F1 LONG ISLAND SPORTS FACILITY

FINAL ENVIRONMENTAL IMPACT STATEMENT

MARCH 2008 (UPDATED MAY 2011)
RESUBMITTED FEBRUARY 2014

F1 Long Island Sports Facility
Final Environmental Impact Statement

Project Location:	Edwards Avenue Calverton Town of Riverhead Suffolk County, NY
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Date of Acceptance by Lead Agency:	
Availability of Document:	This document is a Final Environmental Impact Statement (FEIS). Copies are available for public review and comment at the Town of Riverhead Town Hall and the Riverhead Public Library.

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FOREWORD

In December 2006, the Town of Riverhead certified the Draft Environmental Impact Statement (DEIS) for the F1 Long Island Sports Facility as complete and commenced the public review process of the DEIS. In October 2007, the Town issued a comment letter that summarized all of the Town's comments as well as public comments made on the DEIS. The comments were addressed in a Final Environmental Impact Statement (FEIS) that was submitted by the Applicant to the Town in March 2008. In July 2008, the Town of Riverhead Planning Board made a decision that the FEIS submitted by the Applicant was not complete. The Town then, in August 2008, submitted a letter to the Applicant's representative on why the Planning Board did not accept the FEIS as complete. In response to the August 2008 letter, additional analyses were submitted to the Town by the Applicant to provide additional substantiation to confirm that the studies provided in the March 2008 FEIS specifically regarding noise and traffic, were accurate and complete. The results of the additional analyses undertaken did not lead to any different impacts or conclusions from those provided in the March 2008 FEIS. Based upon discussions with the Town of Riverhead Planning Board in April and May 2011, the Applicant had the FEIS revised to reflect the additional analyses and reproduced 12 copies for resubmission to the Town in May 2011. Due to litigation, the May 2011 FEIS was never submitted to the Town. The Applicant received a letter on February 5, 2014 from Town's representative requesting that the FEIS be resubmitted reflecting comments and changes requested to date. The Applicant is herewith resubmitting the March 2008 FEIS (updated in May 2011 with the inclusion of the additional analyses and responses to the August 2008 letter). Chapter 18, "Response to Comments," of the FEIS includes a description and summary of results of the additional analyses. It is noted that the analyses performed for the March 2008 FEIS and subsequent analyses were based on a 2009 Build Year.[1] Due to the time lapse between submission of the 2008 FEIS and subsequent analyses as well as delays in the environmental review process, the new Build Year is 2015. As such, the results of the analyses that were performed for the 2008 FEIS were examined in May 2011 and, while years have lapsed since these analyses were performed and conditions have changed slightly with the passage of time, the conclusions with regard to potential project impacts have not changed with the passage of time.

The double underlines and strikethrough text note changes between the DEIS and March 2008 FEIS. Any text changes made after the March 2008 FEIS are shown by italics. ✷

[1] The original traffic analysis included in the DEIS assumed a 2007 Build Year.

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A. INTRODUCTION

PROJECT OVERVIEW

The Applicant, F1 Long Island, LLC, is proposing to develop a state-of-the-art go-kart venue to be known as the F1 Long Island Sports Facility (F1 facility or proposed project). The F1 facility would comprise more than one mile of professionally designed go-kart race tracks to serve private corporate outings ~~functions~~ and local residential interests. The facility would include a 14,995 ~~14,800~~ square foot (approximately 21,330 ~~23,000~~ gross square feet) clubhouse that would consist of a restaurant, bar, ~~accommodations for out-sourced catering, a~~ small retail space, office space, club trophy and waiting room, and ~~conference and meeting~~ safety training and briefing rooms for clientele utilizing the go-kart tracks. The ~~only~~ other structures proposed would be a 5,000 square foot maintenance building that would also serve as the greeting post for visitors, and an open structure, approximately 27,540 ~~33,530~~ square feet, used to cover the concession track.

The proposed site is located on Edwards Avenue, about 1,000 feet south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton, Town of Riverhead, Suffolk County, New York. The Suffolk County Tax Map designation for the 12.1 acre site is Section 117, Block 1, Lot 4.2.

After reviewing the proposed site plan, the Town of Riverhead ~~Town~~ Planning Board acting as Lead Agency for the State Environmental Quality Review Act (SEQRA) process, determined that the proposed project has the potential to create significant adverse impacts on the environment and required that an Environmental Impact Statement (EIS) be prepared to address these issues. Accordingly, a draft "Scope of Issues" for the EIS was prepared to identify the issues of concern and provide an outline of how these issues would be analyzed, and the Town of Riverhead held a public scoping meeting on November 16, 2005 to accept public comments on the content of the Draft EIS (DEIS). A final "Scope of Issues" was then prepared to modify the draft "Scope of Issues" as necessary, taking into account these comments, and ultimately adopted by the ~~Town~~ Planning Board.

This Final EIS (FEIS) has been prepared in accordance with Article 8 of the New York State Environmental Conservation Law, the implementing regulations promulgated in 6NYCRR Part 617 by the New York State Department of Environmental Conservation. In accordance with state law and in recognition of the site specific aspects of local concern as identified in the final "Scope of Issues," the proposed project and its alternatives are assessed in this FEIS for their potential and adverse environmental impacts on the site and surrounding community. Impacts attributable to the project are evaluated to determine both their beneficial and adverse consequences.

PROJECT PURPOSE AND NEED

Modeled after its successful sister facilities near Boston, the premise of the F1 facility is to provide a premier ~~off-site corporate conference~~ entertainment center for regional companies as well as a premier recreational/sporting activity for the enjoyment of Long Island families. The corporate aspect of the project would provide a new and fresh venue for ~~meetings, training programs,~~ team building ~~events~~, for fostering improved customer relationships, and for loyalty programs ~~as well as office parties serving~~ for regional based organizations. The general public, while having access to the facility primarily on weekends, would also be able to rent the facility for private parties ~~and events~~.

In November 2005, the Long Island Association, a regional organization that promotes Long Island as an integral place to live, work, and do business, with it publication, *BusinessLI,* identified recent trends of regional corporations to hold innovative corporate ~~meetings and events~~ outings such as go-kart racing, rock climbing, and beach outings. Although this trend has not dominated the corporate affairs market, the idea is catching on and Long Island hotels and entertainment facilities expect these types of activities ~~events~~ to grow as corporations look for ways to improve employee morale; develop creative training techniques to promote teamwork; impress existing and potential clients; and progress overall corporate culture.

Long Island families are also in need of productive outlets to enjoy family and friends. A recurring criticism of the regional Long Island community is the lack of activities and entertainment for children and adults. As Long Island continues to experience intense building pressures, the land to accommodate recreational facilities decreases and thus, the use of motor sports off-road increases. This project would afford those interested in motor sports the opportunity to utilize a legal facility without degrading natural areas. In addition, the recent closing of the Westhampton go-kart track leaves enthusiasts no local venue without having to travel measurable distances. The addition of the F1 facility would also provide children between the ages of 7 and 17 with an exciting activity that would help to promote self confidence, competitive sportsmanship, coordination, self reliance, and a sense of responsibility and accomplishment. In addition, specialty programs such as trading track time for A's on a child's report card are also key features of the F1 facility's premise to support children in healthy and safe activities. Moreover, adults interested in this sport as a hobby or professionally would now have a local place to test and improve their skills.

The go-kart tracks have been professionally designed to utilize the site's natural rolling topography, thus enhancing the racing experience, and would be the first of its kind in the United States and abroad. Typical track designs are flat and lend themselves to repetitive racing. This unique design would attract worldwide attention from experienced drivers as well as from local residents interested in a new form of leisure and entertainment. The design of the track is largely below the existing grade along Edwards Avenue, thus minimizing obtrusive views to the site. If this site were to be developed as a typical industrial or commercial use, the natural topography would have to be significantly altered and drastic changes to the landscape would follow.

By siting the facility in the Town of Riverhead, the proposed project would increase tourism and consumer spending in the region not only at the facility but also at local shopping and lodging venues. It is estimated that the operation of the go-kart facility would generate between about $700,000 and $950,000 in annual sales tax revenues and approximately $84,000 in property tax revenues. Further, it is expected that the facility would employ ~~110 to 125~~ 90 people including

~~50~~ 35 full-time jobs offering employee benefits. The proposed facility would also indirectly result in additional employment opportunities for local tradesmen and service companies.

INVOLVED AGENCIES/PARTIES

Town of Riverhead Planning ~~Town~~ Board

Town of Riverhead Zoning Board of Appeals

Town of Riverhead Conservation Advisory Council

Suffolk County Department of Health Services

DESCRIPTION OF PROPOSED PROJECT

The F1 Long Island Sports Facility would provide the first European F1 style racing accommodations on Long Island and the first go-kart track in the world designed within natural rolling topography. This facility would become a premier destination for novice drivers and experienced track racers. Whether a corporate outing ~~event~~ or a normal weekend customer, anyone planning on racing at the F1 facility would don a flame-proof suit, helmet, neck brace, and gloves; receive a driver briefing; qualify on the concession track to receive a F1 competition license; and finally, race against other drivers and be scored by a computerized system. Each driver would participate in a practice session before the race begins.

The F1 program would include open session driving, training, camps, leagues, and memberships. Specifically, these programs would feature the following components:

- **Arrive and drive:** visitors over 18 with a valid drivers license would rent karts or bring their own karts to race. This activity would be predominant during the weekend hours of operation. Reservations would be accepted, and encouraged, similar to a public golf course;
- **Hourly or daily track rentals:** larger groups of visitors, including corporations and residents, would rent one or more tracks for their exclusive use. The track rentals could include various forms of racing depending on the group size. These races would range from 0.5 to 3 hour endurance races, a mini-grand prix, or open session racing;
- **F1 Driving School/training:** adult clinics would be provided for those interested in learning the basics and for drivers who want to improve their technique and time. In addition, group and private training lessons would be provided;
- **The Junior Racing Academy:** children between the ages of 7 and 17 would be given extensive training in kart racing where graduates would become eligible to participate in the Junior League Racing Series and/or the advanced Junior Racing School;
- **Camps:** daily training for children during the summer months;
- **Leagues:** individuals or small groups would join an existing league or start their own league for regular competitive racing. Interested parties could include companies, clubs, and associations. Leagues would be formed for both adults and children; and
- **The Kart Club:** patrons who own their own karts would purchase a membership to the facility that would afford them such privileges as storage for their karts; access to locker rooms with showers ~~and VIP areas of the clubhouse including private dining and meeting rooms~~; and unlimited driving time.

Corporate outings ~~functions~~ would draw approximately 45 employees/invitees while it is anticipated that the average weekend day would draw approximately 100 customers over the course of the entire day.

The F1 facility is planned to operate on a year-round basis, with the high speed professional track operating on a seasonal basis between mid-March and mid-November~~, until phase 2 when the concession track would be covered~~. Because the high speed track is not covered, this track would likely close during inclement weather. During mild winters, the facility may operate on a periodic basis. While the facility would open at 9 AM, races would commence at 10 AM and stop at dusk. ~~Anyone under the age of 21 is not permitted on-site after 8 PM.~~

PROPOSED PROJECT COMPONENTS

The F1 facility would comprise two separate track~~s~~ types: the covered concession track and the high speed professional track. The covered concession track would primarily be used for corporate outings ~~events~~ and as a qualifying track to receive a F1 competition license and as the track where inexperienced drivers learn and improve their skills. Approximately 90 percent of the go-kart activity would occur on the concession track. ~~This track would provide five configurations with varying lengths that in addition to qualifying would be used to race. The five configurations include four varying lengths from 915 feet to 1,625 feet or a 720 foot oval track.~~ This track would be located toward the southeastern part of the site within the high speed professional track, which would be designed to take advantage of the natural features throughout the entire 12.1-acre site. The high speed professional track would be used only by those who have attended the F1 Driving School and have achieved better than a specified lap time on the concession track. Further, the~~is~~ high speed professional track could be separated into two distinct tracks: the southern section would be used by Kart Club members and the northern portion would be used for arrive and drive customers. Therefore, two races would be allowed to occur simultaneously on this track, in addition to the use of the concession track. Thus, three tracks could be in operation at any one point. Generally, the high speed track would remain separated throughout the operating season, ~~with the exception of one time per year when~~ except if the national go-kart series were ~~is~~ held on-site (see Specialty Races below). ~~This track would provide six configurations. Three of those configurations range in length from 4,640 feet to 5,280 feet. The separated track also has three configurations, where each of the two tracks would range in length from 2,300 to 2,800 feet.~~ All tracks would allow racing in two directions and would be cleaned daily by a machine to remove oil and grease and any remnant rubber from the kart tires.

Each track would be permitted to accommodate 15 karts per race. Therefore, with three separate tracks, there would potentially be up to 45 racers on the track at any one moment. (Since the southern track would be devoted to Kart Club members, the likelihood of 45 karts racing at one time is minimal and would seldom occur.) A race entails 15 laps (usually 1 practice lap and 14 race laps). Each race would range in time from about 15 minutes on the concession track and between 20 minutes and 1 hour on the main track depending on who is racing. The races would be scored by a state-of-the-art computerized system. Spectators would be able to view the races from masonry bleachers that would be constructed at the southeastern and southwestern edges of the site and would each accommodate approximately 30 viewers, and spectators would be able to view the races on television screens within the clubhouse.

Three distinct types of karts would be permitted at the F1 facility; concession karts, club karts, and competition karts. The concession karts would comprise about 90 percent of the facility's

business and are the karts generally rented by the public. These karts have 4 stroke, 6.5 horsepower (HP) Honda engines. The size of the kart would vary depending on the user. Club karts are those sold to members of the Kart Club. These karts also have 4 stroke Honda engines ranging from 9 to 13 HP. The competition karts would be privately owned and would largely be used on weekend days and are only permitted on the arrive and drive track (i.e., the northern track). The engines range from 4 to 33 HP. All privately owned karts would have to meet the F1 facility specs including all safety equipment required by the F1 facility and must use F1 approved mufflers. These mufflers are for sale or rent at the facility. Outlaw karts, karts without mufflers or without a F1 approved muffler, are not permitted at the F1 facility. The average speed for the concession karts ranges from 20 to 34 miles per hour (mph) while the average speed for the club and competition karts is over 50 mph. All karts owned by the F1 facility would have electronically controlled governors that would be handled by the in-house chief safety instructors to ensure maximum safety is achieved when the karts are operating on the tracks.

As mentioned, the structures proposed at the site include a clubhouse, maintenance/greeting building, and open structure to cover the concession track. See Figure S-1 for the proposed site plan. Perspective views, elevations, and floor plans of the clubhouse and concession track cover are provided as Figures S-2 to S-10. The clubhouse, an approximately 21,330 ~~23,000~~ gross square foot building, would comprise three floors and would incorporate existing topography, with portions of the building below grade. ~~, two above grade with the lower level constructed to incorporate the existing topography. This would allow for three sides of the lower level to be above grade with the front of the building below grade.~~ The maximum height of this structure would be ~~approximately~~ 35 ~~55~~ feet ~~with a mean height of 49 feet~~. ~~Figures 1-4 through 1-6 provide a visual depiction of the proposed clubhouse from the front, rear, and sides, respectively. As shown in Figure 1-6,~~ The clubhouse would be connected to the covered concession track by an overpass/bridge ~~enclosed corridor on the first level~~. ~~Provided as Figures 1-7 through 1-9 are the floor plans for each of the three levels proposed within the clubhouse.~~ The building would be located towards the center of site, northwest of the concession track. The clubhouse would include a motor sports themed restaurant with a bar primarily for weekend use by the public; a small retail store for apparel and kart parts such as tires and mufflers; ~~accommodations for out-sourced catering for corporate use principally during the work week;~~ office space; safety training and briefing rooms; a club trophy and waiting room ~~conference/meeting rooms for members and corporate functions~~; locker and shower rooms for members; public restrooms; and storage for up to 236 ~~500~~ karts. The clubhouse would be the hub for social interaction among racers ~~and the state-of-the-art meeting and conference center would be an essential component for learning and skill development~~. Because F1 Long Island Sports Facility has zero tolerance for drugs and alcohol, most race participants would be given a breathalyzer test before racing and then given a wristband to signify that they passed the breathalyzer test. If the participants patronize the bar, the wristband is cut and removed and the participant is no longer allowed to race.

The maintenance building, to be located at the northernmost border of the site at the main entrance, would include the Race Operations Center, where members, guests, and visitors would be greeted. Kart storage would also be provided in this building, as would maintenance of the karts, repairs, parts, and track services. This structure would be approximately 24 feet high. The maintenance building would also provide space for the track operation offices and employee lunchroom ~~lounge~~. A perspective view, elevations, and floor plan of the maintenance building are provided as Figures S-11 to S-13. The facility's ~~main~~ parking area would be located in this area of the site ~~and an additional parking area would be provided within the concession track~~.

3.17.08

F1 Long Island Sports Facility

Proposed Site Plan
Figure S-1

3.25.08

Proposed Clubhouse and Concession Track
Perspective View from North
Figure S-2

F1 Long Island Sports Facility

3.25.08

Proposed Clubhouse and Concession Track
Perspective View from South
Figure S-3

FRONT ELEVATION

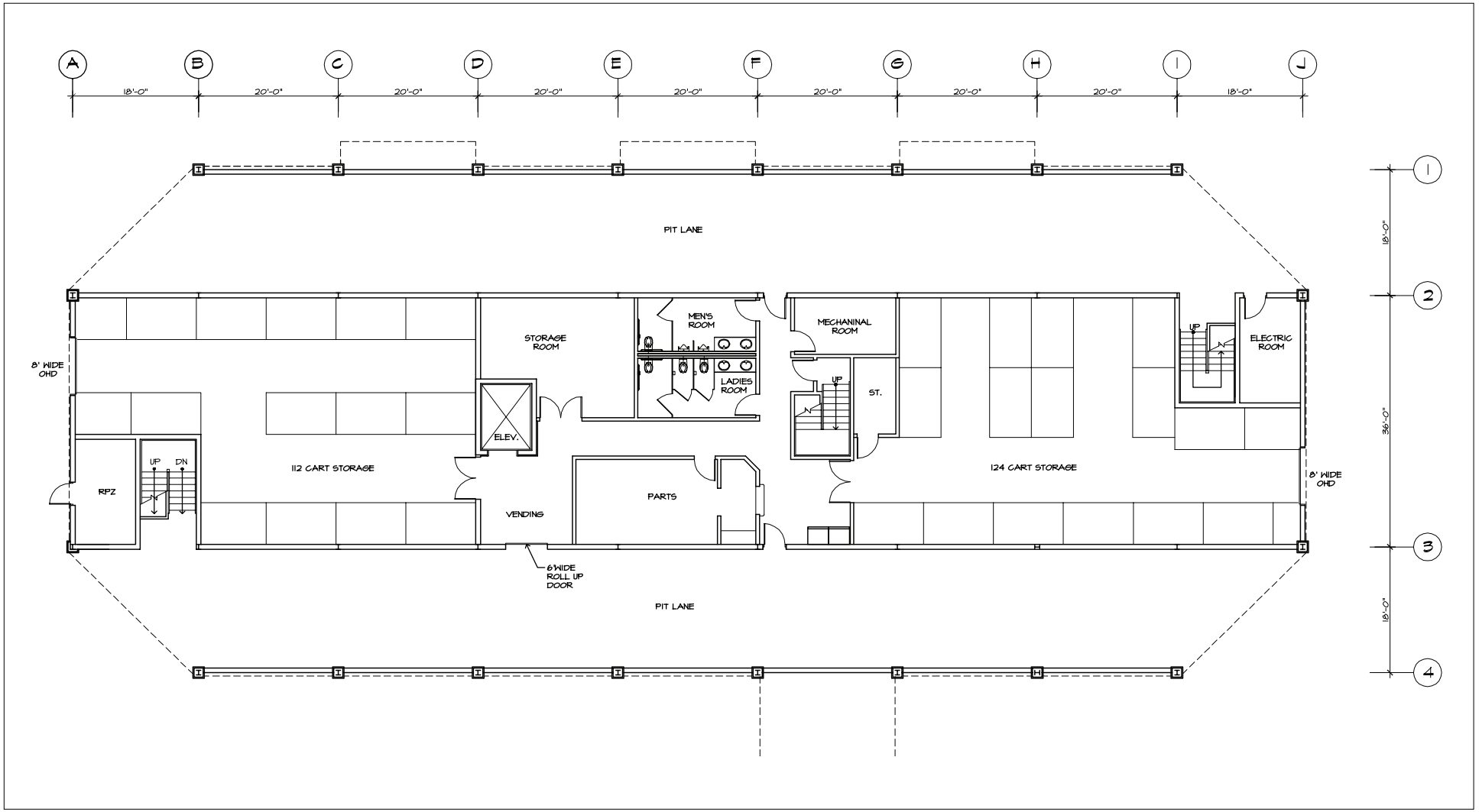
SIDE ELEVATION

Proposed Clubhouse and Concession Track
Front and Side Elevations
Figure S-4

REAR ELEVATION

SIDE ELEVATION

Proposed Clubhouse and Concession Track
Rear and Side Elevations
Figure S-5

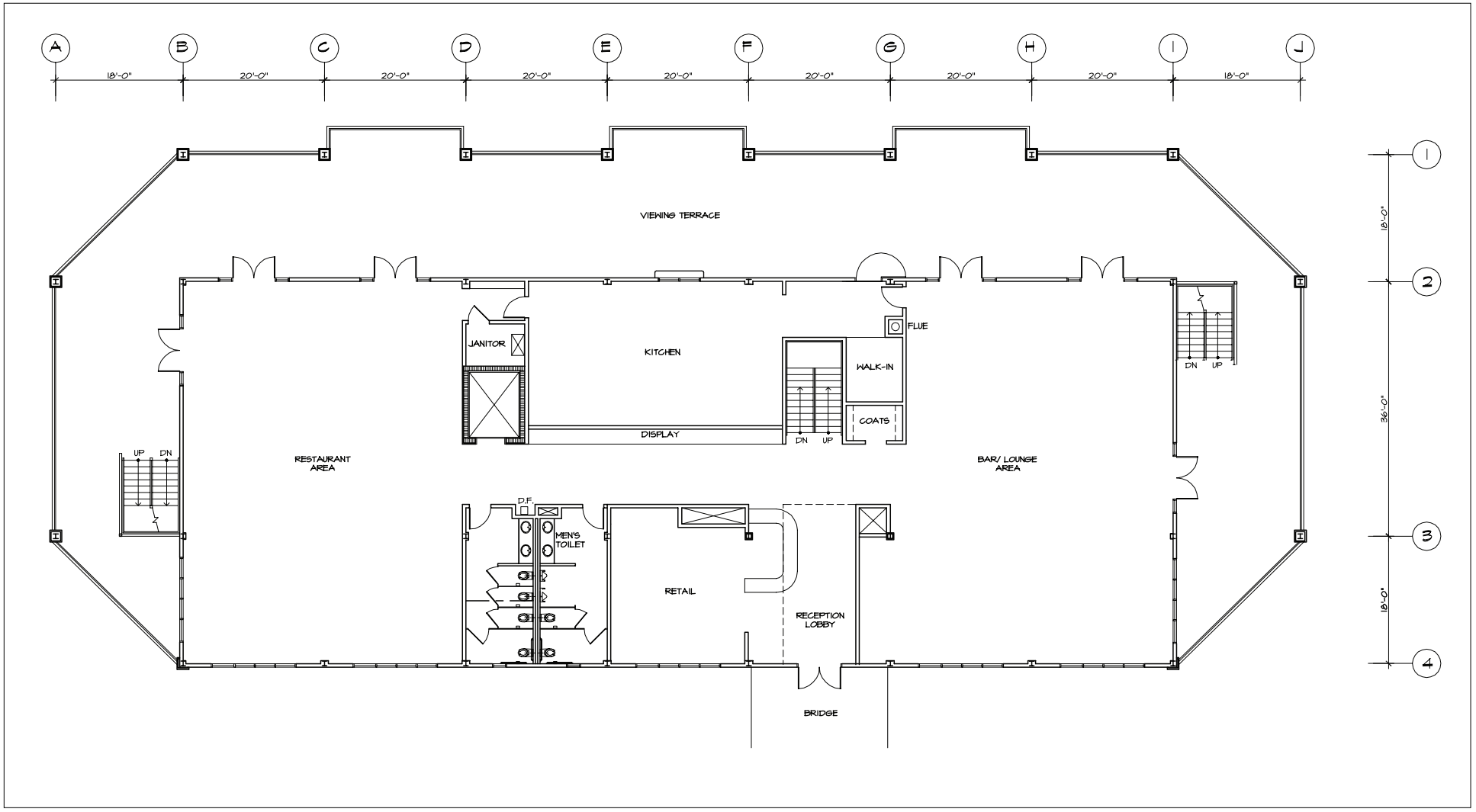


0 20 FEET

SCALE

Proposed Clubhouse
Track Level Floor Plan
Figure S-6

3.25.08



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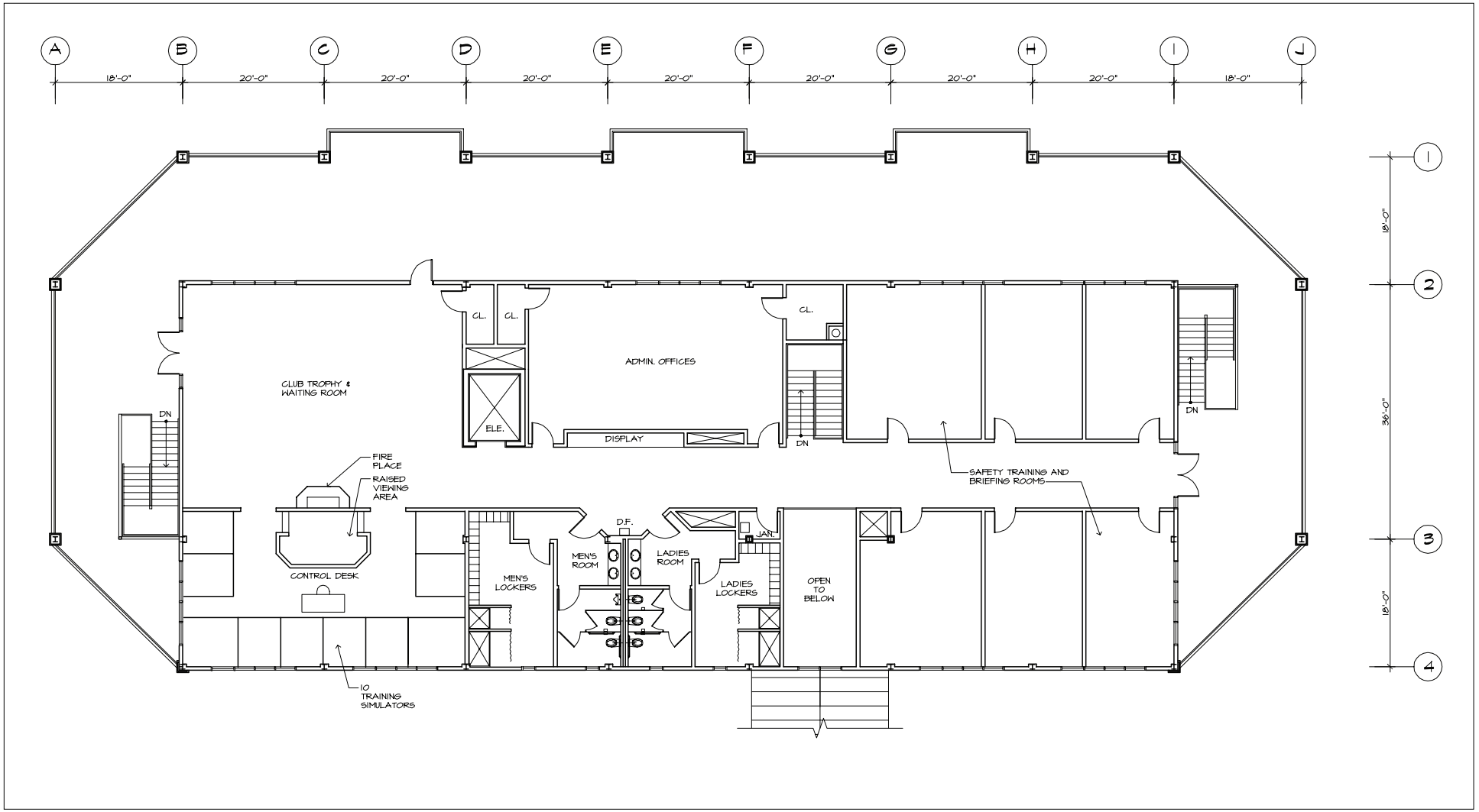
SCALE

Proposed Clubhouse
Main Level Floor Plan
Figure S-7



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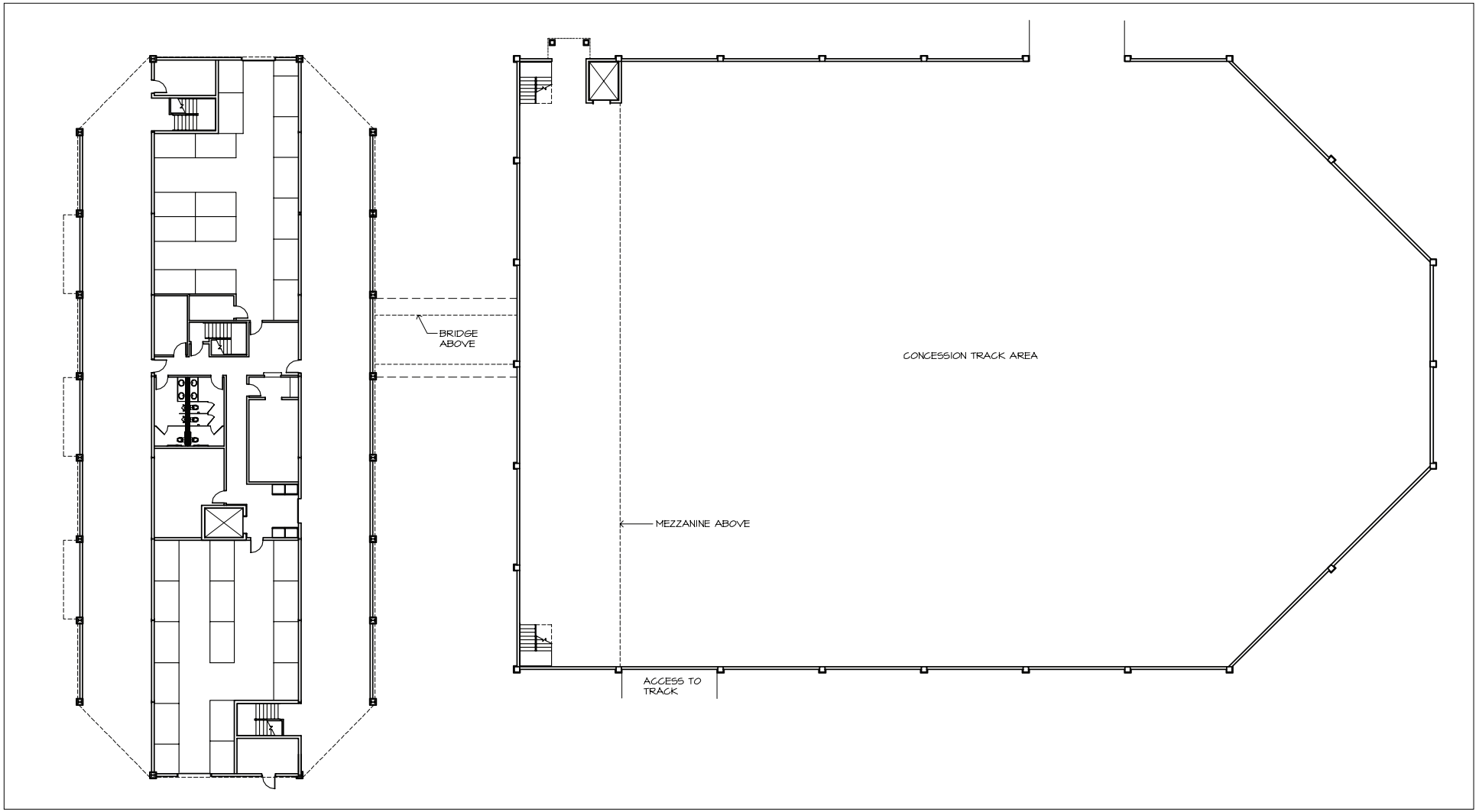
SCALE

Proposed Clubhouse
Upper Level Floor Plan
Figure S-8

3.25.08

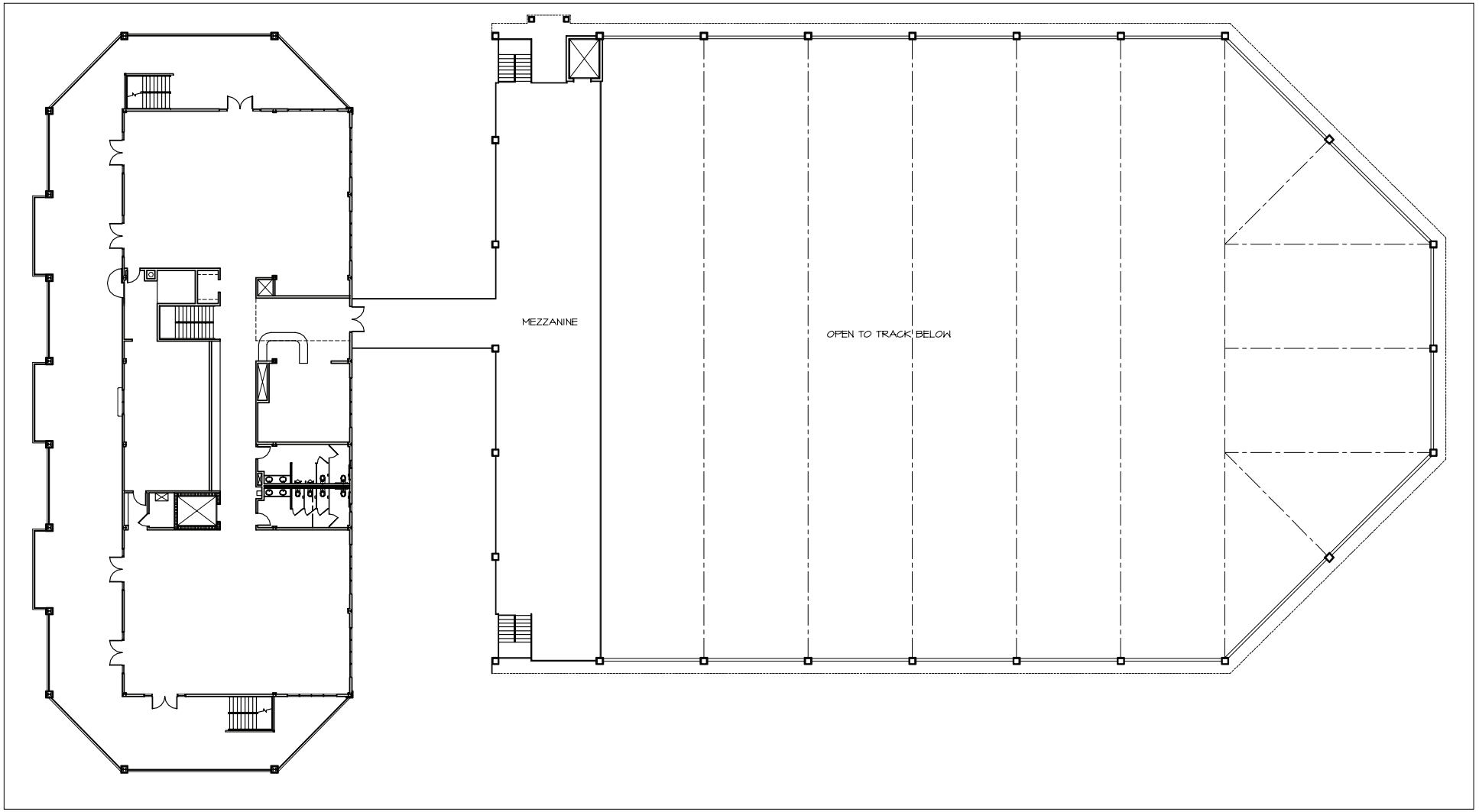


0 40 FEET
SCALE

Proposed Clubhouse and Concession Track
Combined Track Level Floor Plan
Figure S-9

F1 Long Island Sports Facility

3.25.08



0 40 FEET

SCALE

Proposed Clubhouse and Concession Track
Combined Main Level Floor Plan
Figure S-10

Proposed Maintenance Building
Perspective View from South
Figure S-11

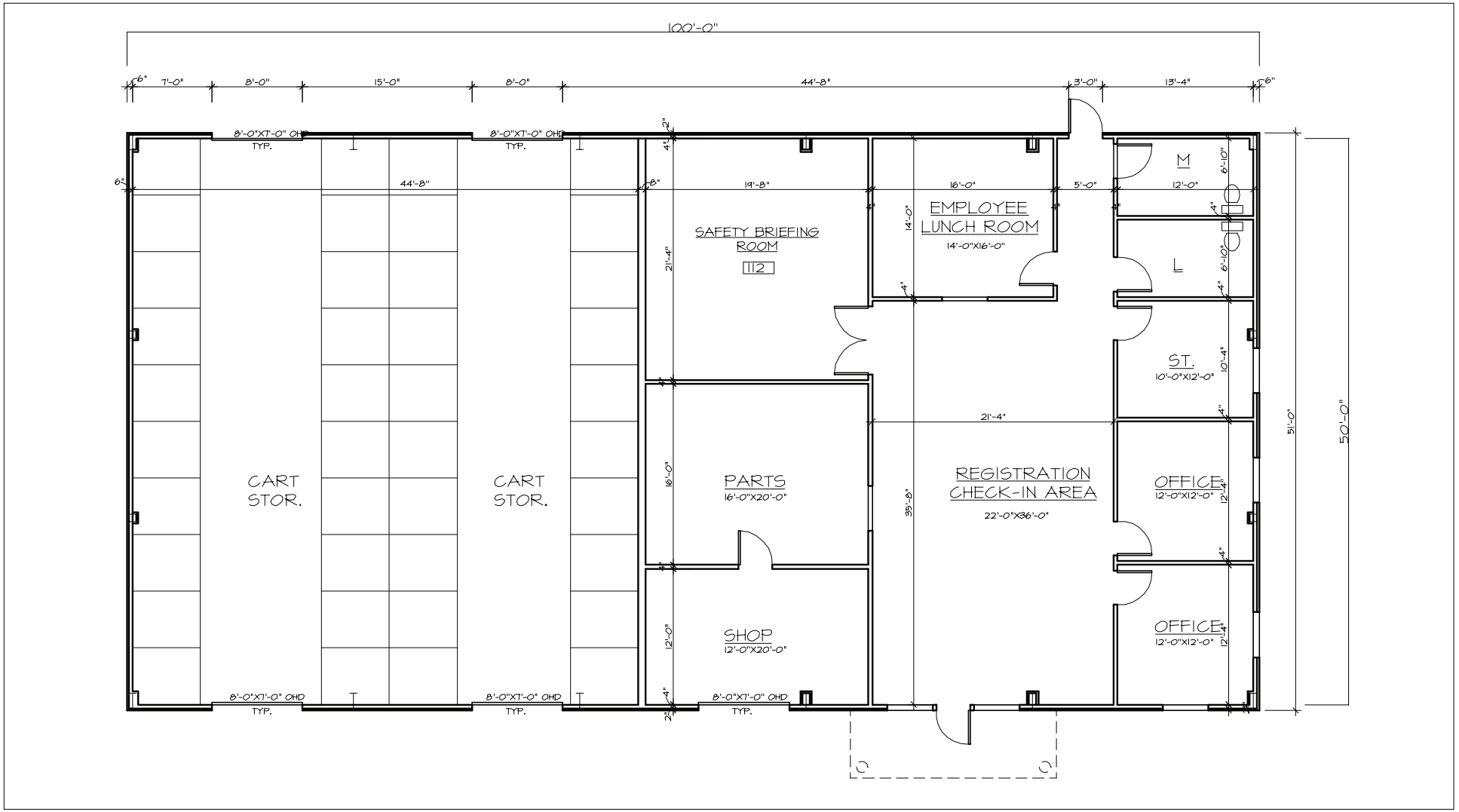
SIDE ELEVATION - SOUTH

FRONT ELEVATION - EAST

SIDE ELEVATION - NORTH

REAR ELEVATION - WEST

Proposed Maintenance Building Elevations
Figure S-12



Proposed Maintenance Building Floor Plan

Figure S-13

~~The parking area within the concession track would only be utilized when the national race is held at the F1 facility or when the track is privately rented. (See Specialty Races below for details on the national races.)~~ The main entrance to the site would be provided along Edwards Avenue where the ~~main~~ parking area would be located. A second entrance located north of the maintenance building would be used solely as a service entrance for deliveries~~,~~ and staff~~, and large trailers expected during the national go-kart event~~.

Both the high speed and concession track pit lanes would be surfaced in concrete. The high speed track, concession track, and parking lot would be surfaced in asphalt. Pervious pavers would be used for proposed walkways.

The open structure is proposed to cover the concession track and would allow kart operations on the concession track regardless of weather conditions. This structure, designed as an open building with a roof and supporting poles, would be approximately 27,540 ~~35,530~~ square feet and ~~range in height from~~ 35 ~~to 51~~ feet above grade. Similar to the clubhouse, the cover over the concession track would be constructed to incorporate the existing topography and therefore minimize the appearance of the structure.

In addition, the proposed project would feature three sound barriers varying in height from about 7 to 25 feet. The longest barrier would be located more than 30 feet from the southern site boundary and wrap around the southern corners heading north for a short duration. This barrier would range in height from about 7 to 25 feet due to the natural changes in elevation. The tallest part of this barrier would be located towards the center-edge of the site. The second barrier would be a permanent retaining wall that extends west from the clubhouse and would follow the southern portion of the northern track. This barrier would be about 10 feet high. Because these barriers would be located beyond the required 30 foot setback from the front and side site boundaries, they are considered a structure as defined by the Town Code. The third barrier would be moveable and only used when competition karts are utilized on the northern track. This barrier would range in height from 7 to 10 feet and would follow the southern portion of the northern track, east of the clubhouse.

Another feature of this unique project is the presence of a manmade pond that was formerly used for irrigation. This pond, located at the western border of the site just north of the site's center, is proposed to be preserved and would remain undisturbed ~~expanded and a pump house would provide local irrigation at site plantings~~. A dedicated well is proposed as an irrigation source for on-site plantings. The well would be located to the south of the pond and would be setback more than 100 feet from the pond.

Native landscaping, where feasible, would remain within the site and primarily along the southern and western borders. Planting of various trees and shrubs would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site. Existing natural and wooded areas would make up 15.6 percent of the total lot area, and landscaped areas would make up 34.2 percent of the total lot area.

The F1 Long Island Sports Facility would become the leading innovative and upscale ~~meeting,~~ entertainment and recreational facility for the local community, regional organizations, and tourists. This facility, fueled by corporate demand for fresh recreational ~~event~~ alternatives and the recent popularity of motor sports, would also afford the local youth and their parents a unique opportunity to reinforce team work, responsibility, focus and judgment skills gained from motor sports; and provide a destination for family fun. The proposed project is designed to

accomplish these goals, resulting in a project that is compatible with the site, its physical characteristics, its location, and the surrounding area.

SPECIALTY RACES

As currently proposed, the project does not include any special events. If such events are contemplated in the future, pursuant to Chapter 90, Special Events, of the Town of Riverhead Town Code, F1 would submit an application for approval of ~~any proposed annual~~ the events to ensure that issues related to public health, parking, traffic, and safety are addressed. It is anticipated that the F1 facility ~~would~~ may hold one national event per year that would draw between 400 and 500 drivers and spectators. These events would commence at 9 AM and end at dusk. The races would take place over the entire high speed track and would be continuous throughout the day. The concession track would be closed during these events ~~and the inside parking area would be utilized~~. Due to the large turnout for these events, parking overflow would be accommodated at the adjacent property immediately north of the project site. The applicant has signed a long-term lease with the owner of this property to utilize 1 acre of land that abuts F1 for overflow and staff parking.

A~~nother~~ scheduled race proposed to be incorporated into F1 facility's program is the monthly club event to take place on Sundays for Kart Club members. This event would include several races at varying levels where the drivers would range in age from 7 years old to senior drivers (over 16 years of age).

DISCRETIONARY ACTIONS

The project is proposed to be located on premises zoned Industrial C (IC). The F1 project, a professional go-kart facility, is an allowable use in the IC district. The intention of this district, according to Chapter 108 of the Town of Riverhead Code, is to allow and encourage commercial recreational businesses and provide for light industrial uses within the area between Enterprise Park (about 1 mile west of the project site) and the terminus of the Long Island Expressway (LIE). Pursuant to §108-278 of the Town of Riverhead Code, permitted uses include offices, warehouses, greenhouses, wholesale businesses, laboratories, vocational schools, golf courses, parks and playgrounds, equestrian facilities, commercial sports and recreation facilities, and dog and horse training and boarding facilities. Further, accessory uses are defined as "customarily incidental" to permitted uses which are allowed in the IC district. Because the accessory uses are not specifically identified, the Town of Riverhead Zoning Board of Appeals (ZBA) was charged with determining whether retail, restaurant, meeting rooms, bar, lockers and kart maintenance and storage are "customarily incidental" to a professional go-kart facility.

The proposed application was designed to comply with the lot, yard, and bulk requirements of the IC district, except that F1 requested a height variance from the ZBA for the proposed clubhouse and open-sided structure to be utilized as a cover to the concession track, pursuant to Article XVII of the Town of Riverhead Zoning Ordinance.

On September 14, 2006, the ZBA issued a four page determination upon the appeal of F1 (Appeal Number 06-53). The ZBA determined that the proposed facility is a sports recreational facility in accordance with the Town Code and therefore is an allowed use in the IC district, and further determined the following:

- The proposed accessory uses of kart maintenance and storage, food services (bar), lockers and limited retail sales are customary and incidental accessory uses to a kart racing facility;

- The proposed accessory uses of meeting and conference rooms are not customary and incidental accessory uses to a kart racing facility;
- Based on the building height definition in the Town Code and the definition of mean ground level, the proposed amended alternative plan for the height of the clubhouse and concession track of 35 feet is granted in support of the design and safety of kart participants' access and having a distinct point of access for the spectators;
- The building height variance is minimal and will not cause an undesirable change in the character of the neighborhood or a detriment to nearby properties, because other commercial businesses have these building heights in this community; and
- Based upon this Board's review of the environmental assessment form, the recommendation of the Planning Department, and its own analysis, it has been determined that the application is a Type II and it has no environmental significance.

F1 agreed to the terms and conditions set forth in the ZBA determination dated September 14, 2006, and the project design has been changed in accordance with this ruling.

~~Pursuant to Article XVII of the Chapter 108 of the Town of Riverhead Zoning Ordinance, the proposed F1 Long Island Sports Facility would require a variance from the Town's Zoning Board of Appeals. The proposed clubhouse would be designed with a maximum height of approximately 55 feet above grade while the permitted height within the designated zone where the project is proposed is 30 feet. The proposed open structure to be utilized as a cover to the concession track would maintain a maximum height of 51 feet above grade. Thus, the proposed project would require the issuance of a height variance of 25 and 21 feet, respectively. However, the clubhouse would be designed to incorporate the existing grade; therefore, the roof of this structure would appear, from Edwards Avenue, to be at the same height as the 24 foot maintenance building. Moreover, due to the natural grade changes at the project site, the roof of the concession track cover would actually be only 10 feet above the grade along Edwards Avenue.~~

~~In addition to this approval,~~ An official site plan of the proposed project must be authorized by the Planning ~~Town~~ Board. All site plans would conform to the rules and regulations set forth in Chapter 108, Article XXVI of the Town of Riverhead Zoning Ordinance.

PROJECT CONSTRUCTION

Construction of the proposed project would occur in two phases: phase 1 would include the tracks, cover for the concession track, maintenance building, sound barriers, and parking areas~~, and pond expansion~~, and phase 2 would include construction of the clubhouse~~ and the cover for the concession track~~. Following receipt of site plan approval, it is estimated that construction of phase 1 would take approximately four months and construction of phase 2 would take approximately nine months. Phase 2 would not be constructed until the second season of operation. As currently planned, construction would commence in *2011* and the proposed facility would be operational in *2012* ~~phase 1 of the new facility would open in summer 2006 and phase 2 would open at the beginning of the 2007 season~~. Prior to construction of the clubhouse, the public would have access to bathroom facilities in the maintenance building, where the staff meeting room would also function as a safety training and briefing room. Catered food would be served under the covered concession track during this same period, consistent with the ZBA determination.

Construction of the project is estimated to create 35 person-years of direct construction employment. (A person-year is the equivalent of one person working full-time for a year.) In addition to direct employment, construction of the project would create an estimated 32 additional jobs off-site, bringing total employment to 67 person-years. Direct wages and salaries from constructing the project are estimated at $1.78 million. Including off-site effects, total direct and indirect wages and salaries from constructing the project are estimated at $3.12 million. In the broader New York State economy, total employment from the construction of the proposed project would be 69 person-years and total direct and indirect wages and salaries from constructing the project are estimated at $3.22 million.

Construction of the project is estimated to create approximately $462,400 in non-property related taxes for Suffolk County, New York State, and the Metropolitan Transportation Authority including sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes.

Construction impacts would be minimized by implementing erosion, sediment, and fugitive dust control measures, including hay bales, silt fence(s), prompt post construction replanting/revegetation, watering down construction areas, and other generally accepted construction practices identified in the *New York Guidelines for Urban Erosion and Sediment Control* ~~determined to be appropriate through the site plan review process~~.

B. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

LAND USE, ZONING, AND PUBLIC POLICY

LAND USE

The development of the proposed go-kart facility would introduce a new use and level of activity that would change the project site from a vacant use with wooded and cleared areas used for illegal dumping to an active recreational facility. F1 Long Island Sports Facility would consist of go-kart tracks; a clubhouse with a motor sports-themed restaurant including a bar, ~~accommodations for out-sourced catering,~~ office space, safety training and briefing rooms, a club trophy and waiting room ~~meeting and conference rooms~~, a small retail use, and kart storage; a maintenance building utilized for repairs and track services and employee offices and lunchroom ~~lounge~~; and an open structure used to cover the concession track. In addition, the proposed project would feature three sound barriers varying in height from about 7 to 25 feet. The longest barrier would be located more than 30 feet from the southern site boundary and wrap around the southern corners heading north for a short duration. This barrier would range in height from about 7 to 25 feet due to the natural changes in elevation. The tallest part of this barrier would be located towards the center-edge of the site. The second barrier would be a permanent retaining wall that extends west from the clubhouse and would follow the southern portion of the northern track. This barrier would be about 10 feet high. Because these barriers would be located beyond the required 30 foot setback from the front and side site boundary, they are considered a structure as defined by the Town Code. The third barrier would be moveable and only used when competition karts are utilized on the northern track. This barrier would range in height from 7 to 10 feet and would follow the southern portion of the northern track, east of the clubhouse.

The change in land use is consistent with the goals of the Town as set forth by the establishment of the IC zone, which permits and encourages active industrial and recreational uses in this

portion of the Town. The prohibition of residential uses within this area of the Town is indicative of the Town's intention to guide land use from residential to commercial/industrial within this section of Calverton. Thus, the change in land use from vacant to commercial recreation is not in conflict with local land use trends nor the residences found in the vicinity of the project, which have coexisted with commercial and agricultural uses for decades. Further, the proposed go-kart facility would not conflict with the surrounding commercial uses along Edwards Avenue nor the agricultural uses that dominate the ½-mile study area, including the Gibbs horse farm located adjacent to the south of the site. The proposed project, although different in function from the horse farm, is considered compatible because both uses are permitted and serve the purpose to provide recreation for the community. As noted in Chapter 9, "Noise," the operation of the proposed facility would not exceed the noise threshold permitted by the Town Code and would not be considered an obtrusive sound. Moreover, the presence of a go-kart facility would not significantly increase the ambient noise levels at the adjacent properties and therefore would not negatively impact the surrounding uses. Thus, the proposed project would not pose a significant adverse impact on land use at the project site or within the surrounding area.

ZONING

Consistent with the intention of the IC district, the proposed project would provide a commercial recreation attraction for residents and tourists in this area of the Town. Consistent with similar go-kart and commercial recreation facilities throughout the United States and Europe, the F1 facility would incorporate a clubhouse that comprises a restaurant~~, conference rooms,~~ and retail space. The closest example of a commercial recreation use in the project vicinity is Calverton Links Golf Course. Similar to F1, this venue maintains a ~~catering facility,~~ restaurant, bar, locker room, bathrooms, and retail space. Further, numerous go-kart venues throughout the world operate one or more of the uses proposed at F1. Based on similar facilities, and consistent with local commercial recreation facilities (e.g. Calverton Links Golf Course), the proposed clubhouse with restaurant~~, conference,~~ and retail space would serve as an accessory use to the go-kart facility that is "customarily incidental" and is therefore also a permitted use.

The Town of Riverhead ZBA's determination upon the appeal of F1 is described above. As noted above, the ZBA determined that the proposed facility is a sports recreational facility in accordance with the Town Code and therefore is an allowed use in the IC district, and further determined that the proposed accessory uses of kart maintenance and storage, food services (bar), lockers and limited retail sales are customary and incidental accessory uses to a kart racing facility.

The proposed project was designed to comply with the lot, yard, ~~height,~~ and bulk requirements of the IC district. ~~However, the proposed clubhouse would not conform to the height requirement and therefore would need~~ F1 has obtained a 5-foot height variance from the ZBA pursuant to Article XVII of the Town of Riverhead Zoning Ordinance. The proposed clubhouse would be designed with a maximum height of approximately 35 ~~55~~ feet above grade while the permitted height within the designated zone where the project is proposed is 30 feet. The proposed open structure to be utilized as a cover to the concession track would also maintain a maximum height of 35 ~~51~~ feet above grade. ~~Thus, the proposed project would require the issuance of a height variance of 25 and 21 feet, respectively.~~ However, since the clubhouse would be designed to incorporate the existing grade, the roof of this structure would appear, from Edwards Avenue, to be at ~~the same~~ a similar height as the approximately 24 foot maintenance building. Moreover, due to the natural grade changes at the project site, the roof of

the concession track cover would ~~actually be 10 feet above~~ not be significantly higher than the grade along Edwards Avenue. Therefore, the obtrusive views of the clubhouse and covered concession track from Edwards Avenue and surrounding properties would be minimized (see Chapter 6, "Visual Quality").

~~In addition to this approval, a~~ An official site plan of the proposed project must be authorized by the Planning ~~Town~~ Board. All site plans would conform to the rules and regulations set forth in Chapter 108, Article XXVI of the Town of Riverhead Zoning Ordinance.

The go-kart facility would maintain more pervious surfaces than required by the Town Code. Thus, the proposed project meets the open space area requirement equal to at least 20 percent of the lot area. In fact, nearly half of the site would be dedicated to open space including existing natural areas. Existing natural and wooded areas would make up 15.6 percent of the lot area, and landscaped areas would make up 34.2 percent of the lot area. These areas ~~coupled with the irrigation pond~~ would also help to provide on-site stormwater management. Consistent with the purpose and intent of the IC district, the ~~main~~ parking area and the entire project site have been designed to accommodate landscaped areas to provide a screen along Edwards Avenue as well as a buffer to surrounding uses, such as the horse farm to "to help protect the rural appearance and minimize views of development from the expressway and arterial roads." Since the proposed project would not require any changes to the existing zoning and it is a use encouraged by the Comprehensive Plan (adopted November 2003), no significant adverse impacts are expected from the proposed project.

PUBLIC POLICY

The addition of the proposed project to the hamlet of Calverton is consistent with the projected trends and needs identified in the Town's Comprehensive Plan. The Town's desire to promote and enhance tourism is signified by the adoption and siting of the IC zone within this area of the Town. The Town has noted that successful tourism development is accomplished through the establishment of attractions and destinations that people seek based on current local, regional and national trends. The proposed facility was modeled after its successful sister facilities (F1 Boston and F1 Outdoors) near Boston. Further, the corporate culture is now heading in a direction where alternative forms of entertainment for both employees and clients are profitable and desirable. Lastly, the closing of the Westhampton go-kart track and the recent surge in motor sports enthusiasts all work to ensure the success and need of the proposed facility.

The proposed project has met the relative goals and policies that were identified in the Comprehensive Plan and therefore is in compliance with the Town's future goals for this site and surrounding area.

SOILS AND TOPOGRAPHY

The most prevalent soils within the boundaries of the project site slated for development primarily have moderate to severe limitations with regard to the construction of roads and parking lots, up to three-story structures, and sanitary sewage disposal fields. Moderate and severe soil limitations as identified by the *Soil Survey of Suffolk County* do not in themselves create significant adverse environmental impacts, but may require additional site preparation and engineering and cause a need for increased maintenance requirements. It is expected that good engineering practices, Best Management Practices (BMP's), and erosion control measures instituted during construction would overcome any soil suitability limitations. ~~These~~ Slope limitations would be an issue of concern for typical commercial and industrial development as

even greater grading through cut and fill operations would be required. This project is unique in that it was designed to utilize the natural topographic features to the maximum extent practicable. About 55,500 ~~53,000~~ cubic yards would be cut and 3,800 ~~10,000~~ cubic yards would be filled with an increment of approximately 51,700 ~~43,000~~ cubic yards removed from the site.

The proposed project would utilize the changes in elevations as a unique feature to enhance the racing experience and become the first facility world-wide to develop a go-kart track with these incomparable natural features. Further, on-site slope limitations identified in the *Soil Survey of Suffolk County* relate to typical county or town roads or subdivisions where severe valleys and peaks are not deemed superior (or typical for Long Island) roadway conditions. ~~The conference center would also be constructed utilizing~~ The site's existing topography would be utilized, with limited disturbance to the existing slopes. Thus, identified slope limitations would not be an engineering constraint with regard to construction of the proposed project. In general, the changes to soils and topography would not be considered significant especially since the project is designed to utilize and enhance these natural features. In fact, almost 50 ~~about 47~~ percent of the site would be dedicated open space ~~including natural areas~~. Existing natural areas would make up 15.6 percent of the site, with 34.2 percent comprised of landscaped areas.

Almost 80 percent of the site has moderate to severe soil erosion potential due to the steep slopes. To minimize erosion, the project would adhere to the *New York Guidelines for Urban Erosion and Sediment Control*, U.S. Department of Agriculture—Natural Resources Conservation Service (April 1997), and the BMPs developed by the New York State Department of Environmental Conservation (DEC) as described in *Reducing Impacts of Stormwater Runoff from New Development* (1993). During and after construction, erosion and sediment control measures would be implemented to stabilize exposed soil and to provide a final cover of vegetation on post-construction slopes. Prior to the onset of construction activities, a wide range of temporary erosion and sediment control measures would be utilized to ensure soil stabilization and protection of exposed areas throughout the construction period to the maximum extent practicable. An Erosion Control Plan has been ~~would be~~ prepared for the site in accordance with the DEC Phase II requirements. This Erosion Control Plan is ~~would be~~ part of a Storm Water Pollution Prevention Plan required by the DEC State Pollution Discharge Elimination System General Permit (GP-02-01).

The Erosion Control Plan ~~would recommend~~ proposes installation of a silt fence ~~be installed~~ at the perimeter of all localized construction activities in a necessary effort to minimize/prevent sediment from leaving the project area. The drainage facilities proposed for the project would be installed in lieu of temporary structures throughout the project site. This can be accomplished in all areas of the track. Hay bale barriers ~~would be provided~~ are proposed to trap sediment in stormwater runoff from impervious surfaces at all grated inlet structures. Establishment of future groundcover would be implemented as rapidly as is practicable to stabilize and minimize loss of soils after the bulk of the site grading, and excavation activities have been completed. Additional sediment barriers or temporary diversion dikes may be utilized as required by field conditions during construction to ensure stormwater runoff is contained on-site. In all practicality, DEC BMPs for erosion controls would be followed. A construction entrance would be installed and maintained to prevent soil and loose debris from being tracked onto local roads.

All erosion and sediment controls depicted on the Erosion Control Plan would be installed prior to construction activities and would remain until final stabilization as defined in Part III.D.4 of the General Permit GP-02-01, unless specifically noted.

COMMUNITY AND EMERGENCY SERVICES

EMERGENCY SERVICES

The proposed recreational facility would have its own security personnel but could create an additional demand for local emergency services.

Based on correspondence with the Riverhead Town Volunteer Ambulance Corps (RTVAC), it is normal for any development to result in an increase in the amount of calls to ambulance services. RTVAC notes that a greater amount of patients would be expected from a sports facility and any venue where alcohol is served. It is noted that the F1 Long Island Sports Facility would have a zero tolerance policy for drug and alcohol use while racing. Most race participants would be given a breathalyzer test before racing and then given a wristband to signify that they passed the breathalyzer test. If the participants patronize the bar, the wristband is cut and removed and the participant is no longer able to race. This strict zero tolerance policy would help to minimize emergency calls from the go-kart facility to RTVAC. This system has worked without incident at F1 Boston.

The only issue raised by correspondence with the Town Police Department with the development of the proposed F1 facility would be the potential increase of traffic at NYS Route 25 and Edwards Avenue. However, based on the traffic analysis for the proposed project, several approaches to this intersection would experience significant traffic impacts both with and without the proposed project. Thus, this intersection would be highly congested in the future without the proposed project. It is noted that, in most cases, the actual incremental traffic associated with the proposed project would be relatively small. Moreover, several roadway improvements were proposed as part of the No Build projects planned in the proposed project vicinity (including providing exclusive left-turn lanes along with minor restriping at the four approaches to the intersection). With these improvements, all of the impacted approaches would operate with better service conditions than under the No Build conditions.

No response letter was received by the Riverhead Fire Department ~~at the time this DEIS was being prepared~~. Based on the zoning and permitted uses at the project site, it is expected that these local emergency services have sufficient capacity to accommodate the proposed project. Therefore, no potentially significant adverse impacts to emergency services are anticipated with the proposed project. ~~If letters are received from these agencies, they will be included and addressed in the Final EIS (FEIS).~~

COMMUNITY FACILITIES

As a recreational facility, the proposed project would not generate new residents. Workers and visitors for the proposed go-kart facility would not significantly impact any community facility within the ½-mile study area. In addition, the proposed project would not affect the ability of any community facility to serve the area. Therefore, no potentially significant adverse impacts to community facilities are expected to result from the proposed go-kart facility. In fact, the proposed go-kart facility would create an alternative recreational resource for the Town's residents.

SOCIOECONOMIC CONDITIONS

EMPLOYMENT AND TAX REVENUE

During Construction

The construction and development of the proposed go-kart facility would result in the investment of significant private capital into the local and regional economy. To estimate the effect of constructing the proposed project on the County and State economy, the Regional Input-Output Modeling System (RIMS II), developed by the U.S. Department of Commerce, Bureau of Economic Analysis was used. The proposed project's estimated effects on the local economy in terms of employment, wages and salaries, and tax revenues generated during the construction period were also based on the direct construction value of the project's improvements. The direct construction value includes hard costs (actual construction), as well as design, engineering, legal, and related development costs. Construction costs are expected to equal approximately $5.6 million.

Construction of the project is estimated to create 35 person-years of direct construction employment. (A person-year is the equivalent of one person working full-time for a year.) In addition to direct employment, construction of the project would create an estimated 32 additional jobs off-site in Suffolk County, bringing the total additional employment in the County to 67 person-years. In the broader state economy, total employment from construction of the project is estimated at 69 person-years.

Direct wages and salaries from constructing the project are estimated at $1.78 million (all figures in 2006 dollars). Including off-site effects, total direct and indirect wages and salaries from constructing the project are estimated at $3.12 million. In the broader New York State economy, total direct and indirect wages and salaries from constructing the project are estimated at $3.22 million.

Constructing the project would also create tax revenues for Suffolk County, the Metropolitan Transportation Authority (MTA), and New York State. These taxes include sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes. Construction of the project is estimated to create approximately $115,000 in non-property related taxes for Suffolk County, approximately $15,300 for the MTA, and approximately $332,100 for New York State. In total, construction of the project is estimated to create approximately $462,400 million in non-property related taxes for the County, MTA, and State. In addition, the County, Town, and local taxing jurisdictions would receive property taxes in the same amount as in the existing condition ($22,708).

During Operation

Based on developer data, the completed project is expected to provide ~~110 to 125~~ 90 direct employment opportunities, including approximately ~~50~~ 35 full-time jobs offering employee benefits. Roughly 15 percent of the employees would be salaried with the remainder receiving hourly wage compensation. The employees are expected to come from the workforce that includes senior citizens and college students. The proposed facility would also indirectly result in additional employment opportunities for local tradesmen and service companies.

The completed project would generate approximately $83,939 in property tax revenues for New York State, Suffolk County, the Town of Riverhead, and the local taxing jurisdictions, based on construction costs. This is an increase of $61,231 or about 270 percent over the existing

condition. The Riverhead Central School District would benefit from approximately $54,365 in taxes, or $39,657 (about 270 percent) over the existing condition, without any increase in the number of school age children. It should be noted that the projected tax revenues provided here are only estimates, and that, ultimately, the future tax revenues generated by the proposed action would be determined by the local tax assessor. In addition, the completed project would generate approximately $690,000 to $948,750 in sales tax revenues, allocated to Suffolk County (4.25 percent), MTA (0.375 percent), and New York State (4 percent), based on an estimated $8 to 11 million in total annual sales at completion of phase 2.

ADDITIONAL FISCAL AND SOCIAL BENEFITS

The proposed go-kart facility would result in new ownership and improved use of the project site, which would increase diversity and stimulate growth in the local economy. The go-kart facility would attract incremental business from the outside community. The venue is expected to attract a premier corporate customer base, local residents, and promote tourism, with up to two-thirds of guests expected from out-of-town.

In addition to benefiting the local economy, the proposed go-kart facility could potentially enhance quality of life in the local community. The facility would serve as a clean, upscale ~~meeting,~~ entertainment~~,~~ and recreational facility. It would create a unique opportunity for youth to reinforce team work, responsibility, focus, and judgment skills gained from motor sports. The F1 Long Island Sports Facility would also be an ideal venue for fund raising and other charitable outings ~~events~~. As explained above, the proposed project would create positive employment opportunities for residents of various socioeconomic strata. Therefore, the proposed project is expected to have positive impacts on the local economy and community in terms of fiscal and social benefits, and no potentially significant adverse effects are anticipated.

VISUAL QUALITY

PROJECT SITE

The F1 facility would comprise more than one mile of professionally designed go-kart race tracks to serve private corporate outings ~~functions~~ and local residential interests. The facility would include a 14,995 ~~14,800~~ square foot (approximately 21,330 ~~23,000~~ gross square feet) clubhouse that consists of a restaurant, bar, small motor-sports retail store, ~~accommodations for out-sourced catering,~~ office space, a club trophy and waiting room, and ~~conference and meeting~~ safety training and briefing rooms. Also proposed would be the 5,000 square foot maintenance building that would also serve as the greeting post for visitors. Lastly, an open structure (approximately 27,540 ~~33,530~~ square feet) would be built to cover the concession track. The proposed buildings are substantially smaller in bulk and scale compared with the surrounding commercial properties. The primary exterior material for the proposed buildings is expected to be masonry with a variety of textures and patterns. In addition, the proposed project would include the development of three sound barriers anticipated to be composed primarily of concrete.

The proposed go-kart facility would utilize the existing topography as the project would incorporate the site's rolling hills and the tracks would follow the natural contours of the land. The concession track would be located toward the southeastern part of the site within the larger main track, which would be featured throughout the entire 12.1-acre site. The clubhouse would

be built at a lower elevation than what exists around most of the perimeter of the site, minimizing its potential visibility from off-site.

The clubhouse would comprise three floors and would incorporate existing topography, with portions of the building~~, two above grade and the lower level would be constructed to incorporate the existing topography so that three sides of this level would be above grade and the front side would be~~ below grade. The building would be located towards the center of site, northwest of the concession track. The clubhouse would have a maximum height of ~~approximately 55~~ 35 feet above grade.

The proposed clubhouse would include an outdoor terrace on the upper levels. The outdoor terraces would be supported by a series of columns and a guardrail along the building's perimeter. Tall rectangular windows ~~in groups of three~~ would run along the building's exterior. ~~Two double doors would mark the entrance to the clubhouse.~~

The front of the clubhouse would feature three triangular gables ~~two triangular cornices; each supported by four columns would be featured~~. ~~Each cornice would project from the main building over each level. The lower cornice would project outward approximately 60 feet from the main building, forming an overhang for the walkway leading to the front entrance.~~

~~The site's grade would slope downward toward the rear of the clubhouse, so that the lower level would be above grade in the rear of the building. The rear of the building would feature three cornices, each one projecting from the rooftop over the upper terrace. The center cornice would be supported by four columns, while the cornice on either side would be supported by just two columns. The lower level would feature garage doors.~~

~~From each side of the clubhouse, one would see the sloping gradient rising toward the front of the building. The roofline would be triangular and the height of building would vary with the rolling topography.~~ The clubhouse would be connected to the covered concession track by an overpass/bridge ~~enclosed corridor on the first level~~.

The maintenance building would be located just south of the service entrance at the northernmost border of the site and north of the main entrance. The facility's ~~main~~ parking area would be located in this area of the site ~~and an additional parking area would be provided within the concession track~~. The maintenance building would have an average height of 24 feet above grade.

The structure proposed to cover the concession track would be designed as an open building with a pitched roof and supporting columns ~~poles~~. The structure would be approximately 27,540 ~~35,530~~ square feet ~~and range in height from~~ with a maximum height of 35 ~~to 51~~ feet above grade. The cover over the concession track would be designed with similar architectural features as the clubhouse and would also be constructed to incorporate the existing topography and therefore minimize the appearance of the structure.

In addition, the proposed project would feature three sound barriers varying in height from about 7 to 25 feet. The longest barrier would be located more than 30 feet from the southern site boundary and wrap around the southern corners heading north for a short duration. This barrier would range in height from about 7 to 25 feet due to the natural changes in elevation. The tallest part of this barrier would be located towards the center-edge of the site. The second barrier would be a permanent retaining wall that extends west from the clubhouse and would follow the southern portion of the northern track. This barrier would be about 10 feet high. The third barrier would be moveable and only used when competition karts are utilized on the northern track.

This barrier would range in height from 7 to 10 feet and would follow the southern portion of the northern track, east of the clubhouse.

The on-site pond is proposed to be preserved in its existing size and state, and would not be used for irrigation ~~expanded and a pump house would provide local irrigation at site plantings~~. The pond would be protected by a vegetated buffer of at least 64 feet in depth, with all buildings located at least 158 feet away. Native landscaping, where feasible, would remain within the site, primarily along the southern and western borders. Planting of various trees and shrubs would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site. Approximately 15.6 percent of the site would be comprised of existing natural areas, with an additional 34.2 percent of the site proposed to be landscaped.

VISUAL RELATIONSHIPS

The combination of existing and new plantings along the site's perimeter would inhibit views of and from the go-kart facility. The dense vegetative buffer at the site's southern border would be retained so that the existing view from the horse farm would not drastically change. Further, the southern sound barrier would provide an additional screen from the horse farm to the proposed site. The southern sound barrier, being the tallest, would only be about 7 feet above grade near the closest viewpoint which is Edwards Avenue and therefore would not be materially different from other surrounding visual features. Because the clubhouse and covered track would be built at a lower elevation than most of the surrounding area, views of it would generally not be visible from the surrounding properties. Where the tracks are to be built at lower elevations than the adjacent properties, particularly in the southern region of the site, they too would not be outwardly visible. However, the tracks are proposed to be constructed across the entire site, so that they would generally be visible where they are level with the surrounding properties. Similarly, views of the surrounding properties from the project site would be obstructed due to the site's topography and the natural and manmade buffers proposed for the perimeter of the site. The proposed bulk and scale of the proposed facility would be substantially smaller than that of the surrounding area, in that there would be two small-to-moderate sized buildings sited on a large tract of land with rolling topography and trees scattered throughout the site. Because the proposed F1 Long Island Sports Facility would utilize the site's existing topography and incorporate new and existing plantings as well as natural and manmade buffers into the facility's design, the proposed project is not expected to result in significant adverse impacts to visual quality or character.

HAZARDOUS MATERIALS AND PUBLIC HEALTH

It is anticipated that no more than 500 gallons of gasoline would be stored on-site at any one time in one 500 ~~two 250~~ gallon container~~s~~ pre-approved by Suffolk County Department of Health Services. The tank, to be located to the northwest of the maintenance building, would be constructed of steel and ~~These containers~~ would be located aboveground within a concrete containment system to ensure that leaks and/or spills are controlled. ~~and~~ The tank would not discharge to the ground, groundwater, or surface waters of Suffolk County. Nominal storage of 55 gallon drums would be provided for both motor oil and 2-stroke oil. Oil would only be stored for the 4-stroke karts. In addition, about 5 gallons of WD-40 and related pump spray bottles would be stored on-site. Aboveground storage tank systems would be inspected weekly using a detailed checklist, consistent with practices at F1's sister facility in Boston.

Each kart is expected to use approximately 1 gallon of gas every 3 hours. Refueling would only occur in pit lanes, which are proposed to be surfaced in concrete. A gas caddy would transport fuel from the gas tank located northwest of the maintenance building to the pit lanes. There would be three gas caddies total on-site. Each caddy holds approximately 20 gallons of gas. The maintenance building would not have a floor drain. Karts would be wiped down rather than washed, and parts would be cleaned using recyclable solvent. A fire suppression system is also proposed.

Based on field reconnaissance and the history of the site as being undeveloped, it can be assumed that no hazardous materials such as asbestos, lead, and polychlorinated biphenyls (PCBs) are located on or within the proposed site. Consistent with the findings of a Phase I Site Assessment performed in 2005 by Coastal Environmental Corp. and because no buildings exist and there are no hazardous materials present at the site, exposure to hazardous materials would not result from construction of the proposed facility and therefore would not pose a significant threat to public health or the environment.

All potential contaminants, such as oils ~~and gasoline~~, would be contained within the storage portions of the maintenance building, in accordance with all applicable rules and regulations. Further, no toxic or hazardous materials would be discharged to ground, groundwater, or surface waters, consistent with Article 7 of the Suffolk County Sanitary Code, and storage of hazardous materials and petroleum products would conform to the requirements of Article 12 of the Suffolk County Sanitary Code. With these precautionary measures in place, no significant adverse impact with respect to hazardous materials would occur as a result of operation of the go-kart facility.

TRAFFIC

There would be two entrances to the site—the service entrance (used solely for deliveries, staff, and large trailers expected at potential ~~the~~ special events) is proposed to the north of the maintenance building, and the main entrance would be located to the south of the maintenance building. In addition, parking for over 95 cars, consistent with the Town Code, would be provided in the ~~main~~ parking area in the northern portion of the site. Further, overflow parking and parking for staff could be provided on the one acre property located immediately north of the project site. The applicant has signed a long-term lease agreement with the owners of this property to utilize the land for parking.

TRIP GENERATION

For trip generation assessment, information provided by the client was used which included the visitation numbers for both the weekday and weekend conditions, modal split estimates and the overall operating characteristics of the facility. This information was used to prepare specific vehicle trip estimates for the regular weekday and the various event conditions during the weekend—including a ~~the~~ Special Event which may ~~is expected to~~ occur approximately one time per year. As currently proposed, the project does not include any special events. However, to present a comprehensive analysis, the traffic study included an assessment of the potential special event. These estimates focus on the peak hours when the maximum levels of activity would occur, thereby typically creating the greatest potential for traffic problems. The peak hours selected for analyses include:

- Weekday AM peak hour;

- Weekday PM peak hour;
- Saturday (Non-Event) Midday Peak Hour;
- Saturday (Special Event Conditions) AM Peak Hour; and,
- Saturday (Special Event Conditions) PM Peak Hour.

The detailed trip generation assumptions, as well as the total vehicle trips expected to be generated during the selected peak hours are summarized in Tables S-1 through S-3, respectively; and are discussed as follows:

Regular Weekday Trip Generation

The proposed facility would primarily be used for corporate outings ~~events~~ during the regular weekday. It is anticipated that the patrons would use the facility for the entire day; arriving in the morning (AM) peak hour and leaving in the evening (PM) peak hour. For trip generation purposes, a maximum of 45 patrons were assumed to be using the facility during the daytime session on a typical weekday. An additional 45 corporate patrons and 15 local racers were also assumed to arrive at the site for evening activities. For the modal split estimates, it is anticipated that the corporate patrons would primarily use buses for commuting to and from the site (34 arrive by bus, 11 arrive by personal auto), while the local users are assumed to access the site via private auto (see Table S-1).

Table S-1
Weekday Trip Generation*

Peak Hour & Directional Distribution	Modal Splits	Person Trips	Vehicle Occupancy	Total Vehicle Trips
AM Peak Hour Inbound Trips	Bus Trips	34	17	2
	Auto Trips (Attendees)	11	1.5	7
	Auto Trips (Employees)	6	1	6
	Deliveries	--	--	2
	Total			**17**
Outbound Trips	Bus Trips	0	0	0
	Auto Trips (Attendees)	3	1.5	2
	Deliveries	--	--	2
	Total			**4**
PM Peak Hour Inbound Trips	Bus Trips	34	34	1
	Auto Trips (Attendees)	26	1.5	19
	Deliveries	--	--	--
	Total			**20**
Outbound Trips	Bus Trips	34	17	2
	Auto Trips (Attendees)	11	1.5	7
	Deliveries	--	--	--
	Total			**9**

Note: Expected Attendance: 45 patrons.
Source: *Based on the information provided by F1 Long Island, LLC.

Regular Weekend Trip Generation

The proposed facility would be open to the general public on weekends, and would feature races staggered throughout the day on three tracks. For trip generation purposes, it was assumed that each track would feature three races per hour, with 15 patrons per race (see Table S-2). In addition, it was assumed that patrons would spend more than an hour at the facility by participating in more than one race, as well as by spending time in the restaurant and retail shop. For spectators—since the majority of them would be family and friends—it was assumed that they would carpool with the racers to arrive at and depart from the facility.

Weekend (Special Event) Trip Generation

A ~~The~~ special event at the proposed facility would potentially attract approximately 400 racers and 100 spectators on a given day. It was assumed that approximately 75 percent of these racers and spectators would arrive during the AM peak hour, and leave during the PM peak hour (see Table S-3). Also, since the majority of the racers and spectators are expected to carpool for special events, an average vehicle occupancy rate of 3.0 was assumed for trip generation purposes.

Table S-2
Weekend (Non-Event)Trip Generation*

Directional Distribution	Components	Participants per Race	Number of Races per Hour	Number of Tracks Available	Total Vehicle Trips
Inbound Trips	Main Tracks	15	3	2	45
	Secondary Track	15	3	1	23
	Deliveries	--	--	--	--
	Total				**68**
Outbound Trips	Main Tracks	15	3	2	45
	Secondary Track	15	3	1	23
	Deliveries	--	--	--	--
	Total				**68**

Note: Expected Peak Hour: 11:45-12:45 PM
Source: *Based on the information provided by F1 Long Island, LLC.

PROJECT VEHICLE ASSIGNMENT

The project generated trips were assigned based on the most likely routes to and from the site, prevailing travel patterns, and the location of the site's proposed driveways. Based on the existing travel patterns, approximately 60 percent of the project generated traffic would enter the study area from the south, while the remaining 40 percent would come from the north. This traffic was then routed to the project site driveway located approximately 1,000 feet south of Middle Country Road. It should be noted that during a ~~the~~ special event, vehicles could also be assigned to an overflow parking area on Edwards Avenue immediately north of the site.

Table S-3
Weekend (Special-Event) Trip Generation*

Directional Distribution	Components	Participants per Race	Number of Races per Hour	Number of Tracks Available	Total Vehicle Trips	Directional Distribution
Morning Peak Hour						
Inbound Trips	Race Participants	400	75%	300	3	100
	Spectators	100	75%	75	3	25
	Deliveries	--	--	--	--	--
	Total					125
Outbound Trips	Miscellaneous	--	--	--	--	10
	Total					**10**
Evening Peak Hour						
Inbound Trips	Miscellaneous	--	--	--	--	10
	Total					10
Outbound Trips	Race Participants	400	75%	300	3	100
	Spectators	100	75%	75	3	25
	Deliveries	--	--	--	--	--
	Total					**125**

Notes: Morning Expected Peak Hour: 10:00-11:00 AM
Evening Expected Peak Hour: 5:00-6:00 PM
Source: *Based on the information provided by F1 Long Island, LLC.

TRAFFIC CONDITIONS

Impact Criteria

Significant traffic impacts were defined as follows:

- Degradation in LOS (A, B, or C) to an unacceptable mid-LOS D or worse,
- Degradation in LOS D to LOS E or F,
- Degradation in LOS E to LOS F, and
- Deterioration within LOS E or F if the delay increases 10 seconds or more.

Capacities at the intersection approaches would be sufficient to accommodate the project generated traffic during Saturday Special Event conditions. However, based on the impact criteria (discussed above), the following approaches would experience significant traffic impacts:

- The westbound approach during both the weekday AM and PM, and Saturday (Non-Event) midday peak hours, respectively; and,
- The northbound approach during the Saturday (Non-Event) midday peak hour.

It should be noted that the westbound approach operates at LOS F in the No Build conditions (with delays ranging from 287 spv to 534 spv) during weekday and Saturday (Non-Event) peak

hours. In addition, the northbound and southbound approaches operate at LOS F and E (with delays of 104 spv and 57 spv) during the Saturday (Non-Event) conditions.

Based on the above discussion, it is evident that the traffic conditions at the intersection of Middle Country Road and Edwards Avenue are highly congested in the No Build conditions due to the traffic generated by various No Build projects. Thus, a minor increase in traffic levels at the congested approaches—already operating at LOS E and F in the 2007 No Build conditions—would result in significant traffic impacts. It should also be noted that in most cases, the actual incremental traffic associated with the proposed project is relatively small both as an absolute number and as a percentage of traffic on the roadway. The incremental traffic at the impacted approaches range from 1 to 5 vehicles per hour (vph) during the regular weekday AM and PM peak hours, which translates in an increase of less than 1 percent at these approaches. As for the Saturday (Non-Event) conditions, the northbound approach would experience the highest number of project generated traffic volumes (27 vph during the midday peak hour), which translates into approximately one car every two minutes. However, at this congested location, the HCS analysis is sensitive to small changes and shows deterioration in delay for minor to moderate increases in traffic.

PROJECT IMPROVEMENTS

Traffic operating conditions at the intersection of Middle Country Road and Edwards Avenue could be improved by providing exclusive left-turn lanes along with minor restriping at the four approaches. It should be noted that there is ample room for the additional lanes and that these improvements are in line with the measures proposed for the Calverton Manor project by RMS Engineering, and for the industrial park, service station/convenience store and single industrial building projects in reports generated by Schneider Engineering. With the proposed improvement measures in place, all of the impacted approaches would operate with better service conditions than under the No Build conditions.

SUPPLEMENTAL TRAFFIC ANALYSIS

In response to comments on the F1 Long Island Sports Facility DEIS, new summer traffic counts were performed at the intersection of Middle Country Road and Edwards Avenue and compared to the original counts (taken February 2006) to determine if the seasonal adjustment factor was sufficient to establish traffic mitigation measures. In addition, a new analysis was conducted for the LIE interchange at Edwards Avenue.

SUMMER TRAFFIC VOLUMES

The supplemental analysis determined that the mitigation measures proposed in the 2006 study, which provided a left turn lane and a through-right lane at all approaches, are still effective utilizing the 2007 summer volumes. No additional mitigation measures are required as a result of utilizing 2007 summer volumes in the analysis.

LONG ISLAND EXPRESSWAY/EDWARDS AVENUE INTERCHANGE

Data collection and an analysis of existing and future traffic conditions at the LIE interchange at Edwards Avenue were also performed. The analysis indicates that the traffic generated by the F1 Sports Facility would not impact traffic operating conditions at the LIE/Edwards Avenue interchange (there would be no change in LOS from No Build to Build conditions with the proposed project in operation). Thus, no additional mitigation is proposed at this interchange.

NOISE

$L_{eq(1)}$ noise levels for Scenario A—a maximum weekend 3-track operation with typical race karts—and for Scenario B—a maximum weekend 3-track operation using karts that produce a maximum noise level of 92.8 dBA at 7 meters using the northern track—were calculated.

It is worth noting that noise levels at the southern property line, which is an Industrial C zoned property, are all below the Riverhead Town Code 65 dBA noise limit for residentially zoned property.

Table S-4 shows the results of a noise impact analysis at representative receptor locations. Potential noise levels at six locations were examined—the Zeh residence near Middle Country Road, the Riverhead Charter School, the Gibb residence at the horse farm south of the proposed facility, the nearest barn at the horse farm south of the proposed facility, a residence slightly south east of the proposed facility on 460 Edwards Avenue, and the closest point on the Calverton Links Golf Course south of the project site. The table shows the lowest existing $L_{eq(1)}$ noise level for the analysis time period, the $L_{eq(1)}$ noise level from the racetrack operations, the total (existing plus racetrack operations and project generated traffic[1]) $L_{eq(1)}$ noise level, and the increase in noise due to the proposed facility (the total noise level minus the existing noise level).

With scenario A, the maximum increase at any of the five discrete receptor locations examined would be 5.3 dBA. A change of 5.3 dBA would be noticeable. However, the noise levels would be below the relative change impact criteria of 6 dBA.

Scenario B results in higher noise levels than scenario A. However, scenario B is an unusual event and as a result would occur very infrequently. At the Gibb horse farm residence, the maximum increase in noise level would be 4.6 dBA, which is below the relative change impact criteria of 6 dBA. At the Gibb horse farm barn and Calverton Links Golf Course, the maximum increase in noise levels would be more than 6 dBA (i.e. 7.0 dBA, and 9.2 dBA, respectively). Noise level increases of this magnitude would be noticeable. At the Gibb horse farm residence and barn, the total noise levels (ambient plus raceway plus project-generated traffic) would be 64.9 dBA and 61.3 dBA, respectively. At the Calverton Links Golf Course, the total noise levels (ambient plus raceway plus project-generated traffic) would be 56.2 dBA.

As shown in Table S-4, there are no locations where operation of the proposed facility, even for "worst case" conditions, would result in both an increase in Leq(1) of more than 6.0 dBA and an ambient noise level of more than 65 dBA at a residence or 79 dBA at an industrial or commercial area. Therefore, the proposed facility would not result in any significant project impacts.

Further, it was requested that a literature search be performed to determine the availability of information related to the physiological impact of noise on breeding horses. ~~Five websites were located and searched (NYbreds.com; gundogsupply.com; ansi.okstate.edu/breed/horses; ilo.org/encyclopedia; and totalhorsesource.com), and no data or analysis relative to this issue was found.~~ The literature search included the National Library of Medicine's Medline database, Veterinary Medicine Journal References, Lexis-Nexis's Academic database, Ebsco's Academic

[1] The noise levels from the project-generated traffic were calculated using the Cadna A model. The increases in noise levels due to project-generated traffic are minimal (0.1 to 0.6 dBA), would not be perceptible.

Search Premier, and Elsevier's Sciencedirect journals, as well as academic and scientific sites on the World Wide Web.

Table S-4
Noise Impact Analysis Results

Location	Scenario	Existing $L_{eq(1)}$	Racetrack Only	Project Generated Traffic	Total	Increase
Zeh Residence-Route 25 (Site M4)	A-Typical Race Karts	67.2	39.6	50.4	67.3	0.1
	B-Max Noise Level Karts	70.0	54.4	50.4	70.2	0.2
River Charter School-Route 25 (Site M5)	A-Typical Race Karts	61.1	46.9	49.2	61.5	0.4
	B-Max Noise Level Karts	63.9	61.0	49.2	65.8	1.9
Residence at Gibb Horse Farm*	A-Typical Race Karts	55.9	54.7	49.2	58.8	2.9
	B-Max Noise Level Karts	60.3	62.9	49.2	64.9	4.6
Barn at Gibb Horse Farm*	A-Typical Race Karts	49.9	53.3	42.7	55.2	5.3
	B-Max Noise Level Karts	54.3	60.3	42.7	61.3	7.0
460 Edwards Avenue**	A-Typical Race Karts	63.8	56.0	53.8	64.8	1.0
	B-Max Noise Level Karts	68.2	64.7	53.8	69.9	1.7
Calverton Links Golf Course (Site M3)	A-Typical Race Karts	44.8	43.2	38.9	47.7	2.9
	B-Max Noise Level Karts	47.0	55.6	38.9	56.2	9.2

Notes: *Existing noise level assumed to be equal to the value at site M2, adjusted for distance.
** Existing noise level assumed to be equal to the value at site M1.

Having performed the exhaustive literature search, no research was discovered that disclosed a relationship between noise produced from go-karts and adverse effects on equine reproductive behavior. The literature found was largely on the effects of transporting horses. One study, Physiology, Balance, and Management of Horses During Transportation, found that "a short term stressor, such as a loud noise, increased the heart rate and may cause constriction of the blood vessels. A stressor which lasts several seconds to a minute may increase heart rate, respiration rate, and cause digestive upset or decreased feed intake." Further, "a long term, chronic stress, usually 24 to 48 hours, can occur in horses which are shipped or experience thermal discomfort. This longer term stress influences a number of systems in the animal including immune, digestive, and reproductive systems. Long term stress can influence hormones essential in reproduction, growth, energy metabolism, and response to disease or

infection. These deficiencies can continue after the stimulus from the stressor has been diminished or eliminated."

~~However, s~~ Studies of animal behavior patterns demonstrate the ability of horses to become acclimated to sites and sounds in their environment. As history demonstrates, horses have been used by law enforcement, at parades, in the military, at sporting events, for hunting, and public assembles. There are numerous examples of small and large horse breeding and riding facilities located along major arterial roadways in Nassau and Suffolk Counties where they coexist without issue. For example, Belmont Racetrack is located near LaGuardia and JFK airports and alongside the Cross Island Parkway. The Jamaica Bay Riding Academy also has its stables and bridle paths alongside the Belt Parkway.

In this particular case where the Gibb horse farm barn and other facilities are located adjacent to Edwards Avenue, the noise analysis shows that the total noise levels at the Gibbs horse farm barn will be less than 62 dBA and less than 65 dBA at the residence. This is well within the minimum permitted level of 80 dBA for the zoning district and also meets the requirements for residential or noise sensitive uses. The proposed F1 Long Island Sports Facility would not produce long-term noise (a long-term stressor) and the noise levels that would be produced from the facility would only occur on a short-term basis and would not result in noise significantly above ambient levels. Therefore, it can be concluded that the facility would not negatively impact the existing horse farm or the animals that board there, and ~~Therefore~~ it is expected that there would be no significant adverse impacts over existing conditions.

WATER AND NATURAL RESOURCES

The proposed go-kart site would maintain the general topography of the site with modifications to accommodate the race track, parking, and structures. These changes would not be expected to have a significant impact on the local geology. The proposed grading would occur in the upper layers of the soil. This would not substantially change the characteristics or functions of the upper Glacial Aquifer, which is the shallowest of Long Island's three geologic formations.

With respect to groundwater at the proposed site, storm water would be recharged on-site, consistent with Suffolk County regulations. Recharge from impervious areas would be provided through a system of catch basins. In reviewing the proposed go-kart design and activities, it is not expected that this storm water runoff would carry any significant or unusual pollutant loads that would pose a threat to groundwater. The proposed project would also be designed consistent with Article 7 of the Suffolk County Sanitary Code in that the proposed sanitary flow would not exceed 3,142 ~~3,630~~ gpd, which is less than ~~the equivalent of~~ 300 gpd per acre as required for sites within Hydrogeologic Zone III.

Consistent with federal, state, and local regulations and in accordance with guidelines set forth to protect Critical Environmental Areas (CEAs), the proposed go-kart facility would be designed to limit the degradation of groundwater in the project vicinity and not cause a detriment to local or regional groundwater or surface water. Consistent with the Special Groundwater Protection Area (SGPA) Plan, the proposed facility would be developed in an area that is already dedicated to commercial uses. The Town of Riverhead's Comprehensive Plan and subsequent rezoning of the area to Industrial C, which allows commercial recreation uses, further validates that the project would not be expected to cause a detriment to local or regional groundwater or surface water.

The existing on-site pond is proposed to be preserved in its natural size and state. The pond would not be used as a source of water for irrigation. ~~enhanced and made larger and would be incorporated into the site layout as an aesthetic feature. The pond would be enhanced by clearing the overgrown vegetation and planting wetland species that thrive in these conditions and promote wetland health. These species would include readily available trees such as red maple and white oak. Shrubs would include swamp azalea (*Rhodendron viscosum*) and wildflowers including cardinal flower (*Lobelia cardinalis*). The pond surface area would increase from 0.09 acres to 0.17 acres. In addition to aesthetics, the pond would be utilized as an irrigation pond for on-site plantings.~~ Pursuant to Chapter 107-4 of the Town of Riverhead Code, it is unlawful without obtaining a written permit issued by the Town of Riverhead to dig, dredge, clear vegetation or in any other way alter or remove any material in or within 150 feet of any tidal waters, tidal wetlands, freshwater wetlands, natural drainage systems, or other watercourses. The Conservation Advisory Council (CAC) advises the Town Board on the issuing of permits for the development and management of natural resources within the Town. ~~Consistent with the Town Code, the Applicant would file for and obtain a permit from the Town Board and/or the CAC for the expansion of the wetland. Because the proposed project would enhance the vegetative features of the pond and continue to utilize the pond in the same capacity as historic uses,~~ It is not anticipated that the proposed project would pose a significant adverse impact to this natural resource. ~~Because the existing pond appears to be isolated, the Army Corp of Engineers would not have jurisdiction over this water feature.~~ The proposed project has been revised to move all buildings at least 158 feet from the wetland. The track would be located at least 64 feet from the wetland. Existing vegetation would remain within the 64-foot buffer area, and no clearing would occur around the wetland. Consistent with the CAC requirements, the wetland and 64-foot buffer would remain in their natural state. As noted above, the pond is not mapped by DEC and is therefore not regulated at the State level. Because the Army Corps of Engineers (ACOE) does not regulate a buffer, there is no requirement that ACOE be contacted to conduct a jurisdictional site visit. As long as the wetland is not directly disturbed, as is the case with the proposed project, ACOE is not involved.

In addition to the buffer, mitigation proposed to prevent degradation of the wetland includes storm drains at the edge of the track, and a 2-foot high wall to prevent storm water from entering the pond and prohibit wildlife from accessing the track.

Connections would be maintained between the on-site wetland and off-site habitats to the west, including open field and forest, to minimize potential impacts to wildlife habitat functions. A fence with a gap at the bottom, allowing mammals, reptiles, and amphibians to pass unimpeded, is proposed. A 2-foot high wall would be used to prevent reptile/amphibian movement upslope onto the proposed racetrack. As noted above, the wall would also help prevent runoff from the track to the wetland, in conjunction with storm drains at the edge of the track.

The vegetative community featured at the project site is not unique to this area of the Town or the region. It is not expected that the proposed project would pose a significant adverse impact to the natural flora or fauna resources on or in close proximity to the project site. The open vegetative areas of the site would continue to provide habitat for animals adapted to developed conditions. In fact, nearly half of the proposed site would be dedicated to open space including natural areas. Existing vegetation, where feasible, would remain within the site and primarily along the southern and western borders. Planting of various indigenous trees and shrubs, where feasible, would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site.

The relatively small size of the proposed project site, its proximity to Edwards Avenue and Middle Country Road, and presence of cleared/disturbed lands on-site suggest that the likelihood of the site providing critical habitat for rare plants and animals is low.

According to correspondence from DEC's New York Natural Heritage Program (NHP) dated February 10, 2006, the project vicinity has records of historic occurrence of several NYS-listed (threatened, endangered, or exploitably vulnerable) plant species. Although ~~the New York State Department of Conservation's Natural Heritage Program (~~NHP~~)~~ identified sensitive species within Calverton, these species have not been recorded since the late 19th and mid 20th centuries in this area. Listed plants are regulated by the New York State Environmental Conservation Law section 9-1503 which specifies that it is illegal to damage or remove a protected plant without the consent of the property owner. The presence of a protected plant would not prohibit development of the proposed project but would be taken into consideration in the site planning process. Protected plants, if present, can often be avoided by preserving them in situ or transplanting them to a nearby location. Of the listed plant species, two require moist, wetland soil not found on the project site. *Viola primulifolia* and *Carex hormathodes* would not occur on-site based on habitat limitations, nor were they seen on-site during the November 2006 site inspection. Open and wooded sandy habitat does occur on-site that may be appropriate for the other listed plant species: *Sericocarpus linifolius, Cyperus lupulinus spp. lupulinus, Symphyotrichum concolor var. concolor*, and *Aletris farinosa*. However, none of these species were seen on-site during site inspection, and much of the site contains disturbed, re-graded topography, making the presence of these plants unlikely, particularly in the central and northern portions of the project site.

Neither NHP nor the U.S. Fish and Wildlife Service (USFWS) have any records of "threatened" or "endangered" animal species on the project site or vicinity, nor were any identified on the project site during the site inspection.

STORMWATER

Land development can affect both the quantity and quality of stormwater runoff. At the proposed site, the quantity of stormwater infiltration would be maintained and recharged on-site, consistent with Suffolk County regulations. Recharge for impervious areas would be provided through a series of catch basins.

The quality of stormwater runoff can be affected by contamination from impervious surfaces, herbicides, and other pollutants. Most soils are particularly effective in filtering particulates, such as sediments including phosphorus and most heavy metals. A 1987 study was prepared by the U.S. Geological Survey in cooperation with the Long Island Regional Planning Board entitled, *The Effect of Urban Stormwater Runoff on Ground Water beneath Recharge Basins on Long Island, New York,* which provides insight into the effectiveness of soil in removing contaminants. Urban runoff contamination was found to be exaggerated when drainage areas are extremely large and all runoff and its contaminants are concentrated in a single location. In contrast, the drainage from the proposed site would be recharged on-site through a series of catch basins. Further, the Long Island Nationwide Urban Runoff Program (NURP) indicated that bacterial contamination of groundwater from infiltration basins is insignificant.

The study also indicated that inorganic and organic pollutants when present in storm water runoff are effectively minimized by filtration through soils. The concentration of selected trace elements in groundwater samples beneath the infiltration basins was similar to the level reported in the regional groundwater.

The *New York State Stormwater Management Design Manual* provides guidance for a unified approach to sizing permanent stormwater management practices (SMPs) to ensure adequate containment and conveyance of stormwater resulting from proposed development. The proposed project would result in approximately 6.03 ~~5.69~~ acres of pervious surfaces and 6.08 ~~6.42~~ acres of impervious surfaces. The criterion outlined in the above referenced design manual specifies that SMPs should be designed to capture and treat 90 percent of the average annual stormwater runoff volume, known as the Water Quality Volume (WQ_v).

The drainage system proposed for this project involves the use of ~~leaching~~ catch basins at designed low areas on the site. The system is designed to capture and store a 2 inch rainfall event. The basic foundation of this practice is to dissipate the energy of the first flush allowing the suspended solids to dropout. Drainage basins would be located in an area northeast of the clubhouse and would not discharge to the on-site wetland. Drains that had been proposed to be directed to the wetland have been eliminated. ~~A rainfall which exceeds the design capacity of the system then overflows to the on-site wetland, ensuring its survival, preventing starvation. Leaching catch basins are considered to be an acceptable SMP according to the Design Manual (Table 5.1, practice I-3). The existing on-site pond is categorized as a pocket wetland and is considered to be an acceptable SMP according the Design Manual (Table 5.1, practice W-4). The area of the project site does not allow for the implementation of other acceptable SMP's since other acceptable practices are area intensive measures.~~

MAINTENANCE OF STORMWATER CONTROLS DURING CONSTRUCTION

In accordance with Part III.D.3 of the General Permit, inspections should be conducted every seven (7) calendar days and after every rainfall event of greater than ½ inch and shall be supervised by a qualified professional. Maintenance of all temporary erosion control measures should also be performed as to ensure the highest level of effectiveness. Maintenance recommendations for erosion control measures include the following:

- Remove sediment from silt fencing when sediment reaches a depth of 6 inches at the fence and repair as necessary to maintain a sound barrier. This practice should be monitored and maintained daily.
- Material is not to be stockpiled in driveway areas. Catch basins are to be protected from silt and control erosion off of the building site.
- Clean inlet protection when storage capacity is at 50 percent.
- Temporarily stabilize areas which are proposed to be paved by applying and maintaining a stone sub-base until asphalt is installed.
- Supplement stone at the construction entrance(s) as necessary to ensure areas are stabilized and to minimize dust and ponding of water in traveled paths.
- During and after construction, erosion and sediment control measures would be implemented to stabilize exposed soil and to provide a final cover of vegetation on post-construction slopes.
- Complete a report of all inspections conducted during the construction period and maintain a record of all reports on-site as required by the General Permit.

CONCLUSIONS

In summary, the proposed drainage system would be designed to adequately comply with the DEC 90 percent capture and treatment requirements as outlined in the Stormwater Design Manual by providing treatment and storage which exceeds the calculated Water Quality Volume, WQ_v.

The manual also requires that swales and channels are designed for 24-hour extended detention under the post-development conditions for a one year, 24-hour storm event, known as Channel Protection (Cp_v). Since there are no channels or streams on or adjacent to the project site, it is assumed that this requirement is waived.

The manual further requires that both Overbank Flood (Q_P) and Extreme Storm (Q_f) requirements be met. Since stormwater runoff would be collected and recharged on-site ~~and/or overflowed to an on-site surface water body~~, it is assumed that this requirement is also waived.

Maintenance of permanent stormwater management controls and drainage structures would be performed by the owner/operator upon completion of construction activities. Routine maintenance responsibilities for the permanent drainage facilities would include the following:

- Monitoring of the drainage inlets should be completed on a routine basis, particularly following large storm events. Curb gutters and drainage grates should be kept free from the obstruction of leaves, trash and other debris.
- Drainage structures should be inspected annually and immediately following a significant rainfall to ensure proper function and adequate recharge rates of stormwater runoff. Annual cleanout of drainage structures are recommended to remove seasonal leaf litter and debris in early winter. Additional monitoring and cleanings may be necessary in the spring if higher than normal applications of sand and salt have been needed during the winter months.
- All seeded and landscaped areas should be maintained, reseeded and mulched as necessary to maintain a dense vegetative cover.

Stormwater runoff from the proposed site would be limited and the types of activities proposed at the yard are not expected to generate significant pollutant loads that would adversely impact groundwater. As a result, it is concluded that the proposed project would not adversely impact surface water or groundwater from site runoff.

INFRASTRUCTURE AND ENERGY

WATER SUPPLY

The proposed project would require utility connections to the Town of Riverhead Water District (RWD) supply system. The proposed go-kart facility would collectively use an approximate 7,200 ~~6,480~~ gpd, assuming water supply would amount to an additional 10 percent of the expected sewage generation, based on industry standards. This is a conservative estimate since sewage design flow rates are calculated for worst case operation of the facility. This estimate includes water use for staff and customers.

A letter was sent to RWD inquiring about water availability. According to the utility's response letter dated February 15, 2006, the project site can be served by the RWD. The project site is expected to generate a demand for potable water that amounts to approximately 0.03 percent of the RWDs current groundwater pumping capacity (21 million gpd). The project site would be

served by a 12-inch water main on the west side of Edwards Avenue. The closest public water supply well to the project site is on Fresh Pond Avenue in Calverton.

~~In addition to receiving potable water from the RWD, the proposed project would utilize water from the on-site pond for irrigation purposes, thus reducing the expected demand for public water. The on-site pond is proposed to be expanded and a pump house would provide irrigation for proposed landscaping.~~

SANITARY SEWAGE

The estimated sewage generation is approximately 6,545 ~~5,890~~ gpd, based on the design sewage flow rates provided in Suffolk County Department of Health Services Division of Environmental Quality's *Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single-Family Residences* (approved June 15, 1982). Based on density flow, the proposed project would generate 3,142 gpd, which is 491 gpd lower than what is allowed in accordance with Suffolk County design criteria, which permits 300 gpd per acre in Hydrogeologic Zone III.

The proposed project involves installation of an on-site septic system to dispose of sewage generated from the proposed action. Based on the preliminary site plan, three different sanitary systems are planned. The first includes two septic tanks, a grease trap, and five leaching pools to handle kitchen waste. A second system includes two septic tanks and nine ~~eight~~ leaching pools to receive and dispose of waste from the clubhouse, less any kitchen waste. The third sanitary system includes one septic tank and two ~~one~~ leaching pools to handle waste from the maintenance building. The on-site septic system was designed to comply with Suffolk County's standards for the construction of sewage disposal systems. The proposed system would conform with the County Sanitary Code and the State Pollutant Discharge Elimination Program (SPDES). ~~and~~ No significant adverse impacts are anticipated with the construction and utilization of this system.

SOLID WASTE

Solid waste generated at the project site would consist primarily of paper, cardboard, food items, and other miscellaneous refuse. Based on industry standards, the proposed project is expected to generate an estimated 1,495 ~~2,150~~ pounds of solid waste per week.[1] The applicant would contract with a private carter that would handle and dispose of solid waste in accordance with the State solid waste regulations described above. The commercial waste stream typically consists of a large fraction of recyclable materials, such as paper and corrugated cardboard. Materials would be recycled in accordance with the State and local regulations described above. The relatively small amount of waste generated from the proposed action is expected to be handled and disposed of by a private carter and no significant adverse impacts to solid waste handling and disposal services are anticipated.

ENERGY

Energy service would be obtained from LIPA/KeySpan. The proposed project would require an extension of existing utility services in the area to provide new electric and gas service to the

[1] Cerrato, David S. and Barbara A. Riley, *Developing Recycling Programs for Commercial Establishments* (1989).

subject site. Projected energy demand for the proposed go-kart facility is based on loads for heating, ventilation, air conditioning, lighting, and auxiliary equipment, such as elevators and pumps. The annual energy consumption is calculated by applying factors from the Association of Energy Engineers, 1997.[1] It is estimated that the proposed project would result in an energy demand of 1,362 ~~2,015~~ million British Thermal Units (BTUs) annually. This is equivalent to approximately 399,062 ~~590,538~~ kilowatt hours (kWh). LIPA indicated in a letter dated February 6, 2006 that LIPA and KeySpan could provide electric and gas services to the proposed project. Therefore, no significant adverse impacts are expected.

CONSTRUCTION IMPACTS

SOIL EROSION AND SEDIMENTATION CONTROL

Due to increased stormwater runoff from areas cleared of natural vegetation, especially in the center of the site, there would be increased potential for on- and off-site soil erosion and sedimentation during the construction period. To minimize erosion, the project would adhere to the *New York Guidelines for Urban Erosion and Sediment Control*, U.S. Department of Agriculture—Natural Resources Conservation Service (April 1997), and the BMPs developed by DEC, as described in *Reducing Impacts of Stormwater Runoff from New Development* (1993). The project would also adhere to any Town and County guidelines regarding erosion and sediment control. An Erosion Control Plan with sequencing and specific details has been ~~would be~~ prepared for the project in accordance with all applicable regulations. Construction impacts would be minimized by implementing erosion, sediment, and fugitive dust control measures, including creating a stabilized construction entrance, hay bales, silt fence(s), prompt post construction replanting/revegetation, watering down construction areas, and other methods identified in the *New York Guidelines for Urban Erosion and Sediment Control*, as shown on the Erosion Control Plan ~~determined to be appropriate through the site plan review process~~.

Specifically, the Erosion Control Plan ~~would~~ recommends a silt fence be installed at the perimeter of all localized construction activities in a necessary effort to minimize/prevent sediment from leaving the project area. The drainage facilities proposed for the project would be installed in lieu of temporary structures throughout the project site. This can be accomplished in all areas of the track. Hay bale barriers would be provided to trap sediment in stormwater runoff from impervious surfaces at all grated inlet structures. Establishment of future groundcover would be implemented as rapidly as is practicable to stabilize and minimize loss of soils after the bulk of the site grading, and excavation activities have been completed. Additional sediment barriers or temporary diversion dikes may be utilized as required by field conditions during construction to ensure stormwater runoff is contained on-site. In all practicality, DEC BMPs for erosion controls would be followed. A construction entrance would be installed and maintained to prevent soil and loose debris from being tracked onto local roads.

These measures would be in addition to construction sequencing and preservation of natural vegetation, where feasible, which would also serve to minimize erosion. By implementing these methods, working with existing grades, and maintaining natural vegetation, no significant adverse impacts are anticipated.

[1] City Environmental Quality Review (CEQR) Technical Manual (2001).

Schedule of Operations

The following outlines a general description of the potential schedule of operations for the proposed construction activities:

- Installation of perimeter erosion control measures, specifically hay bale barriers as indicated on the Erosion Control Plan.
- Installation of stabilized construction entrance(s). Control debris and dust resulting from daily construction activities and water as necessary or as directed by the inspector.
- Inspection of erosion controls throughout the construction period with a minimum frequency of once every seven (7) calendar days and after every rainfall event of greater than ½ inch within a 24-hour period. Maintain inspection reports on site.
- Rough grading of the track corridors and installation of appropriate drainage facilities in accordance with the approved plans. Install inlet protection measures for any drainage structures with grate covers in accordance with the Erosion Control Plan. Stockpile topsoil required for final grading and landscaping as required. Cover stockpiles as necessary to avoid exposure to erosive elements.
- Installation of project retaining walls and curbing.
- Installation of sub-base for all future paved areas and perform final grading. Remove all temporary erosion control measures and install permanent vegetation and landscaping following site stabilization.
- Installation of pavement on track and in driveway and parking areas.
- Installation of remaining drainage structures and associated piping. Install inlet protection measures for any drainage structures with grate covers in accordance with the Erosion Control Plan.
- Foundation excavation, pouring of concrete, and backfilling around walls and footings. Temporary stabilization shall be completed following backfilling as conditions warrant. Stabilization may include but not be limited to hydroseeding, temporary vegetation and mulching. Continuation of clubhouse construction may continue concurrently with the remaining schedule of operations.
- Installation of sub-surface utilities.
- Cleaning of all drainage structures silted due to erosion incurred during the construction process.
- Remove all remaining temporary erosion control devices.

Maintenance of Erosion Control Measures

In accordance with Part III.D.3 of the General Permit, inspections should be conducted every seven (7) calendar days and after every rainfall event of greater than ½ inch and shall be supervised by a qualified professional. Maintenance of all temporary erosion control measures should also be performed as to ensure the highest level of effectiveness. Maintenance recommendations for erosion control measures include the following:

- Remove sediment from silt fencing when sediment reaches a depth of 6 inches at the fence and repair as necessary to maintain a sound barrier. This practice should be monitored and maintained daily.

- Material is not to be stockpiled in driveway areas. Catch basins are to be protected from silt and control erosion off of the building site.
- Clean inlet protection when storage capacity is at 50 percent.
- Temporarily stabilize areas which are proposed to be paved by applying and maintaining a stone sub-base until asphalt is installed.
- Supplement stone at the construction entrance(s) as necessary to ensure areas are stabilized and to minimize dust and ponding of water in traveled paths.

Complete a report of all inspections conducted during the construction period and maintain a record of all reports on-site as required by the General Permit.

TRAFFIC

Project construction may cause some short-term increased local truck traffic due to the delivery and removal of construction materials and equipment from the project site. It is anticipated that most construction equipment and deliveries would be from the LIE to the south. On-site staging areas would be used during construction for loading and unloading of materials to avoid off-site impacts. These staging areas would be located in the cleared area where the clubhouse facility will be constructed during Phase 2.

NOISE AND VIBRATION

The use of construction equipment coupled with the movement of delivery vehicles traveling to and from the site would cause a temporary increase in noise and vibration in the project site area. Noise and vibration levels at a given location would depend on the type of equipment used and number of construction vehicles entering/exiting the site on a daily basis, as well as the distance from the construction site. The level of impact of these noise sources depends on the noise characteristics of the equipment and activities involved, the construction schedule, and the location of potentially sensitive noise receptors. In this instance, the construction period is very short and requires little heavy equipment. In general, like most construction projects, construction of the proposed facility would result in increased noise and vibration that could be considered intrusive only for a short distance, typically 50 feet off-site. It is expected that these impacts, which would be temporary, would vary widely, depending on the phase of construction and the specific task being undertaken. There are no sensitive receptors within 50 feet of the proposed project site.

Increased noise levels caused by construction activities can be expected to be most significant during the early phases of construction. Peak construction noise levels would persist for only a limited time period in the early phase of construction. During the later phases of construction, much of the construction activity would take place within the building structures, and noise levels would be less.

Construction noise is regulated by the U.S. Environmental Protection Agency's noise emission standards for construction equipment. These federal requirements mandate that certain classifications of construction equipment and motor vehicles meet specified noise emission standards and that construction material be handled and transported in such a manner as not to create unnecessary noise. These regulations would be carefully followed. In addition, construction activities would be restricted to occur within the hours of 7 AM and 8 PM in accordance with Chapter 81, "Noise Control," of the Code of the Town of Riverhead. Overall, noise and vibration impacts are not anticipated to be significant and would not be permanent.

SOCIOECONOMIC CONDITIONS

As discussed above, construction of the project is estimated to create 35 person-years of direct construction employment. In addition to direct employment, construction of the project would create an estimated 32 additional jobs off-site in Suffolk County, bringing the total additional employment in the County to 67 person-years. In the broader New York State economy, total employment from construction of the project is estimated at 69 person-years.

Direct wages and salaries from constructing the project are estimated at $1.78 million. Including off-site effects, total direct and indirect wages and salaries from constructing the project are estimated at $3.12 million. In the broader state economy, total direct and indirect wages and salaries from constructing the project are estimated at $3.22 million.

Constructing the project would also create tax revenues for Suffolk County, the Metropolitan Transportation Authority (MTA), and New York State. These taxes include sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes. Construction of the project is estimated to create approximately $115,000 in non-property related taxes for Suffolk County, approximately $15,300 for the MTA, and approximately $332,100 for New York State. In total, construction of the project is estimated to create approximately $462,400 in non-property related taxes for the County, MTA, and State. In addition, the County, Town, and local taxing jurisdictions would receive property taxes.

ALTERNATIVES

Reasonable alternatives to the proposed project were examined and potential impacts of each alternative were compared to those that could result from the proposed project. Below is a description of each alternative followed by an assessment of potential impacts from each alternative as compared with the proposed project.

NO ACTION ALTERNATIVE

The No Action (or No Build) Alternative represents the future conditions if the project site is not developed with the proposed F1 Long Island Sports Facility. Under the No Action Alternative, no changes on the project site would occur. Rather than providing new recreational and economic opportunities in the Town of Riverhead, the No Action Alternative would leave the site vacant and underutilized. The No Action Alternative does not meet the needs of the project developers or the Town's goals for the area, which is to promote and enhance tourism as signified by the adoption and siting of the Industrial C (IC) Zoning District within this area (see Chapter 2, "Land Use, Zoning, and Public Policy"). Although the No Action Alternative is required to be examined under SEQRA, maintaining the existing project site in its current condition is not desirable and is not a feasible, reasonable, or practicable option for the project developers or the Town of Riverhead, as it would not provide the much needed tourist destination, local recreational opportunities, and economic resurgence in the Town of Riverhead, as would the proposed project.

AS-OF-RIGHT WAREHOUSE ALTERNATIVE

The Town of Riverhead IC zone permits a mix of light industrial, warehouse, and office campuses. In the Warehouse Alternative, the project site would be developed with a warehouse, and the proposed F1 Long Island Sports Facility would not be built. A Warehouse Alternative was chosen since warehouses are permitted and are representative of a typical light industrial

use, providing a good contrast in terms of potential impacts as compared with the proposed project. A warehouse is defined here as a structure primarily devoted to the storage of materials, which may include office and maintenance areas. The Warehouse Alternative assumes that the site would be built out to the maximum extent practicable in accordance with local zoning. The Warehouse Alternative would result in the development of a single very large structure or several large structures on-site, totaling over 210,000 square feet, with a 40 percent building lot coverage. The warehouse would be one-story and 30 feet in height. Approximately 525 parking spaces would be provided and 40 percent of the lot would be dedicated to open space/pervious surfaces. The warehouse could operate 7 days a week, 365 days a year, and could operate 24 hours a day. A warehouse would not provide the tourist or recreational needs of the community, but could provide additional revenue for the local economy.

AS-OF-RIGHT OFFICE ALTERNATIVE

Also permitted in the Town of Riverhead IC zone are offices. An Office Alternative was chosen as an office represents a typical commercial use and could result in potential impacts that are different from those anticipated with the proposed project. In the Office Alternative, the proposed F1 Long Island Sports Facility would not be built and the project site would instead be developed with an office to the maximum extent allowed by local zoning. The Office Alternative would result in an even larger structure on-site, totaling over 630,000 gross square feet, with a 40 percent building lot coverage. The office would be three stories and 30 feet high. Approximately 4,200 parking spaces would be provided and 40 percent of the lot would be dedicated to open space/pervious surfaces. The operations of the office would run 7 days a week, 365 days a year, generally from 9 AM to 5 PM. As with the Warehouse Alternative, the Office Alternative would not meet the Town's goals for promoting and enhancing tourism in the area, but could spur economic resurgence in the local community.

COMPARISON OF POTENTIAL IMPACTS

Land Use, Zoning, and Public Policy

Under the No Action Alternative, the site's land use and zoning would not change; it would remain vacant property in an industrially zoned area. The No Action Alternative would still be compatible with the surrounding uses in the area. However, the No Action Alternative would not be compatible with local public policy since it would not provide the needed tourism, recreational, and economic opportunities that the Town would like to see in this area, as demonstrated by the Town's recently adopted *Comprehensive Plan*, including the rezoning of this area.

Like the proposed project, the Warehouse Alternative would be compatible with the site's zoning and land uses in the surrounding area, with the possible exception of the horse farm, depending on specific warehouse activities. However, while the development of a warehouse on the project site could boost the local economy, it would not serve the tourism or recreational needs of the community, and would therefore not be compatible with local public policy.

Development of an office on the project site would not conflict with land uses or zoning on the project site or in the surrounding area. However, the Office Alternative would not meet the Town's goals of promoting and enhancing tourism in the area, and would therefore not be compatible with local public policy. Nonetheless, the Office Alternative could spur some resurgence in the local economy.

Soils and Topography

Under the No Action Alternative, the site conditions would remain as they currently exist. The existing cleared, vegetated, and natural drainage areas would not change and the soils and topography would be unaffected.

The Warehouse Alternative would result in even greater changes than the proposed project to the natural soils and topography that could be considered significant. The dominant soils on the project site generally have moderate to severe limitations with regard to the construction of roads and parking lots, up to three-story structures, and sanitary sewage disposal fields. These slope limitations would be an issue of concern for typical commercial and industrial development as substantial grading through cut and fill operations would be required. To allow for the building footprint and parking, the site would need to be significantly altered from its current condition. Conversely, the proposed project is unique in that it was designed to utilize the natural topographic features. In addition, development of a warehouse on the project site would result in building lot coverage of 40 percent, and 40 percent would be dedicated to open space. The remaining 20 percent would be devoted to parking and walkways. In contrast, the proposed project would achieve almost 50 ~~about 47~~ percent open space, including existing natural areas and topographic features.

As with the Warehouse Alternative, development of an office on the project site could potentially result in significant alteration of the soils and topography due to the need for extensive grading through cut and fill operations to site the building properly and provide the necessary drainage and parking. Compared with the proposed project, the Office Alternative would result in a lesser amount of open space and pervious surfaces on-site (40 percent compared with almost 50 ~~47~~ percent [49.8 percent], respectively).

Community and Emergency Services

In the No Action Alternative, the existing demand for community and emergency services would not change. The No Action Alternative would not serve to provide the recreational resource desired by the Town of Riverhead in the project area.

The Warehouse Alternative would not be expected to result in significant impacts to community and emergency services in the ½-mile study area. Although, depending on types of storage, quantities, etc., there may be an added demand for emergency services. However, unlike the proposed go-kart facility, development of a warehouse on the project site would not serve the recreational needs of the community.

Similar to the Warehouse Alternative, development of an office on the project site would not be expected to result in significant impacts to community and emergency services in the ½-mile study area. The Office Alternative would also not provide a recreational resource for the Town's residents.

Socioeconomic Conditions

The No Action Alternative would not result in additional tax revenues for the State, County, Town, or the local taxing jurisdictions. Further, no new jobs would be created and no additional fiscal or social benefits would be realized.

Development of a warehouse on the project site would generate new tax revenues for the State, County, Town, and the local taxing jurisdictions, but this revenue would not be expected to be as significant as with the proposed project. A warehouse could be expected to generate

approximately 350 jobs, substantially more than the proposed project. Not all of these jobs would be full-time, as some workers would be part-time, and work would be in shifts. However, a warehouse would not serve the community in terms of providing a recreational opportunity, enhancing the quality of life of the Town's residents, or stimulate growth in the local economy from out-of-town visitors.

Similar to the Warehouse Alternative, development of an office on the project site would generate new tax revenues for the State, County, Town, and local taxing jurisdictions, but this revenue would not be expected to be as significant as with the proposed project. An office could be expected to generate approximately 2,520 jobs, substantially more than the proposed project. Office employees would generally be expected to work full-time, between the hours of 9 AM and 5 PM. However, an office would not serve the community in terms of providing a recreational opportunity, enhancing the quality of life of the Town's residents, or stimulate growth in the local economy from out-of-town visitors.

Visual Quality

With the No Action Alternative, views of and from the project in relation to surrounding properties would not change. The site would retain its visual character in terms of rolling topography and natural features on-site.

The Warehouse Alternative would result in the development of a single very large structure or several large structures on-site, totaling over 210,000 square feet. This structure would be much larger in bulk and scale than the proposed go-kart facility, which is less than 46,400 ~~54,000~~ square feet in total building area. Extensive grading through cut and fill operations would be required so that the site would not retain its rolling topography and much of the existing vegetation would be removed. About 40 percent of the lot would be dedicated to open space, compared with nearly 50 ~~about 47~~ percent with the proposed project. As required by zoning, the open space areas would shield views of the development from arterial roads. A 20-foot vegetative buffer would be provided along the site's border with Edwards Avenue. Planted berms would be used to screen views of automobiles in the parking area~~s~~ from public roadways. Overall, the Warehouse Alternative could result in significant adverse visual impacts since the visual character of the site would change drastically. Such a large structure on the project site could be considered intrusive to the surrounding area. Visual buffers may not exist between the warehouse and the surrounding properties, except for along Edwards Avenue. In contrast, the proposed project would utilize the natural topographic features of the site and would provide almost 50 ~~about 47~~ percent pervious coverage, including existing natural areas. Vegetative buffers would be provided along the entire perimeter of the site to shield views of and from the go-kart facility in relation to the surrounding properties. Further, the southern sand barrier would also provide a screen to the adjacent properties to the south.

As with the Warehouse Alternative, development of an over 630,000 square-foot office building on the project site could result in significant adverse impacts to the visual quality of the project site and the surrounding area. The Office Alternative would result in maximum development of the site as permitted by local zoning, and about 40 percent of the lot would be dedicated to open space. The site would lose much of its natural character in terms of rolling topography and natural vegetation due to extensive grading. A vegetative buffer would be provided along Edwards Avenue, but such buffers may not be incorporated along the other boundaries.

Hazardous Materials and Public Health

In the No Action Alternative, the site would remain in its existing condition and there would be no potential for public health impacts from hazardous materials.

The Warehouse Alternative could involve the storage of hazardous materials on-site, but these materials would be handled in accordance with all applicable Occupational Safety & Health Administration (OSHA) and State and County regulations. Therefore, no significant adverse impacts from hazardous materials would be expected, as with the proposed project.

Development of an office building on the project site would not result in any significant impacts to public health from hazardous materials.

Traffic

The No Action Alternative would not result in new trips to and from the project site and the existing traffic levels and road network would continue.

As with the proposed project, the Warehouse Alternative would involve development of parking areas in accordance with local zoning, and access to the site would be granted via Edwards Avenue. In contrast to the proposed go-kart facility, the Warehouse Alternative would generate the most traffic on a weekday, rather than on a Saturday or Sunday. Based on the Institute of Transportation Engineers (ITE) Trip Generation Rates, an approximately 210,000 square-foot warehouse would be expected to generate approximately 120 trips in the weekday AM peak hour and 128 trips in the weekday PM peak hour, compared with 21 and 29 with the proposed project, respectively. Also, a large percentage of these trips would be trucks which adversely impact traffic because they are larger, occupy more roadway space, and have poorer operating capabilities than passenger cars, particularly with respect to acceleration and deceleration. The facility would potentially generate a total of approximately 1,042 trips on a typical weekday. On the busiest weekend day (Saturday), the warehouse could be expected to generate approximately 256 trips and 25 trips during the peak hour. In contrast, the proposed project is expected to generate 136 trips during the peak hour on weekend non-event days and 135 trips during the peak hour on weekend special event days. ~~A special event is expected to occur approximately one time per year.~~ As currently proposed, the project does not include any special events. Peak periods also coincide with adjacent street traffic peak periods, contributing to greater congestion.

Similar to the Warehouse Alternative, an office building would generate the most vehicle trips on a weekday, but an office building is expected to generate substantially more traffic than a warehouse. An approximately 630,000 square-foot office building could potentially generate about 983 trips during the weekday AM peak hour and 939 trips during the weekday PM peak hour, according to the ITE. The Office Alternative could potentially result in a total of approximately 6,936 trips on a typical weekday. On a Saturday, the busiest day of the weekend, an office could generate a total of 1,493 trips, with approximately 258 in the peak hour. The Office Alternative would generate significantly more trips than the proposed project both during the week and on weekend days.

Noise

In the No Action Alternative, the proposed go-kart facility would not be built and noise levels would remain in their existing condition.

Noise generated from a warehouse could be expected to result from outdoor activities and trucks entering and exiting the site and traveling on Edwards Avenue, as well as from traffic noise

resulting from workers traveling to and from the site. The number of trucks on Edwards Avenue and the noise as they accelerate and decelerate has the potential to significantly change the ambient level during peak traffic periods.

The Office Alternative would probably result in the lowest on-site noise compared with the other alternatives. Noise associated with an office would largely result from traffic noise associated with workers traveling to and from the site.

Water and Natural Resources

In the No Action Alternative, the project site would not be developed and the existing natural features of the site, including vegetation and on-site pond, would remain unchanged.

The Warehouse Alternative would result in extensive grading of the site through cut and fill operations, thereby changing the natural topography of the site and removing much of the existing natural vegetation. Approximately 40 percent of the lot would be dedicated to open space, with preference given to the preservation of existing habitat rather than the clearance and creation of new habitat, in accordance with local zoning. In contrast, the proposed project would dedicate almost 50 ~~about 47~~ percent of the site to open space, including natural areas. Native landscaping, where feasible, would remain within the site and primarily along the southern and western borders. The on-site pond would be retained in its natural state, as with the proposed project. ~~most likely, but without improvements such as restoration and expansion. The proposed project would also include improvements to the on-site pond. This pond, located at the western border of the site just north of the site's center, is proposed to be expanded and a pump house would provide irrigation to proposed landscaping.~~

Similar to the Warehouse Alternative, development of an office building on the project site would result in significant changes to the natural topography and features of the site due to substantial grading through cut and fill operations. Open space would account for 40 percent of the lot, including preserved natural areas. The on-site pond would also be retained in its natural state ~~and, depending on site design, could also be restored~~.

Stormwater

In the No Action Alternative, the project site would remain undeveloped and the existing pervious surfaces and natural drainage areas would be retained.

The Warehouse Alternative would result in an increase of impervious surfaces on-site, totaling 60 percent of the lot area, compared with just over 50 ~~about 53~~ percent with the proposed project. Such a large degree of impervious coverage could potentially result in significant changes to stormwater runoff and could create the potential for soil erosion impacts. However, in accordance with local zoning, the open space areas would serve to provide on-site stormwater management.

Similar to the Warehouse Alternative, development of an office building on the project site would result in a large degree of impervious coverage over the existing condition, which could significantly affect stormwater management leading to soil erosion impacts. Nonetheless, the open space areas, which would account for 40 percent of the lot, would serve to provide on-site stormwater management, in accordance with local zoning.

Infrastructure and Energy

In the No Action Alternative, the project site would remain undeveloped with no demand for infrastructure or energy services.

Development of a warehouse on the project site would create new demands for infrastructure and energy services. A warehouse would create a greater demand than the proposed project for infrastructure and energy services, except for solid waste services. These impacts are discussed below in greater detail.

Water Supply

The Warehouse Alternative would require utility connections to the Town of Riverhead Water District supply system. The warehouse would use an estimated 9,240 gpd, assuming water supply would amount to an additional 10 percent of the expected sewage generation, based on industry standards. This is about 2,040 ~~2,760~~ gpd more than the demand expected with the proposed project.

Sewage Generation

The estimated sewage generation for an approximately 210,000-square foot warehouse is about 8,400 gpd, based on the design sewage flow rate for general industrial space provided in Suffolk County Department of Health Services Division of Environmental Quality's *Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single-Family Residences* (approved June 15, 1982). This is 1,855 ~~2,510~~ gpd more than the expected flow with the proposed go-kart facility.

The Warehouse Alternative would likely involve the installation of an on-site septic system to dispose of sewage generated from the project site similar to, although much larger than, the proposed project.

Solid Waste

Based on industry standards, an approximately 210,000 square-foot warehouse could be expected to generate an estimated 1,260 pounds of solid waste per week, assuming 10 percent of the building is occupied. As with the proposed project, the Warehouse Alternative would require a private carter to handle and dispose of the solid waste in accordance with the applicable New York State solid waste regulations, and materials would be recycled in accordance with all applicable State and local regulations. The proposed project would generate approximately 235 ~~890~~ pounds of solid waste per week more than could be expected with the Warehouse Alternative, and this difference is not considered significant.

Energy

Energy service for the warehouse would be obtained from LIPA/KeySpan. Based on rates provided by the Association of Energy Engineers, it is estimated that an approximately 210,000 square-foot warehouse could result in an energy demand of 9,261 million BTUs annually or 7,899 ~~7,246~~ million BTUs more than is expected with the proposed project.

As with the Warehouse Alternative, development of an office building on the project site would create new demands for infrastructure and energy services. An office building would create a greater demand for infrastructure and energy services than both the proposed project and the Warehouse Alternative. These impacts are discussed below in greater detail.

Water Supply

The Office Alternative would require utility connections to the Town of Riverhead Water District supply system. The office building could use an estimated 41,580 gpd, assuming water supply would amount to an additional 10 percent of the expected sewage generation, based on industry standards. This is more than 5.75 ~~six~~ times the demand expected with the proposed project and 4.5 times more than with the Warehouse Alternative.

Sewage Generation

The estimated sewage generation for an approximately 630,000 gross-square-foot office is about 37,800 gpd, based on the design sewage flow rate for non-medical office space provided in Suffolk County Department of Health Services Division of Environmental Quality's *Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single-Family Residences* (approved June 15, 1982). This is more than 5.75 ~~six~~ times the expected flow with the propose go-kart facility and 4.5 times more than with the Warehouse Alternative.

The Office Alternative would likely involve the installation of an on-site septic system to dispose of sewage generated from the project site, similar to, although much larger than, the proposed project.

Solid Waste

Based on industry standards, an approximately 630,000 gross-square-foot office building could be expected to generate an estimated 31,500 pounds of solid waste per week. This is over 21 ~~14~~ times the amount of solid waste expected to be generated from the proposed project and 25 times more than with the Warehouse Alternative. As with the proposed project, the Office Alternative would require a private carter to handle and dispose of the solid waste in accordance with the applicable New York State solid waste regulations, and materials would be recycled in accordance with all applicable State and local regulations. Similar to the proposed project, the waste stream from an office building typically consists of a large fraction of recyclable materials, such as paper and corrugated cardboard.

Energy

Energy service for the office building would be obtained from LIPA/KeySpan. Based on rates provided by the Association of Energy Engineers, it is estimated that an approximately 630,000 gross-square-foot office building could result in an energy demand of 49,077 million BTUs annually or more than 36 ~~24~~ times the demand expected with the proposed project and five times more than with the Warehouse Alternative.

Construction

In the No Action Alternative, the project site would remain undeveloped. Therefore, there would be no potential for construction-related impacts.

Soil Erosion and Sedimentation Control

As with most construction projects, the Warehouse Alternative could result in increased stormwater runoff from areas cleared of natural vegetation, subsequently leading to increased potential for on- and off-site soil erosion and sedimentation during the construction period. Construction impacts could be minimized by implementing erosion, sediment, and fugitive dust control measures. With the proposed project, a substantial amount of natural vegetation would be preserved, where feasible, which would serve to minimize erosion. In contrast, the Warehouse Alternative would require the removal of at least 60 percent of the site's natural vegetative cover, thereby increasing the potential for soil erosion and sedimentation over the

proposed project. It is anticipated that the Town of Riverhead would require an Erosion and Sediment Control Plan to minimize impacts.

Traffic

As with construction of the proposed go-kart facility, construction of a warehouse on the project site could cause some increased local traffic congestion due to the delivery and removal of construction materials and equipment from the project site. The Warehouse Alternative could utilize staging areas on-site for loading and unloading of materials to avoid off-site impacts.

Noise and Vibration

As with construction of the proposed project, the use of construction equipment coupled with the movement of delivery vehicles traveling to and from the site would cause increased noise and vibration in the project site area with the Warehouse Alternative. In general, like most construction projects and the proposed project, construction of a warehouse would result in increased noise and vibration that could be considered intrusive to nearby residents. However, these impacts would be temporary and would vary widely throughout the construction period.

Socioeconomic Conditions

As with construction of the proposed project, construction of a warehouse on the project site would create a number of direct and indirect employment opportunities, resulting in millions of dollars in direct and indirect wages and salaries. Constructing a warehouse would also create millions of dollars in tax revenues for Suffolk County and New York State. These taxes would include sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes.

The potential construction-related impacts with the Office Alternative would be the same as for the Warehouse Alternative and similar to those expected to result from construction of the proposed go-kart facility. Any potential construction-related impacts from development of an office building on the project site would be temporary and not considered significant.

UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts occur when a proposed project results in significant adverse impacts for which there are no reasonable or practicable solutions, and for which there are no reasonable alternatives that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts.

The proposed project would create short-term adverse impacts that would be mitigated by the implementation of mitigation measures, to the maximum extent practicable. Temporary or short-term impacts are those that occur during the construction phases of the project.

The following are examples of short-term impacts anticipated as a result of the construction of the proposed project:

- Increased potential for soil erosion and sedimentation on- and off-site;
- Presence of construction vehicles on the site and area roads; and
- Localized noise from construction vehicles and equipment.

All potential short-term adverse impacts would be mitigated to the maximum extent practicable. Standard soil erosion, sedimentation, and fugitive dust control measures, such as wetting the soil in the area of construction, would be utilized during construction to minimize impacts. In

addition, the project would take advantage of construction sequencing and preservation of natural vegetation on-site, where feasible, which would also serve to minimize potential soil erosion and sedimentation impacts.

A staging area on-site for loading and unloading of materials would be utilized to avoid off-site traffic impacts during construction.

Finally, all construction activities would be conducted in full compliance with applicable regulations and local day and hour construction limitations. State and federal requirements mandate that certain classifications of construction equipment and motor vehicles be used to minimize adverse impacts. Thus, construction equipment would meet specific noise emission standards.

These construction conditions are temporary and would end when the initial phases of construction are complete. Therefore, the proposed project would not result in any unavoidable significant adverse environmental impacts.

GROWTH-INDUCING ASPECTS OF THE PROPOSED PROJECT

Growth inducing aspects are generally described as the long-term secondary impacts of a proposed project that trigger further development. Secondary impacts may include growth of physical development, population increases in the surrounding community, increases in economic growth, and/or social or cultural expansion. Proposals that add substantial new land use, new residents, or new employment could induce additional development of a similar kind or of support uses (e.g., stores to serve new residential uses). Actions that introduce or greatly expand infrastructure capacity (e.g., sewers, central water supply) might also induce growth. The proposed project is new construction on a site that is currently vacant to meet the recreational, economic, and tourism needs of the existing and future population of the Town of Riverhead. The construction of the proposed go-kart facility is not expected to encourage or induce significant growth in any area analyzed in this FEIS. However, the proposed F1 Long Island Sports Facility would facilitate economic resurgence in the community by encouraging new business development or a revival of existing businesses in the Industrial C zoning district. The facility would also promote tourism in the area as well as increase the employment and tax base for the Town, Suffolk County, and New York State.

Construction of the project would create short-term economic incentives for companies in the area and on Long Island. These economic opportunities are spurred by the project's increased demand for supplies, equipment, and goods. Such demand would create new short-term job opportunities in construction. As a result of this temporary employment, there would be an increase in payroll taxes and disposable income from these jobs and monies would be spent on local goods and services.

Operation of the proposed project would result in additional property tax revenue for New York State, Suffolk County, the Town of Riverhead, and local taxing jurisdictions. New job opportunities would be created, resulting in an increase in payroll taxes and disposable income for the local economy. In addition, the proposed project would generate additional sales tax revenue.

Moreover, the go-kart facility would attract incremental business from the outside community. The venue is expected to attract a premier corporate customer base, with approximately two-thirds of guests expected from out of town. These visitors would be expected to invest monies in the local economy.

No significant adverse impacts with respect to growth inducing aspects of the proposed project are expected.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible and irretrievable commitment of resources refers to both the built and natural resources that would be expended in the construction and operation of the proposed project. Among the built resources committed to the creation of the proposed project would be raw materials such as fossil fuels, lumber, and metals. Actual building materials to be used include concrete, masonry, and aluminum. The project would require the commitment of energy in the form of gas and electricity consumed during construction and operation of the buildings and the human effort required to develop, construct, and oversee the various components of the project. These raw construction materials are considered irretrievable committed resources because once they are utilized for the construction of the proposed buildings and parking facilities, their reuse for some purpose other than the proposed project would be highly unlikely.

The project would also require some commitment of existing natural resources on-site in the form of vegetative cover. The vegetative community featured at the project site is not unique to this area of the Town or the region and it is not expected that the proposed project would pose a significant adverse impact to the natural flora or fauna resources on or in close proximity to the project site. The open vegetative areas of the site would continue to provide habitat for animals adapted to developed conditions. In fact, nearly half of the proposed site would be dedicated to open space including natural areas. Native landscaping, where feasible, would remain within the site and primarily along the southern and western borders. Planting of various indigenous species of trees and shrubs, where practical, would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site.

The relatively small size of the proposed project site, its proximity to Edwards Avenue and Middle Country Road, and the presence of cleared/disturbed lands on-site suggest that the likelihood of the site providing critical habitat for rare plants and animals is low.

Although the NHP identified sensitive species within Calverton, these species have not been recorded since the late 19th and mid 20th centuries in this area. Listed plants are regulated by the New York State Environmental Conservation Law Section 9-1503, which specifies that it is illegal to damage or remove a protected plant without the consent of the property owner. The presence of a protected plant would not prohibit development of the proposed project but would be taken into consideration in the site planning process. Protected plants, if present, can often be avoided by preserving them in situ or transplanting them to a nearby location. ✷

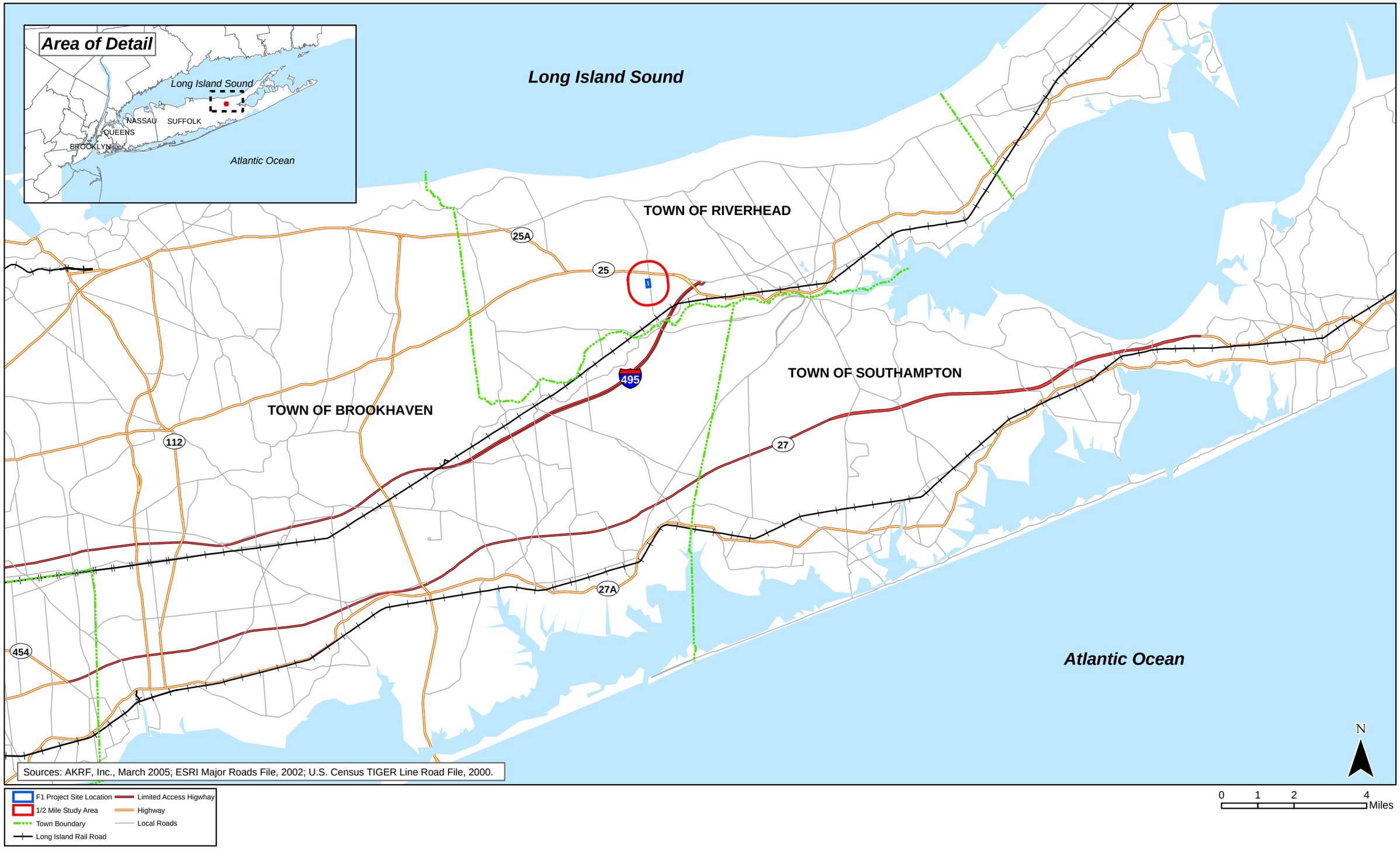
A. INTRODUCTION

The Applicant, F1 Long Island, LLC, is proposing to develop a state-of-the-art go-kart venue to be known as the F1 Long Island Sports Facility (F1 facility or proposed project). The F1 facility would comprise more than one mile of professionally designed go-kart race tracks to serve private corporate outings ~~functions~~ and local residential interests. The facility would include a 14,995 ~~14,800~~ square foot (approximately 21,330 ~~23,000~~ gross square feet) clubhouse that would consist of a restaurant, bar, ~~accommodations for out-sourced catering, a~~ small retail space, office space, club trophy and waiting room, and ~~conference and meeting~~ safety training and briefing rooms for clientele utilizing the go-kart tracks. The ~~only~~ other structures proposed would be a 5,000 square foot maintenance building that would also serve as the greeting post for visitors, and an open structure, approximately 27,540 ~~33,530~~ square feet, used to cover the concession track.

The proposed site is located on Edwards Avenue, about 1,000 feet south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton, Town of Riverhead, Suffolk County, New York (see Figures 1-1 and 1-2). The Suffolk County Tax Map designation for the 12.1-acre site is Section 117, Block 1, Lot 4.2.

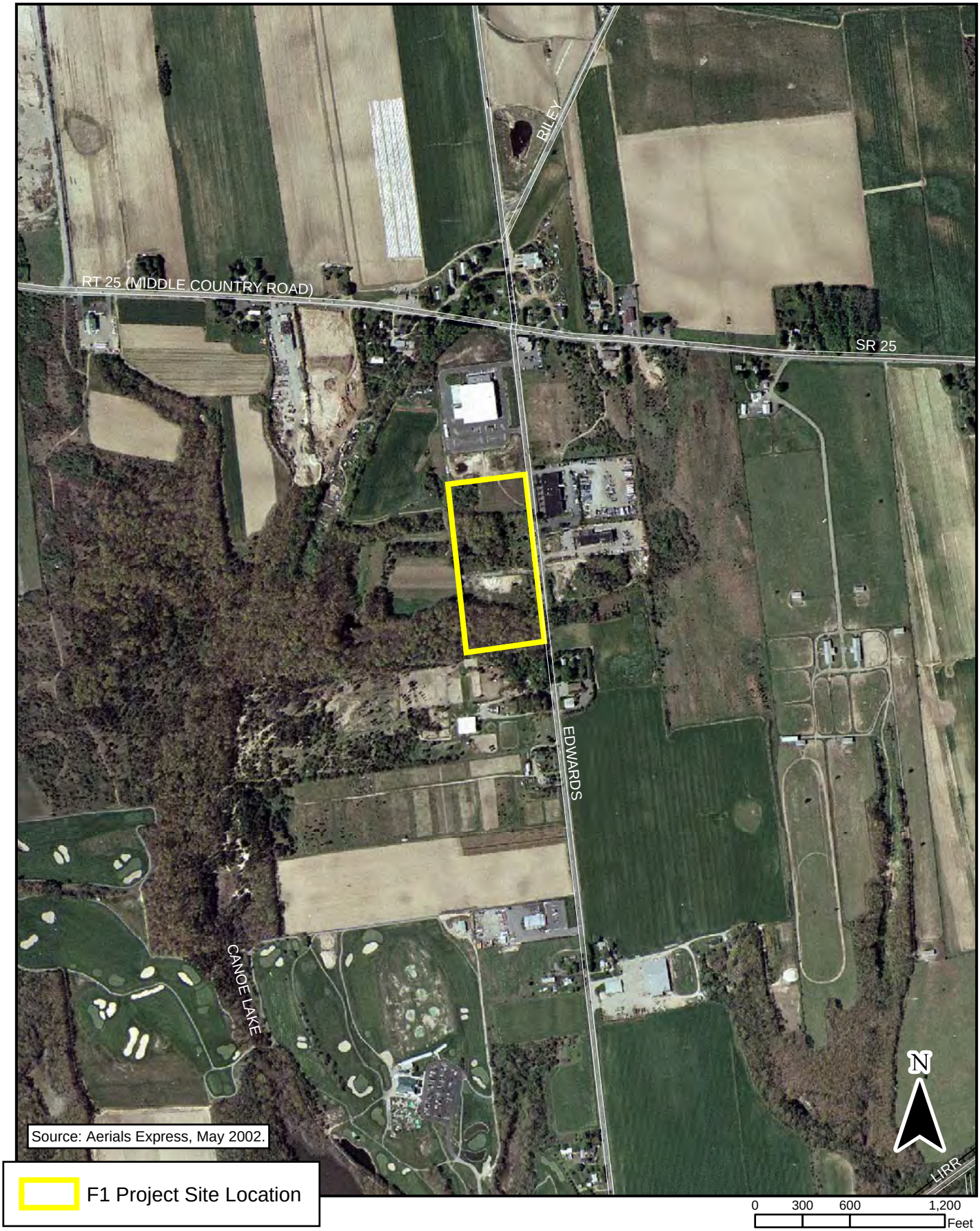
After reviewing the proposed site plan, the Town of Riverhead ~~Town~~ Planning Board, acting as Lead Agency for the State Environmental Quality Review Act (SEQRA) process, determined that the proposed project has the potential to create significant adverse impacts on the environment and required that an Environmental Impact Statement (EIS) be prepared to address these issues. Accordingly, a draft "Scope of Issues" for the EIS was prepared to identify the issues of concern and provide an outline of how these issues would be analyzed, and the Town of Riverhead held a public scoping meeting on November 16, 2005 to accept public comments on the content of the Draft EIS (DEIS). A final "Scope of Issues" was then prepared to modify the draft "Scope of Issues" as necessary, taking into account these comments, and ultimately adopted by the ~~Town~~ Planning Board.

This Final EIS (FEIS) has been prepared in accordance with Article 8 of the New York State Environmental Conservation Law, the implementing regulations promulgated in 6NYCRR Part 617 by the New York State Department of Environmental Conservation. In accordance with state law and in recognition of the site specific aspects of local concern as identified in the final "Scope of Issues," the proposed project and its alternatives are assessed in this FEIS for their potential and adverse environmental impacts on the site and surrounding community. Impacts attributable to the project are evaluated to determine both their beneficial and adverse consequences.



F1 Long Island Sports Facility

Figure 1-1
Regional Site Location



F1 Long Island Sports Facility

Figure 1-2
Site Location

B. PROJECT PURPOSE AND NEED

Go-karts were originally developed in the United States by Art Ingels in 1956 and the phenomenon soon after exploded in Europe. Interestingly, there are currently more than 2,000 F1 go-kart facilities in Europe and about 55 in the United States. The proposed F1 facility and business plan is modeled after its successful sister facilities located near Boston, which have been in operation since June 2000.

The premise of this recreation and sports facility is to provide a premier ~~off-site corporate conference~~ entertainment center for regional companies and a premier recreational/sporting activity for the enjoyment of Long Island families. The corporate aspect of the project would provide a new and fresh venue for ~~meetings, training programs,~~ team building ~~events~~, for fostering improved customer relationships, and for loyalty programs ~~as well as office parties serving~~ for regional based organizations. The general public, while having access to the facility primarily on weekends, would also be able to rent the facility for private parties ~~and events~~.

In November 2005, the Long Island Association, a regional organization that promotes Long Island as an integral place to live, work, and do business, with it publication, *BusinessLI,* identified recent trends of regional corporations to hold innovative corporate ~~meetings and events~~ outings such as go-kart racing, rock climbing, and beach outings. Although this trend has not dominated the corporate affairs market, the idea is catching on and Long Island ~~hotels and~~ entertainment facilities expect these types of activities ~~events~~ to grow as corporations look for ways to improve employee morale; develop creative training techniques to promote teamwork; impress existing and potential clients; and progress overall corporate culture.

Long Island families are also in need of productive outlets to enjoy family and friends. A recurring criticism of the regional Long Island community is the lack of activities and entertainment for children and adults. As Long Island continues to experience intense building pressures, the land to accommodate recreational facilities decreases and thus, the use of motor sports off-road increases. This project would afford those interested in motor sports the opportunity to utilize a legal facility without degrading natural areas. In addition, the recent closing of the Westhampton go-kart track leaves enthusiasts no local venue without having to travel measurable distances. The addition of the F1 facility would also provide children between the ages of 7 and 17 with an exciting activity that would help to promote self confidence, competitive sportsmanship, coordination, self reliance, and a sense of responsibility and accomplishment. In addition, specialty programs such as trading track time for A's on a child's report card are key features of the F1 facility's premise to support children in healthy and safe activities. Moreover, adults interested in this sport as a hobby or professionally would now have a local place to test and improve their skills.

The go-kart tracks have been professionally designed to utilize the site's natural rolling topography, thus enhancing the racing experience, and would be the first of its kind in the United States and abroad. Typical track designs are flat and lend themselves to repetitive racing. This unique design would attract worldwide attention from experienced drivers as well as from local residents interested in a new form of leisure and entertainment. The design of the track is largely below the existing grade along Edwards Avenue, thus minimizing obtrusive views to the site. If this site were to be developed as a typical industrial or commercial use, the natural topography would have to be significantly altered and drastic changes to the landscape would follow.

By siting the facility in the Town of Riverhead, the proposed project would increase tourism and consumer spending in the region, not only at the facility but also at local shopping and lodging venues. It is estimated that operation of the go-kart facility would generate between about $700,000 and $950,000 in annual sales tax revenues and approximately $84,000 in property tax revenues. Further, it is expected that the facility would employ ~~110 to 125~~ 90 people, including ~~50~~ 35 full-time jobs offering employee benefits. The proposed facility would also indirectly result in additional employment opportunities for local tradesmen and service companies.

C. INVOLVED AGENCIES/PARTIES

Town of Riverhead Planning ~~Town~~ Board

Town of Riverhead Zoning Board of Appeals

Town of Riverhead Conservation Advisory Council

Suffolk County Department of Health Services

D. DESCRIPTION OF PROPOSED PROJECT

The F1 Long Island Sports Facility would provide the first European F1 style racing accommodations on Long Island and the first go-kart track in the world designed within natural rolling topography. This facility would become a premier destination for novice drivers and experienced track racers. Whether a corporate outing ~~event~~ or a normal weekend customer, anyone planning on racing at the F1 facility would don a flame-proof suit, helmet, neck brace, and gloves; receive a driver briefing; qualify on the concession track to receive a F1 competition license; and finally, race against other drivers and be scored by a computerized system. Each driver would participate in a practice session before the race begins.

The F1 program would include open session driving, training, camps, leagues, and memberships. Specifically, these programs would feature the following components:

- **Arrive and drive:** visitors over 18 with a valid driver's license would rent karts or bring their own karts to race. This activity would be predominant during the weekend hours of operation. Reservations would be accepted, and encouraged, similar to a public golf course;
- **Hourly or daily track rentals:** larger groups of visitors, including corporations and residents, would rent one or more tracks for their exclusive use. The track rentals could include various forms of racing depending on the group size. These races would range from 0.5 to 3 hour endurance races, a mini-grand prix, or open session racing;
- **F1 Driving School/training:** adult clinics would be provided for those interested in learning the basics and for drivers who want to improve their technique and time. In addition, group and private training lessons would be provided;
- **The Junior Racing Academy:** children between the ages of 7 and 17 would be given extensive training in kart racing where graduates would become eligible to participate in the Junior League Racing Series and/or the advanced Junior Racing School;
- **Camps:** daily training for children during the summer months;

- **Leagues:** individuals or small groups would join an existing league or start their own league for regular competitive racing. Interested parties could include companies, clubs, and associations. Leagues would be formed for both adults and children; and
- **The Kart Club:** patrons who own their own karts would purchase a membership to the facility that would afford them such privileges as storage for their karts; access to locker rooms with showers ~~and VIP areas of the clubhouse including private dining and meeting rooms~~; and unlimited driving time.

Corporate outings ~~functions~~ would draw approximately 45 employees/invitees, while it is anticipated that the average weekend day would draw approximately 100 customers over the course of the entire day.

The F1 facility is planned to operate on a year-round basis, with the high speed professional track operating on a seasonal basis between mid-March and mid-November~~, until phase 2 when the concession track would be covered~~. Because the high speed track is not covered, this track would likely close during inclement weather. During mild winters, the facility may operate on a periodic basis. While the facility would open at 9 AM, races would commence at 10 AM and stop at dusk. ~~Anyone under the age of 21 is not permitted on-site after 8 PM.~~

PROPOSED PROJECT COMPONENTS

The F1 facility would comprise two separate track~~s~~ types: the covered concession track and the high speed professional track. The covered concession track would primarily be used for corporate outings ~~events and~~, as a qualifying track to receive a F1 competition license, and as the track where inexperienced drivers learn and improve their skills. Approximately 90 percent of the go-kart activity would occur on the concession track. ~~This track would provide five configurations with varying lengths that in addition to qualifying would be used to race. The five configurations include four varying lengths from 915 feet to 1,625 feet or a 720 foot oval track.~~ This track would be located toward the southeastern part of the site within the high speed professional track, which would be designed to take advantage of the natural features throughout the entire 12.1-acre site. The high speed professional track would be used only by those who have attended the F1 Driving School and have achieved better than a specified lap time on the concession track. Further, the~~is~~ high speed professional track could be separated into two distinct tracks: the southern section would be used by Kart Club members and the northern portion would be used for arrive and drive customers. Therefore, two races would be allowed to occur simultaneously on this track, in addition to the use of the concession track. Thus, three tracks could be in operation at any one point. Generally, the high speed track would remain separated throughout the operating season, ~~with the exception of one time per year when~~ except if the national go-kart series were ~~is~~ held on-site (see Specialty Races below). ~~This track would provide six configurations. Three of those configurations range in length from 4,640 feet to 5,280 feet. The separated track also has three configurations, where each of the two tracks would range in length from 2,300 to 2,800 feet.~~ All tracks would allow racing in two directions and would be cleaned daily by a machine to remove oil and grease and any remnant rubber from the kart tires.

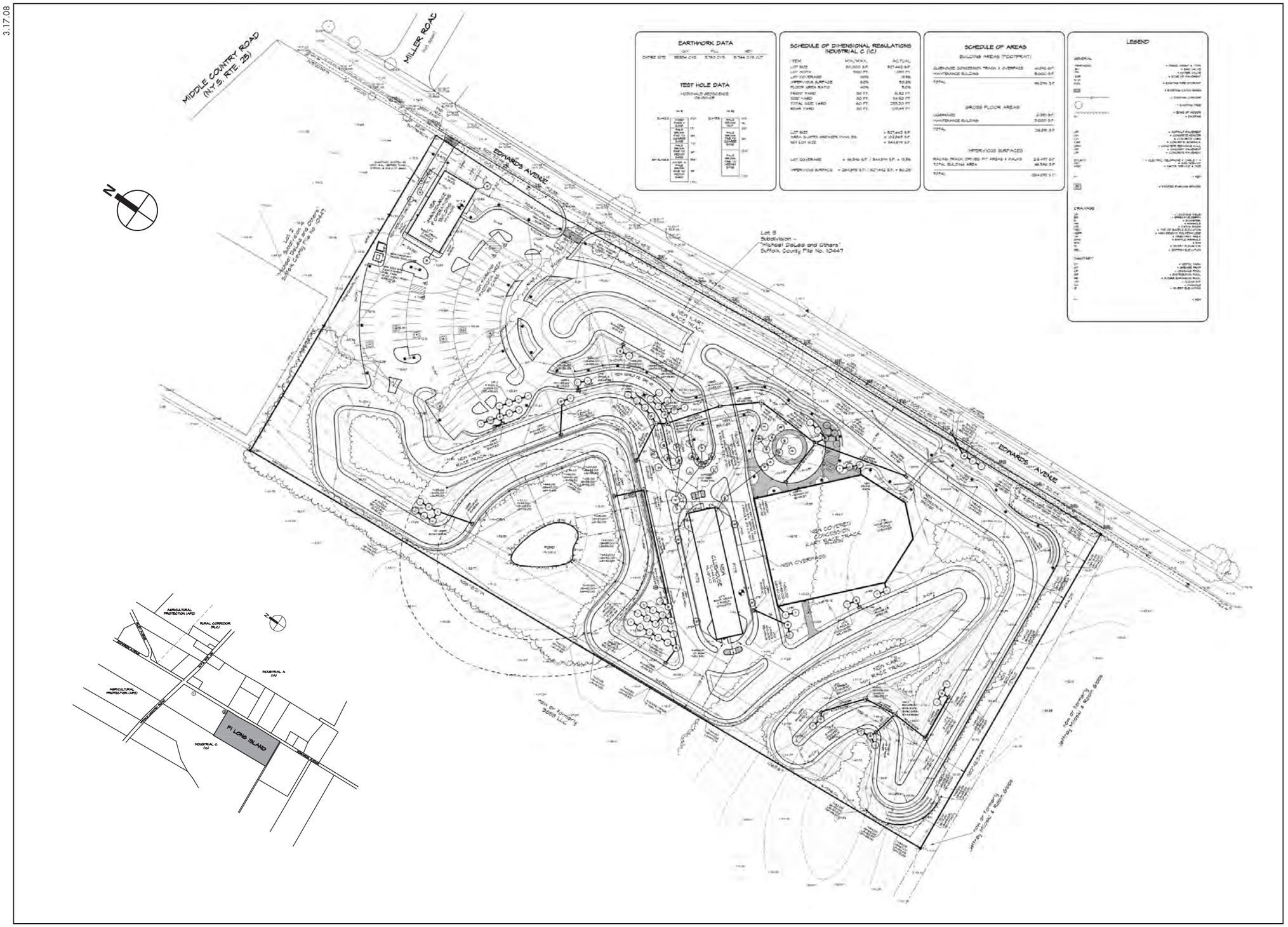
Each track would be permitted to accommodate 15 karts per race. Therefore, with three separate tracks, there would potentially be up to 45 racers on the track at any one moment. (Since the southern track would be devoted to Kart Club members, the likelihood of 45 karts racing at one time is minimal and would seldom occur.) A race entails 15 laps (usually 1 practice lap and 14 race laps). Each race would range in time from about 15 minutes on the concession track and

between 20 minutes and 1 hour on the main track, depending on who is racing. The races would be scored by a state-of-the-art computerized system. Spectators would be able to view the races from masonry bleachers that would be constructed at the southeastern and southwestern edges of the site and would each accommodate approximately 30 viewers, and spectators would be able to view the races on television screens within the clubhouse.

Three distinct types of karts would be permitted at the F1 facility: concession karts, club karts, and competition karts. The concession karts would comprise about 90 percent of the facility's business and are the karts generally rented by the public. These karts have 4-stroke, 6.5-horsepower (HP) Honda engines. The size of the kart would vary depending on the user. Club karts are those sold to members of the Kart Club. These karts also have 4 stroke Honda engines ranging from 9 to 13 HP. The competition karts would be privately owned and would largely be used on weekend days and are only permitted on the arrive-and-drive track (i.e., the northern track). The engines range from 4 to 33 HP. All privately owned karts would have to meet the F1 facility specs, including all safety equipment required by the F1 facility, and must use F1 approved mufflers. These mufflers are for sale or rent at the facility. Outlaw karts, karts without mufflers or without a F1 approved muffler, are not permitted at the F1 facility. The average speed for the concession karts ranges from 20 to 34 miles per hour (mph), while the average speed for the club and competition karts is over 50 mph. All karts owned by the F1 facility would have electronically controlled governors that would be handled by the in-house chief safety instructors to ensure maximum safety is achieved when the karts are operating on the tracks.

As mentioned, the structures proposed at the site include a clubhouse, maintenance/greeting building, and open structure to cover the concession track. See Figure 1-3 for the proposed site plan. Perspective views, elevations, and floor plans of the clubhouse and concession track cover are provided as Figures 1-4 to 1-12. The clubhouse, an approximately 21,330 ~~23,000~~ gross square foot building, would comprise three floors and would incorporate existing topography, with portions of the building below grade. ~~, two above grade with the lower level constructed to incorporate the existing topography~~. ~~This would allow for three sides of the lower level to be above grade with the front of the building below grade.~~ The maximum height of this structure would be ~~approximately~~ 35 ~~55~~ feet ~~with a mean height of 49 feet~~. ~~Figures 1-4 through 1-6 provide a visual depiction of the proposed clubhouse from the front, rear, and sides, respectively. As shown in Figure 1-6, t~~ The clubhouse would be connected to the covered concession track by an overpass/bridge ~~enclosed corridor on the first level~~. ~~Provided as Figures 1-7 through 1-9 are the floor plans for each of the three levels proposed within the clubhouse.~~ The building would be located towards the center of site, northwest of the concession track. The clubhouse would include a motor sports themed restaurant with a bar primarily for weekend use by the public; a small retail store for apparel and kart parts such as tires and mufflers; ~~accommodations for out-sourced catering for corporate use principally during the work week;~~ office space; safety training and briefing rooms; a club trophy and waiting room ~~conference/meeting rooms for members and corporate functions~~; locker and shower rooms for members; public restrooms; and storage for up to 236 ~~500~~ karts. The clubhouse would be the hub for social interaction among racers ~~and the state-of-the-art meeting and conference center would be an essential component for learning and skill development~~. Because F1 Long Island Sports Facility has zero tolerance for drugs and alcohol, most race participants would be given a breathalyzer test before racing and then given a wristband to signify that they passed the breathalyzer test. If the participants patronize the bar, the wristband is cut and removed and the participant is no longer allowed to race.

3.17.08



F1 Long Island Sports Facility

Proposed Site Plan
Figure 1-3

3.25.08

Proposed Clubhouse and Concession Track
Perspective View from North
Figure 1-4

3.25.08

Proposed Clubhouse and Concession Track
Perspective View from South
Figure 1-5

FRONT ELEVATION

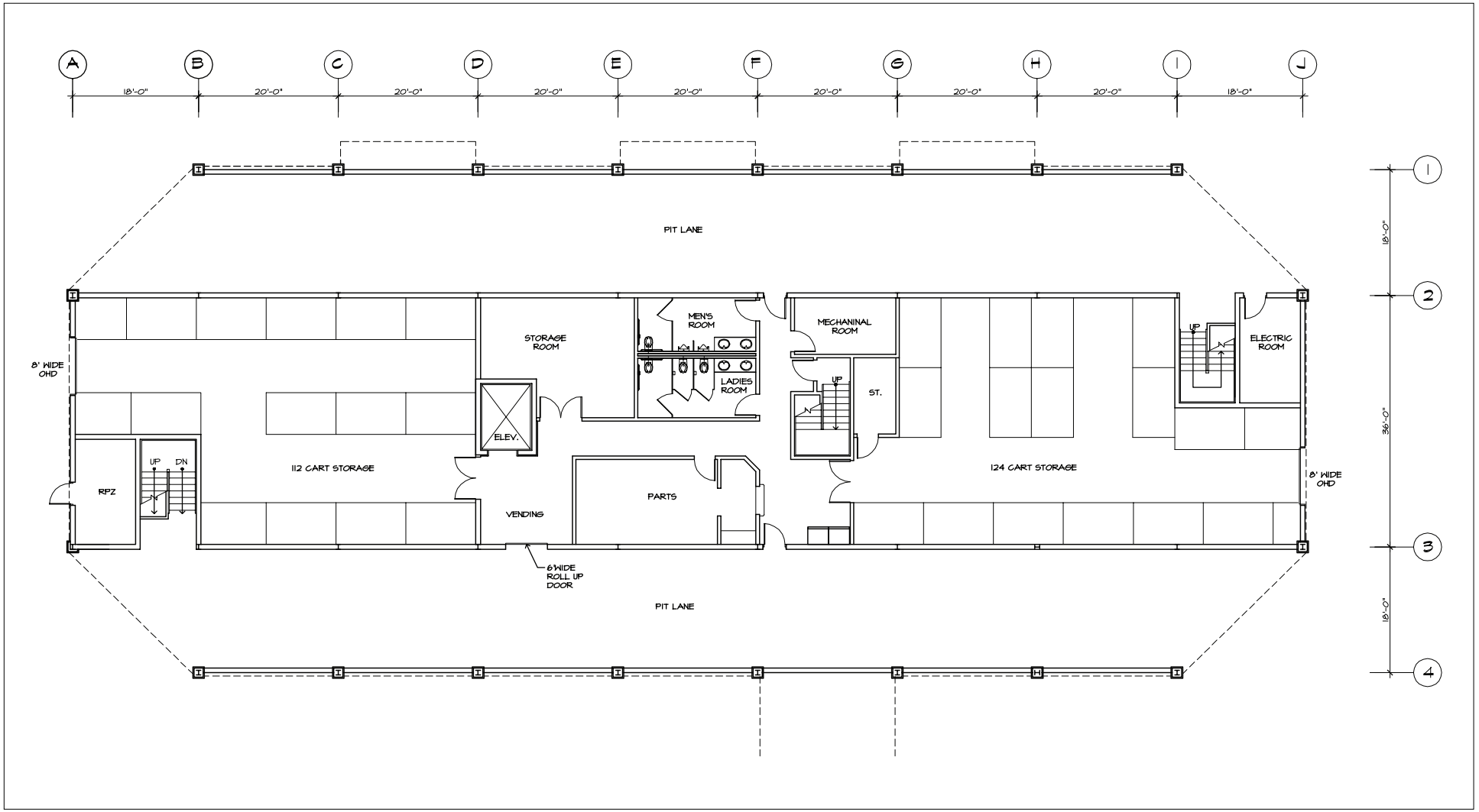
SIDE ELEVATION

Proposed Clubhouse and Concession Track
Front and Side Elevations
Figure 1-6

REAR ELEVATION

SIDE ELEVATION

Proposed Clubhouse and Concession Track
Rear and Side Elevations
Figure 1-7



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SCALE

Proposed Clubhouse
Track Level Floor Plan
Figure 1-8

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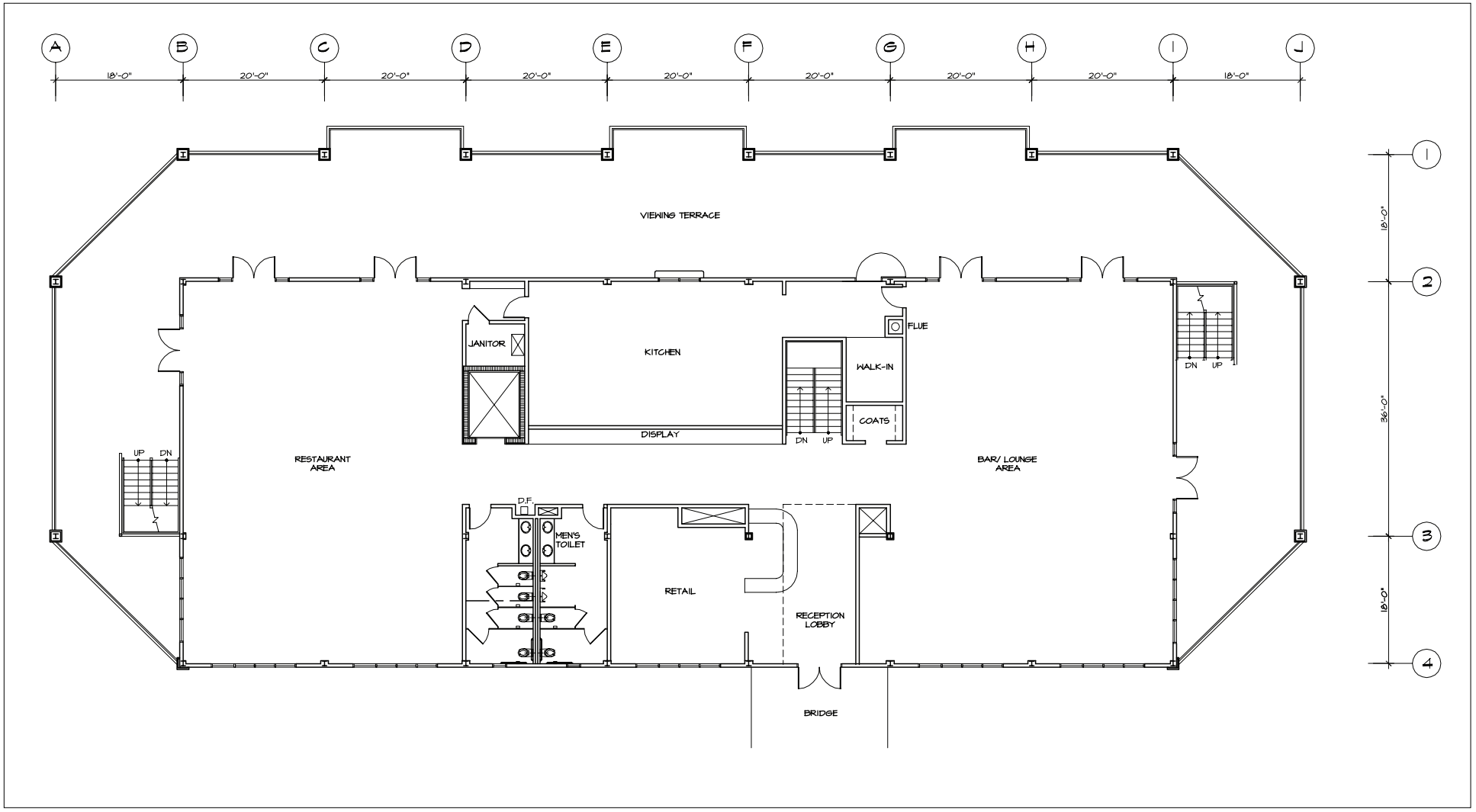

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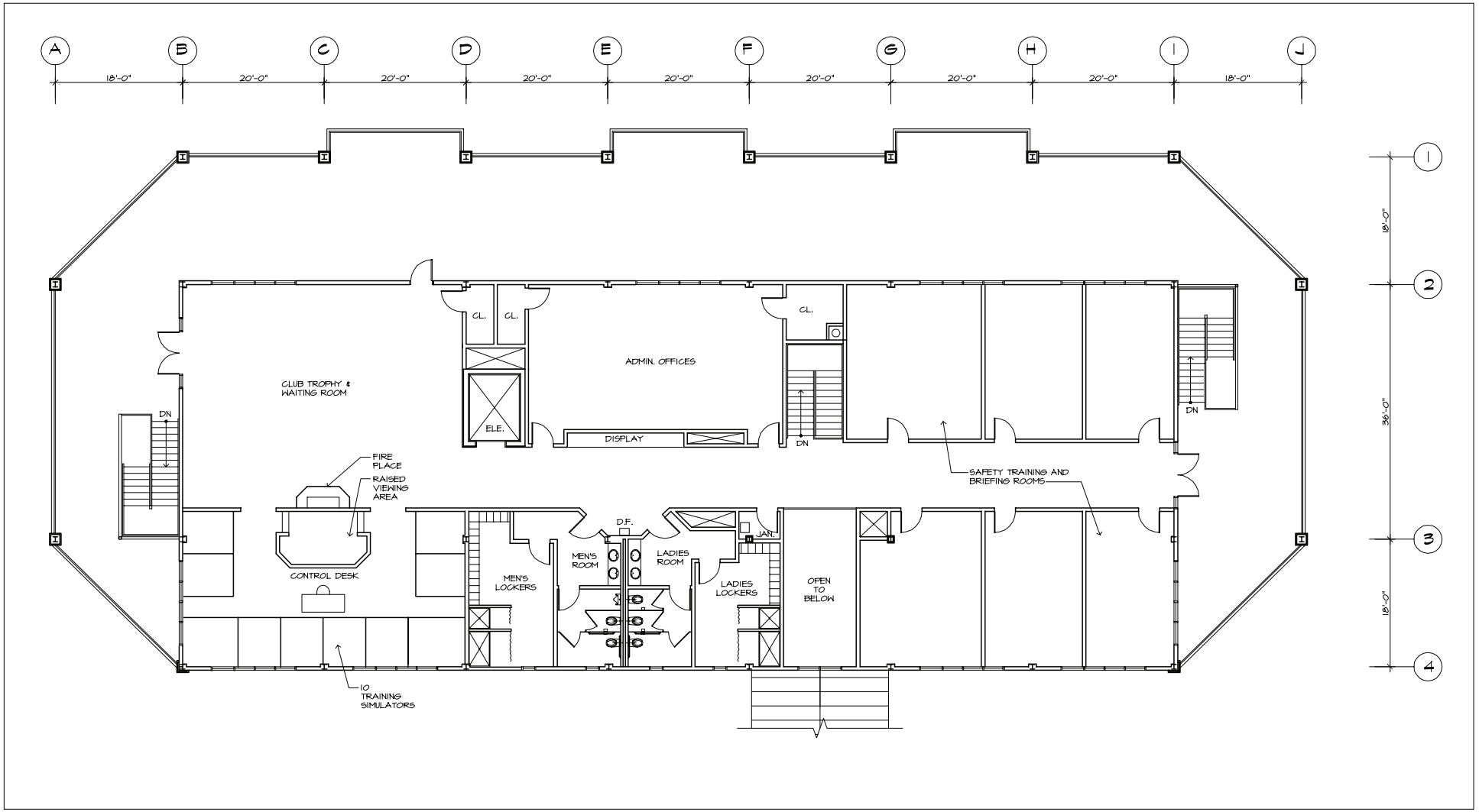
SCALE

Proposed Clubhouse
Main Level Floor Plan
Figure 1-9



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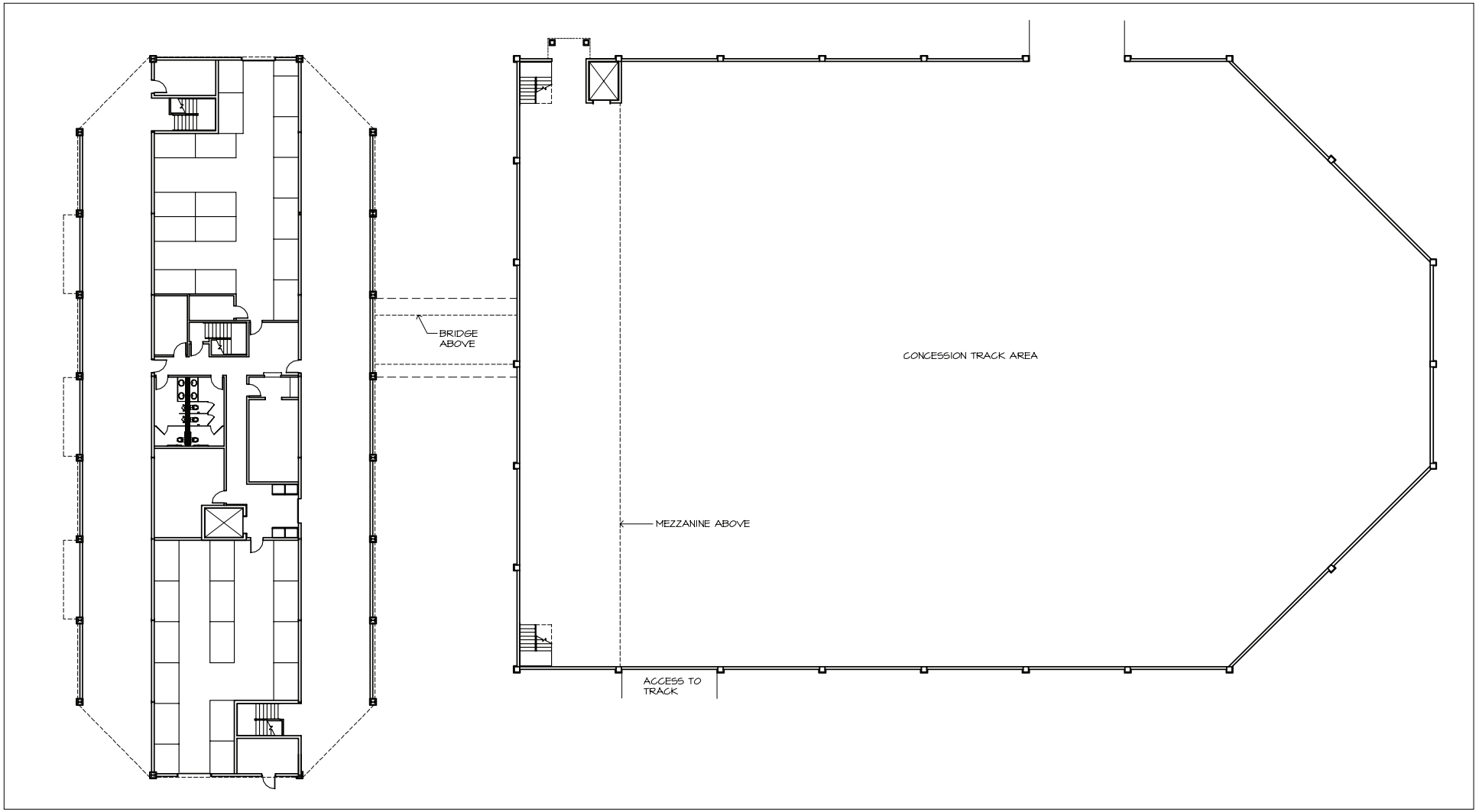
SCALE

Proposed Clubhouse
Upper Level Floor Plan
Figure 1-10

3.25.08



Proposed Clubhouse and Concession Track
Combined Track Level Floor Plan
Figure 1-11

F1 Long Island Sports Facility

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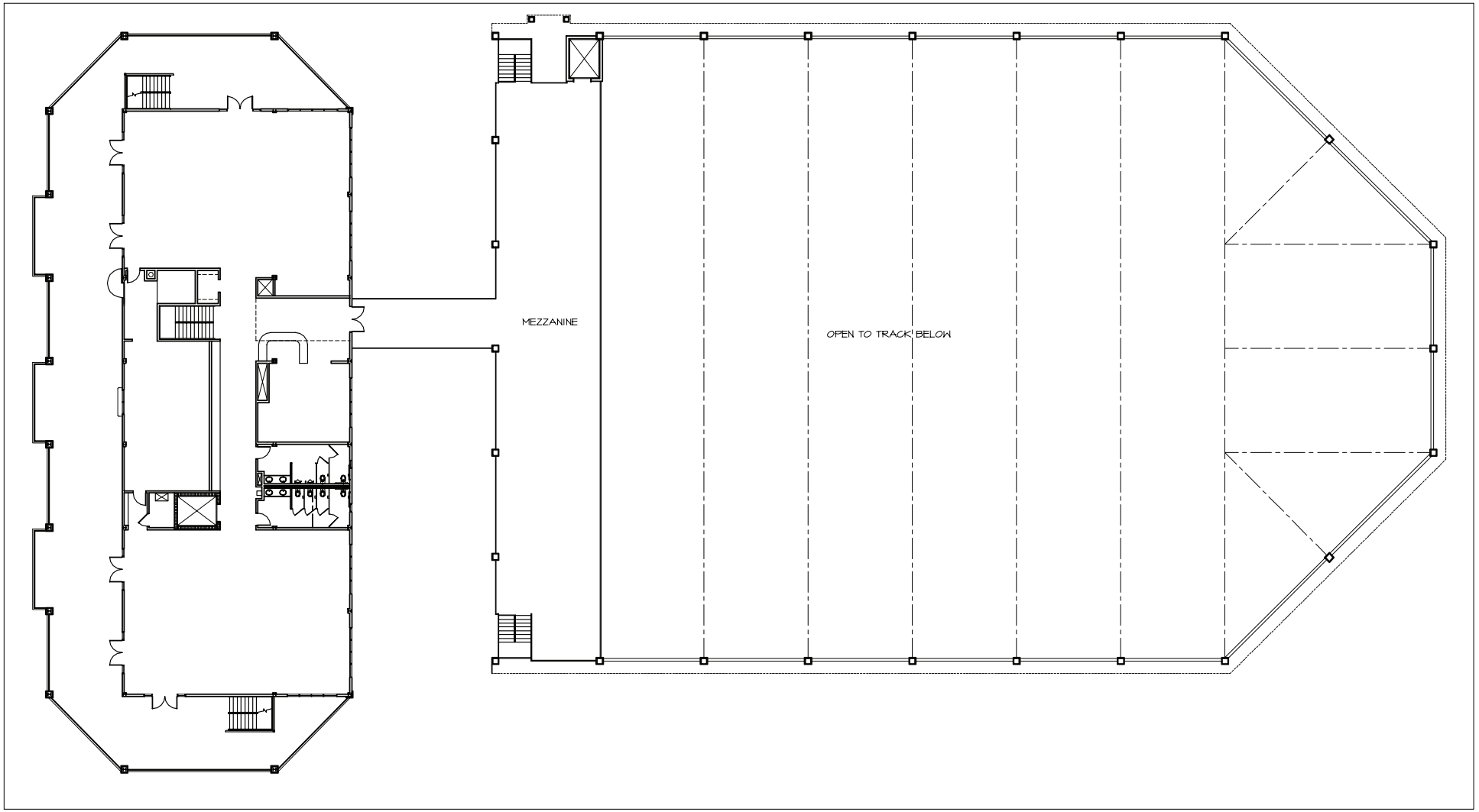

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SCALE

Proposed Clubhouse and Concession Track
Combined Main Level Floor Plan
Figure 1-12

The maintenance building, to be located at the northernmost border of the site at the main entrance, would include the Race Operations Center, where members, guests, and visitors would be greeted. Kart storage would also be provided in this building, as would maintenance of the karts, repairs, parts, and track services. This structure would be approximately 24 feet high. The maintenance building would also provide space for the track operation offices and employee lunchroom ~~lounge~~. A perspective view, elevations, and floor plan of the maintenance building are provided as Figures 1-13 to 1-15. The facility's ~~main~~ parking area would be located in this area of the site~~ and an additional parking area would be provided within the concession track. The parking area within the concession track would only be utilized when the national race is held at the F1 facility or when the track is privately rented. (See Specialty Races below for details on the national races.)~~ The main entrance to the site would be provided along Edwards Avenue where the ~~main~~ parking area would be located. A second entrance located north of the maintenance building would be used solely as a service entrance for deliveries~~,~~ and staff~~, and large trailers expected during the national go-kart event~~.

Both the high speed and concession track pit lanes would be surfaced in concrete. The high speed track, concession track, and parking lot would be surfaced in asphalt. Pervious pavers would be used for proposed walkways.

The open structure is proposed to cover the concession track and would allow kart operations on the concession track regardless of weather conditions. This structure, designed as an open building with a roof and supporting poles, would be approximately 27,540 ~~35,530~~ square feet and~~ range in height from~~ 35 ~~to 51~~ feet above grade. Similar to the clubhouse, the cover over the concession track would be constructed to incorporate the existing topography and therefore minimize the appearance of the structure.

In addition, the proposed project would feature three sound barriers varying in height from about 7 to 25 feet. The longest barrier would be located more than 30 feet from the southern site boundary and wrap around the southern corners, heading north for a short duration. This barrier would range in height from about 7 to 25 feet due to the natural changes in elevation. The tallest part of this barrier would be located towards the center-edge of the site. The second barrier would be a permanent retaining wall that extends west from the clubhouse and would follow the southern portion of the northern track. This barrier would be about 10 feet high. Because these barriers would be located beyond the required 30 foot setback from the front and side site boundaries, they are considered a structure as defined by the Town Code. The third barrier would be moveable and only used when competition karts are utilized on the northern track. This barrier would range in height from 7 to 10 feet and would follow the southern portion of the northern track, east of the clubhouse.

Another feature of this unique project is the presence of a manmade pond that was formerly used for irrigation. This pond, located at the western border of the site just north of the site's center, is proposed to be preserved and would remain undisturbed ~~expanded and a pump house would provide local irrigation at site plantings~~. A dedicated well is proposed as an irrigation source for on-site plantings. The well would be located to the south of the pond and would be setback more than 100 feet from the pond.

Native landscaping, where feasible, would remain within the site and primarily along the southern and western borders. Planting of various trees and shrubs would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site. Existing

Proposed Maintenance Building
Perspective View from South
Figure 1-13

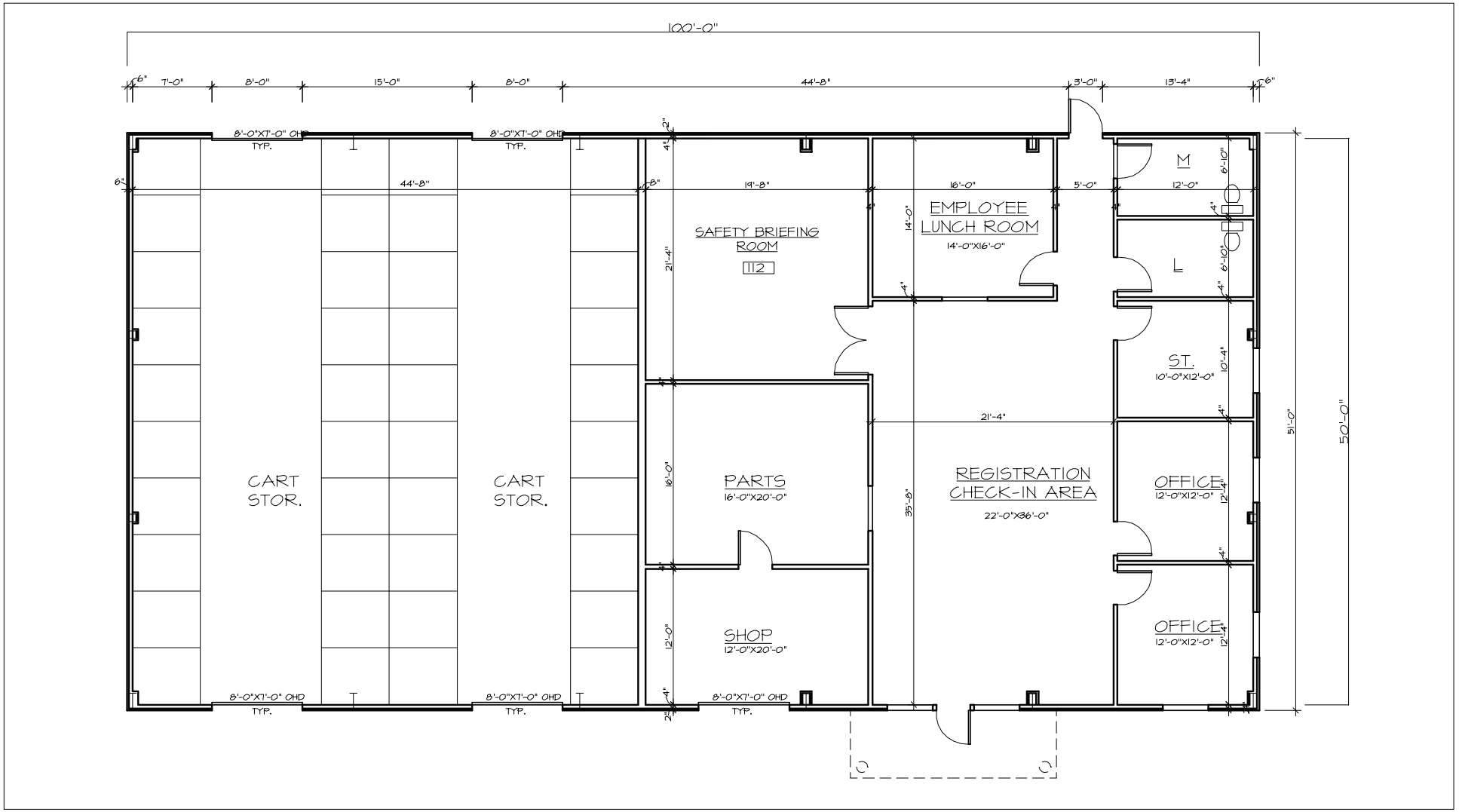
SIDE ELEVATION - SOUTH

FRONT ELEVATION - EAST

SIDE ELEVATION - NORTH

REAR ELEVATION - WEST

Proposed Maintenance Building Elevations



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SCALE

F1 Long Island Sports Facility

Proposed Maintenance Building Floor Plan

Figure 1-15

natural and wooded areas would make up 15.6 percent of the total lot area, and landscaped areas would make up 34.2 percent of the total lot area.

The F1 Long Island Sports Facility would become the leading innovative and upscale ~~meeting,~~ entertainment and recreational facility for the local community, regional organizations, and tourists. This facility, fueled by corporate demand for fresh recreational ~~event~~ alternatives and the recent popularity of motor sports, would also afford local youth and their parents a unique opportunity to reinforce teamwork, responsibility, focus, and judgment skills gained from motor sports; and provide a destination for family fun. The proposed project is designed to accomplish these goals, resulting in a project that is compatible with the site, its physical characteristics, its location, and the surrounding area.

SPECIALTY RACES

As currently proposed, the project does not include any special events. If such events are contemplated in the future, pursuant to Chapter 90, Special Events, of the Town of Riverhead Town Code, F1 would submit an application for approval of ~~any proposed annual~~ the events to ensure that issues related to public health, parking, traffic, and safety are addressed. It is anticipated that the F1 facility ~~would~~ may hold one national event per year that would draw between 400 and 500 drivers and spectators. These events would commence at 9 AM and end at dusk. The races would take place over the entire high speed track and would be continuous throughout the day. The concession track would be closed during these events ~~and the inside parking area would be utilized~~. Due to the large turnout for these events, parking overflow would be accommodated at the adjacent property immediately north of the project site. The applicant has signed a long-term lease with the owner of this property to utilize 1 acre of land that abuts F1 for overflow and staff parking.

A~~nother~~ scheduled race proposed to be incorporated into F1 facility's program is the monthly club event to take place on Sundays for Kart Club members. This event would include several races at varying levels where the drivers would range in age from 7 years old to senior drivers (over 16 years of age).

E. DISCRETIONARY ACTIONS

The project is proposed to be located on premises zoned Industrial C (IC). The F1 project, a professional go-kart facility, is an allowable use in the IC district. The intention of this district, according to Chapter 108 of the Town of Riverhead Code, is to allow and encourage commercial recreational businesses and provide for light industrial uses within the area between Enterprise Park (about 1 mile west of the project site) and the terminus of the Long Island Expressway (LIE). Pursuant to §108-278 of the Town of Riverhead Code, permitted uses include offices, warehouses, greenhouses, wholesale businesses, laboratories, vocational schools, golf courses, parks and playgrounds, equestrian facilities, commercial sports and recreation facilities, and dog and horse training and boarding facilities. Further, accessory uses are defined as "customarily incidental" to permitted uses which are allowed in the IC district. Because the accessory uses are not specifically identified, the Town of Riverhead Zoning Board of Appeals (ZBA) was charged with determining whether retail, restaurant, meeting rooms, bar, lockers and kart maintenance and storage are "customarily incidental" to a professional go-kart facility.

The proposed application was designed to comply with the lot, yard, and bulk requirements of the IC district, except that F1 requested a height variance from the ZBA for the proposed

clubhouse and open-sided structure to be utilized as a cover to the concession track, pursuant to Article XVII of the Town of Riverhead Zoning Ordinance.

On September 14, 2006, the ZBA issued a four page determination upon the appeal of F1 (Appeal Number 06-53). The ZBA determined that the proposed facility is a sports recreational facility in accordance with the Town Code and therefore is an allowed use in the IC district, and further determined the following:

- The proposed accessory uses of kart maintenance and storage, food services (bar), lockers and limited retail sales are customary and incidental accessory uses to a kart racing facility;
- The proposed accessory uses of meeting and conference rooms are not customary and incidental accessory uses to a kart racing facility;
- Based on the building height definition in the Town Code and the definition of mean ground level, the proposed amended alternative plan for the height of the clubhouse and concession track of 35 feet is granted in support of the design and safety of kart participants' access and having a distinct point of access for the spectators;
- The building height variance is minimal and will not cause an undesirable change in the character of the neighborhood or a detriment to nearby properties, because other commercial businesses have these building heights in this community; and
- Based upon this Board's review of the environmental assessment form, the recommendation of the Planning Department, and its own analysis, it has been determined that the application is a Type II and it has no environmental significance.

F1 agreed to the terms and conditions set forth in the ZBA determination dated September 14, 2006, and the project design has been changed in accordance with this ruling.

~~Pursuant to Article XVII of the Chapter 108 of the Town of Riverhead Zoning Ordinance, the proposed F1 Long Island Sports Facility would require a variance from the Town's Zoning Board of Appeals. The proposed clubhouse would be designed with a maximum height of approximately 55 feet above grade while the permitted height within the designated zone where the project is proposed is 30 feet. The proposed open structure to be utilized as a cover to the concession track would maintain a maximum height of 51 feet above grade. Thus, the proposed project would require the issuance of a height variance of 25 and 21 feet, respectively. However, the clubhouse would be designed to incorporate the existing grade; therefore, the roof of this structure would appear, from Edwards Avenue, to be at the same height as the 24 foot maintenance building. Moreover, due to the natural grade changes at the project site, the roof of the concession track cover would actually be only 10 feet above the grade along Edwards Avenue.~~

~~In addition to this approval,~~ An official site plan of the proposed project must be authorized by the Planning ~~Town~~ Board. All site plans would conform with the rules and regulations set forth in Chapter 108, Article XXVI of the Town of Riverhead Zoning Ordinance.

F. PROJECT CONSTRUCTION

Construction of the proposed project would occur in two phases: phase 1 would include the tracks, cover for the concession track, maintenance building, sound barriers, and parking areas~~, and pond expansion~~, and phase 2 would include construction of the clubhouse ~~and the cover for the concession track~~. Following receipt of site plan approval, it is estimated that construction of phase 1 would take approximately four months and construction of phase 2 would take

approximately nine months. Phase 2 would not be constructed until the second season of operation. As currently planned, construction would commence in *2011* and the proposed facility would be operational in *2012* ~~phase 1 of the new facility would open in summer 2006 and phase 2 would open at the beginning of the 2007 season~~. Prior to construction of the clubhouse, the public would have access to bathroom facilities in the maintenance building, where the staff meeting room would also function as a safety training and briefing room. Catered food would be served under the covered concession track during this same period, consistent with the ZBA determination.

Construction of the project is estimated to create 35 person-years of direct construction employment. (A person-year is the equivalent of one person working full-time for a year.) In addition to direct employment, construction of the project would create an estimated 32 additional jobs off-site, bringing total employment to 67 person-years. Direct wages and salaries from constructing the project are estimated at $1.78 million. Including off-site effects, total direct and indirect wages and salaries from constructing the project are estimated at $3.12 million. In the broader New York State economy, total employment from the construction of the proposed project would be 69 person-years and total direct and indirect wages and salaries from constructing the project are estimated at $3.22 million.

Construction of the project is estimated to create approximately $462,400 in non-property related taxes for Suffolk County, New York State, and the Metropolitan Transportation Authority, including sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes.

Construction impacts would be minimized by implementing erosion, sediment, and fugitive dust control measures, including hay bales, silt fence(s), prompt post construction replanting/revegetation, watering down construction areas, and other generally accepted construction practices identified in the *New York Guidelines for Urban Erosion and Sediment Control* ~~determined to be appropriate through the site plan review process~~. Appendix A includes the Erosion Control Plan for the proposed project.

G. THE SEQRA PROCESS

This FEIS for the proposed F1 Long Island Sports Facility project has been prepared pursuant to SEQRA and its implementing regulations. The environmental review provides a means for decision-makers to systematically consider environmental effects, both beneficial and adverse, along with other aspects of project planning and design to evaluate reasonable alternatives, and to identify and, when practicable, mitigate significant adverse environmental effects. The environmental review process is outlined below.

- Establishment of a Lead Agency. Under SEQRA, the "Lead Agency" is the public entity responsible for conducting an environmental review. Usually, the lead agency is also the entity primarily responsible for carrying out, funding, or approving the proposed project. As previously stated, the lead agency for the proposed project is the Town of Riverhead ~~Town~~ Planning Board.
- Determination of Significance. The Lead Agency's first charge was to determine whether the proposed project might have a significant impact on the environment. Appendix B contains a copy of the Determination of Significance. To aid in this determination, the Lead Agency reviewed the Applicant's site plan (see Appendix A for the latest site plan). The

Town determined that the project might have a significant effect on the environment—requiring that an EIS be prepared—and issued a Positive Declaration on October 4, 2005.

- Scoping. Once the Positive Declaration was published, the Town prepared a "Scope of Issues" and the Applicant prepared a scope of the EIS contents. "Scoping," or creating the "Scope of Issues," is the process of focusing the environmental impact analyses on the key issues to be studied. A public scoping meeting was held as part of the process on November 16, 2005. The scope was refined subsequent to the meeting to reflect comments made, and to define methodological approaches to the technical analyses in more detail (see Appendix B).
- Draft EIS (DEIS). In accordance with the "Scope of Issues," a DEIS was prepared. The Town of Riverhead reviewed the DEIS for adequacy and completeness in relation to the adopted scope for the purpose of public review, and issued a Notice of Completion on December 7, 2006. The Town of Riverhead Board issued the DEIS for public review.
- Public Review. Publication of the DEIS and issuance of a Notice of Completion signaled the start of the formal public review period. Other agencies, elected officials, and the public had opportunities to review and comment on the DEIS in writing and at a public hearing. The public hearing was held on February 1, 2007, with written comments accepted through February 13, 2007. ~~The Lead Agency will accept written comments for at least 30 days from the date of issuance of a Notice of Completion.~~ All substantive comments received have become part of the SEQRA record and are included in the Final EIS (FEIS).
- FEIS. After the close of the public comment period for the DEIS, the FEIS was prepared. This document includes a summary restatement of each substantive comment made about the DEIS. A response to those comments and revisions, including further studies necessary, has been set forth. On determining that the FEIS is complete, the Town of Riverhead ~~Town~~ Planning Board will issue a Notice of Completion and circulate the FEIS. There will be a 10-day consideration period for the FEIS.
- Findings. To demonstrate that the responsible public decision-maker has taken a hard look at the environmental consequences of the proposed project, state and local agencies responsible for a discretionary action regarding a project must adopt a formal set of written findings, reflecting their conclusions about the significant adverse environmental impacts of the proposed project, potential alternatives, and potential mitigation measures. The Findings may not be adopted until 10 days after the Notice of Completion has been issued for the FEIS. Once Findings are adopted, the lead and involved agencies may take their actions (or take "no action").

H. ORGANIZATION OF THE FEIS

Based on the scope and the comments received during the scoping process, this FEIS analyzes those environmental issues that were found to have the potential for significant adverse and beneficial environmental impacts, and also issues that were of particular concern within the community. This FEIS considers a full range of physical, environmental, and socioeconomic concerns pursuant to 6 NYCRR Part 617.

For each impact and issue analyzed, the FEIS considers existing conditions in the future (*2012*) when the project would be fully operational, were it to be approved and implemented. To identify potential impacts, conditions in the future without the project are compared to conditions in the future with the project. Mitigation is proposed, as necessary, to reduce or eliminate identified significant adverse environmental impacts. The potential impacts studied in the FEIS are as follows:

- Compatibility of the project with land use, zoning, and public policy (Chapter 2);
- Effect of the project on geology, soil conditions, and topography (Chapter 3);
- Effect of the project on the demand for community facilities and municipal services (Chapter 4);
- Effect of the project on socioeconomic conditions within the Town and region (Chapter 5)
- Effect of the project on visual resources (Chapter 6)
- Impact of the project's use of hazardous materials and the effects of those materials on public health (Chapter 7);
- Impacts of project traffic on the local road network and project parking impacts (Chapter 8);
- Potential increases in noise levels from project-generated traffic and on-site activities (Chapter 9);
- Effect of the project on surface water, groundwater, and natural resources (Chapter 10);
- Impacts of the project on stormwater runoff (Chapter 11);
- Effects of the project on infrastructure and energy (Chapter 12); and
- Effect of the project construction on the surrounding community (Chapter 13).

Chapter 14 considers the No Action Alternative, as required by law, and two as-of-right alternatives, including an office use permitted by the Town of Riverhead Zoning Code and an industrial use also permitted by the Zoning Code. This chapter is followed by chapters that summarize the issues identified in the analyses pursuant to section 617.9 (b)(5) of the SEQRA regulations, including unavoidable adverse impacts (Chapter 15), growth inducing aspects of the proposed project (Chapter 16), and irreversible and irretrievable commitments of resources (Chapter 17). Chapter 18 provides a response to comments on the DEIS. ✷

A. INTRODUCTION

This chapter analyzes the effects of the proposed F1 Long Island Sports Facility on land use, zoning, and public policy. Existing land uses, as well as known development projects and land use trends, have been surveyed and described in the FEIS to establish the setting and context in which the proposed project would occur. Similarly, zoning districts mapped over the area of impact (i.e., the study area) reflect both existing land use patterns and are the principal expression of local land use and development policies regarding new development. Broader public policy initiatives such as municipal or county comprehensive plans and other planning and development policies are also examined in the context of the proposed action.

The study area analyzed for the proposed project is the area within ½ mile of the project site boundary, where the new facility could be expected to have the greatest effect. The study area is also used to consider the general land use patterns and zoning code regulations within the area surrounding the proposed project. The project site and ½-mile study area include the vicinity within which the proposed project could reasonably be expected to exert some degree of influence on future land use patterns.

Information relative to existing land use and zoning was obtained through several sources, including Geographic Information Systems, field surveys conducted by AKRF, Inc. in February 2006, the Zoning Code of the Town of Riverhead, various photographic documentation, and municipal reports and documents from the Town and Suffolk County.

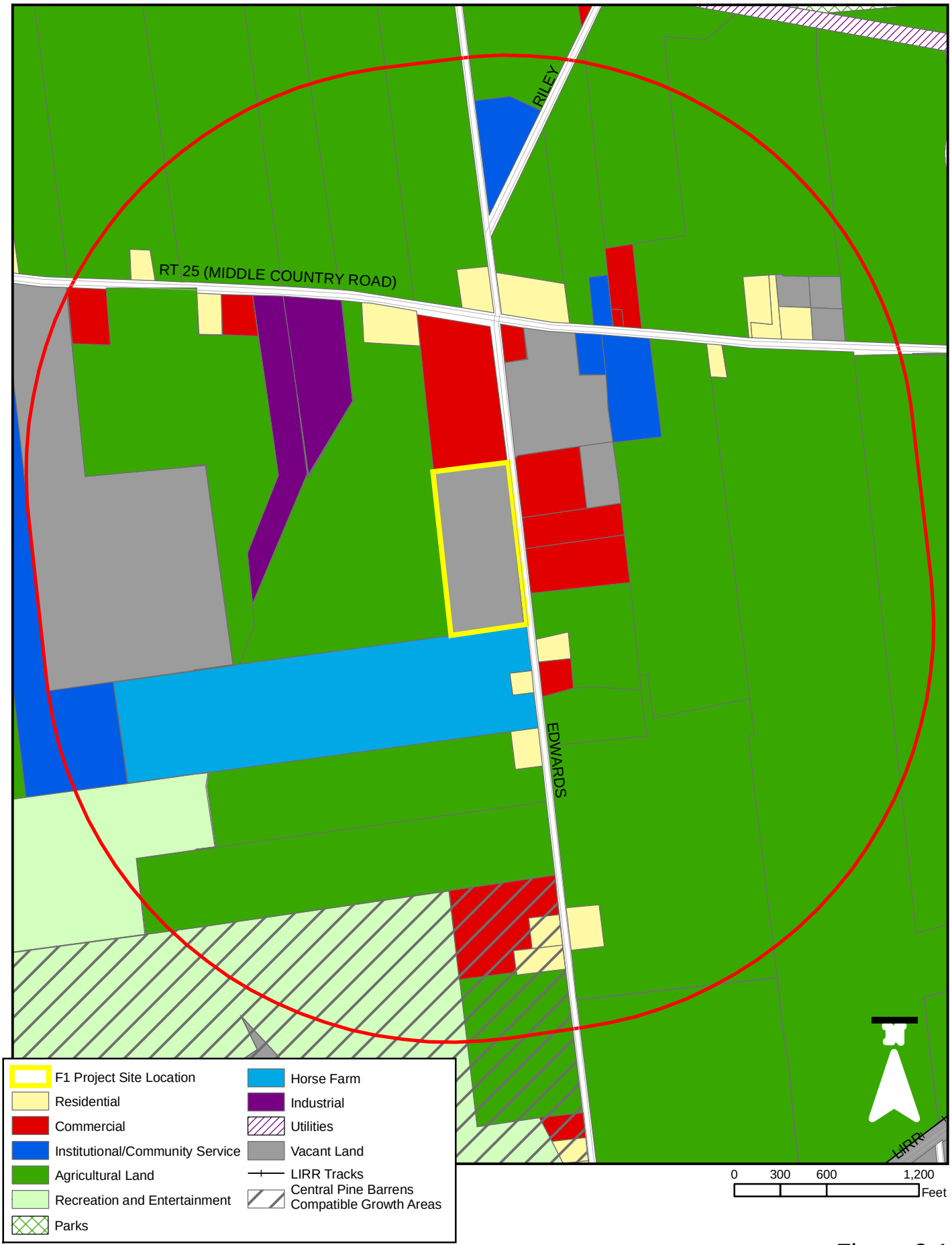
B. EXISTING CONDITIONS

LAND USE

PROJECT SITE

The proposed project site is a vacant parcel of land located on the west side of Edwards Avenue, about 1,000 feet south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton, Town of Riverhead, Suffolk County, New York. The Suffolk County Tax Designation for the site is Section 117, Block 1, Lot 4.2. The site is bordered to the north by the Federal Express Distribution Center, to the east by Edwards Avenue, to the south by an active horse farm (Gibbs horse farm), and to the west by an agricultural use (see Figure 2-1).

The site is comprised of 12.1 acres of disturbed land with wooded areas primarily featured in the northern-center and southern portions of the site. Portions of the site have been cleared and used for illegal dumping of tractor trailers and various debris including tires, wood pallets, split wood, sewer pipes, broken concrete, and miscellaneous construction debris. Specifically, the center of the site has been cleared and large mounds of sand and debris have been deposited here. The northeastern area of the site has also been cleared and appears to have been used for some



F1 Long Island Sports Facility

Figure 2-1
Existing Land Use

agricultural purpose in the past. In addition the site has been disturbed along the eastern border towards the northern area of the site. This area also appears to have been mowed. Historically, a small barn was located towards the center of the site but has since been bulldozed and buried on-site. Approximately 40 percent of the project site has been disturbed in some form and the remainder is comprised of an oak dominated forest.

In addition to those uses that abut the project site, the area immediately surrounding the project site is predominantly associated with commercial and agricultural uses, including Miller Environmental Group, Inc. and the John Deere Dealership, both found directly across from the site along Edwards Avenue. The proposed site is featured within a small pocket of vacant and commercial land that is contained within vast areas of agricultural uses. Limited residential homes are found within close proximity to the site but not bordering the site. The closest residential uses are located approximately 135 feet southeast of the site, across Edwards Avenue and more than 300 feet south of the site on the same side of Edwards Avenue.

½-MILE STUDY AREA

The predominant land use within ½ mile of the project site is clearly agricultural. In fact, the Town of Riverhead notably maintains one of the largest agricultural communities in Suffolk County. Other principal uses include vacant land to the east and west of the project site and commercial uses concentrated along Edwards Avenue closer to Middle Country Road and along Middle Country Road. These commercial establishments are typical of a farming community including a John Deere Dealership, the Village Crossroads Restaurant, a towing company, a local deli, and The Captain's School of Long Island, Inc. There are also sporadic residential uses primarily located along Middle Country Road with only six residences found along Edwards Avenue. These residences were historically associated with the surrounding lands used to farm and thus are located at the edge of the properties along the roadway. These residences are likely still affiliated with the agricultural uses that surround them.

The institutional uses located within the ½-mile study area are not within close proximity to the proposed site. These uses include a World Trade Center Memorial almost at the northern border of the study area; the Calverton Post Office, north of Middle Country Road just east of Edwards Avenue; The Riverhead Charter School south of Middle Country Road and east of Edwards Avenue; and the United Synagogue Cemetery whose southernmost property boundary is located just within the western border of the study area. An active horse farm used for breeding and riding horses is located adjacent to the south of the proposed site and the Calverton Links public golf course is located to the southwest of this horse farm. As shown on Figure 2-1, a small portion of the southwestern ½-mile study area that includes Calverton Links and the adjacent commercial, residential, and agricultural uses between the golf course and Edwards Avenue are located in the Compatible Growth Area as designated by the 1995 Central Pine Barrens Comprehensive Land Use Plan. See Public Policy below for more detail on this land use plan.

There are only two industrial uses located within the ½-mile study area. These uses, found south of Middle County Road towards the northwestern portion of the study area, are those devoted to sand mining operations and construction.

ZONING

PROJECT SITE

The proposed site is zoned Industrial C (IC), as shown on Figure 2-2, and a go-kart facility is an allowable use in this district. The intention of this district, according to Chapter 108 of the Town's Code, is to allow and encourage commercial recreational businesses and provide for light industrial uses within the area between Enterprise Park (about 1 mile west of the project site) and the terminus of the Long Island Expressway (LIE). The proposed project site is located at the northern and eastern edge of this district. The permitted uses include offices, warehouses, greenhouses, wholesale businesses, laboratories, vocational schools, golf courses, parks and playgrounds, equestrian facilities, commercial sports and recreation facilities, and dog and horse training and boarding facilities. Pursuant to §108-278 of the Town of Riverhead Zoning Code, outdoor theaters and sports arenas are allowed through the issuance of a Special Use Permit from the Town Board. Further, accessory uses "customarily incidental" to permitted uses are allowed in the IC district.

As shown in Table 2-1, the minimum lot area for the IC district is 80,000 square feet or almost 2 acres and the maximum building lot coverage is 40 percent. The maximum permissible height for any structure is 30 feet with a minimum front yard setback of 30 feet. Open space and landscaping requirements have also been developed for projects constructed within this district. Specifically, landscaped contiguous open space areas must be equal to at least 20 percent of the lot area to shield view of development from arterial roads and open space should serve to provide on-site stormwater protection. In addition, parking lots must be broken up by rows of landscaping no less than 10 feet in width to create parking fields of no more than 50 spaces.

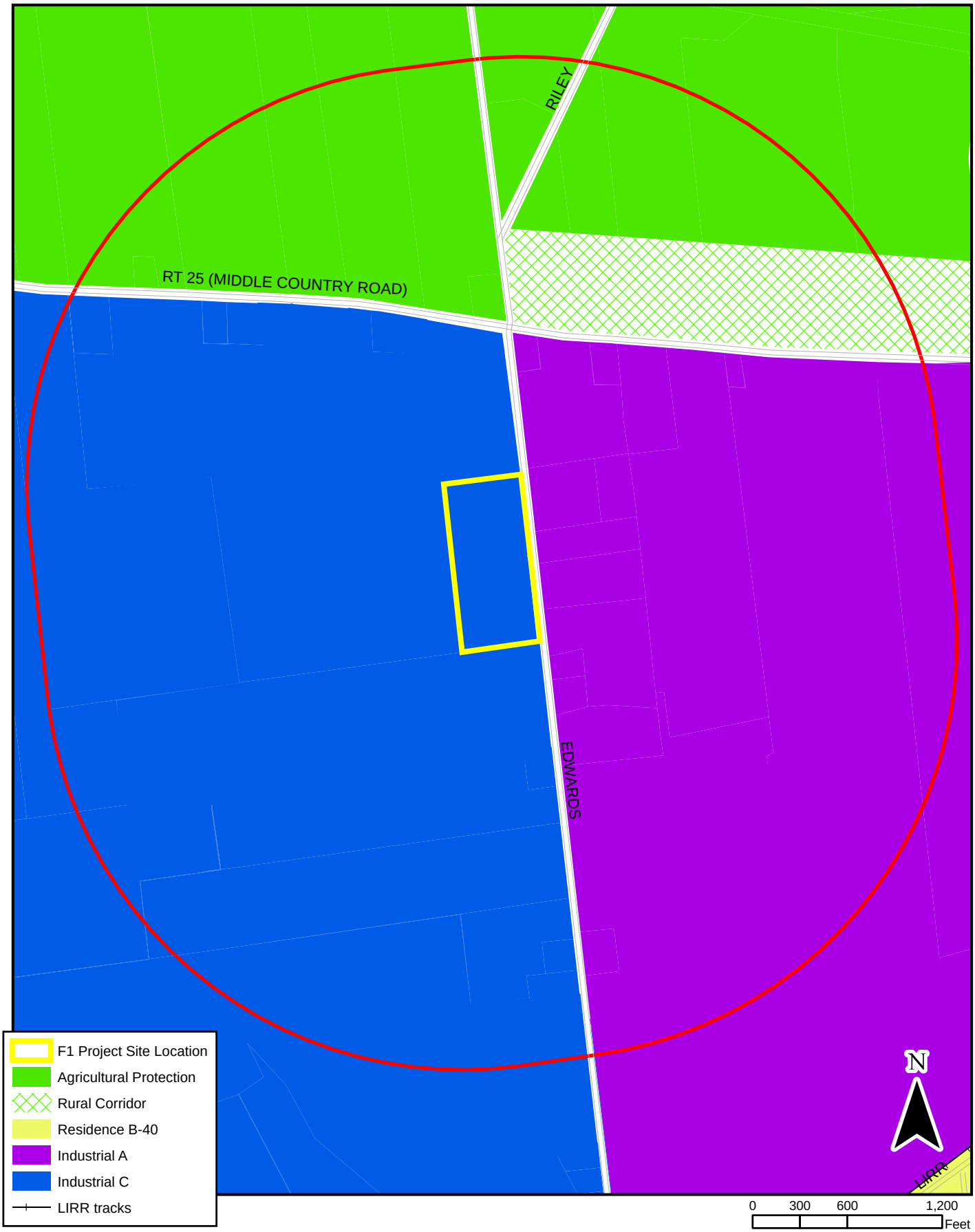
Table 2-1
Town of Riverhead Zoning District Within Project Study Area

Use District	Minimum Lot Size (square foot)	Maximum Building Lot Coverage* (percent)	Floor Area Ration (feet)	Maximum Impervious Coverage (percent)	Height	Minimum Setbacks		
					Feet	Front	Side	Rear
Agricultural Protection	80,000	N/A	N/A	15	35**	60	30	75
Rural Corridor	40,000	10	0.10	25	35	50	25	50
Industrial A	80,000	40	0.4	70	30	100	50	75
Industrial C	80,000	40	0.4	60	30	30	30	50

Notes: *Coverage assumes no sewer connection
**This height requirement relates to residential buildings
Source: Building Zone Ordinance of the Town of Riverhead

½-MILE STUDY AREA

In addition to the IC district discussed above, there are three zoning districts classified within the ½-mile study area: Agricultural Protection (APZ), Rural Corridor (RLC), and Industrial A (IA). The APZ district is entirely located north of Middle Country Road within the ½-mile study area and within the Town as a whole. The only other zone north of Middle Country Road within the



F1 Long Island Sports Facility

Figure 2-2
Existing Zoning

study area is RLC, which spans the area between Edwards Avenue to the west and Manor Road to the east (outside of the ½-mile study area). This district starts at Middle County Road and ends approximately 600 feet north of this roadway. The last district, IA, is located in the eastern portion of the study area, south of Middle Country Road. The IA district within the study area commences at Edwards Avenue and continues east to the LIE (outside of the study area).

According to the Town Code, the APZ district was developed to promote existing and future agriculture within the Town; preserve existing prime agricultural soils; discourage residential sprawl; promote agro-tourism; minimize conflicts between agricultural and nonagricultural uses; and preserve the rural character of the Town. Permitted uses are those associated with agriculture such as field crops, livestock products, horse boarding, and horticultural specialties. Single family dwellings are allowed in this district as are special uses approved by the Town Board. As shown in Table 2-1, there are no building area or floor area ratio restrictions within the APZ district.

Permitted uses in the RLC zone include agriculture, retail stores and antique shops, nurseries, schools, museums, libraries, places of worship, parks and playgrounds, and single-and two-family dwellings. As with the other districts within the study area, special uses such as bistros, funeral homes, and professional offices are permitted in the RLC zone with approval from the Town Board. The last district, IA, permits uses similar to the IC district except that the intent of this district aims to allow heavier industrial uses than what is permitted in the IC zone. The lot and building restrictions are also similar to those in the IC zone. However, the amount of impervious coverage permitted in the IA district is greater and the setbacks are larger than what is required in the IC district to comply with the Town's Zoning Code.

PUBLIC POLICY

TOWN OF RIVERHEAD COMPREHENSIVE PLAN

The Town of Riverhead, in November 2003, adopted their first Comprehensive Plan in more than three decades. A comprehensive master plan is a town's vision for the future and a framework for planning to direct changes within the town so that common community concerns are addressed; and goals, needs, and desires are met. The overall theme of the Town of Riverhead's Comprehensive Plan is to develop a balance between the natural environment and economic vitality. Similar to other East End towns, the Town of Riverhead has been and continues to experience intense development pressures as western areas of Long Island are built-out. This development pressure is both healthy and devastating at the same time. The economic stimulus has improved municipal services, increased job opportunities, and expanded tourism within the Town but has also diminished both the size and quality of the Town's natural areas.

According to the Town's Statement of Findings, the main intentions of the Comprehensive Plan are to "promote compatible agricultural, horticultural and open space recreation uses of the Town's remaining undeveloped land deemed to be a priority to preserve as such; redirect new construction or development from these open space and agricultural resources; protect and preserve the quality of surface water and groundwater resources of the Town; and coordinate and provide for the acquisition and transfer of private land interests as appropriate and consistent with available funds and locational characteristics of the receiving areas; and ensure the continuation of the Pine Barrens environment which contains the unique and significant ecologic, hydrogeologic and other resources representative of such environments."

The Plan has set forth provisions and goals to ensure that the balance between the natural environment and economic stability is accomplished to the extent that it maintains the desired direction of the Town. The Town used zoning as an implementation tool to apply the goals of the Comprehensive Plan. By using zoning as the key implementation tool, the Town is able to control and direct development while enabling preservation to continue throughout the areas of the Town that have been deemed significant. Goals and policy recommendations that relate to the proposed project include:

- Permit a mix of light industrial and recreational uses between Enterprise Park and the terminus of the LIE;
- Continue to attract tourists by developing a wide variety of attractions throughout the Town, with particular emphasis on those attractions that appeal to weekenders and day-trippers;
- Promote theme parks and commercial recreation facilities in Enterprise Park and in the area between Enterprise Park and the LIE; and
- Strengthen industrial zoning outside the Enterprise Park to be more responsive to market demands and surrounding areas.

CENTRAL PINE BARRENS COMPREHENSIVE LAND USE PLAN

The Central Pine Barrens Comprehensive 1995 Land Use Plan was prepared pursuant to Article 57 of the Environmental Conservation Law (ECL), *Long Island Pine Barrens Protection Act of 1993*. ECL §57-0105 states that "The legislature further finds that a portion of the system known as the Central Pine Barrens area required the preparation and implementation of a state supported regional comprehensive land use plan that will provide for the preservation of the core preservation area, protection of the Central Pine Barrens area and for the designation of compatible growth areas to accommodate appropriate patterns of development and regional growth with recognition of the rights of private land owners and the purpose of preservation of the core area." The Pine Barrens Act identified two geographic regions, the Core Preservation Area (52,500 acres) and the Compatible Growth Area (47,500 acres), which collectively comprise the Central Pine Barrens.

As defined in the Land Use Plan, the Core Preservation Area was established to prohibit and/or redirect development away from sensitive areas. Hardship exemptions could be granted by the Pine Barrens Commission established through the Act. Allowable uses permitted in this area include operations or uses that do not constitute development or hardship exemptions and those activities that involve agriculture or horticulture if the activity does not involve material alteration of native vegetation. The Compatible Growth Area, developed to meet the need for balanced growth and development, are those areas where development may occur but only pursuant to the standards defined in the Act. This area also serves as a buffer zone for the Core Preservation Area. As noted earlier, only a small portion of the southwestern study area is located within the Compatible Growth Area. The proposed facility, however, would not be located within the Central Pine Barrens.

PROPOSED/PENDING/APPROVED PROJECTS

There are several development projects in varying stages within the vicinity of the proposed go-kart facility. These projects include 1998 Peconic LLC, Calverton Manor, a 73-lot residential subdivision, and a proposed industrial park. The 1998 Peconic LLC project is the proposed development and operation of a convenience store, car wash, and gas station to be located on

Middle Country Road just east of Edwards Avenue. 1998 Peconic LLC is also proposing to construct a 16,776 square foot industrial building just east of the proposed gas station. The gas station proposal is pending a special use permit and the industrial building has been approved. Calverton Manor is a proposal for the development of a 122,000 square foot retail center and a 54,900 square foot YMCA to be located on approximately 42 acres on Middle Country Road, just west of Manor Road at the northeastern study area boundary. There is a pending application before the Town Board. The residential proposal, known as Beagle Run, is a 73-lot subdivision to be located on the west side of Edwards Avenue, north of Middle Country Road. This project has been approved. The last project pending within this area of the Town is a proposed industrial park to be located on Middle Country Road, approximately 950 feet east of Edwards Avenue. The proposed project is the construction of seven 30,000 square foot industrial buildings.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

LAND USE

The proposed project is the construction and operation of a professionally designed go-kart facility on a 12.1-acre site. The development of the proposed go-kart facility would introduce a new use and level of activity that would change the project site from a vacant use with wooded and cleared areas used for illegal dumping to an active recreational facility. F1 Long Island Sports Facility would consist of go-kart tracks; a clubhouse with a motor sports-themed restaurant including a bar, ~~accommodations for out-sourced catering,~~ office space, safety training and briefing rooms, a club trophy and waiting room ~~meeting and conference rooms~~, a small retail use, and kart storage; a maintenance building utilized for repairs and track services and employee offices and lunchroom ~~lounge~~; and an open structure used to cover the concession track. In addition, the proposed project would feature three sound barriers varying in height from about 7 to 25 feet. The longest barrier would be located more than 30 feet from the southern site boundary and wrap around the southern corners heading north for a short duration. This barrier would range in height from about 7 to 25 feet due to the natural changes in elevation. The tallest part of this barrier would be located towards the center-edge of the site. The second barrier would be a permanent retaining wall that extends west from the clubhouse and would follow the southern portion of the northern track. This barrier would be about 10 feet high. Because these barriers would be located beyond the required 30 foot setback from the front and side site boundary, they are considered a structure as defined by the Town Code. The third barrier would be moveable and only used when competition karts are utilized on the northern track. This barrier would range in height from 7 to 10 feet and would follow the southern portion of the northern track, east of the clubhouse.

The change in land use is consistent with the goals of the Town as set forth by the establishment of the IC zone, which permits and encourages active industrial and recreational uses in this portion of the Town. The prohibition of residential uses within this area of the Town is indicative of the Town's intention to guide land use from residential to commercial/industrial within this section of Calverton. Thus, the change in land use from vacant to commercial recreation is not in conflict with local land use trends nor the residences found in the vicinity of the project, which have coexisted with commercial and agricultural uses for decades. Further, the proposed go-kart facility would not conflict with the surrounding commercial uses along Edwards Avenue nor the agricultural uses that dominate the ½-mile study area, including the Gibbs horse farm located adjacent to the south of the site. The proposed project, although different in function from the horse farm, is considered compatible because both uses are

permitted and serve the purpose to provide recreation for the community. As noted in Chapter 9, "Noise," the operation of the proposed facility would not exceed the noise threshold permitted by the Town Code and would not be considered an obtrusive sound. Moreover, the presence of a go-kart facility would not significantly increase the ambient noise levels at the adjacent properties and therefore would not negatively impact the surrounding uses. Thus, the proposed project would not pose a significant adverse impact on land use at the project site or within the surrounding area.

ZONING

Consistent with the intention of the IC district, the proposed project would provide a commercial recreation attraction for residents and tourists in this area of the Town. Consistent with similar go-kart and commercial recreation facilities throughout the United States and Europe, the F1 facility would incorporate a clubhouse that comprises a restaurant~~, conference rooms,~~ and retail space. The closest example of a commercial recreation use in the project vicinity is Calverton Links Golf Course. Similar to F1, this venue maintains a ~~catering facility,~~ restaurant, bar, locker room, bathrooms, and retail space. Further, Table 2-2 provides a list of comparable go-kart venues that operate one or more of the uses proposed at F1. Based on similar facilities, as shown in Table 2-2 and consistent with local commercial recreation facilities (e.g. Calverton Links Golf Course), the proposed clubhouse with restaurant~~, conference,~~ and retail space would serve as an accessory use to the go-kart facility that is "customarily incidental" and is therefore also a permitted use.

Table 2-2
Comparable Commercial Recreation Facilities

Go-Kart Facility		Restaurant/ Bar	Store	~~Conference/ Meeting Rooms~~
Name	**Address**			
Batavia International Motorsports Park	3840 East Robinson Rd., Amherst, NY, 14228	X		
Grand Junction Motor Speedway	3030 I-70 Frontage Road, Grand Junction, CO 81504		X	
Karting North East	Warden Law Motorsport Centre, Sunderland, Tyne and Wear. SR3 2PR	X		
Daytona	Manchester, Milton Keynes, and Sandown Park, UK	X		~~X~~
Bondurant,	P.O. Box 51980 Phoenix, Arizona 85076-1980		X	
New Castle Motorsports Park	5816 South County 125 West New Castle, IN 47362	X	X	
F1 Boston	290 Wood Road Braintree, MA 02184	X	X	~~X~~
Fast Eddies Fun Center	505 West Michigan Ave., Pensacola, FL	X		
Richmond Go-Kart Track	6631 Sidaway Road, Richmond, British Columbia	X		

Note: Information is based on telephone correspondence with each facility

As described in Chapter 1, "Project Description," on September 14, 2006, the Town of Riverhead Zoning Board of Appeals (ZBA) determined that the proposed facility is a sports recreational facility in accordance with the Town Code and therefore is an allowed use in the IC district, and further determined the following:

- The proposed accessory uses of kart maintenance and storage, food services (bar), lockers and limited retail sales are customary and incidental accessory uses to a kart racing facility;
- The proposed accessory uses of meeting and conference rooms are not customary and incidental accessory uses to a kart racing facility;
- Based on the building height definition in the Town Code and the definition of mean ground level, the proposed amended alternative plan for the height of the clubhouse and concession track of 35 feet is granted in support of the design and safety of kart participants' access and having a distinct point of access for the spectators;
- The building height variance is minimal and will not cause an undesirable change in the character of the neighborhood or a detriment to nearby properties, because other commercial businesses have these building heights in this community; and
- Based upon this Board's review of the environmental assessment form, the recommendation of the Planning Department, and its own analysis, it has been determined that the application is a Type II and it has no environmental significance.

F1 has agreed to the terms and conditions set forth by the ZBA on September 14, 2006.

The proposed project was designed to comply with the lot, yard, ~~height,~~ and bulk requirements of the IC district. ~~However, the proposed clubhouse would not conform to the height requirement and therefore would need~~ As noted above, F1 has obtained a 5-foot height variance from the ZBA pursuant to Article XVII of the Town of Riverhead Zoning Ordinance. The proposed clubhouse would be designed with a maximum height of approximately 35 ~~55~~ feet above grade, while the permitted height within the designated zone where the project is proposed is 30 feet. The proposed open structure to be utilized as a cover to the concession track would also maintain a maximum height of 35 ~~51~~ feet above grade. ~~Thus, the proposed project would require the issuance of a height variance of 25 and 21 feet, respectively. However,~~ Since the clubhouse would be designed to incorporate the existing grade, the roof of this structure would appear, from Edwards Avenue, to be at a similar ~~the same~~ height as the approximately 24 foot maintenance building. Moreover, due to the natural grade changes at the project site, the roof of the concession track cover would not be significantly higher than ~~actually be only 10 feet above~~ the grade along Edwards Avenue. Therefore, the obtrusive views of the clubhouse and covered concession track from Edwards Avenue and surrounding properties would be minimized (see Chapter 6, "Visual Quality").

~~In addition to this approval, a~~ An official site plan of the proposed project must be authorized by the Planning ~~Town~~ Board. All site plans would conform to the rules and regulations set forth in Chapter 108, Article XXVI of the Town of Riverhead Zoning Ordinance.

The go-kart facility would maintain more pervious surfaces than required by the Town Code. Thus, the proposed project meets the open space area requirement equal to at least 20 percent of the lot area. In fact, nearly half of the site would be dedicated to open space including existing natural areas. Existing natural and wooded areas would make up 15.6 percent of the lot area, and landscaped areas would make up 34.2 percent of the lot area. These areas ~~coupled with the irrigation pond~~ would also help to provide on-site stormwater management, see Chapter 11, "Stormwater," for more detail. Consistent with the purpose and intent of the IC district, the ~~main~~

parking area and the entire project site have been designed to accommodate landscaped areas to provide a screen along Edwards Avenue as well as a buffer to surrounding uses such as the horse farm "to help protect the rural appearance and minimize views of development from the expressway and arterial roads." Since the proposed project would not require any changes to the existing zoning and it is a use encouraged by the Comprehensive Plan, no significant adverse impacts are expected from the proposed project.

PUBLIC POLICY

The addition of the proposed project to the hamlet of Calverton is consistent with the projected trends and needs identified in the Town's Comprehensive Plan. The Town's desire to promote and enhance tourism is signified by the adoption and siting of the IC zone within this area of the Town. The Town has noted that successful tourism development is accomplished through the establishment of attractions and destinations that people seek based on current local, regional and national trends. As detailed in Chapter 1, "Project Description," the proposed facility was modeled after its successful sister facilities (F1 Boston and F1 Outdoors) near Boston. Further, the corporate culture is now heading in a direction where alternative forms of entertainment for both employees and clients are profitable and desirable. Lastly, the closing of the Westhampton go-kart track and the recent surge in motor sports enthusiasts all work to ensure the success and need of the proposed facility.

The proposed project has met the relative goals and policies that were identified in the Comprehensive Plan and therefore is in compliance with the Town's future goals for this site and surrounding area. ✷

A. INTRODUCTION

The proposed F1 project site is characterized by significant variations in topography and two dominant soil types—a physical feature that originated during the last major ice age in North America. A portion of the site has been disturbed by previous activities which include clearing and grading. This section analyzes the compatibility of the proposed project with the site's soil features and topography.

B. EXISTING CONDITIONS

SOILS

The soil types of the proposed site were reviewed based on the *Soil Survey of Suffolk County*, New York (United States Department of Agriculture [USDA] Soil Conservation Service, April 1975). The soils mapped on the project site are indicated in Table 3-1 and Figure 3-1. Soil types are characterized by their composition (i.e., sands, clays, etc.), slope, erodability, permeability, and typical depth to groundwater. Based on this characterization, the soil survey provides a three-part measure of constraints on development divided into Slight, Moderate, or Severe for different potential site uses (paved surfaces, home construction, septic disposal). Moderate and Severe limitations do not in themselves create significant adverse environmental impacts but reflect the likelihood of additional site preparation and site engineering, ongoing maintenance requirements, and costs necessary to utilize the land for an intended purpose.

The overall project site is dominated by two soil types: Carver and Plymouth sands and Riverhead sandy loams. The Carver and Plymouth sands (CpE) with slopes ranging from 15 to 35 percent comprise approximately 54 percent of the entire site are largely featured within the center of the site. The second most dominant soil type, Riverhead sandy loam (RdA and RdC), maintain slopes ranging from 0 to 3 percent and 8 to 15 percent, respectively. The RdA soils are prevailing within the northeast and southeast corners of the site while the RdC soils are present through the center of the CpE soils and at the northwesternmost border of the site. Comprising about 10 percent of the entire site are Haven loam (He) and Plymouth loamy sand (PlC) with slopes ranging from 8 to 15 percent. The soils are present at the western border and the PlC soils are located at the northern border in the center of the site. As shown in Figure 3-1, the soils immediately surrounding the project site are principally associated with Riverhead sandy loams with slopes ranging from 0 to 15 percent.

The general soil properties associated with each soil mapping unit described above, as presented in the *Soil Survey of Suffolk County*, are as follows:

- Carver Series—deep excessively drained, coarse textured soils generally present on rolling moraines and broad outwash plains. Slopes range from 0 to 35 percent. Permeability is rapid throughout the zones of this series.

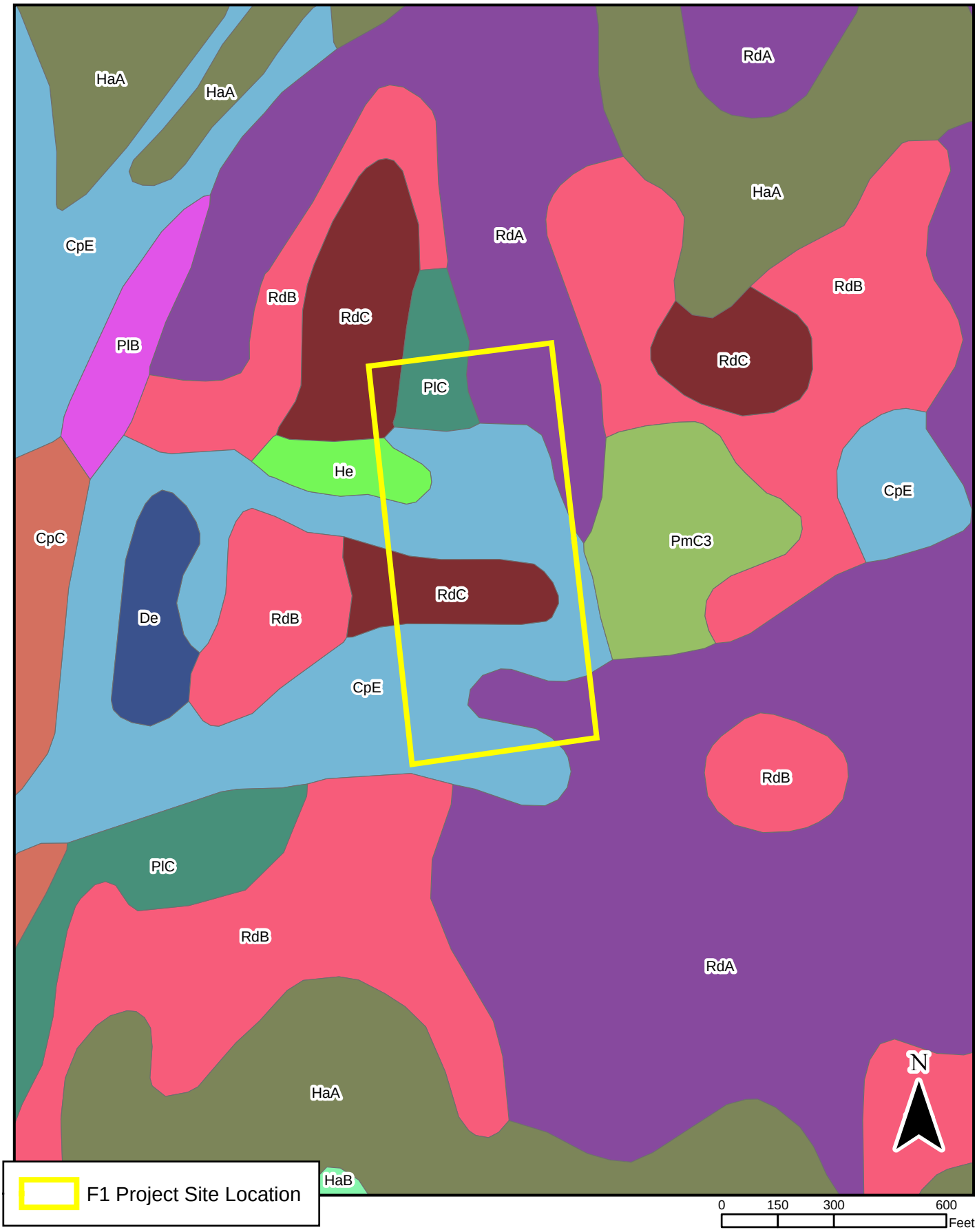


Figure 3-1
Soils

F1 Long Island Sports Facility

Table 3-1
Summary of Soil Properties

Mapping Unit	Soil Name and Gradient	On-Site Area (Acres)	Erosion Hazard	Permeability (Depth[1] — Rate[2])	Depth[3] to Seasonal High Water Table	Limitations of Soils		
						Streets and Parking Lots	Homesites[5]	Sewage Disposal Fields
CpE	Carver and Plymouth sands, 15 to 35 % slopes	6.5	Moderate to severe	0-22—>6.3 22-60—>6.3	>4	Severe: slopes	Severe: slopes	Severe: slopes[6]
He	Haven loam, thick surface layer	0.4	Slight, except where the soil receives large amounts of water from adjoining sloping soils	0-19—0.63-2.0 19-28—>2.0 28-55—>6.3	>4	Severe[4]	Severe[4]	Severe[4]
PlC	Plymouth loamy sand, 8 to 15 % slopes	0.9	Moderate to severe	0-27—>6.3 27-58—>6.3	>4	Severe: slopes, moderate for town and county roads	Moderate: slopes	Moderate : slopes[6]
RdA	Riverhead sandy loam, 0 to 3 % slopes	2.3	Slight	0-32—2.0-6.3 32-65—>6.3	>4	Slight	Slight	Slight[6]
RdC	Riverhead sandy loam, 8 to 15 % slopes	2.0	Moderately severe	0-32—2.0-6.3 32-65—>6.3	>4	Severe: slopes, moderate for town and county roads	Moderate: slopes	Moderate : slopes[6]

Notes: [1] Inches
[2] Inches per hour
[3] Feet
[4] Flooded during prolonged wet periods in places
[5] Three stories or less
[6] Possible pollution hazard to lakes, springs, or shallow wells in these rapidly permeable soils

Source: Soil Survey of Suffolk County, New York, USDA Soil Conservation Service, April 1975

- Haven Series—deep, well-drained, medium-textured soils that formed in a loamy or silty mantle over stratified coarse sand and gravel. Slopes range from 0 to 12 percent but generally range from 1 to 6 percent. Permeability is moderate in the surface layer and subsoil and rapid or very rapid in the substratum.
- Plymouth Series—deep excessively drained, coarse-textured soils that formed in a mantle of loamy sand or sand over thick layers of stratified coarse sand and gravel. Slopes range from 0 to 15 percent. These soils are primarily found on broad, gently sloping to level outwash plains and on undulation to steep moraines. Permeability is rapid in these soils except in those of the silty substratum phase where permeability is moderate.

- Riverhead Series—deep, well-drained, moderately coarse textured soils that formed in a mantle of sandy loam or fine sandy loam over thick layers of coarse sand and gravel. Generally nearly level to gently sloping, these soils range from nearly level to steep slopes. Permeability is moderately rapid in the surface layer and in the subsoil and very rapid in the substratum.

TOPOGRAPHY

The overall topography for the project site is rolling with elevations across the site ranging from about 28 to 74 feet above mean sea level (MSL). The center of the site is generally low with high ridges to both the north and south then the topography decreases and increases again as you move away from the middle of the site.

The lowest area of the site occurs along the western boundary where a manmade pond is present. From this point, the site rises to approximately 74 feet above MSL over about 480 feet in the northern section of the site and 70 feet above MSL over more than 100 feet in the eastern portion. In the southern portion of the site, the topography rises and falls several times from the manmade depression over 600 feet with the most severe increment of 22 feet occurring over 95 linear feet. Topographic features at the proposed site were derived from a topographical survey performed in 2005.

SITE COVERAGES

The project site is comprised of approximately 527,442 square feet or 12.1 acres, and approximately 40 percent of the site has been cleared or disturbed and the remainder is wooded.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

As noted above, the *Soil Survey of Suffolk County* provides generalized soil suitability ratings for potential uses on sites. Any limitations for construction can be overcome through site engineering. The construction activities necessary for development of the site are described in detail in Chapter 13, "Construction Impacts" and the following analysis summarizes the general limitations associated with site development based on soil suitability. The key rating measures applied to the soils analysis are:

- Slight—The soil is generally well suited to the intended use, or the degree of soil limitation is minor and can easily be overcome. Good performance and low maintenance can be expected.
- Moderate—The soil is moderately suited for the intended use, or the degree of soil limitation can be overcome/modified by special planning, design, or maintenance. The performance of these soils for the listed use is less desirable than soils ranked as having a "slight" limitation for the same use. The problems associated with use of these soils may be intermittent or seasonal in nature. Some soils may require additional treatment such as artificial drainage, runoff control to reduce erosion, over-excavation, extended sanitary lines, or special manipulation or modification. Modifications may include soil admixture, special foundations, extra reinforcement for structures, and sump pumps.
- Severe—This rating indicates that the soils have one or more properties which are considered unfavorable for the intended use, such as steep slopes, flooding hazards, a high shrink-swell potential, seasonal high water table, or low bearing strength. This degree of

limitation generally requires major soil reclamation, special design, or intensive maintenance. Some of these limitations may be overcome, but the degree of alteration may be cost-prohibitive.

Figure 3-1 and Table 3-1 indicate that the most prevalent soils within the boundaries of the project site slated for development primarily have moderate to severe limitations with regard to the construction of roads and parking lots, up to three-story structures, and sanitary sewage disposal fields. Moderate and severe soil limitations do not in themselves create significant adverse environmental impacts, but may require additional site preparation and engineering and cause a need for increased maintenance requirements. It is expected that good engineering practices, Best Management Practices (BMPs), and erosion control measures instituted during construction would overcome any soil suitability limitations. ~~These~~ Slope limitations could be an issue of concern for typical commercial and industrial development, as even greater grading through cut and fill operations would be required. This project is unique in that it was designed to utilize the natural topographic features to the maximum extent practicable. About 55,500 ~~53,000~~ cubic yards would be cut and 3,800 ~~10,000~~ cubic yards would be filled with an increment of approximately 51,700 ~~43,000~~ cubic yards removed from the site. Appendix A includes a grading report with explanation for the proposed export of soil.

The proposed project would utilize the changes in elevations as a unique feature to enhance the racing experience and become the first facility worldwide to develop a go-kart track with these incomparable natural features. Further, slope limitations discussed above relate to typical county or town roads or subdivisions where severe valleys and peaks are not deemed superior (or typical for Long Island) roadway conditions. ~~The conference center would also be constructed utilizing~~ The site's existing topography would be utilized, with limited disturbance to the existing slopes. As stated, slope limitations do not in themselves create significant adverse impacts but may require additional site preparation and engineering. In general, the changes to soils and topography would not be considered significant, especially since the project is designed to utilize and enhance these natural features. In fact, almost 50 ~~about 47~~ percent of the site would be dedicated open space ~~including natural areas~~. Existing natural areas would make up 15.6 percent of the site, with 34.2 percent comprised of landscaped areas.

As indicated in Table 3-1, almost 80 percent of the site has moderate to severe soil erosion potential due to the steep slopes. To minimize erosion, the project would adhere to the *New York Guidelines for Urban Erosion and Sediment Control*, U.S. Department of Agriculture—Natural Resources Conservation Service (April 1997), and the BMPs developed by the New York State Department of Environmental Conservation (DEC) as described in *Reducing Impacts of Stormwater Runoff from New Development* (1993). During and after construction, erosion and sediment control measures would be implemented to stabilize exposed soil and to provide a final cover of vegetation on post-construction slopes. Prior to the onset of construction activities, a wide range of temporary erosion and sediment control measures would be utilized to ensure soil stabilization and protection of exposed areas throughout the construction period to the maximum extent practicable. An Erosion Control Plan ~~would be~~ has been prepared for the site in accordance with the DEC Phase II requirements, and is provided in Appendix A. The Erosion Control Plan ~~would be~~ is part of a Storm Water Pollution Prevention Plan required by the DEC State Pollution Discharge Elimination System General Permit (GP-02-01).

The Erosion Control Plan ~~would recommend~~ proposes installation of a silt fence ~~be installed~~ at the perimeter of all localized construction activities in a necessary effort to minimize/prevent sediment from leaving the project area. The drainage facilities proposed for the project would be

installed in lieu of temporary structures throughout the project site. This can be accomplished in all areas of the track. Hay bale barriers ~~would be provided~~ are proposed to trap sediment in stormwater runoff from impervious surfaces at all grated inlet structures. Establishment of future groundcover would be implemented as rapidly as is practicable to stabilize and minimize loss of soils after the bulk of the site grading, and excavation activities have been completed. Additional sediment barriers or temporary diversion dikes may be utilized as required by field conditions during construction to ensure stormwater runoff is contained on-site. In all practicality, DEC BMP's for erosion controls would be followed. A construction entrance would be installed and maintained to prevent soil and loose debris from being tracked onto local roads. Chapter 13, "Construction Impacts," provides a detailed schedule of operations proposed for erosion and sediment control during site construction.

All erosion and sediment controls depicted on the Erosion Control Plan would be installed prior to construction activities and would remain until final stabilization as defined in Part III.D.4 of the General Permit GP-02-01, unless specifically noted. ✷

Chapter 4: Emergency and Community Services

A. INTRODUCTION

This chapter identifies federal, state, and local emergency services and community facilities serving the project site and within a ½-mile radius of the project site. Such services include police and fire services. The potential for project-related impacts to emergency and community services is assessed, including an evaluation of the proposed project's consistency with and potential effect on future trends and an evaluation of the ability of local services to meet projected demands from the proposed go-kart facility.

B. EXISTING CONDITIONS

EMERGENCY SERVICES

POLICE SERVICES

The project site is served by Riverhead Town Police, with headquarters located at 210 Howell Avenue. The police department is made up of several divisions, including patrol (K-9, rescue/scuba team, and bay constable), communication, detective, and juvenile bureau (Police Athletic League, Drug Abuse Resistance Education, youth court, and youth counselor). In addition, several specialized units, including Community Oriented Policing Enforcement (COPE), police training, neighborhood watch/crime prevention, and emergency preparedness, make up the department.[1] The Riverhead Town Police received 25,508 calls in 2005.[2] Based on a letter received from the Riverhead Town Police on March 6, 2006 (see Appendix C), there are 78 sworn officers in the Department, including officers, detectives, and supervisory personnel. The number of support personnel is 16. The location of the proposed project site lies within the 603 sector. In 2005, there were a total of 5,489 calls for service in that particular sector. The average response time to an incident is 7 minutes within the project vicinity.

FIRE SERVICES

The project site is served by the Riverhead Fire Department, a volunteer organization established in 1836 to provide fire protection for the approximately 48 square miles of the Riverhead Fire District. At present, the Department's 181 members cover the townships of Riverhead, Southampton, and Brookhaven, responding to an average of 500 alarms per year. The Department's headquarters are located at 24 East Second Street in Riverhead. In addition, the Department operates three other stations, with two in Riverhead and one in Calverton. The station nearest the project site is located on Twomey Avenue in Calverton. The Department

[1] Riverhead Town Police website at http://www.riverheadli.com/tow-police.html

[2] Gannon, Tim. *The News-Review*, February 23, 2006.

operates with the following equipment: six pumpers, one ladder truck, one tanker, one heavy rescue, two brush trucks, four Chief's vehicles, and six support trucks. The Department consists of six companies including Reliable Hose & Engine Co. #1, Washington Engine Co. #2, Ever Ready Engine Co. #3, Eagle Hose Co. #4, Red Bird Hook & Ladder Co., and Fire Police & Patrol Co.[3]

AMBULANCE SERVICES

The Riverhead Town Volunteer Ambulance Corps (RTVAC), founded in 1978, serves the project site 24 hours a day, 365 days a year. Based on a letter from RTVAC dated February 20, 2006 (see Appendix C), the organization currently includes approximately 50 active volunteer members who are available to respond to any medical emergency within the Town of Riverhead. Currently, RTVAC also employs two paid personnel—one advanced life support (ALS) and one basic life support (BLS)—on weekdays from 6 AM to 4 PM RTVAC's service area includes approximately 78 square miles and a population of 24,000. The organization operates four ALS-equipped ambulances and three first responder vehicles—two ALS-equipped and one BLS-equipped. RTVAC holds regular monthly training meetings for its members. RTVAC has headquarters located at 1111 Osborne Avenue in Riverhead and operates a sub station at 20 Manor Lane in Jamesport.[4]

RTVAC's "west sector," which includes the proposed project site, is the area of the Town of Riverhead that is west of Osborne Avenue to its intersection with Mill Road and thereby west of Mill Road, except that part of the Town that comprises the Wading River Fire District. In 2005, RTVAC's total annual call volume was approximately 2,400, and just less than 500 were from the west sector. While response time varies according to the exact location within the area and whether or not there is crew available in-house, RTVAC estimates that response to the proposed project site by an in-house crew in normal traffic would be 4-5 minutes.

COMMUNITY FACILITIES

In addition to the police and fire services described above, several other community facilities serve the project site and the ½-mile study area. Figure 4-1 depicts the community facilities within a ½-mile of the project site. These include the Calverton Links Golf Course at 149 Edwards Avenue, approximately ⅓-mile south of the project site, and the United Synagogue Cemetery located west of the project site on NYS Route 25 (Middle Country Road). In addition, the Calverton Post Office is located on Middle Country Road, east of Edwards Avenue. Finally, a Town of Riverhead 9/11 Memorial is located at the northeast intersection of Edwards and Riley Avenue.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

EMERGENCY SERVICES

Letters were sent to the Riverhead Town Police, Riverhead Fire Department, and RTVAC on January 20, 2006 inquiring about any future planned changes to these services (see Appendix C).

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[3] Riverhead Fire Department website at http://www.riverheadli.com/fire.html

[4] Riverhead Town Volunteer Ambulance Corps (RTVAC) website at http://www.riverheadli.com/ambulance.html

Figure 4-1
Community Facilities

Based on a response letter from RTVAC dated February 20, 2006 (see Appendix C), RTVAC has monies allotted and is currently in the design phase for the expansion/replacement of its headquarters on Osborne Avenue, Riverhead. The Town of Riverhead has also proposed a concurrent expansion of the facility located at Manor Lane, Jamesport. No money is allotted nor are any specific plans being made for a third facility to the west. While it is realized by the management of RTVAC that future needs for the west sector will have to be addressed, any future plans will depend on the type and amount of development that the Town of Riverhead eventually allows, especially at the Enterprise Park at Calverton (EPCAL). Based on a letter received from the Riverhead Town Police on March 6, 2006, the Department hopes to have an increase in manpower in the future (see Appendix C). No changes to other community services in the vicinity of the project site are expected.

The proposed recreational facility would have its own security personnel but could create an additional demand for local emergency services.

Based on correspondence with RTVAC (see Appendix C), it is normal for any development to result in an increase in the amount of calls to ambulance services. RTVAC notes that a greater amount of patients would be expected from a sports facility and any venue where alcohol is served. It should also be noted, then, that the F1 Long Island Sports Facility would have a zero tolerance policy for drug and alcohol use while racing. Most race participants would be given a breathalyzer test before racing and then given a wristband to signify that they passed the breathalyzer test. If the participants patronize the bar, the wristband is cut and removed and the participant is no longer able to race. This strict zero tolerance policy would help to minimize emergency calls from the go-kart facility to RTVAC. This system has worked without incident at F1 Boston.

The only issue raised by correspondence with the Town Police Department (see Appendix C) with the development of the proposed F1 facility would be the potential increase of traffic at NYS Route 25 and Edwards Avenue. As explained in Chapter 8, "Traffic," several approaches to this intersection would experience significant traffic impacts both with and without the proposed project. Thus, this intersection would be highly congested in the future without the proposed project. It should be noted that in most cases, the actual incremental traffic associated with the proposed project would be relatively small. Moreover, several roadway improvements were proposed as part of the No Build projects planned in the proposed project vicinity (including providing exclusive left-turn lanes along with minor restriping at the four approaches to the intersection). With these improvements, all of the impacted approaches would operate with better service conditions than under the No Build conditions.

No response letter was received from the Riverhead Fire Department ~~at the time this DEIS was being prepared~~. Based on the zoning and permitted uses at the project site, it is expected that these local emergency services have sufficient capacity to accommodate the proposed project. Therefore, no potentially significant adverse impacts to emergency services are anticipated with the proposed project. ~~If letters are received from these agencies, they will be included and addressed in the Final EIS (FEIS).~~

COMMUNITY FACILITIES

As a recreational facility, the proposed project would not generate new residents. Workers and visitors for the proposed go-kart facility would not significantly impact any community facility within the ½-mile study area. In addition, the proposed project would not affect the ability of any community facility to serve the area. Therefore, no potentially significant adverse impacts to

community facilities are expected to result from the proposed go-kart facility. In fact, the proposed go-kart facility would create an alternative recreational resource for the Town's residents. ✷

A. INTRODUCTION

This chapter describes existing conditions on the project site in terms of employment and tax revenues, and estimates project-generated employment and tax revenues during construction and operation of the proposed project. Additional fiscal and social benefits that could be expected to result from operation of the proposed go-kart facility are also discussed.

B. EXISTING CONDITIONS

EMPLOYMENT

The project site is presently vacant and does not provide any jobs.

TAX REVENUE

The project site is a vacant 12.1-acre parcel designated as Section 117, Block 1, Lot 4.2 on the Suffolk County Tax Map (2005). Based on the current property tax record for the parcel (2005-06), the project site presently generates a total of $22,708 in property tax revenues. Table 5-1 shows the existing tax revenue generated from the project site, apportioned to the different taxing jurisdictions.

Table 5-1
Current Tax Revenue Generated from Project Site

School	County	Town	Other[1]	Total
$14,708	$109	$5,740	$2,151	$22,708

Notes: [1]Includes local ambulance, fire, light, waste, and water districts.
Source: Statement of Real Property Taxes, Town of Riverhead, 2005-06.

Of the current total tax revenue generated from the project site, approximately 65 percent of that revenue is allocated to the Riverhead Central School District. The second largest aggregate property tax revenue contribution is made to the Town of Riverhead. By far, the smallest share of the total tax revenue goes to Suffolk County.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

EMPLOYMENT AND TAX REVENUE

DURING CONSTRUCTION

The construction and development of the proposed go-kart facility would result in the investment of significant private capital into the local and regional economy. The following

analysis examines this investment in the local economy in terms of employment, wages and salaries, and tax revenues generated during the construction period.

The economic effects of construction projects are generally of two kinds: direct benefits, usually measured by specific construction-related expenditures for labor, services, and materials; and indirect or generated benefits, representing expenditures made by material suppliers, construction workers, and other employees involved in the direct activity for the purchase of other goods and services within the region. The "secondary" expenditures support economic activity that, in turn, generates new employment within the region.

The principal model used to estimate the effect of constructing the proposed project on the County and State economy is the Regional Input-Output Modeling System (RIMS II), developed by the U.S. Department of Commerce, Bureau of Economic Analysis. The model contains data for Suffolk County on 490 economic sectors, showing how each sector affects every other sector as a result of change in the quantity of its product or service. A similar RIMS II model for New York State, also developed by the U.S. Department of Commerce, has been used to trace the effects on the State economy. Using these models and the specific characteristics of the project, the total effect has been projected for Suffolk County and New York State.

For the purpose of analyzing effects during the development period, the estimates presented are based on the direct construction value of the project's improvements. These figures (which are used to determine inputs into the model) are based on the estimated costs for the facility's construction, and exclude the value of the land, financing costs, real property tax payments, management fees, initial marketing expenditures, and similar portions of the total private investment in the development. The direct construction value includes hard costs (actual construction), as well as design, engineering, legal, and related development costs. Construction costs are expected to equal approximately $5.6 million.

Construction of the project is estimated to create 35 person-years of direct construction employment. (A person-year is the equivalent of one person working full-time for a year.) In addition to direct employment, construction of the project would create an estimated 32 additional jobs off-site in Suffolk County, bringing the total additional employment in the County to 67 person-years (see Table 5-2). In the broader state economy, total employment from construction of the project is estimated at 69 person-years.

Direct wages and salaries from constructing the project are estimated at $1.78 million (all figures in 2006 dollars). Including off-site effects, total direct and indirect wages and salaries from constructing the project are estimated at $3.12 million. In the broader New York State economy, total direct and indirect wages and salaries from constructing the project are estimated at $3.22 million.

Constructing the project would also create tax revenues for Suffolk County, the Metropolitan Transportation Authority (MTA), and New York State. These taxes include sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes. Construction of the project is estimated to create approximately $115,000 in non-property related taxes for Suffolk County, approximately $15,300 for the MTA, and approximately $332,100 for New York State. In total, construction of the project is estimated to create approximately $462,400 million in non-property related taxes for the County, MTA, and State. In addition, the County, Town, and local taxing jurisdictions would receive property taxes in the same amount as in the existing condition.

Table 5-2
Employment and Economic Benefits from Construction of the Proposed Project

	Suffolk County	Total in New York State
Employment (Person-years)*		
Direct (Construction)	35	35
Indirect (Secondary and Induced)	32	34
Total	67	69
Wages and Salaries (Millions of 2006 dollars)		
Direct (Construction)	$1.78	$1.78
Indirect (Secondary and Induced)	$1.34	$1.44
Total	$3.12	$3.22
Total Economic Output or Demand (Millions of 2006 dollars)**		
Direct (Construction)	$5.60	$5.60
Indirect (Secondary and Induced)	$4.70	$5.13
Total	$10.30	$10.73
Fiscal		
Tax Revenues, Exclusive of Real Estate (Constant 2006 dollars)***		
Suffolk County		$115,000
MTA Taxes		$15,300
New York State Taxes		$332,100
Total		$462,400

Notes: *A person-year is the equivalent of one person working full-time a year.
**The economic output or total effect on the local economy derived from the direct construction spending.
***Includes sales tax, personal income taxes, corporate and business taxes, and numerous other taxes on construction and secondary expenditures.

Sources: The characteristics and construction cost of the proposed development; the Regional Input-Output Modeling System (RIMS II), U.S. Department of Commerce, Bureau of Economic Analysis; and the tax rates by applicable jurisdiction.

DURING OPERATION

Based on developer data, the completed project is expected to provide ~~110 to 125~~ 90 direct employment opportunities, including approximately ~~50~~ 35 full-time jobs offering employee benefits. Roughly 15 percent of the employees would be salaried, with the remainder receiving hourly wage compensation. The employees are expected to come from the workforce that includes senior citizens and college students. The proposed facility would also indirectly result in additional employment opportunities for local tradesmen and service companies.

The completed project would generate approximately $83,939 in property tax revenues for New York State, Suffolk County, the Town of Riverhead, and the local taxing jurisdictions, based on construction costs. This is an increase of $61,231 or about 270 percent over the existing condition. The Riverhead Central School District would benefit from approximately $54,365 in taxes, or $39,657 (about 270 percent) over the existing condition, without any increase in the number of school age children. It should be noted that the projected tax revenues provided here are only estimates, and that, ultimately, the future tax revenues generated by the proposed action would be determined by the local tax assessor. In addition, the completed project would generate approximately $690,000 to $948,750 in sales tax revenues, allocated to Suffolk County (4.25

percent), MTA (0.375 percent), and New York State (4 percent), based on an estimated $8 to 11 million in total annual sales at completion of phase 2.

ADDITIONAL FISCAL AND SOCIAL BENEFITS

The proposed go-kart facility would result in new ownership and improved use of the project site, which would increase diversity and stimulate growth in the local economy. The go-kart facility would attract incremental business from the outside community. The venue is expected to attract a premier corporate customer base, local residents, and promote tourism, with up to two-thirds of guests expected from out-of-town.

In addition to benefiting the local economy, the proposed go-kart facility could potentially enhance quality of life in the local community. The facility would serve as a clean, upscale ~~meeting,~~ entertainment~~,~~ and recreational facility. It would create a unique opportunity for youth to reinforce teamwork, responsibility, focus, and judgment skills gained from motor sports. The F1 Long Island Sports Facility would also be an ideal venue for fund raising and other charitable outings ~~events~~. As explained above, the proposed project would create positive employment opportunities for residents of various socioeconomic strata. Therefore, the proposed project is expected to have positive impacts on the local economy and community in terms of fiscal and social benefits, and no potentially significant adverse effects are anticipated. ✷

A. INTRODUCTION

This chapter analyzes the potential effects of the proposed F1 Long Island Sports Facility on the visual character of the project site and the surrounding community. A physical description of the project site and the existing visual relationships between the project site and the surrounding area is provided. In addition, this chapter describes the proposed new construction and assesses the visual relationships that could occur between the project and bordering properties.

B. EXISTING CONDITIONS

Views of and from the project site were taken on February 1, 2006. Figure 6-1, "Key to Photographs," is a key to the location from which each photograph was taken. Figures 6-2 through 6-21 are the actual photographs taken. The location from which each photograph was taken is marked on the Key to Photographs with an arrow, which points in the direction that the photograph was taken. Each arrow on the Key to Photographs is marked with a number that corresponds to the second Figure number of the photograph that it represents, so that Arrow 2 corresponds to Figure 6-2 and Arrow 10 corresponds to Figure 6-10.

PROJECT SITE

The project site is vacant, disturbed land with rolling topography in a predominantly agricultural setting. The main entrance to the site is off of Edwards Avenue, where a gravel/dirt path slopes downward leading to the center of the site (see Figure 6-2). The site features both wooded patches, primarily in the northern-central and southern portions, and cleared areas (see Figure 6-3). The largest cleared area exists in the center of the site, where tractor trailers and miscellaneous construction debris have been illegally dumped (see Figure 6-4).

The center of the site is generally at a lower elevation than the grade at the site's perimeter (see Figure 6-5). Although the site's topography is varied and rises and falls from the site's center to the north and the south, the site is below grade relative to the adjacent southern property (see Figure 6-6). The site has an existing series of dirt paths which corresponds with the design of the proposed go-kart tracks. Another feature of the project site is the presence of a pond that was formerly used for irrigation. This pond is located at the western border of the site just north of the site's center (see Figure 6-7).

SURROUNDING PROPERTIES

The proposed site is featured within a small pocket of vacant and commercial land that is contained within vast areas of agricultural uses. The site is bordered to the north by the Federal Express (FedEx) Distribution Center, to the east by Edwards Avenue, to the south by an active horse farm (Gibbs horse farm), and to the west by an agricultural use. Figure 6-8 depicts the agricultural use at the project site's western border. Miller Environmental Group, Inc. and the

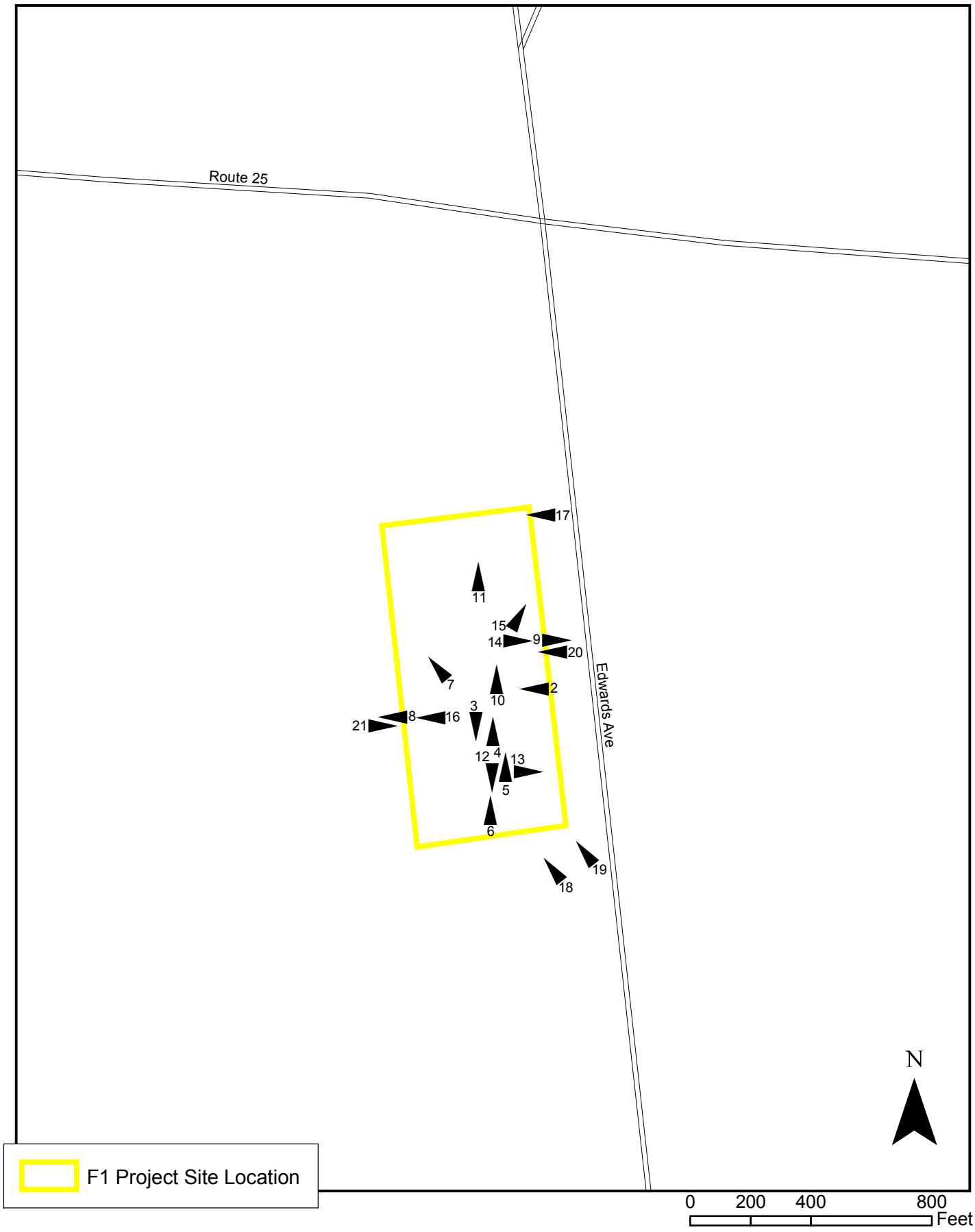


Figure 6-1
Key to Photographs

F1 Long Island Sports Facility

Figure 6-2: Looking west from entrance to site on Edwards Avenue toward path leading to center of site.

Figure 6-3: Looking south from cleared area in center of site toward natural ridge.

Figure 6-4: Looking north from center of site toward truck trailers, tires and other miscellaneous debris, and sand mound in cleared area on-site.

Figure 6-5: Looking north from high ridge in southern area of site toward sloping topography.

Figure 6-6: Looking north from approximate southern property line toward high ridge.

Figure 6-7: Looking northwest from northwestern area of site toward on-site pond.

Figure 6-8: Looking west from western property line toward adjacent agricultural use.

Figure 6-9: Looking northeast from eastern property line toward John Deere facility and Miller Environmental Group, Inc. across Edwards Avenue.

Figure 6-10: Looking north from path leading to center of site from Edwards Avenue toward FedEx property.

Figure 6-11: Looking north from northern area of site behind chain link fence toward FedEx facility.

Figure 6-12: Looking south from southern ridge toward horse farm.

Figure 6-13: Looking east from southern ridge toward Edwards Avenue.

Figure 6-14: Looking east from eastern part of site toward John Deere facility across Edwards Avenue.

Figure 6-15: Looking northeast from eastern part of site toward Miller Environmental Group, Inc. facility across Edwards Avenue.

Figure 6-16: Looking west from cleared area in center of site toward western property boundary and agricultural land beyond.

Figure 6-17: Looking west from Miller Environmental toward northern property line.

Figure 6-18: Looking northwest from house fronting Edwards Avenue on horse farm property toward southern part of site through dense vegetation.

Figure 6-19: Looking northwest from residence at 460 Edwards Avenue toward southeastern part of site through dense vegetation.

Figure 6-20: Looking west from John Deere property toward site across Edwards Avenue.

Figure 6-21: Looking east from adjacent agricultural area toward center of site.

John Deere Dealership, both commercial uses, are found directly across from the site along Edwards Avenue (see Figure 6-9). The buildings within the project vicinity are generally one and two stories and large in bulk and scale. There are a limited number of residential homes found within close proximity to the site.

VISUAL RELATIONSHIPS

Views of the surrounding properties from the project site are generally impeded by dense vegetation along most of the site's perimeter, especially along the southern and western boundaries. However, views of the FedEx facility to the north are generally unobstructed. Figure 6-10 represents the view of the FedEx property from the eastern-central path on-site. The view is screened by sparse vegetation in the northern portion of the site. Figure 6-11 offers a closer view of the FedEx property from the northern portion of the site behind a chain link fence. The proposed site's northern property boundary is actually north of this fence (approximately 190 feet), so that there is no wooded buffer between the project site and this adjacent property. Conversely, views of the horse farm to the south are substantially screened by a dense vegetative buffer along the site's southern boundary (see Figure 6-12). The Gibbs horse farm is situated on a high ridge that drops down to the site's southern boundary. Because the horse farm is at a higher elevation than the site's southern property line, views of the horse farm are not possible from areas of the site that are below this grade. Figure 6-13 presents a view of Edwards Avenue looking east from the southern portion of the site, through a vegetative screen. Moving northward along the site's eastern boundary, vegetation becomes less dense. As shown in Figure 6-14, the John Deere facility is clearly visible from the project site through a line of sparse trees and a chain link fence. A similar buffer exists between the project site and Miller Environmental (see Figure 6-15). From the center of the site views of the adjacent agricultural property to the west are possible through sparse vegetation and a dilapidated fence (see Figure 6-16).

Views of the project site are generally unimpeded from the north and from Miller Environmental Group, Inc. on Edwards Avenue to the east, as shown in Figure 6-17. As indicated in Figure 6-12, dense vegetation along the northern boundary of the horse farm to the south impedes views of the project site from this location, as does the difference in grade. Figure 6-18 shows a view toward the southern portion of the site from a house associated with the horse farm located south of the project site along Edwards Avenue. This view is sufficiently screened by dense vegetation along the northern border of the horse farm property and along the southern boundary of the project site. From the residence on Edwards Avenue to the southeast, views of the project site are of the site's dense vegetative buffer in the southern area (see Figure 6-19). As shown in Figure 6-20, views of the project site from the John Deere facility to the east are screened by vegetation and a chain link fence. From the west, the view of the project site is possible from the cleared area; though there are no sensitive viewer groups associated with the adjacent use (see Figure 6-21).

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

PROJECT SITE

The F1 facility would comprise more than one mile of professionally designed go-kart race tracks to serve private corporate outings ~~functions~~ and local residential interests. The facility would include a 14,995 ~~14,800~~ square foot (approximately 21,330 ~~23,000~~ gross square feet) clubhouse that consists of a restaurant, bar, small motor-sports retail store, ~~accommodations for~~

~~out-soureed catering,~~ office space, a club trophy and waiting room, and ~~conference and meeting~~ safety training and briefing rooms. Also proposed would be the 5,000 square foot maintenance building that would also serve as the greeting post for visitors. Lastly, an open structure (approximately 27,540 ~~33,530~~ square feet) would be built to cover the concession track. The proposed buildings are substantially smaller in bulk and scale compared with the surrounding commercial properties. The primary exterior material for the proposed buildings is expected to be masonry with a variety of textures and patterns. In addition, the proposed project would include the development of three sound barriers anticipated to be composed primarily of concrete.

The proposed go-kart facility would utilize the existing topography as the project would incorporate the site's rolling hills and the tracks would follow the natural contours of the land. The concession track would be located toward the southeastern part of the site within the larger main track, which would be featured throughout the entire 12.1-acre site. The clubhouse would be built at a lower elevation than what exists around most of the perimeter of the site, minimizing its potential visibility from off-site.

The clubhouse would comprise three floors and would incorporate existing topography, with portions of the building ~~, two above grade, and the lower level would be constructed to incorporate the existing topography so that three sides of this level would be above grade and the front side would be~~ below grade. The building would be located towards the center of site, northwest of the concession track. The clubhouse would have a maximum height of ~~approximately 55~~ 35 feet above grade.

The proposed clubhouse would include an outdoor terrace on the upper levels. The outdoor terraces would be supported by a series of columns and a guardrail along the building's perimeter. Tall rectangular windows ~~in groups of three~~ would run along the building's exterior. ~~Two double doors would mark the entrance to the clubhouse.~~

The front of the clubhouse would feature three triangular gables ~~two triangular cornices; each supported by four columns would be featured~~. ~~Each cornice would project from the main building over each level. The lower cornice would project outward approximately 60 feet from the main building, forming an overhang for the walkway leading to the front entrance.~~ (see Figure 1-6 ~~1-4~~ in Chapter 1, "Project Description").

~~The site's grade would slope downward toward the rear of the clubhouse, so that the lower level would be above grade in the rear of the building. The rear of the building would feature three cornices, each one projecting from the rooftop over the upper terrace. The center cornice would be supported by four columns, while the cornice on either side would be supported by just two columns. The lower level would feature garage doors (see Figure 1-5 in Chapter 1, "Project Description").~~

~~From each side of the clubhouse, one would see the sloping gradient rising toward the front of the building. The roofline would be triangular and the height of building would vary with the rolling topography (see Figure 1-6 in Chapter 1, "Project Description").~~ As shown in Figure 1-4 ~~1-6~~, the clubhouse would be connected to the covered concession track by an overpass/bridge ~~enclosed corridor on the first level~~.

The structure proposed to cover the concession track would be designed as an open building with a pitched roof and supporting columns ~~poles~~. The structure would be approximately 27,540 ~~35,530~~ square feet ~~and range in height from~~ with a maximum height of 35 ~~to 51~~ feet above grade. The cover over the concession track would be designed with similar architectural features

as the clubhouse and would also be constructed to incorporate the existing topography and therefore minimize the appearance of the structure.

The maintenance building would be located just south of the service entrance at the northernmost border of the site and north of the main entrance. The facility's ~~main~~ parking area would be located in this area of the site ~~and an additional parking area would be provided within the concession track~~. The maintenance building would have an average height of 24 feet above grade.

In addition, the proposed project would feature three sound barriers varying in height from about 7 to 25 feet. The longest barrier would be located more than 30 feet from the southern site boundary and wrap around the southern corners heading north for a short duration. This barrier would range in height from about 7 to 25 feet due to the natural changes in elevation. The tallest part of this barrier would be located towards the center-edge of the site. The second barrier would be a permanent retaining wall that extends west from the clubhouse and would follow the southern portion of the northern track. This barrier would be about 10 feet high. The third barrier would be moveable and only used when competition karts are utilized on the northern track. This barrier would range in height from 7 to 10 feet and would follow the southern portion of the northern track, east of the clubhouse.

The on-site pond is proposed to be preserved in its existing size and state, and would not be used for irrigation ~~expanded and a pump house would provide local irrigation at site plantings~~. The pond would be protected by a vegetated buffer of at least 64 feet in depth, with all buildings located at least 158 feet away. Native landscaping, where feasible, would remain within the site, primarily along the southern and western borders. See Appendix A for the proposed landscape plan. Planting of various trees and shrubs would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site. Approximately 15.6 percent of the site would be comprised of existing natural areas, with an additional 34.2 percent of the site proposed to be landscaped.

VISUAL RELATIONSHIPS

The combination of existing and new plantings along the site's perimeter would inhibit views of and from the go-kart facility. The dense vegetative buffer at the site's southern border would be retained so that the existing view from the horse farm would not drastically change. Further, the southern sound barrier would provide an additional screen from the horse farm to the proposed site. The southern sound barrier, being the tallest, would only be about 7 feet above grade near the closest viewpoint, which is Edwards Avenue, and therefore would not be materially different from other surrounding visual features. Because the clubhouse and covered track would be built at a lower elevation than most of the surrounding area, views of it would generally not be visible from the surrounding properties. Where the tracks are to be built at lower elevations than the adjacent properties, particularly in the southern region of the site, they too would not be outwardly visible. However, the tracks are proposed to be constructed across the entire site, so that they would generally be visible where they are level with the surrounding properties. Similarly, views of the surrounding properties from the project site would be obstructed due to the site's topography and the natural and manmade buffers proposed for the perimeter of the site. The proposed bulk and scale of the proposed facility would be substantially smaller than that of the surrounding area, in that there would be two small-to-moderate sized buildings sited on a large tract of land with rolling topography and trees scattered throughout the site. Because the

proposed F1 Long Island Sports Facility would utilize the site's existing topography and incorporate new and existing plantings as well as natural and manmade buffers into the facility's design, the proposed project is not expected to result in significant adverse impacts to visual quality or character. ✷

A. INTRODUCTION

This chapter of the FEIS provides an inventory of hazardous materials that would be stored at the proposed F1 Long Island Sports Facility on a regular basis. Hazardous materials are those that could impact human health and/or the environment. This chapter also assesses the presence of hazardous materials at the existing site and describes the procedures used to ensure the safety of the staff and surrounding community.

B. EXISTING CONDITIONS

Based on field reconnaissance conducted in February 2006, there are no permanent structures on-site, however, based on a historic site survey, it appears that a barn was present at some point at the center of the site but has since been bulldozed and buried on-site. This structure has since been buried east of the on-site pond. There is also no evidence of underground storage tanks or indications of past storage on-site. However, the site has been disturbed throughout the central corridor and at the northern and northeastern boundaries. The central corridor has been cleared and large mounds of sand have been deposited. Illegal dumping in the form of two tractor trailer beds, wood pallets, sewer pipes, broken concrete, split wood, tires, and miscellaneous construction debris has taken place at the site. The parcel has also been disturbed along the eastern border towards the northern section of the site. This area has been mowed in the past and it appears that numerous trees were taken from the site. Several empty plastic drums and various other debris, including a non-commercial trailer, were dumped here as well. In addition, the northeastern portion of the site has been cleared and consists entirely of mowed grass. This area appears to have been used for some agricultural purpose in the past.

SUFFOLK COUNTY DEPARTMENT OF HEALTH REGULATIONS

SUFFOLK COUNTY WATER POLLUTION CONTROL

Article 7 of the Suffolk County Sanitary Code is included in Appendix D. The purpose of Article 7 ~~of the Suffolk County Sanitary Code~~ is to safeguard all the water resources of Suffolk County, especially in deep recharge areas and water supply sensitive areas, from discharges of sewage, industrial and other wastes, toxic or hazardous materials, and storm water runoff by preventing and controlling such sources in existence when the article was enacted, and also by preventing further pollution from new sources under a program which is consistent with maintaining and protecting the water resources. This article regulates the discharge of sewage, industrial wastes, toxic or hazardous materials, or other wastes to surface or groundwater. These discharges are prohibited in deep recharge or water supply sensitive areas. It also regulates the storage of toxic or hazardous materials.

SUFFOLK COUNTY TOXIC AND HAZARDOUS MATERIALS HANDLING

Article 12 of the Suffolk County Sanitary Code is included in Appendix D. Article 12 ~~of the Suffolk County Sanitary Code~~ regulates the storage of hazardous materials/wastes and petroleum products with requirements for spill cleanup. This article provides design details for underground and aboveground storage tanks. Specifically, plans and specifications for aboveground storage facilities must be approved by the Commissioner and impervious secondary containment for the new storage facility are required to be equal or greater than 110 percent of the entire volume to be contained. Further, the facility must be designed to prevent the release of toxic and/or hazardous materials into the ground, groundwater, or surface waters of Suffolk County.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

It is anticipated that no more than 500 gallons of gasoline would be stored on-site at any one time in one 500 ~~two 250~~ gallon container~~s~~ pre-approved by Suffolk County Department of Health Services. The tank would be constructed of steel and ~~These containers~~ would be located aboveground within a concrete containment system to ensure that leaks and/or spills are controlled. ~~and~~ The tank would not discharge to the ground, groundwater, or surface waters of Suffolk County, consistent with Article 7. Nominal storage of 55 gallon drums would be provided for both motor oil and 2-stroke oil. Oil would only be stored for the 4-stroke karts. In addition, about 5 gallons of WD-40 and related pump spray bottles would be stored on-site. Aboveground storage tank systems would be inspected weekly using a detailed checklist, consistent with practices at F1's sister facility in Boston. Appendix E includes the weekly inspection checklist and storage tank specifications, consistent with Article 12.

Each kart is expected to use approximately 1 gallon of gas every 3 hours. Refueling would only occur in pit lanes, which are proposed to be surfaced in concrete. A gas caddy would transport fuel from the gas tank located northwest of the maintenance building to the pit lanes. There would be three gas caddies total on-site. Each caddy holds approximately 20 gallons of gas. The maintenance building would not have a floor drain. Karts would be wiped down rather than washed, and parts would be cleaned using recyclable solvent. A fire suppression system is also proposed.

Based on field reconnaissance and the history of the site as being undeveloped, it can be assumed that no hazardous materials such as asbestos, lead, and polychlorinated biphenyls (PCBs) are located on or within the proposed site. Consistent with the findings of a Phase I Site Assessment performed in 2005 by Coastal Environmental Corp. and because no buildings exist and there are no hazardous materials present at the site, exposure to hazardous materials would not result from construction of the proposed facility and therefore would not pose a significant threat to public health or the environment.

All potential contaminants, such as oils ~~and gasoline~~, would be contained within the storage portions of the maintenance building, in accordance with all applicable rules and regulations. Further, no toxic or hazardous materials would be discharged to the ground, groundwater, or surface waters, consistent with Article 7 of the Suffolk County Sanitary Code, and storage of hazardous materials and petroleum products would conform to the requirements of Article 12 of the Suffolk County Sanitary Code. With these precautionary measures in place, no significant adverse impacts with respect to hazardous materials would occur as a result of operation of the go-kart facility. ✷

A. INTRODUCTION

The proposed project would generate new vehicle trips traveling to and from the proposed project site. This chapter examines the potential for impacts of the proposed project on the local traffic network in the study area.

B. METHODOLOGY

The operation of signalized intersection in the study area was analyzed applying the methodologies presented in the *Highway Capacity Manual 2000* (HCM). This procedure evaluates signalized intersections for average delay per vehicle and level of service (LOS).

SIGNALIZED INTERSECTIONS

LOS for signalized intersections is based on the average stopped delay per vehicle for the various lane group movements within the intersection. This delay is the basis for an LOS determination for individual lane groups, the approaches, and the overall intersection. The levels of service are defined as follows:

LOS Criteria for Signalized Intersections

Level-of-Service (LOS)	Delay
A	≤ 10.0 seconds
B	>10.0 and ≤ 20.0 seconds
C	>20.0 and ≤ 35.0 seconds
D	>35.0 and ≤ 55.0 seconds
E	>55.0 and ≤ 80.0 seconds
F	>80.0 seconds

Source: Transportation Research Board. *Highway Capacity Manual 2000.*

Although the HCM methodology calculates a volume-to-capacity (v/c) ratio, there is no strict relationship between v/c ratios and LOS as defined in the HCM. A high v/c ratio indicates substantial traffic passing through an intersection, but a high v/c ratio combined with low average delay actually represents the most efficient condition in terms of traffic engineering standards, where an approach or the whole intersection processes traffic close to its theoretical maximum with minimal delay. However, very high v/c ratios—especially those approaching or greater than 1.0—are often correlated with a deteriorated LOS. LOS A and B indicate good operating conditions with minimal delay. Other important variables affecting delay include cycle length, progression, and green time. At LOS C, the number of vehicles stopping is higher, but congestion is still fairly light. LOS D describes a condition where congestion levels are more noticeable and individual cycle failures (a condition where motorists may have to wait for more

than one green phase to clear the intersection) can occur. Conditions at LOS E and F reflect poor service levels, and cycle breakdowns are frequent. The HCM methodology provides for a summary of the total intersection operating conditions. The analysis chooses the two critical movements (the worst-case from each roadway) and calculates a summary critical v/c ratio, delay, and LOS. See Appendix F for the HCS output files.

C. EXISTING CONDITIONS

STUDY AREA

The proposed site is located on Edwards Avenue, about 1,000 feet south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton, Town of Riverhead, Suffolk County, New York. To assess the traffic impacts associated with the proposed project, the intersection of Middle Country Road and Edwards Avenue was selected for detailed traffic analysis. This intersection is the busiest location affected by project generated traffic, and is controlled by an actuated traffic signal with variable cycle lengths depending upon traffic conditions. The following is a brief description of the two roadways within the study area:

NYS Route 25 (Middle Country Road): Middle County Road is also designated as NYS Route 25 and is a primary two-way east-west corridor within the Town of Riverhead. It is under the jurisdiction of New York State Department of Transportation (NYSDOT) and operates with one moving lane of traffic in each direction at its intersection with Edwards Avenue.

Edwards Avenue: Edwards Avenue is a two-way north-south roadway which operates with one moving lane of traffic in each direction. This roadway is under the jurisdiction of Town of Riverhead.

TRAFFIC CONDITIONS

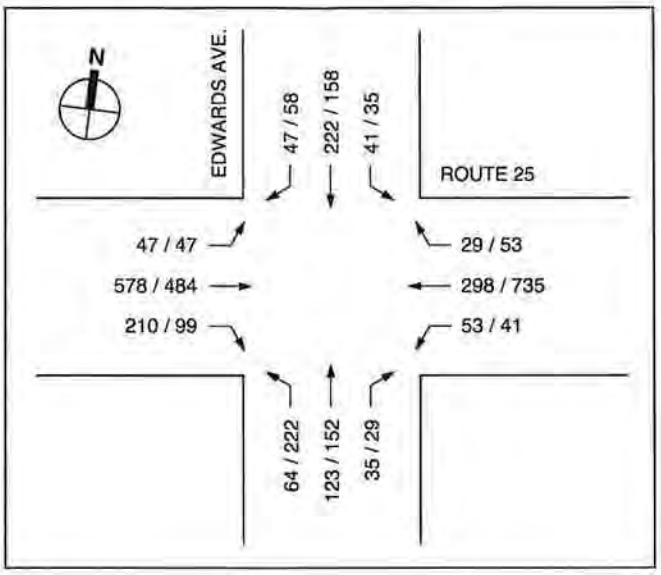
As discussed in Chapter 1, "Project Description," the proposed facility would primarily host corporate outings ~~events~~ during the weekday and would serve arrive and drive ~~regular~~ customers over the weekend with a special event potentially occurring ~~planned~~ one time per year. As currently proposed, the project does not include any special events. Therefore, to account for both the weekday and weekend periods, baseline (existing) traffic conditions in the study area were established based on field counts conducted during the weekday and Saturday peak periods in February 2006 at the intersection of Middle Country Road and Edwards Avenue. To account for the variation in traffic levels, the existing traffic volumes were increased by applying a seasonal adjustment factor of 0.857 based on the NYSDOT traffic data report.

In addition to manual counts, an Automated Traffic Recorder (ATR) was placed on Middle Country Road for one week to identify temporal and daily traffic variations. Field inventories of roadway geometry, traffic control, bus stop presence, and parking regulations/activities were also conducted to provide the appropriate inputs to the operational analyses. Figure 8-1 shows the traffic volumes for various weekday and Saturday peak hours for the 2006 Existing conditions. (These peak hours are discussed in further detail later in the chapter under "Potential Impacts of the Proposed Action.")

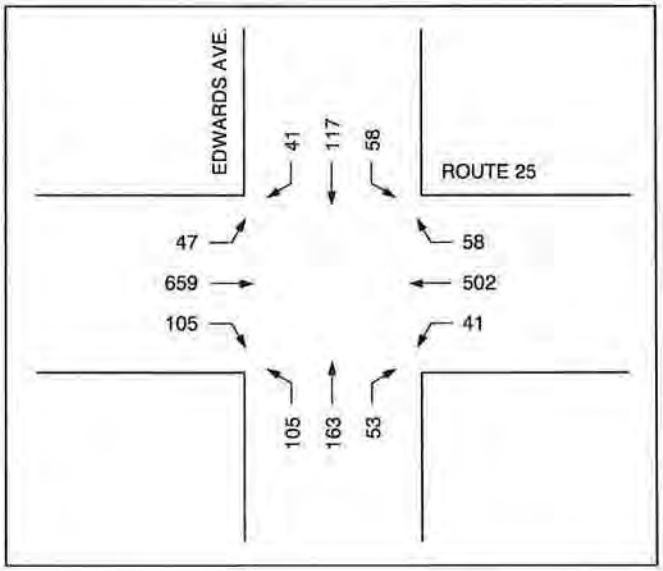
LEVEL OF SERVICE

Table 8-1 presents the service conditions for the intersection of Middle Country Road and Edwards Avenue. Approaches which operate at LOS E or F are described as follows:

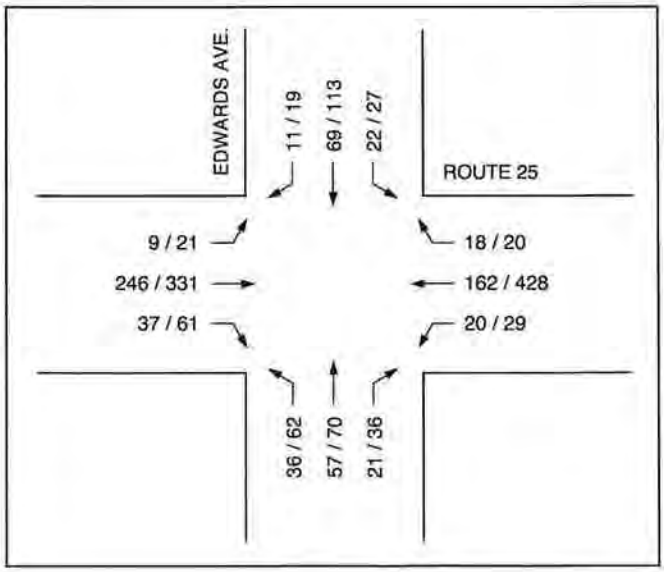
3.3.06



Weekday
Regular Operations
AM / PM



Saturday
Regular Operations
Non-Event



Saturday
Special Event
AM / PM

2005 Existing Traffic Volumes

Table 8-1
Level of Service–2006 Existing Conditions

Edwards Avenue/ Middle Country Road Inter.	Weekday Conditions								Saturday (Non-Event) Conditions				Saturday Special Event Conditions							
	AM Peak Hour				PM Peak Hour				Midday Peak Hour				AM Peak Hour				PM Peak Hour			
	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS
EB	LTR	1.17	103.0	F	LTR	0.83	25.3	C	LTR	0.99	44.1	D	LTR	0.34	10.1	B	LTR	0.50	12.0	B
WB	LTR	1.07	66.0	E	LTR	0.98	45.1	D	LTR	0.74	17.8	B	LTR	0.24	9.2	A	LTR	0.57	13.2	B
NB	LTR	0.52	18.6	B	LTR	1.36	210.0	F	LTR	0.72	27.0	C	LTR	0.24	18.3	B	LTR	0.38	19.4	B
SB	LTR	0.65	21.4	C	LTR	0.56	28.3	C	LTR	0.57	22.1	C	LTR	0.23	18.2	B	LTR	0.35	19.2	B
	Intersection		69.5	E	Intersection		70.3	E	Intersection		30.8	C	Intersection		12.3	B	Intersection		14.5	B

Note: L = Left Turn, T = Through, R = Right Turn, Defl. = Defacto Left Turn; LOS = Level of Service

- The eastbound approach which operates at LOS F with delays of 103.0 seconds per vehicle (spv) during the weekday AM peak hour;
- The westbound approach which operates at LOS E with delays of 66.0 spv during the weekday AM peak hour; and,
- The northbound approach which operates at LOS F with delays of 210.0 spv during the weekday PM peak hour.

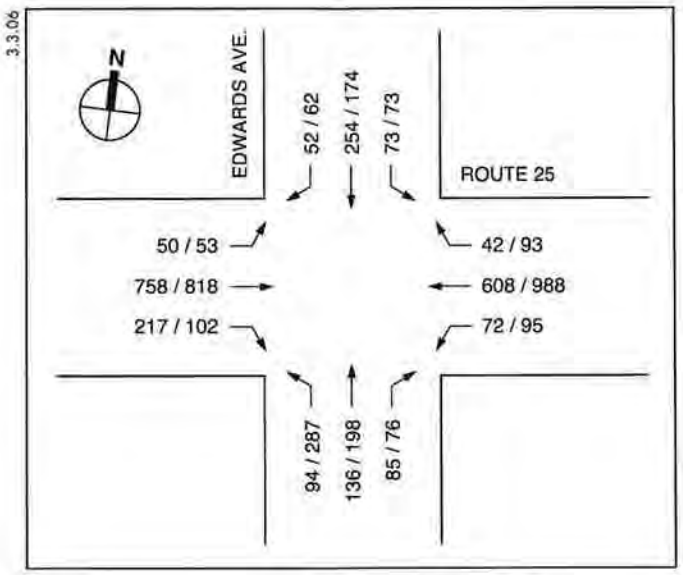
D. THE FUTURE WITHOUT THE PROPOSED ACTION

Future 2007 conditions without the proposed project—also referred to as the No Build conditions—were forecasted by increasing baseline traffic levels to reflect expected growth in overall travel through and within the study area. In line with the NYSDOT recommended annual growth rates, a background growth rate of 1.88 percent per year was assumed by 2007. In addition to the background growth, trips generated by potential No Build projects expected to be completed by the year 2007 were incorporated in the analysis. Some of the notable No Build projects include:

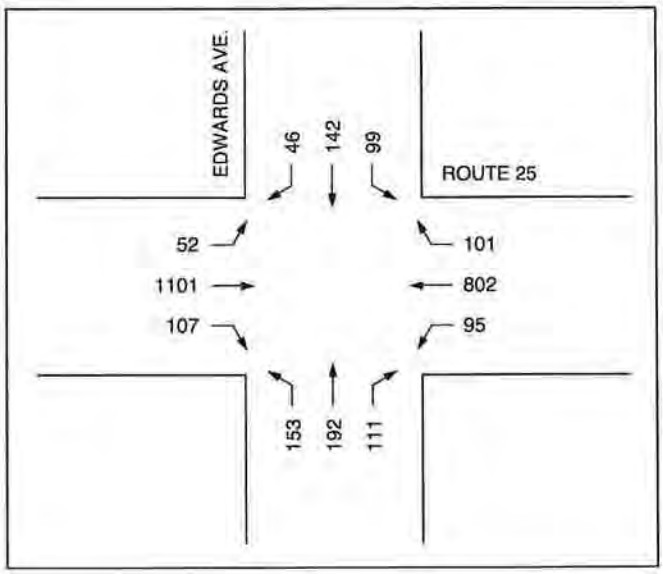
- *Beagle Run:* A residential development consisting of 73 dwelling units;
- *Headriver:* A retail big box structure;
- *Riverhead Marquee:* A retail center development including a 55,000 square foot movie theater and a 13,000 square foot restaurant;
- *Calverton Camelot:* A commercial development consisting of approximately 2.4 million square feet of industrial space, 450,000 square feet of manufacturing space, and a 302,000 square foot office space;
- *Calverton Manor:* A mixed use development consisting of approximately 122,000 square feet of retail space, and a 54,900 square foot YMCA;
- *Gas Station:* A commercial development consisting of a gas station with 20 fueling stations, a convenience store and a car wash to be located in the southeast quadrant of the Middle Country Road/Edwards Avenue intersection; and,
- *Industrial Park/Industrial Building:* Two commercial developments consisting of seven 210,000 square foot industrial park and a separate 20,000 square foot light industrial building to be located in the southeast quadrant of the Middle Country Road/Edwards Avenue intersection

TRAFFIC CONDITIONS

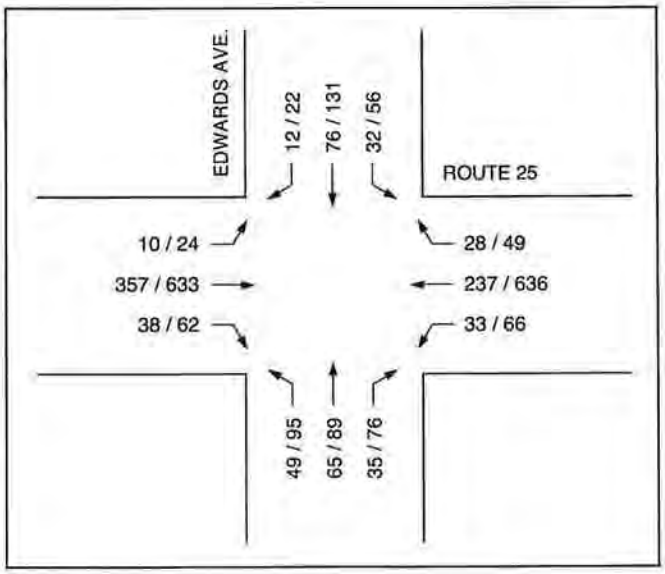
The 2007 No Build traffic volumes are shown in Figure 8-2 for the weekday and Saturday peak hours. Table 8-2 presents a comparison of the Existing and No Build conditions. As presented in Table 8-2, traffic conditions at the study area intersection would deteriorate in the 2007 No Build conditions due to the increase in traffic volumes resulting from the potential No Build projects planned for the study area. The exception would be the Saturday AM and PM peak hours for Special Event conditions during which the majority of the approaches/lane groups would operate with similar LOS as in the Existing conditions.



Weekday
Regular Operations
AM / PM



Saturday
Regular Operations
Non-Event



Saturday
Special Event
AM / PM

2007 No Build Traffic Volumes

Table 8-2
Level of Service Analysis–2006 Existing and 2007 No Build Conditions

Edwards Avenue and Middle Country Road Intersection		Weekday Conditions							Saturday Non-Event Conditions				Saturday Special Event Conditions					
		AM Peak Hour				PM Peak Hour			Midday Peak Hour				AM Peak Hour				PM Peak Hour			
		Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS
2006 Existing Conditions																					
Eastbound	LTR	1.17	103.0	F	LTR	0.83	25.3	C	LTR	0.99	44.1	D	LTR	0.34	10.1	B	LTR	0.50	12.0	B
Westbound	LTR	1.07	66.0	E	LTR	0.98	45.1	D	LTR	0.74	17.8	B	LTR	0.24	9.2	A	LTR	0.57	13.2	B
Northbound	LTR	0.52	18.6	B	LTR	1.36	210.0	F	LTR	0.72	27.0	C	LTR	0.24	18.3	B	LTR	0.38	19.4	B
Southbound	LTR	0.65	21.4	C	LTR	0.56	28.3	C	LTR	0.57	22.1	C	LTR	0.23	18.2	B	LTR	0.35	19.2	B
	Intersection		89.5	E	Intersection		70.3	E	Intersection		30.8	C	Intersection		12.3	B	Intersection		14.5	B
2007 No Build Conditions																					
Eastbound	LTR	1.59	288.6	F	LTR	1.32	171.1	F	LTR	1.55	270.3	F	LTR	0.47	11.6	B	LTR	0.86	24.2	C
Westbound	LTR	2.14	534.3	F	LTR	1.70	339.5	F	LTR	1.59	287.3	F	LTR	0.37	10.5	B	LTR	0.98	42.3	D
Northbound	LTR	0.87	37.7	D	LTR	1.94	467.2	F	LTR	1.12	104.4	F	LTR	0.33	18.9	B	LTR	0.65	24.0	C
Southbound	LTR	0.87	36.9	D	LTR	0.76	36.5	D	LTR	0.94	57.0	E	LTR	0.28	18.5	B	LTR	0.51	20.7	C
	Intersection		350.1	F	Intersection		280.1	F	Intersection		230.1	F	Intersection		13.2	B	Intersection		30.8	C

Note: L = Left Turn, T = Through, R = Right Turn, DefL = Defacto Left Turn; LOS = Level of Service.

The notable changes in traffic conditions at intersection approaches between the 2006 Existing and 2007 No Build conditions are discussed as follows:

REGULAR WEEKDAY AM PEAK HOUR

- The westbound approach would deteriorate from LOS E with a delay of 66.0 spv to LOS F with a delay of 534.3 spv.

REGULAR WEEKDAY PM PEAK HOUR

- The eastbound approach would deteriorate from LOS C with a delay of 25.3 spv to LOS F with a delay of 171.1 spv; and,
- The westbound approach would deteriorate from LOS D with a delay of 45.1 spv to LOS F with a delay of 339.5 spv.

SATURDAY (NON-EVENT) MIDDAY PEAK HOUR

- The eastbound approach would deteriorate from LOS D with a delay of 44.1 spv to LOS F with a delay of 270.3 spv;
- The westbound approach would deteriorate from LOS B with a delay of 17.8 spv to LOS F with a delay of 287.3 spv;
- The northbound approach would deteriorate from LOS C with a delay of 27.0 spv to LOS F with a delay of 104.4 spv; and
- The southbound approach would deteriorate from LOS C with a delay of 22.1 spv to LOS E with a delay of 57.0 spv.

E. POTENTIAL IMPACTS OF THE PROPOSED ACTION

As discussed in Chapter 1, "Project Description," the proposed project would comprise more than one mile of professionally designed go-kart race tracks along with a ~~14,800 square foot~~ clubhouse, a ~~5,000 square foot~~ maintenance building that would also serve as the greeting post for visitors, and an ~~33,530 square foot~~ open structure used to cover the concession track. There would be two entrances to the site, the service entrance (used solely for deliveries, staff, and large trailers expected at potential ~~the~~ special events) is proposed to the north of the maintenance building, and the main entrance would be located to the south of the maintenance building. In addition, parking for over 95 cars, consistent with the Town Code, would be provided in the ~~main~~ parking area in the northern portion of the site. Further, overflow parking and parking for staff could be provided on the one acre property located immediately north of the project site. The applicant has signed a long-term lease agreement with the owners of this property to utilize the land for parking.

TRIP GENERATION

For trip generation assessment, information provided by the client (F1 Long Island, LLC) was used which included the visitation numbers for both the weekday and weekend conditions, modal split estimates and the overall operating characteristics of the facility. This information was used to prepare specific vehicle trip estimates for the regular weekday and the various event conditions during the weekend—including a ~~the~~ Special Event which may ~~is expected to~~ occur

approximately one time per year. (As discussed in Chapter 1, "Project Description," as currently proposed, the project does not include any special events. However, to present a comprehensive analysis, the traffic study included an assessment of the potential special event. Pursuant to Chapter 90, Special Events, of the Town of Riverhead Town Code, F1 would submit an application for approval of any anticipated annual events to ensure that issues related to public health, parking, traffic, and safety are addressed.) These estimates focus on the peak hours when the maximum levels of activity would occur, thereby typically creating the greatest potential for traffic problems. The peak hours selected for analyses include:

- Weekday AM peak hour;
- Weekday PM peak hour;
- Saturday (Non-Event) Midday Peak Hour;
- Saturday (Special Event Conditions) AM Peak Hour; and,
- Saturday (Special Event Conditions) PM Peak Hour.

The detailed trip generation assumptions, as well as the total vehicle trips expected to be generated during the selected peak hours are summarized in Tables 8-3 through 8-5, respectively; and are discussed as follows:

Table 8-3
Weekday Trip Generation*

Peak Hour & Directional Distribution	Modal Splits	Person Trips	Vehicle Occupancy	Total Vehicle Trips
AM Peak Hour Inbound Trips	Bus Trips	34	17	2
	Auto Trips (Attendees)	11	1.5	7
	Auto Trips (Employees)	6	1	6
	Deliveries	--	--	2
	Total			**17**
Outbound Trips	Bus Trips	0	0	0
	Auto Trips (Attendees)	3	1.5	2
	Deliveries	--	--	2
	Total			**4**
PM Peak Hour Inbound Trips	Bus Trips	34	34	1
	Auto Trips (Attendees)	26	1.5	19
	Deliveries	--	--	--
	Total			**20**
Outbound Trips	Bus Trips	34	17	2
	Auto Trips (Attendees)	11	1.5	7
	Deliveries	--	--	--
	Total			**9**

Note: Expected Attendance: 45 patrons.
Source: *Based on the information provided by F1 Long Island, LLC.

REGULAR WEEKDAY TRIP GENERATION

The proposed facility would primarily be used for corporate outings ~~events~~ during the regular weekday. It is anticipated that the patrons would use the facility for the entire day; arriving in the morning (AM) peak hour and leaving in the evening (PM) peak hour. For trip generation purposes, a maximum of 45 patrons were assumed to be using the facility during the daytime session on a typical weekday. An additional 45 corporate patrons and 15 local racers were also assumed to arrive at the site for evening activities. For the modal split estimates, it is anticipated that the corporate patrons would primarily use buses for commuting to and from the site (34 arrive by bus, 11 arrive by personal auto), while the local users are assumed to access the site via private auto (see Table 8-3).

REGULAR WEEKEND TRIP GENERATION

The proposed facility would be open to the general public on weekends, and would feature races staggered throughout the day on three tracks. For trip generation purposes, it was assumed that each track would feature three races per hour, with 15 patrons per race (see Table 8-4). In addition, it was assumed that patrons would spend more than an hour at the facility by participating in more than one race, as well as by spending time in the restaurant and retail shop. For spectators—since the majority of them would be family and friends—it was assumed that they would carpool with the racers to arrive at and depart from the facility.

Table 8-4
Weekend (Non-Event) Trip Generation*

Directional Distribution	Components	Participants per Race	Number of Races per Hour	Number of Tracks Available	Total Vehicle Trips
Inbound Trips	Main Tracks	15	3	2	45
	Secondary Track	15	3	1	23
	Deliveries	–	–	–	–
	Total				**68**
Outbound Trips	Main Tracks	15	3	2	45
	Secondary Track	15	3	1	23
	Deliveries	–	–	–	–
	Total				**68**

Note: Expected Peak Hour: 11:45-12:45 PM
Source: *Based on the information provided by F1 Long Island, LLC.

WEEKEND (SPECIAL EVENT) TRIP GENERATION

A ~~The~~ special event at the proposed facility would potentially attract approximately 400 racers and 100 spectators on a given day. It was assumed that approximately 75 percent of these racers and spectators would arrive during the AM peak hour, and leave during the PM peak hour (see Table 8-5). Also, since the majority of the racers and spectators are expected to carpool for special events, an average vehicle occupancy rate of 3.0 was assumed for trip generation purposes.

PROJECT VEHICLE ASSIGNMENT

The project generated trips were assigned based on the most likely routes to and from the site, prevailing travel patterns, and the location of the site's proposed driveways. Based on the existing travel patterns, approximately 60 percent of the project generated traffic would enter the study area from the south, while the remaining 40 percent would come from the north. This traffic was then routed to the project site driveway located approximately 1,000 feet south of Middle Country Road. It should be noted that during a ~~the~~ special event, vehicles could also be assigned to an overflow parking area on Edwards Avenue immediately north of the site.

Table 8-5
Weekend (Special-Event) Trip Generation*

Directional Distribution	Components	Participants per Race	Number of Races per Hour	Number of Tracks Available	Total Vehicle Trips	Directional Distribution
Morning Peak Hour						
Inbound Trips	Race Participants	400	75%	300	3	100
	Spectators	100	75%	75	3	25
	Deliveries	–	–	–	–	–
	Total					**125**
Outbound Trips	Miscellaneous	–	–	–	–	10
	Total					**10**
Evening Peak Hour						
Inbound Trips	Miscellaneous	–	–	–	–	10
	Total					10
Outbound Trips	Race Participants	400	75%	300	3	100
	Spectators	100	75%	75	3	25
	Deliveries	–	–	–	–	–
	Total					**125**

Notes: Morning Expected Peak Hour: 10:00-11:00 AM
Evening Expected Peak Hour: 5:00-6:00 PM
Source: *Based on the information provided by F1 Long Island, LLC.

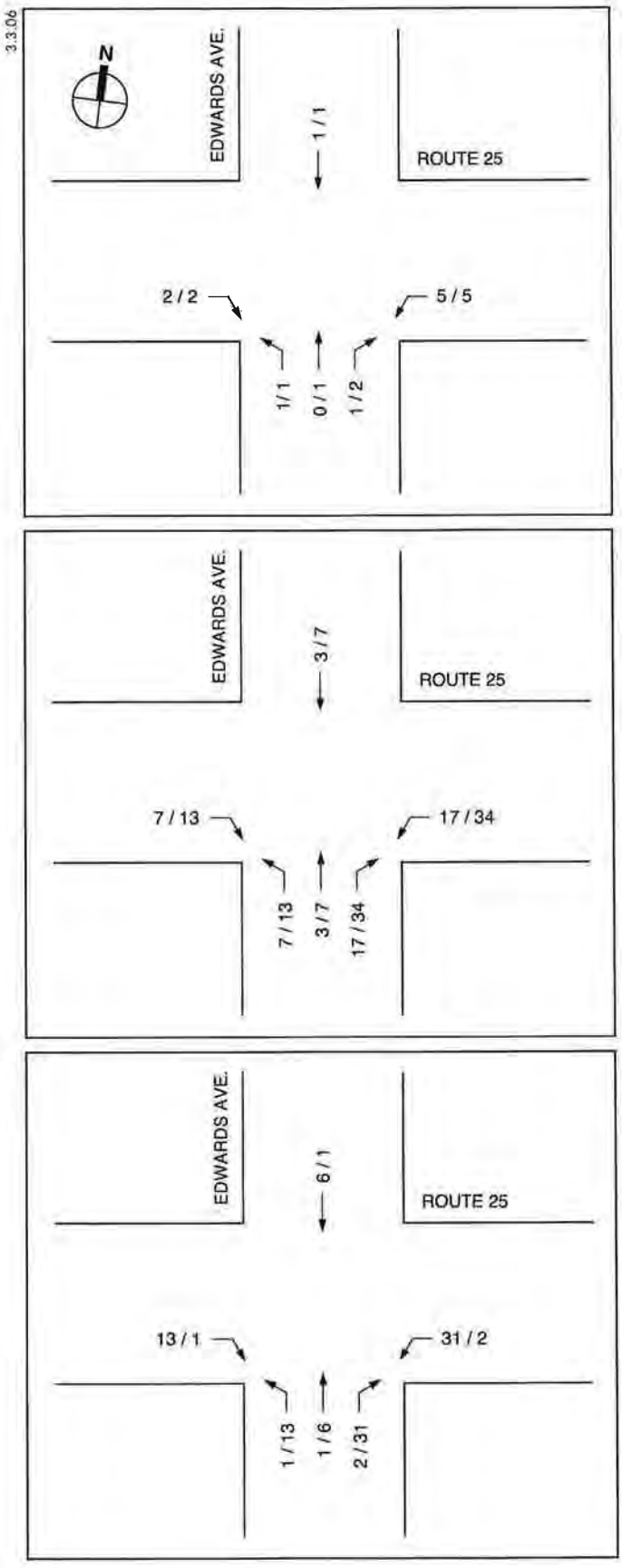
TRAFFIC CONDITIONS

Figure 8-3 shows the total project-generated traffic volumes, and Figure 8-4 shows the estimated 2007 Build Condition volumes for the selected peak hours, respectively. Table 8-6 presents a comparison of the No Build and Build conditions for the intersection of Middle Country Road and Edwards Avenue.

Table 8-6
Level of Service Analysis–2007 No Build and Build Conditions

Edwards Avenue/ Middle Country Road Inter.	Weekday Conditions								Saturday Non-Event Conditions				Saturday Special Event Conditions							
	AM Peak Hour				PM Peak Hour				Midday Peak Hour				AM Peak Hour				PM Peak Hour			
	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS	Ln Grp	v/c Ratio	Dly (sec)	LOS
2007 No Build Conditions																				
EB	LTR	1.59	288.6	F	LTR	1.32	171.1	F	LTR	1.55	270.3	F	LTR	0.47	11.6	B	LTR	0.86	24.2	C
WB	LTR	2.14	534.3	F	LTR	1.70	339.5	F	LTR	1.59	287.3	F	LTR	0.37	10.5	B	LTR	0.98	42.3	D
NB	LTR	0.87	37.7	D	LTR	1.94	467.2	F	LTR	1.12	104.4	F	LTR	0.33	18.9	B	LTR	0.65	24	C
SB	LTR	0.87	36.9	D	LTR	0.76	36.5	D	LTR	0.94	57.0	E	LTR	0.28	18.5	B	LTR	0.51	20.7	C
	Intersection		350.1	F	Intersection		280.1	F	Intersection		230.1	F	Intersection		13.2	B	Intersection		30.8	C
2007 Build Conditions																				
EB	LTR	1.59	289.4	F	LTR	1.32	172.7	F	LTR	1.56	275.3	F	LTR	0.49	11.9	B	LTR	0.86	24.3	C
WB	LTR	2.19	553.5	F	LTR	1.74	358.7	F	LTR	1.75	359.4	F	LTR	0.45	11.6	B	LTR	0.99	44.9	D
NB	LTR	0.87	38.7	D	LTR	1.96	473.5	F	LTR	1.19	130.4	F	LTR	0.34	19.0	B	LTR	0.78	30.8	C
SB	LTR	0.88	37.2	D	LTR	0.76	36.6	D	LTR	0.97	63.5	E	LTR	0.29	18.7	B	LTR	0.53	21.1	C
	Intersection		359.6	F	Intersection		289.5	F	Intersection		259.9	F	Intersection		13.7	B	Intersection		32.7	C

Note: L = Left Turn, T = Through, R = Right Turn, DefL = Defacto Left Turn; LOS = Level of Service.

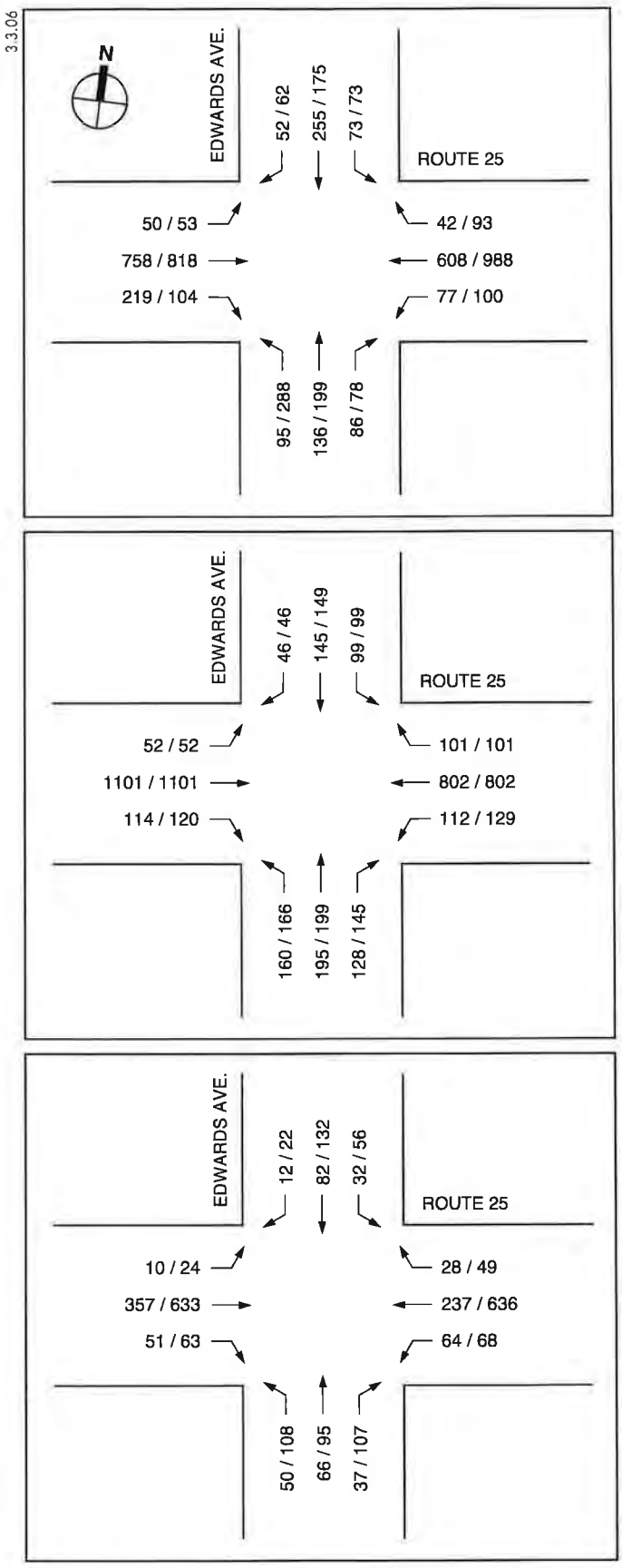


Weekday
Regular Operations
AM / PM

Saturday
Regular Operations
Non-Event
68 Attendees / 135 Attendees

Saturday
Special Event
AM / PM

Project Increment Traffic Volumes
Figure 8-3



Weekday
Regular Operations
AM / PM

Saturday
Regular Operations
Non-Event
68 Attendees / 135 Attendees

Saturday
Special Event
AM / PM

2007 Build Traffic Volumes
Figure 8-4

IMPACT CRITERIA

Significant traffic impacts were defined as follows:

- Degradation in LOS (A, B, or C) to an unacceptable mid-LOS D or worse,
- Degradation in LOS D to LOS E or F,
- Degradation in LOS E to LOS F, and
- Deterioration within LOS E or F if the delay increases 10 seconds or more.

As presented in Table 8-6, capacities at the intersection approaches would be sufficient to accommodate the project generated traffic during Saturday Special Event conditions. However, based on the impact criteria (discussed above), the following approaches would experience significant traffic impacts:

- The westbound approach during both the weekday AM and PM, and Saturday (Non-Event) midday peak hours, respectively; and,
- The northbound approach during the Saturday (Non-Event) midday peak hour.

It should be noted that the westbound approach operates at LOS F in the No Build conditions (with delays ranging from 287 spv to 534 spv) during weekday and Saturday (Non-Event) peak hours. In addition, the northbound and southbound approaches operate at LOS F and E (with delays of 104 spv and 57 spv) during the Saturday (Non-Event) conditions.

Based on the above discussion, it is evident that the traffic conditions at the intersection of Middle Country Road and Edwards Avenue are highly congested in the No Build conditions due to the traffic generated by various No Build projects. Thus, a minor increase in traffic levels at the congested approaches—already operating at LOS E and F in the 2007 No Build conditions—would result in significant traffic impacts. It should also be noted that in most cases, the actual incremental traffic associated with the proposed project is relatively small both as an absolute number and as a percentage of traffic on the roadway (see Table 8-7). As presented in Table 8-7, the incremental traffic at the impacted approaches range from 1 to 5 vehicles per hour (vph) during the regular weekday AM and PM peak hours, which translates in an increase of less than 1 percent at these approaches. As for the Saturday (Non-Event) conditions, the northbound approach would experience the highest number of project generated traffic volumes (27 vph during the midday peak hour), which translates into approximately one car every two minutes. However, at this congested location, the HCS analysis is sensitive to small changes and shows deterioration in delay for minor to moderate increases in traffic.

PROJECT IMPROVEMENTS

Traffic operating conditions at the intersection of Middle Country Road and Edwards Avenue could be improved by providing exclusive left-turn lanes along with minor restriping at the four approaches. It should be noted that there is ample room for the additional lanes and that these improvements are in line with the measures proposed for the Calverton Manor project by RMS Engineering, and for the industrial park, service station/convenience store and single industrial building projects in reports generated by Schneider Engineering. As presented in Table 8-8, with the proposed improvement measures in place, all of the impacted approaches would operate with better service conditions than under the No Build conditions. ✷

Table 8-7
2006 No Build vs. Project Generated Traffic Volumes

Edwards Avenue and Middle Country Road Intersection	Weekday Conditions						Saturday Non-Event Conditions			Saturday Special Event Conditions					
	AM Peak Hour			PM Peak Hour			Midday Peak Hour			AM Peak Hour			PM Peak Hour		
	No Build Traffic Vol (vph)	Proj Gen Trips	% Increase	No Build Traffic Vol (vph)	Proj Gen Trips	% Increase	No Build Traffic Vol (vph)	Proj Gen Trips	% Increase	No Build Traffic Vol (vph)	Proj Gen Trips	% Increase	No Build Traffic Vol (vph)	Proj Gen Trips	% Increase
Eastbound Approach	1025	2	0.2%	973	2	0.2%	1260	7	0.6%	405	13	3.2%	719	1	0.1%
Westbound Approach	722	5	0.7%	1176	5	0.4%	998	17	1.7%	298	31	10.4%	751	2	0.3%
Northbound Approach	315	2	0.6%	561	4	0.7%	456	27	5.9%	149	4	2.7%	260	50	19.2%
Southbound Approach	379	1	0.3%	309	1	0.3%	287	3	1.0%	120	6	5.0%	209	1	0.5%

Note: vph=vehicles per hour

Table 8-8
Level of Service Analysis–2007 Build With Mitigation Conditions

Edwards Avenue and Middle Country Road Intersection	Weekday Conditions								Saturday Non-Event Conditions			
	AM Peak Hour				PM Peak Hour				Midday Peak Hour			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
Eastbound	L	0.50	25.0	C	L	0.82	77.1	E	L	0.55	29.7	C
	TR	1.30	159.6	F	TR	1.10	80.7	F	TR	1.43	216.8	F
	Approach		153.1	F	Approach		80.6	F	Approach		209.1	F
Westbound	L	0.78	52.6	D	L	1.50	302.3	F	L	1.15	151.5	F
	TR	1.76	361.9	F	TR	1.20	121.6	F	TR	1.01	48.2	D
	Approach		345.8	F	Approach		137.0	F	Approach		59.6	F
Northbound	L	0.48	18.9	B	L	1.39	229.4	F	L	0.57	22.8	C
	TR	0.51	18.3	B	TR	0.67	31.6	C	TR	0.70	25.5	C
	Approach		18.5	B	Approach		132.3	F	Approach		24.6	C
Southbound	L	0.29	16.7	B	L	0.42	27.2	C	L	0.58	24.3	C
	TR	0.67	22.1	C	TR	0.53	27.8	C	TR	0.47	20.2	C
	Approach		21.1	C			27.7	C	Approach		21.6	C
	Intersection		214.8	F	Intersection		107.1	F	Intersection		113.3	F

Note: L = Left Turn, T = Through, R = Right Turn, DefL = Defacto Left Turn; LOS = Level of Service

A. INTRODUCTION

This chapter is provided as an update to Chapter 8, "Traffic," in response to comments on the F1 Long Island Sports Facility Draft Environmental Impact Statement (DEIS). As described below, new summer traffic counts were performed at the intersection of Edwards Avenue and Route 25 and compared to the original February counts to determine if the seasonal adjustment factor was sufficient to establish traffic mitigation measures. In addition, a new analysis was conducted for the Long Island Expressway (LIE) interchange at Edwards Avenue.

B. SUMMER TRAFFIC VOLUMES

At the request of the Lead Agency, summer counts were conducted in August 2007 to determine the validity of the traffic analysis presented in the original F1 Sports Facility traffic study dated February 2006, which included a seasonal adjustment factor. As shown in Table 8a-1, the new 2007 summer counts were lower during the AM peak period, approximately the same during the PM peak period (but higher for southbound traffic) and generally higher during the Saturday peak period compared to the seasonal adjusted February 2006 volume data. In general, the 2006 seasonal adjusted volumes compared well (similarly) to the 2007 summer counts.

Table 8a-1
Comparison of Volume Data, February 2006 & August 2007

	Month-Year	Time	NB	SB	EB	WB	Total
AM Peak	February 2006[1]	8:00-9:00	223	313	837	372	1,744
	August 2007	8:15-9:15	210	250	761	310	1,531
	2007 vs. 2006		94.2%	79.9%	91.0%	83.3%	87.8%
PM Peak	February 2006[1]	4:30-5:30	396	**251**	630	827	2,104
	August 2007	4:15-5:15	374	**308**	607	807	2,096
	2007 vs. 2006		94.5%	**122.8%**	96.3%	97.5%	99.6%
Sat	February 2006[1]	11:45-12:45	**321**	**215**	812	**596**	1,944
	August 2007	12:15-1:15	**460**	**263**	664	**643**	2,030
	2007 vs. 2006		**143.4%**	**122.5%**	81.8%	**107.8%**	104.4%

Notes: [1] To account for the seasonal variation in traffic levels, the existing traffic volumes were increased by applying a seasonal adjustment factor of 0.857 based on the NYSDOT traffic data report.

The Highway Capacity Software (HCS) analysis was performed for the PM and Saturday peak hours using the 2007 summer volumes to determine whether the mitigation measures developed with the 2006 seasonal adjusted volumes as presented in the 2006 study are still valid, see Chapter 8, "Traffic." To present a conservative analysis, the 2006 AM peak hour and the 2007 PM and Saturday peak hours are being examined, because the 2007 summer counts are higher

during these periods at some of the approaches (not all) compared to the 2006 seasonal adjusted volumes.

Table 8a-2 below presents Level of Service (LOS) results for the 2006 study and the revised analysis with the August 2007 volumes for the No Build, Build, and Build with Mitigation conditions during the PM and Saturday Midday (non-event) peak periods. See Chapter 8, "Traffic," for the AM peak hour LOS results for 2006. As shown, the mitigation measures proposed in the 2006 study, which provided a left turn lane and a through-right lane at all approaches, are still effective utilizing the 2007 summer volumes. No additional mitigation measures are required as a result of utilizing 2007 summer volumes in the analysis. See Chapter 8, "Traffic," for a complete description of the traffic mitigation proposed as part of this project.

C. LONG ISLAND EXPRESSWAY/EDWARDS AVENUE INTERCHANGE

In accordance with the Town of Riverhead's request, as summarized in the November 16, 2007 letter from Richard Hanley, Town Planning Director (see Appendix G), AKRF, Inc. performed data collection and an analysis of existing and future traffic conditions at the LIE interchange at Edwards Avenue. This directional interchange provides an exit for eastbound LIE traffic to Edwards Avenue and an entrance from Edwards Avenue to the westbound LIE, and will serve an access route for the F1 Sports Facility. Both intersections are unsignalized.

2008 EXISTING CONDITIONS

Turning movement data was collected in January 2008 at both the exit and entrance ramps. To account for the variation in traffic levels, the January existing traffic volumes were increased by applying a seasonal adjustment factor of 0.833 based on the New York State Department of Transportation (NYSDOT) traffic data report. The analysis of existing conditions was performed utilizing the 2000 Highway Capacity Manual (HCM) unsignalized intersection methodology. As shown in Table 8a-3 below, all lane groups operate at LOS C or better except for the right turn movement from the eastbound exit ramp onto Edwards Avenue, which operates at LOS E, with an average delay of 43.4 seconds per vehicle (spv) during the weekday AM peak hour.

Table 8a-2

Level of Service Analysis – No Build, Build, and Build with Mitigation Conditions

2006 F1 Long Island Sports Facility Study & Updated F1 Long Island Sports Facility Study with August 2007 Volumes

2006 F1 Long Island Sports Facility Study[1]								
	Weekday Conditions PM Peak Hour				Saturday (Non-Event) Conditions Midday Peak Hour			
Intersection	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
2007 No Build Conditions								
Edwards Avenue and Route 25								
Eastbound	LTR	1.32	171.1	F	LTR	1.55	270.3	F
Westbound	LTR	1.70	339.5	F	LTR	1.59	287.3	F
Northbound	LTR	1.94	467.2	F	LTR	1.12	104.4	F
Southbound	LTR	0.76	36.5	D	LTR	0.94	57.0	E
Intersection			280.1	F	Intersection		230.1	F
2007 Build Conditions								
Edwards Avenue and Route 25								
Eastbound	LTR	1.32	172.7	F	LTR	1.56	275.3	F
Westbound	LTR	1.74	358.7	F	LTR	1.75	359.4	F
Northbound	LTR	1.96	473.5	F	LTR	1.19	130.4	F
Southbound	LTR	0.76	36.6	D	LTR	0.97	63.5	E
Intersection			289.5	F	Intersection		259.9	F
2007 Build with Mitigation Conditions								
Edwards Avenue and Route 25								
Eastbound	L	0.82	77.1	E	L	0.55	29.7	C
	TR	1.10	80.7	F	TR	1.43	216.8	F
	Approach	--	80.6	F	Approach	--	209.1	F
Westbound	L	1.50	302.3	F	L	1.15	151.5	F
	TR	1.20	121.6	F	TR	1.01	48.2	D
	Approach	--	137.0	F	Approach	--	59.6	F
Northbound	L	1.39	229.4	F	L	0.57	22.8	C
	TR	0.67	31.6	C	TR	0.70	25.5	C
	Approach	--	132.3	F	Approach	--	24.6	C
Southbound	L	0.42	27.2	C	L	0.58	24.3	C
	TR	0.53	27.8	C	TR	0.47	20.2	C
	Approach	--E	27.7	C	Approach	--	21.6	C
Intersection			107.1	F	Intersection		113.3	F

Updated F1 Long Island Sports Facility Study with August 2007 Volumes								
	Weekday Conditions PM Peak Hour				Saturday (Non-Event) Conditions Midday Peak Hour			
Intersection	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
2007 No Build Conditions								
Edwards Avenue and Route 25								
Eastbound	LTR	1.14	96.3	F	LTR	1.50	247.2	F
Westbound	LTR	1.44	223.9	F	LTR	1.59	288.5	F
Northbound	LTR	1.84	422.7	F	LTR	1.51	266.0	F
Southbound	LTR	0.88	48.8	D	LTR	1.07	92.8	F
Intersection			197.8	F	Intersection		248.4	F
2007 Build Conditions								
Edwards Avenue and Route 25								
Eastbound	LTR	1.14	97.7	F	LTR	1.51	253.0	F
Westbound	LTR	1.47	236.9	F	LTR	1.74	357.2	F
Northbound	LTR	1.86	431.0	F	LTR	1.59	300.5	F
Southbound	LTR	0.89	49.1	D	LTR	1.09	100.0	F
Intersection			205.0	F	Intersection		281.5	
2007 Build with Mitigation Conditions								
Edwards Avenue and Route 25								
Eastbound	L	0.78	69.5	E	L	0.65	39.2	D
	TR	0.97	41.7	D	TR	1.30	159.5	F
	Approach	--	43.3	D	Approach	--	153.1	F
Westbound	L	1.25	198.5	F	L	1.11	135.6	F
	TR	1.05	63.3	E	TR	1.13	89.0	F
	Approach	--	75.5	E	Approach	--	93.5	F
Northbound	L	1.40	238.7	F	L	0.58	23.6	C
	TR	0.63	30.2	C	TR	1.06	79.2	E
	Approach	--	127.6	F	Approach	--	67.7	E
Southbound	L	0.37	26.3	C	L	0.77	50.7	D
	TR	0.67	31.8	C	TR	0.62	23.0	C
	Approach	--	30.8	C	Approach	--	28.9	C
Intersection			69.3	E	Intersection		103.0	F

Notes: [1]Utilized 2006 seasonal adjusted volumes

L = Left Turn, T = Through, R = Right Turn, DefL = Defacto Left Turn; LOS = Level of Service

Table 8a-3

LOS Summary for Unsignalized Intersections: 2008 Existing Conditions

Intersection/ Approach	Lane Group	Weekday						Saturday without Event			Saturday with Special Event					
		AM Peak			PM Peak			Midday Peak			AM Peak			PM Peak		
		V/C Ratio	Delay (spv)	LOS	V/C Ratio	Delay (spv)	LOS	V/C Ratio	Delay (spv)	LOS	V/C Ratio	Delay (spv)	LOS	V/C Ratio	Delay (spv)	LOS
Edwards Avenue & Eastbound Long Island Expressway Exit																
Eastbound	L	0.45	18.5	C	0.52	19.7	C	0.25	12.9	B	0.10	10.0	B	0.16	11.0	B
	R	0.94	43.4	E	0.44	12.0	B	0.30	10.7	B	0.10	9.0	A	0.20	9.7	A
Edwards Avenue & Westbound Long Island Expressway Entrance																
Northbound	L	0.33	10.8	B	0.23	9.8	A	0.23	9.1	A	0.07	7.8	A	0.11	8.2	A

Notes: L: Left Turn; R: Right Turn; V/C: Volume to Capacity; spv: Seconds per Vehicle; LOS: Level of Service.

2009 NO BUILD CONDITIONS

Existing 2008 volumes were increased by an annual growth factor of 1.0188 for the 2009 No Build condition, and traffic from specific nearby No Build projects (consistent with information presented in the DEIS) was added to the network to estimate future conditions without the project. Table 8a-4 presents a comparison of Existing and No Build LOS conditions. As presented in Table 8a-4, the eastbound right turn movement at the LIE exit ramp would deteriorate from LOS E to F, with a No Build delay of 65.9 spv during the weekday AM peak hour, and the left turn movement also at the LIE exit ramp would deteriorate from LOS C to D during the weekday AM and PM peak hours, with No Build delays of 31.8 and 26.4 spv, respectively.

Table 8a-4

LOS Summary for Unsignalized Intersections: 2008 Existing and 2009 No Build Conditions

Int/ Appr	Ln Grp	Weekday												Saturday without Event						Saturday with Special Event											
		AM Peak						PM Peak						Midday Peak						AM Peak						PM Peak					
		Existing			No Build			Existing			No Build			Existing			No Build			Existing			No Build			Existing			No Build		
		V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS
Edwards Avenue & Eastbound Long Island Expressway Exit																															
EB	L	0.45	18.5	C	0.71	31.8	D	0.52	19.7	C	0.65	26.4	D	0.25	12.9	B	0.41	16.1	C	0.10	10.0	B	0.15	10.6	B	0.16	11.0	B	0.27	12.7	B
	R	0.94	43.4	E	1.03	65.9	F	0.44	12.0	B	0.47	12.6	B	0.30	10.7	B	0.32	11.2	B	0.10	9.0	A	0.10	9.1	A	0.20	9.7	A	0.21	10.0	B
Edwards Avenue & Westbound Long Island Expressway Entrance																															
NB	L	0.33	10.8	B	0.38	12.0	B	0.23	9.8	A	0.27	10.7	B	0.23	9.1	A	0.26	9.9	A	0.07	7.8	A	0.07	8.0	A	0.11	8.2	A	0.12	8.6	A

Notes: L: Left Turn; R: Right Turn; V/C: Volume to Capacity; spv: Seconds per Vehicle; LOS: Level of Service.

2009 BUILD CONDITIONS

Project-generated trips were assigned to the network (consistent with information presented in the DEIS) and added to the No Build volumes to create the Build volumes. An HCS analysis was performed to determine Build operating conditions. As shown in Table 8a-5, which presents a comparison of No Build and Build conditions, project-generated traffic would result in very minor increases in delay (less than a 2 second increase in all cases).

Table 8a-5

LOS Summary for Unsignalized Intersections: 2009 No Build and Build Conditions

Int/ Appr	Ln Grp	Weekday												Saturday without Event						Saturday with Special Event									
		AM Peak						PM Peak						Midday Peak						AM Peak						PM Peak			
		Existing			No Build			Existing			No Build			Existing			No Build			Existing			No Build			Existing			No Build	
		V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS	V/C Ratio	Dly (spv)	LOS
Edwards Avenue & Eastbound Long Island Expressway Exit																													
EB	L	0.71	31.8	D	0.73	33.6	D	0.65	26.4	D	0.68	28.2	D	0.41	16.1	C	0.49	18.0	C	0.15	10.6	B	0.24	11.4	B	0.27	12.7	B	0.28	12.9	B
	R	1.03	65.9	F	1.03	65.9	F	0.47	12.6	B	0.47	12.6	B	0.32	11.2	B	0.32	11.3	B	0.10	9.1	A	0.10	9.1	A	0.21	10.0	B	0.22	10.1	B
Edwards Avenue & Westbound Long Island Expressway Entrance																													
NB	L	0.38	12.0	B	0.38	12.0	B	0.27	10.7	B	0.27	10.7	B	0.26	9.9	A	0.27	10.1	B	0.07	8.0	A	0.07	8.0	A	0.12	8.6	A	0.13	9.0	A

Notes: L: Left Turn; R: Right Turn; V/C: Volume to Capacity; spv: Seconds per Vehicle; LOS: Level of Service.

CONCLUSION

The analysis indicates that the traffic generated by the F1 Sports Facility would not impact traffic operating conditions at the LIE/Edwards Avenue interchange (there would be no change in LOS from No Build to Build conditions with the proposed project in operation). Thus, no additional mitigation is proposed at this interchange. ✶

A. INTRODUCTION

The noise analysis for the F1 Long Island Sports Facility focused on determining the following two items:

- What level of noise would be produced due to operation of the racing vehicles; and
- Would operation of the proposed facility result in significant noise impacts.

This noise attachment is divided into six sections: an introduction; a discussion of noise fundamentals; a discussion of noise standards and impact criteria; a discussion of the analysis methodology; a discussion of existing conditions; and a discussion of project impacts and conformance to standards.

B. NOISE FUNDAMENTALS

GENERAL EFFECTS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Although it is possible to study these effects on people on an average or statistical basis, it must be remembered that all the stated effects of noise on people vary greatly with the individual. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time.

"A"-WEIGHTED SOUND LEVEL (dBA)

Noise is typically measured in units called decibels (dB), which are ten times the logarithm of the ratio of the sound pressure squared to a standard reference pressure squared. Because loudness is important in the assessment of the effects of noise on people, the dependence of loudness on frequency must be taken into account in the noise scale used in environmental assessments. Frequency is the rate at which sound pressures fluctuate in a cycle over a given quantity of time, and is measured in Hertz (Hz), where 1 Hz equals 1 cycle per second. Frequency defines sound in terms of pitch components. In the measurement system, one of the simplified scales that accounts for the dependence of perceived loudness on frequency is the use of a weighting network—known as A-weighting—that simulate response of the human ear. For most noise assessments the A-weighted sound pressure level in units of dBA is used in view of its widespread recognition and its close correlation with perception. In this analysis, all measured noise levels are reported in dBA or A-weighted decibels. Common noise levels in dBA are shown in Table 9-1.

Table 9-1
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	
Busy city street, loud shout	80
Busy traffic intersection	
Highway traffic at 15 meters, train	70
Air Conditioning Unit at 6 meters	60
Predominantly industrial area	
Light car traffic at 15 meters, city or commercial areas or residential areas close to industry	
Background noise in an office	50
Suburban areas with medium density transportation	
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
Sources: Cowan, James P. Handbook of Environmental Acoustics. Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.
New York State Department of Environmental Conservation *Assessing and Mitigating Noise Impacts* (October 6, 2000)

COMMUNITY RESPONSE TO CHANGES IN NOISE LEVELS

The average ability of an individual to perceive changes in noise levels is well documented (see Table 9-2). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

Table 9-2
Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Newman, Inc., *Fundamentals and Abatement of Highway Traffic Noise*, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are sometimes used to indicate noise levels that are exceeded 1, 10, 50, 90 and x percent of the time, respectively. Discrete event peak levels are given as L_1 levels. L_{eq} is used in the prediction of future noise levels, by adding the contributions from new sources of noise (i.e., increases in traffic volumes) to the existing levels and in relating annoyance to increases in noise levels.

The relationship between L_{eq} and levels of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little, L_{eq} will approximate L_{50} or the median level. If the noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by 10 or more decibels. Thus the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}. The relationship between L_{eq} and exceedance levels has been used in this analysis to characterize the noise sources and to determine the nature and extent of their impact at all receptor locations.

For the purposes of this project, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. $L_{eq(1)}$ is the noise descriptor used by most governmental agencies for noise impact evaluation, and is used to provide an indication of highest expected sound levels

C. NOISE STANDARDS AND IMPACT CRITERIA

There are a variety of noise standards and guidelines that have been promulgated by various local, state, and federal agencies. Most criteria are not directly applicable to the proposed facility. Two criteria that have some applicability to the proposed facility are Chapter 81 of the Riverhead Town Code and impact criteria of the New York State Department of Environmental Conservation (DEC). These are discussed below.

RIVERHEAD TOWN CODE

Chapter 81-5 of the Town of Riverhead Code specifies that the maximum permissible noise levels from commercial, business, and industrial operations which has crossed the property line of such sound sources and enters property zoned for residential use or property within a noise-sensitive zone as 65 dBA between the hours of 7:00 AM to 8:00 PM and 50 dBA between the hours of 8:00 PM and 7:00 AM. The Town Code further defines the maximum permissible noise level from any sound source that enters a property which is zoned for business or property where the public in general congregates, except a property zoned for industrial use, as 65 dBA. The Town Code also specifies that the maximum permissible noise levels from commercial, business, and industrial operations which has crossed the property line of such sound sources

and enters property zoned for industrial use as 80 dBA over 24 hours, 82 dBA over 16 hours, 85 dBA over 8 hours, 88 dBA over 4 hours, 91 dBA over 2 hours, 94 dBA over 1 hour, 97 dBA over 0.5 hours, and 100 dBA over 0.25 hours.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

The DEC published a guidance document titled *Assessing and Mitigating Noise Impacts* (October 6, 2000). This document states that increases from 0-3 dBA should have no appreciable effect on receptors, increases of 3-6 dBA may have the potential for adverse impact only in cases where the most sensitive of receptors are present, and increases of more than 6 dBA may require a closer analysis of impact potential depending on existing noise levels and the character of surrounding land use and receptors. It goes on to say that in terms of threshold values, the addition of any noise source, in a non-industrial setting, should not raise the ambient noise level above a maximum of 65 dBA, and ambient noise levels in industrial or commercial areas may exceed 65 dBA with a high end of approximately 79 dBA. Projects which exceed these guidance levels should explore the feasibility of implementing mitigation.

PROJECT IMPACT CRITERIA

With regard to Chapter 81 of the Riverhead Town Code, Figure 2-2 of Chapter 2 shows zoning in the areas adjacent to the project site. Land immediately adjacent to the proposed facility site are zoned Industrial A and Industrial C, and land north of NYS Route 25 (Middle Country Road) is zoned Agricultural Protection and Rural Corridor. None of the land is zoned residential or is property within a noise-sensitive zone. Consequently, the noise limits regarding residentially zoned property or noise sensitive zones specified in Chapter 81-5 of the Town of Riverhead Code would not be applicable.

However, for purposes of impact assessment, per DEC guidance, an increase in $L_{eq(1)}$ of more than 6 dBA which produces an ambient noise level of more than 65 dBA at a residence or 79 dBA at industrial or commercial areas will be considered to be a significant project impact.

D. ANALYSIS METHODOLOGY

The noise analysis was performed using the Cadna A model. The Cadna A model is a computerized model developed by DataKustik for noise prediction and assessment. The model can be used for the analysis of roads, highways, airports, industrial facilities, sporting facilities, etc. The model takes into account the noise power levels of the noise sources, ground contours, reflections from barriers and structures, attenuation due to shielding, etc. The Cadna A model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. This standard is currently under review for adoption by the American National Standards Institute (ANSI) as an American Standard. It is a state-of-the-art analysis tool for noise analysis.

During typical operation, three types of race karts would be used on the tracks—a kart with a maximum noise level of 76 dBA at 7 meters, a kart with a maximum noise level of 77 dBA at 7 meters, and a kart with a maximum noise level of 78 dBA at 7 meters. These three race karts can be purchased from a number of manufacturers, as long as they do not exceed a maximum noise level of 76, 77, and 78 dBA, respectively, at a distance of 7 meters (approximately 23 feet). A fourth type of race kart that produces a maximum noise level of *93* dBA at 7 meters will be used on a very infrequent basis. This kart, when used, would be restricted to the northern track, and can be purchased from a number of manufacturers.

The race facility would contain three tracks—a short concession track which would be located southeast of the clubhouse and towards the center of the site, a longer track which would be located on the southern portion of the site and abuts the southern property line, and a northern track which would be located north of the clubhouse. The concession track would be used for teaching new drivers racing techniques, and would be the principal track used for corporate functions and by novice drivers.

Several different operating scenarios were considered for the noise analysis. The scenarios which would produce the highest noise levels due to race kart operation, and would produce the highest ambient noise levels, would be events which take place on the weekends and utilize all three tracks simultaneously. (Ambient noise levels on weekends are lower than ambient noise levels on weekdays, and therefore, all things being equal, weekend scenarios would produce higher project impacts than weekday scenarios.) Typically the facility would be used for corporate outings ~~functions~~ on weekdays, and these events would use a maximum of two tracks. Therefore, no analysis was performed to examine corporate outings ~~events~~, since weekend 3-track scenarios produced higher noise levels and project impacts.

The two scenarios which produced the highest noise levels due to race kart operation, and produced the highest ambient noise levels that were selected for analysis are described below.

Scenario A: This scenario assumes maximum weekend operation with three tracks simultaneously in operation with typical race karts. The following assumptions were made for this analysis scenario:

- Each track was assumed to have 15 karts operating at maximum conditions for 45 minutes per hour;
- The northern track has karts that produce a maximum noise level of 78 dBA at 7 meters, the southern track has karts that produce a maximum noise level of 77 dBA at 7 meters, and the concession track has karts that produce a maximum noise level of 76 dBA at 7 meters; and
- Racing occurs between 10 AM and 8 PM.

Scenario B: This scenario assumes maximum weekend operation with three tracks simultaneously in operation with karts that produce a maximum noise level of *93* dBA at 7 meters allowed to race on the northern track. This scenario would not be typical and would be expected to occur a limited number of times each year. The following assumptions were made for this analysis scenario:

- Each track was assumed to have 15 karts operating at maximum conditions for 45 minutes per hour;
- The northern track has karts that produce a maximum noise level of *93* dBA at 7 meters (operating 11 AM to 5 PM), the southern track has karts that produce a maximum noise level of 78 dBA at 7 meters, and the concession track has karts that produce a maximum noise level of 76 dBA at 7 meters; and
- Racing occurs between 11 ~~10~~ AM and 5 ~~8~~ PM ~~(Scenario A could occur 10 AM to 8 PM)~~.

The analysis was performed assuming three sound barriers. The first sound barrier is permanent and varies from 2 to 7.5 meters (6.6 to 24.6 feet) in height (above grade) to be located at least 30 feet from the southern site boundary wrapping around the southern corners and heading north for a short distance. The second sound barrier, a retaining wall, is 3 meters (9.8 feet) in height (above grade) and follows the southern portion of the northern track west of the clubhouse. The

third sound barrier is moveable and varies from 2 to 3 meters (6.6 to 9.8 feet) in height (above grade) and follows the southern portion of the northern track east of the clubhouse. The third sound barrier would only be utilized for Scenario B operations.

Modifications to the design of the proposed F1 facility were made between the analysis performed for the DEIS and the FEIS. The design updates include: 1) adding a cover to the concession track, 2) reducing the size of the clubhouse from 23,000 gross square feet to 21,330 gross square feet, 3) eliminating the additional parking area within the concession track, 4) preserving the man-made pond located on the project site and increasing the size of the wetland buffer, and 5) adding native landscaping where feasible to the southern border of the site, and keeping existing vegetation throughout the site, where feasible. These design modifications are not expected to significantly change the results and conclusions of the analysis performed for the DEIS, and as a result, no new analysis was performed for the FEIS.

E. EXISTING CONDITIONS

NOISE MONITORING

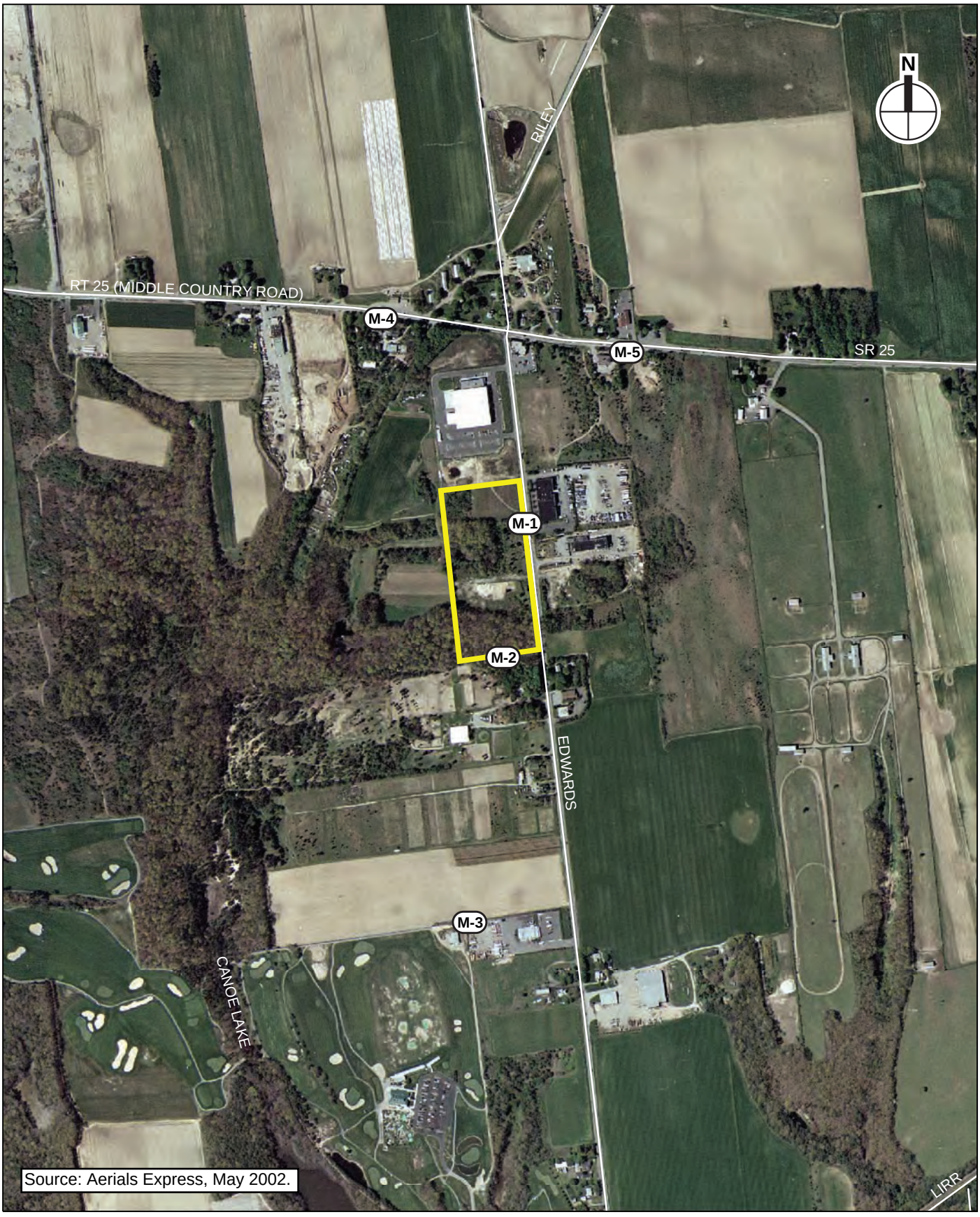
Noise monitoring was conducted at five locations near the proposed facility. The measurements included both short term (20-minute) spot measurements made on a Sunday and continuous 24-hour measurements made on both a Sunday and Monday. The continuous measurements were used to adjust the spot measurements to determine the lowest ambient noise levels during the time periods when racing would occur at the proposed facility. Table 9-3 lists the receptor sites and the type and dates of measurements, and Figure 9-1 shows the measurement sites.

Table 9-3
Measurement Locations (in dBA)

Site	Measurement Location	Type of Measurement	Monitoring Dates
M1	Edwards Avenue, Opposite Entrance to Project Site	Continuous Weekend & Weekday	1/29/06, 2/5/06 – 2/6/06
M2	Southern Property Line of Project Site	Spot Weekend	1/29/06
M3	Calverton Links Golf Course Property Line	~~Spot Weekend~~ *Continuous Weekend & Weekday*	1/29/06, 2/5/06 – 2/6/06
M4	Zeh Residence on NYS Route 25 (Middle Country Road)	Continuous Weekend & Weekday	1/29/06, 2/5/06 – 2/6/06
M5	Riverhead Charter School (Facing Towards Project Site)	Spot Weekend	1/29/06

Three noise monitoring instruments were used for the measurement program. All three were used for the continuous noise monitoring, and one was used for the spot measurements. Each noise monitoring instrument set-up included a Brüel & *Kjær* Type ~~4176~~ *4189* ½-inch microphone connected to a Brüel & *Kjær* Model 2260 Type 1 (according to ANSI Standard S1.4-1983) sound level meter. This assembly was mounted at a height of approximately five feet above the ground surface on a tripod and at least five feet away from any large sound-reflecting surface to avoid major interference with sound propagation. The meter was calibrated before and after readings with a Brüel & *Kjær* Type 4231 sound-level calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA). The data were digitally recorded by the sound level meter and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used

3.8.06



Project Site Boundary

M- *Noise Receptor*

0 600 1200 FEET

SCALE

F1 Long Island Sports Facility

Noise Receptor Location

Figure 9-1

during all sound measurements except for calibration. Weather conditions were noted to ensure a true reading, as follows: wind speed under 12 mph; relative humidity under 90 percent; and temperature above 14°F and below 122°F. All measurement procedures conformed to the requirements of ANSI Standard S1.13-~~1971 (R1976)~~ 2005.

RESULTS OF MEASUREMENTS

At all five monitoring sites, traffic from the nearby roadways (Edwards Avenue or Middle Country Road) was the dominant noise source. Table 9-4 shows the maximum and minimum measured $L_{eq(1)}$ values at the three continuous monitored sites and the maximum and minimum calculated $L_{eq(1)}$ values at the two spot measurement sites during the 10 AM to 8 PM time period when racing would occur at the proposed facility. During this time period, the lowest existing noise levels occur during 7 to 8 PM time period, both on weekends and on weekdays. The maximum and minimum calculated $L_{eq(1)}$ values at the three spot measurement sites are based upon the relationship between the measured spot values and the continuous measurements. (See Appendix H for results of the ~~24 hour~~ continuous measurements.)

Table 9-4
Maximum and Minimum Existing $L_{eq(1)}$ Noise Levels Between 10 AM and 8 PM (in dBA)

Site	Measurement Location	Day	Maximum $L_{eq(1)}$	Minimum $L_{eq(1)}$
M1	Edwards Avenue, Opposite Entrance to Project Site	Weekend	*70*	*64*
		Weekday	*71*	*68*
M2	Southern Property Line of Project Site	Weekend	*56*	*50*
		Weekday	*57*	*55*
M3	Calverton Links Golf Course Property Line	Weekend	*50*	*45*
		Weekday	*57*	*42*
M4	Zeh Residence on Route 25 (Middle Country Road)	Weekend	*71*	*67*
		Weekday	*72*	*70*
M5	Riverhead Charter School (Facing Towards Project Site)	Weekend	*65*	*61*
		Weekday	*66*	*64*

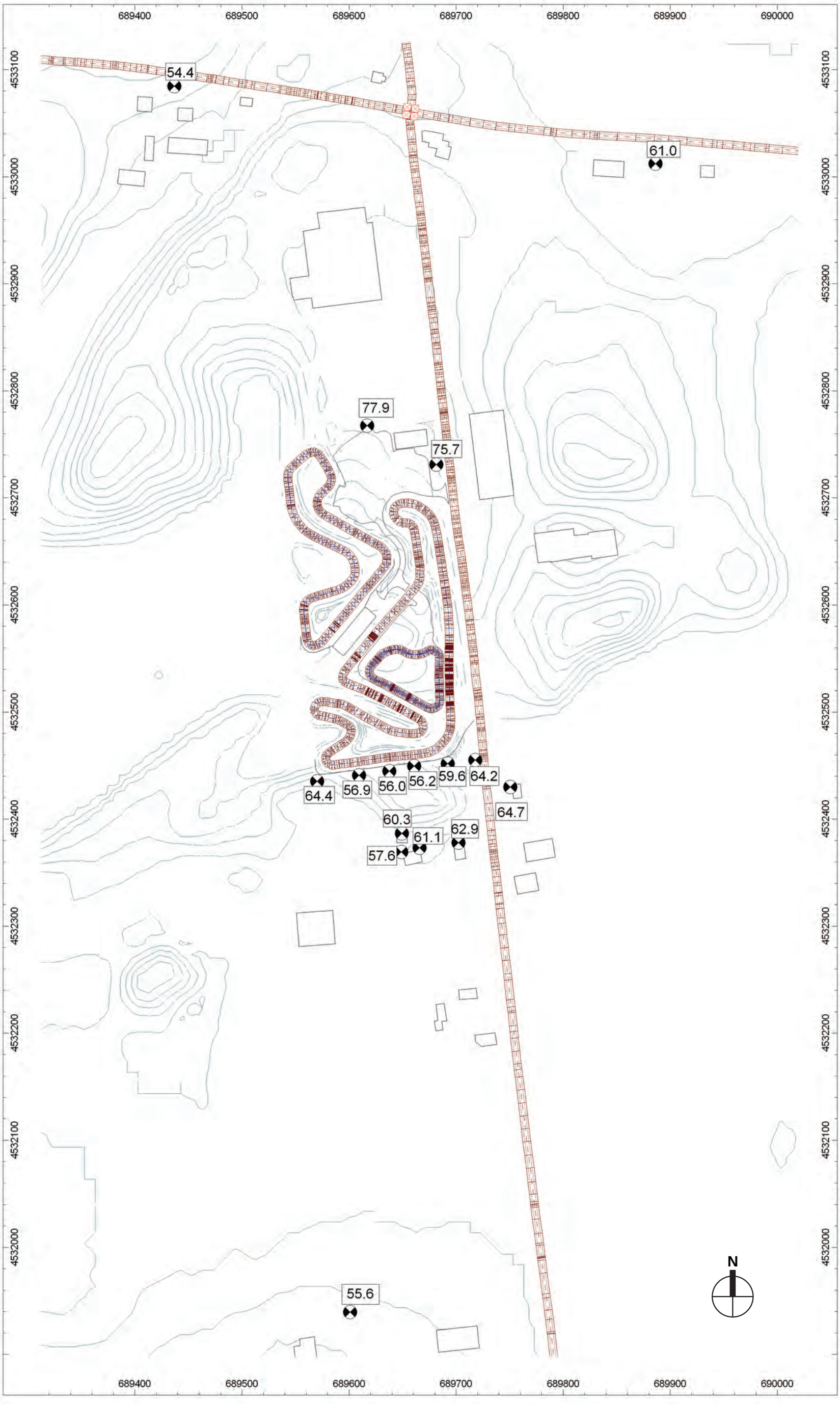
Notes: *Fractionalized decibels were rounded to the nearest whole number.*

F. PROJECT IMPACTS AND CONFORMANCE TO STANDARDS

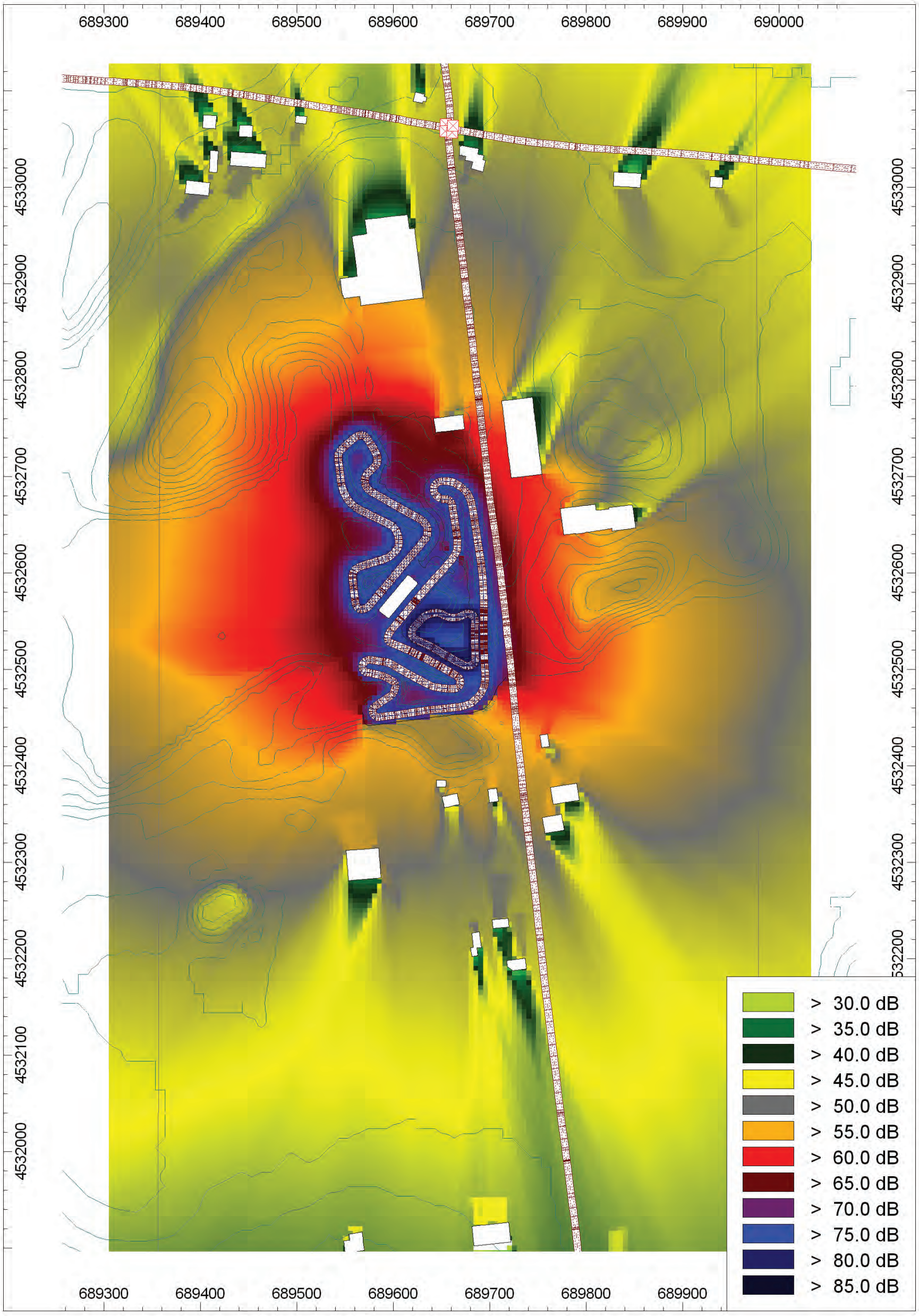
Using the analysis methodology described above, $L_{eq(1)}$ noise levels for Scenario A—a maximum weekend 3-track operation with typical race karts—and for Scenario B—a maximum weekend 3-track operation using karts that produce a maximum noise level of *93* dBA at 7 meters using the northern track—were calculated. Figures 9-2 and 9-3 show noise levels due to race track operations at discrete locations, including along the property line, and at nearby residences, the Riverhead Charter School, and commercial and industrial facilities for Scenarios A and B, respectively. Figures 9-4 and 9-5 show $L_{eq(1)}$ noise level contours at adjacent properties for Scenarios A and B, respectively.

It is worth noting that noise levels at the southern property line, which is an Industrial C zoned property permitting greater than 82 dBA, are all below the Riverhead Town Code 65 dBA noise limit for residential zoned noise property.

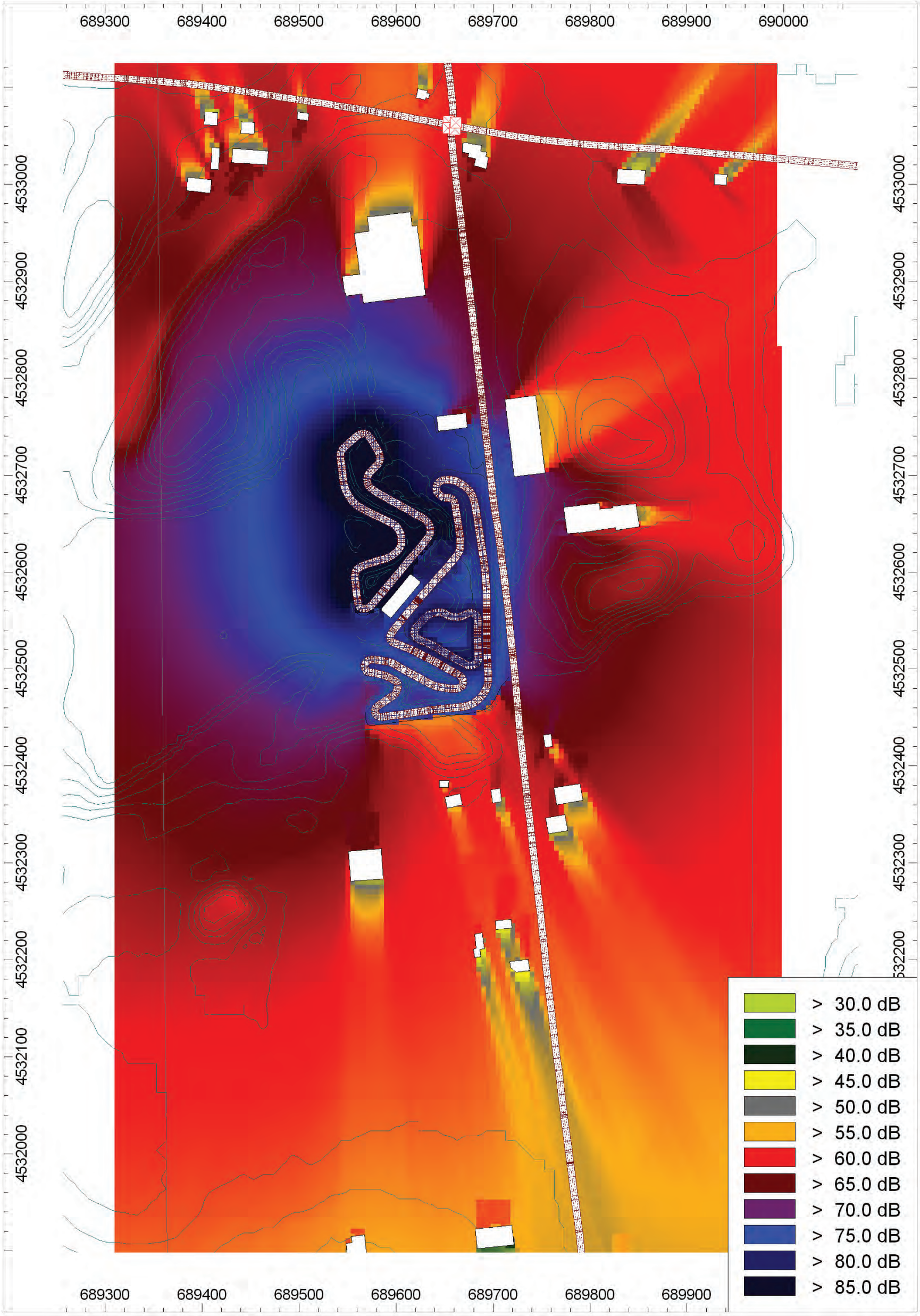
Scenario A
Noise Levels
Figure 9-2



Scenario B
Noise Levels
Figure 9-3



Scenario A
Noise Level Contours
Figure 9-4



Scenario B
Noise Level Contours
Figure 9-5

Table 9-5 shows the results of a noise impact analysis at representative receptor locations. Potential noise levels at six locations were examined—the Zeh residence near Middle Country Road, the Riverhead Charter School, the Gibb residence at the horse farm south of the proposed facility, the nearest barn at the horse farm south of the proposed facility, a residence slightly southeast of the proposed facility on 460 Edwards Avenue, and the closest point on the Calverton Links Golf Course south of the project site. The table shows the lowest existing $L_{eq(1)}$ noise level for the analysis time period, the $L_{eq(1)}$ noise level from the racetrack operations, the total (existing plus racetrack operations and project generated traffic[1]) $L_{eq(1)}$ noise level, and the increase in noise due to the proposed facility (the total noise level minus the existing noise level).

Table 9-5
Noise Impact Analysis Results

Location	Scenario	Existing $L_{eq(1)}$	Racetrack Only	Project Generated Traffic	Total	Increase
Zeh Residence-Route 25 (Site M4)	A-Typical Race Karts	*67*	*40*	*50*	*67*	*0*
	B-Max Noise Level Karts	*70*	*54*	*50*	*70*	*0*
River Charter School-Route 25 (Site M5)	A-Typical Race Karts	*61*	*47*	*49*	*62*	*1*
	B-Max Noise Level Karts	*64*	*61*	*49*	*66*	*2*
Residence at Gibb Horse Farm*	A-Typical Race Karts	*56*	*55*	*49*	*59*	*3*
	B-Max Noise Level Karts	*60*	*63*	*49*	*65*	*5*
Barn at Gibb Horse Farm*	A-Typical Race Karts	*50*	*53*	*43*	*55*	*5*
	B-Max Noise Level Karts	*54*	*60*	*43*	*61*	*7*
460 Edwards Avenue**	A-Typical Race Karts	*64*	*56*	*54*	*65*	*1*
	B-Max Noise Level Karts	*68*	*65*	*54*	*70*	*2*
Calverton Links Golf Course (Site M3)	A-Typical Race Karts	*45*	*43*	*39*	*48*	*3*
	B-Max Noise Level Karts	*47*	*56*	*39*	*56*	*9*

Notes: *Existing noise level assumed to be equal to the value at site M2, adjusted for distance.
**Existing noise level assumed to be equal to the value at site M1.
Fractionalized decibels were rounded to the nearest whole number.

[1] The noise levels from the project-generated traffic were calculated using the Cadna A model. The increases in noise levels due to project-generated traffic are minimal (0 to 1 dBA), would not be perceptible.

With scenario A, the maximum increase at any of the five discrete receptor locations examined would be 5 dBA. A change of 5 dBA would be noticeable. However, the noise levels would be below the relative change impact criteria of 6 dBA.

Scenario B results in higher noise levels than scenario A. However, scenario B is an unusual event and as a result would occur very infrequently. At the Gibb horse farm residence, the maximum increase in noise level would be 5 dBA, which is below the relative change impact criteria of 6 dBA. At the Gibb horse farm barn and Calverton Links Golf Course, the maximum increase in noise levels would be more than 6 dBA (i.e. 7 dBA, and 9 dBA, respectively). Noise level increases of this magnitude would be noticeable. At the Gibb horse farm residence and barn, the total noise levels (ambient plus raceway plus project-generated traffic) would be 65 dBA and 61 dBA, respectively. At the Calverton Links Golf Course, the total noise levels (ambient plus raceway plus project-generated traffic) would be 56 dBA.

As shown in Table 9-5 there are no locations where operation of the proposed facility, even for "worst case" conditions, would result in both an increase in $L_{eq(1)}$ of more than 6 dBA and an ambient noise level of more than 65 dBA at a residence or 79 dBA at an industrial or commercial area. Therefore, the proposed facility would not result in any significant project impacts.

Further, it was requested that a literature search be performed to determine the availability of information related to the physiological impact of noise on breeding horses. ~~Five websites were located and searched (NYbreds.com; gundogsupply.com; ansi.okstate.edu/breed/horses; ilo.org/encyclopedia; and totalhorsesource.com), and no data or analysis relative to this issue was found.~~ The literature search included the National Library of Medicine's Medline database, Veterinary Medicine Journal References, Lexis-Nexis's Academic database, Ebsco's Academic Search Premier, and Elsevier's Sciencedirect journals, as well as academic and scientific sites on the World Wide Web.

Provided below is a list of journals reviewed as part of the literature search:

- Animal Reproduction Science
- Animal Welfare
- Applied Animal Behavior Science
- Equine Veterinary Journal
- Livestock Production Science
- Journal of Veterinary Medicine
- Journal of Veterinary Pharmacology & Therapeutics
- Applied Animal Behavior Science
- New Zealand Veterinary Journal
- Journal of Equine Veterinary Science
- Farm & agricultural periodicals
- Biology of Reproduction
- American Journal of Veterinary Research

- Journal of the American Veterinary Medical Association
- Livestock Production Science
- Journal of Animal Physiology & Animal Nutrition
- Veterinary Journal
- Reproductive Medicine & Biology
- Research in Veterinary Science
- Journal of Animal Science

Having performed the exhaustive literature search, no research was discovered that disclosed a relationship between noise produced from go-karts and adverse effects on equine reproductive behavior. The literature found was largely on the effects of transporting horses. One study, Physiology, Balance, and Management of Horses during Transportation, found that "a short term stressor, such as a loud noise, increased the heart rate and may cause constriction of the blood vessels. A stressor which lasts several seconds to a minute may increase heart rate, respiration rate, and cause digestive upset or decreased feed intake." Further, "a long term, chronic stress, usually 24 to 48 hours, can occur in horses which are shipped or experience thermal discomfort. This longer term stress influences a number of systems in the animal including immune, digestive, and reproductive systems. Long term stress can influence hormones essential in reproduction, growth, energy metabolism, and response to disease or infection. These deficiencies can continue after the stimulus from the stressor has been diminished or eliminated."

~~However, s~~ Studies of animal behavior patterns demonstrate the ability of horses to become acclimated to sites and sounds in their environment. As history demonstrates, horses have been used by law enforcement, at parades, in the military, at sporting events, for hunting, and public assemblies. There are numerous examples of small and large horse breeding and riding facilities located along major arterial roadways in Nassau and Suffolk Counties where they coexist without issue. For example, Belmont Racetrack is located near LaGuardia and JFK airports and alongside the Cross Island Parkway. The Jamaica Bay Riding Academy also has its stables and bridle paths alongside the Belt Parkway.

In this particular case, where the Gibb horse farm barn and other facilities are located adjacent to Edwards Avenue, the noise analysis shows that the total noise levels at the Gibbs horse farm barn will be less than 62 dBA and less than 65 dBA at the residence. This is well within the minimum permitted level of 80 dBA for the zoning district and also meets the requirements for residential or noise sensitive uses. The proposed F1 Long Island Sports Facility would not produce long-term noise (a long-term stressor) and the noise levels that would be produced from the facility would only occur on a short-term basis and would not result in noise significantly above ambient levels. Therefore, it can be concluded that the facility would not negatively impact the existing horse farm or the animals that board there, and ~~Therefore~~ it is expected that there would be no significant adverse impacts over existing conditions. ✷

A. INTRODUCTION

This chapter reviews the general groundwater and surface water conditions for the proposed go-kart site and surrounding areas as well as presents the changes in the site use that would affect groundwater and surface water and discusses potential for impacts to these resources. Local well data for the area are also presented. Further, this chapter addresses the existing natural resources including flora and fauna featured within the proposed site as well as the site's subsurface hydrogeology.

B. EXISTING CONDITIONS

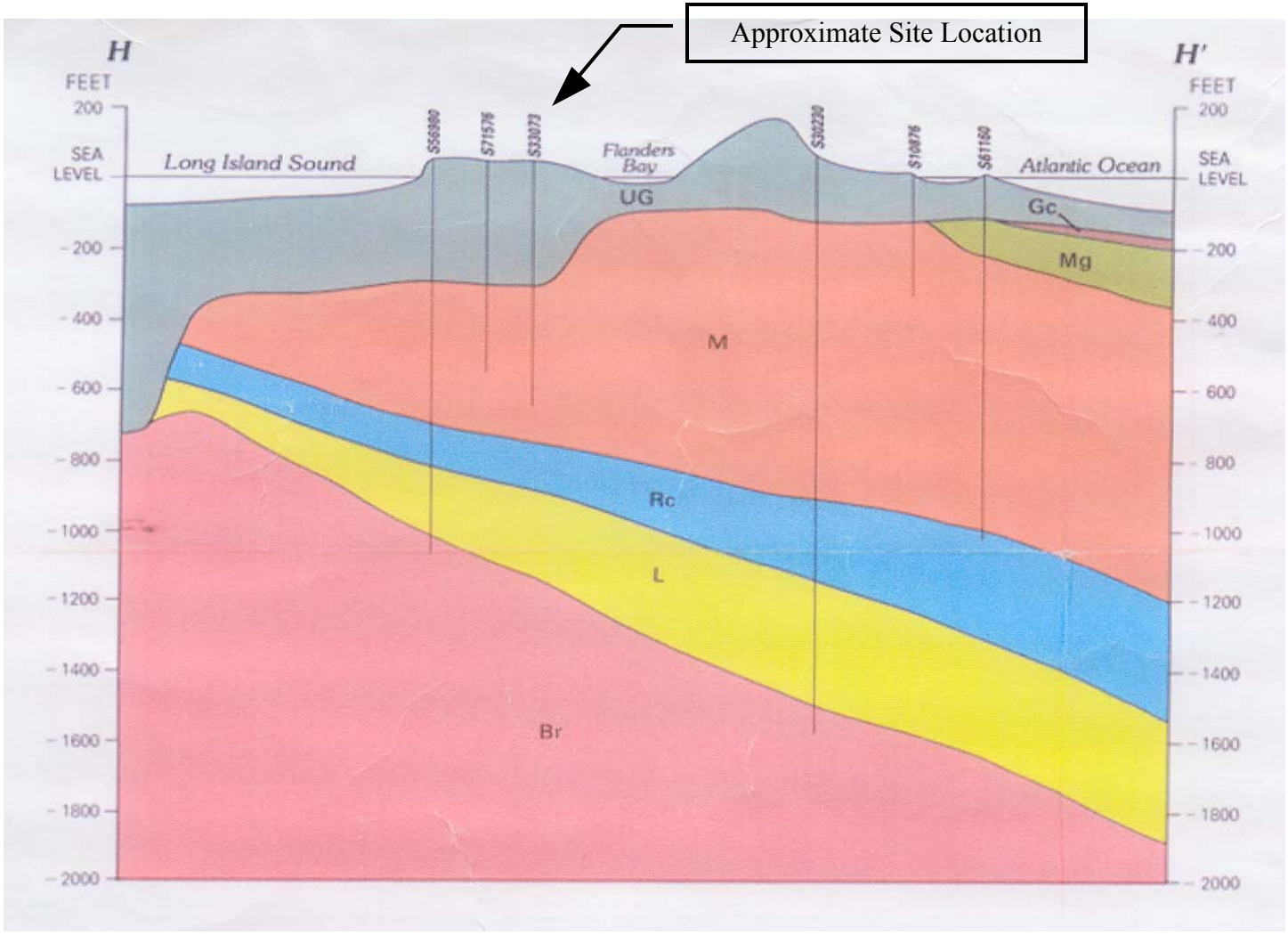
WATER RESOURCES

REGIONAL GEOLOGIC CONDITIONS

Most of Long Island's geology is defined by two terminal moraines—low, hill-like formations that are remnants of the advances of glaciers during the last ice age (the Pleistocene epoch). The two morainal ridges—the Harbor Hill Moraine and Ronkonkoma Moraine—run the length of Long Island and diverge to the east to form the North Fork and South Fork. The moraines are made of poorly sorted glacial till deposited at the glacial terminus. South of the moraines are outwash plain deposits of sands and gravel. The proposed project lies on the outwash plains between the Harbor Hill and Ronkonkoma Moraines.

Long Island is composed of many layers of sand, clay, and gravel, with southeasterly sloping bedrock below. These layers of subsurface geologic deposits are important in defining the groundwater aquifers that underlie Long Island. The interrelationships of the various geologic deposits dictate how the aquifer is recharged by rainfall, and also determine how activities on the land surface might affect the quantity and quality of the groundwater. As shown schematically in Figure 10-1, the geologic composition of most of Long Island consists of three distinct formations that lie atop bedrock (Smolensky et al. 1989). The thickness of these unconsolidated glacial and deltaic deposits ranges from a few hundred feet in the northwestern sections of Nassau County to more than 2,000 feet along Suffolk's south shore barrier beaches. Beginning at the surface and extending down to bedrock, these formations include:

- Glacial Aquifer (Upper Pleistocene)—The Glacial Aquifer is the youngest of the formations and the closest to the surface. It was created 15,000 years ago from glacial deposits of sand and gravel from the retreating glaciers. At the proposed site, these deposits extend from ground level (approximately 28 to 74 feet above mean sea level) to about 300 feet down below the surface to the top of the Magothy Formation.
- Magothy Aquifer—Just below the Upper Pleistocene, the Magothy Formation was formed in the Cretaceous Age (70 to 140 million years ago). This formation consists of fluvial and



Source: U.S. Geological Survey Hydrogeologic Framework of Long Island, NY

Gc	Gardiners Clay
Mg	Monmouth greensand
UG	Upper Glacial
M	Magothy aquifer
Rc	Raritan confining unit
L	Lloyd aquifer
Br	Bedrock

Figure 10-1
Approximate Site Geologic Cross-Section

deltaic deposits and is composed mainly of mixed layers of sand, silt, and clay. The Magothy contains some discontinuous clay layers ("lenses"). Gravel is also present, but limited primarily to the lower strata of the formation. Minerals (e.g., muscovite and pyrite) distinguish this formation from the upper glacial deposits, as does lignite, which is a signature feature of the Magothy. This formation is approximately 450 feet thick below the proposed site. The Magothy Aquifer is the primary drinking water source for most of Long Island.

- Raritan Formation and the Lloyd Aquifer—Beneath the Magothy is a layer of clay, which comprises the upper strata of the Raritan Formation. This formation is 175 feet thick in the vicinity of the proposed project site. Below the clay is the Lloyd Aquifer. The Lloyd is approximately 300 feet thick beneath the proposed project site. It consists primarily of fine- to coarse-grained sand and gravel, intermixed with clay. The Raritan Formation's confining unit of clay is quite thick and restricts the water flow between the Lloyd Aquifer and the Magothy Aquifer.
- Bedrock—Bedrock dates from the Precambrian and Paleozoic eras (more than 500 million years old). It begins about 1,225 feet below the proposed project site, and is composed of impermeable schist and gneiss.

GROUNDWATER CONDITIONS

Overview

In 1978, the aquifers of Long Island were designated by the United States Environmental Protection Agency (EPA) as a sole source aquifer (Federal Register, 43, June 21, 1978), with the finding that the system is the "principal source of drinking water" to the people of Long Island and "if contaminated, would create a significant hazard to public health."

The three main aquifers supply both Nassau and Suffolk Counties with potable water. The Upper Glacial Aquifer is used widely for water supply in areas of central and eastern Suffolk County. Because the Upper Glacial Aquifer in Nassau County is generally of degraded quality due to past sanitary and industrial waste disposal practices, the majority of Nassau County obtains its water supply from the deeper Magothy Aquifer. While the Magothy Aquifer also supplies the majority of Suffolk County with potable water, the Lloyd Aquifer supplies water to the south shore barrier beach communities. In the area of the proposed project site, potable water is primarily drawn from both the Upper Glacial and Magothy Aquifers.

Depth to Water

Depth to groundwater is generally equivalent to sea level at the north and south shorelines of Long Island and, following the topography, rises in elevation towards the center of the Island. These elevation changes form a parabola in the groundwater levels. The depth to groundwater on Long Island ranges from a few feet along the shorelines and stream/lake margins to more than 200 feet in the center of the Island, depending on the surface topography. The high point of the parabola is referred to as the groundwater divide that creates a hydraulic gradient causing groundwater to generally flow to the north (into Long Island Sound), or to the south (into the Atlantic Ocean). Groundwater flow in the vicinity of the proposed go-kart site is generally southeast to the Peconic Estuary. As discussed in detail below, the proposed project site is located within Hydrogeologic Zone III as defined by the Long Island Comprehensive Waste Treatment Management Plan (208 Study) characterized as a deep flow system with a large vertical component of groundwater flow recharging the aquifer.

According to the Suffolk County Department of Health Services (SCDOH), the water table is at an elevation of approximately 25 feet above mean sea level (MSL) near the project site. Therefore, the approximate depth to groundwater at the proposed site ranges from 8 to 49 feet above MSL.

Average rainfall on Long Island is approximately 44 inches per year, roughly half of which goes to evaporation or evapotranspiration. The remaining 22 inches recharge the aquifers, primarily during the months of October through April.

Groundwater Protection and Programs

Safe Drinking Water Act

The Safe Drinking Water Act of 1974 (SDWA) authorized EPA to regulate public water systems to protect the public's health. The EPA set standards for chemicals that might be found in water that could potentially have adverse effects. EPA has 25 drinking water standards, 10 of which are for synthetic organics. These drinking water protection measures are also written into the state and county regulations (see the discussion below).

Special Groundwater Protection Areas

Article 55 of the New York State Conservation Law (known as the Sole Source Aquifer Protection Act) designates areas on Long Island that are Special Groundwater Protection Areas (SGPAs). Prepared under the direction of the Long Island Regional Planning Board (LIRPB) and released in 1992, *The Long Island Comprehensive Special Groundwater Protection Area Plan* identifies nine SGPAs in the Nassau and Suffolk County regions. The SGPAs are watershed recharge areas important for the maintenance of large volumes of high-quality groundwater. SGPAs are usually located in largely undeveloped or sparsely developed areas of Long Island that provide recharge to portions of the deep flow aquifer system. The existing water supply policy is to ensure the future quantity and quality of groundwater recharge by controlling development and pumpage in these SGPAs. All SGPAs are designated Critical Environmental Areas (CEAs), which are areas of exceptional or unique natural settings which have an inherent ecological, geological, or hydrological sensitivity. The Central Suffolk SGPA covers the project site and study area (see Figure 10-2). This SGPA, the largest of the nine SGPAs, comprises approximately 125,000 acres within the Towns of Brookhaven, Riverhead, and Southampton and a small portion of the Town of Southold.[1] Almost all of the 100,000 acres designated as part of the Long Island Central Pine Barrens are included in the Central Suffolk SGPA.

The plan makes the following recommendations relative to the northeastern portion of the Central Suffolk SGPA where the proposed project is located:

- Suffolk County, together with the Towns of Riverhead and Southold should expand the existing agricultural preserve. The County should continue to acquire development rights under its Farmland Preservation Program.
- The Town of Riverhead should amend its zoning to require a five acre minimum lot size for all farmland located within the SGPA. At the same time, it should provide for the transfer of development rights (TDR) to non-farm sites outside the SGPA at one dwelling unit per two acres.

[1] The Long Island Comprehensive Special Groundwater Protection Area Plan, 1992.

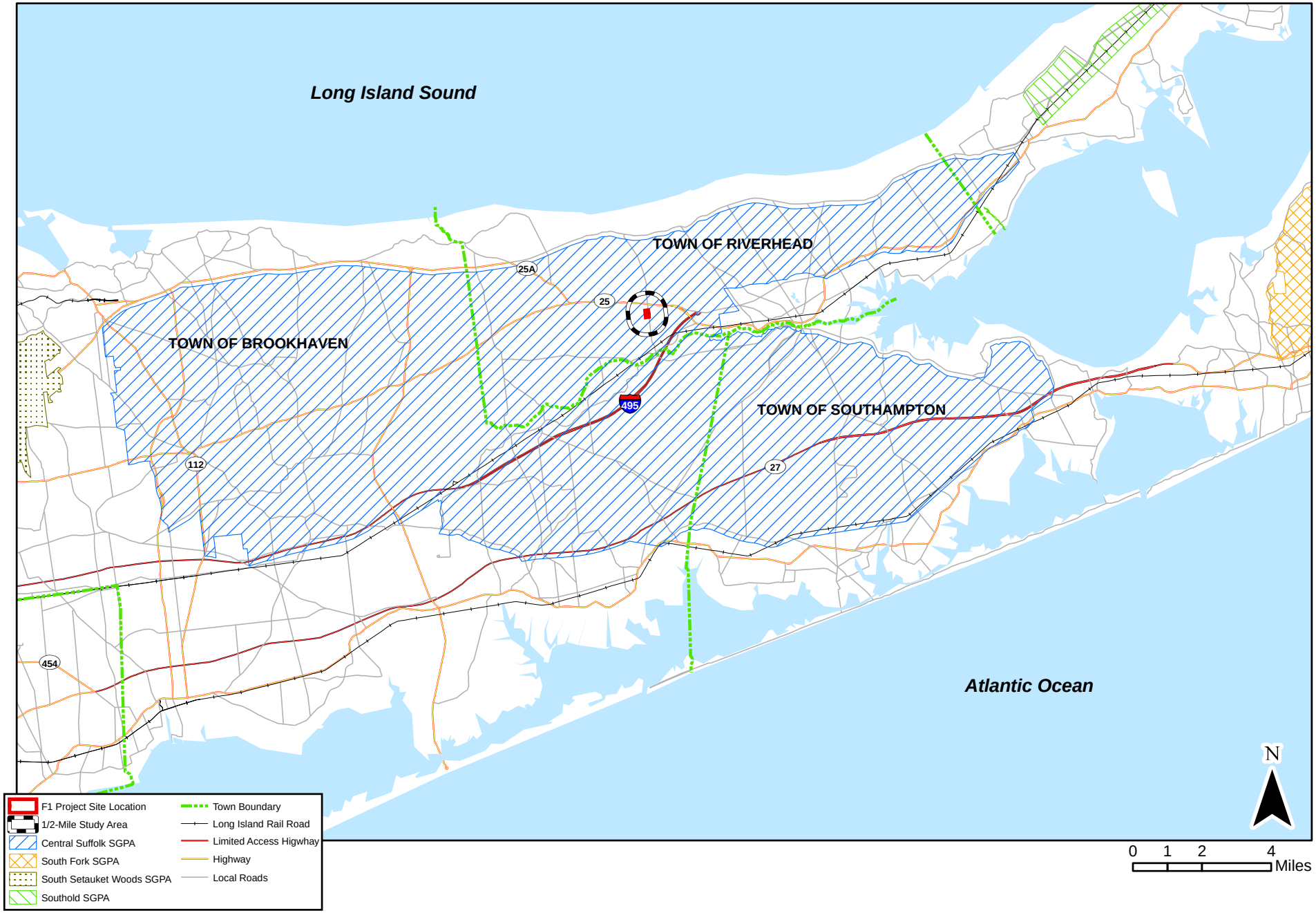


Figure 10-2
Special Groundwater Protection Areas

F1 Long Island Sports Facility

- The Town of Riverhead should require clustering of development on those parcels where TDR is not feasible. The County and the Town of Southold should use a combination of selective acquisition, TDR, and mandatory clustering to assemble and protect a 200+ acre watershed preserve in the vicinity of Laurel Lake. Such a preserve would comprise both woodlands and portions of farm parcels.
- The County should acquire the unused portion of Camp Wauwepex while permitting the Boy Scouts to continue using the remainder. The County or the Town of Riverhead should acquire the Canoe Lake area and part or all of several small parcels along the Peconic River.
- The Federal Government should place excess land at the National Cemetery and in the Airport clear zones for the Calverton facility in a protected category. Such lands constitute an important part of the deep recharge area and should be retained as open space.
- The Town of Riverhead should reduce the amount of industrially zoned land and should concentrate such development in existing industrial areas at the end of the Long Island Expressway. The Town of Southold should facilitate the phase out of the former mining operation and of the small industrial use on Sound Avenue. Both properties should be converted to residential use and further industrial development should not be permitted in this part of the SGPA.
- The Town of Riverhead and Southold should review their zoning ordinances and amend them as necessary to preclude the expansion of the commercial activities beyond the limits of those SGPA areas where such activities currently exist.

New York State Department of Health Source Water Assessment Program

A mission of the New York State Department of Health (DOH) is to protect and promote the health of the citizens of New York State. Within the DOH, the Bureau of Public Water Supply Protection has the primary responsibility of administering the Public Water System Supervision program (PWSS) and for assuring that safe, potable water, in adequate quantities, is provided throughout the state. This is accomplished through:

- Oversight of local water supply regulatory programs;
- Training and certification of water supply operators;
- Maintenance of a statewide database on individual public water systems;
- Development and initiation of enforcement policies;
- Plan review;
- Maintenance of a water quality surveillance program; and
- Providing technical assistance to both regulatory units and water suppliers.

The regulatory agency that oversees New York's PWSS is the EPA. The primary federal legislation governing public drinking water systems is the SDWA, including the 1986 and 1996 amendments.

The 1996 amendment of the SDWA places a strong emphasis on the protection of surface and groundwater sources used for public drinking water. As a result of these amendments, states must develop a Source Water Assessment Program (SWAP) and complete assessments of the sources of drinking water used by public water systems. Each source water assessment must include:

- A delineation of the source water assessment areas;

- An inventory of potential significant contaminant sources within the source water assessment area; and
- An evaluation of the source water's susceptibility to contamination.

The SWAP for Long Island has been performed by the DOH and Nassau and Suffolk County Departments of Health.

Groundwater and Surface Water Discharge Permits

In 1987, the Clean Water Act (CWA) was amended to specifically identify the types of storm water discharges requiring permit authorization and to establish deadlines for their achievement. New York State administers the State Pollutant Discharge Elimination System (SPDES) program which serves as the authorizing mechanism for activities in the State to comply with the National Pollution Discharge Elimination System (NPDES) program.

Whenever there are discharges to State waters, authorization is required through a SPDES permit from the New York State Department of Environmental Conservation (DEC). A SPDES permit also satisfies the federal NPDES process, since the DEC has an approved NPDES program which is administered in lieu of the EPA issuing discharge permits in New York State.

Long Island Comprehensive Waste Treatment Plan (208 Study)

The 208 Study issued in 1978 by the LIRPB identified eight Hydrogeologic Zones in Nassau and Suffolk Counties with the objective of protecting groundwater quality. These eight zones were differentiated based on differences in underlying groundwater flow patterns and groundwater quality. Zones I through III occupy geographic areas that are primarily characterized by a deep flow system (or large vertical component of groundwater flow recharging the aquifer). The remaining five zones are characterized by a larger horizontal component of groundwater flow, which contributes to shallow recharge or transmits flows to surface waters.

The proposed project site is located in Hydrogeologic Zone III, which covers the central area of Suffolk County including a large portion of the Long Island Central Pine Barrens. Zone III is a deep flow recharge area that contributes water to portions of the lower Glacial and upper Magothy Aquifers where the major source of water is supplied to both Nassau and Suffolk Counties.[1] The groundwater within Zone III is of very high quality.

Suffolk County Water Pollution Control

The purpose of Article 7 of the Suffolk County Sanitary Code is to safeguard all the water resources of Suffolk County, especially in deep recharge areas and water supply sensitive areas, from discharges of sewage, industrial and other wastes, toxic or hazardous materials, and storm water runoff by preventing and controlling such sources in existence when the article was enacted, and also by preventing further pollution from new sources under a program which is consistent with maintaining and protecting the water resources. This article regulates the discharge of sewage, industrial wastes, toxic or hazardous materials, or other wastes to surface or groundwater. These discharges are prohibited in deep recharge or water supply sensitive areas. It also regulates the storage of toxic or hazardous materials. One of the most important aspects of this article is that it restricts the sanitary flow per acre within various Hydrogeologic Zones. In Hydrogeologic Zones III, V, and VI, or where public water supply is not provided, the

[1] The Long Island Comprehensive Waste Treatment Management Plan (208 Study), 1978.

maximum sanitary flow per acre is 300 gallons per day (gpd). This is the equivalent of 1-acre residential zoning and is based on a nitrogen loading that is equivalent to 6 mg/l with a drinking water standard of 10 mg/l. Densities in excess of these standards require the use of a sewage treatment plant (STP). In addition, DEC regulations require the use of a STP if the flow from a single facility is in excess of 30,000 gpd.

Peconic Estuary Program

In 1992, the Peconic Estuary was designated an "Estuary of National Significance" by the EPA. The Peconic Estuary Program was then developed and a unique partnership of federal, state, and local government, citizens and environmental groups collectively drafted The Peconic Estuary Program Comprehensive Conservation and Management Plan (CCMP). The CCMP was approved and adopted by the EPA on November 15, 2001. The Peconic Estuary study area includes more than 125,000 acres of land and 158,000 acres of surface water, including those within the Towns of Riverhead, Southold, Shelter Island, Southampton, and East Hampton as well as a small portion of the Town of Brookhaven.[1] As depicted in Figure 10-3, the proposed site is located just within the northwestern border of this study area. The Peconic Estuary Program's watershed encompasses both surface water and groundwater contributing areas.

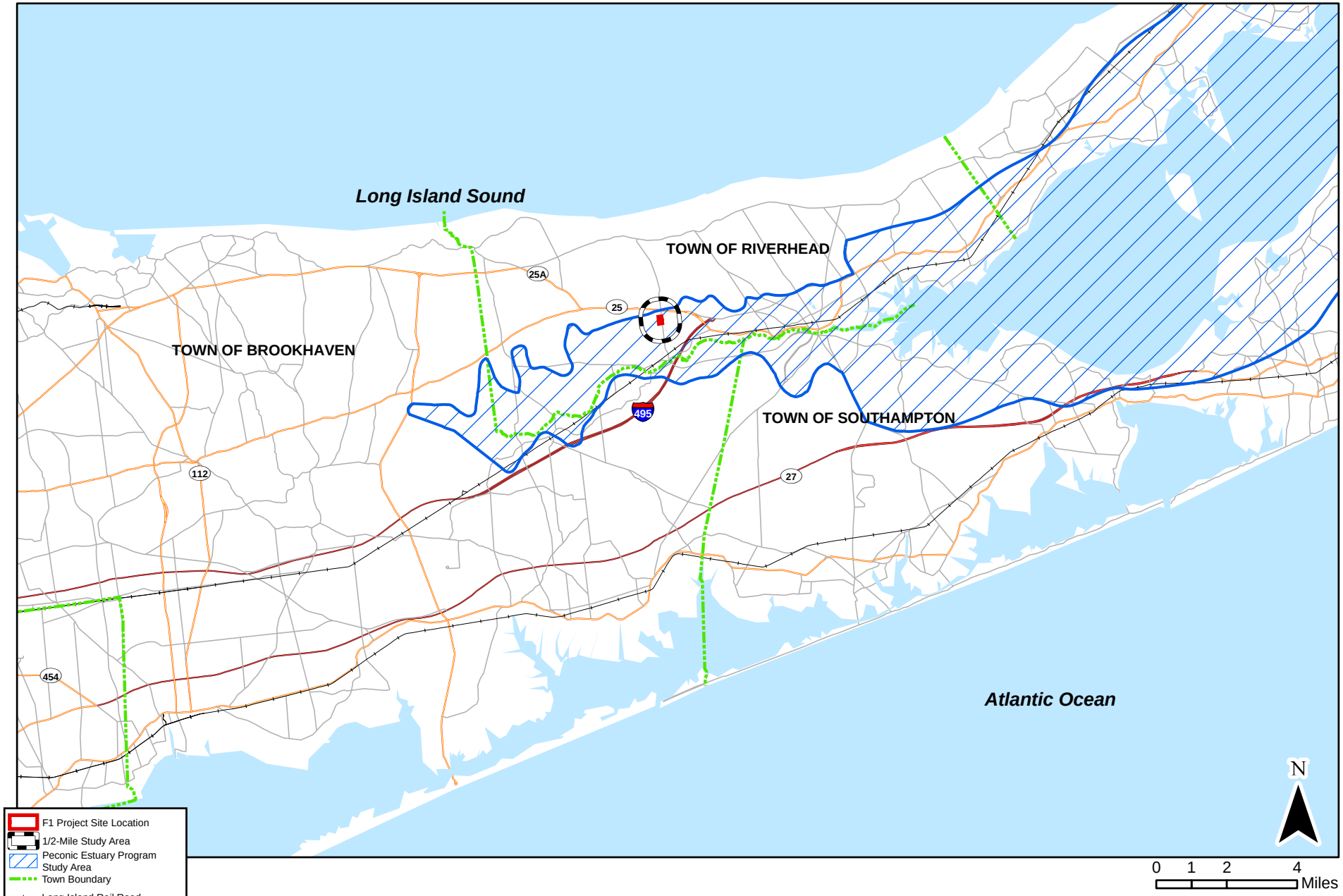
The plan indicates that the management of habitats and living resources in the Peconic will require a combination of protecting existing natural areas and restoring or enhancing others to achieve a high quality ecosystem. To accomplish this, the plan established Critical Natural Resource Areas (CNRAs) that delineate specific locations with significant biodiversity in need of extra protection and management. The CNRAs encompass whole ecosystems and includes portions of the Peconic Estuary as well as freshwater and terrestrial zones. The proposed project site and ½-mile study area are not featured within the CNRAs and therefore would not fall within the "extra protection and management" category.

The plan suggests that the most effective means of protecting natural resources is for government or private conservation organizations to acquire property and manage it for preservation purposes or purchase conservation easements. However, if neither of these options are viable, the plan recommends that local governments work with landowners and developers to maximize protection of resources through creative land development layouts. According to the plan, the responsible entities for carrying out this initiative include DEC, New York State Office of Parks, Recreation and Historic Preservation, the Suffolk County Planning Department, the five East End towns, and the Town of Brookhaven. The plan also indicates that coordinated and comprehensive land use planning at the local level can be used to ensure protection of natural resources and habitats from cumulative impacts on the East End. It further states that the development of a master plan in each town and minimization of variances allowed are good measures for achieving such control. It is estimated that $330 million are necessary to implement the recommendations of the plan.

WATER QUALITY

Drinking water within the Town of Riverhead is provided by the Riverhead Water District. The entire Town is serviced by 13 wells that are drilled into the Upper Glacial and Magothy

[1] http://www.peconicestuary.org/AboutPEP.html



F1 Long Island Sports Facility

Figure 10-3
Peconic Estuary Program

Aquifers.[1] The proposed project site is located more than 1-mile east of the closest well on Fresh Pond Avenue. In 2004, approximately 40,000 residents were served by the Riverhead Water District with 2.29 billion gallons of water withdrawn from the aquifers. The water quality of the aquifers is generally good to excellent with localized areas of contamination.

The Water District regularly tests the water supply wells for coliform bacteria, turbidity, inorganic contaminants, lead and copper, nitrate, volatile organic contaminants, total trihalomethanes, and synthetic organic contaminants. Of the parameters tested in 2004, only iron was detected over the regulatory limit. Because iron has no health affects, there is only a secondary drinking water standard and therefore, exceeding the standard for iron represents a level at which adverse aesthetic effects start to occur. The well where the exceedance occurs is only used during the peak demand period and emergencies.[2]

The Riverhead Water District treats all wells to reduce corrosion and minimize the potential for bacteria growth in the distribution system by adding lime to adjust the pH and chlorinating with calcium hypochlorite, respectively. Iron sequestering agents are also utilized at all of the wells to minimize water stains on laundry and plumbing fixtures. In addition, two of the twelve wells are retrofitted with a granular activated carbon filter to remove any volatile organic contaminants.

A source water assessment was completed for the Riverhead Water District and the system was rated as having a high susceptibility to industrial solvents, pesticides and nitrates, and microbial contamination. The elevated susceptibility ratings are due in large part to the various land uses and their related point sources of contamination.[3] As stated, the District regularly tests for various contaminants and all wells meet New York State's drinking water standards.

SURFACE WATER CONDITIONS

AKRF, Inc. conducted an ecological site assessment on November 20, 2006. AKRF visited the project site to inventory on-site vegetation species, characterize on-site habitat, and verify the extent of regulated wetland areas.

There is one surface water body present at the western border of the proposed project site north of the center of the site. The wetland appears on USGS maps dating back at least as far as 1903. This wetland was mapped as part of the Town of Riverhead's 1979 Wetlands Inventory and is mapped as a freshwater pond (excavated palustrine, unconsolidated bottom, permanently flooded (PUBHx) wetland) by the National Wetlands Inventory (NWI). The pond is not mapped by DEC and is therefore not regulated at the State level. The pond is approximately 0.09 acres and its boundary is generally dominated by shrubs and deciduous trees within the forest now dominant in the north-central portion of the project site. The wetland lacks emergent vegetation, and the wetland boundary is therefore primarily confined to the high water mark. It is bounded on the south by a sand/soil berm of recent origin, judging by the lack of established woody vegetation. North of the wetland, the land slopes upward in a forested landscape that has not been significantly re-graded. Based on conversations with the adjacent site owner, Elmer Zeh, this pond was likely manmade and was historically used by the Zeh family as a way to irrigate

[1] Riverhead Water District 2004 Drinking Water Quality Report and correspondence with Riverhead Water District (Appendix C)

[2] Riverhead Water District 2004 Drinking Water Quality Report

[3] ibid

the adjacent agricultural field. The pond has since been left to natural conditions. As with many wetlands modified or deepened for farming purposes, it may now be more open water habitat than in the past.

No other areas of wetland habitat were found on-site based on examination of dominant plant species throughout and their hydrophytic status. A narrow drainage swale separates the central, disturbed portion of the project site from the southern wooded portion of the site. This swale is dry, conveying flows temporarily only after storm events. It does not contain wetland soil and does not contain a predominance of hydrophytic plants. Therefore, it is not wetland.

There are no wetland areas located immediately adjacent to the project site. However, there are other mapped NWI and DEC wetlands within the ½ mile study area, generally located south of the site. The closest of these wetlands is about 430 feet southeast of the go-kart site boundary. Palustrine emergent and palustrine forested wetlands occur approximately 600 feet to the west of the project site within a low, crescent moon-shaped topographic feature extending southwards to Canoe Lake and the Peconic River. ~~These off-site wetlands consist of open water, forested and emergent wetlands that generally follow a low point in topography extending from the project site southwesterly to Canoe Lake and the Peconic River.~~ This low, curving topographic feature is a relict landscape depression formed from glacial meltwater at the end of the last glaciation. It is now largely occupied by wetlands. Although the on-site wetland is generally in line with this topographic feature, site inspection confirms that it is an isolated wetland sharing no surface hydrology with any off-site wetlands.

~~However, the on-site pond is an isolated wetland and does not appear to exhibit a surface drainage connection to wetlands in the vicinity.~~

NATURAL RESOURCES

HABITAT DESCRIPTIONS AND FLORA

Overview

The proposed 12.1-acre project site maintains a rolling topography and is generally wooded in the northern-center and southern sections with a band of disturbed land over the center of the site. The extreme northeasternmost portion of the site has been cleared and appears to have been used for some agricultural purpose in the past. The route into the site is gravel and leads to a disturbed area that is largely void of vegetation. This area was cleared for an unknown reason and large mounds of sand have been deposited towards the eastern center of the site. Debris in the form of tires, tractor trailer beds, split wood, sewer pipes, broken concrete, wood pallets, and some miscellaneous garbage has been dumped in this cleared area. The parcel has also been disturbed along the eastern border towards the northern section of the site. This area has been mowed in the past and it appears that numerous trees were taken from the site. Several empty plastic drums and various other debris, including a non-commercial trailer bed were dumped here as well. Historically, a small barn was located on the site but has since been bulldozed and buried on-site. Approximately 40 percent of the project site is open/field or disturbed and the remainder comprise an oak dominated forest.

The two wooded portions of the proposed site are very similar in nature in that they both are oak dominated lands with a fairly healthy understory of shrubs. Limited pine trees are featured throughout the site while cedar trees are featured along the eastern border. Overall, Long Island exhibits a diverse array of tree species, due in part to its central location along the Atlantic

seaboard, thereby having a mixture of both southern and northern tree species, including such species as sweetgum (*Liquidambar styraciflua*) and blackjack oak (*Quercus marilandica*), reaching northward to Long Island though more abundant in southern climes. Among the more common native trees to Long Island are white oak (*Quercus alba*), red oak (*Quercus rubra*), scarlet oak (*Quercus coccinea*), pitch pine (*Pinus rigida*), tuliptree (*Liriodendron tulipifera*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), American sycamore (*Platanus occidentalis*), American elm (*Ulmus americana*), American beech (*Fagus grandifolia*), blackgum (*Nyssa sylvatica*), white pine (*Pinus strobus*), and sassafras (*Sassafras albidum*).

~~Based on the *Ecological Communities of New York*, the project site exhibits similar habitat to a pitch pine-oak forest. This community is described as a mixed forest that typically occurs on well-drained, sandy soils of glacial outwash plains or moraines. The dominant trees are pitch pine mixed with one or more of the following oaks: scarlet oak, white oak, red oak, or black oak (*Quercus velutina*). It is noted that the relative portions of pines and oaks varies considerably in this type of community. As stated, oaks are the dominate species on the site with pines appearing to a much lesser extent.~~

From site inspection, the vegetative composition of undisturbed, forested portions of the project site resembles the "Coastal oak-heath forest" community described in *Ecological Communities of New York State, 2nd Edition*, Edinger et al, 2002. This community type occurs in undeveloped portions of eastern Long Island underlain by sandy, glacially deposited soils, such as the Carver, Plymouth, and Riverhead soils found on the project site. The assemblage of herbaceous plants is somewhat different than the "coastal oak-heath forest" community, in part due to the history of site disturbance.

Due to the time of year of the site assessment, vegetation was largely identified by bud and remnant seed.

Northeast Old Field and Disturbed Land in Center of Site

The northeastern portion of the project site contains old field habitat characterized by sparse, early successional trees and shrubs and an abundance of grasses and herbaceous plants common to cleared land left to re-grow. Red cedar (*Juniperus virginiana*) saplings 2 to 8 inches in diameter are the most abundant tree species in this region, as well as less frequent occurrence of sycamore maple (*Acer pseudoplatanus*)[1], black cherry (*Prunus serotina*), flowering dogwood (*Cornus florida*), ailanthus (*Ailanthus altissima*) and Norway maple (*Acer platanoides*). Tree diameters range from sapling size (1 to 3 inches in diameter) to larger individuals up to 20 inches in diameter along the periphery of the old field habitat. Early successional shrub species are abundant throughout, including autumn olive (*Elaegnus umbellata*), multiflora rose (*Rosa multiflora*), blackberry (*Rubus allegheniensis*), wine raspberry (*Rubus phoenicolasius*), and poison ivy (*Rhus radicans*). Grass species are dominant in much of the herbaceous stratum, including orchard grass (*Dactylis glomerata*), broomsedge (*Andropogon virginicus*), *Agrostis sp.*, and foxtail (*Setaria sp.*). Additional herbaceous species include several species of goldenrod (*Solidago puberula; Solidago rugosa*), as well as mullein (*Verbascum thapsus*), bitter dock (*Rumex obtusifolius*), bedstraw (*Galium sp.)* and Japanese knotweed (*Polygonum cuspidatum*) in selected locations.

[1] Non-native maple, sycamore maple (*Acer pseudoplatanus*) or a variety of red maple (*Acer rubrum var.*).

The old field habitat transitions to a highly disturbed habitat in the center of the site, showing evidence of past grading activity, rubble fill and active sand stockpiling. Such woody species as pussy willow (*Salix discolor*), ailanthus (*Ailanthus altissima*), and red oak (*Quercus rubra*) saplings are common on the periphery of the central disturbed portion of the site, as are the herbaceous Japanese knotweed (*Polygonum cuspidatum*), pokeweed (*Phytolacca americana L.*), thistle (*Cirsium sp.*), and mugwort (*Artemisia vulgaris*).

Northwestern Forested Portion of Site and Wetland Pond Environs

The northwestern portion of the project site contains an oak dominated forest. White oak (*Quercus alba*) and black oak (*Quercus velutina*) are most abundant in the overstory with mature pitch pine (*Pinus rigida*), red oak (*Quercus rubra*), and sweet cherry (*Prunus avium*) occurring less frequently. Overstory dominant trees are generally 18 to 24 inches in diameter. Sapling American holly (*Ilex opaca*) occurs sporadically. Late lowbush blueberry (*Vaccinium angustifolium*), garlic mustard (*Alliaria officinalis*), and striped wintergreen (*Chimaphila maculata*) occur in the understory.

The oak forest descends to the west towards the on-site pond. Brambles (*Rubus sp.*) and vines become more abundant in this location and as one proceeds southwards in the site towards the more disturbed habitat in the center. Oriental bittersweet (*Celastrus orbiculatus*) and Japanese honeysuckle (*Lonicera japonica*) are the most abundant non-native vines, dominating the understory in much of the forest surrounding the pond. Greenbriar (*Smilax rotundifolia*), Japanese barberry (*Berberis thunbergii*), grape (*Vitis sp.*), blackberry (*Rubus allegheniensis*) and wine raspberry (*Rubus phoenicolasius*) surround the pond up to its margins. The pond itself exhibits few emergent herbaceous plants and can be characterized as an isolated open water habitat confined by relatively steep upland topography. Duckweed (*Lemna minor*) is abundant on the pond surface and several large black willow (*Salix nigra*) trees 12 to 24 inches in diameter. Duckweed is a food source for aquatic animals and provides cover for amphibians.

Southern Woods

The southernmost portion of the site is occupied by an oak dominated forest and is the on-site habitat type least affected by invasive plant species. It retains a species composition and structure typical of remnant oak woods on sandy soils found in much of this region of eastern Long Island. White oak (*Quercus alba*), black oak (*Quercus velutina*), red oak (*Quercus rubra*), and scarlet oak (*Quercus coccinea*) dominate the overstory. Other tree species found sporadically in this habitat include pin cherry (*Prunus pensylvanica*), American holly (*Ilex opaca*), American beech (*Fagus grandifolia*), black cherry (*Prunus serotina*), and American holly (*Ilex opaca*) ranging in diameter from 1 to 8 inches. Unlike the northern forested portions of the site, the understory of the southern forest is dominated by native species including lowbush blueberry (*Vaccinium angustifolium*), highbush blueberry (*Vaccinium Corymbosum*), dewberry (*Rubus flagellaris*), glaucous greenbriar (*Smilax glauca*), greenbriar (*Smilax rotundifolia*), wintergreen (*Gaultheria procumbens*), Christmas fern (*Polystichum lonchitis*), haircap moss (*Polytrichum commune*) and very occasionally privet (*Ligustrum vulgare*) and mountain laurel (*Kalmia latifolia*). Numerous species of fungus are abundant on fallen dead wood throughout.

FAUNA

Overview

The proposed project site contains both forested areas and open/disturbed land. It is located in a region of agricultural land—portions of which have been converted to commercial and residential uses. The lands immediately adjacent to the project site include Edwards Avenue to the east, commercial development to the north and east, some agricultural lands both to the east and west, and forested land that connects the site's southern forested areas to a swath of undeveloped forest in topographically lower areas west and southwesterly towards Canoe Lake and the Peconic River. Animals expected to utilize the site are those associated with forested and agricultural lands of relatively low development densities, and those that are more tolerant of habitat disturbance, due to the on-site clearing and disturbance and the proximity of the adjacent roadway and commercial development to the north and east. Linkages to larger forest and field habitats to the west benefit the project site, possibly allowing its use by some species requiring larger home ranges and less tolerant of human activity. Such species could include neotropical migrant birds and reptiles/amphibians preferring open water and a mix of upland habitats such as spotted turtle (*Clemmys guttata*), eastern box turtle (*Terrapene carolina carolina*), and eastern hognose snake (*Heterodon platirhinos*) as well as other more typical species common in the region. Other species more tolerant of disturbance that thrive in small home ranges and are expected to utilize the site include white-tailed deer (*Odocoilous virginianus borealis*), gray squirrel (*Sciurus carolinensis pensylvanicus*), and chipmunk (*Tamias striatus*). Deer droppings were noted during field reconnaissance.

According to the 1988 *Atlas of Breeding Birds in New York State* between 1980 and 1985, there were 89 bird species considered possible, probable, or confirmed breeders in the "block" where the proposed project site is located. The Atlas was developed by covering the entire state with a grid made up of 5 km by 5 km blocks. Of the 89 species considered, 52 were confirmed in this block (identified as block 6853C). The Atlas has since been updated and the interim data has been posted to the DEC's website. ~~It is expected that the final Atlas would be available in 2008~~. Based on the data collected between 2000 and 2005, there were a total of 87 possible, probable, or confirmed breeders in the specified block with 41 confirmed, 34 probable, and 12 possible breeders.[1] The vast number of bird species identified by the most recent Atlas are either protected or game species. Protected species as defined in the Environmental Conservation Law 11-0103 are all wild birds except those named as unprotected. Some bird species identified by the Breeding Bird Atlas project in the vicinity of the project site are "special concern" species which are not yet recognized as endangered or threatened but for which documented evidence exists relating to their continued welfare in New York State (e.g., grasshopper sparrow [*Ammodramus savannarum*], whip-poor-will [*Caprimulgus vociferous*], and common nighthawk [*Chordeiles minor*]). Only one threatened species, the northern harrier (*Circus cyaneus*), was identified in this area. These species are recognized as likely to become endangered in the future in New York State. Appendix I provides the list of bird species identified during the 2000 Atlas survey within block 6853C. Due to the site's disturbance and location at the edge of the western forested area and adjacent to Edwards Avenue, the proposed project site would not likely provide forest interior habitat and therefore it is not expected that forest interior bird species would utilize this site for breeding.

[1] www.apps.dec.state.ny.us/apps/bba/results

Wildlife Identified During Site Visit

A number of animal species were identified on-site by sight or sign during the November 2006 site inspection. These include the mammals white tailed deer (*Odocoileus virginianus*), woodchuck (*Marmota monax*), raccoon (*Procyon lotor*), and red fox (*Vulpes vulpes*). Bird species seen on-site include mourning dove (*Zenaida macroura*), blue jay (*Cyanocitta cristata*), American robin (*Turdus migratorius*), savannah sparrow (*Passerculus sandwichensis*), red bellied woodpecker (*Melanerpes carolinus*), and red tailed hawk (*Buteo jamaicensis*). The site exhibits many areas of woodpecker boring/nesting in standing dead wood throughout. The site has an abundance of standing and fallen dead wood appropriate for cavity nesting mammals, birds, reptiles, amphibians and invertebrates. Lastly, the carapace (shell) of an eastern box turtle (*Terrapene carolina carolina*) was found on-site. This suggests an extant (currently existing) box turtle population on-site or locally. However, the carapace appears to be some years old, as many of its scutes are missing. Therefore, its presence does not confirm current use of the site by box turtles.

Additional animal species can be expected to frequent the site as residents and transients. Due to their limited ability to move away from human activity and generally more specific habitat requirements, reptiles and amphibians (*herpetofauna*) are often cited as species of greater concern from an environmental impact perspective than avifauna (*birds*) and mammals. The on-site pond likely contains such species as green frog (*Rana clamitans melanota*) and possibly spring peeper (*Acris curcifer*) and painted turtle (*Chrysemys picta*). Other *herpetofauna* that may occur on-site include redbacked salamander (*Plethodon cinereus*), American toad (*Bufo americanus*), northern brown snake (*Storeria dekayi dekayi*), and garter snake (*Thamnophis sirtalis*). Site disturbance makes the presence of rare reptiles/amphibians less likely.

ENDANGERED AND THREATENED SPECIES AND OTHER SPECIES OF CONCERN

According to the U.S. Fish and Wildlife Service (USFWS), except for transient individuals, no federally listed or proposed endangered or threatened species are known to exist on the proposed site. In addition, the USFWS reported that no habitat on the site is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S. C. 1531 et seq.).

According to correspondence from DEC's Natural Heritage Program (NHP) dated February 10, 2006, the project vicinity has records of historic occurrence of several NYS-listed (threatened, endangered, or exploitably vulnerable) plant species. ~~DEC's Natural Heritage Program (~~NHP~~)~~ reported the existence of five designated threatened species in the Calverton area within the Towns of Brookhaven and Riverhead. These species include stargrass (*Aletris farinosa*), marsh straw sedge (*Carex hormathodes*), hop sedge (*Cyperus lupulinus ssp. Lupulinus*), flax-leaf whitetop (*Sericocarpus linifolius*), and primrose-leaf violet (*Viola primulifolia*). NHP also reported one designated endangered plant, silvery aster (*Symphyotrichum concolor var. concolor*) in the Calverton vicinity. In addition, the tiger beetle (*Cicindela patruela consentanea*), an unlisted species, was reported within NHP's database. All of these species were last identified in Calverton between the late 19th and mid 20th centuries; they were last observed in the project vicinity between 1893 and 1955, with no further reports of occurrence.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

The proposed go-kart site would maintain the general topography of the site with modifications to accommodate the race track, parking, and structures. These changes would not be expected to

have a significant impact on the local geology. The proposed grading would occur in the upper layers of the soil. This would not substantially change the characteristics or functions of the upper Glacial Aquifer, which is the shallowest of Long Island's three geologic formations.

With respect to groundwater at the proposed site, storm water would be recharged on-site, consistent with Suffolk County regulations. Recharge from impervious areas would be provided through a system of catch basins. In reviewing the proposed go-kart design and activities, it is not expected that this storm water runoff would carry any significant or unusual pollutant loads that would pose a threat to groundwater. See Chapter 11, "Stormwater," for more details. The proposed project would also be designed consistent with Article 7 of the Suffolk County Sanitary Code in that the proposed sanitary flow would not exceed 3,142 ~~3,630~~ gpd, which is less than ~~the equivalent of~~ 300 gpd per acre as required for sites within Hydrogeologic Zone III. Chapter 12, "Infrastructure and Energy" provides further detail on the projected sanitary flow from the proposed project.

Consistent with federal, state, and local regulations and in accordance with guidelines set forth to protect CEAs, the proposed go-kart facility would be designed to limit the degradation of groundwater in the project vicinity and not cause a detriment to local or regional groundwater or surface water. Consistent with the SGPA Plan, the proposed facility would be developed in an area that is already dedicated to commercial uses. The Town of Riverhead's Comprehensive Plan and subsequent rezoning of the area to Industrial C, which allows commercial recreation uses, further validates that the project would not be expected to cause a detriment to local or regional groundwater or surface water.

The existing on-site pond is proposed to be preserved in its natural size and state. The pond would not be used as a source of water for irrigation. ~~enhanced and made larger and would be incorporated into the site layout as an aesthetic feature. The pond would be enhanced by clearing the overgrown vegetation and planting wetland species that thrive in these conditions and promote wetland health. These species would include readily available trees such as red maple and white oak. Shrubs would include swamp azalea (*Rhodendron viscosum*) and wildflowers including cardinal flower (*Lobelia cardinalis*). The pond surface area would increase from 0.09 acres to 0.17 acres. In addition to aesthetics, the pond would be utilized as an irrigation pond for on-site plantings.~~ Pursuant to Chapter 107-4 of the Town of Riverhead Code, it is unlawful without obtaining a written permit issued by the Town of Riverhead to dig, dredge, clear vegetation or in any other way alter or remove any material in or within 150 feet of any tidal waters, tidal wetlands, freshwater wetlands, natural drainage systems, or other watercourses. The Conservation Advisory Council (CAC) advises the Town Board on the issuing of permits for the development and management of natural resources within the Town. ~~Consistent with the Town Code, the Applicant would file for and obtain a permit from the Town Board and/or the CAC for the expansion of the wetland. Because the proposed project would enhance the vegetative features of the pond and continue to utilize the pond in the same capacity as historic uses,~~ It is not anticipated that the proposed project would pose a significant adverse impact to this natural resource. ~~Because the existing pond appears to be isolated, the Army Corp of Engineers would not have jurisdiction over this water feature.~~ The proposed project has been revised to move all buildings at least 158 feet from the wetland. The track would be located at least 64 feet from the wetland. Existing vegetation would remain within the 64-foot buffer area, and no clearing would occur around the wetland. Consistent with the CAC requirements, the wetland and 64-foot buffer would remain in their natural state. As noted above, the pond is not mapped by DEC and is therefore not regulated at the State level. Because the Army Corps of Engineers (ACOE) does not regulate a buffer, there is no requirement that ACOE be contacted to conduct a jurisdictional

site visit. As long as the wetland is not directly disturbed, as is the case with the proposed project, ACOE is not involved.

In addition to the buffer, mitigation proposed to prevent degradation of the wetland includes storm drains at the edge of the track, and a 2-foot high wall to prevent storm water from entering the pond and prohibit wildlife from accessing the track.

Connections would be maintained between the on-site wetland and off-site habitats to the west, including open field and forest, to minimize potential impacts to wildlife habitat functions. A fence with a gap at the bottom, allowing mammals, reptiles, and amphibians to pass unimpeded, is proposed. A 2-foot high wall would be used to prevent reptile/amphibian movement upslope onto the proposed racetrack. As noted above, the wall would also help prevent runoff from the track to the wetland, in conjunction with storm drains at the edge of the track.

The vegetative community featured at the project site is not unique to this area of the Town or the region. It is not expected that the proposed project would pose a significant adverse impact to the natural flora or fauna resources on or in close proximity to the project site. The open vegetative areas of the site would continue to provide habitat for animals adapted to developed conditions. In fact, nearly half of the proposed site would be dedicated to open space including natural areas. Existing vegetation, where feasible, would remain within the site and primarily along the southern and western borders. Planting of various indigenous trees and shrubs, where feasible, would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site. The landscape plan is included in Appendix A.

The relatively small size of the proposed project site, its proximity to Edwards Avenue and Middle Country Road, and presence of cleared/disturbed lands on-site suggest that the likelihood of the site providing critical habitat for rare plants and animals is low.

As noted above, according to correspondence from NHP dated February 10, 2006, the project vicinity has records of historic occurrence of several NYS-listed (threatened, endangered, or exploitably vulnerable) plant species. Although NHP identified sensitive species within Calverton, these species have not been recorded since the late 19th and mid 20th centuries in this area. Listed plants are regulated by the New York State Environmental Conservation Law section 9-1503 which specifies that it is illegal to damage or remove a protected plant without the consent of the property owner. The presence of a protected plant would not prohibit development of the proposed project but would be taken into consideration in the site planning process. Protected plants, if present, can often be avoided by preserving them in situ or transplanting them to a nearby location. Of the listed plant species, two require moist, wetland soil not found on the project site. *Viola primulifolia* and *Carex hormathodes* would not occur on-site based on habitat limitations, nor were they seen on-site during the November 2006 site inspection. Open and wooded sandy habitat does occur on-site that may be appropriate for the other listed plant species: *Sericocarpus linifolius*, *Cyperus lupulinus spp. lupulinus*, *Symphyotrichum concolor var. concolor*, and *Aletris farinosa*. However, none of these species were seen on-site during site inspection, and much of the site contains disturbed, re-graded topography, making the presence of these plants unlikely, particularly in the central and northern portions of the project site.

As noted above, neither the NHP nor the USFWS have any records of "threatened" or "endangered" animal species on the project site or vicinity, nor were any identified on the project site during the site inspection. ✷

A. INTRODUCTION

Development of the proposed project site from a vacant lot that is partially cleared and wooded to an active go-kart facility with nearly half of the site dedicated to open space would result in changes to stormwater flow patterns. This chapter presents the current status of the site's surface waters, the changes in the site use that would affect surface water, and discusses the potential for impacts to these resources.

B. EXISTING CONDITIONS

The majority of stormwater runoff infiltrates into the ground due to the highly permeable nature of the on-site soils or into the on-site pond. Because of the low topographic relief of the project site relative to the surrounding area, surface run-on from off-site areas is possible. There is no evidence of any significant stormwater pooling on the site or any significant quantities or gullying that would indicate high volumes of stormwater runoff. There are no external stormwater discharges to the site.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

Land development can affect both the quantity and quality of stormwater runoff. At the proposed site, the quantity of stormwater infiltration would be maintained and recharged on-site, consistent with Suffolk County regulations. Recharge for impervious areas would be provided through a system of catch basins.

The quality of stormwater runoff can be affected by contamination from impervious surfaces, herbicides, and other pollutants. Most soils are particularly effective in filtering particulates, such as sediments including phosphorus and most heavy metals. Insight into the effectiveness of soil in removing contaminants can be found in studies of the accumulation of these contaminants in soil beneath recharge/infiltration basins. For example, a 1987 study was prepared by the U.S. Geological Survey in cooperation with the Long Island Regional Planning Board entitled, *The Effect of Urban Stormwater Runoff on Ground Water Beneath Recharge Basins on Long Island, New York*. The study addresses urban runoff in the context of monitoring the source, type, quantity, and rate of contaminants routed to recharge basins on Long Island to determine whether this runoff might be a significant source of contamination to the groundwater. This study is anticipated to represent a worst-case example of urban runoff contamination, since the drainage areas are extremely large and all runoff and its contaminants are concentrated in a single location. In contrast, the drainage from the proposed site would be recharged on-site through a series of catch basins.

In the study, samples were analyzed for standard constituents, priority pollutants, heavy metals, organic compounds, and bacteria. The study results indicate that soil is a highly effective filter for removing most, but not all, pollutants found in urban runoff. Removal mechanisms include

adsorption, trapping, straining, and bacterial transformation. The sample analyses determined that the contaminants were found to be accumulating in the first few centimeters of soil in the floor of the basins, with little significant downward movement over a period of seven years. Soil can also be quite effective in filtering and breaking bacteria down into a non-injurious form. The Long Island Nationwide Urban Runoff Program (NURP) indicated that bacterial contamination of groundwater from infiltration basins is insignificant.

The study also indicated that inorganic and organic pollutants when present in stormwater runoff are effectively minimized by filtration through soils. The concentration of selected trace elements in groundwater samples beneath the infiltration basins was similar to the level reported in the regional groundwater.

The *New York State Stormwater Management Design Manual* provides guidance for a unified approach to sizing permanent stormwater management practices (SMPs) to ensure adequate containment and conveyance of stormwater resulting from proposed development. The proposed project would result in approximately 6.03 ~~5.69~~ acres of pervious surfaces and 6.08 ~~6.42~~ acres of impervious surfaces. The criterion outlined in the above referenced design manual specifies that SMP's should be designed to capture and treat 90 percent of the average annual stormwater runoff volume, known as the Water Quality Volume (WQ_v).

The drainage system proposed for this project involves the use of ~~leaching~~ catch basins at designed low areas on the site. See Appendix A for the proposed site/drainage plan. The system is designed to capture and store a 2 inch rainfall event. The basic foundation of this practice is to dissipate the energy of the first flush, allowing the suspended solids to dropout. Drainage basins would be located in an area northeast of the clubhouse and would not discharge to the on-site wetland. Drains that had been proposed to be directed to the wetland have been eliminated. ~~A rainfall which exceeds the design capacity of the system then overflows to the on-site wetland, ensuring its survival, preventing starvation. Leaching catch basins are considered to be an acceptable SMP according the Design Manual (Table 5.1, practice I-3). The existing on-site pond is categorized as a pocket wetland and is considered to be an acceptable SMP according to the Design Manual (Table 5.1, practice W-4). The area of the project site does not allow for the implementation of other acceptable SMP's since other acceptable practices are area intensive measures.~~

MAINTENANCE OF STORMWATER CONTROLS DURING CONSTRUCTION

Appendix A includes the Erosion Control Plan for the proposed project. In accordance with Part III.D.3 of the General Permit, inspections should be conducted every seven (7) calendar days and after every rainfall event of greater than ½ inch and shall be supervised by a qualified professional. Maintenance of all temporary erosion control measures should also be performed as to ensure the highest level of effectiveness. Maintenance recommendations for erosion control measures include the following:

- Remove sediment from silt fencing when sediment reaches a depth of 6 inches at the fence and repair as necessary to maintain a sound barrier. This practice should be monitored and maintained daily.
- Material is not to be stockpiled in driveway areas. Catch basins are to be protected from silt and control erosion off of the building site.
- Clean inlet protection when storage capacity is at 50 percent.

- Temporarily stabilize areas which are proposed to be paved by applying and maintaining a stone sub-base until asphalt is installed.
- Supplement stone at the construction entrance(s) as necessary to ensure areas are stabilized and to minimize dust and ponding of water in traveled paths.
- During and after construction, erosion and sediment control measures would be implemented to stabilize exposed soil and to provide a final cover of vegetation on post-construction slopes.
- Complete a report of all inspections conducted during the construction period and maintain a record of all reports on-site as required by the General Permit.

CONCLUSIONS

In summary, the proposed drainage system would be designed to adequately comply with the New York State Department of Environmental Conservation 90 percent capture and treatment requirements as outlined in the Stormwater Design Manual by providing treatment and storage which exceeds the calculated Water Quality Volume, WQ_v.

The manual also requires that swales and channels are designed for 24-hour extended detention under the post-development conditions for a one year, 24-hour storm event, known as Channel Protection (Cp_v). Since there are no channels or streams on or adjacent to the project site, it is assumed that this requirement is waived.

The manual further requires that both Overbank Flood (Q_P) and Extreme Storm (Q_f) requirements be met. Since stormwater runoff would be collected and recharged on-site ~~and/or overflowed to an on-site surface water body~~, it is assumed that this requirement is also waived.

Maintenance of permanent stormwater management controls and drainage structures would be performed by the owner/operator upon completion of construction activities. Routine maintenance responsibilities for the permanent drainage facilities would include the following:

- Monitoring of the drainage inlets should be completed on a routine basis, particularly following large storm events. Curb gutters and drainage grates should be kept free from the obstruction of leaves, trash, and other debris.
- Drainage structures should be inspected annually and immediately following a significant rainfall to ensure proper function and adequate recharge rates of stormwater runoff. Annual cleanout of drainage structures are recommended to remove seasonal leaf litter and debris in early winter. Additional monitoring and cleanings may be necessary in the spring if higher than normal applications of sand and salt have been needed during the winter months.
- All seeded and landscaped areas should be maintained, reseeded and mulched as necessary to maintain a dense vegetative cover.

Stormwater runoff from the proposed site would be limited and the types of activities proposed at the yard are not expected to generate significant pollutant loads that would adversely impact groundwater. As a result, it is concluded that the proposed project would not adversely impact surface water or groundwater from site runoff. ✷

A. INTRODUCTION

This chapter analyzes the proposed project's potential to create an added demand for potable water, sanitary sewage treatment, solid waste handling and disposal, and energy supply. The proposed F1 Long Island Sports Facility would create an added demand for infrastructure and energy. Since the project site is undeveloped, utility connections would be required to handle the added demand expected from the proposed project.

B. EXISTING CONDITIONS

As a vacant parcel, the project site does not have an existing demand for any infrastructure or energy services. This section, however, describes the infrastructure and energy systems that currently serve the project area.

WATER SUPPLY

Information on the existing water supply was obtained from a letter from the Town of Riverhead Water District (RWD) dated February 15, 2004 (see Appendix C) and the RWD's *2004 Drinking Water Quality Report,* the most current data available. The project site lies within the service area of the RWD. In 2004, the RWD served a population of 40,000 in the Town of Riverhead during 2004. The RWD encompasses approximately 45 square miles and does not serve the entire Town of Riverhead. The source of water for the District is groundwater pumped from 13 wells located throughout the service area that are drilled into the Glacial and Magothy aquifers beneath Long Island. The RWD's current groundwater pumping capacity is 21 million gallons per day (gpd). The total amount of water withdrawn from the aquifer in 2004 was 2.29 billion gallons, of which approximately 92 percent was billed directly to consumers.

There is currently an on-site pond that was originally manmade for irrigation purposes.

SANITARY SEWAGE

Sanitary sewage in the surrounding area is handled either by on-site septic systems or a Suffolk County municipal sewer system. Suffolk County Department of Public Works (SCDPW) oversees this system. The project site is not currently connected to this system and does not generate sewage.

SOLID WASTE

The Town of Riverhead Sanitation Department collects waste from residential properties only. Commercial facilities, such as the proposed project, must contract with private carters for the disposal of their solid waste. Licensed carters are required to dispose of solid waste in compliance with 6 New York Code of Rules and Regulations Part 360, the Solid Waste Management Facilities Rules and Regulations of the New York State Department of

Environmental Conservation. State law mandates commercial entities to separate recyclables from the solid waste stream, if an economic market exists. Under Chapter 103 of the Town of Riverhead Code, source separated/curbside recycling is mandatory in Riverhead for both commercial and residential properties. The Town requires cardboard and newsprint and commingled materials to be recycled. The existing site does not currently generate any solid waste.

ENERGY

The Long Island Power Authority (LIPA) and KeySpan provide energy to Long Island. KeySpan is the largest electric generator in New York State, with approximately 6,600 megawatts of generating capacity that provides power to LIPA's 1.1 million customers on Long Island and supplies approximately 25 percent of New York City's capacity needs. KeySpan also operates LIPA's transmission and distribution system under contract to LIPA. In addition, KeySpan provides natural gas service to 2.6 million customers in New York City, Long Island, and New England, and operates more than 21,000 miles of gas main in its service territory.[1] LIPA's Eastern Suffolk Division delivers electricity to approximately 274,800 customers and encompasses 606 square miles of service territory, including facilities surrounding the project site. The service territory includes 2,799 miles of overhead wire, 1,905 miles of underground cable, and 161,838 utility poles.[2] The subject property does not currently utilize electric or gas services.

C. POTENTIAL IMPACTS OF THE PROPOSED PROJECT

WATER SUPPLY

The proposed project would require utility connections to the RWD supply system. The proposed go-kart facility would collectively use an approximate 7,200 ~~6,480~~ gpd, assuming water supply would amount to an additional 10 percent of the expected sewage generation, based on industry standards. This is a conservative estimate since sewage design flow rates are calculated for worst case operation of the facility. This estimate includes water use for staff and customers.

A letter was sent to the Town of Riverhead Water District (see Appendix C) inquiring about water availability. According to the utility's response letter dated February 15, 2006 (see Appendix C), the project site can be served by the RWD. The project site is expected to generate a demand for potable water that amounts to approximately 0.03 percent of the RWD's current groundwater pumping capacity (21 million gpd). The project site would be served by a 12-inch water main on the west side of Edwards Avenue. The closest public water supply well to the project site is on Fresh Pond Avenue in Calverton.

~~In addition to receiving potable water from the RWD, the proposed project would utilize water from the on-site pond for irrigation purposes (see Chapter 11, "Water and Natural Resources," for a description of the pond), thus reducing the expected demand for public water. The on-site pond is proposed to be expanded and a pump house would provide irrigation for proposed landscaping.~~

[1] KeySpan Energy website at http://www.keyspanenergy.com/corpinfo/about/index_all.jsp

[2] LIPA website at http://www.lipower.org/company/stats.html

SANITARY SEWAGE

The estimated sewage generation is approximately 6,545 ~~5,890~~ gpd, based on the design sewage flow rates provided in Suffolk County Department of Health Services Division of Environmental Quality's *Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single-Family Residences* (approved June 15, 1982). Based on density flow, the proposed project would generate 3,142 gpd, which is 491 gpd lower than what is allowed in accordance with Suffolk County design criteria, which permits 300 gpd per acre in Hydrogeologic Zone III.

The proposed project involves installation of an on-site septic system to dispose of sewage generated from the proposed action. Based on the preliminary site plan, three different sanitary systems are planned. The first includes two septic tanks, a grease trap, and five leaching pools to handle kitchen waste. A second system includes two septic tanks and nine ~~eight~~ leaching pools to receive and dispose of waste from the clubhouse, less any kitchen waste. The third sanitary system includes one septic tank and two ~~one~~ leaching pools to handle waste from the maintenance building. The on-site septic system was designed to comply with Suffolk County's standards for the construction of sewage disposal systems. The proposed system would conform to the County Sanitary Code and the State Pollutant Discharge Elimination Program (SPDES). ~~and~~ No significant adverse impacts are anticipated with the construction and utilization of this system.

SOLID WASTE

Solid waste generated at the project site would consist primarily of paper, cardboard, food items, and other miscellaneous refuse. Based on industry standards, the proposed project is expected to generate an estimated 1,495 ~~2,150~~ pounds of solid waste per week.[1] The applicant would contract with a private carter that would handle and dispose of solid waste in accordance with the State solid waste regulations described above. The commercial waste stream typically consists of a large fraction of recyclable materials, such as paper and corrugated cardboard. Materials would be recycled in accordance with the State and local regulations described above. The relatively small amount of waste generated from the proposed action is expected to be handled and disposed of by a private carter and no significant adverse impacts to solid waste handling and disposal services are anticipated.

ENERGY

Energy service would be obtained from LIPA/KeySpan. The proposed project would require an extension of existing utility services in the area to provide new electric and gas service to the subject site. Projected energy demand for the proposed go-kart facility is based on loads for heating, ventilation, air conditioning, lighting, and auxiliary equipment, such as elevators and pumps. The annual energy consumption is calculated by applying factors from the Association of Energy Engineers, 1997.[2] It is estimated that the proposed project would result in an energy demand of 1,362 ~~2,015~~ million British Thermal Units (BTUs) annually. This is equivalent to approximately 399,062 ~~590,538~~ kilowatt hours (kWh). LIPA indicated in a letter dated February

[1] Cerrato, David S. and Barbara A. Riley, *Developing Recycling Programs for Commercial Establishments* (1989).

[2] City Environmental Quality Review (CEQR) Technical Manual (2001).

6, 2006 that LIPA and KeySpan could provide electric and gas services to the proposed project (see Appendix C). Therefore, no significant adverse impacts are expected. ✷

A. INTRODUCTION

This chapter describes construction activities that would occur at the project site with the proposed F1 Long Island Sports Facility and includes information on the proposed construction schedule and phasing. A qualitative analysis of the effects of construction on the local environment is also provided, as well as a description of the techniques that would be used to minimize any short-term construction impacts.

B. CONSTRUCTION ACTIVITIES

Construction activities would involve preconstruction site preparation, including clearing, grading, installation of sanitary system, and utility connections.

PRECONSTRUCTION SITE PREPARATION

Preconstruction site preparation would start with clearing the site to remove vegetation where necessary, though native vegetation, where feasible, would remain within the site and primarily along the southern and western borders. Grade changes to accommodate the race track, as shown on the site plan, would be established using a cut and fill technique in the upper portion of the soil. This would involve heavy equipment and machinery to move the soil until the necessary grade and elevations were achieved. Such equipment and machinery would include dump trucks, tractors, backhoes, and paving equipment. Whenever possible, topsoil from excavated areas would be saved and stockpiled for future use.

CONSTRUCTION

Construction of the proposed go-kart tracks would involve paving and striping. Construction of the proposed buildings would follow typical procedures for similar-type structures, and would incorporate all applicable safety and construction standards, materials, and systems. Construction of the buildings would conform to all applicable regulations, including the New York State Energy Code recommendations. Once actual construction of the buildings has begun, larger equipment is likely to include cranes, forklifts, and larger delivery trucks, such as concrete deliverers. Subsequently, smaller equipment and manual labor would be employed to erect the structures, install utilities and plumbing, and finish the buildings. As the buildings near completion, driveway paving and landscaping would occur.

C. CONSTRUCTION SEQUENCING

The proposed F1 Long Island Sports Facility would be constructed in two phases over two years, with construction expected to commence in ***2011*** ~~summer of 2006~~. Phase 1 would include construction of the entire project except for the clubhouse~~ and open structure proposed to cover the concession track~~. The clubhouse would be built in phase 2. Following receipt of site plan

approval, it is estimated that construction of phase 1 would take approximately four months and construction of phase 2 would take approximately nine months. As currently planned, the facility would be operational in *2012* ~~phase 1 of the new facility would open in summer 2006 and phase 2 would open at the beginning of the 2007 season~~. Prior to construction of the clubhouse, the public would have access to bathroom facilities in the maintenance building, where the staff meeting room would also function as a safety training and briefing room. Catered food would be served under the covered concession track during this same period, consistent with the Zoning Board of Appeals determination.

D. POTENTIAL IMPACTS OF THE PROPOSED PROJECT DURING CONSTRUCTION

SOIL EROSION AND SEDIMENTATION CONTROL

Due to increased stormwater runoff from areas cleared of natural vegetation, especially in the center of the site, there would be increased potential for on- and off-site soil erosion and sedimentation during the construction period. To minimize erosion, the project would adhere to the *New York Guidelines for Urban Erosion and Sediment Control*, U.S. Department of Agriculture—Natural Resources Conservation Service (April 1997), and the Best Management Practices (BMPs) developed by the New York State Department of Environmental Conservation (DEC) as described in *Reducing Impacts of Stormwater Runoff from New Development* (1993). The project would also adhere to any Town and County guidelines regarding erosion and sediment control. An Erosion Control Plan with sequencing and specific details has been ~~would be~~ prepared for the project in accordance with all applicable regulations, and is provided in Appendix A. Construction impacts would be minimized by implementing erosion, sediment, and fugitive dust control measures, including: creating a stabilized construction entrance, hay bales, silt fence(s), prompt post construction replanting/revegetation, watering down construction areas, and other methods identified in the *New York Guidelines for Urban Erosion and Sediment Control*, as shown on the Erosion Control Plan ~~determined to be appropriate through the site plan review process~~ (see Appendices A and J).

Specifically, the Erosion Control Plan ~~would~~ recommends that a silt fence be installed at the perimeter of all localized construction activities in a necessary effort to minimize/prevent sediment from leaving the project area. The drainage facilities proposed for the project would be installed in lieu of temporary structures throughout the project site. This can be accomplished in all areas of the track. Hay bale barriers would be provided to trap sediment in stormwater runoff from impervious surfaces at all grated inlet structures. Establishment of future groundcover would be implemented as rapidly as is practicable to stabilize and minimize loss of soils after the bulk of the site grading, and excavation activities have been completed. Additional sediment barriers or temporary diversion dikes may be utilized as required by field conditions during construction to ensure stormwater runoff is contained on-site. In all practicality, DEC BMPs for erosion controls would be followed. A construction entrance would be installed and maintained to prevent soil and loose debris from being tracked onto local roads.

These measures would be in addition to construction sequencing and preservation of natural vegetation, where feasible, which would also serve to minimize erosion. By implementing these methods, working with existing grades, and maintaining natural vegetation, no significant adverse impacts are anticipated.

SCHEDULE OF OPERATIONS

The following outlines a general description of the potential schedule of operations for the proposed construction activities:

- Installation of perimeter erosion control measures, specifically hay bale barriers as indicated on the Erosion Control Plan.
- Installation of stabilized construction entrance(s). Control debris and dust resulting from daily construction activities and water as necessary or as directed by the inspector.
- Inspection of erosion controls throughout the construction period with a minimum frequency of once every seven (7) calendar days and after every rainfall event of greater than ½ inch within a 24-hour period. Maintain inspection reports on site.
- Rough grading of the track corridors and installation of appropriate drainage facilities in accordance with the approved plans. Install inlet protection measures for any drainage structures with grate covers in accordance with the Erosion Control Plan. Stockpile topsoil required for final grading and landscaping as required. Cover stockpiles as necessary to avoid exposure to erosive elements.
- Installation of project retaining walls and curbing.
- Installation of sub-base for all future paved areas and perform final grading. Remove all temporary erosion control measures and install permanent vegetation and landscaping following site stabilization.
- Installation of pavement on track and in driveway and parking areas.
- Installation of remaining drainage structures and associated piping. Install inlet protection measures for any drainage structures with grate covers in accordance with the Erosion Control Plan.
- Foundation excavation, pouring of concrete, and backfilling around walls and footings. Temporary stabilization shall be completed following backfilling as conditions warrant. Stabilization may include but not be limited to hydroseeding, temporary vegetation and mulching. Continuation of clubhouse construction may continue concurrently with the remaining schedule of operations.
- Installation of sub-surface utilities.
- Cleaning of all drainage structures silted due to erosion incurred during the construction process.
- Remove all remaining temporary erosion control devices.

MAINTENANCE OF EROSION CONTROL MEASURES

In accordance with Part III.D.3 of the General Permit, inspections should be conducted every seven (7) calendar days and after every rainfall event of greater than ½ inch and shall be supervised by a qualified professional. Maintenance of all temporary erosion control measures should also be performed as to ensure the highest level of effectiveness. Maintenance recommendations for erosion control measures include the following:

- Remove sediment from silt fencing when sediment reaches a depth of 6 inches at the fence and repair as necessary to maintain a sound barrier. This practice should be monitored and maintained daily.

- Material is not to be stockpiled in driveway areas. Catch basins are to be protected from silt and control erosion off of the building site.
- Clean inlet protection when storage capacity is at 50 percent.
- Temporarily stabilize areas which are proposed to be paved by applying and maintaining a stone sub-base until asphalt is installed.
- Supplement stone at the construction entrance(s) as necessary to ensure areas are stabilized and to minimize dust and ponding of water in traveled paths.

Complete a report of all inspections conducted during the construction period and maintain a record of all reports on-site as required by the General Permit.

TRAFFIC

Project construction may cause some short-term increased local truck traffic due to the delivery and removal of construction materials and equipment from the project site. It is anticipated that most construction equipment and deliveries would be from the Long Island Expressway (Route 495) to the south. On-site staging areas would be used during construction for loading and unloading of materials to avoid off-site impacts. These staging areas would be located in the cleared area where the clubhouse facility will be constructed during phase 2.

NOISE AND VIBRATION

The use of construction equipment coupled with the movement of delivery vehicles traveling to and from the site would cause a temporary increase in noise and vibration in the project site area. Noise and vibration levels at a given location would depend on the type of equipment used and number of construction vehicles entering/exiting the site on a daily basis, as well as the distance from the construction site. The level of impact of these noise sources depends on the noise characteristics of the equipment and activities involved, the construction schedule, and the location of potentially sensitive noise receptors. In this instance, the construction period is very short and requires little heavy equipment. In general, like most construction projects, construction of the proposed facility would result in increased noise and vibration that could be considered intrusive only for a short distance, typically 50 feet off-site. It is expected that these impacts, which would be temporary, would vary widely, depending on the phase of construction and the specific task being undertaken. There are no sensitive receptors within 50 feet of the proposed project site.

Typical noise levels of construction equipment expected to be employed during the construction process are presented in Table 13-1.

Increased noise levels caused by construction activities can be expected to be most significant during the early phases of construction. Peak construction noise levels would persist for only a limited time period in the early phase of construction. During the later phases of construction, much of the construction activity would take place within the building structures, and noise levels would be less.

Construction noise is regulated by the U.S. Environmental Protection Agency's noise emission standards for construction equipment. These federal requirements mandate that certain classifications of construction equipment and motor vehicles meet specified noise emission standards and that construction material be handled and transported in such a manner as not to create unnecessary noise. These regulations would be carefully followed. In addition,

construction activities would be restricted to occur within the hours of 7 AM and 8 PM in accordance with Chapter 81, "Noise Control," of Riverhead's Town Code. Overall, noise and vibration impacts are not anticipated to be significant and would not be permanent.

Table 13-1
Typical Noise Emission Levels For Construction Equipment

Equipment Item	Noise Level at 50 Feet (dBA)
Air Compressor	81
Asphalt Spreader (paver)	89
Asphalt Truck	88
Backhoe	85
Bulldozer	87
Compactor	80
Concrete Plant	83(1)
Concrete Spreader	89
Concrete Mixer	85
Concrete Vibrator	76
Crane (derrick)	76
Delivery Truck	88
Diamond Saw	90(2)
Dredge	88
Dump Truck	88
Front End Loader	84
Gas-driven Vibro-compactor	76
Hoist	76
Jack Hammer (Paving Breaker)	88
Line Drill	98
Motor Crane	93
Pile Driver/Extractor	101
Pump	76
Roller	80
Shovel	82
Truck	88
Vibratory Pile Driver/Extractor	89(3)

Notes: [1]Wood, E.W., and A.R. Thompson, Sound Level Survey, Concrete Batch Plant; Limerick Generating Station, Bolt Beranek and Newman Inc., Report 2825, Cambridge, MA, May 1974.

[2]New York State Department of Environmental Conservation, *Construction Noise Survey, Repot No. NC-P2*, Albany, NY, April 1974.

[3]F.B. Foster Company, Foster *Vibro Driver/Extractors, Electric Series Brochure*, W-925-10-75-5M.

Sources: Patterson, W.N., R.A. Ely, And S.M. Swanson, *Regulation of Construction Activity Noise*, Bolt Beranek and Newman, Inc., Report 2887, for the Environmental Protection Agency, Washington, D.C., November 1974, except for notated items.

SOCIOECONOMIC CONDITIONS

Construction of the project is estimated to create 35 person-years of direct construction employment. In addition to direct employment, construction of the project would create an

estimated 32 additional jobs off-site in Suffolk County, bringing the total additional employment in the County to 67 person-years. In the broader New York State economy, total employment from construction of the project is estimated at 69 person-years.

Direct wages and salaries from constructing the project are estimated at $1.78 million. Including off-site effects, total direct and indirect wages and salaries from constructing the project are estimated at $3.12 million. In the broader state economy, total direct and indirect wages and salaries from constructing the project are estimated at $3.22 million.

Constructing the project would also create tax revenues for Suffolk County, the Metropolitan Transportation Authority (MTA), and New York State. These taxes include sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes. Construction of the project is estimated to create approximately $115,000 in non-property related taxes for Suffolk County, approximately $15,300 for the MTA, and approximately $332,100 for New York State. In total, construction of the project is estimated to create approximately $462,400 in non-property related taxes for the County, MTA, and State. In addition, the County, Town, and local taxing jurisdictions would receive property taxes. ✷

A. INTRODUCTION

This chapter examines reasonable alternatives to the proposed project and compares potential impacts of each alternative to those that could result from the proposed project. The potential impacts of the proposed F1 Long Island Sports Facility across a full range of environmental areas were analyzed in the preceding chapters. This chapter is intended to qualitatively assess the potential impacts of the alternatives and compare them to those of the proposed project.

For the purposes of comparison, the following three alternatives were chosen to show a range of uses that are permitted on the project site as-of-right:

- No Action Alternative;
- As-of-Right Warehouse Alternative; and
- As-of-Right Office Alternative.

B. DESCRIPTION OF ALTERNATIVES

NO ACTION ALTERNATIVE

The No Action (or No Build) Alternative represents the future conditions if the project site is not developed with the proposed F1 Long Island Sports Facility. In this chapter, the No Action condition is compared with the proposed project. Under the No Action Alternative, no changes on the project site would occur. Rather than providing new recreational and economic opportunities in the Town of Riverhead, the No Action Alternative would leave the site vacant and underutilized. The No Action Alternative does not meet the needs of the project developers or the Town's goals for the area, which is to promote and enhance tourism as signified by the adoption and siting of the Industrial C (IC) Zoning District within this area (see Chapter 2, "Land Use, Zoning, and Public Policy"). Although the No Action Alternative is required to be examined under State Environmental Quality Review Act (SEQRA), maintaining the existing project site in its current condition is not desirable and is not a feasible, reasonable, or practicable option for the project developers or the Town of Riverhead, as it would not provide the much needed tourist destination, local recreational opportunities, and economic resurgence in the Town of Riverhead, as would the proposed project.

AS-OF-RIGHT WAREHOUSE ALTERNATIVE

The Town of Riverhead IC zone permits a mix of light industrial, warehouse, and office campuses. In the Warehouse Alternative, the project site would be developed with a warehouse, and the proposed F1 Long Island Sports Facility would not be built. A Warehouse Alternative was chosen since warehouses are permitted and are representative of a typical light industrial use, providing a good contrast in terms of potential impacts as compared with the proposed project. A warehouse is defined here as a structure primarily devoted to the storage of materials,

which may include office and maintenance areas. The Warehouse Alternative assumes that the site would be built out to the maximum extent practicable in accordance with local zoning (see Chapter 2, "Land Use, Zoning, and Public Policy"). The Warehouse Alternative would result in the development of a single very large structure or several large structures on-site, totaling over 210,000 square feet, with a 40 percent building lot coverage. The warehouse would be one-story and 30 feet in height. Approximately 525 parking spaces would be provided and 40 percent of the lot would be dedicated to open space/pervious surfaces. The warehouse could operate 7 days a week, 365 days a year, and could operate 24 hours a day. A warehouse would not provide the tourist or recreational needs of the community, but could provide additional revenue for the local economy.

AS-OF-RIGHT OFFICE ALTERNATIVE

Also permitted in the Town of Riverhead IC zone are offices. An Office Alternative was chosen as an office represents a typical commercial use and could result in potential impacts that are different from those anticipated with the proposed project. In the Office Alternative, the proposed F1 Long Island Sports Facility would not be built and the project site would instead be developed with an office to the maximum extent allowed by local zoning (see Chapter 2, "Land Use, Zoning, and Public Policy"). The Office Alternative would result in an even larger structure on-site, totaling over 630,000 gross square feet, with a 40 percent building lot coverage. The office would be three stories and 30 feet high. Approximately 4,200 parking spaces would be provided and 40 percent of the lot would be dedicated to open space/pervious surfaces. The operations of the office would run 7 days a week, 365 days a year, generally from 9 AM to 5 PM. As with the Warehouse Alternative, the Office Alternative would not meet the Town's goals for promoting and enhancing tourism in the area, but could spur economic resurgence in the local community.

C. COMPARISON OF POTENTIAL IMPACTS

The comparison of potential impacts addresses each technical area presented in the other chapters of this FEIS. In this section, the potential impacts of the three alternatives are compared with those of the proposed project.

LAND USE, ZONING, AND PUBLIC POLICY

NO ACTION ALTERNATIVE

Under the No Action Alternative, the site's land use and zoning would not change; it would remain vacant property in an industrially zoned area. The No Action Alternative would still be compatible with the surrounding uses in the area. However, the No Action Alternative would not be compatible with local public policy since it would not provide the needed tourism, recreational, and economic opportunities that the Town would like to see in this area, as demonstrated by the Town's recently adopted *Comprehensive Plan*, including the rezoning of this area (see Chapter 2, "Land Use, Zoning, and Public Policy").

WAREHOUSE ALTERNATIVE

Like the proposed project, the Warehouse Alternative would be compatible with the site's zoning and land uses in the surrounding area, with the possible exception of the horse farm, depending on specific warehouse activities. However, while the development of a warehouse on

the project site could boost the local economy, it would not serve the tourism or recreational needs of the community, and would therefore not be compatible with local public policy.

OFFICE ALTERNATIVE

Development of an office on the project site would not conflict with land uses or zoning on the project site or in the surrounding area. However, the Office Alternative would not meet the Town's goals of promoting and enhancing tourism in the area, and would therefore not be compatible with local public policy. Nonetheless, the Office Alternative could spur some resurgence in the local economy.

SOILS AND TOPOGRAPHY

NO ACTION ALTERNATIVE

Under the No Action Alternative, the site conditions would remain as they currently exist. The existing cleared, vegetated, and natural drainage areas would not change and the soils and topography would be unaffected.

WAREHOUSE ALTERNATIVE

As noted in Chapter 3, "Soils and Topography," the dominant soils on the project site generally have moderate to severe limitations with regard to the construction of roads and parking lots, up to three-story structures, and sanitary sewage disposal fields. These slope limitations would be an issue of concern for typical commercial and industrial development as substantial grading through cut and fill operations would be required. The Warehouse Alternative would result in even greater changes than the proposed project to the natural soils and topography that could be considered significant. To allow for the building footprint and parking, the site would need to be significantly altered from its current condition. Conversely, the proposed project is unique in that it was designed to utilize the natural topographic features. In addition, development of a warehouse on the project site would result in building lot coverage of 40 percent, and 40 percent would be dedicated to open space. The remaining 20 percent would be devoted to parking and walkways. In contrast, the proposed project would achieve almost 50 ~~about 47~~ percent open space, including existing natural areas and topographic features.

OFFICE ALTERNATIVE

As with the Warehouse Alternative, development of an office on the project site could potentially result in significant alteration of the soils and topography due to the need for extensive grading through cut and fill operations to site the building properly and provide the necessary drainage and parking. Compared with the proposed project, the Office Alternative would result in a lesser amount of open space and pervious surfaces on-site (40 percent compared with almost 50 ~~47~~ percent [49.8 percent], respectively).

COMMUNITY AND EMERGENCY SERVICES

NO ACTION ALTERNATIVE

In the No Action Alternative, the existing demand for community and emergency services would not change. The No Action Alternative would not serve to provide the recreational resource desired by the Town of Riverhead in the project area.

WAREHOUSE ALTERNATIVE

The Warehouse Alternative would not be expected to result in significant impacts to community and emergency services in the ½-mile study area. Although, depending on types of storage, quantities, etc., there may be an added demand for emergency services. However, unlike the proposed go-kart facility, development of a warehouse on the project site would not serve the recreational needs of the community.

OFFICE ALTERNATIVE

Similar to the Warehouse Alternative, development of an office on the project site would not be expected to result in significant impacts to community and emergency services in the ½-mile study area. The Office Alternative would also not provide a recreational resource for the Town's residents.

SOCIOECONOMIC CONDITIONS

NO ACTION ALTERNATIVE

The No Action Alternative would not result in additional tax revenues for the State, County, Town, or the local taxing jurisdictions. Further, no new jobs would be created and no additional fiscal or social benefits would be realized.

WAREHOUSE ALTERNATIVE

Development of a warehouse on the project site would generate new tax revenues for the State, County, Town, and the local taxing jurisdictions, but this revenue would not be expected to be as significant as with the proposed project. A warehouse could be expected to generate approximately 350 jobs, substantially more than the proposed project. Not all of these jobs would be full-time, as some workers would be part-time, and work would be in shifts. However, a warehouse would not serve the community in terms of providing a recreational opportunity, enhancing the quality of life of the Town's residents, or stimulate growth in the local economy from out-of-town visitors.

OFFICE ALTERNATIVE

Similar to the Warehouse Alternative, development of an office on the project site would generate new tax revenues for the State, County, Town, and the local taxing jurisdictions, but this revenue would not be expected to be as significant as with the proposed project. An office could be expected to generate approximately 2,520 jobs, substantially more than the proposed project. Office employees would generally be expected to work full-time, between the hours of 9 AM and 5 PM. However, an office would not serve the community in terms of providing a recreational opportunity, enhancing the quality of life of the Town's residents, or stimulate growth in the local economy from out-of-town visitors.

VISUAL QUALITY

NO ACTION ALTERNATIVE

With the No Action Alternative, views of and from the project in relation to surrounding properties would not change. The site would retain its visual character in terms of rolling topography and natural features on-site.

WAREHOUSE ALTERNATIVE

The Warehouse Alternative would result in the development of a single very large structure or several large structures on-site, totaling over 210,000 square feet. This structure would be much larger in bulk and scale than the proposed go-kart facility, which is less than 46,400 ~~54,000~~ square feet in total building area. Extensive grading through cut and fill operations would be required so that the site would not retain its rolling topography and much of the existing vegetation would be removed. About 40 percent of the lot would be dedicated to open space, compared with nearly 50 ~~about 47~~ percent with the proposed project. As required by zoning, the open space areas would shield views of the development from arterial roads. A 20-foot vegetative buffer would be provided along the site's border with Edwards Avenue. Planted berms would be used to screen views of automobiles in the parking area~~s~~ from public roadways. Overall, the Warehouse Alternative could result in significant adverse visual impacts since the visual character of the site would change drastically. Such a large structure on the project site could be considered intrusive to the surrounding area. Visual buffers may not exist between the warehouse and the surrounding properties, except for along Edwards Avenue. In contrast, the proposed project would utilize the natural topographic features of the site and would provide almost 50 ~~about 47~~ percent pervious coverage, including existing natural areas. Vegetative buffers would be provided along the entire perimeter of the site to shield views of and from the go-kart facility in relation to the surrounding properties. Further, the southern sand barrier would also provide a screen to the adjacent properties to the south.

OFFICE ALTERNATIVE

As with the Warehouse Alternative, development of an over 630,000 square-foot office building on the project site could result in significant adverse impacts to the visual quality of the project site and the surrounding area. The Office Alternative would result in maximum development of the site as permitted by local zoning, and about 40 percent of the lot would be dedicated to open space. The site would lose much of its natural character in terms of rolling topography and natural vegetation due to extensive grading. A vegetative buffer would be provided along Edwards Avenue, but such buffers may not be incorporated along the other boundaries.

HAZARDOUS MATERIALS AND PUBLIC HEALTH

NO ACTION ALTERNATIVE

In the No Action Alternative, the site would remain in its existing condition and there would be no potential for public health impacts from hazardous materials.

WAREHOUSE ALTERNATIVE

The Warehouse Alternative could involve the storage of hazardous materials on-site, but these materials would be handled in accordance with all applicable Occupational Safety & Health

Administration (OSHA) and State and County regulations. Therefore, no significant adverse impacts from hazardous materials would be expected, as with the proposed project.

OFFICE ALTERNATIVE

Development of an office building on the project site would not result in any significant impacts to public health from hazardous materials.

TRAFFIC

NO ACTION ALTERNATIVE

The No Action Alternative would not result in new trips to and from the project site and the existing traffic levels and road network would continue.

WAREHOUSE ALTERNATIVE

As with the proposed project, the Warehouse Alternative would involve development of parking areas in accordance with local zoning, and access to the site would be granted via Edwards Avenue. In contrast to the proposed go-kart facility, the Warehouse Alternative would generate the most traffic on a weekday, rather than on a Saturday or Sunday. Based on the Institute of Transportation Engineers (ITE) Trip Generation Rates, an approximately 210,000 square-foot warehouse would be expected to generate approximately 120 trips in the weekday A.M. peak hour and 128 trips in the weekday P.M. peak hour, compared with 21 and 29 with the proposed project, respectively. Also, a large percentage of these trips would be trucks which adversely impact traffic because they are larger, occupy more roadway space, and have poorer operating capabilities than passenger cars, particularly with respect to acceleration and deceleration. The facility would potentially generate a total of approximately 1,042 trips on a typical weekday. On the busiest weekend day (Saturday), the warehouse could be expected to generate approximately 256 trips and 25 trips during the peak hour. In contrast, the proposed project is expected to generate 136 trips during the peak hour on weekend non-event days and 135 trips during the peak hour on weekend special event days. ~~A special event is expected to occur approximately one time per year.~~ As currently proposed, the project does not include any special events. If such events are contemplated in the future, pursuant to Chapter 90, Special Events, of the Town of Riverhead Town Code, F1 would submit an application for approval of the events. Peak periods also coincide with adjacent street traffic peak periods, contributing to greater congestion.

OFFICE ALTERNATIVE

Similar to the Warehouse Alternative, an office building would generate the most vehicle trips on a weekday, but an office building is expected to generate substantially more traffic than a warehouse. An approximately 630,000 square-foot office building could potentially generate about 983 trips during the weekday A.M. peak hour and 939 trips during the weekday P.M. peak hour, according to the ITE. The Office Alternative could potentially result in a total of approximately 6,936 trips on a typical weekday. On a Saturday, the busiest day of the weekend, an office could generate a total of 1,493 trips, with approximately 258 in the peak hour. The Office Alternative would generate significantly more trips than the proposed project both during the week and on weekend days.

NOISE

NO ACTION ALTERNATIVE

In the No Action Alternative, the proposed go-kart facility would not be built and noise levels would remain in their existing condition.

WAREHOUSE ALTERNATIVE

Noise generated from a warehouse could be expected to result from outdoor activities and trucks entering and exiting the site and traveling on Edwards Avenue, as well as from traffic noise resulting from workers traveling to and from the site. The number of trucks on Edwards Avenue and the noise as they accelerate and decelerate has the potential to significantly change the ambient level during peak traffic periods.

OFFICE ALTERNATIVE

The Office Alternative would probably result in the lowest on-site noise compared with the other alternatives. Noise associated with an office would largely result from traffic noise associated with workers traveling to and from the site.

WATER AND NATURAL RESOURCES

NO ACTION ALTERNATIVE

In the No Action Alternative, the project site would not be developed and the existing natural features of the site, including vegetation and on-site pond, would remain unchanged.

WAREHOUSE ALTERNATIVE

The Warehouse Alternative would result in extensive grading of the site through cut and fill operations, thereby changing the natural topography of the site and removing much of the existing natural vegetation. Approximately 40 percent of the lot would be dedicated to open space, with preference given to the preservation of existing habitat rather than the clearance and creation of new habitat, in accordance with local zoning. In contrast, the proposed project would dedicate almost 50 ~~about 47~~ percent of the site to open space, including natural areas. Native landscaping, where feasible, would remain within the site and primarily along the southern and western borders. The on-site pond would be retained in its natural state, as with the proposed project. ~~most likely, but without improvements such as restoration and expansion. The proposed project would also include improvements to the on-site pond. This pond, located at the western border of the site just north of the site's center, is proposed to be expanded and a pump house would provide irrigation to proposed landscaping.~~

OFFICE ALTERNATIVE

Similar to the Warehouse Alternative, development of an office building on the project site would result in significant changes to the natural topography and features of the site due to substantial grading through cut and fill operations. Open space would account for 40 percent of the lot, including preserved natural areas. The on-site pond would also be retained in its natural state ~~and, depending on site design, could also be restored~~.

STORMWATER

NO ACTION ALTERNATIVE

In the No Action Alternative, the project site would remain undeveloped and the existing pervious surfaces and natural drainage areas would be retained.

WAREHOUSE ALTERNATIVE

The Warehouse Alternative would result in an increase of impervious surfaces on-site, totaling 60 percent of the lot area, compared with just over 50~~about 53~~ percent with the proposed project. Such a large degree of impervious coverage could potentially result in significant changes to stormwater runoff and could create the potential for soil erosion impacts. However, in accordance with local zoning, the open space areas would serve to provide on-site stormwater management.

OFFICE ALTERNATIVE

Similar to the Warehouse Alternative, development of an office building on the project site would result in a large degree of impervious coverage over the existing condition, which could significantly affect stormwater management leading to soil erosion impacts. Nonetheless, the open space areas, which would account for 40 percent of the lot, would serve to provide on-site stormwater management, in accordance with local zoning.

INFRASTRUCTURE AND ENERGY

NO ACTION ALTERNATIVE

In the No Action Alternative, the project site would remain undeveloped with no demand for infrastructure or energy services.

WAREHOUSE ALTERNATIVE

Development of a warehouse on the project site would create new demands for infrastructure and energy services. A warehouse would create a greater demand than the proposed project for infrastructure and energy services, except for solid waste services. These impacts are discussed below in greater detail.

Water Supply

The Warehouse Alternative would require utility connections to the Town of Riverhead Water District supply system. The warehouse would use an estimated 9,240 gpd, assuming water supply would amount to an additional 10 percent of the expected sewage generation, based on industry standards. This is about 2,040 ~~2,760~~ gpd more than the demand expected with the proposed project.

Sewage Generation

The estimated sewage generation for an approximately 210,000-square foot warehouse is about 8,400 gpd, based on the design sewage flow rate for general industrial space provided in Suffolk County Department of Health Services Division of Environmental Quality's *Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single-Family*

Residences (approved June 15, 1982). This is 1,855 ~~2,510~~ gpd more than the expected flow with the proposed go-kart facility.

The Warehouse Alternative would likely involve the installation of an on-site septic system to dispose of sewage generated from the project site similar to, although much larger than, the proposed project.

Solid Waste

Based on industry standards, an approximately 210,000 square-foot warehouse could be expected to generate an estimated 1,260 pounds of solid waste per week, assuming 10 percent of the building is occupied. As with the proposed project, the Warehouse Alternative would require a private carter to handle and dispose of the solid waste in accordance with the applicable New York State solid waste regulations, and materials would be recycled in accordance with all applicable State and local regulations. The proposed project would generate approximately 235 ~~890~~ pounds of solid waste per week more than could be expected with the Warehouse Alternative, and this difference is not considered significant.

Energy

Energy service for the warehouse would be obtained from LIPA/KeySpan. Based on rates provided by the Association of Energy Engineers, it is estimated that an approximately 210,000 square-foot warehouse could result in an energy demand of 9,261 million British Thermal Units (BTUs) annually or 7,899 ~~7,246~~ million BTUs more than is expected with the proposed project.

OFFICE ALTERNATIVE

As with the Warehouse Alternative, development of an office building on the project site would create new demands for infrastructure and energy services. An office building would create a greater demand for infrastructure and energy services than both the proposed project and the Warehouse Alternative. These impacts are discussed below in greater detail.

Water Supply

The Office Alternative would require utility connections to the Town of Riverhead Water District supply system. The office building could use an estimated 41,580 gpd, assuming water supply would amount to an additional 10 percent of the expected sewage generation, based on industry standards. This is more than 5.75 ~~6~~ times the demand expected with the proposed project and 4.5 times more than with the Warehouse Alternative.

Sewage Generation

The estimated sewage generation for an approximately 630,000 gross-square-foot office is about 37,800 gpd, based on the design sewage flow rate for non-medical office space provided in Suffolk County Department of Health Services Division of Environmental Quality's *Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single-Family Residences* (approved June 15, 1982). This is more than 5.75 ~~6~~ times the expected flow with the propose go-kart facility and 4.5 times more than with the Warehouse Alternative.

The Office Alternative would likely involve the installation of an on-site septic system to dispose of sewage generated from the project site, similar to, although much larger than, the proposed project.

Solid Waste

Based on industry standards, an approximately 630,000 gross-square-foot office building could be expected to generate an estimated 31,500 pounds of solid waste per week. This is over 21~~14~~ times the amount of solid waste expected to be generated from the proposed project and 25 times more than with the Warehouse Alternative. As with the proposed project, the Office Alternative would require a private carter to handle and dispose of the solid waste in accordance with the applicable New York State solid waste regulations, and materials would be recycled in accordance with all applicable State and local regulations. Similar to the proposed project, the waste stream from an office building typically consists of a large fraction of recyclable materials, such as paper and corrugated cardboard.

Energy

Energy service for the office building would be obtained from LIPA/KeySpan. Based on rates provided by the Association of Energy Engineers, it is estimated that an approximately 630,000 gross-square-foot office building could result in an energy demand of 49,077 million BTUs annually or more than 36~~2~~4 times the demand expected with the proposed project and five times more than with the Warehouse Alternative.

CONSTRUCTION

NO ACTION ALTERNATIVE

In the No Action Alternative, the project site would remain undeveloped. Therefore, there would be no potential for construction-related impacts.

WAREHOUSE ALTERNATIVE

Soil Erosion and Sedimentation Control

As with most construction projects, the Warehouse Alternative could result in increased stormwater runoff from areas cleared of natural vegetation, subsequently leading to increased potential for on- and off-site soil erosion and sedimentation during the construction period. Construction impacts could be minimized by implementing erosion, sediment, and fugitive dust control measures. With the proposed project, a substantial amount of natural vegetation would be preserved, where feasible, which would serve to minimize erosion. In contrast, the Warehouse Alternative would require the removal of at least 60 percent of the site's natural vegetative cover, thereby increasing the potential for soil erosion and sedimentation over the proposed project. It is anticipated that the Town of Riverhead would require an Erosion and Sediment Control Plan to minimize impacts.

Traffic

As with construction of the proposed go-kart facility, construction of a warehouse on the project site could cause some increased local traffic congestion due to the delivery and removal of construction materials and equipment from the project site. The Warehouse Alternative could utilize staging areas on-site for loading and unloading of materials to avoid off-site impacts.

Noise and Vibration

As with construction of the proposed project, the use of construction equipment coupled with the movement of delivery vehicles traveling to and from the site would cause increased noise and

vibration in the project site area with the Warehouse Alternative. In general, like most construction projects and the proposed project, construction of a warehouse would result in increased noise and vibration that could be considered intrusive to nearby residents. However, these impacts would be temporary and would vary widely throughout the construction period.

Socioeconomic Conditions

As with construction of the proposed project, construction of a warehouse on the project site would create a number of direct and indirect employment opportunities, resulting in millions of dollars in direct and indirect wages and salaries. Constructing a warehouse would also create millions of dollars in tax revenues for Suffolk County and New York State. These taxes would include sales tax, personal income tax, corporate and business taxes, and numerous miscellaneous taxes.

OFFICE ALTERNATIVE

The potential construction-related impacts with the Office Alternative would be the same as for the Warehouse Alternative and similar to those expected to result from construction of the proposed go-kart facility. Any potential construction-related impacts from development of an office building on the project site would be temporary and not considered significant. ✷

Chapter 15: Unavoidable Adverse Impacts

Unavoidable adverse impacts occur when a proposed project results in significant adverse impacts for which there are no reasonable or practicable solutions, and for which there are no reasonable alternatives that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts.

The proposed project would create short-term adverse impacts that would be mitigated by the implementation of mitigation measures, to the maximum extent practicable. Temporary or short-term impacts are those that occur during the construction phases of the project (see Chapter 13, "Construction Impacts").

The following are examples of short-term impacts anticipated as a result of the construction of the proposed project:

- Increased potential for soil erosion and sedimentation on- and off-site;
- Presence of construction vehicles on the site and area roads; and
- Localized noise from construction vehicles and equipment.

As discussed in more detail in Chapter 13, "Construction Impacts," all potential short-term adverse impacts would be mitigated to the maximum extent practicable. Standard soil erosion, sedimentation, and fugitive dust control measures, such as wetting the soil in the area of construction, would be utilized during construction to minimize impacts. In addition, the project would take advantage of construction sequencing and preservation of natural vegetation on-site, where feasible, which would also serve to minimize potential soil erosion and sedimentation impacts.

A staging area on-site for loading and unloading of materials would be utilized to avoid off-site traffic impacts during construction.

Finally, all construction activities would be conducted in full compliance with applicable regulations and local day and hour construction limitations. State and federal requirements mandate that certain classifications of construction equipment and motor vehicles be used to minimize adverse impacts. Thus, construction equipment would meet specific noise emission standards.

These construction conditions are temporary and would end when the initial phases of construction are complete.

As described in the previous Chapters, the proposed project would not result in any unavoidable significant adverse environmental impacts. ✷

Chapter 16: Growth Inducing Aspects of the Proposed Project

Growth inducing aspects are generally described as the long-term secondary impacts of a proposed project that trigger further development. Secondary impacts may include growth of physical development, population increases in the surrounding community, increases in economic growth, and/or social or cultural expansion. Proposals that add substantial new land use, new residents, or new employment could induce additional development of a similar kind or of support uses (e.g., stores to serve new residential uses). Actions that introduce or greatly expand infrastructure capacity (e.g., sewers, central water supply) might also induce growth. The proposed project is new construction on a site that is currently vacant to meet the recreational, economic, and tourism needs of the existing and future population of the Town of Riverhead. The construction of the proposed go-kart facility is not expected to encourage or induce significant growth in any area analyzed in this FEIS. However, the proposed F1 Long Island Sports Facility would facilitate economic resurgence in the community by encouraging new business development or a revival of existing businesses in the Industrial C zoning district. The facility would also promote tourism in the area as well as increase the employment and tax base for the Town, Suffolk County, and New York State.

Construction of the project would create short-term economic incentives for companies in the area and on Long Island. These economic opportunities are spurred by the project's increased demand for supplies, equipment, and goods. Such demand would create new short-term job opportunities in construction. As a result of this temporary employment, there would be an increase in payroll taxes and disposable income from these jobs and monies would be spent on local goods and services (see Chapter 5, "Socioeconomic Conditions").

Operation of the proposed project would result in additional property tax revenue for New York State, Suffolk County, the Town of Riverhead, and local taxing jurisdictions. New job opportunities would be created, resulting in an increase in payroll taxes and disposable income for the local economy. In addition, the proposed project would generate additional sales tax revenue (see Chapter 5, "Socioeconomic Conditions").

As explained in further detail in Chapter 5, "Socioeconomic Conditions," the go-kart facility would attract incremental business from the outside community. The venue is expected to attract a premier corporate customer base, with approximately two-thirds of guests expected from out-of-town. These visitors would be expected to invest monies in the local economy.

No significant adverse impacts with respect to growth inducing aspects of the proposed project are expected. ✷

Chapter 17: Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable commitment of resources refers to both the built and natural resources that would be expended in the construction and operation of the proposed project. Among the built resources committed to the creation of the proposed project would be raw materials such as fossil fuels, lumber, and metals. Actual building materials to be used include concrete, masonry, and aluminum. The project would require the commitment of energy in the form of gas and electricity consumed during construction and operation of the buildings and the human effort required to develop, construct, and oversee the various components of the project. These raw construction materials are considered irretrievable committed resources because once they are utilized for the construction of the proposed buildings and parking facilities, their reuse for some purpose other than the proposed project would be highly unlikely.

The project would also require some commitment of existing natural resources on-site in the form of vegetative cover. As discussed in Chapter 10, "Water and Natural Resources," the vegetative community featured at the project site is not unique to this area of the Town or the region and it is not expected that the proposed project would pose a significant adverse impact to the natural flora or fauna resources on or in close proximity to the project site. The open vegetative areas of the site would continue to provide habitat for animals adapted to developed conditions. In fact, nearly half of the proposed site would be dedicated to open space including natural areas. Native landscaping, where feasible, would remain within the site and primarily along the southern and western borders. Planting of various indigenous species of trees and shrubs, where practical, would be established around the tracks and along the northern, southern, and eastern borders of the site. The combination of existing and new plantings would work to maintain the natural quality of the site.

The relatively small size of the proposed project site, its proximity to Edwards Avenue and Middle Country Road, and the presence of cleared/disturbed lands on-site suggest that the likelihood of the site providing critical habitat for rare plants and animals is low.

Although the New York State Department of Environmental Conservation's Natural Heritage Program identified sensitive species within Calverton, these species have not been recorded since the late 19th and mid 20th centuries in this area. Listed plants are regulated by the New York State Environmental Conservation Law Section 9-1503, which specifies that it is illegal to damage or remove a protected plant without the consent of the property owner. The presence of a protected plant would not prohibit development of the proposed project but would be taken into consideration in the site planning process. Protected plants, if present, can often be avoided by preserving them in situ or transplanting them to a nearby location (see Chapter 10, "Water and Natural Resources"). ✷

Chapter 18: Response to Comments

A. INTRODUCTION

This chapter of the FEIS responds to public comments on the F1 Long Island Sports Facility DEIS, dated March 2006, resubmitted October 2006, and approved by the Town of Riverhead Planning Board on December 7, 2006. Oral comments on the DEIS were made at a public hearing on February 1, 2007, while written comments were accepted until the close of the comment period on February 13, 2007. The Town of Riverhead, as lead agency, reviewed records of the public hearing and written comments, and provided the FEIS preparers with a summary of comments via written correspondence dated October 25, 2007. For comments on traffic and noise, the Town's correspondence references memoranda prepared by TRC Engineers, Inc. on August 13, 2007, and A&C, Inc. on August 20, 2007, respectively. The Town also provided comments in correspondence dated November 16, 2007. The FEIS responds to comments provided by the Town as lead agency. Comments on the DEIS are provided in Appendix G.

After the March 31, 2008 submission of the FEIS, the Town of Riverhead Planning Board did not accept the FEIS as complete and submitted a final comment letter on August 1, 2008 as to basis for their decision. The comment letter on the FEIS is also included in Appendix G. For ease of review, all responses to comments made on the FEIS as well as new text in response to the August 1, 2008 letter are shown by italics.

B. COMMENTERS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

WRITTEN COMMENTS

1. Stephan A. Maffia, P.E., TRC Engineers, Inc, on behalf of the Town of Riverhead, August 13, 2007 (TRC)
2. V. Lee, Ph.D., A&C, Inc., on behalf of the Town of Riverhead, August 20, 2007 (A&C)
3. Richard Hanley, Planning Director, Town of Riverhead Planning Department, October 25 and November 16, 2007 (Town Planning)

The commenter/source is noted in parenthesis after each comment.

C. COMMENTS ON THE F1 DEIS

SITE PLAN

Comment 1: Upon the initial application for site plan approval, the Planning Department did not require the submission of an Agricultural Data

Statement pursuant to Section 305-a of the New York State Agricultural District Law. However, public commentary included the site plan's failure to adhere to Agriculture and Markets law with respect to submission of an agricultural data statement, location map, and notice to agricultural district property owners within 500 feet. The two submissions enumerated above for satisfaction of Agriculture and Markets law are to be provided as part of the FEIS, as well as demonstration of notice to the two area agricultural district property owners. (Town Planning)

Response: An Agricultural Data Statement containing information required by Section 305-a of the New York State Agricultural District Law has been prepared and is included in Appendix K of the FEIS. A notice with the project description and location map, advising of the site plan application, will be sent to the agricultural district property owners.

Comment 2: The plans should make it possible to differentiate between the three proposed track circuits and a rendering made of the open structure covering the concession track. (Town Planning)

Response: Appendix A of the FEIS includes a revised site plan. As shown on the site plan, the F1 facility would comprise two separate track types: the covered concession track and the high speed professional track. The southern section of the high speed professional track would be used by Kart Club members and the northern portion would be used for arrive and drive customers. A rendering of the open structure covering the concession track is also included in Appendix A.

Comment 3: Please provide floor plans of the maintenance building. (Town Planning)

Response: Appendix A of the FEIS includes floor plans of the maintenance building.

Comment 4: The floor plans and elevations should be altered to remove references to corporate uses and to eliminate structural heights above the 35-foot height relief awarded by the Zoning Board of Appeals (ZBA). (Town Planning)

Response: Appendix A includes revised floor plans and elevations illustrating a maximum height of 35 feet for the clubhouse and concession track, consistent with the ZBA's decision on September 14, 2006. The plans have also been revised to eliminate references to corporate uses.

Comment 5: The site plan ordinance (Section 108-133) considers wetlands, surface waters, and slopes greater than 15 percent to be unbuildable, and consequently their area may not be considered in calculation of performance standards. The project plans shall be revised to include the area of wetlands and a slope analysis which identifies the relevant grades at 0 to 5 percent, 6 to 10 percent, and greater than 11 percent slopes. The plans shall then tabulate the Industrial C bulk requirements and the project's conformance with building and impervious coverage and floor area ratio, computed after the restrictive areas have been extracted from the site's acreage. The layout of the facility's improvements upon the identified slopes would be expected to verify the claim that the project works with existing grades. (Town Planning)

Response: Young & Young, the Project Engineers, have performed a slope analysis and wetland calculation that addresses this comment. The slope breakdown is as follows: approximately 26.5 percent of the site is comprised of 0 to 5 percent slopes; approximately 15.6 percent of the site is comprised of 5 to 10 percent slopes; approximately 22.9 percent of the site is comprised of 10 to 15 percent slopes; and approximately 35 percent of the site is comprised of slopes greater than 15 percent. As stated in e-mail correspondence from Town of Riverhead Attorney Dawn Thomas to Project Attorney Robert Kozakiewicz, dated January 3, 2008, subtraction for slopes of 15 percent or greater relates to lot coverage, not impervious surface. The revised site plan identifies the gross lot size, area with slopes greater than 15 percent, and net lot size, and provides a calculation of lot coverage based on the net lot size.

PROJECT DESCRIPTION

Comment 6: The determination of the ZBA that corporate meeting and dining facilities are not customarily accessory to the recreational use significantly alters the project description and use dynamics as analyzed by the DEIS. The FEIS should concisely re-describe the facility's composition and indicate in narrative and tabulated form how impacts such as sanitary flow, traffic, and solid waste generation are affected and the effect on identified mitigations. References in the text to corporate uses and structural heights above the 35-foot height relief awarded by the ZBA are inapplicable. (Town Planning)

Response: Chapter 1, "Project Description," has been updated to reflect changes to the proposed project as a result of the ZBA's determination. Analyses of potential impacts of the proposed project on traffic, and sanitary sewage and solid waste, have been updated in Chapter 8a, "Supplemental Traffic Analysis," and Chapter 12, "Infrastructure and Energy,"

respectively. Where applicable, impacts have been reanalyzed throughout the EIS due to changes in the proposed project.

Comment 7: Please describe how the tracks will operate for one year prior to the construction of the clubhouse as stated on pages 1-7 and 13-1 of the DEIS. What services and facilities are to be provided for the patrons, and where? (Town Planning)

Response: Construction of the proposed project would occur in two phases. Phase 1 would include construction of the tracks, cover for the concession track, maintenance building, sound barriers, and parking area, and phase 2 would include construction of the clubhouse. Prior to construction of the clubhouse, the public would have access to bathroom facilities in the maintenance building, where the staff meeting room would also function as a safety training and briefing room. Catered food would be served under the covered concession track during this same period, consistent with the ZBA determination.

SOILS AND TOPOGRAPHY

Comment 8: The site plan ordinance (Section 108-133) directs that extensive grading, cut and filling, and excavating shall be avoided. Erosion and sediment control is critical on this site due to the degree of project disturbance proposed, coupled with the presence of a freshwater wetland having a large, steeply sloped contributory area. A far stronger demonstration of impact mitigation is called for than mere reference to practices determined to be appropriate by the site plan process. Control measures commensurate to the severity of erosion potentials on-site and sufficient to protect both the wetland and adjacent lands and uses (including the public road) should be definitively described and depicted. A construction plan fashioned in accordance with the New York Standards and Specifications for Erosion and Sediment Control (the Blue Book) should be provided in the FEIS. Justification should be made for the export of 43,000 cubic yards (cy) of fill. A balanced cut and fill could reduce impacts on land and construction-related traffic. (Town Planning)

Response: The revised project would include the export of approximately 51,700 cy of fill. Appendix A includes a grading report with explanation for the proposed export of soil. As described in Chapter 3, "Soils and Topography," the most prevalent soils within the boundaries of the project site primarily have moderate to severe limitations for construction of roads and parking lots, up to three-story structures, and sanitary sewage disposal fields. These slope limitations would be an

issue of concern for typical commercial and industrial development, as even greater grading through cut and fill operations would be required. The proposed project is unique in that it was designed to utilize the site's natural topographic features to the maximum extent practicable. Chapters 3 and 13, "Construction Impacts," provide detailed mitigation measures to be utilized during and after construction to reduce erosion and sediment impacts from the proposed project. Appendix A of the FEIS includes the Erosion Control Plan.

HAZARDOUS MATERIALS AND PUBLIC HEALTH

Comment 9: Provide details with respect to the conformance with Articles VII and XII of the Suffolk County Sanitary Code of the storage facilities for toxic and hazardous materials used in kart operations. What specifically are the applicable rules and regulations governing gas and oil storage within the maintenance building? Would all servicing and fueling take place in that building? Are there any floor drains? What sort of pre-approved containers will be employed and how is the concrete containment designed to the task? Is there anything proposed for the possibility of fire, such as smoke or heat sensors and a deluge system? (Town Planning)

Response: Articles VII and XII of the County Sanitary Code are summarized in Chapters 7 and 10 and are included in Appendix D of the FEIS. It is anticipated that no more than 500 gallons of gasoline would be stored on-site at any one time, in one 500-gallon container pre-approved by the Suffolk County Department of Health Services (DHS). The tank would be constructed of steel and located aboveground within a concrete containment system to ensure that leaks and/or spills are controlled. Containers would not discharge to the ground, groundwater, or surface waters of Suffolk County, consistent with Article VII. Nominal storage of 55 gallon drums would be provided for both motor oil and 2-stroke oil. Oil would only be stored for the 4-stroke karts. In addition, about 5 gallons of WD-40 and related pump spray bottles would be stored on-site. All potential contaminants, such as oils, would be contained within the storage portions of the maintenance building, in accordance with all applicable rules and regulations. Aboveground storage tank systems would be inspected weekly using a detailed checklist, consistent with practices at F1's sister facility in Boston. Appendix E of the FEIS includes the weekly inspection checklist and storage tank specifications, consistent with Article XII. Each kart is expected to use approximately 1 gallon of gas every 3 hours. Refueling would only occur in pit lanes, which are proposed to be surfaced in concrete, rather than asphalt. A gas caddy would transport fuel from the gas tank located northwest of the

maintenance building to the pit lanes. There would be three gas caddies total on-site. Each caddy holds approximately 20 gallons of gas. The maintenance building would not have a floor drain. Karts would be wiped down rather than washed, and parts would be cleaned using recyclable solvent. A fire suppression system is proposed.

TRAFFIC

Comment 10: The DEIS traffic study contains detailed capacity analyses of only one existing area intersection—NYS Route 25 at Edwards Avenue. In order to address potential traffic impacts on the Calverton area, additional intersections must be analyzed. Of particular concern are intersections south of the project site, where Edwards Avenue crosses the Long Island Expressway (LIE) at a grade-separated interchange just 1.5 miles away. This interchange will provide for direct access between the site and the regional highway system, and cannot be ignored. Also, NYS Route 24 extends eastward from this interchange to numerous populated areas. Other intersections along Route 25 also are of concern, since Route 25 is the major east/west arterial serving this section of Riverhead. Therefore, at a minimum, the intersections of Edwards Avenue at the LIE ramps, and Route 25 at Manor Road and Route 25 at Route 25A, should be included in a revised impact study. (TRC)

Response: See response to following comment.

Comment 11: The basis for examining the intersection of the LIE and Route 24 (Nugent Drive) for traffic impacts was the assertion that the bulk of project-generated trips would arrive by that route and not burden the Edwards Avenue/Route 25 (Middle Country Road) intersection. It will not be necessary to include intersections of Route 25 and Route 25A, or Route 25 and Manor Road, in the revised traffic analysis. (Town Planning)

Response: Additional analyses have been conducted for the LIE interchange with Edwards Avenue, and incorporated into the FEIS within Chapter 8a, "Supplemental Traffic Analysis." In accordance with correspondence from Richard Hanley, Town of Riverhead Planning Director, dated November 16, 2007, analyses of the intersections of Route 25 and Manor Road, and Route 25 and Route 25A, were not necessary.

Comment 12: The DEIS Traffic Study contains traffic volumes collected by the applicant in February 2006. These volumes were then increased by a factor derived from data available from the New York State Department of Transportation (DOT) to account for seasonal variations. The

adjustment procedure is not fully explained, leaving out such important information as the season to which the February counts are factored and whether the adjustment factor is appropriate for Edwards Avenue, a Town road. Summer time periods should be evaluated, since they represent peak conditions for the proposed use, as well as the adjacent street system. Summer counts at the key intersections should be undertaken to adequately evaluate project traffic impacts. (TRC)

Response: The traffic counts referenced above have already been taken. Summer counts were conducted in August 2007 and an analysis was performed utilizing summer volumes, as described in Chapter 8a of the FEIS.

Comment 13: The applicant should provide detailed information regarding the source(s) of trip generation data. A vague reference to information supplied by the developer is not adequate. Another section of the DEIS refers to the developer's "sister" facility in the Boston area. TRC found information regarding an F1 Boston Facility on the Internet, which was described as having indoor tracks; if this is the referenced facility, more detailed information should be provided so that TRC can determine the applicability of the Boston site to the proposed Long Island facility. Such specifics should include volume counts at the access to the sample site(s), and it would be preferred that this data be representative of peak conditions expected at the Riverhead location (i.e., summer conditions for an outdoor facility). Other similar existing kart track facilities could be used to formulate trip generation. (TRC)

Response: The trip generation information presented in the study is based on the observations and information from the manager of the F1 Boston Facility. The applicant stated in the presentation made to the Town of Riverhead that the proposed Long Island facility would operate in a similar manner compared to Boston.

Comment 14: The traffic section references road improvements to be undertaken by the sponsors of other area developments at the Route 25 and Edwards Avenue intersection. This intersection has been described by the applicant as experiencing significant peak hour congestion. However, the status of the other projects and their commitment to implement these improvements is not clear with respect to the timing of construction of the F1 Facility and these other developments. TRC recommends that the F1 Facility participate in a fair-share construction cost program that ensures the funding of the necessary improvements at this intersection and at other locations as may require mitigation of Fl Facility traffic impacts. (TRC)

Response: Traffic operating conditions at the intersection of Edwards Avenue and Route 25/Middle Country Road could be improved by providing exclusive left-turn lanes along with minor restriping at the four approaches. There is ample room for the additional lanes and these improvements are in line with the measures proposed for the Calverton Manor project by RMS Engineering, and for the industrial park, service station/convenience store, and single industrial building projects in reports generated by Schneider Engineering. With these proposed improvement measures in place, all of the impacted approaches would operate with better service conditions than under the No Build conditions. The applicant is willing to pay a proportionate share of the costs of the abovementioned improvements at the intersection of Edwards Avenue and Route 25, along with sponsors of other projects. The mechanism by which contributions would be maintained and distributed remains to be determined by the Town of Riverhead.

NOISE

Comment 15: There are two residences adjacent or near the proposed facility site—the residence at Gibb Horse Farm and 400 Edwards Avenue. Residences are typically considered a noise-sensitive land use. The applicant made a literal interpretation of the Chapter 81 of the Town of Riverhead Code with respect to "zone" and "noise-sensitive zone" and concluded that the Code is not applicable to these residences. It is a common professional practice to treat any residential use as "noise-sensitive" land use. Additionally, if the Application is other than "Use-of-Right," the Town Noise Control Code should apply to protect existing "noise-sensitive" land uses—pending ruling by the Town. Accordingly, since car racing has impulsive characteristics (e.g., backfiring), the facility sound level shall not exceed the levels specified in the Code for residential use or property within a noise-sensitive zone at the nearest residential property line. (A&C)

Response: With regard to Chapter 81 of the Town of Riverhead Code, the land immediately adjacent to the proposed facility site is zoned Industrial A and Industrial C, and land north of NYS Route 25 (Middle Country Road) is zoned Agricultural Protection and Rural Corridor. None of the adjoining properties are "zoned for residential use," nor "within a noise-sensitive zone" as specified in Chapter 81-5 of the Town of Riverhead Code, and consequently the noise limits regarding residentially zoned property or noise-sensitive zones in the Code would not be applicable.

Upon review of Chapter 81, there are only two references to "'Noise-sensitive zone(s)." Section 81-1, the definition section, defines a "Noise-Sensitive Zone" as "Any area designated pursuant to this

chapter for the purpose of ensuring exceptional quiet." Section 81-5 E then adds the following: "Noise-sensitive zones. No person shall cause or permit the creation of any sound by means of any device or otherwise on any sidewalk, street or public place adjacent to any school, court, house of worship or public library while such facility is in use or adjacent to any hospital or nursing home at any time..." Conspicuously absent is any reference to residence or dwellings. Based upon the reading of this subsection, it follows that the surrounding properties are not within a "noise-sensitive zone" as defined in the Town Code.

Regarding the issue of karts backfiring, the karts will be well maintained and are not automobiles, and thus do not backfire.

Comment 16: The maximum noise level to be demonstrated at the property lines of the project site is to be 65 dBA, not 45, as suggested in the A&C, Inc. correspondence dated August 20, 2007. (Town Planning)

Response: See response to preceding comment regarding applicability of the noise limits specified in Chapter 81-5 of the Town of Riverhead Code to the proposed project. In addition, according to New York State Department of Environmental Conservation (DEC) guidance, the addition of any noise source, in a non-industrial setting, should not raise the ambient noise level above a maximum of 65 dBA, and ambient noise levels in industrial or commercial areas may exceed 65 dBA with a high end of approximately 79 dBA. The DEC guidance document further states that projects which result in exceedances of the recommended guidance levels should explore the feasibility of implementing mitigation.

Comment 17: The applicant used only the Equivalent Sound Level or L_{eq} (l hour). The maximum noise level, L_{max} (l hour), and 10-percentile level, L_{10} (l hour) should also be used for measurement, prediction, and assessment against the Town Code. (A&C)

Response: Because the sound pressure level unit of dBA describes a noise level at just one moment, and because very few noises are constant, other ways of describing noise over more extended periods have been developed. One way is to describe the fluctuating noise heard over a specific period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and period (e.g., 1 hour, denoted by $L_{eq(1)}$), conveys the same sound energy as the actual time-varying sound. For the impact analysis of the proposed project, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in this noise impact evaluation, and is used to provide an indication of highest expected sound levels. $L_{eq(1)}$ is the

noise descriptor used by most governmental entities, including the Federal Highway Administration and the DEC, for purposes of assessing impacts for projects under their jurisdiction.

Comment 18: For relative (predicted future relative to existing) impact assessment such as DEC Guidance, comparison should be made between the highest 1-hour future noise level and the lowest 1-hour existing level for each time period (day and night). (A&C)

Response: This is what was done. As presented in the DEIS, for impact assessment purposes, the highest 1-hour future L_{eq} noise level with the proposed project was compared to the lowest 1-hour existing L_{eq} noise level (see Table 9-5) during the hours that the proposed facility would operate.

Comment 19: The worst case assumed was detailed as Scenario B on pages 9-5 and 9-6; namely, 15 karts on each of the 3 tracks for 45 minutes out of the hour from 10 AM to 8 PM, with the noisier kart of 92.8 dBA at 7 meters on the northern track and operating from 11 AM to 5 PM, the southern track with the club karts of maximum level of 78 dBA at 7 meters, and the concession track with karts with maximum level of 76 dBA at 7 meters. Was the worst-case L_{eq} (1 hour) computed based on the 45 minutes out of 60 minutes? What was assumed for the remaining 15 minutes? (A&C)

Response: The noise analysis examined two worst case conditions. For both conditions, the worst-case $L_{eq(1\text{-}hour)}$ was calculated based on the assumption that the karts would be producing their maximum noise emission levels for 45 minutes out of each hour. This assumption is very conservative since in reality it would be very difficult for the proposed facility to be operated efficiently enough to achieve 45 minutes of activity for each hour, much less 45 minutes of vehicles operating at maximum conditions. (For analysis purposes during the remaining 15 minutes, it was assumed that vehicles would be moved on and off the track and new drivers would be entering the track.) During the majority of the time the proposed facility would be in operation, there would be acoustically less severe conditions than those assumed for analysis purposes, and as a result, noise levels and project impacts would be less than what is predicted.

Comment 20: On page S-6, it is stated that there will be a national event that would draw between 400 and 500 drivers and spectators. It will take over the entire high speed track and be continuous throughout the day from 9 AM to dusk. Why is this not the worst-case noise event? (A&C)

Response: As currently proposed, the project does not include any special events. If such events are contemplated in the future, pursuant to Chapter 90, Special Events, of the Town of Riverhead Code, F1 would submit an application for approval of the events. Scenario B assumes maximum weekend operation with three tracks simultaneously in operation with karts that produce a maximum noise level of 92.8 dBA at 7 meters allowed to race on the northern track. Potential special events would use the same karts as allowed on the northern track in Scenario B.

Comment 21: Regarding input to Cadna-A, source sound power level or sound pressure level, the applicant needs to provide documentation supporting the maximum kart emission levels used; do they vary with speed or throttle/power settings? (A&C)

Response: The noise emission levels would be expected to vary with speed or throttle/power settings. To be conservative, the manufacturer's maximum noise emission level, or L_{max}, was used as the source level for the noise analyses. See Appendix H for kart manufacturer noise specifications.

Comment 22: Regarding input to Cadna-A, site terrain/topography, how were ground contours/elevations taken into account? At what resolution—every 10 or 50 feet or other amount? Please provide input file. Does the model account for upgrades? If so, how? (A&C)

Response: The site terrain/topography data was supplied from a GIS database and the Project Architect. This information was imported into the Cadna-A model at an approximate resolution of 1 meter.

Comment 23: Provide brief descriptions of the acoustic attenuation factors accounted for in Cadna-A (e.g., distance decay, atmospheric absorption per ANSI SI.26-1995, barrier per Maekawa, traffic line, source per FHWA). If other more sophisticated excess attenuation mechanism is used (e.g., multiple barriers/obstructions, reflection/diffraction, ground impedance, wind and temperature gradient effects), please provide computation procedure. Brochure material is inappropriate. (A&C)

Response: The Cadna A model is a computerized model developed by DataKustik for noise prediction and assessment. The model can be used for the analysis of a wide variety of noise sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment, etc.), transportation sources (e.g., roads, highways, railroad lines, busways, airports, etc.), and other specialized sources (e.g., sporting facilities, etc.) The model takes into account the noise power levels of the noise sources, attenuation with distance, ground contours,

reflections from barriers and structures, attenuation due to shielding, and so forth. The Cadna A model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. The Cadna A model is a state-of-the-art tool for noise analysis. Additional information on the Cadna A model is available from DataKustik and their representatives.

Comment 24: Model results without and with noise barriers should be provided to gauge the reasonable expectation of the effectiveness of the proposed mitigation measure. (A&C)

Response: The preliminary results of the noise analysis indicated the need for some type of noise barrier to avoid significant noise impacts. The proposed project design includes the noise barriers utilized in the noise analysis and described in the FEIS. Plans call for construction of the proposed facility with the proposed barrier designs. Modeling of the proposed track design without the proposed noise barriers was never performed and is not relevant since the project includes construction of the barriers. *See also response to comment 45.*

Comment 25: Continuous measurements were made at two sites (M-1 and M-4) from 10 AM to 8 PM on one weekday and one weekend day, both of which are on major roadways with noise levels in the upper 60 to lower 70s in dBA, as to be expected for arterial roadways. Twenty-minute spot measurements were made at three other locations, including one at the southern property line (Table 9-3 on page 9-6). No data were shown to substantiate the lowest hourly noise levels used for impact assessment. (A&C)

Response: The continuous measurements were used as a control point to adjust the spot measurements, based on the temporal distribution of noise levels at the continuous measurement locations, to determine the lowest ambient noise levels during the time periods when racing would occur at the proposed facility. (The lowest ambient noise levels were used in the analysis to show maximum impacts.) Appendix H contains the results of the noise measurement program.

Comment 26: No direct hourly (from the facility opening to closing hours on weekdays and on weekend days) measurements were available corresponding to the positions of the residence on Gibb Horse Farm or 460 Edwards Avenue for impact assessment at the nearest noise-sensitive receptors. Justification of extrapolating the lowest hourly noise levels at M-2,-3, and -4 (Table 9-4 on page 9-7) was not provided. (A&C)

Response: Noise monitoring location M1 is located west of Edwards Avenue approximately 27 feet from the nearest travel lane of traffic. Noise levels would be identical at similar distances from the nearest travel lane of traffic on either side of the roadway. Noise monitoring location M2 was located on the southern property line of the project site and was approximately 200 feet west of Edwards Avenue. The value at M2 was assumed at the Barn at the Gibb Horse Farm which is approximately the same distance west of Edwards Avenue. The Residence at the Gibb Horse Farm is approximately 60 feet west of Edwards Avenue, and existing noise levels were considered to be 6 dBA higher than the lowest measured value at M2. At both locations, the dominant existing noise source is traffic from Edwards Avenue. Appendix H contains the results of the noise measurement program. The continuous measurements were used as a control point to adjust the spot measurements, based on the temporal distribution of noise levels at the continuous measurement locations, to determine the lowest ambient noise levels during the time periods when racing would occur at the proposed facility.

Comment 27: Justification of extrapolating the lowest existing hourly noise levels at Gibbs Horse Farm and 460 Edwards Avenue (Table 9-5 on page 9-8) was not provided. (A&C)

Response: The continuous measurements were used as a control point to adjust the spot measurements, based on the temporal distribution of noise levels at the continuous measurement locations, to determine the lowest ambient noise levels during the time periods when racing would occur at the proposed facility. Appendix H contains the results of the noise measurement program.

Comment 28: The existing $L_{eq-(1)}$ for B-Max in Table 9-5 on page 9-8 are much higher than those for A-Typical. How were they derived? If they are for weekdays, then are Scenario B events to occur on weekdays only? (A&C)

Response: For Scenario B, the existing $L_{eq(1)}$ in Table 9-5 represents the lowest existing noise level at each location on a weekend between the hours of 11 AM to 5 PM when the loudest karts would be in operation. Existing noise levels on the weekends are lower than the existing noise levels on weekdays (see Appendix H in the FEIS). Using the weekend existing noise levels for impact assessment would be conservative.

Comment 29: Do the "Project-Generated Traffic" noise levels in Table 9-5 include contributions from traffic movements on-site (customers coming onto or leaving the site and driving around for parking)? (A&C)

Response: In Table 9-5, the "Project Generated Traffic" values represent vehicular traffic travelling to and from the proposed project site. Noise due to on-site operations such as customers driving around for parking would not be expected to contribute significantly to the overall noise level due to the low speeds which vehicles will be required to adhere to in the parking lot for safety reasons. In addition, noise from vehicular activity on Edwards Avenue and the proposed track would acoustically mask any noise from the proposed project's parking lot.

Comment 30: The impact analysis results (Table 9-5 on page 9-8) already indicated an impact per DEC Guidance criteria of 6 dBA increase. (A&C)

Response: For purposes of impact assessment, per DEC guidance, an increase in $L_{eq(1)}$ of than 6.0 dBA which produces an ambient noise levels of more than 65 dBA at a residence or 79 dBA at industrial or commercial areas will be considered to be a significant project impact. There are no locations in Table 9-5 which have both an increase of more than 6.0 dBA and a total noise level of 65 dBA.

Comment 31: The US Environmental Protection Agency (EPA) in its report entitled "Effects of Noise on Wildlife and Other Animals—Review of Research since 1971" of July 1980 documented available researches on the auditory, masking, non-auditory, and behavioral effects on laboratory animals, domestic animals, and wildlife. It reported fright reaction by horses to loud noises as in most species of animals. Startle and fright reactions to impulsive noises such as gunfire (similar to backfire) are well known, when combined with sight in particular. While no specific research is available on the specific effect of noise on horse breeding, the document did identify some adverse reproductive effects on laboratory animals. (A&C)

Response: AKRF, Inc. performed an extensive literature search regarding noise impacts on breeding horses. Conclusions based on this research are provided in Chapter 9, "Noise," of the FEIS. *See also response to comment 46.*

WATER AND NATURAL RESOURCES

Comment 32: In addition to discussing appropriate mitigative measures during construction of the project, further analysis is to be offered as to how the site wetland is to be protected in the long term from the influence of

the developed land. Creation of the hard track surface and even the cleared and landscaped areas within the pond's tributary area will significantly increase its runoff coefficient, and the volume of overland flow may carry a burden of contaminants from materials employed in landscaping care or from the karts, such as upset or chronic releases of gas and oil. (Town Planning)

Response: Chapter 10, "Water and Natural Resources," of the FEIS describes proposed wetland protection measures. As described in Chapter 10, connections would be maintained between the on-site wetland and off-site habitats to the west, including open field and forest, to minimize potential impacts to wildlife habitat functions. A fence with a gap at the bottom, allowing mammals, reptiles, and amphibians to pass unimpeded, is proposed. A 2-foot high wall would be used to prevent reptile/amphibian movement upslope onto the proposed racetrack. The wall would also help prevent runoff from the track to the wetland, in conjunction with storm drains at the edge of the track. The revised site plan illustrates a natural, vegetated buffer of at least 64 feet in depth surrounding the wetland. No clearing would occur around the wetland, and existing vegetation would be maintained within the buffer area. Chapter 7, "Hazardous Materials and Public Health," describes containment of potential contaminants. Chapter 11, "Stormwater," describes proposed maintenance of storm water controls during construction, and also describes maintenance of storm water controls and drainage structures upon completion of construction activities. Routine maintenance responsibilities for permanent drainage facilities would include: monitoring of the drainage inlets on a routine basis, particularly following large storm events; removal of leaves, trash, and other debris from curb gutters and drainage grates; inspection of drainage structures annually, and immediately following significant rainfalls, to ensure proper function and adequate recharge rates of storm water runoff; cleanout of drainage structures to remove seasonal leaf litter and debris in early winter; additional monitoring and cleanings in the spring if higher than normal applications of sand and salt have been needed during the winter months; and maintenance, reseeding, and mulching as necessary of all seeded and landscaped areas, to maintain a dense vegetative cover. Storm water runoff from the proposed site would be limited and the activities proposed are not expected to generate significant pollutant loads that would adversely impact groundwater or surface water. Recharge from impervious areas of the site would be provided through a system of catch basins. See "Stormwater" below for additional response.

Comment 33: The idea of using the wetland pond as a source of irrigation water and of an expansion of its area as mitigation is not favorably viewed by the Conservation Advisory Council (CAC) and other Town representatives. The historic use of the waterbody for that purpose referred to in the DEIS was for agriculture, which enjoys some freedom from wetlands law that this project does not. References to the notion should be stricken from the text and plans. It is suggested that a dedicated well tapped into the glacial aquifer might be a better irrigation source, which would conserve the treated potable supply of the Riverhead Water District and be free of the associated cost. Such a well would have to be located at a sufficient distance that its drawdown would not impact the pond's level. (Town Planning)

Response: As illustrated by the latest site plan in Appendix A of the FEIS, the wetland would be preserved in its natural size and state. It is no longer proposed that the wetland be used as a source of water for irrigation. A dedicated well is proposed as an irrigation source, rather than the pond. The well would be located to the south of the wetland, setback more than 100 feet. Chapter 10, "Water and Natural Resources," of the FEIS describes proposed wetland protection measures.

Comment 34: The plans should clearly depict the wetland boundary and the extent of the CAC's 150-foot jurisdiction. They have indicated their opposition to the DEIS's depicted location of track surfaces as close as 30 feet to the wetland and related clearing and alterations even closer, as an overly intensive use of the property that would unacceptably compromise the wetland. They reiterated displeasure with the revised location at 67 feet, and their concerns were sufficiently substantial to believe that at most, only limited disturbance should occur within their 150-foot interest. (Town Planning)

Response: The revised site plan clearly depicts the wetland boundary. The proposed project has been revised to move all buildings at least 158 feet from the wetland. However, the track would be located 64 feet from the wetland. Existing vegetation would be maintained within the buffer area, and no clearing would occur around the wetland. Mitigation proposed to prevent degradation of the wetland also includes storm drains at the edge of the track, and a 2-foot high wall to prevent storm water from entering the pond and prohibit wildlife from accessing the track.

Comment 35: The CAC and Town of Riverhead Planning Department both note the very general nature of the natural history descriptions of the site. A detailed flora and fauna survey should be made to definitively answer

the question of threatened and endangered plant species or of animal species of special concern. Information should be sought from the DEC respecting the presence of Tiger salamanders. (Town Planning)

Response: AKRF, Inc., conducted an ecological site assessment on November 20, 2006, subsequent to submittal of the DEIS. AKRF visited the project site to inventory on-site vegetation species, characterize on-site habitat, and verify the extent of regulated wetland areas. The survey of flora and fauna has been incorporated into Chapter 10, "Water and Natural Resources," of the FEIS. According to correspondence from the DEC New York Natural Heritage Program (NHP) dated February 10, 2006, the project vicinity has records of historic occurrence of several NYS-listed (threatened, endangered, or exploitably vulnerable) plant species, including: hop sedge (*Cyperus lupulinus spp. lupulinus*), flax leaf whitetop aster (*Sericocarpus linifolius*), silvery aster (*Symphyotrichum concolor var. concolor*), primrose leaf violet (*Viola primulifolia*), stargrass (*Aletris farinosa*), and marsh straw sedge (*Carex hormathodes*). However, these species were last observed in the project vicinity between 1893 and 1955, with no further reports of occurrence. Of these listed species, two require moist, wetland soil not found on the project site. Therefore, *Viola primulifolia* and *Carex hormathodes* would not occur on-site based on habitat limitations, nor were they seen on-site during the November 2006 inspection. Of the listed plant species, open and wooded sandy habitat does occur on-site that may be appropriate for *Sericocarpus linifolius*, *Cyperus lupulinus spp. lupulinus*, *Symphyotrichum concolor var. concolor*, and *Aletris farinosa*. However, none of these species were seen on-site during site inspection, and much of the site contains disturbed, re-graded topography, making the presence of these plants unlikely, particularly in the central and northern portions of the project site. Neither NHP nor the US Fish and Wildlife Service (USFWS) has any records of "threatened" or "endangered" animal species on the project site or vicinity, and none were identified on the project site during the November 2006 site inspection.

Comment 36: The US Army Corps of Engineers (ACOE) should be asked to make a jurisdictional determination on the wetland. (Town Planning)

Response: Because ACOE does not regulate a buffer, there is no requirement that ACOE be contacted to conduct a jurisdictional site visit. As long as the wetland is not directly disturbed, as is the case with the proposed project, ACOE is not involved.

Comment 37: The site plan ordinance (Section 108-133) directs that significant natural features are to be preserved whenever possible and that extensive tree removal shall be avoided. Justification should be given for the degree of clearing in favor of track improvements and landscaping. The DEIS asserts a significant impact on the site's flora and fauna is not expected, apparently depending on nearly half the site being kept in what is described as open space. That area seems to consist almost entirely of landscaping, including a large percentage of turf which does not have habitat or other natural resource benefits equivalent to the lost wooded coverage. Discuss the potential to protect the wetland habitat with as wide an undisturbed band of forest as possible, and to limit the site clearing overall for preservation of biotic and aesthetic benefits, such as visual and noise buffering. Retaining the existing wooded coverage is preferred to making indigenous plantings "where feasible." (Town Planning)

Response: As described in Chapter 2, "Land Use, Zoning, and Public Policy," the go-kart facility would maintain more pervious surfaces than required by the Town Code. The proposed project meets the open space area requirement equal to at least 20 percent of the lot area. In fact, nearly half of the site would be dedicated to open space. Specifically, existing natural and wooded areas would make up 15.6 percent of the total lot area, and landscaped areas would make up 34.2 percent of the total lot area. As discussed above, clearing within and around the wetland is no longer proposed. Consistent with the CAC requirements, the wetland and 64-foot buffer would remain in their natural state.

STORMWATER

Comment 38: Test hole data indicate the wetland to be an expression of groundwater (not perched) and not dependant on overland runoff. Implications that an additional volume of runoff is beneficial to the wetland's persistence have no rational basis, and the use of a naturally occurring wetland for drainage relief is to be avoided, not provided for by design. The plan gives the pond's surface elevation as 26.2 feet and shows 47 massed drainage rings as close as 25 feet from the wetland at an elevation of about 32 to 34 feet. Allowing for their profile depth in the ground, show there is a sufficient horizon of soil between their bottom and groundwater to adequately entrain and absorb pollutants. Page S-23 of the DEIS describes how urban runoff contamination is exaggerated when drainage areas are large and concentrated in a single location. (Town Planning)

Response: The wetland is no longer proposed to be used for drainage relief. Drains that had been proposed to be directed to the wetland have been

eliminated. Drainage basins would now be located in an area northeast of the clubhouse and would not discharge to the on-site wetland.

INFRASTRUCTURE AND ENERGY

Comment 39: The site soils are described in the Suffolk County Soil Survey as constraining to the operation of sanitary systems. Discuss how this impediment will be dealt with. Also discuss the conformance of all systems proposed with the Suffolk County Sanitary Code and (if still applicable) with the State Pollutant Discharge Elimination System (SPDES) program delegated to Suffolk County Health by DEC, as the DEIS had given two of the three systems as having discharges in excess of 1,000 gallons per day (gpd). Call out the breakdown of septage and greywater that will result from the project as defined by the ZBA ruling. (Town Planning)

Response: The most prevalent soils within the boundaries of the project site primarily have moderate to severe limitations for sanitary sewage disposal fields. Moderate and severe soil limitations do not in themselves create significant adverse environmental impacts, but may require additional site preparation and engineering and cause a need for increased maintenance requirements. It is expected that good engineering practices, Best Management Practices, and erosion control measures instituted during construction would overcome any soil suitability limitations. The estimated sewage generation is approximately 6,545 gpd, based on the design sewage flow rates provided in Suffolk County DHS Division of Environmental Quality's *Standards for Approval of Plans and Construction for Sewage Disposal Systems for Other Than Single-Family Residences* (approved June 15, 1982). Based on density flow, the proposed project would generate 3,142 gpd, which is 491 gpd lower than what is allowed in accordance with Suffolk County design criteria, which permits 300 gpd per acre in Hydrogeologic Zone III. As shown on the revised site plan, three different sanitary systems are planned. The first includes two septic tanks, a grease trap, and five leaching pools to handle kitchen waste. A second system includes two septic tanks and nine leaching pools to receive and dispose of waste from the clubhouse, less any kitchen waste. The third sanitary system includes one septic tank and two leaching pools to handle waste from the maintenance building. The on-site septic system is designed to comply with Suffolk County's standards for the construction of sewage disposal systems. The proposed system would conform to the County Sanitary Code and SPDES. The breakdown of septage and greywater is anticipated to be as follows: clubhouse (kitchen/grey) generation would be approximately

2,150 gpd, clubhouse (sanitary) generation would be approximately 4,195 gpd, and maintenance building (sanitary only) generation would be approximately 200 gpd.

D. COMMENTERS ON THE FINAL ENVIRONMENTAL IMPACT STATEMENT

WRITTEN COMMENTS

4. *Richard Hanley, Planning Director, Town of Riverhead Planning Department, August 1,2008 (Town Planning 2008)*
5. *V. Lee, Ph.D., A&C, Inc., on behalf of Town of Riverhead, May 22, 2008 (A&C 2008)*

E. COMMENTS ON THE F1 FEIS

NOISE

Comment 40: *All of the requests of Dr. Lee must be studied and analyzed with the exception that the noise limit to be studied is 65 db not 45 db. The FEIS attempted to demonstrate compliance to DEC guidelines; not to the db limits established by the Town of Riverhead noise ordinance. Noise levels were expressed in hourly (Leq) terms and not the maximum levels (Lmax or L10) employed by the code. Noise impacts are to be handled by demonstration of compliance with Chapter 81 of the Riverhead Town Code. (Town Planning 2008)*

Response: *See response to comments 15, 16 and 41 through 46.*

Comment 41: *Non-compliance with the Riverhead Town Noise Control Code §81-5 L(2). (A&C 2008)*

Response: *Adherence to the Riverhead Town Noise Control Code §81-5 L(2) applies to sound that enters property zoned for residential use or property within a noise-sensitive zone. Since no properties that are immediately adjacent to the site or located within the ½-mile study area are residential or considered to be located in a noise sensitive zone, this regulation[1] does not apply to the proposed project. See also response to comments 15 and 16.*

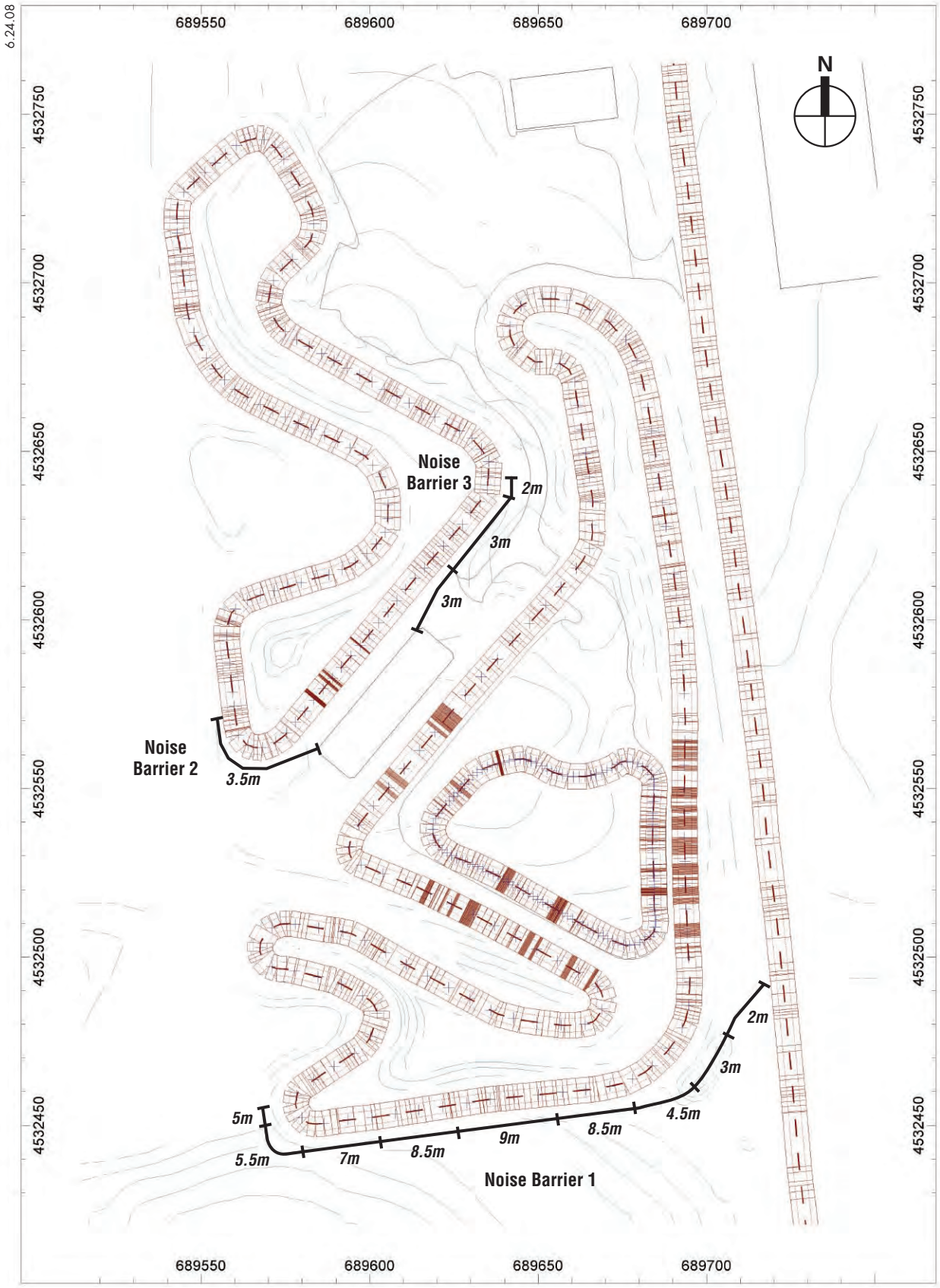
[1] In the Riverhead Town Noise Control Code, the L_{10} statistical descriptor applies to property zoned for non-industrial use. Section §81-5(L)(5) does not specify that the L_{max} statistical descriptor be used. Further, the L_{max} statistical descriptor is not referenced in the Town noise code.

Comment 42: *Project has significant impact per DEC Guideline criteria of 6 dBA or more increase. (A&C 2008)*

Response: *As stated in the FEIS, for purposes of impact assessment, per DEC guidance, an increase in $L_{eq(1)}$ of more than 6.0 dBA which produces an ambient noise level of more than 65 dBA at a residence or 79 dBA at industrial or commercial areas was considered to be a significant project impact.*

The results of the FEIS noise study, as presented in Chapter 9, "Noise," were summarized in Table 9-5. Scenario B in the FEIS represents a worst case scenario since it utilizes race karts with higher maximum noise emission levels than the race karts utilized in Scenario A, and produces the highest noise levels and largest impacts. The Scenario B results presented in the FEIS took into account the acoustical benefit of three noise barriers that would be constructed as part of the proposed project. The specifics of the three noise barriers are shown on Figure 1 included in Appendix H of this FEIS. As shown in Table 9-5 of this FEIS, during Scenario B a 7 dBA increase in noise levels due to the proposed project at the Gibb horse farm barn was predicted. While this increase is above 6 dBA, it is not a significant impact since the total noise levels would be below 65 dBA.

In addition, AKRF performed an additional noise study that examined whether increasing the height of some of the proposed barriers for the F1 Long Island Sports Facility, presented in the FEIS, would reduce the maximum increase in noise levels at the Gibb horse farm barn to below 6 dBA. As part of this study, further investigation was performed using the CadnaA model to determine if the predicted increase in noise levels at the Gibb horse farm barn could be reduced to less than 6 dBA by increasing the height of specific segments of the proposed noise barriers. Figure 18-1 shows the proposed noise barrier heights that would achieve this objective. Comparing Figure 18-1 with Figure 1 included in Appendix H, shows some segments of the noise barrier would require increases of up to 1.5 meters. Table 18-1 presents the results for both Scenario A and B with the taller noise barrier configuration. As shown in Table 18-1, the taller barrier would result in a reduction in noise impacts. In particular, with Scenario B with the taller barrier, a maximum increase of 6 dBA (rather than a 7 dBA increase) in noise levels would be predicted to occur at the Gibb horse farm barn. With these revised barrier heights, the maximum increase at all locations



Noise Barrier

#m *Height of the top portion of each barrier section above ground*

Note:

1. *All three barriers were modeled as absorptive barriers (absorption coefficient=1)*
2. *Noise barrier 3 is movable and is assumed to be utilized for Scenario B Opertions*

Proposed Taller Noise Barrier Details

F1 Long Island Sports Facility

Figure 18-1

(except for Scenario B conditions at one site at the Calverton Links Golf Course where ambient noise levels are extremely low) would be less than 6 dBA. (At this one site at the Calverton Links Golf Course where ambient noise levels are extremely low, even with the proposed facility and Scenario B conditions, total ambient noise levels are low and the proposed facility would not have a significant impact.)

In comparing Table 18-1 to Table 9-5, the largest benefit gained with the taller noise barriers is 1 dBA, which occurs at the barn at Gibb horse farm for Scenario B. A change of 1 dBA would not be considered perceptible. Since a change of 1 dBA would not be considered perceptible, the cost to increase the proposed wall another 1.5 meters would not be warranted. See also response to comment 16

Table 18-1
Noise Impact Analysis Results with New Proposed Noise Barrier Configuration

Location	Scenario	Existing $L_{eq(1)}$	Racetrack Only	Project Generated Traffic	Total	Increase
Zeh Residence-Route 25 (Site M4)	A-Typical Race Karts	67	40	50	67	0
	B-Max Noise Level Karts	70	54	50	70	0
River Charter School-Route 25 (Site M5)	A-Typical Race Karts	61	47	49	62	1
	B-Max Noise Level Karts	64	61	49	66	2
Residence at Gibb Horse Farm*	A-Typical Race Karts	56	54	49	59	3
	B-Max Noise Level Karts	60	62	49	65	4
Barn at Gibb Horse Farm*	A-Typical Race Karts	50	52	43	54	5
	B-Max Noise Level Karts	54	59	43	60	6
460 Edwards Avenue**	A-Typical Race Karts	64	55	54	65	1
	B-Max Noise Level Karts	68	65	54	70	2
Calverton Links Golf Course (Site M3)	A-Typical Race Karts	45	43	39	48	3
	B-Max Noise Level Karts	47	56	39	56	9

Notes: **Existing noise level assumed to be equal to the value at site M2, adjusted for distance.*
***Existing noise level assumed to be equal to the value at site M1.*
Fractionalized decibels have been rounded to the nearest whole number per the request of the Planning Board.

Comment 43: *Rejection of Applicant's assumption that L_{dn} level of 65 dBA is the limit for residences. (A&C 2008)*

Response: *The L_{dn}, or day-night average sound level, describes a receiver's cumulative noise exposure from all events over a full 24 hours, with events between 10 PM and 7 AM increased by 10 decibels to account for greater nighttime sensitivity to noise. The proposed project will not operate between the hours of 10 PM and 7 AM. Neither the Town of Riverhead Noise Control Code nor the DEC guidance uses the L_{dn} for assessment purposes. Consequently, the L_{dn} descriptor is not applicable and was not used in the noise analysis presented in the FEIS.*

Comment 44: *Proper existing noise measurements at Critical Receptors were not made. (A&C 2008)*

Response: *It is not typical to perform continuous noise measurements on private property and therefore such measurements were not included in the FEIS. It should be noted that for the studies that appear in the FEIS, a continuous measurement was made on the west side of Edwards Avenue adjacent to the proposed project site (Noise Receptor M-1 in Figure 9-1 of the FEIS). In addition, a short-term noise measurement was made at the southern boundary of the project site at approximately 200 feet from Edwards Avenue (Noise Receptor M-2 in Figure 9-1 of the FEIS). These measurements were used to estimate noise levels at the residence at the Gibbs horse farm and 460 Edwards Avenue since noise measurements are typically not performed on private property. Absent permission to perform noise measurements on the private property of the Gibb horse farm and 460 Edwards Avenue, it is expected that the values presented in this FEIS are representative of the existing noise levels at the aforementioned private property.*

Comment 45: *Lack of noise mitigation study. (A&C 2008)*

Response: *This comment pertained to the examination of projected noise levels that would be predicted to occur as a result of race kart operations in the future with the proposed project both with and without the proposed noise barriers. Dr. Lee claimed that it is a "standard professional practice" to provide results both with and without the proposed noise barriers to assess "barrier effectiveness." Scenario B in the FEIS represents a worst case scenario since it utilizes race karts with higher maximum noise emission levels than the race karts utilized in Scenario A, and*

produces the highest noise levels and largest impacts. Therefore, Scenario B was used to demonstrate the acoustical effectiveness of the noise barriers proposed in the FEIS, and presented below are the results of the noise study due to race kart operations both with and without the proposed barriers.

Noise levels resulting from Scenario B race kart operations were presented in the FEIS in Figure 9-3. Figures 18-2 through 18-4 present the results of this investigation in a similar manner. Figure 18-2 presents the noise results due to Scenario B race kart operations without the proposed noise barriers. Figure 18-3 presents the noise results due to Scenario B race kart operations with the proposed noise barriers (this is the same as Figure 9-3 in Chapter 9). Figure 18-4 presents the reduction in noise levels that the proposed noise barriers would be expected to provide during Scenario B. (Figures 18-2 through 18-4 show noise levels from race kart operations alone [i.e., without ambient]). As stated, Figure 1 in Appendix H, presents the locations and heights of the proposed noise barriers that were used for the Scenario B noise analysis presented in Chapter 9 of this FEIS.

In general, based on the results in Figure 18-4, the proposed noise barriers would reduce noise levels due to Scenario B race kart operations by: 1) approximately 4 to 6 dBA at locations adjacent to the Gibb residence and barn at the horse farm, 2) approximately 5 to 15 dBA at locations immediately adjacent to the south side of proposed Noise Barrier 1 (see Appendix H, Figure 1), and 3) approximately 1 dBA at the northern boundary of the Schulman Golf Course.

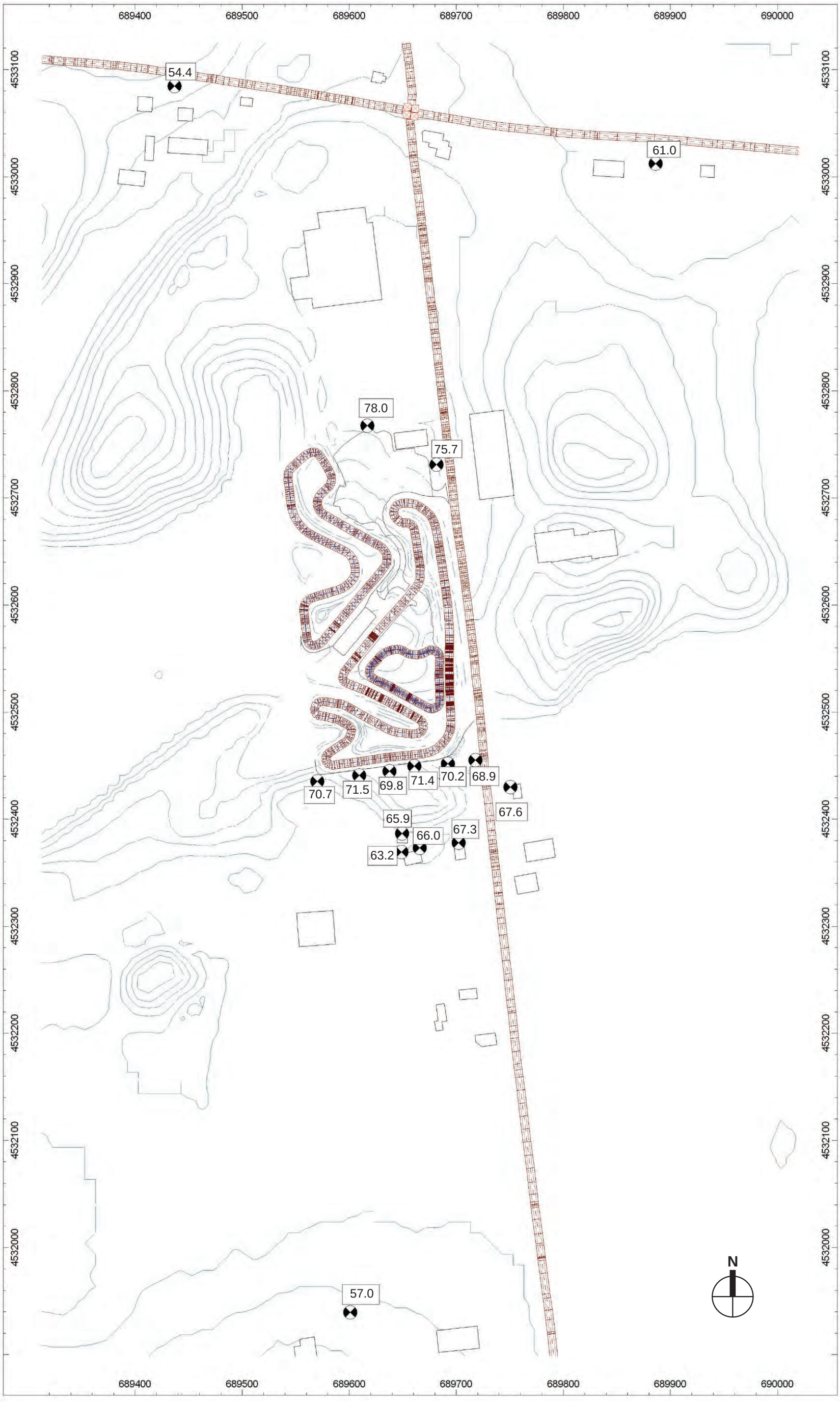
No noise barriers are provided to reduce noise levels at locations north of the proposed project site. As presented in the FEIS, the proposed project would result in a barely perceptible increase in noise levels at sensitive receptor sites that are north of the project site (i.e., the Zeh Residence and the River Charter School) and consequently mitigation is not necessary for these locations.

Comment 46: *Effects of Noise on Horses and Horse Breeding. (A&C 2008)*

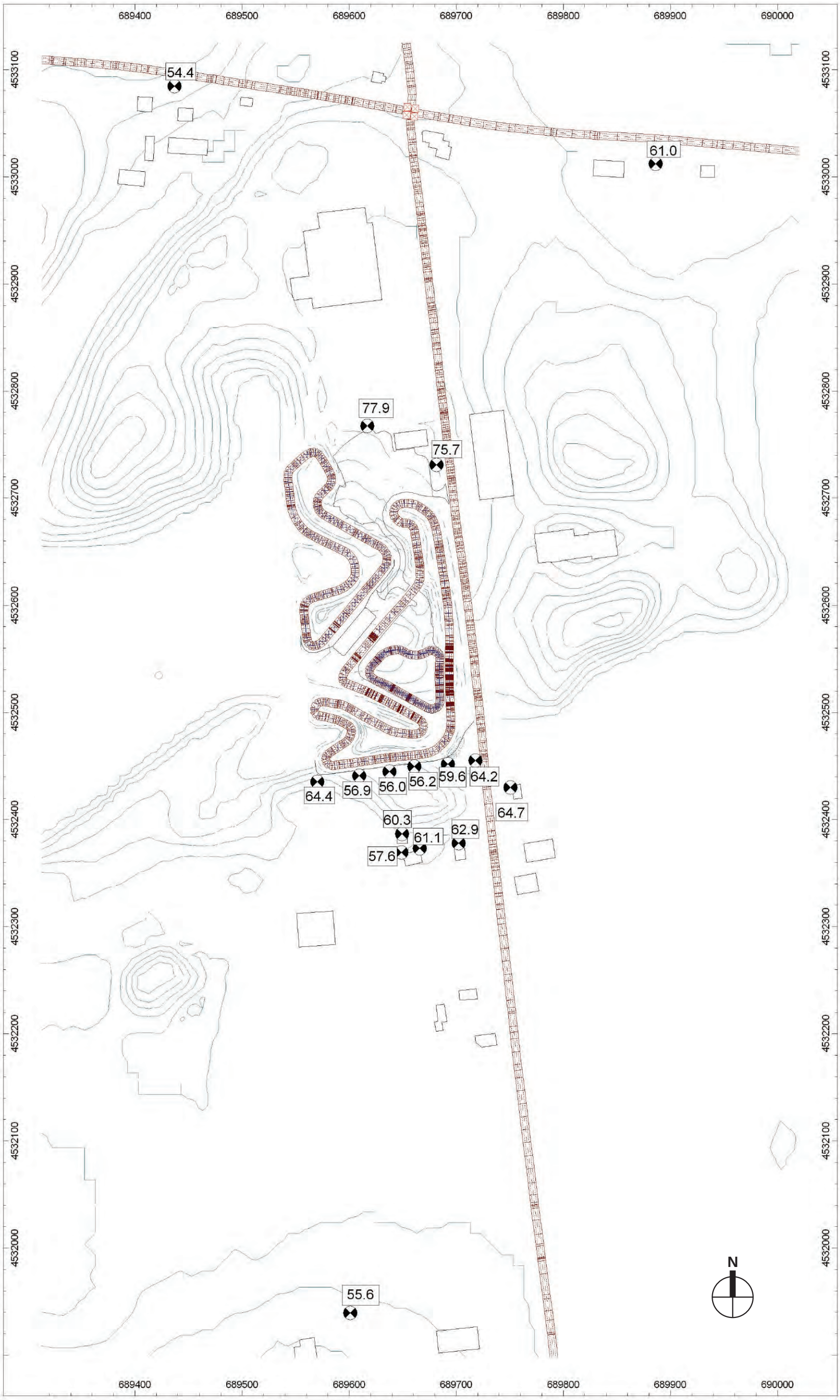
Response: *A letter written by an expert on this topic from the faculty of Rutgers University has been provided to the Town that addresses this issue. This letter is included in Appendix C.*

TRAFFIC

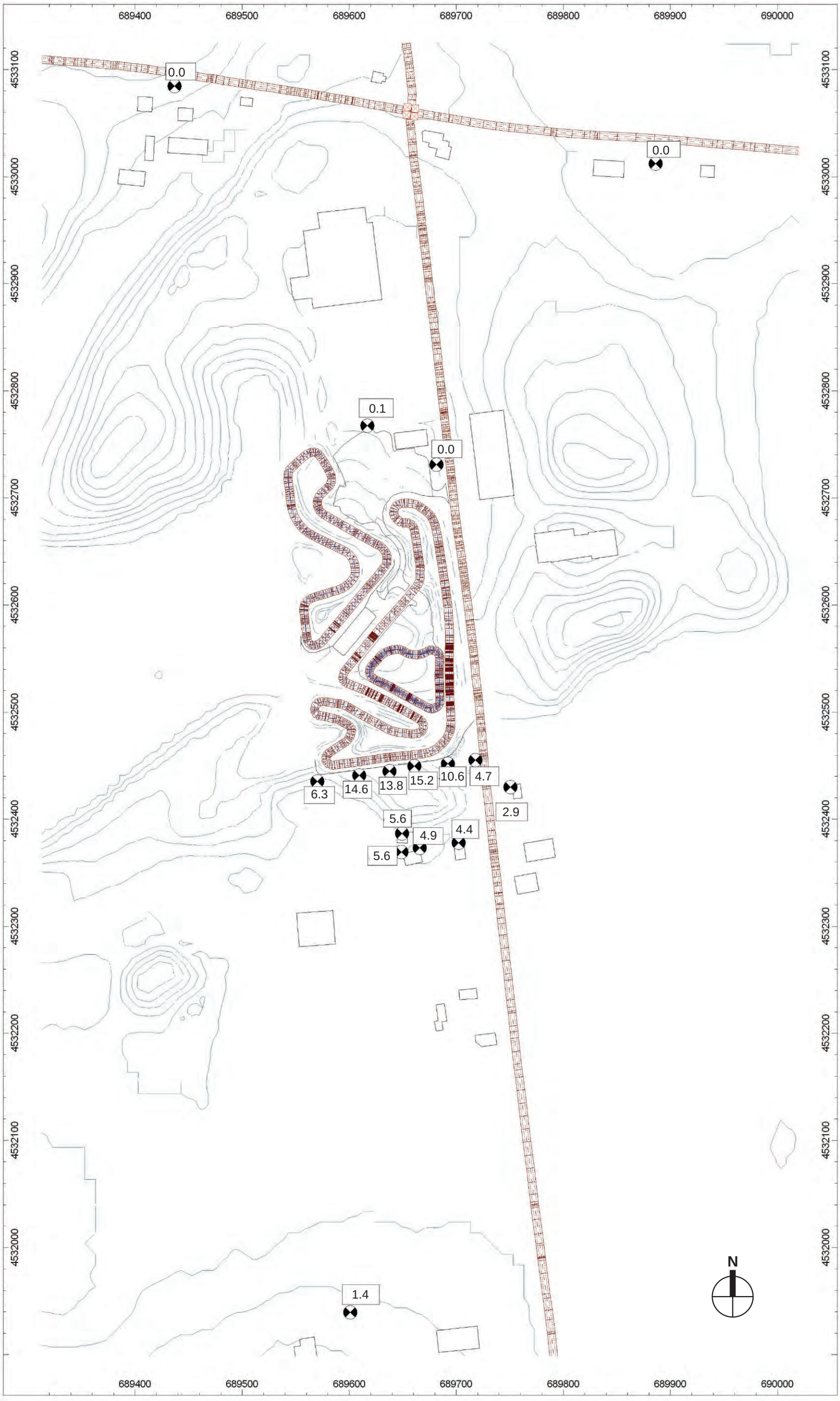
Comment 47: *Existing traffic counts at the LIE ramps were not taken during the worst case summer months. Please note the opportunity to make*



Scenario B
Noise Levels Without Proposed Noise Barrier
Figure 18-2



Scenario B
Noise Levels with Proposed Noise Barrier
Figure 18-3



Scenario B
Reduction in Noise Levels Achieved by Proposed Noise Barrier

Figure 18-4

those counts will soon end until next summer season. It is not necessary for the traffic analysis to discuss the intersection of SR25 and 25A or of SR25 and Manor Road. (Town Planning 2008)

Response: *Additional counts were conducted in August 2008, during the busier summer season. Table 18-2 compares the January 2008 data (presented in the FEIS) with a seasonal adjustment factor applied to the 2008 summer counts. As shown in Table 18-2, the new 2008 summer count totals for both interchange intersections were lower during both the AM and PM peak periods (however, the 2008 summer counts at the southbound and eastbound approaches at the LIE Eastbound Exit Ramp/Edwards Avenue intersection were higher for the PM peak period), and generally higher during the Saturday peak period compared to the seasonal adjusted January 2008 volume data. In general, the January 2008 seasonal adjusted volumes compared well (similar) to the August 2008 summer counts.*

Table 18-2
F-1 Sports – Riverhead
Comparison of Volume Data - January 2008 & August 2008

	Month-Year	Time	NB	SB	EB	WB	Total
LIE Westbound Entrance Ramps at Edwards Avenue							
AM Peak	January, 2008(1)	8:00-9:00	609	580			1188
	August, 2008	7:45-8:45	576	455			1031
	Aug. 08 vs. Jan. 08		94.6%	78.5%			86.7%
PM Peak	January, 2008(1)	4:30-5:30	970	453			1423
	August, 2008	4:30-5:30	806	428			1234
	Aug. 08 vs. Jan. 08		83.1%	94.6%			86.7%
Sat	January, 2008(1)	11:45-12:45	475	370			845
	August, 2008	12:30-1:30	**646**	**373**			**1019**
	Aug. 08 vs. Jan. 08		**135.9%**	**100.9%**			**120.6%**
LIE Eastbound Exit Ramps at Edwards Avenue							
AM Peak	January, 2008(1)	8:00-9:00	420	365	831		1616
	August, 2008	8:30-9:30	301	266	792		1359
	Aug. 08 vs. Jan. 08		71.6%	72.9%	95.3%		84.1%
PM Peak	January, 2008(1)	4:30-5:30	766	182	520		1468
	August, 2008	5:00-6:00	521	**196**	**634**		1351
	Aug. 08 vs. Jan. 08		68.0%	**107.4%**	**122.0%**		92.0%
Sat	January, 2008(1)	11:45-12:45	354	204	329		887
	August, 2008	12:00-1:00	299	198	**712**		**1209**
	Aug. 08 vs. Jan. 08		84.4%	97.0%	**216.5%**		**136.3%**

Note:
(1) To account for the seasonal variation in traffic levels, the existing traffic volumes were increased by applying a seasonal adjustment factor of 0.833 based on the NYSDOT traffic data report.

The HCS analysis was performed for the PM and Saturday peak hours using the 2008 summer volumes to determine whether the

intersections with the January 2008 seasonal adjusted volumes would still operate acceptably at Level of Service (LOS) D or better. To present a conservative analysis, the PM and Saturday peak hours were examined because the 2008 summer counts are higher at some of the approaches compared to the January 2008 seasonal adjusted volumes.

Table 18-3 presents LOS results for the March 2008 analysis and the revised analysis with the August 2008 volumes for the 2008 Existing, 2009 No Build, and 2009 Build conditions during the PM and Saturday Midday (non-event) peak periods. As shown, all lane groups would continue to operate at LOS D or better utilizing the August 2008 volumes with the exception of the left turn movement from the eastbound LIE exit ramp onto Edwards Avenue, which would operate at LOS E, with an average delay of 35.6 seconds per vehicle during the Saturday Midday peak hour. It is important to note that the threshold for LOS E is 35.1 seconds and in this case, this average delay of this movement crosses the threshold by less than one full second. Additionally, LOS E is not uncommon for the minor approaches at unsignalized intersections due to the opposing volumes along the major roadway (such as Edwards Avenue). The capacity analysis indicates that the 95th percentile queue length at the eastbound LIE exit ramp approach at Edwards Avenue under 2009 Build conditions would be 9 cars (approximately 180 feet) in length during the Saturday Midday peak hour. The eastbound LIE exit ramp is approximately 1,100 feet in length. Therefore, even with LOS E, queuing would not be a notable problem at this location under 2009 Build conditions as the exit ramp would provide sufficient storage for the queue under Build conditions and mitigation measures would not be necessary.

Table 18-3
Level of Service Analysis
2008 Existing, 2009 No Build, and 2009 Build Conditions
F1 Long Island Sports Facility Study with January 2008 Volumes & Updated F1 Long Island Sports Facility Study with August 2008 Volumes

January 2008 F1 Long Island Sports Facility Study[1]									Updated F1 Long Island Sports Facility Study with August 2008 Volumes								
	Weekday Conditions				Saturday Conditions					Weekday Conditions				Saturday Conditions			
	PM Peak Hour				Midday Peak Hour					PM Peak Hour				Midday Peak Hour			
Intersection	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Intersection	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
2008 Existing Conditions									**2008 Existing Conditions**								
Edwards Avenue and EB LIE Exit									*Edwards Avenue and EB LIE Exit*								
Eastbound	L	0.52	19.7	C	L	0.25	12.9	B	Eastbound	L	0.50	17.6	C	L	0.58	18.3	C
	R	0.44	12.0	B	R	0.30	10.7	B		R	0.48	12.6	B	R	0.45	12.2	B
Edwards Avenue and WB LIE Entrance									*Edwards Avenue and WB LIE Entrance*								

Northbound	L	0.23	9.3	A	L	0.23	9.1	A	Northbound	L	0.22	9.4	A	L	0.24	9.1	A
2009 No Build Conditions									**2009 No Build Conditions**								
Edwards Avenue and EB LIE Exit									*Edwards Avenue and EB LIE Exit*								
Eastbound	L	0.65	26.4	D	L	0.41	16.1	C	Eastbound	L	0.62	22.6	C	L	0.76	28.6	D
	R	0.47	12.6	B	R	0.32	11.2	B		R	0.51	13.3	B	R	0.49	13.2	B
Edwards Avenue and WB LIE Entrance									Edwards Avenue and WB LIE Entrance								
Northbound	L	0.27	10.7	B	L	0.26	9.9	A	Northbound	L	0.25	10.1	B	L	0.27	9.8	A
2009 Build Conditions									**2009 Build Conditions**								
Edwards Avenue and EB LIE Exit									*Edwards Avenue and EB LIE Exit*								
Eastbound	L	0.68	28.2	D	L	0.49	18.0	C	Eastbound	L	0.64	23.6	C	L	0.83	35.6	E
	R	0.47	12.6	B	R	0.32	11.3	B		R	0.51	13.3	B	R	0.49	13.3	B
Edwards Avenue and WB LIE Entrance									Edwards Avenue and WB LIE Entrance								
Northbound	L	0.27	10.7	B	L	0.27	10.1	B	Northbound	L	0.25	10.1	B	L	0.28	10.1	B

Notes:
(1) Utilized January 2008 seasonal adjusted volumes.
L = Left Turn, T = Through, R = Right Turn, DefL = Defacto Left Turn; LOS = Level of Service.

WATER AND NATURAL RESOURCES

Comment 48: *Flora and Fauna must be inventoried with an accounting of seasonal variations. The very general nature of the natural history descriptions is not sufficient. The FEIS only mentions a site inventory of November of 2006. What other natural history information is there to evidence consideration of seasonal variation as requested? (Town Planning 2008)*

Response: *As provided in the FEIS, an inventory of both flora and fauna was conducted on November 20, 2006. Although this survey was performed in the fall, the identification of species and characterization of habitat contains an accurate description of the site's species and ecological value. Although additional plant and animal species would likely be identified on-site if additional inventories were conducted in other seasons, it is not expected that an inventory undertaken during other seasons would result in the identification of State or federal threatened or endangered species based on the disturbed condition of much of the on-site habitat. See also response to comment 35.*

Comment 49: *A demonstration of compliance with Industrial C performance standards after unbuildable attributes were extracted from the parcel area pursuant to Section 108-133 of the site plan ordinance is required. Slopes above 15 percent was accounted for but not the water surface and wetland margin. That code section also directs significant natural features be preserved whenever possible and that extensive grading, cut and fill and tree clearing be avoided. The Lead Agency desires a calculation of total lot coverage after subtractions as a function of SEQRA discovery. The export of fill has risen from the DEIS's 43,000 to 51,700 cy. This reflects increased construction impacts on the*

site and would result in increased construction related traffic and impact on area roads. Motor vehicle trip ends must be calculated. (Town Planning 2008)

Response: *See response to comment 5. Approximately 35 percent of the project site is comprised of slopes greater than 15 percent and approximately 0.76 percent of the site is comprised of the pond and wetland. Proposed lot coverage is 13.6 percent (see the Grading and Drainage Plan in Appendix A). The increase in proposed exported fill is due to the request by the Town to move construction of the track and clubhouse to the southeast to achieve a 150 foot setback from the manmade wetland. This move would require additional digging, and thus increase exported fill due to the existing on-site topography. Larger trucks would be used to accommodate the increase in proposed exported fill and therefore, no change to motor vehicle ends is expected. Where feasible, the project has been designed to preserve existing habitat.*

Comment 50: *Your response to our comment about the area and quality of open space preserved was to cite conformance to IC requirements respecting pervious surface preservation and open space area. Impervious coverage in the IC district is limited to 60% (which by default sets a 40 percent pervious minimum) and the district code (Section 108-279B) calls for 20 percent of lot area as contiguous landscaped open space. The provision of a site plan depicting the proper contiguous open space would be helpful in this regard. Speaking more directly to our comment respecting the aesthetic and biotic value of forested open space vs. landscaping, we observe that Section 108-279 also states preference is given to preservation of existing habitat rather than clearing and creation of new. We also note reference to a 64ft. natural buffer surrounding the wetland which appears to be as measured from the downslope edge of the track. When the proposed wall and drainage trench is considered, the natural setback decreases to 55ft. (Town Planning 2008)*

Response: *See also response to comment 37. The proposed project is in conformance with the requirements of the Town Code regarding open space requirements. Where feasible, the project has been designed to preserve existing habitat. As such, the 64-foot buffer around the wetland would remain in its natural state, excluding the concrete retaining wall to be constructed at the request of the Town. The 64-foot wooded buffer, excluding the retaining wall, is*

the minimum width of natural area to be maintained around the wetland. ✷

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LIST OF APPENDICES

A. Plans and Grading Report
B. Determination of Significance
C. Correspondence
D. Articles VII and XII of Suffolk County Sanitary Code
E. Storage Tank Specifications and Weekly Inspection Checklist
F. Traffic Analysis
G. Comments on the Draft Environmental Impact Statement (EIS) and 2008 Final EIS
H. Noise Analysis
I. Bird Species Identified During the 2000 Atlas Survey
J. Standards and Specifications for Dust Control, Stabilized Construction Entrance, Straw Bale Dike, and Silt Fence
K. Agricultural Data Statement

APPENDIX A

Plans and Grading Report

- Landscape and Alignment Plan
- Grading and Drainage Plan
- Erosion Control Plan
- Grading Report
- Perspective Views, Elevations, and Floor Plans for Concession Track and Clubhouse
- Perspective View, Elevations, and Floor Plan for Maintenance Building

MIDDLE COUNTRY ROAD (N.Y.S. RTE. 25)
MILLER ROAD (NO SIGN)
EDWARDS AVENUE
S03°32'34"E 872.00'
S03°52'46"E 872.00'
S03°52'46"E 523.44'
N06°26'46"W 872.00'
N06°18'21"W 1063.87'
S03°52'46"E 523.44'
Lot 2 Subdivision - "Michael DeLea and Others" Suffolk County File No. 10447
Lot 3 Subdivision - "Michael DeLea and Others" Suffolk County File No. 10447
NEW MAINTENANCE & OPERATIONS BUILDING
NEW PARKING AREA & DRAINAGE AREAS
NEW KART RACE TRACK
NEW COVERED CONCESSION KART RACE TRACK
NEW CLUBHOUSE
NEW OVERPASS
NEW STONE PATH
NEW SERIES OF DRYWELLS
POND EL.+26.2
EXISTING TREES TO REMAIN
EXISTING VEGETATION TO REMAIN. TO BE SUPPLEMENTED WITH UNDERSTORY PLANTS AS SHOWN
EXISTING 10' WIDE ACCESS EASEMENT
NEW 500 GALLON CONCRETE DEL. TANK W/ SPEECE APPARATUS
NEW 500 GALLON CONCRETE SEPTIC TANK
NEW 1,000 GALLON CONCRETE DIST. BOX
NEW 4" PVC SEWER MAIN
NEW 6" PVC WATER MAIN
NEW 1" WATER SERVICE
NEW 1" GAS SERVICE
NEW 1" ELECTRIC, TELEPHONE & CABLE T.V. SERVICE
NEW 6" WATER MAIN
NEW 8" WATER MAIN
NEW 12" WATER MAIN
NEW HYDRANT
NEW GATE VALVE & BOX
NEW 6" GATE VALVE & BOX
NEW 8" GATE VALVE & BOX
NEW 12" GATE VALVE & BOX
NEW 6" REDUCER
NEW 8" REDUCER
NEW 12" REDUCER
NEW 6" BEND
NEW 8" BEND
NEW 12" BEND
NEW 6" TEE
NEW 8" TEE
NEW 12" TEE
NEW 6" CROSS
NEW 8" CROSS
NEW 12" CROSS
NEW 6" PLUG
NEW 8" PLUG
NEW 12" PLUG
NEW 6" CAP
NEW 8" CAP
NEW 12" CAP
NEW 6" COUPLING
NEW 8" COUPLING
NEW 12" COUPLING
NEW 6" SLEEVE
NEW 8" SLEEVE
NEW 12" SLEEVE
NEW 6" FLANGE
NEW 8" FLANGE
NEW 12" FLANGE
NEW 6" FLANGE ADAPTER
NEW 8" FLANGE ADAPTER
NEW 12" FLANGE ADAPTER
NEW 6" MECHANICAL JOINT RESTRAINT
NEW 8" MECHANICAL JOINT RESTRAINT
NEW 12" MECHANICAL JOINT RESTRAINT
NEW 6" MECHANICAL JOINT SLEEVE
NEW 8" MECHANICAL JOINT SLEEVE
NEW 12" MECHANICAL JOINT SLEEVE
NEW 6" MECHANICAL JOINT ADAPTER
NEW 8" MECHANICAL JOINT ADAPTER
NEW 12" MECHANICAL JOINT ADAPTER
NEW 6" MECHANICAL JOINT PLUG
NEW 8" MECHANICAL JOINT PLUG
NEW 12" MECHANICAL JOINT PLUG
NEW 6" MECHANICAL JOINT CAP
NEW 8" MECHANICAL JOINT CAP
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NEW 6" MECHANICAL JOINT COUPLING
NEW 8" MECHANICAL JOINT COUPLING
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NEW 8" MECHANICAL JOINT FLANGE ADAPTER
NEW 12" MECHANICAL JOINT FLANGE ADAPTER
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NEW 12" MECHANICAL JOINT FLANGE PLUG
NEW 6" MECHANICAL JOINT FLANGE CAP
NEW 8" MECHANICAL JOINT FLANGE CAP
NEW 12" MECHANICAL JOINT FLANGE CAP
NEW 6" MECHANICAL JOINT FLANGE COUPLING
NEW 8" MECHANICAL JOINT FLANGE COUPLING
NEW 12" MECHANICAL JOINT FLANGE COUPLING
NEW 6" MECHANICAL JOINT FLANGE SLEEVE
NEW 8" MECHANICAL JOINT FLANGE SLEEVE
NEW 12" MECHANICAL JOINT FLANGE SLEEV

MIDDLE COUNTRY ROAD
(N.Y.S. RTE. 25)
MILLER ROAD
EDWARDS AVENUE
Lot 2
Subdivision of Michael DeLea and Others
Suffolk County File No. 10447
Lot 3
Subdivision -
"Michael DeLea and Others"
Suffolk County File No. 10447
SANITARY SYSTEM #3
1000 GAL. SEPTIC TANK
2 POOL @ 8'Ø x 12' DEEP
NEW MAINTENANCE & OPERATIONS BUILDING
FF=42.0
NEW KART RACE TRACK
NEW COVERED CONCESSION KART RACE TRACK
FF=48.00
NEW OVERPASS
NEW BRIDGE
CLUBHOUSE
FF=45.00
POND
EL=29.2
NEW PARKING FOR 150 CARS
NEW SERIES OF DRYWELLS
NEW STONE PATH
NEW HANDICAP PARKING
TRASH ENCLOSURE
NEW SOD AREA
SANITARY SYSTEM #1
1000 GAL. SEPTIC TANK
4 POOLS @ 10'Ø x 5' DEEP
SANITARY SYSTEM #2
1000 GAL. SEPTIC TANK
6 POOLS @ 10'Ø x 5' DEEP
S09°23'30"E 8.00'
S09°23'30"E 8.00'
S09°23'30"E 8.00'

MIDDLE COUNTRY ROAD (N.Y.S. RTE. 25)
MILLER ROAD (not open)
EDWARDS AVENUE
Lot 2 Subdivision of "Michael DeLea and Others" Suffolk County File No. 10447
Lot 3 Subdivision - "Michael DeLea and Others" Suffolk County File No. 10447
SANITARY SYSTEM #3 1,000 GAL. SEPTIC TANK - 2 POOL # 2'6 x 12' deep
NEW MAINTENANCE & OPERATIONS BUILDING (FF=45.00)
NEW PARKING AREA 4 PASSENGER GOLF CARS
NEW KART RACE TRACK
NEW COVERED CONCESSION KART RACE TRACK FF=48.00
NEW CLUBHOUSE TC=57.42
NEW OVERPASS
POND EL=26.2
non of formerly 3855 LLC
non of formerly Jeffrey Hilgeki & Robin Gibbs
N 22°46'12" W 505.90'
S 22°46'12" E 521.44'
S 67°13'48" W 1063.67'
N 67°13'48" E 1139.90'
N 22°46'12" W 505.90'
S 22°46'12" E 521.44'
S 67°13'48" W 1063.67'
N 67°13'48" E 1139.90'
N/F
N-CRA
N-CRV
N-CRV
N-CRV

GRADING REPORT

MARCH 20,2008

SPORTS FACILITY
F1 LONG ISLAND
(KARTING TRACK)

AT CALVERTON, TOWN OF RIVERHEAD
SUFFOLK COUNTY, NEW YORK

1. SITE

a. The site was chosen so as to utilize its moderate to steep slopes in an effort to design and construct a premier Karting Track.

b. The topography indicates a vacant, mostly wooded site, a small, cleared, relatively flat meadow, a small irrigation pond, and a disturbed depression. The site slopes range from flat to greater than 15%. The break down of the slopes are:

   i. 0%-5% . . . . . 26.5% of site
   ii. 5%-10% . . . . . 15.6% of site
   iii. 10%-15% . . . . . 22.9% of site
   iv. >15% . . . . . 35.0% of site

c. The test hole in the undisturbed area of the site indicates approximately two (2) feet "top soil".

d. The elevation of the site varies from a high of elevation 74 to a low of elevation 26.

2. EARTHWORK VOLUMES

a. Cut Volume . . . . . 55,534 cubic yards
b. Fill Volume . . . . . 3,790 cubic yards
c. Net Volume . . . . . cut 51,744 cubic yards

3. PROPOSED DEVELOPMENT

a. The Karting Track was of primary importance to the site development and its layout was affected by the consideration of:

   i. Total length
   ii. Track separation
   iii. Turns, banks and straights
   iv. Radical changes in elevation
   v. Vegetation retention
   vi. Setback from pond
   vii. Accelerating, breaking and passing

b. The location of the ancillary features of the Karting Facility were dictated by the track development. For instance:
    i. The clubhouse, situate in the disturbed depression, serves the pits located on track straight-a-ways
    ii. The covered concession track must be served by the clubhouse
    iii. The service drive, with its underpass, terminates at the clubhouse entry drop off
    iv. The maintenance building and parking areas are situate in the flat meadow northerly of the Karting Tracks

4. GRADING

a. The project grading is dictated by civil engineering elements, aesthetic issues, soil types, economics, zoning, and land use parameters.

b. Particular dictates that will result in the volume of soils to be removed from this site include:
    i. The volume of the unusable topsoil to be removed from the site is approximately 20,000 cubic yards.
    ii. The track cross-section must be relatively flat
    iii. The tracks proximity to the preserved pond and surrounding vegetation.
    iv. The clubhouse track level floor at existing, undisturbed grade.
    v. The concession track floor level with the clubhouse track floor level requiring cuts of up to 8 feet.
    vi. The service drive underpass requiring cuts up to 23 feet.
    vii. Blending the parking area to the tracks and to the preserved wetlands requiring cuts up to 11 feet.
    viii. Controlled storm water surface run-off, collection and recharge.
    ix. Development of paved surfaces and structures on filled land should be avoided when possible.

5. CONCLUSION

Our efforts, together with our clients karting knowledge, environmental review and municipal design parameters have resulted in a faithful and effectively developed project.

Respectfully Submitted,

By: _____

Howard W. Young, Land Surveyor
New York State License No. 045893n

F-1 LONG ISLAND
EDWARDS AVENUE, CALVERTON, L.I. NY
ARCHITECTURAL REVIEW BOARD
FEBRUARY 27, 2008

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352

215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT: F-1 LONG ISLAND
EDWARDS AVENUE
RIVERHEAD, N.Y. 11901

CLUBHOUSE FACILITY
COVER SHEET

PROJECT #: 0514

DRAWN BY: RZ

CAD FILE: 0514
0-0

DRAWING#:

0-0

F1 LONG ISLAND CLUBHOUSE & CONCESSION TRACK FACILITY

VIEW FROM NORTH

MARTIN F. SENDLEWSKI, A.I.A.
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(631) 727-5352

215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

R-1

DATE: 02-27-08

F1 LONG ISLAND CLUBHOUSE & CONCESSION TRACK FACILITY

VIEW FROM SOUTH

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(631) 727-5352

215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

R-2

DATE: 02-27-08

FRONT ELEVATION

SIDE ELEVATION

F1 LONG ISLAND CLUBHOUSE & CONCESSION TRACK FACILITY

ELEVATIONS

MARTIN F. SENDLEWSKI, A.I.A.
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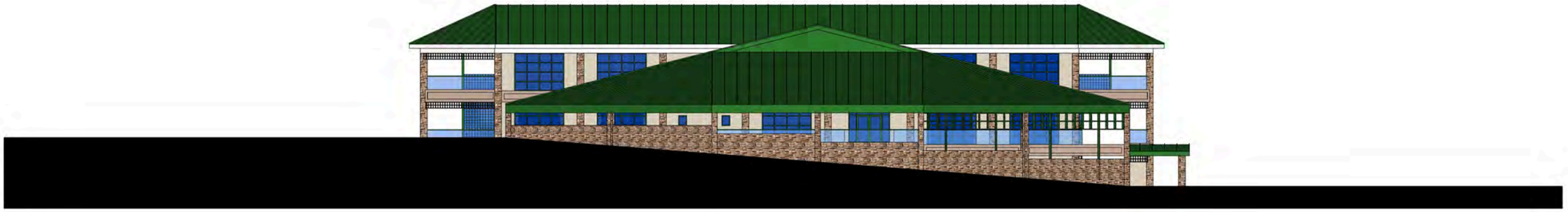
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

A-4.1

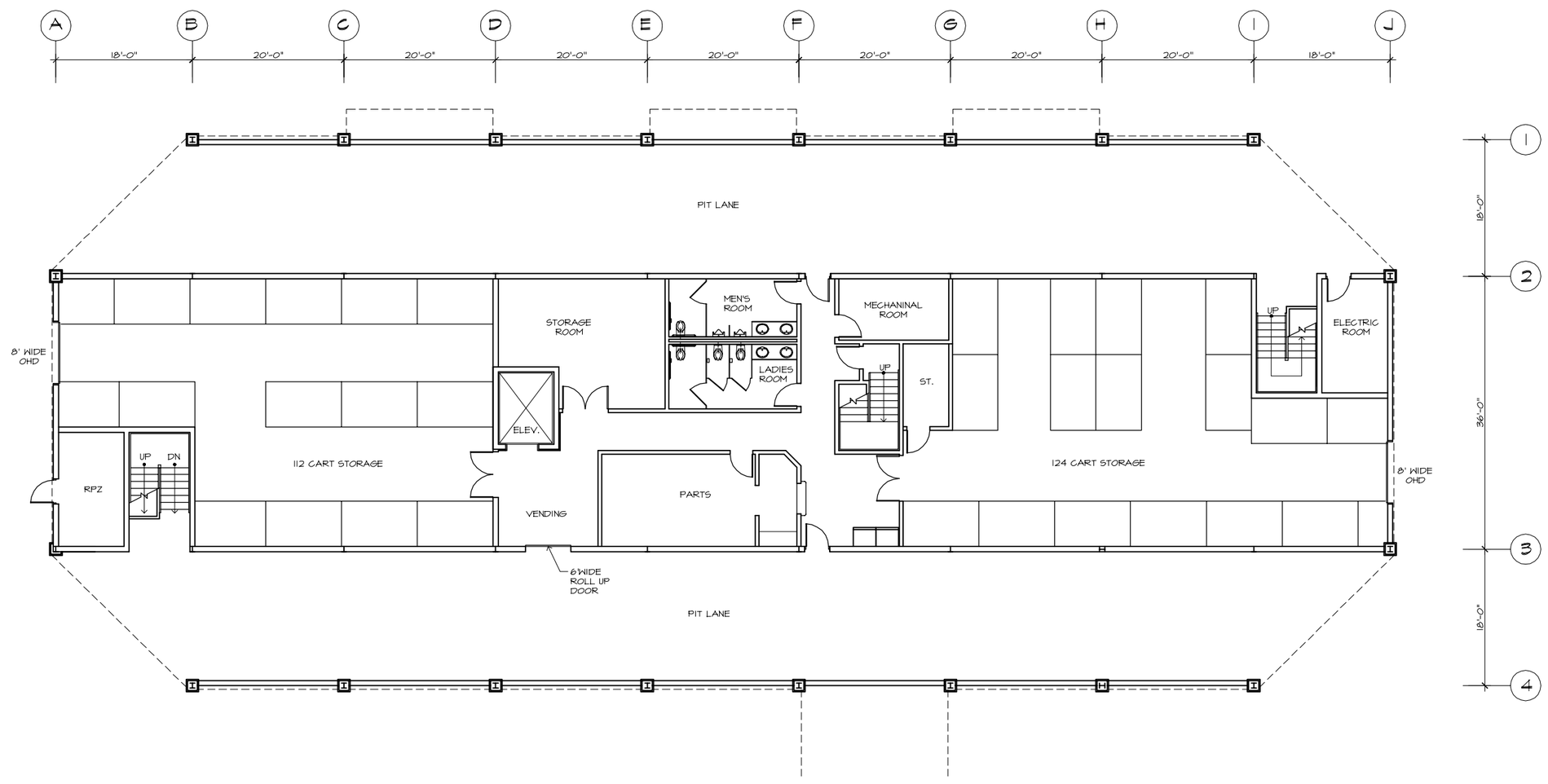
DATE: 02-27-08



REAR ELEVATION

SIDE ELEVATION

F1 LONG ISLAND CLUBHOUSE & CONCESSION TRACK FACILITY	**ELEVATIONS**	MARTIN F. SENDLEWSKI, A.I.A. ARCHITECT - PLANNER (631) 727-5352 215 ROANOKE AVENUE RIVERHEAD, NEW YORK 11901	**A-4.2** DATE: 02-27-08



TRACK LEVEL FLOOR PLAN (6336 SQ. FT.)

SCALE: 1/8" = 1'-0"

0 10 20 30 40 50

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT:

F-1 LONG ISLAND
EDWARDS AVENUE
RIVERHEAD, N.Y. 11901

CLUBHOUSE FACILITY
TRACK LEVEL FLOOR PLAN

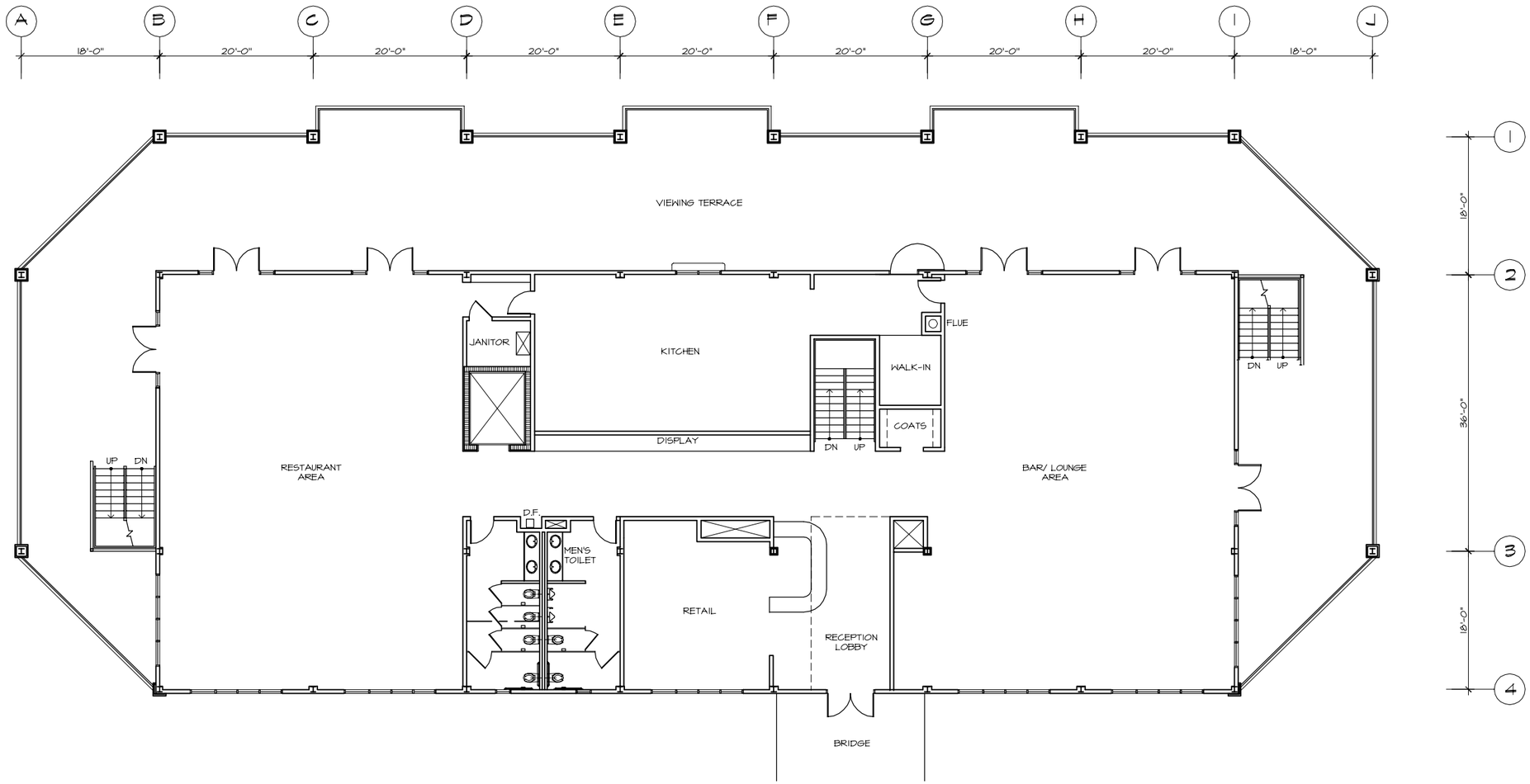
PROJECT #: 0514

DRAWN BY: MM

CAD FILE: 0514
A-1.1

DRAWING#:

A-1.1



MAIN LEVEL FLOOR PLAN (7660 SQ. FT.)

SCALE: 1/8" = 1'-0"

0 10 20 30 40 50

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT: F-1 LONG ISLAND EDWARDS AVENUE RIVERHEAD, N.Y. 11901

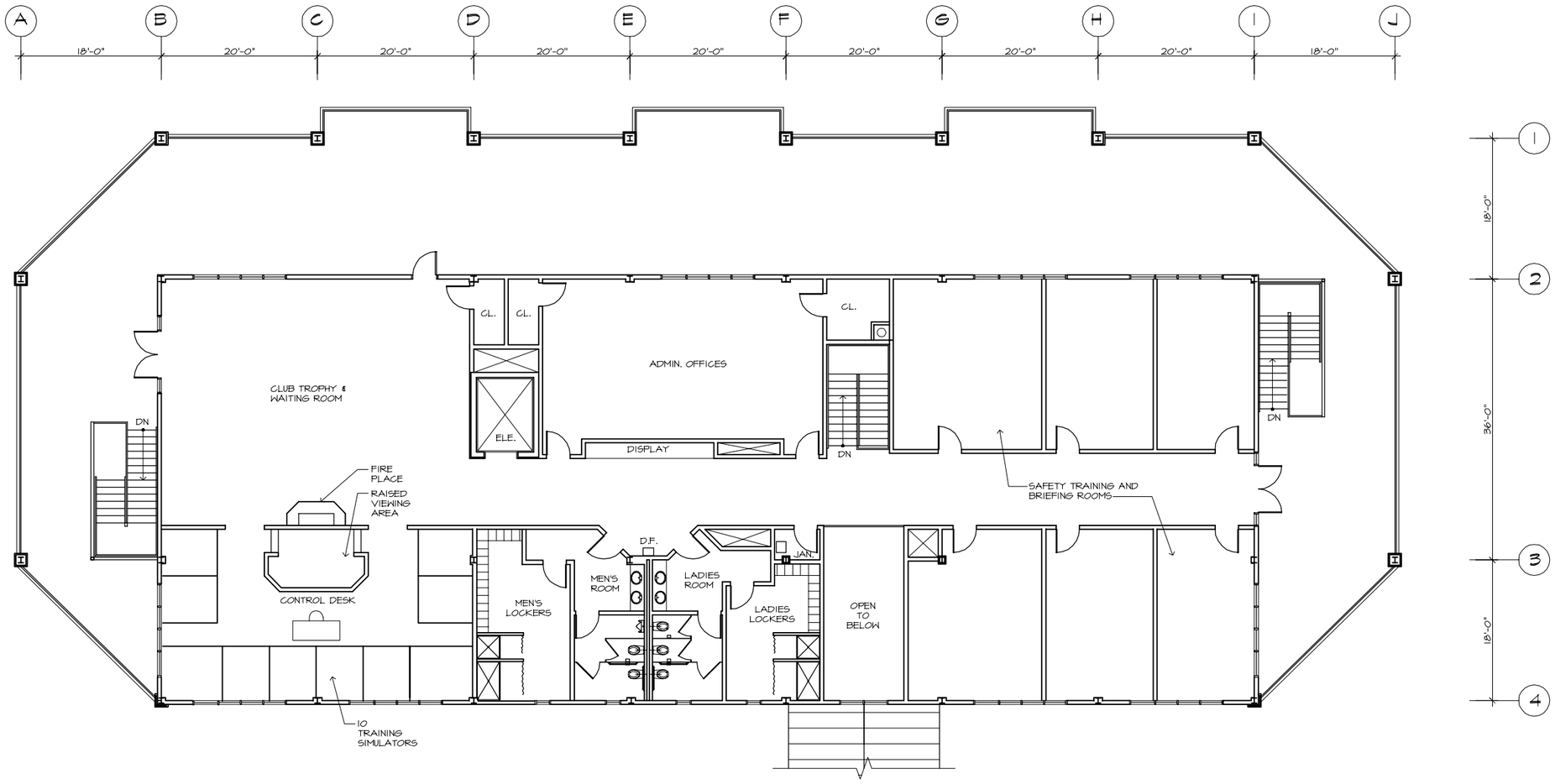
CLUBHOUSE FACILITY
MAIN LEVEL FLOOR PLAN

PROJECT #: 0514

DRAWN BY: MM

CAD FILE: 0514 A-1.2

DRAWING#: A-1.2



UPPER LEVEL FLOOR PLAN (7335 SQ. FT.)

SCALE: 1/8" = 1'-0"

0 10 20 30 40 50

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT: F-1 LONG ISLAND EDWARDS AVENUE RIVERHEAD, N.Y. 11901

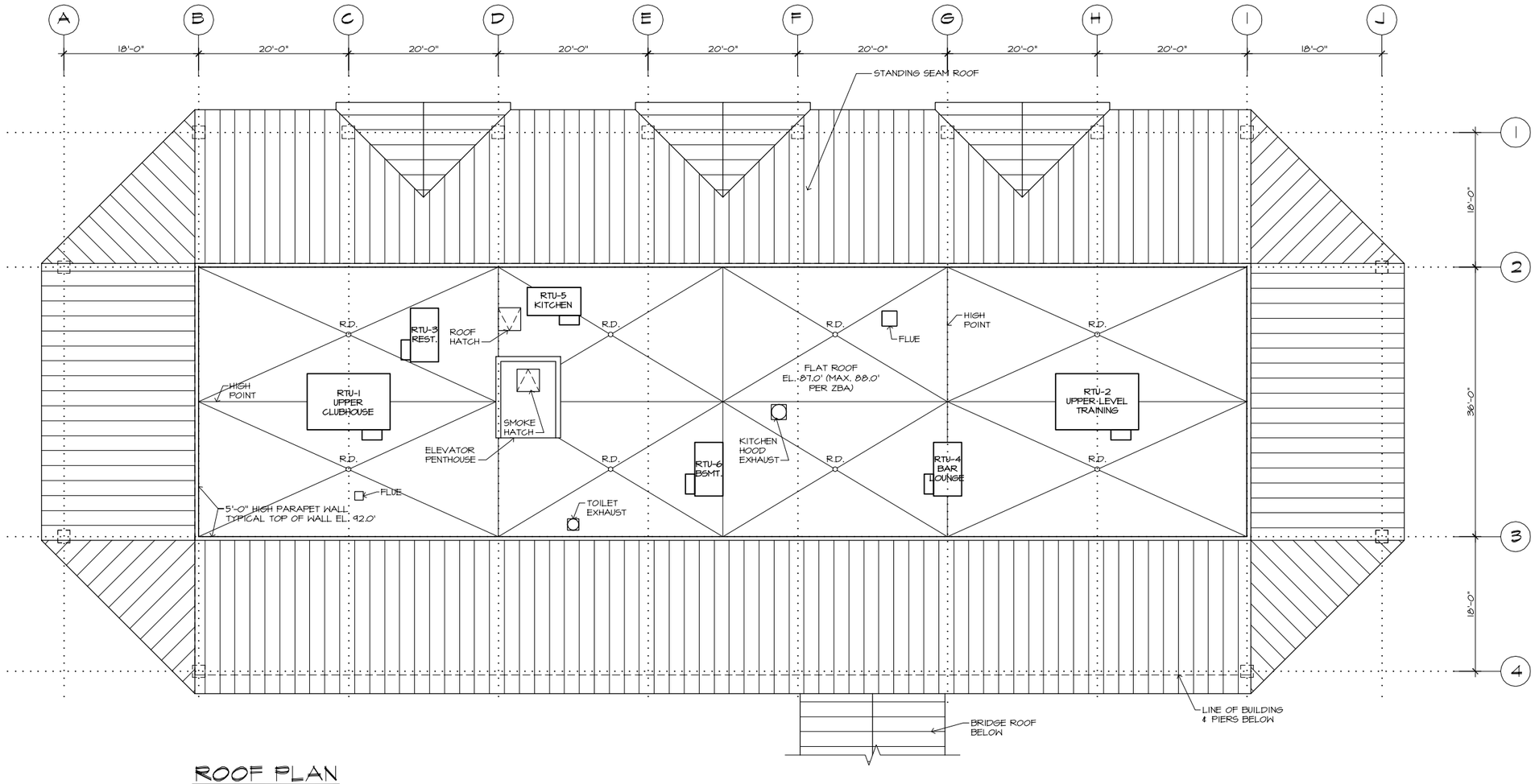
CLUBHOUSE FACILITY
UPPER LEVEL FLOOR PLAN

PROJECT #: 0514

DRAWN BY: MM

CAD FILE: 0514 A-1.3

DRAWING#: A-1.3



ROOF PLAN

SCALE: 1/8" = 1'-0"

0 50

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT: F-1 LONG ISLAND EDWARDS AVENUE RIVERHEAD, N.Y. 11901

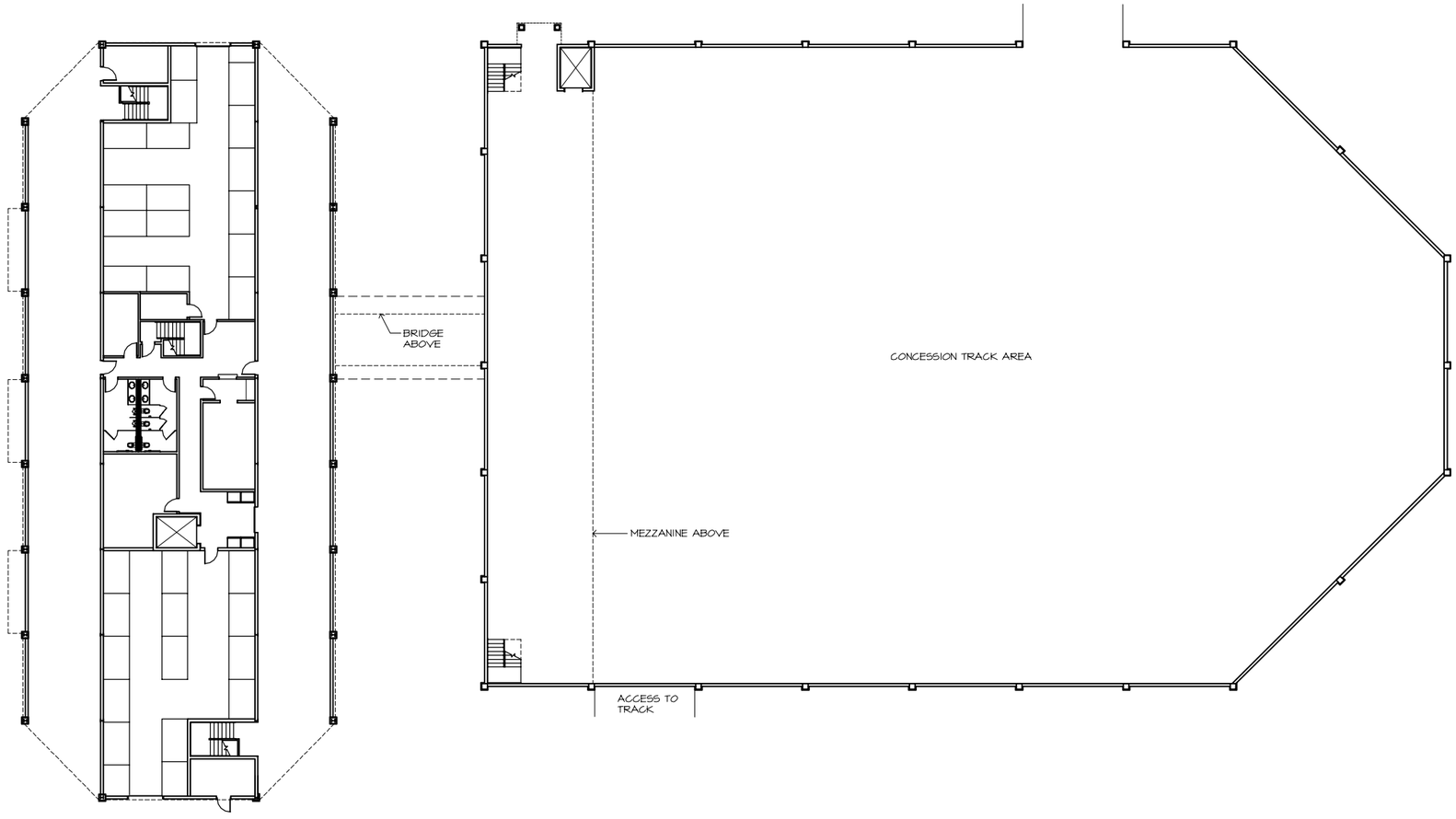
CLUBHOUSE FACILITY ROOF PLAN

PROJECT #: 0514

DRAWN BY: RZ

CAD FILE: 0514 A-3.1

DRAWING#: A-3.1



COMBINED TRACK LEVEL FLOOR PLAN

SCALE: 1/8" = 1'-0"

0 10 20 30 40 50

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT: F-1 LONG ISLAND EDWARDS AVENUE RIVERHEAD, N.Y. 11901

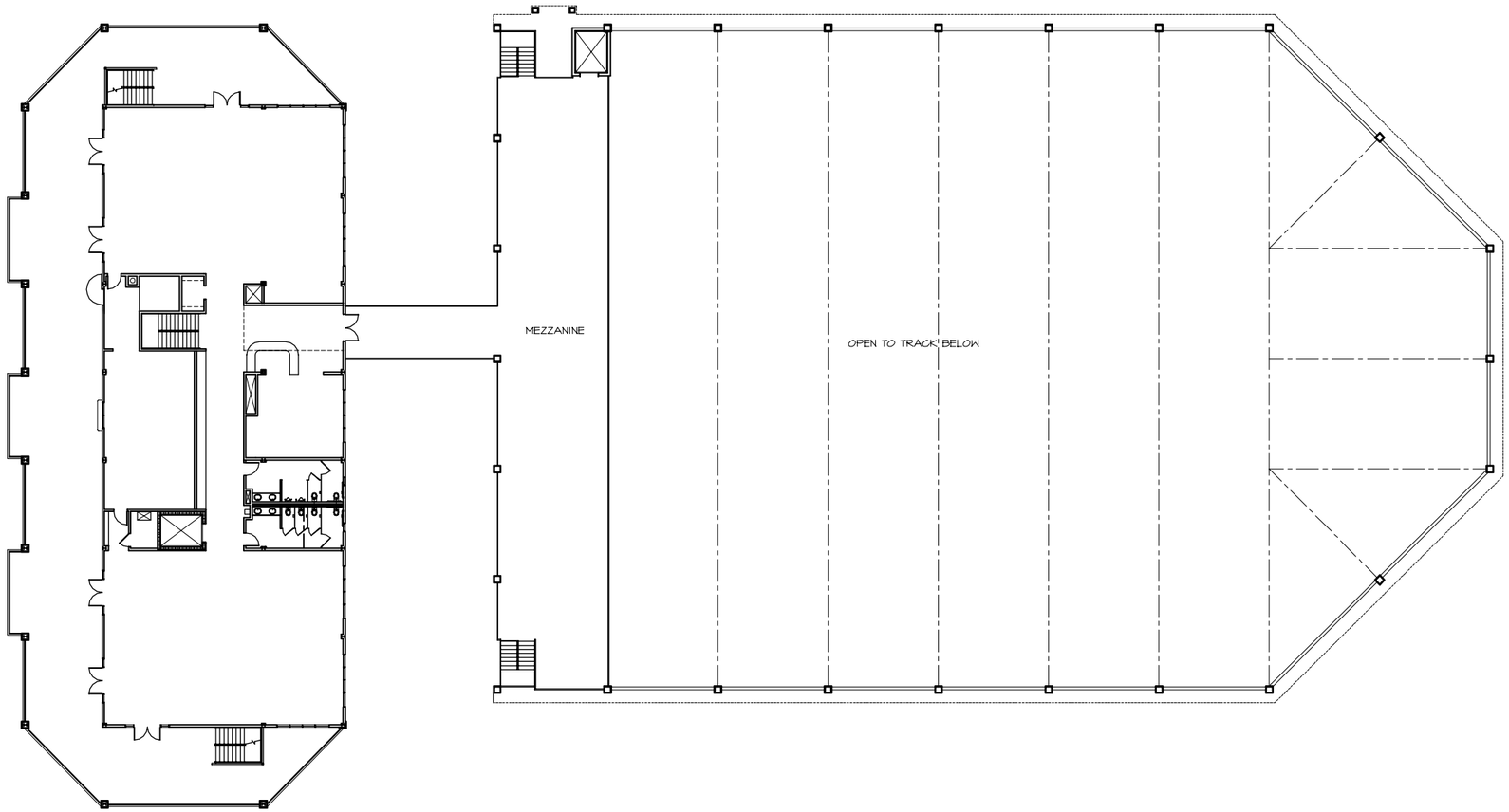
CLUBHOUSE FACILITY
COMBINED TRACK LEVEL FLOOR PLAN

PROJECT #: 0514

DRAWN BY: MM

CAD FILE: 0514 A-1.1

DRAWING#: ARB-1



COMBINED MAIN LEVEL PLAN

SCALE: 1/16" = 1'-0"

0 10 20 30 40 50

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT: F-1 LONG ISLAND EDWARDS AVENUE RIVERHEAD, N.Y. 11901

COMBINED MAIN LEVEL FLOOR PLAN

PROJECT #: 0514

DRAWN BY: INITIALS

CAD FILE: 0514 ARB-2

DRAWING#: ARB-2

F1 LONG ISLAND MAINTENANCE FACILITY

PERSPECTIVE VIEW

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352

215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

M-3

DATE: 02-27-08

SIDE ELEVATION (SOUTH)

FRONT ELEVATION (EAST)

SIDE ELEVATION (NORTH)

REAR ELEVATION (WEST)

F1 LONG ISLAND MAINTENANCE FACILITY

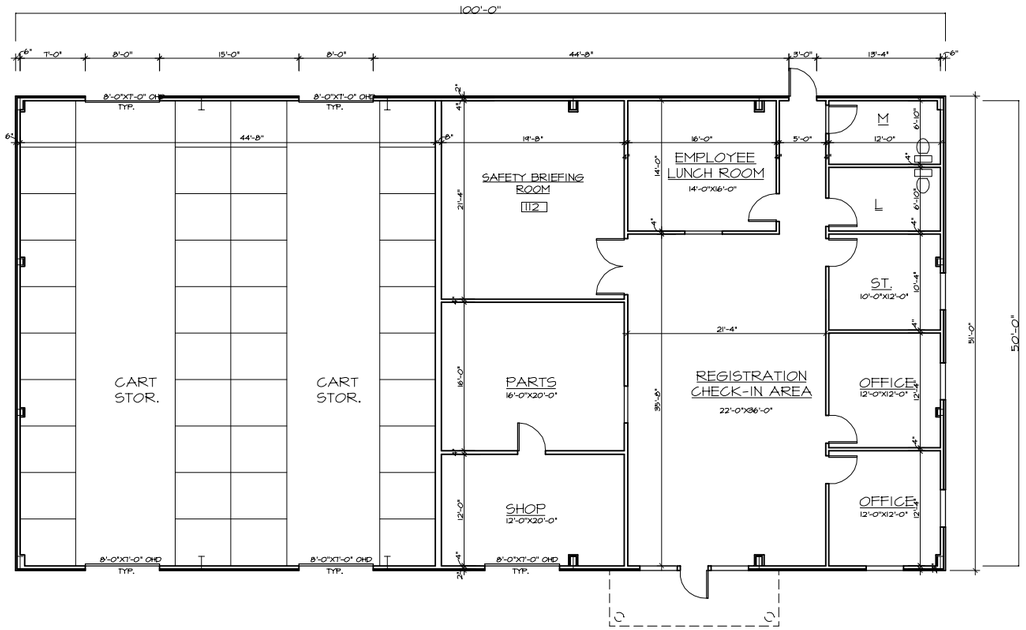
ELEVATIONS MAINTENANCE FACILITY

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352

215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

M-2

DATE: 02-27-08



MAINTENANCE BUILDING FLOOR PLAN

SCALE: 1/8" = 1'-0"

0 10 20 30 40 50

DATE: ISSUE

02-01-08 DESIGN DEVELOPMENT

02-27-08 ARB REVIEW

SEAL:

MARTIN F. SENDLEWSKI, A.I.A.
ARCHITECT - PLANNER
(631) 727-5352
215 ROANOKE AVENUE
RIVERHEAD, NEW YORK 11901

PROJECT: F-1 LONG ISLAND EDWARDS AVENUE RIVERHEAD, N.Y. 11901

MAINTENANCE BUILDING PLAN

PROJECT #: 0514

DRAWN BY: RZ

CAD FILE: 0514 ARB-2

DRAWING#: M.1

APPENDIX B

Determination of Significance

State Environmental Quality Review
Positive Declaration
Notice of Intent to Prepare a Draft EIS
Determination of Significance

October 4,2005

This notice is issued pursuant to Part 617 of the implementing regulations pertaining to Article 8 (State Environmental Quality Review Act) of the Environmental Conservation Law.

The Town of Riverhead Town Board, as lead agency, has determined that the proposed action described below may have a significant effect on the environment and that a Draft Environmental Impact Statement will be prepared.

Name of Action: Site Plan of F1 Long island Sports Facility.

SEQR Status: Type I.

Description of Action: Applicant proposes to construct a commercial sports facility consisting of a series of Kart racing tracks, a 14,800sq.ft. clubhouse/corporate conference building of 23,000sq.ft. gfa and a 5,000sq.ft. maintenance building on a 12.1ac. parcel zoned Industrial C.

Location: West side Edwards Ave., approx. 900ft. south of Middle Country Rd. (SR25), Calverton, Riverhead Township, Suffolk County. SCTM 0600-117-1-4.2

Reasons Supporting This Determination: The agency believes the potential exists for significant impact relative to land, water, plants and animals, public health, on transportation resources and on growth and community character. The agency will conduct scoping to properly focus the EIS.

Contact Person for Further Information:

Mr. Richard Hanley
Town of Riverhead Planning Department
200 Howell Avenue
Riverhead, New York 11901
(631) 727-3200, Ext.239

A copy of this notice sent to: Supervisor, Town of Riverhead; Town Clerk, Town of Riverhead; Suffolk County Health Dept.; Robert F. Kozakiewicz. (for the applicant); Environmental Notice Bulletin.

TOWN OF RIVERHEAD
PLANNING DEPARTMENT
200 HOWELL AVENUE, RIVERHEAD, NEW YORK 11901-2596
(631) 727-3200, EXT. 267

Robert F. Kozakiewicz
Attorney At Law
P.O. Box 341
Riverhead, NY 11901

RECEIVED
DEC 13 2005
ROBERT F. KOZAKIEWICZ
ATTORNEY AT LAW

Re: SEQR Final Scope of Issues for DEIS on Site Plan of F1 Long Island Sports Facility. SCTM 0600-117-1-4.2

December 12, 2005

Dear Mr. Kozakiewicz:

Pursuant to 6NYCRR Part 617.8(f) the Riverhead Town Board, as lead agency, hereby issues the final scope of issues for inclusion in the above referenced document. The format should be as outlined in 617.9(b).

1. Project Description: The action is a site plan petition to construct a commercial sports facility consisting of a series of kart racing tracks, a 14,800sq.ft. clubhouse/corporate conference facility of 23,000sq.ft. gfa (including meeting rooms, event/banquet hall, dining and other food and beverage features and motor sport related retail) and a 5,000sq.ft. maintenance building on a 12.1ac. parcel zoned Industrial C..

2. Potentially Significant Impacts: Agency analysis and scoping identified the potential for significant impact to land, water, plant and animal and transportation resources, on public health and growth and community character.

A. Land and Water: Development of the 12.1ac. as proposed poses the potential of runoff and erosion effecting the subject site and adjacent properties; especially given the extent and severity of slopes present, the degree of improved areas and absence of drainage control measures and also the volume of material to be excavated and exported. Intuition and technical guidance suggests the structural integrity and function of project improvement may be threatened and disturbance of over 10ac. lends a greater implication that such potentials may be significant.

B. Water and Plants and Animals: One consequence of runoff and erosion is impact on a locally regulated freshwater wetland on site and its association of flora and fauna and also on the remnants of upland wooded habitat not directly lost to the development itself. The wetland is located down slope to a large part of the site and is therefore a potential target to much of the developmental consequences. Project disturbance and improvements are not only positioned to be tributary to the wetland but at close proximity to it.

C. Water and Public Health: The project site lies within hydrogeologic zone III. as identified by the Suffolk County Health Department. Therefore the discharge of the project's sanitary effluent is primarily to the deep groundwater aquifer, which resource is the sole source of the public water supply. The septic volume is likely to require a discharge permit and together with any upset or chronic discharge of toxic or hazardous materials used and stored on site, would have the potential to adversely impact both groundwater and the surface water body on site. The storage may also be a safety issue for its explosive or combustive nature.

D. Transportation: The project's forecast traffic generation may have the potential to significantly impact area roads and traffic patterns given the current periodic volume and the number of vehicles expected in the future. Previous analysis of the nearby signalized intersection projected its level of service to degrade significantly even without the contribution of another proposed development and that the other project's unsignalized entry would suffer a poor level of service even with mitigation measures taken. Mitigation required a major alteration of the intersection and that necessity would seem to be hastened by this project whose unsignalized entry may also perform poorly. In addition to the long term use traffic expected, the project's short term construction traffic will include a large number of truck trips for the export of 25,000cy of site fill.

E. Noise and Growth and Community Character: This topic includes possible conflict with adopted plans and goals: chiefly the zoning ordinance. Although departures from the performance and design standards of the prevailing Industrial C district can be logically held to the administrations of the site plan process, the specifics of this project, which is promoted as new and unique, raise questions as to its conformance with the district's purpose and use descriptions. The code permits commercial sports and recreation facilities and doesn't qualify them as indoor or outdoor but outdoor motor sport activity may be at odds with other envisioned outdoor activities as well as with existing uses in the area. Motor sport related retail may be problematic in that accessory retail is listed only to wholesale business and the conduct of corporate conference activity and its related dining and banquet services may not be customarily accessory to the primary outdoor recreation. The project's previously discussed potential to adversely impact wetlands and surface waters amounts to a conflict with the Town's adopted Storm Water Management Plan, even though the site is subject to the State's regulation for storm water management, and the necessity to condemn land and expand the nearby intersection for traffic mitigation involves considerable capital expenditures.

The most obvious potential impact on area character results from the project's generated noise. This emanation has the potential to not only adversely effect existing development in the area but may constrain the future development of Industrial C land with its envisioned outdoor permitted uses such as equestrian facilities and golf courses. Public participation in scoping made particular mention of the effect on an existing horse farm and riding facility adjacent to the south and on a nearby golf course. Both were concerned with the aesthetic impact of noise distracting from the enjoyment of their services and the horse farm also worried about rider safety and reduced breeding success resulting from the physiological effects of noise. The chief noise mitigation offered is a wall structure whose use may at odds with the existing rural character and the IC district's goal to protect that appearance.

3. Extent of Information Needed to Adequately Address Identified Impacts:

A. Land and Water: The project data to date only states that standard erosion control measures would be employed. The project is well enough understood that not only can general strategies such as the use of silt barriers and dust control measures and the limitation of soil exposure be given, but also details as to barrier construction and components, how mulch and wet down will be employed against dust and how site preparation and construction would be planned to limit the area and duration of soil exposure. Measures to prevent site soils from being tracked out onto adjacent roads would also be expected. The impact potential from construction activity would be suitably addressed by the preparation of an erosion and sediment control plan for the site as described in the DEC's New York Standards and Specifications for Erosion and Sediment Control. In addition to developing the necessary drainage improvements (as called for in the zone's supplementary requirements) supported by engineering analysis, a slope analysis of the site would ensure principal construction locates in the areas of the site with the least challenging slope and that the track circuits (including banking, curbing and other barriers and landscape, pit and fueling and viewing areas) are laid out to follow the existing topography as much as possible thereby reducing site alteration to the maximum extent practical. In view of the need to reduce ground disturbance, justification for the removal of 25,000cy of fill from the site would have to be made by demonstration that and a balanced cut and fill was not possible.

B. Water and Plants and Animals: The above control plan's role for the particular protection of the freshwater wetland on site should be highlighted including its positioning to guard against all aspects of the project's disturbance. The potential to buffer the wetlands and surface waters with as much undisturbed wooded coverage as possible should be explored and clearing of wooded areas should be minimized for aesthetic (visual and noise buffers) and biotic (habitat preservation) purposes. An inventory of the wetland's plant and animal associations should be made which should account for seasonal variations and call out any species or associations of note with regards to the endangered, threatened or special concerns list or with the Natural Heritage database. The wetland boundary should be located in the field and included on revised plans together with the 150ft. limit of the Town's wetlands jurisdiction.

C. Water and Public Health: The project's strategy for all septic discharges (including sanitary calculations) should be provided and conformance with County Health (Article VI of the sanitary code) and State SPDES (Article 17, Title 8 of the ECL) codes outlined. The extent to which the site's sloped soil constrains septic fields should be taken into account in this discussion and in the previously mentioned slope analysis. An inventory of toxic or hazardous materials expected to be used and stored on site (and storage volume) should be provided and conformance with County (Articles VII and XII of the sanitary code) and all other applicable laws given. A recitation should be made of any and all measures to be employed to protect public safety from the fire and explosive potential of bulk storage of gasoline and oil. Also discuss measures to be taken to prevent upset or chronic discharges of such substances from contaminating groundwater or the site's land and surface waters.

D. Transportation: A traffic study for the area should be prepared which establishes baseline volume and level of service at the signalized intersection of Edwards Ave. and SR25 and which imposes the forecast traffic generation on existing patterns to determine

the project's impact. The methodology of calculating project traffic shall be provided and in addition to applying a standard multiplier to account for per annum traffic growth, the study shall also take into account the traffic contributions expected of other projects in the area such as the Calverton Industrial Park, the industrial building and the convenience store/gas station projects of 1998 Peconic, LLC and Calverton Manor. The study shall offer mitigation measures and their projected cost for maintaining acceptable level of service at the study intersection and to provide same at the site entry. Relevant existing traffic information is contained in the project EAF's and traffic studies of the projects mentioned.

E. Growth and Community Character: A discussion shall be offered which demonstrates how the particular nature of a commercial sports or recreational facility featuring motor sports is in harmony with the Industrial C use district's purpose and vision. Particularly how it fits in with other examples of permitted uses such as equestrian facilities or golf courses and how the district's purpose for protection of rural appearance and minimizing views of development from the roadway is respected. A further demonstration should be made of the IC district supporting the logic of retail as customarily accessory to outdoor recreation and also of the proposed corporate meeting, catering and dining functions and facility as customarily and physically accessory or subordinate to the track itself.

Noise impact shall be addressed by offering a demonstration of compliance with the Town's noise ordinance (Chapter 81 of the Town code). The Town feels that the conformance to the Massachusetts DEP standard (that a noise source not increase broadband sound level by more than 10dbA above ambient) to be irrelevant to our ordinance's strictures. While the PowerPoint presentation to the Town Board and supporting documentation show Chapter 81 conforming decibel readings at various public assembly points in the area, that's based on the theoretical attenuation of a single worst case track noise emitter over those distances. The Town's code attends to sound in air crossing the property line of a sound source site: i.e. as measured at the property line. The Town recognizes the 80db limit set down in the code pertaining to industrially zoned land, but the ordinance dates from the time of the old industrial A and B districts which supported typical light and heavy industries. The Town feels the IC uses reflecting recreational businesses support the 65db limit for property where the public in general congregates. A successful demonstration of code compliance by measurement at property lines would involve a generation of noise on site more representative of the track as it would function in real life: that is, a number of motors running together and under the stresses and loads of racing performance. The discussion of noise should describe how racing, trials, practice or more casual use will be conducted. What are the tracks hours of operation on what days of the week for how much of the year? Would the corporate conference aspect operate on the same schedule? How many karts might be expected to be operating at any given time, for how long and how often in a typical day? Are competitive and organized races to be held? What sort and how often? If conforming noise measurements depend on the sound attenuation of the natural vegetation, the degree that buffer will be removed must be considered. The principal mitigation offered is the use of the sound fighter walls. Their performance in attenuating the expected noise in all directions should be provided and a discussion of how their appearance conforms to the zone's aims of husbanding a rural appearance aims? This discussion should consider the potential for the site's topography to act like an amphitheater and reflect and amplify

noise to the west and present any available evidence from on a literature search of journals or other publications subject to peer review, respecting the physiological impact of noise on the breeding success of horses and whether the animals may become habituated to it.

4. Initial Identification of Mitigation Measures: As recounted above, the creation of an erosion and sediment control plan, engineered storm water control measures, disturbance limits and the siteing of project improvements according to slope analysis and wetland delineation are aimed at reducing impacts on land water and plants and animals. Observing the requirements of all regulations governing toxic and hazardous materials and good housekeeping practices are probable measures to be taken for public health and safety protection. A traffic impact analysis and its directive mitigations are identified for that issue and will likely involve new signalization and turning lanes and significant improvement and reprogramming of an existing signalized intersection. Impacts on growth and community character, on existing patterns of development and adopted plans and goals, would be best mitigated by conforming design and adherence to existing code and by employing noise mitigations such as forested buffers and the structural technique proposed by the applicant.

5. Reasonable Alternatives: Together with the no action alternative, other permitted Industrial C uses (offices, warehousing) should be examined.

6. Information to be Included as an Appendix: The traffic study should be so treated and summarized in the body of the EIS. If lengthy, the erosion and sediment control plan and tabulated site inventory should as well. Correspondences or related project documentation should also be treated in this fashion.

7. Agency Analysis and Scoping Issues Determined Not to be Significant: None.

I trust the above will serve to accurately represent the agency Town Board's concerns and interests on the EIS for this project. Please contact the undersigned with any questions you may have in this matter.

Very truly yours,

Richard Hanley, Planning Director

CC: Jeff Seaman

APPENDIX C

Correspondence

Riverhead
Volunteer Ambulance Corps, Inc.

P.O. Box 924
Riverhead, NY 11901
(631) 727-1686 Ext. 25
Fax: (631) 727-3041

Jessica Zanca
AKRF, INC.
3900 Veterans Memorial Hwy, Suite 300
Bohemia, NY 11716

February 20, 2006

Re: F1 Long Island Sports Facility

Dear Ms. Zanca:

In response to your request for information on the potential impact to municipal services pertaining to the above project, I will list the answers to the questions as you put them.

1. We currently have approximately 50 active volunteer members. Naturally, as this is a mainly volunteer service, the total number of active members, and their level of activity, fluctuates. Currently, we also employ two paid personnel, one advanced (ALS) and one basic life support (BLS), on weekdays from 0600-1600.
2. Our fleet currently consists of 4 ALS-equipped ambulances and 3 first response vehicles, 2 ALS-equipped and 1 BLS-equipped. We have no heavy rescue nor technical rescue equipment.
3. Our "west sector" is the area of Riverhead Town that is west of Osborne Avenue to it's intersection with Mill Road and thereby west of Mill Road, except that part of the town that comprises the Wading River Fire District. Our total annual call volume is approximately 2400. In 2005, just less than 500 were from the "west sector". Naturally, the response time varies according to where in the area and whether or not there is crew available in-house. Response to the proposed facility by an in-house crew in normal traffic is 4-5 minutes.
4. The Corps has monies allotted, and is currently in the design phase, for the expansion/replacement of it's headquarters on Osborne Avenue, Riverhead. Riverhead Town has also proposed a concurrent expansion of the facility located at Manor Lane, Jamesport. No money is allotted nor are any specific plans being made for a third facility to the west. While it is realized by the management of the Corps that the need will have to be addressed, the scope of the project will depend on the type and amount of development that Riverhead Town eventually allows, especially at the EPCAL site.
5. The only apparent "issue" with the development of the F1 facility is the resultant increase in the amount of calls to the area. While that is normal with any development, naturally a greater amount of patients would be expected from a sports

facility and any venue where alcohol is served.

If there are any clarifications needed or any further questions to be asked, please contact me at (631) 727-1686.

Sincerely,

Ronald Rowe
President, Board of Directors

AKRF
Environmental and Planning Consultants

3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 20, 2006

Mr. Ron Rowe
Riverhead Town Volunteer Ambulance Corps
1111 Osborne Avenue
Riverhead, NY 11901

Re: **F1 Long Island Sports Facility**

Dear Mr. Rowe:

AKRF, Inc. is currently preparing a draft Environmental Impact Statement for the proposed development of a Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

The project site is approximately 12.1 acres of disturbed land with portions of woodland areas located along Edwards Avenue, south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton. The go-kart facility would comprise about 1-mile of kart racing tracks, a 14,800 square foot clubhouse including a restaurant, bar and catering, and a 5,000 square foot maintenance building. The facility would operate on a seasonal basis and would close daily at dusk.

As part of the document, we are analyzing the potential for impacts of the project on municipal services. Please note that a similar letter has also been sent to the Riverhead Fire Department for their assessment of the project. The following questions pertain to the proposed project:

1. How many volunteers are presently in the organization?
2. What number and types of equipment do you have?
3. How many calls, on average, per year are made to the Ambulance Corps from this area of the Town? What is the response time to an incident?
4. Are there any plans for future changes in the Ambulance Corps?
5. Do you foresee any problems and/or issues with the development of the F1 facility in the Town of Riverhead?

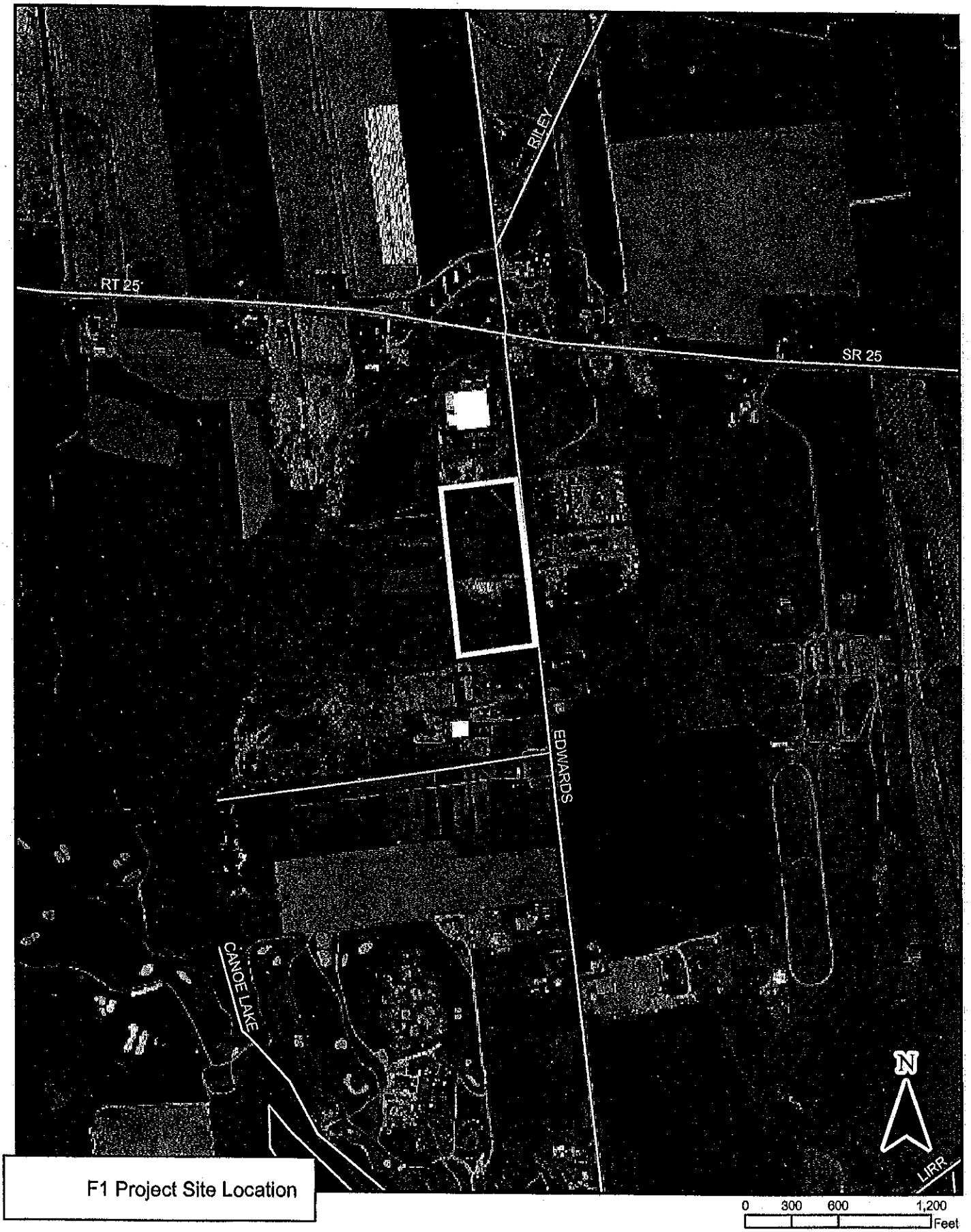
For your information, a regional map showing the location of the proposed project site is enclosed.

AKRF, Inc. is seeking to complete the analysis for this project by the end of February and therefore, a written response would be appreciated as soon as possible. If you have any questions, please contact me at (631) 285-6980.

Sincerely,

AKRF, INC.

Jessica Zanca
Environmental Scientist



F1 Long Island Sports Facility

Site Location

RWD
Riverhead Water District, 1035 Pulaski Street, Riverhead, N.Y., 11901
(631) 727-3205 Fax: (631) 369-4608

RECEIVED
FEB 23 2006
SUFFOLK A.H.R.C.

DATE: February 15, 2006

SUBJECT: Availability of public water to RIVERHEAD PROPERTIES.

LOCATION: SUFFOLK COUNTY TAX MAP # 0600-117-1-1-Lot 4.2;
Location: F1 Long Island Sports Facility, west side of Edwards Avenue, Calverton, NY, 11933; TOWN OF RIVERHEAD.

ATTENTION: Jessica Zanca, AKRF, 3900 Veterans Memorial Highway, Suite 300, Bohemia, NY, 11716; Telephone #: 631-285-6980; Fax #: 631-285-6919

Dear Ms. Zanca,

Property located at SUFFOLK COUNTY TAX MAP # 0600-117-1-Lot 4.2 is currently within the boundaries of the Riverhead Water District and can be served by same. Please take note that this property maybe subject to the Riverhead Water District's Developmental Fees. Please read the following concerning your letter of 1/20/2006:

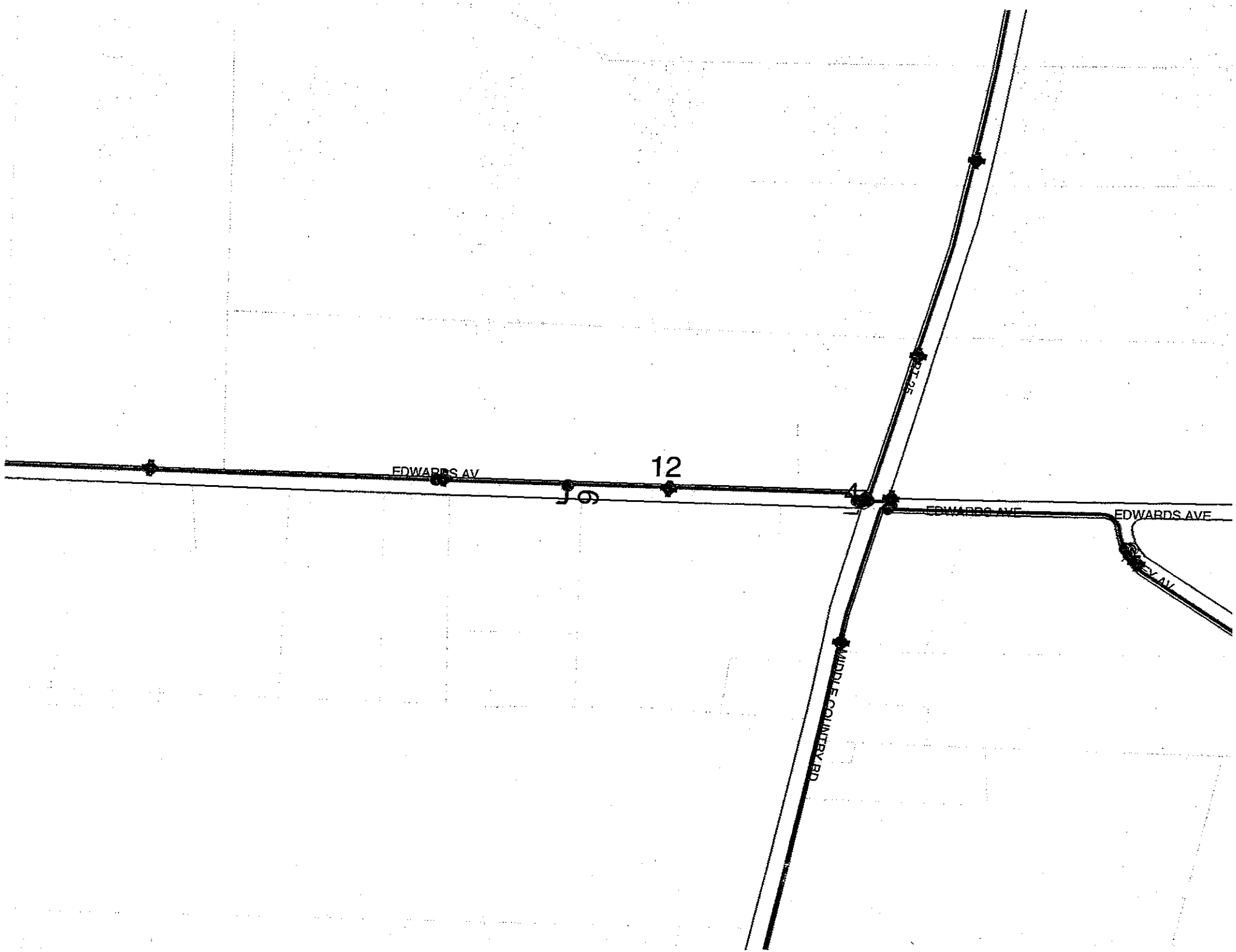
1. **The Riverhead Water District encompasses approximately 45 square miles and does not serve the whole town of Riverhead.**
2. **The RWD's current ground water pumping capacity is 21 mgd.**
3. **The RWD's currently has 13 active wells.**
4. **The RWD tests all of its wells according to county, state and federal drinking water rules and regulations.**
5. **The closest well to this location is ON Fresh Pond Avenue in Calverton.**
6. **There is a 12" water main on west side of Edwards Avenue that would serve this site.**
7. **Please refer to the attached CCR.**
8. **Please contact our consulting Engineers who are H2M of Melville.**
9. **Yes there are future plans for the Riverhead Water District.**
10. **This project currently is under review.**

If I can be of further service please do not hesitate to contact me.

Sincerely Yours,

Gary J. Pendzick
Superintendent
Riverhead Water District

cc mp
C:\MSOFFICE1\RWD2005\RWDCOM2006\LETTER\AVAILLTR\AKRFF1SPORTS20061.DOC


EDWARDS AV
12
EDWARDS AVE
EDWARDS AVE
MIDDLE COUNTRY RD

AKRF
Environmental and Planning Consultants

3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 20, 2006

Mr. Gary Pendzick, Superintendent
Town of Riverhead Water District
1035 Pulaski Street
Riverhead, NY 11901

Re: **F1 Long Island Sports Facility**

Dear Mr. Pendzick:

AKRF, Inc. is currently preparing a draft Environmental Impact Statement for the proposed development of a Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

The project site is approximately 12.1 acres of disturbed land with portions of woodland areas located along Edwards Avenue, south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton. The go-kart facility would comprise about 1-mile of kart racing tracks, a 14,800 square foot clubhouse including a restaurant, bar and catering, and a 5,000 square foot maintenance building. The estimated water usage would be approximately 6,480 gallons per day. The facility would operate on a seasonal basis and would close daily at dusk.

As part of the document, we are analyzing the potential for impacts of the project on municipal services. The following questions pertain to the proposed project:

1. How many square miles does the Water District encompass and does it serve the entire Town?
2. What is the current water supply and pumping capacity (mgd) in the project vicinity of Calverton?
3. How many inactive and active wells are in the Town of Riverhead Water District?
4. How many times do you test the wells and distribution system annually? May we have the results of the most recent test performed?
5. What is the closest well to the project site and is data available regarding water quality and depth to groundwater from this well?
6. What is the size of the water main that presently serves the site?
7. Can we obtain a copy of the latest Drinking Water Quality Report as well as a copy of the Source Water Assessment for this district including a map of the assessment area?
8. Does this capacity meet the needs of the Riverhead Fire Department?
9. Are there any future plans for the Water District?

10. Do you have any concerns regarding this project and the needs that it would place on the water district?

This inquiry is to ensure that enough capacity exists in the water district to accommodate the proposed F1 facility. For your information, a regional map showing the location of the proposed project site is enclosed. AKRF, Inc. is seeking to complete the analysis for this project by the end of February and therefore, a written response would be appreciated as soon as possible. If you have any questions, please contact me at (631) 285-6980.

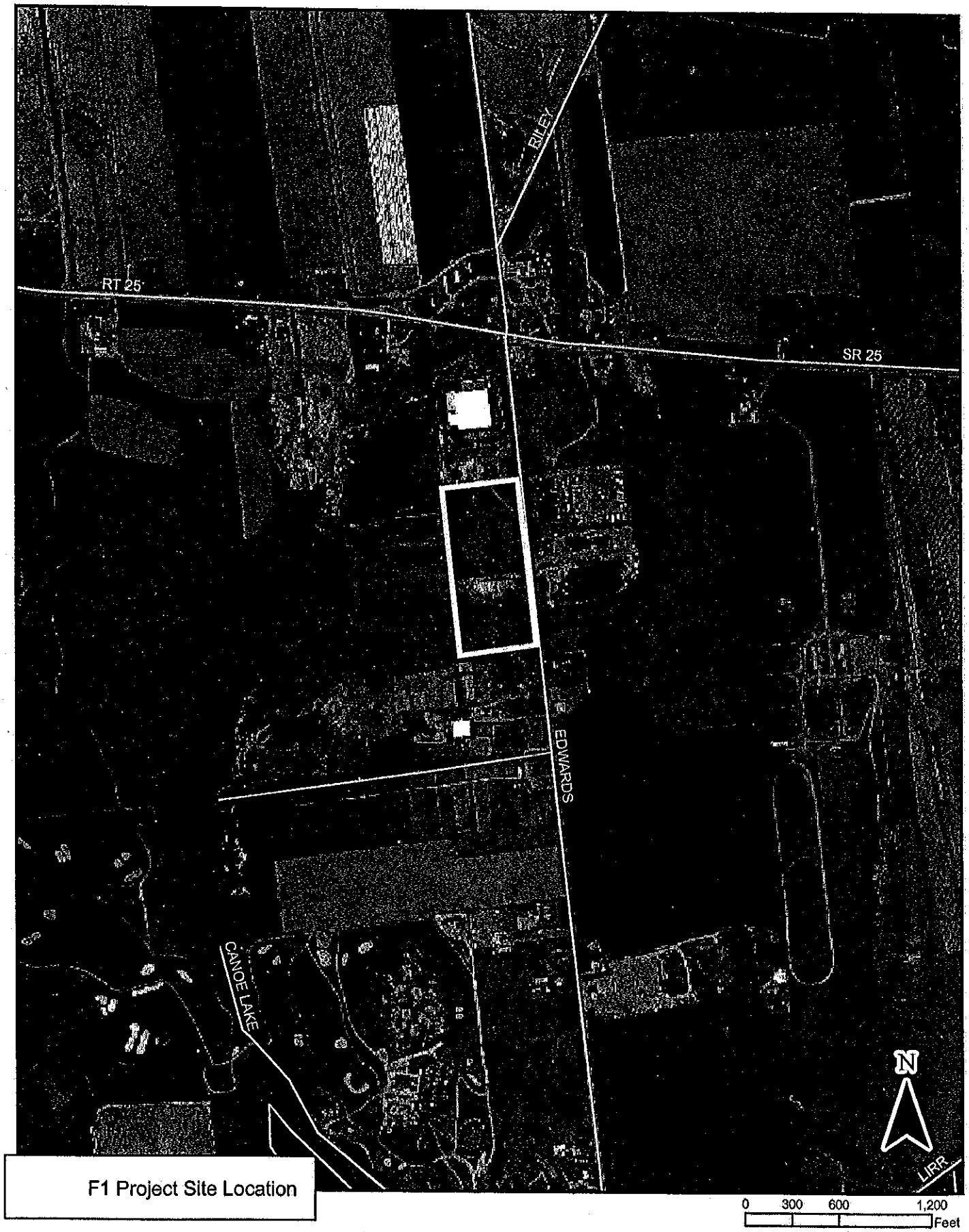
Sincerely,

AKRF, INC.

Jessica Zanca

Jessica Zanca
Environmental Scientist

Encl.



F1 Long Island Sports Facility

Site Location

RIVERHEAD POLICE DEPARTMENT

210 Howell Avenue, Riverhead, New York 11901

David J. Hegermiller
Chief of Police

Tel (631) 727-4500 Ext 335
Fax (631) 727-8630

March 6, 2006

Ms. Jessica Zanca, Environmental Scientist
AKRF, Inc.
3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716

Dear Ms. Zanca:

I am in receipt of your letter with regards to the proposed development of a Formula 1 go-kart facility to be located in the Town of Riverhead and offer the following responses to your questions:

1. Your proposed development does lie entirely in the Town of Riverhead and is within the jurisdiction of the Riverhead Police Department. The address of the Police Department is 210 Howell Avenue, Riverhead, New York, 11901.

2. There are 78 sworn officers in the Department. That figure includes uniformed officers, detectives and supervisory personnel. The number of support personnel is 16.

3. The location of the proposed development lies within the 603 sector. From January 1, 2005 to December 31, 2005, there was a total of 5489 calls for service in that particular sector. The average response time to an incident is 7 minutes.

4. Hopefully we will have an increase in manpower in the future.

5. The only problem I can foresee with the development of the F1 facility is the increase of traffic at S.R. 25 and Edwards Avenue.

If I can be of any further assistance, please do not hesitate to call me at (631) 727-4500, ext. 335.

Very truly yours,

David J. Hegermiller
Chief of Police

DJH/ma

CC: file

AKRF
Environmental and Planning Consultants

3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 20, 2006

Chief David J. Hegermiller
Riverhead Town Police
210 Howell Avenue
Riverhead, NY 11901

Re: **F1 Long Island Sports Facility**

Dear Chief Hegermiller:

AKRF, Inc. is currently preparing a draft Environmental Impact Statement for the proposed development of a Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

The project site is approximately 12.1 acres of disturbed land with portions of woodland areas located along Edwards Avenue, south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton. The go-kart facility would comprise about 1-mile of kart racing tracks, a 14,800 square foot clubhouse including a restaurant, bar and catering, and a 5,000 square foot maintenance building. The facility would operate on a seasonal basis and would close daily at dusk.

As part of the document, we are analyzing the potential for impacts of the project on municipal services. The following questions pertain to the proposed project.

1. What precinct and what station would serve the project site, and what is the address of each?
2. How many uniform officers and how many support personnel are in the precinct serving the project site?
3. How many calls to the project vicinity, on average, per year does the Police Department respond to? What is the response time to an incident?
4. Are there any plans for future changes in the Police Department?
5. Do you foresee any problems and/or issues with the development of the F1 facility?

For your information, a regional map showing the location of the proposed project site is enclosed.

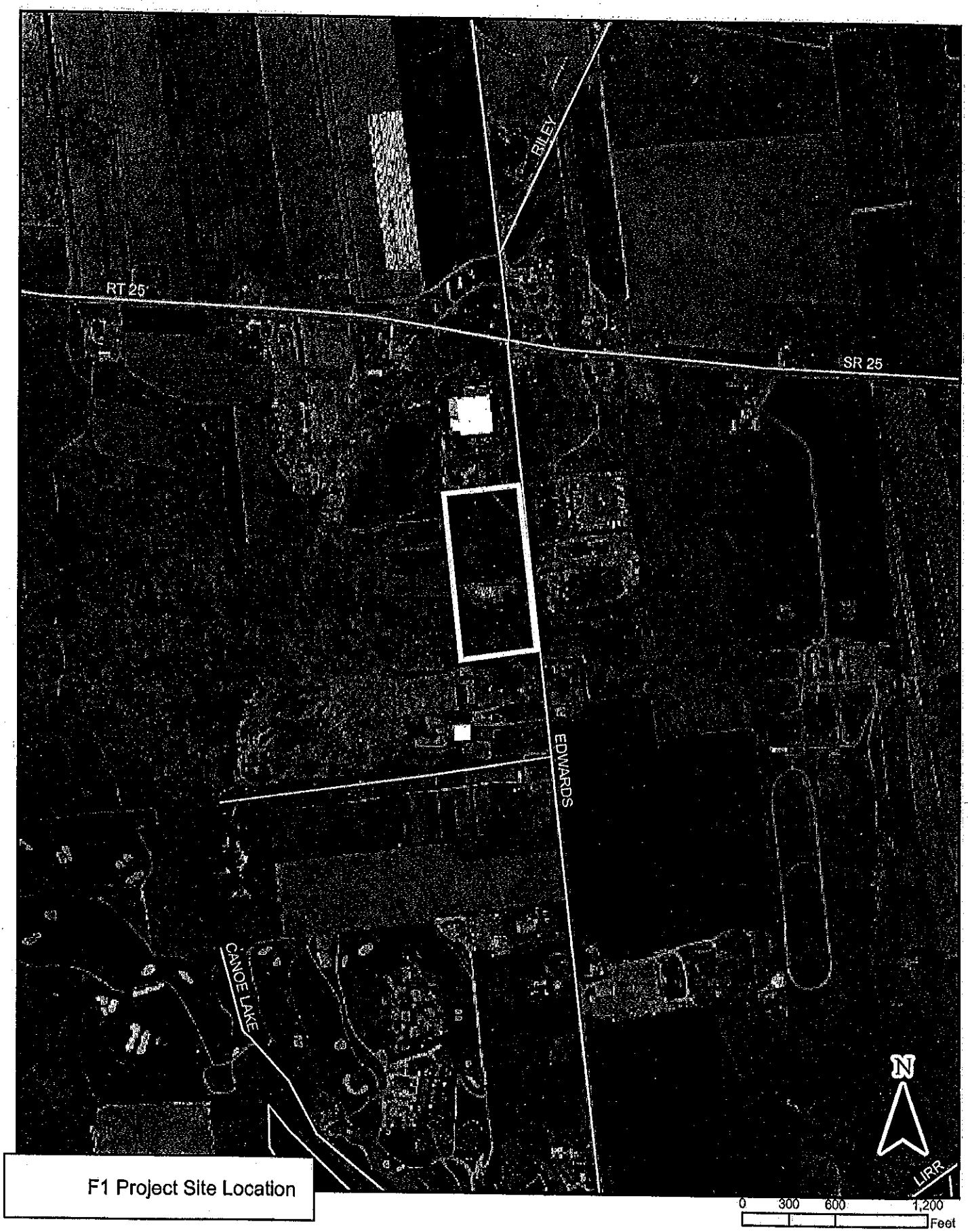
AKRF, Inc. is seeking to complete the analysis for this project by the end of February and therefore, a written response would be appreciated as soon as possible. If you have any questions, please contact me at (631) 285-6980.

Sincerely,

AKRF, INC.

Jessica Zanca
Environmental Scientist

Encl.



F1 Long Island Sports Facility

Site Location

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • **FAX:** (518) 402-8925
Website: www.dec.state.ny.

Denise M. Sheehan
Commissioner

February 10, 2006

Jessica Zanca
A K R F Environmental
3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716

Dear Ms. Zanca:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Go-kart Facility, site as indicated on the map you provided, located in the Town of Riverhead, Suffolk County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

The presence of rare species may result in this project requiring additional permits, permit conditions, or review. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report Ponly includes records from our databases. We cannot provide a definitive statement on presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information.

Sincerely,

Betty A Ketcham, Information Services
NY Natural Heritage Program

Enc.
cc: Reg. 1, Wildlife Mgr.

AKRF
Environmental and Planning Consultants

3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 19, 2006

Ms. Betty A. Ketcham
Information Services
New York Natural Heritage Program
New York State Department of Environmental Conservation
625 Broadway, 5th Floor
Albany, NY 12233-4757

Re: **New York Natural Heritage Program Database Request**

Dear Ms. Ketcham:

AKRF, Inc. is currently preparing a draft Environmental Impact Statement for the proposed development of a Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

The project site is approximately 12.1 acres of disturbed land with portions of woodland areas located along Edwards Avenue, south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton. The go-kart facility would comprise about 1-mile of kart racing tracks, a 14,800 square foot clubhouse, and a 5,000 square foot maintenance building. The project site is located within the Central Suffolk Special Groundwater Protection Area.

This request is for data regarding any rare, threatened, endangered, or special concern flora and fauna, areas of special concern, and NYS identified ecological communities within and surrounding the project area. In addition, a map indicating the locations where these species of concern were identified would be useful. Enclosed is an aerial photograph of the project site and the USGS Wading River Quadrangle map.

This information will be used in a limited manner and only on this project. Any maps and/or database lists produced by the NHP will not be published in any documentation. Please forward these data to my attention in either electronic form (jessica_zanca@akrf.com) or hard copy to AKRF, 3900 Veterans Memorial Highway, Suite 300, Bohemia, New York 11716. Please note that we are seeking to complete the analysis by the end of February. Should you have any questions or require additional information, please contact me at (631) 285-6980.

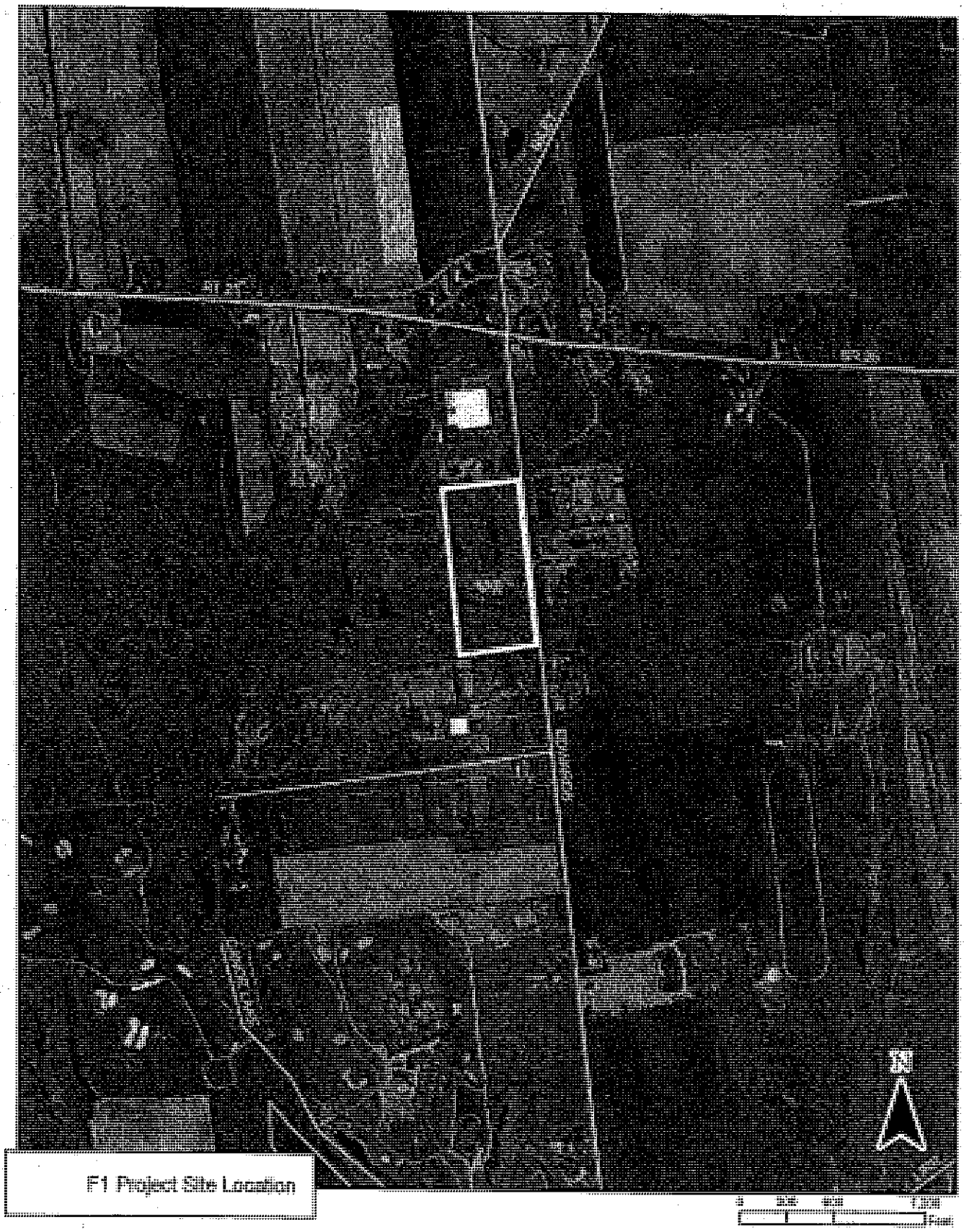
Sincerely,

AKRF, INC

Jessica Zanca

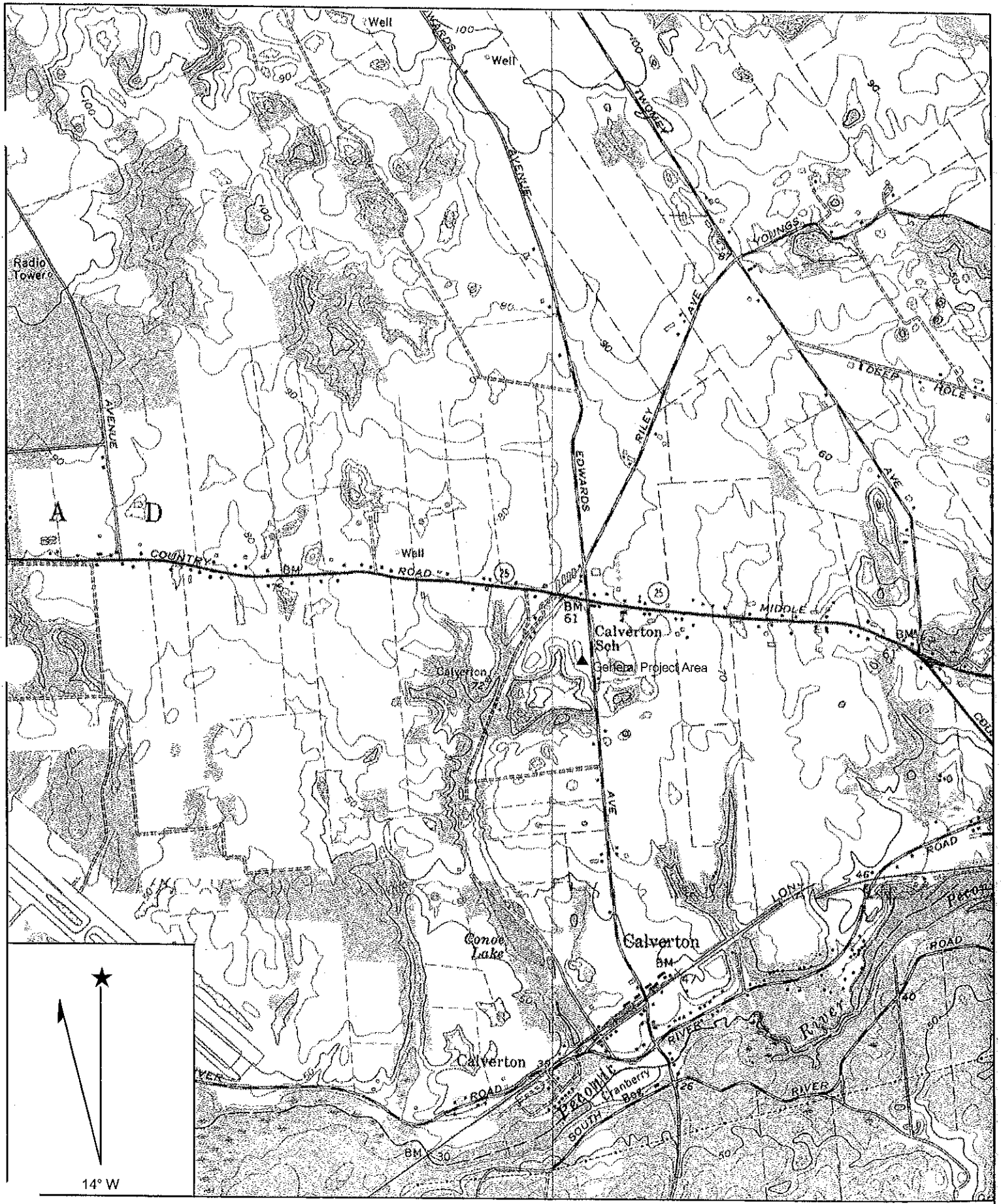
Jessica Zanca
Environmental Scientist

Encl.



F1 Long Island Sports Facility

Site Location



Name: WADING RIVER
Date: 1/19/2006
Scale: 1 inch equals 2000 feet

Location: 040° 55' 33.17" N 072° 45' 10.70" W
Caption: F1 Long Island Sports Facility

Copyright (C) 2001, Maptech, Inc.

FAX TRANSMITTAL RE: LISTED SPECIES REQUEST
U.S. FISH AND WILDLIFE SERVICE
Long Island Field Office
500 St. Marks Lane, Islip, NY 11751
Phone: (631) 581.2941 Fax: (631) 581.2972

January 30, 2006

To: Ms. Jessica Zanca, Environmental Scientist
AKRF
3900 Veterans Memorial Highway
Suite 300
Bohemia, NY 11716

This responds to your January 19, 2006, request for listed species information in the vicinity of proposed development of a Formula 1 (F1) go-kart facility to be located along Edwards Avenue, Claverton, Town of Riverhead, Suffolk County, New York.

Except for occasional transient individuals, no Federally-listed or proposed endangered or threatened species under our jurisdiction are known to exist within the project impact area. In addition, no habitat in the project impact area is currently designated or proposed "critical habitat" in accordance with provisions of the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). Therefore, no further ESA coordination or consultation with the U.S. Fish and Wildlife Service (Service) is required. Should project plans change, or if additional information on listed or proposed species or critical habitat becomes available, this determination may be reconsidered. The most recent compilation of Federally-listed and proposed endangered and threatened species in New York* is available for your information. If the proposed project is not completed within one year from the date of this FAX, we recommend that you contact us to ensure that the listed species presence/absence information for the proposed project is current. Should our determination change and any part of the proposed project be authorized, funded, or carried out, in whole or in part, by a Federal agency, further consultation between the Service and that Federal agency pursuant to the ESA may be necessary.

The above comments pertaining to endangered species under our jurisdiction are provided pursuant to the ESA. This response does not preclude additional Service comments under other legislation.

For additional information on fish and wildlife resources or State-listed species, we suggest you contact the appropriate State regional office(s),* and:

New York State Department of Environmental Conservation
New York Natural Heritage Program Information Services
625 Broadway
Albany, NY 12233-4757
(518) 402-8935

Thank you for your time. If you require additional information please contact me at (631) 581.2941.

Sincerely,

Jill A. Olin
Fish and Wildlife Biologist

*Additional information may be found on our website at: http://nyfo.fws.gov/es/section7.htm

TAILS 2006-TA-0037

AKRF
Environmental and Planning Consultants

3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 19, 2006

Mr. David A. Stilwell
United States Department of the Interior
Fish and Wildlife Service
3817 Luker Road
Cortland, NY 13045

Re: **United State Fish and Wildlife Service Database Request**

Dear Mr. Stilwell:

AKRF, Inc. is currently preparing a draft Environmental Impact Statement for the proposed development of a Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

The project site is approximately 12.1 acres of disturbed land with portions of woodland areas located along Edwards Avenue, south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton. The go-kart facility would comprise about 1-mile of kart racing tracks, a 14,800 square foot clubhouse, and a 5,000 square foot maintenance building. The project site is located within the Central Suffolk Special Groundwater Protection Area.

This request is for data regarding any rare, threatened, endangered, or special concern flora and fauna, and areas of special concern within and surrounding the project area. In addition, a map indicating the locations where these species of concern were identified would be useful. Enclosed is an aerial photograph of the project site and the USGS Wading River Quadrangle map.

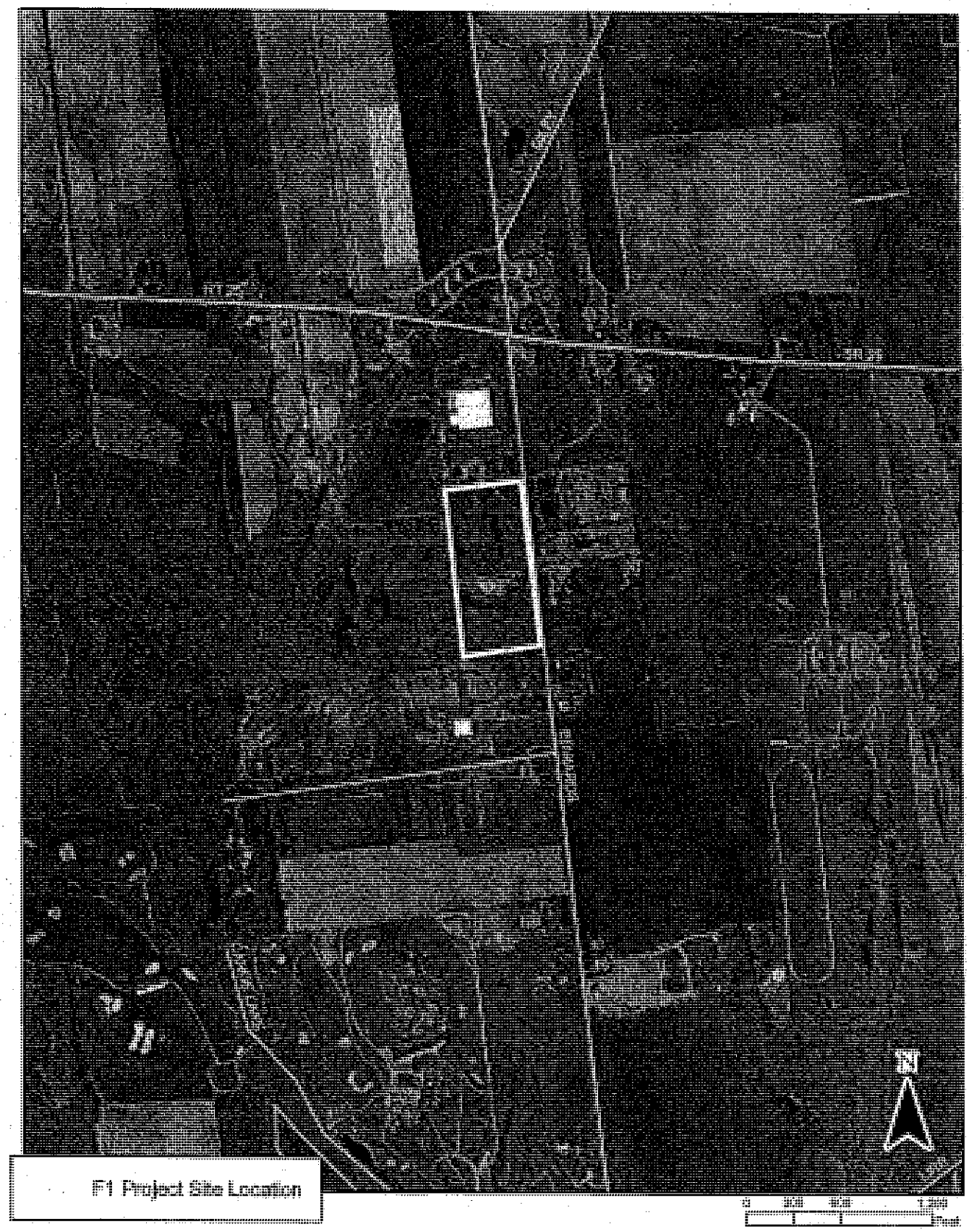
This information will be used in a limited manner and only on this project. Any maps and/or database lists produced by the USFWS will not be published in any documentation. Please forward these data to my attention in either electronic form (jessica_zanca@akrf.com) or hard copy to AKRF, 3900 Veterans Memorial Highway, Suite 300, Bohemia, New York 11716. Please note that we are seeking to complete the analysis by the end of February. Should you have any questions or require additional information, please contact me at (631) 285-6980.

Sincerely,

AKRF, INC

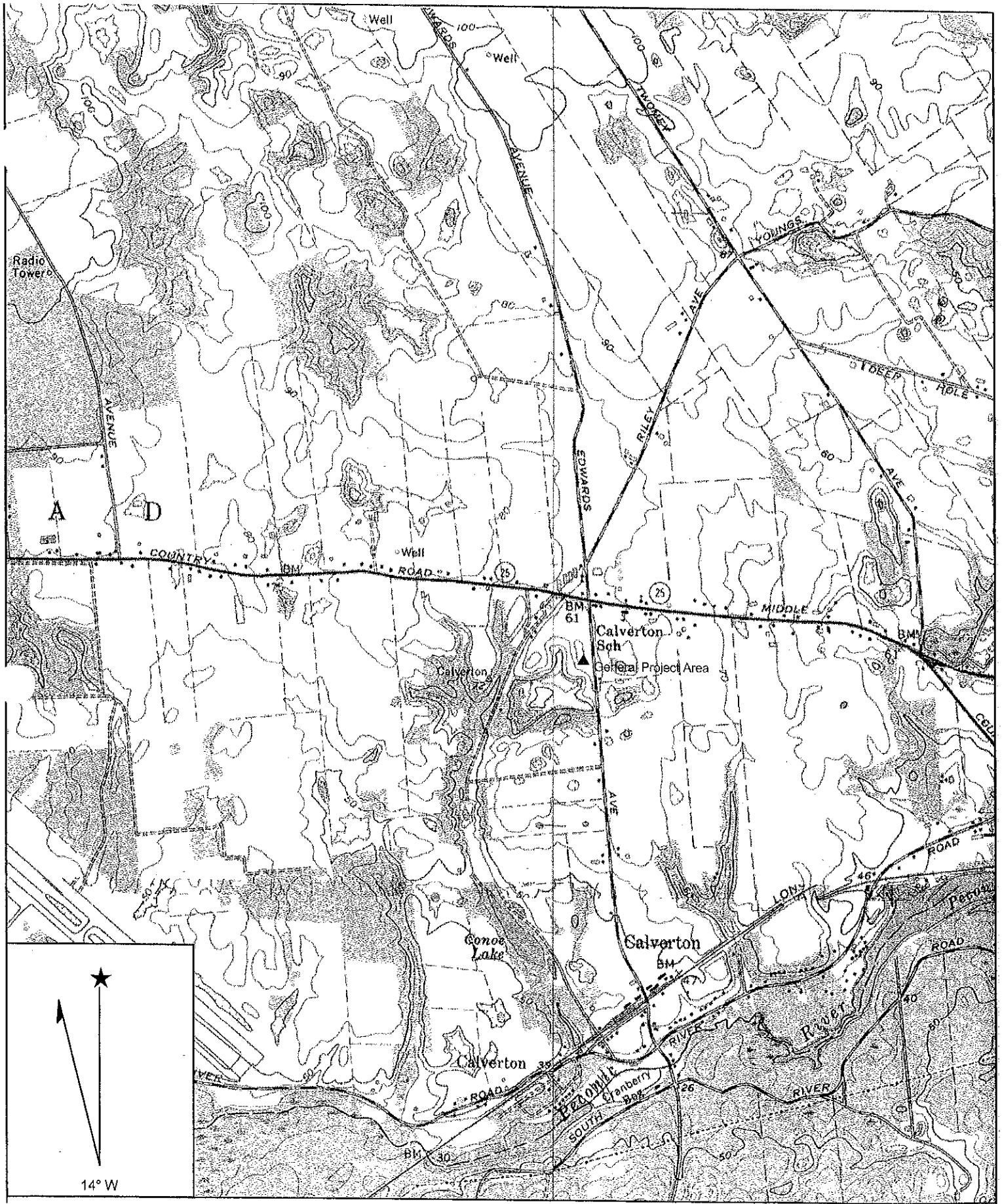
Jessica Zanca
Environmental Scientist

Encl.



F1 Long Island Sports Facility

Site Location



Name: WADING RIVER
Date: 1/19/2006
Scale: 1 inch equals 2000 feet

Location: 040° 55' 33.17" N 072° 45' 10.70" W
Caption: F1 Long Island Sports Facility

Copyright (C) 2001, Maptech, Inc.

LIPA
Long Island Power Authority

117 Doctors Path
Riverhead, NY 11901

February 6, 2006

Ms. Lorianne DeFalco
AKRF Environmental and Planning Consultants
3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716

Re: Fl Long Island Sports Facility
Edwards Ave., Calverton
LIPA Ref. # T100596574

Dear Ms. DeFalco:

As requested, please be advised that the LIPA and KeySpan Energy will provide electric and Gas services to the above-referenced project in accordance with our filed tariff and schedules in effect at the time service is required.

Please feel free to contact me as your Electric lead at (631)548-7062 and Mr. John Merrill as your Gas Lead at (631) 758-5157 if you require any further information.

Very truly yours,

Steven P. Aylward
Design Engineer
Electric Design & Construction

SPA/rh

AKRF
Environmental and Planning Consultants

3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 26, 2006

Mr. Nicholas De Pascale
Long Island Power Authority
Electric Design & Construction Department
455 Mill Road
Hewlett, NY 11557

Re: **F1 Long Island Sports Facility**

Dear Mr. De Pascale:

AKRF, Inc. is currently preparing a draft Environmental Impact Statement for the proposed development of a Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

The project site is approximately 12.1 acres of disturbed land with portions of woodland areas located along Edwards Avenue, south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton. The go-kart facility would comprise about 1-mile of kart racing tracks, a 14,800 square foot clubhouse including a restaurant, bar and catering, and a 5,000 square foot maintenance building. The facility would operate on a seasonal basis and would close daily at dusk.

Based on energy use rates from the Association of Energy Engineers (1997) and sourced in the *City Environmental Quality Review (CEQR) Technical Manual* (2001), it is estimated that the proposed project could result in an energy demand of 2,015 million British Thermal Units (BTUs) per square foot annually, or 590,538 kilowatt hours (kWh).

As part of the document, we are analyzing the potential for impacts of the project on electric and gas services. The following questions pertain to the proposed project:

1. What is LIPA/KeySpan's maximum generating capacity?
2. Would LIPA/KeySpan have any concerns regarding its ability to satisfy the energy requirements of this project?
3. Does LIPA/KeySpan have any other comments or concerns in regard to supplying the energy needs of this project?

For your information, a regional map showing the location of the proposed project site is enclosed.

AKRF, Inc. is seeking to complete the analysis for this project by the end of February and therefore, a written response would be appreciated as soon as possible. If you have any questions, please contact me at (631) 285-6980.

Sincerely,

AKRF, INC.

LDeFalco

Lorianne DeFalco
Environmental Planner

AKRF
Environmental and Planning Consultants

3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 20, 2006

Chief Edward Carey
Riverhead Fire Department
24 East Second Street
Riverhead, NY 11901

Re: **F1 Long Island Sports Facility**

Dear Chief Carey:

AKRF, Inc. is currently preparing a draft Environmental Impact Statement for the proposed development of a Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

The project site is approximately 12.1 acres of disturbed land with portions of woodland areas located along Edwards Avenue, south of New York State Route 25 (Middle Country Road) in the hamlet of Calverton. The go-kart facility would comprise about 1-mile of kart racing tracks, a 14,800 square foot clubhouse including a restaurant, bar and catering, and a 5,000 square foot maintenance building. The facility would operate on a seasonal basis and would close daily at dusk.

As part of the document, we are analyzing the potential for impacts of the project on municipal services. The following questions pertain to the proposed project:

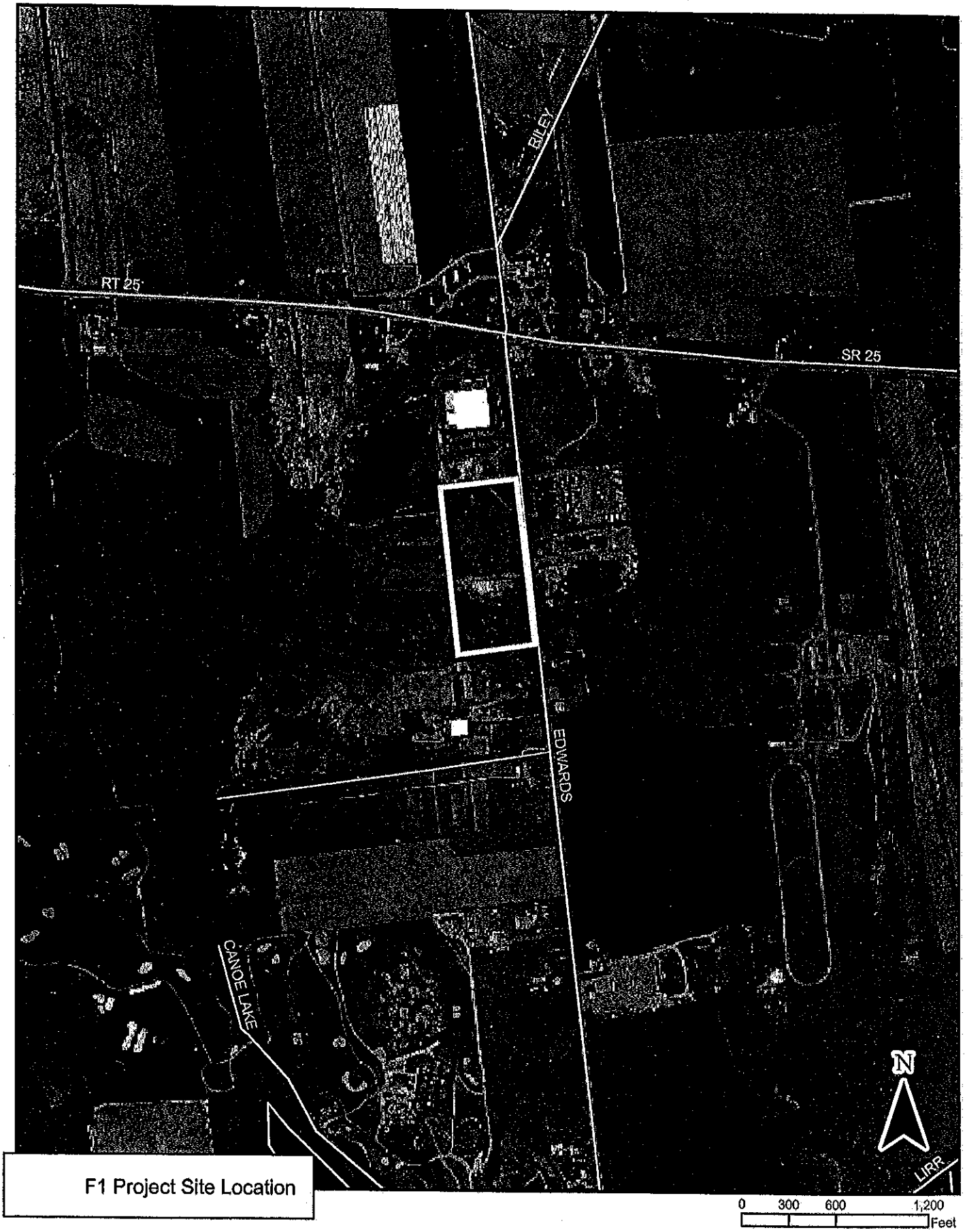
1. What fire station would serve the project site, and what is the location?
2. How many volunteers and full time employees do you have?
3. What number and types of apparatus do you have at the fire station serving the site?
4. What is the current water supply and capacity at the fire station? At what capacity is the fire station currently operating?
5. How many calls, on average, per year are made to the Fire Department from this area of the Town? What is the response time to an incident?
6. Are there any plans for future changes in the Fire Department?
7. Do you foresee any problems and/or issues with the development of the F1 facility in the Town of Riverhead?

For your information, a regional map showing the location of the proposed project site is enclosed.

AKRF, Inc. is seeking to complete the analysis for this project by the end of February and therefore, a written response would be appreciated as soon as possible. If you have any questions, please contact me at (631) 285-6980.

Sincerely,

AKRF, INC.
Jessica Zanca
Jessica Zanca
Environmental Scientist



F1 Long Island Sports Facility

Site Location

AKRF
Environmental and Planning Consultants
3900 Veterans Memorial Highway, Suite 300
Bohemia, NY 11716
tel: 631 285-6980
fax: 631 285-6919
www.akrf.com

January 20, 2006

Mr. Joe Hall
Riverhead Planning Department
200 Howell Avenue
Riverhead, NY 11901

Re: **F1 Long Island Sports Facility**

Dear Mr. Hall:

As you are aware, AKRF, Inc. is currently preparing a draft Environmental Impact Statement (DEIS) for the proposed development of the Formula 1 (F1) go-kart facility to be located in the Town of Riverhead, Suffolk County, New York.

This inquiry is to obtain information on whether any proposed, approved, or anticipated development projects are planned within one mile of the project site. Please include information relative to the name, location, and size of the any such project. In addition, it was mentioned in the Town's Final Scope of Work for this project that EAF's and traffic studies for projects developed in the vicinity of the proposed F1 facility should be reviewed as part of the DEIS. Please include these documents or any additional information you may be aware of and deem useful for the preparation of the DEIS (such as site history or prior studies of the on-site wetland) as part of your response to this information request.

If you have any questions, please contact me at (631) 285-6980.

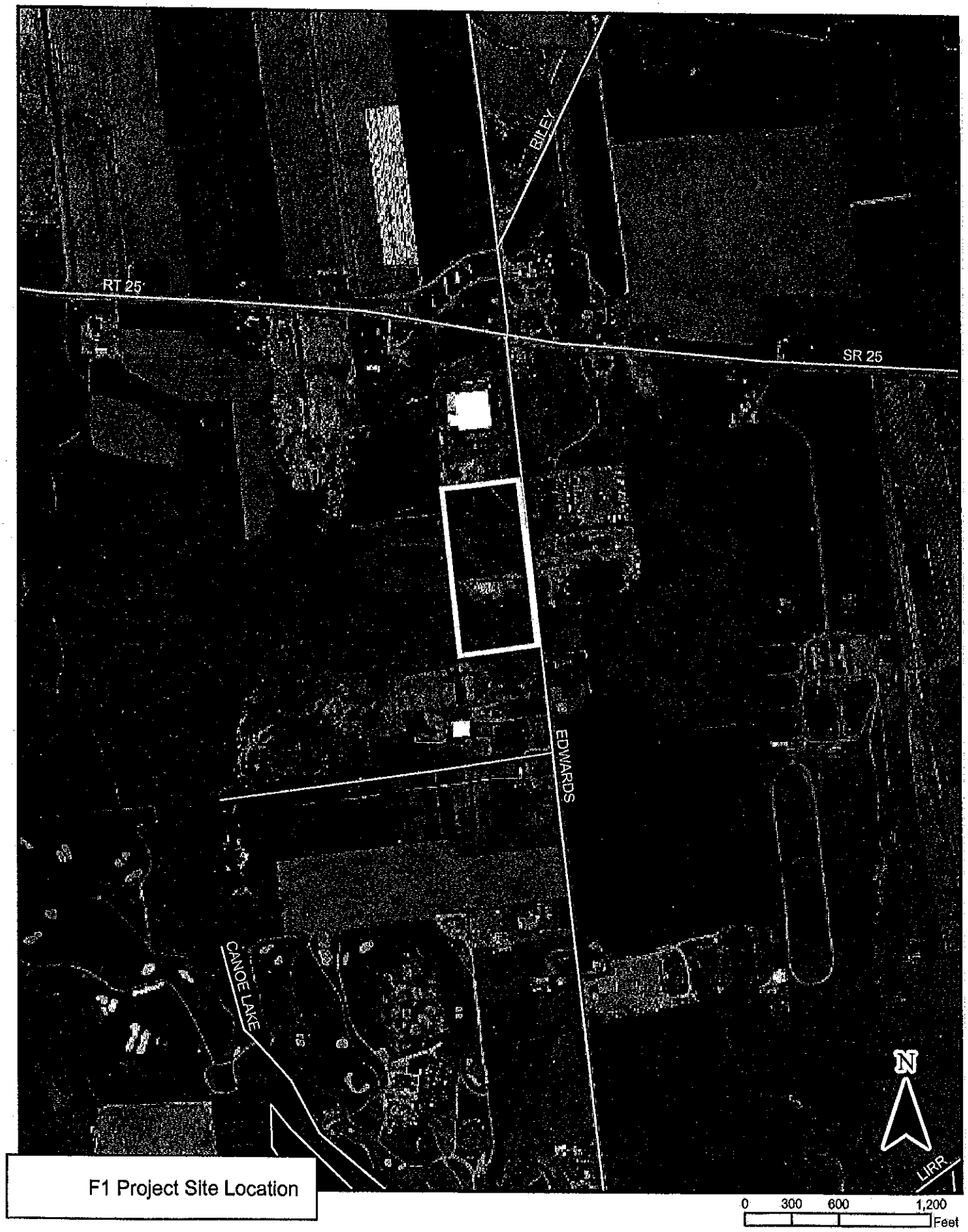
Sincerely,

AKRF, INC.

Jessica Zanca

Jessica Zanca
Environmental Scientist

Encl.



F1 Long Island Sports Facility

Site Location

RUTGERS
New Jersey Agricultural
Experiment Station

Cooperative Extension
Department of Animal Science
Rutgers, The State University of New Jersey
84 Lipman Drive, Bartlett Hall
New Brunswick, NJ 08901-8525

njaes.rutgers.edu/extension
cwilliams@aesop.rutgers.edu
phone: 732-932-9514
fax: 732-932-6996

6/23/08

Mr. Richard O'Dea, Planning Board Chairman
Town of Riverhead
200 Howell Avenue
Riverhead, NY 11901

RE: F1 Long Island Sport Facility

Dear Mr. O'Dea,

At the request of representatives of F1 Long Island, LLC, I have been asked to review and address the issue of whether the proposed go-kart race track facility in Riverhead, N.Y. (i.e., the F1 Long Island Sports Facility) would be expected to have a significant negative effect on horse-related operations, including horse breeding, at the adjacent Gibb Horse Farm. I am the Extension Equine Specialist at Rutgers University and the Equine Science Center (see attached curriculum vitae). The Rutgers Equine Science Center is an internationally acclaimed facility devoted to research and education in order to advance the well-being of the horse and the equine industry.

Based upon my review of portions of the draft FEIS prepared for the proposed F1 Facility (namely Chapter 1, the Project Description, and Chapter 9, Noise), results of relevant empirical studies conducted in other geographic areas that relate to the effect of noise on horses, in particular the study conducted by Dr. Sandi Lieb of the University of Florida in the 1990s that examined the effect of airplane overflight noise on horses housed adjacent to an airport, and my knowledge of horse behavior, I find no reason to believe that the F1 Facility would have a significant adverse long-term effect on horse-related operations, including horse breeding at the adjacent Gibb Horse Farm. Dr. Lieb's study was published and presented at the Equine Nutrition and Physiology Society Research Symposium in the 1990's, unfortunately I am unable to find a hard copy of the article at this time, but I will send it along when I find it. The objective of this study was to see if the horses were abnormally stressed by the constant excessive noise produced by the jets flying in and out of the airport. The study determined that the horses' stress level did increase immediately after the noise disturbance however, returned to normal after only 10 min. The stress measures included physical parameters such as heart rate, respiration, etc., and hormonal levels like the common stress hormone cortisol. The study also determined that the immediate stress response decreased over the time the horses were exposed to the noise.

This is just scientific evidence that horses are easily habituated to sounds and actions once they learn that there is not any risk of bodily harm. Take for instance the race or show horse; they undergo many stressful events at shows and races. These horses tolerate extreme conditions including crowds waving and cheering wildly, flags waving and various loudspeaker noises, etc. They learn that these things are not there to harm them. There is always an exception to the rule however, any individual horse has the potential to be overly reactive and spook or get

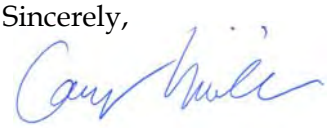
Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

RUTGERS
New Jersey Agricultural
Experiment Station

startled by an excessive noise, but again this is the exception. As for breeding horses they will not be any different than a performance horse. These horses probably will even habituate faster then the higher strung race or show horse. Therefore in my opinion and from looking at published research and the noise levels of the proposed sport facility I do not feel that the horses will have prolonged stress due to the noise it will produce.

If you have any questions please feel free to contact me.

Sincerely,



Carey A. Williams, Ph.D.
Extension Equine Specialist and
Assistant Professor

Cc: James McAllister, AKRF, Inc.,
F-1 Long Island, LLC, and
Robert F. Kozakiewicz

APPENDIX D

Articles VII and XII of Suffolk County Sanitary Code

SUFFOLK COUNTY SANITARY CODE - ARTICLE 7

Water Pollution Control

§760-701 Declaration of Policy

The designated best use of all groundwaters of Suffolk County is for public and private water supply, and of most surface waters for food production, bathing and recreation. The federal government has officially designated the aquifer below Suffolk County as a sole-source for water supply. Therefore, it is hereby declared to be the policy of the County of Suffolk to maintain its water resources as near to their natural condition of purity as reasonably possible for the safeguarding of the public health and, to that end, to require the use of all available practical methods of preventing and controlling water pollution from sewage, industrial and other wastes, toxic or hazardous materials, and stormwater runoff.

§760-702 Statement of Purpose

It is the intent and purpose of this Article to safeguard all the water resources of the County of Suffolk, especially in deep recharge areas and water supply sensitive areas, from discharges of sewage, industrial and other wastes, toxic or hazardous materials and stormwater runoff by preventing and controlling such sources in existence when this Article is enacted and also by preventing further pollution from new sources under a program which is consistent with the above-stated Declaration of Policy.

§760-703 Definitions

Whenever used in this Article, unless otherwise expressly stated, or unless the context or subject matter requires a different meaning, the following terms shall have the respective meanings set forth or indicated.

A. Board means the Suffolk County Board of Health.

B. Commissioner means the Commissioner of the Suffolk County Department of Health Services.

C. Communal Sewage System means a series of sanitary intercepting sewers or intercepting collecting sewers, pumping stations, sewage treatment plants, and associated pollution control facilities for the conveyance, treatment, and disposal of

sewage operated by a person other than a municipality.

D. Deep Recharge Area means a geographic area of Suffolk County that contributes recharge water to a deep groundwater flow system, thus replenishing the quantity and affecting the quality of the long-term water supply. These areas are identified as Groundwater Management Zones I, II, III and V.

E. Department means the Suffolk County Department of Health Services.

F. Discharge means to release by any means or to relinquish control in a manner that could result in a release to the surface waters, groundwaters, surface of the ground, or below ground.

G. Disposal System means any plumbing or conveyances which result in or are capable of resulting in a discharge of sewage, industrial wastes, toxic or hazardous materials, stormwater runoff, cooling water or other wastes. This includes but is not limited to septic tanks, leaching pools, sumps, tile fields, holding tanks, outfalls and connecting piping.

H. Groundwater Management Zone means any of the areas delineated in Suffolk County by the "Long Island Comprehensive Waste Treatment Management Plan (L.I. 208 Study)," as revised by the "Long Island Groundwater Management Plan," and subsequent revisions adopted by the Board identifying differences in regional hydrogeologic and groundwater quality conditions. The boundaries of the Groundwater Management Zones are set forth on a map adopted by the Board, filed in the Office of the Commissioner in Hauppauge, New York.

I. Housebarge means the same as Houseboat except that a housebarge has no self-contained mechanical method of propulsion.

J. Houseboat means a floating structure used as a dwelling with a self-contained mechanical method of propulsion, not primarily designed to be a means of locomotion over water. The design criteria shall be generally accepted standards of naval architecture.

K. Industrial Waste means any liquid, gaseous, or solid waste substance or a combination thereof resulting from any operation or process of industry, manufacturing, trade or business or from the development or recovery of any natural resources, which may cause or might reasonably be expected to cause pollution of the water resources of the County of Suffolk in contravention of the requirements of this Article.

L. Municipal Sewage System means the series of sanitary intercepting sewers or intercepting collecting sewers, pumping stations, sewage treatment plants, or pollution control facilities, drains and other facilities, connections and equipment or any combination of the aforementioned, for the conveyance, treatment and disposal of sewage operated by the County of Suffolk or a municipality within the County of

Suffolk.

M. Offensive Material means any sewage or non-sewage fecal matter, urine, garbage, waste, or any putrescible organic matter, scavenger waste, the contents of private or individual sewage disposal systems, either liquid or solid, or other substances or liquid which may adversely affect health.

N. Other Wastes means refuse, spillage and the leaching from these materials, oil, tar, acids, chemicals, and all other discarded matter which may reasonably be expected to cause pollution of the waters of the County of Suffolk.

O. Private or Individual Sewage Disposal System means a water-flush facility for the disposal of sewage which does not connect either with a municipal or communal sewage system. This includes, but is not limited to, septic tanks, leaching pools and tile fields.

P. Restricted Toxic or Hazardous Materials shall mean the following toxic or hazardous chemicals that have been or could be expected to be detected in the groundwater, or in discharges to he groundwater, of Suffolk County. This definition applies to these substances alone or in combination, solution or mixture with other substances, or chemically compounded with other elements or compounds.

Arsenic	1,1 Dichloroethane	Roadway Deicing Salt
Barium	1,2 Dichloroethane	Silver
Benzene	1,1 Dichloroethylene	Styrene
Bromobenzene	1,2 Dichloropropane	Tetrachloroethylene
Bromodichloromethane	p-Diethylbenzene	1,2,4,5 Tetramethylbenzene
Bromoform	Ethylbenzene	Toluene
Cadmium	p-Ethyltoluene	1,2,3 Trichlorobenzene
Carbon	Fluoride	1,2,4 Trichlorobenzene
Chlorobenzene	Freon 113	1,1,1 Trichloroethane
Chlorodibromomethane	Lead	1,1,2 Trichloroethane
Chloroform	Mercury	1,1,2 Trichloroethylene
Chlorotoluene	Methylene Chloride	1,2,3 Trichloropropane
Chromium	Nickel	1,2,4 Trimethylbenzene
Cis 1,2 Dichloroethylene	Pesticides	1,3,5 Trimethylbenzene
Creosotes	Petroleum Distillates	Vinyl Chloride
Cyanide	Phenols	Xylenes
Dichlorobenzene	Phthalates	

All other halogenated hydrocarbon compounds.

Q. Sewage means the water-carried human or animal wastes from residences, buildings, industrial establishments or other places, together with such groundwater

infiltration and surface water as may be present. A mixture of sewage as herein defined and industrial wastes or other wastes as defined above may be considered industrial wastes or commingling within the meaning of this Article.

R. Stormwater Runoff means the portion of total precipitation that travels over natural and developed land surfaces (e.g., woodlands, lawns, farms, gardens, roofs, driveways, parking lots, roads, etc.) transporting contaminants that may be present.

S. Temporary Disposal System means a system for the disposal of sewage where such system is intended for use for a specified period of time prior to completion of the construction of an approved sewage treatment and disposal system.

T. Toxic or Hazardous Materials shall mean the same as defined in Article 12 of this Code.

U. Toxic or Hazardous Wastes shall mean the same as defined in Article 12 of this Code.

V. Treatment System means a system designed to reduce or alter the contaminant content of sewage or industrial waste for the purpose of permitting the discharge of some portion of said waste.

W. Water Supply Sensitive Areas means:

1. A groundwater area separated from a larger regional groundwater system where salty groundwater may occur within the Upper Glacial aquifer, and where deepening of private wells and/or the development of community water supplies may be limited; or

2. Areas in close proximity to existing or identified future public water supply wellfields. In general, for the purposes of this Article, "close proximity" shall mean within 1,500 feet upgradient or 500 feet downgradient of public supply wells screened in the Upper Glacial aquifer.

3. A limited water budget area, not underlined by fresh Magothy, defined by published reports acceptable to the Commissioner.

4. The areas described in items W.1.,2.,3., above are set forth on a map adopted by the Board filed in the Office of the Commissioner in Hauppauge, New York.

§760-704 Powers of the Commissioner

The Commissioner may:

A. make, or cause to be made, or order the owner or operator of any property or facility to make any investigation or study which, in the Commissioner's opinion, is

needed for the enforcement of this Article or for controlling or reducing the potential for contamination of the waters of the County from sewage, industrial or other wastes, toxic or hazardous materials and/or stormwater runoff. This may include the ordering of an independent groundwater investigation where evidence suggests that a discharge of toxic or hazardous materials may have occurred.

B. approve, with conditions, non-residential structures, processes, facilities and activities in deep recharge areas and water supply sensitive areas to assure compliance with §760-706. Such conditions shall be embodied in covenants running with the land as specified in the Department's standards;

C. promulgate and establish standards and schedules to effect the purpose of this Article;

D. order the posting of a performance bond or other undertaking either prior to or subsequent to the construction or operation of an industrial facility within Suffolk County on a case-by-case basis if evidence indicates such may be necessary to protect water resources from the adverse effects of operating such a facility.

E. Notwithstanding any other provision of this Article, if the Commissioner finds a condition which has the potential for contaminating the waters of the County with toxic or hazardous materials, or which otherwise constitutes an immediate danger to public health, and determines that it could appear prejudicial to the public interest to delay action, the Commissioner may serve an order upon the permit holder, or if there is no permit upon the person in charge of the facility or site, citing such conditions and specifying the corrective action to be taken and a time period of less than fifteen (15) days within which such action shall be taken.

Such order may state that a permit is immediately suspended and/or that all operations are to be discontinued forthwith.

Any order requiring certain action or the cessation of certain activities immediately or within a specified period of less than fifteen (15) days shall provide such person an opportunity to be heard, which hearing shall be scheduled for a time no more than fifteen (15) days after the date the order is served.

§760-705 General Restrictions and Prohibitions

A. Construction of a Disposal System

1. It shall be unlawful for any person to construct, reconstruct, install or substantially modify any disposal system without first having obtained a permit therefor issued by or acceptable to the Commissioner, pursuant to Department standards.

2. §760-705.A.1 does not apply to stormwater disposal systems unless

there is an actual or potential discharge into the system of industrial wastes, toxic or hazardous materials, or sewage.

B. Discharge

1. It shall be unlawful for any person to discharge sewage, industrial wastes, offensive materials, toxic or hazardous materials or other wastes to any surface waters or groundwaters, to the surface of the ground or to a disposal system unless such discharge is specifically in accordance with a State Pollutant Discharge Elimination System (SPDES) Permit or other permit issued by or acceptable to the Commissioner for that purpose.

2. No permits, as stipulated in §760-705.B.1, are required for the following types of discharges:

a. discharge of sewage from an existing residential structure to a private or individual sewage disposal system, or from any residential structure, houseboat or housebarge to a communal sewage system or municipal sewage system that does not contravene standards or result in a public health nuisance;

b. discharge of sewage from a commercial or industrial facility to a communal sewage system or municipal sewage system;

c. discharge of stormwater to a disposal system unless there is an actual or potential discharge into the system of industrial wastes or toxic or hazardous materials or sewage.

3. For existing discharges not prohibited by law prior to the effective date of this Article, a permit shall be obtained within the time limit provided in §760-707.

C. Construction or Operation of a Treatment System

1. It shall be unlawful for any person to construct, modify or operate a treatment system without first obtaining a permit therefor issued by or acceptable to the Commissioner.

D. Commingling

1. It shall be unlawful for any person to commingle stormwater runoff, cooling water, sewage or industrial wastes in any disposal system not approved for that purpose pursuant to this Article.

E. Stormwater Discharges

1. It shall be unlawful for any person to develop or use land in such a manner as to cause stormwater runoff from that land to become contaminated and

discharged in contravention of the other provisions of this Article.

F. Marinas

1. It shall be unlawful for any marina to permit overnight docking of any houseboat or housebarge unless the marina has a waste pump-out facility. Construction of said pump-out facilities shall be in accordance with standards which may be promulgated by the Commissioner.

§760-706 Deep Recharge Areas and Water Supply Sensitive Areas

The following additional restrictions and prohibitions shall apply in deep recharge areas and water supply sensitive areas.

A. It shall be unlawful for any person to discharge any restricted toxic or hazardous materials or to discharge industrial wastes from any facility containing restricted toxic or hazardous materials to the groundwaters, to the surface of the ground, beneath the surface of the ground, to a municipal or communal sewage system, or to a disposal system except as follows:

1. application of fertilizers, pesticides or other agricultural chemicals approved for that purpose by the appropriate state and federal agencies; or

2. application of road surfacing or road construction materials or deicing salts to roadways, walkways, and parking areas; or

3. discharge from an establishment to a municipal or communal sewage system with effluent disposal to marine surface waters or recharge outside of the deep recharge areas and water supply sensitive areas, and the following minimum requirements are satisfied pursuant to a permit issued by or acceptable to the Commissioner:

a. Dual plumbing systems shall be installed, one for sanitary wastes and one for industrial wastes.

b. Sampling access approved by the administrative head of the municipal or communal sewage system and the Department shall be provided for both the sanitary and industrial waste systems.

c. The administrative head of the municipal or communal sewage system, with approval of the Department, shall determine which industrial wastes are acceptable to "hold and haul" and which require pretreatment prior to discharge to the collection system in order to assure compliance with the applicable sewer use ordinance.

d. Personnel authorized by the administrative head of the municipal or communal sewage system or other individual(s) acceptable to the

Commissioner, pursuant to Department standards, shall operate at each establishment its pretreatment facility for industrial wastes prior to discharge to the collection system.

e. Only batch pretreatment of industrial wastes will be permitted. Batch facilities and facilities for storage of drums containing toxic or hazardous wastes shall be located in an area accessible at all times by district personnel, in or adjacent to the industrial building, with heat and power provided by the owner.

f. Personnel authorized by the administrative head of the municipal or communal sewage system or other individual(s) acceptable to the Commissioner, will be responsible for collection and disposal of pretreatment sludges, and other "hold and haul" materials.

g. The owner shall allow the personnel authorized by the administrative head of the municipal or communal sewage system or other individual(s) acceptable to the Commissioner, access, from time to time, to wet process areas to perform their duties and inspections.

h. Industrial process-area floors shall be provided with adequate means to contain any spill of restricted toxic or hazardous materials. The design of containment facilities shall be subject to the approval of the Commissioner.

i. A minimum of four (4) groundwater monitoring wells shall be installed at the owner's expense.

j. Financial assurance shall be provided to pay for cleanup of spills. This cost shall be entered as a judgment upon notice against the owner, occupant, tenant, or lessee responsible for such spill or spills.

B. It shall be unlawful to use or store any restricted toxic or hazardous materials on any premises except as follows:

1. a. the intended use of the product stored is solely for on-site heating, or intermittent stationary power production such as stand-by electricity generation or irrigation pump power; and

b. the facility for such storage is intended solely for the storage of kerosene, number 2 fuel oil, number 4 fuel oil, number 6 fuel oil, diesel oil or lubricating oil; and

c. the facility for such storage is constructed in accordance with the requirements of Article 12 of the Suffolk County Sanitary Code for new construction; and

d. the materials so stored are not industrial wastes from processes containing restricted toxic or hazardous materials; and

e. the materials stored are not intended for resale; or

2. a. for buildings with gross floor area of less than or equal to 20,000 square feet (s.f.), the materials so stored are in containers where the total liquid capacity stored at any time does not exceed 250 gallons and where the dry storage in bags, bulk or small containers does not exceed 2,000 pounds; and

b. for buildings with gross floor area greater than 20,000 square feet (s.f.), the materials so stored are in containers where the total liquid capacity stored at any time does not exceed 0.0125 gals/s.f. of gross floor area and where the dry storage in bags, bulk or small containers does not exceed 0.1 pounds/s.f. of gross floor area; and

c. for the purpose of determining quantity of allowable storage, the internal fluids within production machinery shall not be included; and

d. if storage of restricted toxic or hazardous materials at a facility exceeds 1250 gallons or 10,000 pounds dry storage, then an annual environmental audit is to be conducted of the property, buildings and appurtenances, and the audit will conform to any standards which may be promulgated by the Commissioner; or

3. a. the materials so stored are intended solely for treatment or disinfection of water or sewage in treatment processes located at the site; or

4. a. the materials are stored solely incident to office operations, or wholesale/retail sales on premises and are not processed, pumped, packaged, or repackaged at the site; and

b. for the purpose of these regulations, Office Operations means a place in which business, clerical or professional activities are exclusively conducted and there are no manufacturing or other industrial activities; and

c. wholesale storage shall be limited to 5-gallon maximum size containers and the total storage capacity shall not exceed the storage allowed under §760-706 B.2.b or 5,000 gallons or 40,000 pounds of dry storage in bags, bulk, or small containers, whichever is greater; or

5. a. the materials are stored at a service station or similar installation solely incident to the distribution of gasoline, kerosene, diesel oil or other petroleum products for motor vehicular uses and repair; and

b. the facility for such storage is constructed in accordance with the requirements of Article 12 of the Suffolk County Sanitary Code for new construction; or

6. a. the materials are stored at an establishment for which a permit has been secured in accordance with §760-706.A.3, and a permit for such

storage has been granted by the Department.

7. a. the materials are stored on a farm site solely incident to on-premises use, and consist of fertilizers, pesticides, or other agricultural chemicals to be applied in accordance with the provisions of §760-706.A.1.

C. The provisions of §760-706.A and §760-706.B of this Article shall not apply to residential facilities, but shall be applicable:

1. immediately for all non-residential facilities which have not been approved, constructed, or put into operation prior to the effective date of this Article; and

2. immediately for all non-residential facilities which were approved, constructed, or put into operation prior to the effective date of this Article upon:

a. any change in use or process which results in an increase of mass loading in the discharge of restricted toxic or hazardous materials, or introduces a toxic or hazardous material not previously discharged; or

b. any change in use or process which results in an increase of the storage or change of type of restricted toxic or hazardous materials.

D. When upgraded in accordance with the time schedule specified in Article 12, existing facilities, including those for petroleum products, not otherwise covered by items §760-706.A., §760-706.B. or §760-706.C., above, shall conform to the requirements of Article 12 for new construction. These requirements do not apply to facilities upgraded in accordance with Article 12 prior to the effective date of this Article.

§760-707 Permits

A. All permits required by this Article shall be applied for in accordance with the provisions of Article 3 of the Suffolk County Sanitary Code.

B. All persons required to obtain a permit by reason of any law, rule or regulation in effect prior to the effective date of this Article shall be governed by such law, rule or regulation in determining when said permit shall be obtained.

C. All persons newly required to obtain a permit by this Article due to any act or condition in existence as of the date this Article becomes effective, shall apply for said permit within one (1) year of that date.

D. All persons required to obtain a permit by this Article due to any act or condition not in existence on the effective date of this Article must apply for and receive said permit prior to undertaking such act or creating such condition.

§760-708 Emergency Embargo; Seizure

A. In accordance with the general provisions of Article 2 of the Suffolk County Sanitary Code, the Commissioner or his authorized agent is authorized to seize and embargo materials consisting of industrial wastes, toxic or hazardous materials, or any combination thereof when in the judgment of the Commissioner, the nature and condition of said material constitutes an actual or potential hazard to the source of drinking water supply.

B. The following additional requirements shall also apply:

1. When materials are embargoed or seized pursuant to subsection A. above, they shall not be moved, used or removed except by or under the direction of an agent authorized by the Commissioner.

2. It shall be unlawful for a person not authorized by the Commissioner to remove or alter an embargo order or tag.

3. After having embargoed, condemned or otherwise seized materials pursuant to this section, the Commissioner shall afford the owner of the seized material an opportunity to be heard at a hearing held within ninety-six (96) hours after the seizure. The Commissioner may then vacate the order or sustain it and order a proper and safe disposition of the material seized.

4. Unless ordered otherwise, removal shall be at the expense of the owner.

§760-709 Monitoring and Reporting

A. All persons maintaining subsurface leaching facilities and holding tanks for the purposes defined in §760-703.G shall make them accessible to representatives of the Department for sampling and monitoring purposes. The type of access shall be in conformance with the requirements of the Commissioner.

B. All persons maintaining a discharge of industrial wastes, toxic or hazardous materials, and/or offensive materials pursuant to a permit issued by the Commissioner must, at their own expense, monitor the discharge for such constituents at such intervals as specified in the permit.

1. The samples shall be collected in a manner acceptable to the Commissioner, pursuant to Department standards, and analytical results shall be reported to the Department as specified in the permit.

2. The permittee may employ private laboratory facilities of its own choosing. However, the laboratory shall be approved by New York State Departments of Health or Environmental Conservation or other agency acceptable to the Commissioner for the type of analyses performed.

3. Sampling shall be by an employee of the laboratory which prepares the analysis, and the laboratory shall be responsible for the accuracy and quality of the sample.

C. Owners, tenants and occupants of industrial facilities may be required to install monitoring systems, such as monitoring wells, both upgradient and downgradient in the groundwater flow. The number and location of the monitoring wells and their installation shall be in conformance with the requirements of the Department. The owner, tenant and occupant shall be responsible for all costs, as well as costs for groundwater monitoring and evaluation as required by the Department.

D. The owners of all real property used for non-residential purposes shall, within thirty (30) days of change, report in writing to the Department:

1. New Facility

a. Name of tenant or occupant; address, including tax map number.

b. Description of process, operation, or use.

2. Existing Facility

a. Name of new tenant or occupant; address, including tax map number; description of process, operation, or use.

b. Description of change of process, operation, or use.

This notification requirement shall not apply to changes in tenancy or occupancy of the space where a permit is not, or would not be, required for the use.

§760-710 Requirement to Connect to Public Sanitary Sewer

A. Sewage and industrial wastes from any building or premises shall be discharged directly into a municipal sewage system, if available and accessible. Discharge of industrial wastes to a municipal sewage system shall be in accordance with the applicable sewer use ordinance.

B. If there is no municipal sewage system or facility connecting therewith available and accessible, sewage from any new building or premises shall be discharged directly into a communal sewage system or a facility connecting with a communal sewage system, if available and accessible.

C. If there is no municipal or communal sewage system or facility connecting therewith available and accessible, a private sewage disposal system approved by the Department may be used.

D. In the event that a municipal or communal sewage system or facility connecting therewith becomes available and accessible, any building or premises shall be

connected to such municipal or communal sewage system, and immediately thereafter the use of any other sewage disposal system or facility shall be discontinued.

§760-711 Abandonment of Disposal Systems

Existing disposal systems abandoned as a result of connection to municipal sewage systems or communal sewage systems or different disposal systems or for other reasons shall be removed or permanently sealed in a manner acceptable to the Commissioner.

§760-712 Engineering Plans

A. All plans, specifications, and reports required by this Article shall be prepared by a New York State licensed Professional Engineer unless otherwise prescribed in the New York State Education Law.

B. No permit to construct, reconstruct, modify, use or operate shall be issued without the prior submission of plans and/or reports acceptable to the Commissioner, pursuant to Department standards.

§760-713 Operation, Maintenance and Repair of Sewage or Industrial Waste Treatment Facilities

A. All sewage and industrial waste treatment facilities shall be operated by a person or persons with qualifications acceptable to the Commissioner, pursuant to Department standards.

B. An operator of a sewage or industrial waste treatment system shall be physically present at the sewage or industrial waste treatment plants he is responsible for operating for a period of time each day satisfactory to the Commissioner.

C. This section does not apply to underground septic tank and leaching pool systems used for the disposal of domestic sewage.

D. All sewage or industrial waste treatment facilities shall be operated in strict accordance with the discharge permit issued for the facility.

E. All sewage or industrial waste treatment facilities shall be maintained in good operating condition at all times in accordance with good engineering practice. All structures and equipment shall be protected against corrosion and deterioration. Repairs shall be made in a timely fashion to minimize downtime of equipment.

Preventative maintenance shall be performed on a scheduled basis to anticipate and prevent equipment failure.

§760-714 Enforcement

The provisions of this Article shall be enforced in accordance with the enforcement provisions of Article 2 of the Suffolk County Sanitary Code.

§760-715 Variances and Waivers

In any case where an applicant for a permit or approval is dissatisfied with a determination of the authorized agent to act for the Commissioner, or seeks a variance or waiver from the strict application of the letter of the requirements of this Article, or standards promulgated pursuant to this Article, the applicant may appeal from the determination of the deputy or for consideration of the application to the Board of Review in accordance with the provisions of §760-609 of the Suffolk County Sanitary Code.

§760-716 Separability of Provisions

In the event that any provision of this Article is declared unconstitutional or invalid, or the application thereof to any person or circumstance is held invalid, the applicability of such provision to other persons and circumstances and the constitutionality or validity of every other provision of this Article shall not be affected thereby.

(Adopted 5/22/1985; Amended 4/9/1986, 1/14/1987, 1/24/1990, 11/4/1992, 6/30/1993)

SUFFOLK COUNTY SANITARY CODE - ARTICLE 12

Toxic And Hazardous Materials Storage And Handling Controls

§760-1201 Declaration of Policy

The designated best use of all groundwaters of Suffolk County is for public and private water supply, and of most surface waters for food production, bathing and recreation. The federal government has officially designated the aquifer below Suffolk County as a sole-source for water supply. Therefore, it is hereby declared to be the policy of the County of Suffolk to maintain its water resources as near to their natural condition of purity as reasonably possible for the safeguarding of the public health and, to that end, to require the use of all available practical methods of preventing and controlling water pollution from toxic and hazardous materials.

§760-1202 Statement of Purpose

It is the intent and purpose of this Article to safeguard the water resources of the County of Suffolk from toxic or hazardous materials pollution by controlling or abating pollution from such sources in existence when this Article is enacted and also by preventing further pollution from new sources under a program which is consistent with the above-stated Declaration of Policy.

§760-1203 Definitions

Whenever used in the Article, unless otherwise expressly stated, or unless the context or subject matter requires a different meaning, the following terms shall have the respective meanings set forth or indicated:

A. Aboveground, when referring to tanks, means more than 90 percent exposed above the final ground elevation.

B. Bulk Storage means the loose or bagged torage of dry or semi-dry materials.

C. Commissioner means the Commissioner of the Suffolk County Department of Health Services.

D. Discharge means to release by any means or to relinquish control in a manner

that could result in a release to the surface waters, groundwaters, surface of the ground or below ground. Discharge includes but is not necessarily limited to the following, either singly or in any combination:

1. leaks from the failure of a storage facility;

2. spills during transport or transfer of toxic or hazardous materials;

3. disposal or storage of soils, sand or debris containing toxic or hazardous materials;

4. disposal to: storm drains, cooling water, roof drains, sanitary systems, or any other drainage system or leaching system of toxic or hazardous materials;

5. burial, land-spreading or dumping anywhere of toxic or hazardous materials, including but not limited to landfill and scavenger facilities, notwithstanding that the material so buried, spread or dumped was containerized at the time of said burial, spreading or dumping;

6. passing of toxic or hazardous waste materials to any person;

7. abandonment of containers, tanks, pipes, vehicles or premises containing toxic or hazardous materials or residues. For the purpose of this subdivision, abandonment shall mean:

a. substantially empty and unattended, or

b. the relinquishment or termination of possession, ownership or control without full disclosure to the new owner thereof of containers, tanks, pipes, vehicles or premises containing toxic or hazardous materials or residues, whether by vacating or by disposition thereof, and shall not depend on a mere lapse of time.

E. Double-Walled means constructed with more than one containment layer with space between the layers sufficient to allow monitoring of any leakage into or out of the space.

F. Impervious means a layer of natural and/or man-made material of sufficient thickness, density and composition as to prevent the discharge into the underlying groundwater or adjacent surface waters of any toxic or hazardous substances for a period of at least as long as the maximum anticipated time during which the toxic or hazardous substances will be in contact with the material, and sufficient to allow complete recovery of the spilled product with minimum disturbance of the containment material.

G. New York State Discharge Standards means standards of quality and purity and special standards, and groundwater quality standards and effluent standards, and/or limitations as found in Title 6, Parts 701-703 of the Official New York Compilation of Codes, Rules and Regulations.

H. Pollution means the presence in the environment of conditions and/or contaminants in quantities or characteristics, which are or may be injurious to human, plant or animal life or to property, or which unreasonably interfere with the comfortable enjoyment of life and property throughout such areas of the County as shall be affected thereby.

I. Product-Tight means impervious to the material which is or could be contained therein so as to prevent the detectable seepage of the product through the container. To be product-tight, the container shall be made of a material that is not subject to physical or chemical deterioration by the product being contained.

J. Properly Registered Industrial Waste Scavenger means a person in the business of collecting industrial wastes who carries a current, valid industrial waste collector registration issued by the New York State Department of Environmental Conservation.

K. Substantial Modifications shall mean the construction of any additions to an existing storage facility as defined under §760-1203.M, or restoration, refurbishment or renovation which:

1. increases or decreases the in-place storage capacity of the facility;

2. alters the physical configuration; or

3. impairs or affects the physical integrity of the facility or its monitoring systems.

L. Single-Walled means constructed with walls made of but one thickness of material. Laminated, coated, or clad materials shall be considered as single-walled.

M. Storage Facility means tanks, pipes, vaults, buildings, yards, pavements or fixed containers used or designed to be used, either singly or in any combination thereof, for the storage and/or transmission of toxic or hazardous materials or for the storage of portable containers containing toxic or hazardous materials. This shall include skid or wheel mounted tanks if they are used for storing toxic or hazardous materials in a manner that could be accomplished by use of fixed or permanently installed tanks, but shall not include the temporary use of wheeled or skid mounted tanks for the purpose of dispensing petroleum products into "off- road" vehicles and other equipment used for construction-related purposes at construction sites, or for

temporary use at spill cleanup or groundwater remediation sites.

N. Toxic or Hazardous Materials means any substance, solution or mixture which, because of its quality, quantity, concentration, physical, chemical or infectious characteristics, or any combination of the foregoing, presents or may present an actual or potential hazard to human health or to the drinking water supply if such substance, solution, mixture or combination thereof is discharged to the land or waters of the County of Suffolk. Toxic or Hazardous Materials shall include:

1. each and every substance, material or waste identified or listed anywhere in Part 116, Part 261, or Part 302, Title 40 of the Code of Federal Regulations; or in either or both Part 371 and Part 597, of Title 6 of the New York State Codes, Rules and Regulations;

2. acids and alkalies beyond the pH range of 4 to 10;

3. heavy metal sludges, mixtures and solutions in excess of standards;

4. petroleum products, including fuels and waste oils, except heavy tars and asphalts;

5. organic solvents, including petroleum solvents, halogenated and non-halogenated hydrocarbons;

6. any material listed in Part 703.6 of the Official Compilation of New York Codes, Rules and Regulations, in excess of the concentration standards thereof, except for iron, manganese, foaming agents and pH unless otherwise provided elsewhere in this Article;

7. any substance not included within subdivisions one through six above subsequently declared to be a Toxic or Hazardous Material by the Commissioner;

8. any solid or semi-solid material which, if left to stand or if exposed to water will leach out or wholly or partially dissolve forming a Toxic or Hazardous Material as defined in subdivisions one through seven above.

All Toxic or Hazardous Materials are hereby declared to also be offensive materials for the purposes of Article 5.

O. Toxic or Hazardous Wastes mean:

1. Toxic or Hazardous Materials as defined in subdivision (N) above, generated by or as the result of operations in or the existence of any manufacturing or

other industrial or commercial establishment, which toxic or hazardous materials are not actually used in a final product for sale, and shall include those toxic or hazardous materials retained as byproducts of the operations within such manufacturing or other industrial or commercial establishment for the purpose of recouping salvage value; or

2. Toxic or Hazardous Materials generated by one in possession or control of any residential premises, for which materials disposal is intended, and which waste is not domestic wastewater without the admixture of non-sewage wastewater from any industrial process.

3. All toxic or hazardous wastes are Toxic or Hazardous Materials.

P. Underground, when referring to tanks, means 10 percent or more below the final ground elevation.

Q. Existing Storage Facility means any one constructed before January 1, 1980. It also means any outdoor heating oil tank of 1,100 gallons or less and any indoor heating oil tank of any size constructed before November 1, 1982.

R. New Storage Facility means any one constructed after January 1, 1980, except that for any outdoor heating oil tank of 1,100 gallons or less and for any indoor heating oil tank of any size, it shall mean one constructed after November 1, 1982.

S. Installation shall mean the same as facility.

§760-1204 Powers of the Commissioner

A. The Commissioner may make, or cause to be made, or order the owner or operator of any property or facility to make any investigation or study which, in his/her opinion, is desirable for enforcing this Article or controlling or reducing the potential for contamination of the waters of the County from toxic or hazardous materials. This may include the ordering of a groundwater investigation where information suggests that a discharge of toxic or hazardous materials may have occurred.

B. The Commissioner may order the owner or any other person in possession or control of any land, structure or equipment, or agent of such owner or other person, to take whatever action is necessary in the opinion of the Commissioner to bring said land, structure or equipment into compliance with the provisions of this Article and any standards or regulations promulgated thereunder. Such action may include but is not necessarily limited to the following, either singly or in any combination thereof:

1. ordering tank-testing or the testing of the physical integrity of pipes or any other part of a storage facility or ordering the physical testing of the integrity of an entire storage facility;

2. ordering the removal of the contents of a tank, portable container, storage facility or any part thereof;

3. ordering the removal or abandonment or reconstruction of any installation, tank, storage facility or any part thereof installed in contravention of any of the requirements of this Article or any standards or regulations promulgated thereunder;

4. ordering that physical improvements be performed on any tank, storage facility or part thereof before permitting it to be returned to service including such improvements as tank lining removal and replacement, bottom and structural repairs;

5. ordering the drafting of and/or implementation of contingency plans if there is evidence that such plans may be necessary to protect the public from toxic or hazardous materials stored at any particular facility;

6. ordering the posting of a performance bond or other undertaking either prior to or subsequent to the construction or operation of a storage facility within Suffolk County on a case-by-case basis if evidence indicates such may be necessary to protect the public from the effects of operating or closing such a facility.

C. The Commissioner may require the licensing, pursuant to standards adopted by the Department, of persons and/or companies installing, constructing, testing, inspecting or removing tanks, piping, pipelines, fittings, connections, alarms, and other related equipment required by this Article.

D Notwithstanding any other provision of this Article, if the Commissioner finds a condition which has the potential for contaminating the waters of the County with toxic or hazardous materials, or which otherwise constitutes an immediate danger to public health, and determines that it could appear prejudicial to the public interest to delay action, the Commissioner may serve an order upon the permit holder, or if there is no permit upon the person in charge of the facility or site, citing such conditions and specifying the corrective action to be taken and a time period of less than fifteen (15) days within which such action shall be taken.

Such order may state that a permit is immediately suspended and/or that all operations are to be discontinued forthwith.

Any order requiring certain action or the cessation of certain activities immediately or within a specified period of less than fifteen (15) days shall provide such person an opportunity to be heard, which hearing shall be scheduled for a time no more than fifteen (15) days after the date the order is served.

§760-1205 Prohibited Discharges, Transporting, Disposal, Improper Storage

A. It shall be unlawful for any person to discharge toxic or hazardous materials in Suffolk County, unless such discharge is specifically in accordance with a State Pollutant Discharge Elimination System (SPDES) Permit or other permit issued by or acceptable to the Commissioner for that purpose.

B. It shall be unlawful for any person to pick up, transport or dispose of toxic or hazardous waste materials in Suffolk County without having a valid and appropriate New York State industrial waste collector registration.

C. It shall be unlawful for any industrial waste collector with a registration issued by the New York State Department of Environmental Conservation to fail to maintain a copy thereof on each vehicle operated by said collector at all times.

D. It shall be unlawful for any person to store toxic or hazardous materials in a facility unless the materials of construction of the facility are compatible with the product being stored.

E. No reactive toxic or hazardous materials shall be stored in close proximity to each other in a manner that could allow a reaction to occur in the case of leakage, spillage or fire.

§760-1206 Construction and Modification Permits

A. It shall be unlawful for any person to construct, install or substantially repair or modify a storage facility, or part thereof, without a valid permit therefor issued by or acceptable to the Commissioner.

B. It shall be unlawful for any person in possession of or acting pursuant to a permit issued under this section to act, allow or cause any act in contravention of any provision of the permit.

C. Any permit issued pursuant to this section shall be effective for the specified duration of time indicated thereon, not to exceed one year from the effective date

thereof.

§760-1207 Permits to Operate

A. It shall be unlawful for any person to use, cause to be used, maintain, or fill or cause to be filled with toxic or hazardous materials any storage facility or part thereof without having registered all the tanks at the facility on forms provided by the Commissioner, and without having obtained a valid permit to operate such storage facility or part thereof issued by or acceptable to the Commissioner. Changes to registration information, such as owner name, facility operator, tank contents, use, etc., shall be submitted to the Department by the storage facility owner as they occur.

B. It shall be unlawful for any person in possession of or acting pursuant to a permit issued pursuant to this section to act, permit or cause any act in contravention of any provision of the permit.

C. (Deleted 12/16/92)

D. Any permit issued pursuant to this section shall be effective only for the specified duration of time indicated thereon, not to exceed five (5) years from the effective date thereof. Such permit shall be permanently displayed in a front window of the facility or other equally prominent location clearly visible to any inspector positioned outside the facility.

§760-1208 Exemptions

A. All storage facilities which meet all of the following criteria shall be exempt from all provisions of this Article except those contained in §760-1203 - Definitions; §760-1204 - Powers of the Commissioner; §760-1205 - Prohibited Discharges; §760-1208 - Exemptions; §760-1210.A - New Storage Facilities; §760-1210.F - General Provisions and Requirements; §760-1210.H - Overfill Protection; §760-1211.A.4 - Overfill Detection; §760- 1211.D.1 and 2 - Leaks; Repairs; §760-1213.B.1 and 4 - Transfer Operations; and §760-1220 - Variances and Waivers:

1. the materials so stored are not toxic or hazardous wastes; and

2. the volume of the storage facility is less than 1,100 gallons; and

3. the facility is intended solely for the storage of kerosene, number 2 fuel oil, number 4 fuel oil, number 6 fuel oil, diesel oil or lubricating oil, gasoline in aboveground tanks; and

4. the intended use of the product stored is solely for on-site heating, or intermittent stationary power production such as stand-by electricity generation or irrigation pump power; and

5. the materials stored are not intended for resale.

B. All storage facilities which meet the following criteria shall be exempt from the provisions of this Article contained in §760-1210.B, §760-1210.C, §760-1214, §760-1219, and any regulations or standards promulgated thereunder:

1. the materials so stored are not toxic or hazardous wastes; and

2. the volume of the storage facility is greater than 1,100 gallons; and

3. the facility is intended solely for the storage of kerosene, number 2 fuel oil, number 4 fuel oil, number 6 fuel oil, diesel oil, or lubricating oil; and

4. the intended use of the product stored is solely for on-site heating, or intermittent stationary power production such as stand-by electricity generation or irrigation pump power; and

5. the materials stored are not intended for resale.

C. All storage facilities no longer receiving the benefit of any exemption but which were previously exempted from any or all provisions of this Article shall be required to appropriately conform to all of the provisions of this Article and all regulations and standards promulgated pursuant thereto by November 1, 1983.

D. Tanks for the storage of number 6 fuel oil, or other petroleum products of equivalent viscosity, located outside of the deep recharge areas and water supply sensitive areas as defined in Article 7 of this Code, are exempt from the internal inspection and tank lining requirements.

Diked areas surrounding such tanks, regardless of location, need not be lined with material more impervious than sand due to the viscose nature of the oil at ambient temperature.

E. Existing aboveground tanks that are in contact with the ground, but which are, in the opinion of the Commissioner, too large to be moved, are exempt from the requirement for a secondary containment barrier beneath the tank bottom.

F. All storage of toxic or hazardous materials in containers of five-gallon capacity or smaller where the total capacity stored at any time does not exceed 250 gallons or

where the dry storage in bags, bulk, or small containers does not exceed 2,000 pounds is exempt from all portions of this Article unless specifically ruled otherwise by the Commissioner on a case-by-case basis.

§760-1209 Transfer of Permits Prohibited

It shall be unlawful for any person to transfer a permit issued pursuant to §760-1206 and §760-1207 of this Article from one location to another, from one storage facility to another, or from one person to another. Any permit transferred in violation of this section shall be deemed null and void and without any effect whatsoever as of the date of said unlawful transfer.

However, upon making proper application, a new owner of a facility which was previously operating under a valid permit may continue operation under the terms of the old permit until such time as the new permit is issued or denied.

§760-1210 Underground Storage Facilities

A. New Storage Facilities

1. All new storage facilities used or to be used for the underground storage of toxic or hazardous materials shall be designed and constructed in a manner which will, in the opinion of the Commissioner, provide the maximum reasonable protection available against leakage or spillage from the facility due to corrosion, breakage, structural failure, or other means. Double-walled or equivalent facilities are required for all toxic or hazardous materials, except for tanks for the storage of on-premises heating oil at residential homes. For these, single-walled, non-corrodible facilities may be used. Acceptable designs for tanks include cathodically protected steel; glass fiber reinforced plastic; cathodically protected steel clad with glass fiber reinforced plastic; or other equivalent design approved by the Commissioner.

2. Approval of design by the Commissioner is required before installation, and the determination of equivalency or adequacy lies with the Commissioner.

3. Design, construction, fabrication, and installation of new underground storage facilities shall be in accordance with regulations and standards as they may be adopted by the Commissioner under this Article from time to time.

4. (Deleted 12/16/92)

5. It shall be unlawful for any person to sell for use in Suffolk County, install,

use, put into service or maintain the existence of any new underground storage facility or part thereof if said new storage facility or part thereof fails to conform to all of the provisions of subsections 1, 2, and 3 above, that were in effect at the time of construction and all regulations and standards promulgated thereunder; subject however to the exemptions contained in §760-1208.

B. Existing Storage Facilities

1. (Deleted 12/16/92)

2. It shall be unlawful for any person to substantially modify or cause the substantial modification of any existing underground storage facility or part thereof without complying with the provisions of subdivision A above and all regulations and standards promulgated thereunder.

3. It shall be unlawful to use, or maintain the existence of any existing underground storage facility beyond January 1, 1990, which is intended for use with toxic or hazardous materials with a specific gravity of less than one and which are only slightly soluble in water such as oils and gasoline, without modifying said storage facility so as to comply with all of the provisions of subdivision A above and all regulations and standards promulgated thereunder.

4. It shall be unlawful to use or maintain the existence of any existing underground storage facility beyond January 1, 1987, which is intended for use with any toxic or hazardous materials other than those with a specific gravity of less than one and which are only slightly soluble in water such as oils and gasoline, without modifying said storage facility so as to comply with all of the provisions of subdivision A above and all regulations and standards promulgated thereunder.

C. Single-walled Non-corrodible Facilities

1. Single-walled non-corrodible facilities with leak detection and overfill protection must be upgraded to meet the secondary containment requirements of new construction. It shall be unlawful to use or maintain the existence of any facility of this description beyond January 1, 2010 for the storage of any toxic or hazardous material which is not adequately protected with a secondary containment system.

D. Abandonment

1. It shall be unlawful for any person to use or maintain the existence of an abandoned underground storage facility or part thereof.

2. It shall be unlawful for anyone to sell or transfer to another an improperly abandoned underground storage facility or land containing an improperly abandoned underground storage facility if there exists any reasonable evidence of the existence of such a facility, unless the purchasing party has been made fully aware of the presence of such facility or evidence.

3. It shall be unlawful for any person to repair, alter or prepare for use any abandoned storage facility without first obtaining a permit to construct from the Commissioner.

4. It shall be unlawful for the owner or other person in possession or control of any real property, building or place or vehicle to fail to immediately empty of all toxic or hazardous materials and to completely fill with sand or concrete or permanently remove an abandoned storage facility or part thereof within ninety (90) days of the discovery thereof on or in said real property, building or place pursuant to the provisions of subdivision 1 below unless approval is granted by the Commissioner to do otherwise.

5. For the purposes of this section, an abandoned storage facility or part thereof means one which has remained out of service for two (2) years or more, or which has been declared by the owner to be abandoned.

6. For the purposes of this section, out of service means substantially empty, meaning five (5%) percent or less filled; or not in use, meaning no regular filling or drawing; or not being maintained, meaning lacking adherence to the requirements of this Article; or uncontrolled, meaning not attended or secured; or any combination thereof.

7. For the purposes of this section, discovery means either actual discovery or knowledge of the existence of the abandoned storage facility or part thereof or possession of sufficient knowledge of the facts and circumstances involved so that the existence of the abandoned storage facility or part thereof should have been discovered or known of.

E. Testing and Inspection

1. All existing underground storage facilities or parts thereof which do not meet the construction standards in subdivision A above must be tested and inspected in accordance with the schedule set forth below. It shall be unlawful for any existing underground storage facility owner, operator or lessee to fail to test his/her tanks, and he/she shall be responsible for insuring that an acceptable certificate of test completion is filed with the Commissioner in accordance with the following schedule:

TESTING SCHEDULE FOR EXISTING UNDERGROUND TANKS
AGE OF SYSTEM BY 1980
(in years)

	1-4	5-9	10-14	15-19	20 or more
1980					
1981					X
1982				X	
1983			X		X
1984		X			
1985	X			X	X
1986			X		

ALL TANKS COVERED BY §760-1208.B BY VIRTUE
OF THE 1986 AMENDMENT SHALL BE INITIALLY TESTED IN 1986
IF THE TANK IS TEN (10) YEARS OR OLDER, AND/OR ALL TANKS
SHALL BE TESTED ON THEIR TENTH ANNIVERSARY AND
EVERY FIVE (5) YEARS THEREAFTER UNTIL PERMANENTLY CLOSED.
FULL COMPLIANCE FOR ALL FACILITIES EXCEPT THOSE
DESCRIBED IN §760-1210.B.3

	1-4	5-9	10-14	15-19	20 or more
1987			X		X
1988		X			
1989					
1990	Full Compliance for all Facilities				

2. If for any reason testing satisfactory to the Commissioner cannot be performed, the tank must be removed from service or brought up to the standards of subsection A by the first scheduled test date.

3. The Final Test of the National Fire Protection Association (NFPA), Recommended Practice No. 329 or other test of equivalent or superior accuracy as approved by the Commissioner must be used to comply with the testing and inspection requirement of 760-1210.E.1.

4. Any test and inspection as required by this subdivision shall be performed by a person whose qualifications are acceptable to the Commissioner, pursuant to Department standards, for performing such tests. Certificates of test completion containing the results of such tests as performed shall be prepared by the tester and shall be filed by him/her with the Commissioner within thirty (30) days after

completion of the testing of the storage facility. No certificate of test completion shall be acceptable to the Commissioner to indicate satisfactory compliance with the testing requirements of this subdivision if the qualifications of the tester have not been accepted by the Commissioner prior to the test. No certificate of test completion shall be acceptable to the Commissioner, pursuant to Department standards, if the test and inspection were not performed in accordance with subsection 3 of this subdivision and in accordance with any regulations and standards which may be promulgated pursuant thereto.

5. The Certificate of Test Completion shall be filed on a form provided by the Commissioner and a copy of such form, completed, shall be kept by the storage facility owner, operator or lessee and by the tester for a period of not less than five (5) years from the date of its issuance. It shall be unlawful for the storage facility owner, operator or lessee and for the tester thereof to fail to keep a copy of the Certificate of Test Completion for the required five (5) year period.

6. Certificates of Test Completion shall contain a legally authorized form notice to the effect that false statements made knowingly therein are punishable pursuant to 210.45 of the Penal Law.

7. A Certificate of Test Completion not properly completed and/or not subscribed by the tester shall not be acceptable to the Commissioner.

F. General Provisions and Requirements

1. When an underground storage facility or part thereof is found to be leaking, the portion containing the leak must be immediately emptied of all contents therein and removed from service. It shall be unlawful to cause or permit a leaking underground storage facility or part thereof to remain in service or to continue to retain its toxic or hazardous contents after the owner, operator or lessee of said storage facility or part thereof knows or should have known of the existence of the leak therein.

2. It shall be unlawful for any person to repair or to permit the repair, in place, of any underground storage facility or part thereof which has leaked or has otherwise failed, for the purpose of reusing said storage facility, unless:

a. such repair will result in the storage facility or part thereof complying with the requirements of subdivision A above and all regulations and standards promulgated thereunder; and unless

b. such repair occurs pursuant to plans therefor previously submitted to and approved by the Commissioner.

3. It shall be unlawful for any person to replace or cause the replacement of any underground storage facility or part thereof for any reason if the replacement facility does not meet the requirements of subdivision A above and all regulations and standards promulgated thereunder.

4. It shall be unlawful for any person to use, maintain, or put into service any underground storage facility or part thereof without first complying with the testing and inspection requirements of subdivision E above and regulations and standards promulgated thereunder.

5. It shall be unlawful not to maintain any secondary containment system for underground storage in a dry condition except for tanks that utilize a fluid-filled space between the tank walls for leak detection. Any liquid which enters a secondary containment system shall be removed within 24 hours, the source determined and corrected, and a permanent record of the event made and kept available for inspection by a Department representative.

G. Monitoring and Leak Detection

1. All underground storage facilities or parts thereof must be equipped with means of calculating product delivery and consumption. Accurate records must be kept of all deliveries and consumption and the figures reconciled daily in an approved manner unless a less frequent schedule is allowed by the Commissioner.

2. All underground storage facilities or parts thereof, except those for residential homes, must be provided with a means of monitoring frequently and accurately for any leakage and spillage that might occur. All leak detection systems and tanks shall be monitored by the facility operator at least on a weekly basis and the results recorded and kept with the product records. Leak detection and monitoring can be provided by an electrical continuous leak detection system; visually operated or float operated alarms for tanks in pits; pressure, vacuum or fluid level detectors for double-walled facilities; or other equivalent design approved by the Commissioner. Permanent records of all monitoring shall be kept for a period of five (5) years.

3. It shall be unlawful for the owner or other person in possession or control of a storage facility or part thereof to fail to comply with any of the requirements of this subdivision and of any regulations and standards promulgated pursuant thereto.

H. Overfill Protection

1. A means of overfill protection shall be provided for all new underground

storage facilities or parts thereof and for all replacement underground storage facilities or parts thereof. Overfill protection shall consist of either an overfill prevention device or a product-tight containment capable of intercepting and preventing the release to the ground or groundwater of an overfill spill.

2. It shall be unlawful for the owner, operator or lessee to fail to provide satisfactory overfill protection for any new underground storage facility or part thereof in accordance with the provisions of this subdivision and any regulations and standards promulgated pursuant thereto.

I. Removal of Underground Storage Facilities From Service

1. It shall be unlawful for the owner or any other person in possession or control of an underground storage facility or part thereof, to remove it from service unless:

a. said storage facility or part thereof is declared abandoned, emptied immediately and removed within ninety (90) days of so declaring, and is disposed of as junk by first rendering it vapor-free and by sufficiently perforating it so as to render it unfit for further use; or

b. said storage facility or part thereof is declared abandoned, emptied immediately and removed within ninety (90) days for reuse for the storage of toxic or hazardous materials after having met all of the requirements of subdivision A and all regulations and standards promulgated pursuant thereto; or

c. said storage facility or part thereof is declared abandoned, emptied immediately and removed within ninety (90) days for the storage of other than toxic and hazardous materials in which case the facility shall be emptied, cleaned of all residue, and made safe and vapor-free; or

d. said storage facility is declared temporarily out of service and maintained in accordance with subdivision 3 of this section; or

e. said storage facility or part thereof is declared abandoned, emptied immediately and made inert by completely filling with sand or concrete within ninety (90) days; however, this can only be done by special permission by the Department upon application demonstrating the absence of leaks and upon inspection by the Department or its representatives at the owner's expense, or for extraordinary circumstances where complete removal is unreasonable such as beneath a building foundation; or

f. said storage facility is declared to be suspected of leaking and maintained

in accordance with §760- 1210.F; and

g. proof is obtained and presented to the Department as to whether or not leakage has occurred from said storage facility. Such proof shall be to the satisfaction of the Commissioner.

2. Any declaration of facility abandonment or of taking a facility temporarily out of or returning a facility to service, must be made to the Commissioner in writing.

3. It shall be unlawful for the owner or any other person in possession or control of any underground storage facility or part thereof to render it temporarily out of service unless said storage facility or part thereof substantially meets the requirements of §760-1210.A, and it is emptied of its contents immediately, the fill line, gauge opening and pump line are capped and secured against tampering, the vent line is left open, and approval is granted by the Commissioner. No facility in a temporarily out of service condition shall be returned to use prior to approval by the Commissioner and prior to the successful completion of any tightness testing the Commissioner may require. The temporarily out-of-service designation may be extended in two-year increments by the Commissioner upon application. No tank in a temporarily out-of-service condition may be brought back into service after January 1, 1990 without first meeting the requirements of 760-1210.A.

4. It shall be unlawful for anyone to place toxic or hazardous materials in a facility which is temporarily out of service.

§760-1211 Outdoor Aboveground Storage Facilities

A. New Storage Facilities

1. (Deleted 12/16/92)

2. It shall be unlawful to fabricate, construct, install, use or maintain any new aboveground storage facility or part thereof in a manner which will allow the discharge of a toxic or hazardous material to the ground, groundwaters, or surface waters of Suffolk County.

3. It shall be unlawful to fabricate, construct, install, use or maintain any new aboveground storage facility or part thereof without having constructed around and under it an impervious containment and dike enclosing the storage facility or part thereof, conforming to the following requirements:

a. The volume of the diked area shall be at least 110% of the volume of the largest tank contained therein excluding the volume below the dike level occupied by other tanks. Additional volume up to 10% of the total volume of all other tanks or vessels contained in the diked area may be required if the configuration, arrangement and spacing of the tanks and dikes do not meet National Fire Protection Association standards.

b. The dikes and the entire area enclosed by the dikes including the area under the tanks shall be made permanently impervious to the types of products expected to be stored in the tanks. A tank cannot be switched from one product to another unless the barrier is impervious to the new material stored.

c. Drainage of precipitation from within the diked area shall be controlled in a manner that will prevent any toxic or hazardous material from entering the ground, groundwaters or surface waters of Suffolk County.

d. Alternate designs may be approved if, in the opinion of the Commissioner, they provide protection equivalent to that of a diked enclosure.

4. It shall be unlawful to construct, fabricate, install, use or maintain any new aboveground storage facility without providing a positive means of detecting an overfilling condition therein before any spillage can occur, which detection system shall include, but shall not necessarily be limited to, both visual and audible alarms at a point on the storage facility most frequently manned. The overflow point must be clearly visible to the operator filling the facility or the operator at the receiving facility where possible. If not possible, adequate means must be provided to immediately detect an overflow.

5. It shall be unlawful to fabricate, construct, install, use or maintain any new aboveground storage facility or part thereof without conforming to all regulations and standards promulgated pursuant to this section relating to such new storage facilities.

6. It shall be unlawful to fabricate, construct, install, use or maintain any new aboveground storage facility sitting on the ground and making contact therewith or partially buried in the ground and making contact therewith, or part thereof, unless and until the exterior surface of the areas in contact with the ground are cathodically protected in conformance with a design approved by the Commissioner. The interior bottom of such facilities shall be coated with a properly bonded epoxy coating or other approved coating system to minimize interior corrosion. (See Exemptions Section 760-1208.)

B. Existing Storage Facilities

1. (Deleted 12/16/92)

2. Commencing January 1, 1990, it shall be unlawful for any person to use, maintain or fill with toxic or hazardous materials any existing aboveground storage facility or part thereof without conforming to all of the requirements of subdivision A above and all regulations and standards promulgated pursuant thereto, except as noted in the Exemptions Section 760-1208. In achieving the above compliance, the following schedule shall be adhered to:

a. By January 1, 1985, all interior coating of facilities shall be completed.

b. By January 1, 1985, all facilities shall be protected against overfill.

c. By January 1, 1987, installation of cathodic protection shall be completed on all facilities in contact with the ground which were built prior to 1967.

d. By January 1, 1988, installation of cathodic protection shall be completed on all facilities in contact with the ground which were built between 1967 and 1972.

e. By January 1, 1989, installation of cathodic protection shall be completed on all facilities in contact with the ground which were built between 1972 and 1977.

f. By January 1, 1992, all inspections and interior coating of tanks containing No. 6 fuel oil shall be completed.

3. It shall be unlawful for any person to use, maintain or fill with toxic or hazardous materials an existing aboveground storage facility or part thereof without complying with the following inspection schedule and all regulations and standards promulgated pursuant thereto, and without submitting to the Commissioner a statement of Proof of Inspection.

a. Any owner or other person in possession or control of an aboveground storage facility or part thereof shall have said tanks and vessels inspected and shall file a Proof of Inspection with the Commissioner by January 1, 1985. Where interior coating has not yet been applied, such inspection will be performed before coating.

b. For the purpose of this section, inspection means the inspection of all aboveground tanks and other vessels for the storage of toxic or hazardous materials constituting an aboveground storage facility or part thereof.

c. Any inspection of an existing aboveground storage facility of greater than

10,000 gallon capacity or part thereof as required by this subdivision shall be performed in accordance with a written protocol submitted to and approved by the Commissioner, pursuant to Department standards, by an authorized tank inspection firm or person or by a professional engineer licensed to practice professional engineering in the State of New York, and it shall be performed in compliance with any regulations and standards promulgated pursuant to this section relating to such inspections.

d. Aboveground storage facilities or parts thereof sitting on the ground and in contact therewith or partially buried in the ground and in contact therewith, shall be emptied and cleaned to facilitate inspection of portions thereof not accessible from the outside.

e. Proofs of Inspection must be filed with the Commissioner on a form provided by the Commissioner or one acceptably equivalent thereto within thirty (30) days of each inspection and before the tank is refilled, and a copy of such form shall be kept and maintained by both the owner or other person in possession or control of the aboveground storage facility or part thereof and the inspector for a period of not less than five (5) years from the date of the inspection. The Proof of Inspection form shall be subscribed by both the owner or other person in possession or control of the aboveground storage facility inspected and the inspector. This Proof of Inspection form shall contain a legally authorized form notice to the effect that false statements made knowingly therein are punishable pursuant to 210.45 of the Penal Law.

4. It shall be unlawful for any person to substantially modify or cause the substantial modification of any aboveground storage facility or part thereof without complying with the provisions of subdivision A above and all regulations and standards promulgated pursuant thereto.

C. General Provisions

1. It shall be unlawful for any person to abandon an aboveground storage facility or part thereof. Aboveground tanks, if they are not in active service, must be either placed in a temporarily out of service condition or removed. A temporarily out-of-service tank need not meet all requirements of the Code for storage until it is ready to be brought back into service, however, it must be completely protected from deterioration during the time it is held in a temporarily out-of-service condition. This shall include at least the following:

a. sufficient exterior coating to prevent rusting;

b. cathodic protection continuously applied and maintained for all portions of the tank in contact with the soil.

c. maintenance of the interior in a dry condition to prevent rusting from moisture accumulation.

To place a tank in a temporarily out-of-service condition it must first be cleaned of all residue, vented until dry and safe and secured with hatches opened for ventilation but protected from precipitation. All connections shall be severed or blank-flanged to prevent filling.

Notice must be given to the Department and approval granted before a tank can be placed in a temporarily out of service condition. Approval will be granted for up to two years and can be renewed at two-year intervals upon satisfactory demonstration to the Department that the tank is being maintained sufficiently to prevent degradation.
For the purpose of this subdivision, an abandoned aboveground storage facility or part thereof means one that has remained substantially empty or unattended for one (1) year or more without being either declared temporarily out-of-service or maintained in all respects as an active tank as required by this Code.

2. It shall be unlawful for the owner or other person in possession or control of an aboveground storage facility or part thereof to remove it from service unless:

a. said storage facility or part thereof is disposed of as junk by first rendering it vapor-free and by sufficiently perforating it so as to render it unfit for further use, and demolishing it and removing it from the site; or

b. said storage facility or part thereof is demolished for sale or use elsewhere in which case it must be first cleaned and made vapor-free to be safe in transit, and such reuse shall be in accordance with all pertinent portions of this Article if relocation is to be within Suffolk County; or

c. said storage facility is declared temporarily out of service; and

d. the Commissioner has been notified of the intended status of removal from service.

3. It shall be unlawful for anyone to place toxic or hazardous materials in an abandoned or temporarily out-of-service aboveground storage facility.

4. It shall be unlawful for any person to bring an abandoned aboveground storage facility back into service without meeting all of the requirements of subsections A or B above. No abandoned facility shall be brought back into service without a complete inspection acceptable to the Commissioner.

5. It shall be unlawful for any person to bring a temporarily out of service facility

back into use after January 1, 1990, without first meeting all the requirements of subsections A or B above.

6. It shall be unlawful for the owner or other person in possession or control of an aboveground storage facility or part thereof to fail to empty, clean, and inspect pursuant to subsection B.3.c above, to file Proof of Inspection pursuant to subsection B.3.e above, to leak test, and/or to recoat if necessary every seven (7) years each tank or vessel for the storage of toxic or hazardous materials within the said storage facility or part thereof.

7. It shall be unlawful for any person to replace or cause the replacement of any aboveground storage facility or part thereof for any reason without complying with the new storage requirements of subdivision A above and without complying with the inspection and Proof of Inspection requirements of subsections B.3.c and B.3.e, respectively.

8. It shall be unlawful for any person to use, maintain, construct, fabricate, modify or install any aboveground storage facility or part thereof without conforming to all plans and specifications submitted to and approved by the Commissioner prior to such use, maintenance, construction, fabrication, modification or installation.

9. It shall be unlawful after January 1, 1990 for any person to use, maintain, construct, fabricate, modify or install any aboveground storage facility or part thereof, which has tanks that rest on the ground or which has underground piping, unless permanent groundwater monitoring wells are installed to the satisfaction of the Department for the purpose of detecting any leakage that may have occurred from the facility into the ground. The wells shall be constructed and installed in accordance with standards established by the Department and shall number 4 (1 upstream and 3 downstream) unless directed otherwise by the Department.

D. Leaks; Repairs

1. When an aboveground storage facility or part thereof is found to be leaking, it must immediately be emptied of all contents therein contained and removed from service unless approval is specifically granted by the Commissioner to do otherwise.

2. It shall be unlawful for the owner or other person in possession or control of a leaking aboveground storage facility or part thereof to cause or permit it to remain in service or to continue to retain its toxic or hazardous contents after said owner or other person knows or should have known of the existence of the leak.

3. It shall be unlawful for any person to reuse and repair or cause the reuse and repair of an aboveground storage facility or part thereof which is leaking or which has leaked without:

a. performing or having said repairs performed in accordance with a written protocol submitted to and approved by the Commissioner prior to said repairs; and

b. inspecting or having said leaking storage facility or part thereof inspected by a person whose qualifications are acceptable to the Commissioner, with such inspection in accordance with subsection B.3.c above and filing a Proof of Inspection in accordance with subsection B.3.e above, with such inspection performed and Proof of Inspection filed prior to reuse of the storage facility or part thereof or filling it with a toxic or hazardous material but after repairs have been effected.

§760-1212 Piping, Fittings, Connections

A. New Installations

1. (Deleted 12/16/92)

2. All new installations shall:

a. be fabricated, constructed and installed in a manner that will prevent the escape of the toxic or hazardous materials contained therein to the ground, groundwater or surface waters of Suffolk County; and

b. be protected against corrosion by the use of non-corrodible materials, cathodic protection with coatings approved by the Commissioner or the functional equivalent of the foregoing options approved by the Commissioner; and

c. be designed, constructed and installed with access points as required by the Commissioner to permit periodic pressure testing of all underground piping without the need of extensive excavation; and

d. be designed, constructed and installed with a simple, effective, reliable means of monitoring the new installation for leakage including a warning device to indicate the presence of a leak, spill or other failure or breach of integrity for piping installed underground or in areas where piping is not clearly visible; and

e. be constructed of double-walled pipe or be constructed in durable product-tight galleries or otherwise be protected by a secondary containment system approved by the Commissioner. This applies to aboveground as well as below ground piping, except that piping for No. 6 oil need not have secondary containment other than underground in the groundwater management zones and water supply sensitive areas and where a discharge from a pipe might threaten surface waters.

3. It shall be unlawful for any person to fabricate, construct, install, use or maintain or to cause the fabrication, construction, installation, use or maintenance of any new substantial installation or part thereof for use with toxic or hazardous materials:

a. without previously having submitted plans therefor to the Commissioner, and without having received approval of said plans; and

b. without complying with the plans submitted to and approved by the Commissioner as required in subsection A.3.a above; and

c. without complying with the provisions of subsections A.1 and A.2 above and any regulations and standards promulgated thereunder.

B. Existing Installations

1. (Deleted 12/16/92)

2. Existing aboveground piping and underground piping not associated with underground tanks shall be brought into conformance with the provisions of subdivision A above by January 1, 1995.

Underground piping associated with underground tanks shall be brought into conformance with the provisions of subdivision A above at the time the tanks are upgraded.

3. (Deleted 12/16/92)

4. (Deleted 12/16/92)

C. General Provisions

1. Notwithstanding the requirements of subsection C.4, it shall be unlawful for the owner or other person in possession or control of a new or existing installation or part thereof not to test said installation or part in accordance with

the procedures set forth in subsection C.4 and in all regulations and standards promulgated thereunder whenever the Commissioner has determined that such a test is necessary, or whenever the Commissioner has ordered that such a test be performed.

2. Whenever an existing or new installation or part thereof is found to be leaking, it must immediately be emptied of all contents therein contained and removed from service.

a. It shall be unlawful for the owner or other person in possession or control of said leaking installation or part thereof to cause or permit it to remain in service or to continue to retain its toxic or hazardous contents after said owner or other person knows or should have known of the existence of the leak.

b. It shall be unlawful for any person to repair or cause the repair of any new or existing installation or part thereof which has leaked or otherwise failed without performing said repairs or having said repairs performed in a manner approved by the Commissioner.

c. It shall be unlawful for any person to reuse or cause the reuse of any new or existing installation or part thereof which had leaked or otherwise failed without repairing said installation pursuant to the provisions of subsection C.2.b above and all regulations and standards promulgated thereunder.

d. It shall be unlawful for any person to reuse or to cause the reuse of any new or existing installation or part thereof which had leaked or otherwise failed without repairing said installation or part so as to conform to the requirements of subdivision A above and all regulations and standards promulgated thereunder.

e. It shall be unlawful for any person to reuse or cause the reuse of any new or existing installation or part thereof which had leaked or otherwise failed without inspecting or having said installation or part inspected subsequent to the completion of any repairs but prior to said reuse by a person whose qualifications are acceptable to the Commissioner in accordance with §760-1211.B.3.c and any regulations and standards promulgated thereunder and without filing with the Commissioner a Proof of Inspection prior to said reuse in accordance with §760-1211 B.3.e and any regulations and standards promulgated thereunder.

3. It shall be unlawful not to maintain a secondary containment piping system in a dry condition unless it is a system that depends on the space between primary and secondary pipes being filled with fluid for leak detection in which case it shall

be unlawful not to maintain the leak detection fluid at the proper level. Any liquid which enters a secondary containment system shall be removed within 24 hours.

4. It shall be unlawful for the owner or other person in possession or control of any single-walled piping installation or part thereof to fail to pressure test said piping or part thereof by January 1, 1994 and every year thereafter.

Testing of all pressure piping shall be to at least 150% of maximum operating pressure, but not to exceed the manufacturer's maximum design specifications, and the pressure shall be held for at least one-half hour.

5. It shall be unlawful for the owner or other person in possession or control of an existing installation or part thereof when testing or contracting to test said installation or part pursuant to subsection C.4 above:

a. to fail to test or have said installation or part thereof tested by a person whose qualifications are acceptable to the Commissioner; and

b. to fail to test or have tested said installation in a manner acceptable to the Commissioner; and

c. to fail to test or have tested said installation in accordance with a written protocol submitted to and approved by the Commissioner prior to said test; and

d. to fail to test or have tested said installation in accordance with any regulations or standards which may be promulgated under this subdivision relating to said testing; and

e. to fail to submit to the Commissioner within thirty (30) days of said test a completed Certificate of Test Completion form, pursuant to §760-1210.E.3-6 and any regulations and standards promulgated thereunder.

§760-1213 Transfer of Toxic or Hazardous Materials

A. Transfer Facilities

1. Transfer facilities means truck fill stands and/or any other facility for the loading or unloading of toxic or hazardous materials.

2. It shall be unlawful for any person to fabricate, construct or install a transfer facility or part thereof:

a. without first submitting plans therefor to the Commissioner and without first obtaining the Commissioner's approval thereof; and

b. without fabricating, constructing and installing said transfer facility or part thereof in accordance with the plans submitted and approved pursuant to subsection A.2.a above; and

c. without providing a simple, effective, reliable means of monitoring the transfer facility or part thereof for leakage or spillage, including a warning device; and

d. without providing a level of spill protection equivalent to that provided by a fill stand area completely paved and curbed with an impervious material and drained to a holding tank of adequate size to contain any spill that could reasonably be expected to occur from the normal operation of the facility, and roofed so as to exclude precipitation which would otherwise tend to fill the holding tank.

3. It shall be unlawful for any person to operate, maintain or use a transfer facility or part thereof so as to permit the escape therefrom of toxic or hazardous materials to the ground, groundwaters or surface waters of Suffolk County. All holding tanks associated with spill control shall be maintained in an empty condition at all times to provide maximum storage capacity at the time of a spill.

4. It shall be unlawful for any person to fabricate, construct, install, use, operate or maintain any transfer facility or part thereof without doing so in accordance with all regulations and standards pertaining thereto which may be promulgated by the Commissioner.

B. Transfer Operations

1. It shall be unlawful for any person to transfer, cause the transfer or permit the transfer of toxic or hazardous materials to or from a storage facility, part thereof or vehicle, where conditions at the transfer facility are inadequate at the time of said transfer to ensure a safe transfer operation without the occurrence of spills, leaks or accidents.

2. Failure of a transfer facility to conform and comply with the provisions of subdivision A and all regulations and standards promulgated thereunder shall constitute a rebuttable presumption that conditions at said transfer facility are inadequate for the purposes of subsection B.1 above.

3. The transfer of toxic or hazardous materials to any storage facility or part

thereof which does not comply with all provisions of this Article applicable thereto and any regulations and standards promulgated under this Article applicable thereto, shall constitute a rebuttable presumption that conditions at said transfer facility are inadequate for the purposes of subdivision B.1 above.
4. Conditions at the transfer facility shall be deemed to be inadequate at the time of a transfer if:

a. the transfer facility is constructed so that all possible points of overflow are not visible from the loading and unloading locations; or

b. the truck, storage facility or part thereof being delivered to does not have adequate capacity to contain the amount of toxic or hazardous material being transferred or to be transferred, or if a person performing or causing said transfer does not insure by some reliable means that the truck, storage facility or part thereof has adequate capacity to contain the amount of toxic or hazardous material being transferred or to be transferred.

5. Vehicles shall not be used for transferring toxic or hazardous materials in situations where a permanently installed transfer facility is considered by the Commissioner to be more appropriate, such as multiple deliveries of fuel to small boats at a marina.

§760-1214 Indoor Storage Facilities

A. General

1. An indoor storage facility is specifically intended to include within its meaning all tanks, vessels and appurtenant plumbing which contain or are to contain or be used for the transmission of toxic or hazardous materials regardless of the volume of said tanks and vessels and regardless of the duration of time said tanks and vessels may contain the toxic or hazardous materials and regardless of their use. All processing baths and tanks including dip tanks and rinse tanks and tanks associated with wastewater treatment located indoors shall constitute an indoor storage facility or part thereof.

2. All portable containers and tanks with an individual volume of greater than 80 gallons, stored or located indoors and used to contain toxic or hazardous materials, shall be deemed to be an indoor storage facility or part thereof and shall be subject to all of the provisions of this section and any regulations and standards promulgated pursuant hereto, and not the provisions of §760-1215 and the regulations and standards created thereunder.

B. New Storage Facilities

1. (Deleted 12/16/92)

2. It shall be unlawful to fabricate, construct or install a new indoor storage facility or part thereof unless:

a. plans and specifications for said storage facility have been first submitted to and approved by the Commissioner; and unless

b. said fabrication, construction or installation is accomplished in accordance with the approved plans and specifications submitted pursuant to subsection B.2.a above; and unless

c. said fabrication, construction or installation is accomplished in accordance with all regulations and standards which may be promulgated under this subdivision; and unless

d. the fabrication, construction or installation provides for impervious secondary containment for the new storage facility or part thereof equal to or greater than 110% of the entire volume to be contained; and unless

e. said storage facility or part thereof is fabricated, constructed or installed in a manner which will prevent the release into the ground, groundwaters or surface waters of Suffolk County of any toxic or hazardous materials; and unless

f. any open tanks or vessels containing or to contain toxic or hazardous materials within the storage facility or part thereof in a building equipped with a sprinkler system are provided with head deflectors or automatic covers or the equivalent thereof acceptable to the Commissioner to prevent the overflow of the tanks by reason of flow from the sprinkler system; and unless

g. high level alarms or other adequate means of detecting an impending overfill condition have been provided for all tanks not readily visible by the operator controlling filling.

3. It shall be unlawful to operate, maintain or use a new indoor storage facility or part thereof unless:

a. said storage facility or part thereof has been fabricated, constructed and installed in accordance with all of the provisions of subdivision B above and any regulations and standards promulgated thereunder; and unless

b. said storage facility or part thereof has been inspected prior to said operation, maintenance or use pursuant to the provisions of §760-1211.B.3.c and any regulations and standards promulgated thereunder; and unless

c. Proof of Inspection is filed with the Commissioner within thirty (30) days of the inspection conducted pursuant to subsection B.3.b above and such filing occurs prior to said operation, maintenance or use, and said Proof of Inspection conforms to all of the provisions of §760-1211.B.3.e and any regulations and standards promulgated thereunder; and unless

d. said storage facility or part thereof is operated, used or maintained in a manner which will prevent the discharge of toxic or hazardous materials therefrom into the ground, groundwaters or surface waters of Suffolk County.

4. It shall be unlawful to repair and reuse a new indoor storage facility or part thereof without complying with all of the provisions of subsection B.2 above and all regulations and standards promulgated pursuant thereto.

C. Existing Storage Facilities

1. (Deleted 12/16/92)

2. Commencing November 1, 1982, it shall be unlawful to fabricate, construct, install, modify, operate, maintain or use any indoor storage facility or part thereof which does not conform to all of the provisions of subdivision B above and all regulations and standards promulgated thereunder.

3. It shall be unlawful for any person to operate, maintain or use an existing indoor storage facility or part thereof in a manner which will allow the discharge of toxic or hazardous materials therefrom into the ground, groundwaters or surface waters of Suffolk County.

§760-1215 Portable Containers and Tanks

A. Storage Facilities

1. It shall be unlawful to fabricate, construct, install or otherwise create a storage facility or part thereof for portable containers and tanks in excess of 250 gallons total capacity containing toxic or hazardous materials if the facility has to be used for more than thirty (30) days without:

a. first having submitted satisfactory plans and specifications therefor to the

Commissioner; and without

b. constructing, installing, fabricating or otherwise creating said storage facility in accordance with the reports and plans submitted pursuant to subsection A.1.a above; and without

c. constructing, installing, fabricating or otherwise creating said storage facility so as to prevent the discharge of any of the toxic or hazardous contents of the portable containers therein to the ground, groundwaters or surface waters of Suffolk County; and without

d. providing a chemically resistant pad on which to place the portable containers or tanks, impervious to the toxic or hazardous materials being stored in said containers and tanks; and without

e. providing a complete impervious containment of the storage facility or part thereof sufficient to contain at least thirty (30%) percent of the volume to be stored; and without

f. constructing, fabricating, installing or otherwise creating a storage facility or part thereof in accordance with all regulations and standards promulgated under this subdivision.

2. It shall be unlawful for any person to use, maintain or operate a storage facility containing portable containers or tanks for the storage of toxic or hazardous materials without:

a. preventing the discharge of any of the toxic or hazardous contents of the portable containers or tanks to the ground, groundwaters or surface waters of Suffolk County; and without

b. properly securing the portable containers or tanks containing toxic or hazardous materials so as to protect them from vandalism, unauthorized access and damage by traffic, machinery or falling objects; and without

c. storing the portable containers and tanks containing toxic or hazardous materials indoors except where such storage is prevented by fire regulations, or where sufficient evidence is presented that physical or financial constraints of the facility make indoor storage impractical. Waiver of the indoor storage requirements shall be only by permission of the Commissioner; and without

d. protecting any outdoor storage of portable containers or tanks containing toxic or hazardous materials from damage from heat, cold, rust and other weather-related conditions; and without

e. complying with all regulations and standards promulgated relating to the maintenance, use or operation of a storage facility containing portable containers containing toxic or hazardous materials; and without

f. complying with all of the provisions of subdivision B below and any regulations and standards promulgated thereunder.

B. Handling of Portable Containers or Tanks

1. It shall be unlawful for the owner or other person in possession or control of a storage facility containing portable containers or tanks which contain toxic or hazardous materials:

a. to stack said portable containers or tanks more than two (2) high without using a properly designed storage rack for that purpose, or to attempt any stacking without adequate equipment; and

b. to store said portable containers or tanks in a manner so as to prevent all sides thereof from being available for inspection; and

c. to fail to maintain current inventory records indicating deliveries, consumption, sale and final disposal of all toxic or hazardous materials stored in portable containers or tanks and to maintain said records for five (5) years from the occurrence recorded; and

d. to fail to handle the said portable containers or tanks in accordance with any regulations and standards promulgated pursuant to this subdivision; and

e. to store said portable containers in numbers in excess of the maximum allowed by the approved design of the storage facility.

C. Inspections

1. It shall be unlawful for the owner or other person in possession or control of a storage facility containing portable containers or tanks for the storage of toxic or hazardous materials to fail to have said facility or part thereof containing said portable containers or tanks inspected:

a. prior to application for the renewal of a permit to operate a storage facility issued pursuant to §760-1207; and

b. subsequent to any substantial modification of the storage facility or part thereof containing said portable containers or tanks, and prior to the using or

putting into service of a storage facility or part thereof; and

c. prior to the using or putting into service of said storage facility or part thereof after repairs had been performed on it.

2. It shall be unlawful to fail to have the inspections required by subsection C.1 above performed in accordance with the provisions of §760-1211.B.3.c and all regulations and standards promulgated pursuant thereto and those promulgated under this subdivision.

3. It shall be unlawful to fail to file a Proof of Inspection with the Commissioner within thirty (30) days of the performance of an inspection required by subsection C.1 above complying with the provisions of §760-1211.B.3.e and any regulations and standards promulgated pursuant thereto.

D. It shall be unlawful for any person to repair or modify or to cause or permit said repairs or modifications of a storage facility or part thereof containing portable containers or tanks for the storage of toxic or hazardous materials without performing said repairs or modifications or to have them performed pursuant to a written protocol previously submitted to and approved by the Commissioner.

E. At the discretion of the Commissioner, §760-1215.A.1.d, e, f, and §760-1215.C, may be waived for temporary facilities such as spill cleanup operations.

F. Empty Containers

1. Once toxic or hazardous materials containers are empty and no longer in use, they must be labeled as such, and not reused unless they are properly relabeled with their contents. Unless containers are labeled empty, they must be treated as active containers.

2. Empty containers must be stored in a way that will prevent precipitation from entering the containers. Water accumulated in this manner will be presumed to be contaminated with the previous contents of the containers.

§760-1216 Bulk Storage of Toxic or Hazardous Materials

A. It shall be unlawful for any person to fabricate, construct, install, repair or modify any bulk storage facility or part thereof without doing so in accordance with a written protocol previously submitted to and approved by the Commissioner.

B. It shall be unlawful for any person to fabricate, construct, install, modify, repair, use, maintain or operate any bulk storage facility or part thereof without:

1. doing so in a manner that will prevent the toxic or hazardous materials contained therein from coming into contact with precipitation or other sources of moisture unless there is provision made for collecting and treating the leachate and runoff generated so as to prevent a discharge of toxic or hazardous materials to the ground, groundwaters or surface waters of Suffolk County and so as to prevent the development of an explosive, incendiary or other hazardous or dangerous condition; and without

2. providing for the segregation of and without segregating potentially reactive chemicals which are toxic or hazardous materials or which may react so as to form toxic or hazardous materials, which reaction may present or cause a hazardous or dangerous condition; and without

3. providing for and storing bagged toxic or hazardous materials on pallets, and within a roofed structure which prevents precipitation from reaching the bags; and

4. in the case of an indoor bulk storage facility, without providing for and providing an impervious floor without floor drains with a surrounding impervious dike so as to provide containment for hazardous or toxic materials generated from firefighting within the building; and without

5. providing for and providing adequate security so as to protect the storage facility and toxic or hazardous contents therein from vandalism and accident; and without

6. complying with any regulations and standards which may be promulgated pursuant to this section.

C. Road deicing salt and other deicing materials are toxic or hazardous materials. In addition to the foregoing provisions of this section, road deicing salt may be stored near the shore or other areas where no adverse environmental impact will occur without brine control so long as the Commissioner's approval for such a storage facility has been applied for and received in advance.

§760-1217 Reporting; Records; Clean-up; Maintenance

A. It shall be unlawful for the owner or other person in possession or control of any storage facility or part thereof to fail to report any unauthorized discharge, spill, leak or recognizable loss of toxic or hazardous materials therefrom or the failure of said storage facility to the Commissioner within two (2) hours of the time such owner or other person had sufficient evidence that he knew or should have known of said

unauthorized discharge, spill, leak, loss or failure.

1. A report to the Commissioner shall not be deemed compliance with any reporting requirement of any other federal, state or local law.

B. It shall be unlawful for the owner or other person in possession or control of any storage facility or part thereof to fail to keep records in writing reflecting the types and amounts of toxic or hazardous materials stored in the said storage facility or part thereof at any given time.

1. It shall be unlawful for the owner or other person in possession or control of any storage facility or part thereof to fail to keep records of the disposal or other transfer in or out of the said storage facility or part thereof, such records reflecting the types and amounts of toxic or hazardous materials involved in the transfer. The name and vehicle license and registration numbers of the transporter, and the intended destination must also be included if the material is waste.

2. It shall be unlawful for any person required to keep records by any provision of this Article to fail to maintain said records available for inspection by the Commissioner for at least five (5) years from the date of the event, occurrence or transaction recorded. Copies shall be provided by the owner or operator for the Commissioner if requested.

3. It shall be unlawful for any person required to keep records by any provision of this Article to fail to keep, record and maintain said records in accordance with any regulations and standards promulgated pursuant to this section.

C. It shall be the responsibility and obligation of any person who discharges, or causes or permits the discharge of any toxic or hazardous material to the ground, groundwaters or surface waters of Suffolk County to cease said discharge, to reclaim, recover and/or properly dispose of the discharged toxic or hazardous material and any other substance contaminated therefrom, to restore the environment to a condition and quality acceptable to the Commissioner, and to repair any damages caused thereby, all to the satisfaction of the Commissioner.

1. It shall be unlawful for the owner or any other person in possession or control of any source discharging toxic or hazardous materials to the ground, groundwaters or surface waters of Suffolk County to fail to cease said discharge immediately upon obtaining knowledge or notice of its existence.

2. It shall be unlawful for the owner or any other person in possession or control of any source discharging or which has discharged toxic or hazardous materials to the ground, groundwaters or surface waters of Suffolk County to fail to

reclaim, recover and/or dispose of the discharged toxic or hazardous materials. Where time permits, cleanup shall be in accordance with a written protocol previously submitted to and approved by the Commissioner.

3. It shall be unlawful for the owner or other person in possession or control of any premises or place to fail to reclaim, recover and/or otherwise dispose of any toxic or hazardous materials discharged thereto, in accordance with a written protocol previously submitted to and approved by the Commissioner, in the event the persons described in subsection C.2 above are not ascertainable or otherwise fail to comply with the provisions of subsection C.2. This provision shall not abridge any existing right of action in any person, nor shall it create any new right of action in any person.

4. It shall be unlawful for the owner or any person in possession or control of any source which has discharged toxic or hazardous materials to the ground, groundwaters or surface waters of Suffolk County to fail to restore the environment contaminated or damaged by the said discharge to its condition prior to the discharge, repairing any damages caused thereby in accordance with a written protocol previously submitted to and approved by the Commissioner.

5. It shall be unlawful for any person required by this Article or by any order of the Commissioner to reclaim, recover or otherwise dispose of discharged toxic or hazardous materials and other substances contaminated therefrom and/or to restore the environment to the condition that existed prior to the discharge of toxic or hazardous materials thereto, to fail to perform said required acts pursuant to any regulations and standards promulgated pursuant to this subdivision.

D. All storage facility appurtenances, such as level monitors, leak detection systems, cathodic protection systems, etc., shall be kept in proper operating conditions at all times. All systems shall be inspected and tested at least monthly and records kept on each inspection.

§760-1218 Confidentiality of Records

A. Any information relating to secret processes, or methods of manufacture or production, obtained in the course of an inspection or investigation, or submitted to the Department, shall be kept confidential except for the use and purpose of the Department in the enforcement of this Article and the rules and regulations promulgated thereunder.

B. In the event that a person claims to be unable to file complete reports and/or plans and specifications on the grounds that it relates to and is part of a secret

process or method of manufacture or production, an affidavit signed by an authorized person must be filed with the Commissioner, stipulating:

1. location of process or equipment, specifying the building and the section or part of the building in which it is located;

2. in general terms, the name of the process equipment;

3. means to be employed for the control of water contaminants;

4. nature and estimated rate of discharge of contaminants to the ground or surface waters:

5. authority of the person signing the affidavit;

6. a statement that the installation is related to a secret process or method of manufacture or production.

In the event any such affidavit is filed, the Commissioner shall determine the extent to which an exemption should be granted. Any information relating to secret processes, methods of manufacture or production which may be required, ascertained or discovered by the Commissioner shall not be disclosed and shall be kept confidential.

§760-1219 Posting and Labeling

A. It shall be unlawful for the owner or other person in possession or control of any place, building, land, vehicle or thing to store toxic or hazardous materials therein without conspicuously posting a notice thereat or thereon warning of the presence of such materials and providing any safety information necessary to protect the public and assist emergency response personnel in carrying out their responsibilities.

B. It shall be unlawful for any person to use, maintain or operate any storage facility or part thereof:

1. without clearly labeling the specific contents of each portable container conspicuously on said container; and

2. without clearly labeling the specific contents of each indoor and aboveground tank or vessel conspicuously thereon; and

3. without clearly labeling the specific actual, intended and possible contents of piping associated with any storage facility or part thereof at or near the points of

filling or drawing; and

4. without conspicuously posting any permit issued pursuant to this Article.

C. It shall be unlawful for any person to falsely post or label any container or storage facility or to post an invalid permit.

D. It shall be unlawful for any person to use, maintain or operate any storage facility or part thereof without complying with all regulations and standards promulgated pursuant to this section.

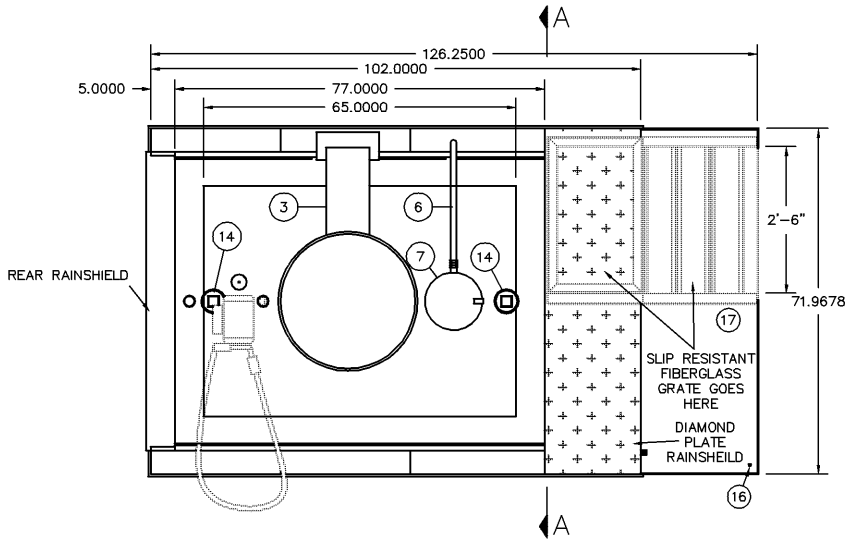
§760-1220 Variances and Waivers

In any case where an applicant for a permit or approval is dissatisfied with a determination of the authorized agent to act for the Commissioner, or seeks a variance or waiver from the strict application of the letter of the requirements of this Article, or standards promulgated pursuant to this Article, he may appeal from the determination of the deputy or for consideration of his application to the Board of Review in accordance with the provisions of §760-609 of the Suffolk County Sanitary Code.

(Adopted 9/12/1979; Effective 1/1/1980; Amended 7/28/1982, 8/29/1984, 4/9/1986, 1/14/1987, 10/5/1988, 4/12/1989, 11/8/1989, 1/24/1990, 5/15/1991, 12/16/1992)

APPENDIX E

Storage Tank Specifications and Weekly Inspection Checklist



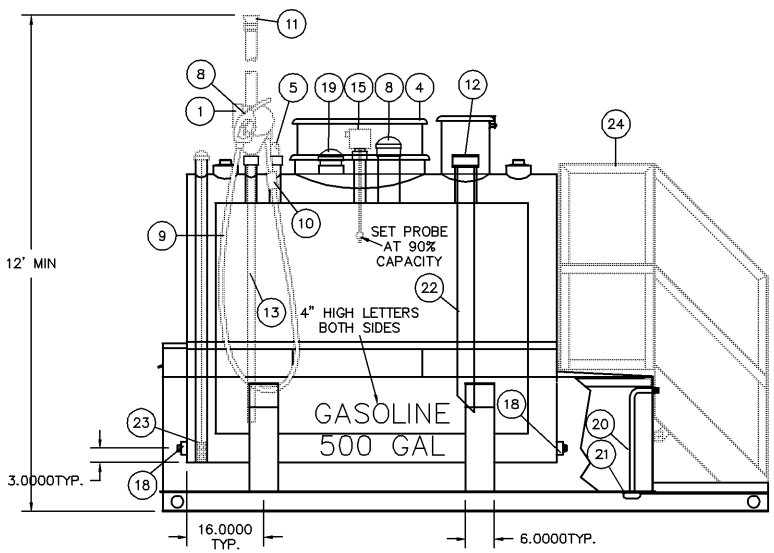
500 GAL GASOLINE TANK – PLAN

SCALE : 1"=2'-6"

NOTES:

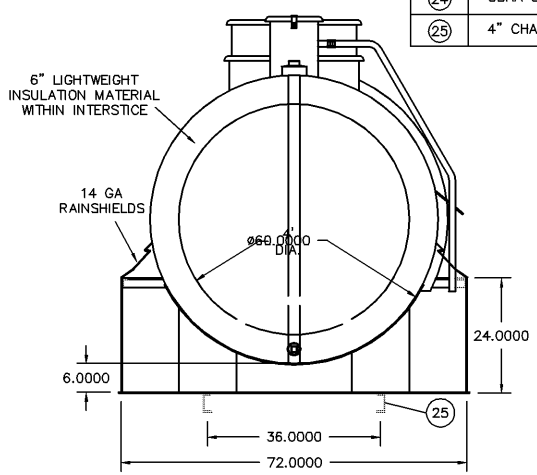
1. PRIMARY TANK:
   INNER & OUTER SHELL – 10 GA. HEAD – 10 GA.
   CONTAINMENT: 7 GA.
2. MATERIAL – MILD CARBON STEEL
3. FACTORY TEST AT 5–7 PSIG.
4. UNIT TO BE UL 2085 LISTED AND LABELED.
5. EXTERIOR FINISH (INCLUDING INTERIOR OF DIKE) – SSPC–SP7 BRUSH OFF BLAST CLEANING & MAB PLYMASTIC 101 WHITE EPOXY.
6. ALL DIMENSIONS ARE APPROXIMATE.
7. CONTAINMENT CAPACITY >110%
8. TANK SHELL AND HEAD WELDS TO BE AS SPECIFIED IN UL142.
9. ANY JOINT NOT DETAILED SHALL BE A CONTINUOS FULL FILLET WELD.
10. A 8' WIDE X 12'10" LONG X 8" THICK CONCRETE PAD REINFORCED WITH 6X6 10–10 WWM MUST BE PROVIDED. TANKS LOCATED IN HEAVILY TRAFFICED AREAS MUST BE PROTECTED BY TRAFFIC BOLLARDS. THE BOLLARDS MUST BE MADE OF SCH80 STEEL PIPE, CONCRETE FILLED AND SET IN THE GROUND TO A DEPTH OF 4'. THE BOLLARDS WILL BE SET IN CONCRETE FOOTINGS. THE BOLLARDS SHALL BE A MINIMUM OF 4' ABOVE GRADE. BOLLARDS SHALL BE PLACED NO MORE THAN 4' APART.
11. A WARRICK ALARM PANEL MODEL DMS 572 IS TO BE SUPPLIED AND SHIPPED LOOSE WITH TANK. PANEL MUST BE MOUNTED OUTSIDE HAZARDOUS AREA. ALL ELECTRICAL WORK TO BE IN ACCORDANCE WITH NEC REQUIREMENTS FOR HAZARDOUS LOCATIONS.

ITEM	DESCRIPTION
1	MODEL T701, 18 GPM PUMP WITH METER
2	4"–8 OZ. EMERGENCY VENT – SHIP LOOSE
3	EMERGENCY VENT OVERFLOW CHUTE
4	VENT DEFLECTOR ASSEMBLY
5	2" LEVEL GAUGE
6	1" OVERFLOW PIPE
7	FILL CONTAINMENT CHAMBER
8	HUSKY AUTOMATIC NOZZLE
9	3/4" X 12' UL LISTED FUEL HOSE
10	OPW "SAFEBREAK" WITH STRAITENING HOSE
11	2" PRESSURE/VAC VENT 2 OZ / 1 OZ
12	4" COAX FILL ADAPTER AND CAP
13	1" SCH. 40 SUCTION PIPE
14	4" PLUGGED FITTING
15	WARRICK FT SERIES HIGH LEVEL ALARM PROBE
16	1/2" DRAIN FITTING WITH PLUG
17	DRIP PAN WITH 2" LIP
18	2" PLUGGED FITTING
19	4" INTERSTITIAL EMERGENCY VENT
20	3/4" PUMPOUT PIPE
21	3" PIPE CAP SUMP
22	COAXIAL DROP TUBE
23	WARRICK MODEL DLP LEAK DETECTOR
24	OSHA STAIRS / PLATFORM
25	4" CHANNEL SUPPORTS



500 GAL GASOLINE TANK – ELEVATION

SCALE : 1"=2'-6"



500 GAL GASOLINE TANK – SECTION AA

SCALE : 1"=2'-6" *PIPING AND ACCESORIES NOT SHOWN FOR CLARITY*

AREO–POWER
UNITIZED FUELER, INC.
103 SMITHTOWN BLVD
SMITHTOWN, NY 11787

CLIENT:

500 GAL. GENERIC GASOLINE

WORK LOCATION:

REV	DATE	BY	REVISION DESCRIPTION

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DWG NO:	
SCALE:	DWN BY:
SHEET:	DATE:

WEEKLY INSPECTION CHECKLIST
ABOVEGROUND STORAGE TANK SYSTEMS

For additional Stage II information refer to the applicable CARB order for your Aboveground Storage Tank system listed below.

COMPONENT	QUESTIONS	YES/NO
Nozzles/Balance	1. Are the nozzle boots torn, slit, taped or loose? 2. Are the nozzles leaking gasoline?	
Nozzles/Healy	1. Are the Healy 400 ORVR Nozzle boots torn, slit, damaged, or loose?	
Hoses/Balance	1. Does the hose loop exceed 10 inches? (See Pump, pg. 7). 2. Are the hoses flattened, kinked, cracked, or taped? 3. Are the hoses lying on the island or ground? (For Smaller AST's, pg. 16).	
Hoses/Healy	1. Is there more than 6 inches of the hose surface touching the island or ground? 2. Are the hoses damaged or leaking gasoline?	
Hose Breakaways (for all self-service islands)	1. Are the breakaways installed in the proper direction? 3. Are the breakaways leaking gasoline?	
Tank Vent Lines	1. Does the tank vent pipe have a PV Valve installed?	

Armorcast AST	**G-70-190**	**Envirovault AST**	**G-70-167**
Convault AST	**G-70-116-F**	**Fireguard AST**	**G-70-162A**
Ecovault AST	**G-70-157**	**Healy 400 ORVR AST**	**G-70-187**
Hoover AST	**G-70-161**	**FuelSafe**	**G-70-137**

Stage II System Maintenance Log.

Period: ____ / ____

Records of Weekly Visual Inspections/Stage II System Maintenance		
Date inspection performed	Components repaired or replaced as a result of visual inspection	Inspector signature

APPENDIX F

Traffic Analysis

- February 2006 Highway Capacity Software (HCS) Output Files
- August 2007 HCS Output Files
- August 2007 Traffic Volumes

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: AM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2006-Ex-seasonal adj. applied

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	47	578	210	53	298	29	64	123	35	41	222	47
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
WB Left	P				SB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	32.0					20.0		
Yellow	4.0					3.0		
All Red	2.0					2.0		

Cycle Length: 63.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	823	1620	1.17	0.51	103.0	F	103.0	F
Westbound								
LTR	811	1597	1.07	0.51	66.0	E	66.0	E
Northbound								
LTR	484	1524	0.52	0.32	18.6	B	18.6	B
Southbound								
LTR	518	1632	0.65	0.32	21.4	C	21.4	C

Intersection Delay = 69.5 (sec/veh) Intersection LOS = E

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: AM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2006-Ex-seasonal adj. applied
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	47	578	210	53	298	29	64	123	35	41	222	47
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
PK 15 Vol	14	166	60	15	193	8	18	35	10	11	60	13
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		959			864			253			337	
%InSharedLn												
Prop LTs		0.056			0.071			0.289			0.134	
Prop RTs		0.251			0.038			0.158			0.151	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												
Duration	0.25			Area Type: All other areas								

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	
Green		32.0			20.0
Yellow		4.0			3.0
All Red		2.0			2.0

Cycle Length: 63.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	47	578	210	53	298	29	64	123	35	41	222	47
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
Adj flow	54	664	241	61	770	33	73	140	40	45	241	51
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		959			864			253			337	
Prop LTs		0.056			0.071			0.289			0.134	
Prop RTs		0.251			0.038			0.158			0.151	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.957			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.966			0.995			0.979			0.980		
fLT	0.922			0.884			0.790			0.929		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1620			1597			1524			1632		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	V/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	959	1620	# 0.59	0.51	823	1.17
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	864	1597	0.54	0.51	811	1.07
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	253	1524	0.17	0.32	484	0.52
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	337	1632	# 0.21	0.32	518	0.65
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.80
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.97

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/c	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
LTR	1.17	0.51	15.5	1.000	823	0.50	87.5	0.0	103.0	F	103.0	F
Westbound												
LTR	1.07	0.51	15.5	1.000	811	0.50	50.5	0.0	66.0	E	66.0	E
Northbound												
LTR	0.52	0.32	17.6	1.000	484	0.13	1.0	0.0	18.6	B	18.6	B
Southbound												
LTR	0.65	0.32	18.5	1.000	518	0.23	2.9	0.0	21.4	C	21.4	C

Intersection delay = 69.5 (sec/veh) Intersection LOS = E

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 63.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.

For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 63.0 sec				
Total actual green time for LT lane group, G (s)	32.0	32.0	20.0	20.0
Effective permitted green time for LT lane group, g(s)	32.0	32.0	20.0	20.0
Opposing effective green time, go (s)	32.0	32.0	20.0	20.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	54	61	73	45
Proportion of LT in LT lane group, PLT	0.056	0.071	0.289	0.134
Proportion of LT in opposing flow, PLTo	0.07	0.06	0.13	0.29
Adjusted opposing flow rate, Vo (veh/h)	864	959	337	253
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	0.95	1.07	1.28	0.79
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	15.12	16.78	5.90	4.43

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	8.0	7.1	2.3	4.5
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.49	0.49	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	12.45	13.98	7.74	5.24
gu=g-gq if gq>=gf, or = g-gf if gq<gf	19.55	18.02	12.26	14.76
n=Max(gq-gf)/2,0)	2.25	3.46	2.70	0.35
PTHo=1-PLTo	0.93	0.94	0.87	0.71
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.06	0.07	0.29	0.13
EL1 (refer to Exhibit C16-3)	3.28	3.59	1.95	1.79
EL2=Max((1-Ptho**n)/Plto, 1.0)	2.15	3.23	2.41	1.00
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.07	0.07	0.13	0.11
gdiff=max(gq-gf,0)	4.50	6.92	5.41	0.70
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.92	0.88	0.79	0.93
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.922	0.884	0.790	0.929

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 63.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	15.5	15.5	0.00	34.0	0.0	103.0
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	15.5	15.5	0.00	13.2	0.0	66.0
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	21.5	17.6	0.00	0.0	0.0	18.6
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	21.5	18.5	0.00	0.0	0.0	21.4
	0.0						0.0	

Intersection Delay 69.5 sec/veh Intersection LOS E

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	959	864	253	337
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1620	1597	1524	1632
LnCapacity	823	811	484	518
Flow Ratio	0.59	0.54	0.17	0.21
v/c Ratio	1.17	1.07	0.52	0.65
Grn Ratio	0.51	0.51	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	16.8	15.1	3.6	5.1
kB	0.8	0.8	0.4	0.4
Q2	21.4	13.0	0.4	0.7
Q Average	38.1	28.1	4.0	5.8
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	45.8	33.8	4.8	6.8
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.6	1.5
BOQ	53.4	39.4	6.3	8.9
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.7	1.7
BOQ	57.2	42.2	6.9	9.8
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	2.0	1.9
BOQ	61.0	45.1	7.9	11.1
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	2.4	2.3
BOQ	64.9	48.0	9.8	13.5
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2006-Ex-seasonal adj. applied

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	47	484	99	41	735	53	222	152	29	35	158	58
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		54.0						30.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	895	1574	0.83	0.57	25.3	C	25.3	C
Westbound								
LTR	959	1687	0.98	0.57	45.1	D	45.1	D
Northbound								
LTR	362	1146	1.36	0.32	210.0	F	210.0	F
Southbound								
LTR	497	1575	0.56	0.32	28.3	C	28.3	C

Intersection Delay = 70.3 (sec/veh) Intersection LOS = E

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: PM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2006-Ex-seasonal adj. applied
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	47	484	99	41	735	53	222	152	29	35	158	58
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
PK 15 Vol	14	142	29	12	209	15	68	46	9	10	43	16
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		740			942			491			276	
%InSharedLn												
Prop LTs		0.074			0.050			0.552			0.138	
Prop RTs		0.157			0.064			0.071			0.232	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												
Duration	0.25			Area Type: All other areas								

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	54.0	30.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	47	484	99	41	735	53	222	152	29	35	158	58
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
Adj flow	55	569	116	47	835	60	271	185	35	38	174	64
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		740			942			491			276	
Prop LTs		0.074			0.050			0.552			0.138	
Prop RTs		0.157			0.064			0.071			0.232	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.959			0.961			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.979			0.991			0.990			0.969		
fLT	0.883			0.936			0.587			0.907		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1574			1687			1146			1575		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	740	1574	0.47	0.57	895	0.83
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	942	1687	# 0.56	0.57	959	0.98
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	491	1146	# 0.43	0.32	362	1.36
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	276	1575	0.18	0.32	497	0.56
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.99
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.12

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
LTR	0.83	0.57	16.7	1.000	895	0.50	8.6	0.0	25.3	C	25.3	C
Westbound												
LTR	0.98	0.57	20.0	1.000	959	0.50	25.1	0.0	45.1	D	45.1	D
Northbound												
LTR	1.36	0.32	32.5	1.000	362	0.50	177.5	0.0	210.0	F	210.0	F
Southbound												
LTR	0.56	0.32	27.0	1.000	497	0.15	1.4	0.0	28.3	C	28.3	C

Intersection delay = 70.3 (sec/veh) Intersection LOS = E

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)		54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)		54.0	54.0	30.0	30.0
Opposing effective green time, go (s)		54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		55	47	271	38
Proportion of LT in LT lane group, PLT		0.074	0.050	0.552	0.138
Proportion of LT in opposing flow, PLTo		0.05	0.07	0.14	0.55
Adjusted opposing flow rate, Vo (veh/h)		942	740	276	491
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.45	1.24	7.15	1.00
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		24.86	19.53	7.28	12.96

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	12.2	14.2	0.0	7.7
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	17.45	13.51	10.00	18.27
gu=g-gq if gq>=gf, or = g-gf if gq<gf	36.55	39.83	20.00	11.73
n=Max(gq-gf)/2,0)	2.62	0.00	5.00	5.30
PTHo=1-PLTo	0.95	0.93	0.86	0.45
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.07	0.05	0.55	0.14
EL1 (refer to Exhibit C16-3)	3.53	2.91	1.84	2.28
EL2=Max((1-Ptho**n)/Plto, 1.0)	2.52	1.00	3.80	1.79
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.04	0.04	0.10	0.08
gdiff=max(gq-gf,0)	5.24	0.00	10.00	10.60
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.88	0.94	0.59	0.91
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.883	0.936	0.587	0.907

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	16.7	0.00	0.0	0.0	25.3
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.0	0.00	0.0	0.0	45.1
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	32.5	0.00	32.3	0.0	210.0
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	27.0	0.00	0.0	0.0	28.3
	0.0						0.0	

Intersection Delay 70.3 sec/veh Intersection LOS E

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	740	942	491	276
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1574	1687	1146	1575
LnCapacity	895	959	362	497
Flow Ratio	0.47	0.56	0.43	0.18
V/c Ratio	0.83	0.98	1.36	0.56
Grn Ratio	0.57	0.57	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	15.9	24.3	13.0	6.0
kB	1.1	1.2	0.4	0.5
Q2	4.3	10.6	17.5	0.6
Q Average	20.2	34.9	30.4	6.6
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.1	1.2
BOQ	24.3	41.9	34.9	7.8
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.4	1.5
BOQ	28.4	48.9	42.9	10.2
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.5	1.7
BOQ	30.5	52.4	45.3	11.2
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.6	1.9
BOQ	32.7	55.9	49.0	12.7
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	1.8	2.3
BOQ	34.9	59.4	54.7	15.2
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2006-Ex seasonal adj. applied

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	47	659	105	41	502	58	105	163	53	58	117	41
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		37.0						21.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	898	1674	0.99	0.54	44.1	D	44.1	D
Westbound								
LTR	876	1633	0.74	0.54	17.8	B	17.8	B
Northbound								
LTR	458	1504	0.72	0.30	27.0	C	27.0	C
Southbound								
LTR	432	1421	0.57	0.30	22.1	C	22.1	C

Intersection Delay = 30.8 (sec/veh) Intersection LOS = C

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	Saturday Peak
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2006-Ex seasonal adj. applied

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	47	659	105	41	502	58	105	163	53	58	117	41
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
PK 15 Vol	13	181	29	11	135	16	27	42	14	17	34	12
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		891			646			331			248	
%InSharedLn												
Prop LTs		0.058			0.068			0.326			0.270	
Prop RTs		0.129			0.096			0.166			0.190	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	47	659	105	41	502	58	105	163	53	58	117	41
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
Adj flow	52	724	115	44	540	62	108	168	55	67	134	47
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		891			646			331			248	
Prop LTs		0.058			0.068			0.326			0.270	
Prop RTs		0.129			0.096			0.166			0.190	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound	Westbound	Northbound	Southbound
LG	LTR	LTR	LTR	LTR
So	1900	1900	1900	1900
Lanes 0	1 0 0	1 0 0	1 0 0	1 0
fW	1.000	1.000	1.100	1.000
fHV	0.959	0.960	0.943	0.943
fG	1.000	1.000	1.000	1.000
fP	1.000	1.000	1.000	1.000
fBB	1.000	0.996	1.000	1.000
fA	1.000	1.000	1.000	1.000
fLU	1.000	1.000	1.000	1.000
fRT	0.983	0.987	0.978	0.974
fLT	0.935	0.910	0.780	0.814
Sec.				
fLpb	1.000	1.000	1.000	1.000
fRpb	1.000	1.000	1.000	1.000
S	1674	1633	1504	1421
Sec.				

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	891	1674	# 0.53	0.54	898	0.99
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	646	1633	0.40	0.54	876	0.74
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	331	1504	# 0.22	0.30	458	0.72
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	248	1421	0.17	0.30	432	0.57
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.75
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.90

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.99	0.54	15.9	1.000	898	0.50	28.2	0.0	44.1	D	44.1	D
Westbound												
LTR	0.74	0.54	12.3	1.000	876	0.50	5.5	0.0	17.8	B	17.8	B
Northbound												
LTR	0.72	0.30	21.4	1.000	458	0.28	5.6	0.0	27.0	C	27.0	C
Southbound												
LTR	0.57	0.30	20.2	1.000	432	0.17	1.9	0.0	22.1	C	22.1	C

Intersection delay = 30.8 (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g
Opposing platoon ratio, Rpo (refer Exhibit 16-11)
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]
gq, (see Exhibit C16-4,5,6,7,8)
gu=g-gq if gq>=gf, or = g-gf if gq<gf
n=Max(gq-gf)/2,0)
PTHo=1-PLTo
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]
EL1 (refer to Exhibit C16-3)
EL2=Max((1-Ptho**n)/Plto, 1.0)
fmin=2(1+PL)/g or fmin=2(1+Pl)/g
gdiff=max(gq-gf,0)
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt=[fm+0.91(N-1)]/N**
Left-turn adjustment, fLT

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)		37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)		37.0	37.0	21.0	21.0
Opposing effective green time, go (s)		37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		52	44	108	67
Proportion of LT in LT lane group, PLT		0.058	0.068	0.326	0.270
Proportion of LT in opposing flow, PLTo		0.07	0.06	0.27	0.33
Adjusted opposing flow rate, Vo (veh/h)		646	891	248	331
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.00	0.84	2.07	1.28
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		12.38	17.08	4.75	6.34

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	9.7	11.1	0.4	2.7
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	8.88	13.01	6.03	8.75
gu=g-gq if gq>=gf, or = g-gf if gq<gf	27.31	23.99	14.97	12.25
n=Max(gq-gf)/2,0)	0.00	0.96	2.82	3.04
PTHo=1-PLTo	0.93	0.94	0.73	0.67
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.06	0.07	0.33	0.27
EL1 (refer to Exhibit C16-3)	2.65	3.36	1.78	1.94
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.00	1.00	2.18	2.14
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.12
gdiff=max(gq-gf,0)	0.00	1.93	5.64	6.07
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.94	0.91	0.78	0.81
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.935	0.910	0.780	0.814

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	15.9	0.00	0.0	0.0	44.1
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	12.3	0.00	0.0	0.0	17.8
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	21.4	0.00	0.0	0.0	27.0
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	20.2	0.00	0.0	0.0	22.1
	0.0						0.0	

Intersection Delay 30.8 sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	891	646	331	248
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1674	1633	1504	1421
LnCapacity	898	876	458	432
Flow Ratio	0.53	0.40	0.22	0.17
v/c Ratio	0.99	0.74	0.72	0.57
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	16.9	9.5	5.7	4.0
kB	0.9	0.9	0.4	0.4
Q2	9.5	2.3	0.9	0.5
Q Average	26.4	11.7	6.6	4.5
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	31.7	14.2	7.8	5.3
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.5	1.6
BOQ	37.0	16.8	10.1	7.0
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.7	1.7
BOQ	39.7	18.2	11.1	7.7
QSRatio				
95th Percentile Output:				
fB%	1.6	1.7	1.9	2.0
BOQ	42.4	19.9	12.6	8.8
QSRatio				
98th Percentile Output:				
fB%	1.7	1.8	2.3	2.4
BOQ	45.1	21.7	15.1	10.8
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday a.m. peak (8:00-9:00)
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Exisitng Sat Special

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	9	246	37	20	162	18	36	57	21	22	69	11
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		37.0						21.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	951	1774	0.34	0.54	10.1	B	10.1	B
Westbound								
LTR	917	1710	0.24	0.54	9.2	A	9.2	A
Northbound								
LTR	520	1707	0.24	0.30	18.3	B	18.3	B
Southbound								
LTR	500	1643	0.23	0.30	18.2	B	18.2	B

Intersection Delay = 12.3 (sec/veh) Intersection LOS = B

Phone:
E-Mail:
Fax:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	Saturday a.m. peak (8:00-9:00)
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007 - Exisitng Sat Special

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	9	246	37	20	162	18	36	57	21	22	69	11
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PK 15 Vol	3	68	10	6	45	5	10	16	6	6	19	3
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		324			222			126			113	
%InSharedLn												
Prop LTs		0.031			0.099			0.317			0.212	
Prop RTs		0.127			0.090			0.183			0.106	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination	1	2	3	4		5	6	7	8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	9	246	37	20	162	18	36	57	21	22	69	11
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj flow	10	273	41	22	180	20	40	63	23	24	77	12
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		324			222			126			113	
Prop LTs		0.031			0.099			0.317			0.212	
Prop RTs		0.127			0.090			0.183			0.106	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.959			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.983			0.988			0.975			0.986		
fLT	0.991			0.953			0.888			0.930		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1774			1710			1707			1643		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	324	1774	# 0.18	0.54	951	0.34
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	222	1710	0.13	0.54	917	0.24
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	126	1707	# 0.07	0.30	520	0.24
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	113	1643	0.07	0.30	500	0.23
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.26
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.31

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.34	0.54	9.1	1.000	951	0.50	1.0	0.0	10.1	B	10.1	B
Westbound												
LTR	0.24	0.54	8.5	1.000	917	0.50	0.6	0.0	9.2	A	9.2	A
Northbound												
LTR	0.24	0.30	18.0	1.000	520	0.11	0.2	0.0	18.3	B	18.3	B
Southbound												
LTR	0.23	0.30	17.9	1.000	500	0.11	0.2	0.0	18.2	B	18.2	B

Intersection delay = 12.3 (sec/veh) Intersection LOS = B

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	10	22	40	24
Proportion of LT in LT lane group, PLT	0.031	0.099	0.317	0.212
Proportion of LT in opposing flow, PLTo	0.10	0.03	0.21	0.32
Adjusted opposing flow rate, Vo (veh/h)	222	324	113	126
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	0.19	0.42	0.77	0.46
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	4.26	6.21	2.17	2.41

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	21.3	16.5	5.1	7.4
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	0.59	2.80	1.06	1.58
gu=g-gq if gq>=gf, or = g-gf if gq<gf	15.71	20.55	15.86	13.61
n=Max(gq-gf)/2,0)	0.00	0.00	0.00	0.00
PTHo=1-PLTo	0.90	0.97	0.79	0.68
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.03	0.10	0.32	0.21
EL1 (refer to Exhibit C16-3)	1.74	1.93	1.55	1.57
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.00	1.00	1.00	1.00
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.12
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.99	0.95	0.89	0.93
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.991	0.953	0.888	0.930

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	9.1	0.00	0.0	0.0	10.1
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	8.5	0.00	0.0	0.0	9.2
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	18.0	0.00	0.0	0.0	18.3
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	17.9	0.00	0.0	0.0	18.2
	0.0						0.0	

Intersection Delay 12.3 sec/veh Intersection LOS B

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	324	222	126	113
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1774	1710	1707	1643
LnCapacity	951	917	520	500
Flow Ratio	0.18	0.13	0.07	0.07
v/c Ratio	0.34	0.24	0.24	0.23
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	3.5	2.3	1.8	1.6
kB	0.9	0.9	0.4	0.4
Q2	0.5	0.3	0.1	0.1
Q Average	4.0	2.6	1.9	1.7
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.3	1.2	1.2
BOQ	5.0	3.2	2.3	2.1
QSRatio				
85th Percentile Output:				
fB%	1.5	1.6	1.6	1.6
BOQ	6.1	4.0	3.1	2.7
QSRatio				
90th Percentile Output:				
fB%	1.7	1.8	1.8	1.8
BOQ	6.9	4.6	3.4	3.1
QSRatio				
95th Percentile Output:				
fB%	2.0	2.2	2.0	2.0
BOQ	8.2	5.6	4.0	3.5
QSRatio				
98th Percentile Output:				
fB%	2.4	2.6	2.6	2.6
BOQ	9.5	6.6	5.0	4.5
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday p.m. peak (6:00-7:00)
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Existing Sat Special

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	21	331	61	29	428	20	62	70	36	27	113	19
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		37.0						21.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	923	1721	0.50	0.54	12.0	B	12.0	B
Westbound								
LTR	928	1730	0.57	0.54	13.2	B	13.2	B
Northbound								
LTR	488	1604	0.38	0.30	19.4	B	19.4	B
Southbound								
LTR	499	1638	0.35	0.30	19.2	B	19.2	B

Intersection Delay = 14.5 (sec/veh) Intersection LOS = B

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	Saturday p.m. peak (6:00-7:00)
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007 - Existing Sat Special

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	21	331	61	29	428	20	62	70	36	27	113	19
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PK 15 Vol	6	92	17	8	119	6	17	19	10	8	31	5
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		459			530			187			177	
%InSharedLn												
Prop LTs		0.050			0.060			0.369			0.169	
Prop RTs		0.148			0.042			0.214			0.119	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination	1	2	3	4	5	6	7	8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	21	331	61	29	428	20	62	70	36	27	113	19
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj flow	23	368	68	32	476	22	69	78	40	30	126	21
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		459			530			187			177	
Prop LTs		0.050			0.060			0.369			0.169	
Prop RTs		0.148			0.042			0.214			0.119	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.959			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.980			0.994			0.971			0.984		
fLT	0.964			0.957			0.837			0.929		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1721			1730			1604			1638		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	459	1721	0.27	0.54	923	0.50
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	530	1730	# 0.31	0.54	928	0.57
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	187	1604	# 0.12	0.30	488	0.38
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	177	1638	0.11	0.30	499	0.35
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.42
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.50

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.50	0.54	10.1	1.000	923	0.50	1.9	0.0	12.0	B	12.0	B
Westbound												
LTR	0.57	0.54	10.7	1.000	928	0.50	2.5	0.0	13.2	B	13.2	B
Northbound												
LTR	0.38	0.30	18.9	1.000	488	0.11	0.5	0.0	19.4	B	19.4	B
Southbound												
LTR	0.35	0.30	18.7	1.000	499	0.11	0.4	0.0	19.2	B	19.2	B

Intersection delay = 14.5 (sec/veh) Intersection LOS = B

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)		37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)		37.0	37.0	21.0	21.0
Opposing effective green time, go (s)		37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		23	32	69	30
Proportion of LT in LT lane group, PLT		0.050	0.060	0.369	0.169
Proportion of LT in opposing flow, PLTo		0.06	0.05	0.17	0.37
Adjusted opposing flow rate, Vo (veh/h)		530	459	177	187
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		0.44	0.61	1.32	0.57
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		10.16	8.80	3.39	3.58

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	16.1	13.7	2.5	6.4
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	6.80	5.47	3.53	3.90
gu=g-gq if gq>=gf, or = g-gf if gq<gf	20.86	23.34	17.47	14.56
n=Max(gq-gf)/2,0)	0.00	0.00	0.50	0.00
PTHo=1-PLTo	0.94	0.95	0.83	0.63
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.05	0.06	0.37	0.17
EL1 (refer to Exhibit C16-3)	2.37	2.21	1.66	1.68
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.00	1.00	1.00	1.00
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.11
gdiff=max(gq-gf,0)	0.00	0.00	1.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.96	0.96	0.84	0.93
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.964	0.957	0.837	0.929

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	10.1	0.00	0.0	0.0	12.0
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	10.7	0.00	0.0	0.0	13.2
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	18.9	0.00	0.0	0.0	19.4
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	18.7	0.00	0.0	0.0	19.2
	0.0						0.0	

Intersection Delay 14.5 sec/veh Intersection LOS B

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	459	530	187	177
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1721	1730	1604	1638
LnCapacity	923	928	488	499
Flow Ratio	0.27	0.31	0.12	0.11
v/c Ratio	0.50	0.57	0.38	0.35
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	5.6	6.8	2.8	2.6
kB	0.9	0.9	0.4	0.4
Q2	0.9	1.2	0.2	0.2
Q Average	6.4	8.0	3.1	2.9
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	7.9	9.7	3.6	3.4
QSRatio				
85th Percentile Output:				
fB%	1.5	1.5	1.6	1.6
BOQ	9.5	11.6	4.8	4.5
QSRatio				
90th Percentile Output:				
fB%	1.6	1.6	1.7	1.7
BOQ	10.5	12.8	5.3	5.0
QSRatio				
95th Percentile Output:				
fB%	1.9	1.8	2.0	2.0
BOQ	12.1	14.4	6.1	5.7
QSRatio				
98th Percentile Output:				
fB%	2.1	2.0	2.5	2.5
BOQ	13.6	16.0	7.6	7.2
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: AM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 No Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	50	758	217	72	608	42	94	136	85	73	254	52
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
WB Left	P				SB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	32.0					20.0		
Yellow	4.0					3.0		
All Red	2.0					2.0		

Cycle Length: 63.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	739	1455	1.59	0.51	288.6	F	288.6	F
Westbound								
LTR	794	1564	2.14	0.51	534.3	F	534.3	F
Northbound								
LTR	414	1305	0.87	0.32	37.7	D	37.7	D
Southbound								
LTR	471	1484	0.87	0.32	36.9	D	36.9	D

Intersection Delay = 350.1 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: AM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 No Build
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	50	758	217	72	608	42	94	136	85	73	254	52
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
PK 15 Vol	14	218	62	21	393	12	27	39	24	20	69	14
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1177			1702			359			412	
%InSharedLn												
Prop LTs		0.048			0.049			0.298			0.192	
Prop RTs		0.212			0.028			0.270			0.138	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	32.0	20.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 63.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	50	758	217	72	608	42	94	136	85	73	254	52
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
Adj flow	57	871	249	83	1571	48	107	155	97	79	276	57
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1177			1702			359			412	
Prop LTs		0.048			0.049			0.298			0.192	
Prop RTs		0.212			0.028			0.270			0.138	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	0 1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.958			0.961			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.971			0.996			0.964			0.981		
fLT	0.823			0.864			0.687			0.844		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1455			1564			1305			1484		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	1177	1455	0.81	0.51	739	1.59
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1702	1564	# 1.09	0.51	794	2.14
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	359	1305	0.28	0.32	414	0.87
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	412	1484	# 0.28	0.32	471	0.87
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.37
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.65

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.59	0.51	15.5	1.000	739	0.50	273.1	0.0	288.6	F	288.6	F
Westbound												
LTR	2.14	0.51	15.5	1.000	794	0.50	518.8	0.0	534.3	F	534.3	F
Northbound												
LTR	0.87	0.32	20.2	1.000	414	0.40	17.4	0.0	37.7	D	37.7	D
Southbound												
LTR	0.87	0.32	20.3	1.000	471	0.40	16.6	0.0	36.9	D	36.9	D

Intersection delay = 350.1 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	63.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	63.0 sec				
Total actual green time for LT lane group, G (s)		32.0	32.0	20.0	20.0
Effective permitted green time for LT lane group, g(s)		32.0	32.0	20.0	20.0
Opposing effective green time, go (s)		32.0	32.0	20.0	20.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		57	83	107	79
Proportion of LT in LT lane group, PLT		0.048	0.049	0.298	0.192
Proportion of LT in opposing flow, PLTo		0.05	0.05	0.19	0.30
Adjusted opposing flow rate, Vo (veh/h)		1702	1177	412	359
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.00	1.45	1.87	1.38
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		29.78	20.60	7.21	6.28

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	7.6	4.8	0.6	2.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.49	0.49	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	24.93	17.35	9.85	8.37
gu=g-gq if gq>=gf, or = g-gf if gq<gf	7.07	14.65	10.15	11.63
n=Max(gq-gf)/2,0)	8.69	6.28	4.63	3.20
PTHo=1-PLTo	0.95	0.95	0.81	0.70
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.05	0.05	0.30	0.19
EL1 (refer to Exhibit C16-3)	7.25	4.42	2.11	2.00
EL2=Max((1-Ptho**n)/Plto, 1.0)	7.22	5.53	3.27	2.27
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.07	0.07	0.13	0.12
gdiff=max(gq-gf,0)	17.37	12.57	9.27	6.40
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.82	0.86	0.69	0.84
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.823	0.864	0.687	0.844

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 63.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
V/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	15.5	15.5	0.00	109.5	0.0	288.6
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	15.5	15.5	0.00	227.0	0.0	534.3
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	21.5	20.2	0.00	0.0	0.0	37.7
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	21.5	20.3	0.00	0.0	0.0	36.9
	0.0						0.0	

Intersection Delay 350.1 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1177	1702	359	412
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1455	1564	1305	1484
LnCapacity	739	794	414	471
Flow Ratio	0.81	1.09	0.28	0.28
V/c Ratio	1.59	2.14	0.87	0.87
Grn Ratio	0.51	0.51	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	20.6	29.8	5.9	6.8
kB	0.7	0.8	0.3	0.4
Q2	56.6	114.9	1.7	2.0
Q Average	77.2	144.7	7.6	8.8
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	92.7	174	9.0	10.4
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.5	1.5
BOQ	108	203	11.7	13.4
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.7	1.7
BOQ	116	217	12.8	14.5
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.9	1.9
BOQ	124	231	14.4	16.4
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	2.3	2.2
BOQ	131	246	17.2	19.4
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - No Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	53	818	102	95	988	93	287	198	76	73	174	62
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		54.0						30.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	869	1528	1.32	0.57	171.1	F	171.1	F
Westbound								
LTR	788	1386	1.70	0.57	339.5	F	339.5	F
Northbound								
LTR	352	1115	1.94	0.32	467.2	F	467.2	F
Southbound								
LTR	448	1419	0.76	0.32	36.5	D	36.5	D

Intersection Delay = 280.1 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	PM Peak
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007 - No Build

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	53	818	102	95	988	93	287	198	76	73	174	62
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
PK 15 Vol	16	241	30	27	281	26	88	60	23	20	48	17
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1144			1337			684			339	
%InSharedLn												
Prop LTs		0.054			0.081			0.512			0.236	
Prop RTs		0.105			0.079			0.136			0.201	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	54.0	30.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	53	818	102	95	988	93	287	198	76	73	174	62
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
Adj flow	62	962	120	108	1123	106	350	241	93	80	191	68
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1144			1337			684			339	
Prop LTs		0.054			0.081			0.512			0.236	
Prop RTs		0.105			0.079			0.136			0.201	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.986			0.989			0.982			0.973		
fLT	0.850			0.771			0.576			0.814		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1528			1386			1115			1419		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	1144	1528	0.75	0.57	869	1.32
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1337	1386	# 0.96	0.57	788	1.70
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	684	1115	# 0.61	0.32	352	1.94
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	339	1419	0.24	0.32	448	0.76
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.58
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.78

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.32	0.57	20.5	1.000	869	0.50	150.6	0.0	171.1	F	171.1	F
Westbound												
LTR	1.70	0.57	20.5	1.000	788	0.50	319.0	0.0	339.5	F	339.5	F
Northbound												
LTR	1.94	0.32	32.5	1.000	352	0.50	434.7	0.0	467.2	F	467.2	F
Southbound												
LTR	0.76	0.32	29.2	1.000	448	0.31	7.3	0.0	36.5	D	36.5	D

Intersection delay = 280.1 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)		54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)		54.0	54.0	30.0	30.0
Opposing effective green time, go (s)		54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		62	108	350	80
Proportion of LT in LT lane group, PLT		0.054	0.081	0.512	0.236
Proportion of LT in opposing flow, PLTo		0.08	0.05	0.24	0.51
Adjusted opposing flow rate, Vo (veh/h)		1337	1144	339	684
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.64	2.85	9.24	2.11
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		35.28	30.19	8.95	18.05

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	10.7	4.2	0.0	2.6
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	24.62	21.19	12.55	24.96
gu=g-gq if gq>=gf, or = g-gf if gq<gf	29.38	32.81	17.45	5.04
n=Max(gq-gf)/2,0)	6.95	8.47	6.27	11.19
PTHo=1-PLTo	0.92	0.95	0.76	0.49
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.05	0.08	0.51	0.24
EL1 (refer to Exhibit C16-3)	5.14	4.28	1.96	2.75
EL2=Max((1-Ptho**n)/Plto, 1.0)	5.48	6.94	3.45	1.95
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.04	0.04	0.10	0.08
gdiff=max(gq-gf,0)	13.90	16.94	12.55	22.38
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.85	0.77	0.58	0.81
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.850	0.771	0.576	0.814

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	68.8	0.0	171.1
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	137.2	0.0	339.5
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	32.5	0.00	83.0	0.0	467.2
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	29.2	0.00	0.0	0.0	36.5
	0.0						0.0	

Intersection Delay 280.1 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1144	1337	684	339
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1528	1386	1115	1419
LnCapacity	869	788	352	448
Flow Ratio	0.75	0.96	0.61	0.24
v/c Ratio	1.32	1.70	1.94	0.76
Grn Ratio	0.57	0.57	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00		1.00		1.00	
Q1	30.2	35.3		18.0		8.0	
kB	1.1	1.0		0.4		0.4	
Q2	38.4	71.0		42.3		1.3	
Q Average	68.6	106.3			60.3		9.3
Q Spacing	25.0	25.0		25.0		25.0	
Q Storage	0	0		0		0	
Q S Ratio							
70th Percentile Output:							
fB%	1.2	1.2		1.1		1.2	
BOQ	82.3	128		67.7		11.0	
QSRatio							
85th Percentile Output:							
fB%	1.4	1.4		1.3		1.5	
BOQ	96.0	149		80.8		14.1	
QSRatio							
90th Percentile Output:							
fB%	1.5	1.5		1.4		1.7	
BOQ	103	159		85.6		15.4	
QSRatio							
95th Percentile Output:							
fB%	1.6	1.6		1.5		1.9	
BOQ	110	170		91.7		17.3	
QSRatio							
98th Percentile Output:							
fB%	1.7	1.7		1.7		2.2	
BOQ	117	181		103		20.4	
QSRatio							

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - No Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	52	1101	107	95	802	101	153	192	111	99	142	46
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
WB Left	P				SB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	37.0					21.0		
Yellow	4.0					3.0		
All Red	2.0					2.0		

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	892	1663	1.55	0.54	270.3	F	270.3	F
Westbound								
LTR	676	1261	1.59	0.54	287.3	F	287.3	F
Northbound								
LTR	420	1381	1.12	0.30	104.4	F	104.4	F
Southbound								
LTR	350	1149	0.94	0.30	57.0	E	57.0	E

Intersection Delay = 230.3 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: Saturday Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - No Build
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	52	1101	107	95	802	101	153	192	111	99	142	46
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
PK 15 Vol	14	302	29	26	216	27	39	49	29	28	41	13
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1385			1073			470			330	
%InSharedLn												
Prop LTs		0.041			0.095			0.336			0.345	
Prop RTs		0.085			0.102			0.243			0.161	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	52	1101	107	95	802	101	153	192	111	99	142	46
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
Adj flow	57	1210	118	102	862	109	158	198	114	114	163	53
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1385			1073			470			330	
Prop LTs		0.041			0.095			0.336			0.345	
Prop RTs		0.085			0.102			0.243			0.161	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes 0	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.988			0.986			0.967			0.978		
fLT	0.922			0.704			0.724			0.655		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1663			1261			1381			1149		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	1385	1663	0.83	0.54	892	1.55
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1073	1261	# 0.85	0.54	676	1.59
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	470	1381	# 0.34	0.30	420	1.12
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	330	1149	0.29	0.30	350	0.94
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.19
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.42

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.55	0.54	16.0	1.000	892	0.50	254.3	0.0	270.3	F	270.3	F
Westbound												
LTR	1.59	0.54	16.0	1.000	676	0.50	271.3	0.0	287.3	F	287.3	F
Northbound												
LTR	1.12	0.30	24.0	1.000	420	0.50	80.4	0.0	104.4	F	104.4	F
Southbound												
LTR	0.94	0.30	23.4	1.000	350	0.46	33.5	0.0	57.0	E	57.0	E

Intersection delay = 230.3 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	57	102	158	114
Proportion of LT in LT lane group, PLT	0.041	0.095	0.336	0.345
Proportion of LT in opposing flow, PLTo	0.10	0.04	0.35	0.34
Adjusted opposing flow rate, Vo (veh/h)	1073	1385	330	470
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.09	1.96	3.03	2.18
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	20.57	26.55	6.32	9.01

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	8.9	4.0	0.0	0.1
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	15.91	20.61	8.71	12.96
gu=g-gq if gq>=gf, or = g-gf if gq<gf	21.09	16.39	12.29	8.04
n=Max(gq-gf)/2,0)	3.50	8.32	4.36	6.40
PTHo=1-PLTo	0.90	0.96	0.65	0.66
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.04	0.10	0.34	0.35
EL1 (refer to Exhibit C16-3)	4.00	5.38	1.94	2.23
EL2=Max((1-Ptho**n)/Plto, 1.0)	3.10	7.17	2.44	2.76
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.13
gdiff=max(gq-gf,0)	7.00	16.64	8.71	12.81
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.92	0.70	0.72	0.66
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.922	0.704	0.724	0.655

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	123.3	0.0	270.3
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	99.3	0.0	287.3
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	24.0	0.00	12.5	0.0	104.4
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	23.4	0.00	0.0	0.0	57.0
	0.0						0.0	

Intersection Delay 230.3 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1385	1073	470	330
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1663	1261	1381	1149
LnCapacity	892	676	420	350
Flow Ratio	0.83	0.85	0.34	0.29
v/c Ratio	1.55	1.59	1.12	0.94
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	26.5	20.6	9.0	6.2
kB	0.9	0.7	0.3	0.3
Q2	64.0	51.5	8.6	2.6
Q Average	90.5	72.1	17.6	8.7
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	109	86.5	20.5	10.3
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.5	1.5
BOQ	127	101	25.9	13.3
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.6	1.7
BOQ	136	108	27.6	14.5
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.7	1.9
BOQ	145	115	30.4	16.3
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	2.0	2.2
BOQ	154	123	34.5	19.3
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday a.m. peak (8:00-9:00)
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - No Build Sat Special

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	10	357	38	33	237	28	49	65	35	32	76	12
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		37.0						21.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	956	1783	0.47	0.54	11.6	B	11.6	B
Westbound								
LTR	887	1654	0.37	0.54	10.5	B	10.5	B
Northbound								
LTR	504	1657	0.33	0.30	18.9	B	18.9	B
Southbound								
LTR	480	1578	0.28	0.30	18.5	B	18.5	B

Intersection Delay = 13.2 (sec/veh) Intersection LOS = B

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: Saturday a.m. peak (8:00-9:00)
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - No Build Sat Special
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	10	357	38	33	237	28	49	65	35	32	76	12
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PK 15 Vol	3	99	11	9	66	8	14	18	10	9	21	3
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		450			331			165			133	
%InSharedLn												
Prop LTs		0.024			0.112			0.327			0.271	
Prop RTs		0.093			0.094			0.236			0.098	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	10	357	38	33	237	28	49	65	35	32	76	12
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj flow	11	397	42	37	263	31	54	72	39	36	84	13
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		450			331			165			133	
Prop LTs		0.024			0.112			0.327			0.271	
Prop RTs		0.093			0.094			0.236			0.098	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	0 1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.959			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.987			0.987			0.968			0.987		
fLT	0.990			0.922			0.868			0.892		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1783			1654			1657			1578		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm								
Left								
Prot								
Perm								
Thru	LTR	450	1783	#	0.25	0.54	956	0.47
Right								
Westbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	331	1654		0.20	0.54	887	0.37
Right								
Northbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	165	1657	#	0.10	0.30	504	0.33
Right								
Southbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	133	1578		0.08	0.30	480	0.28
Right								

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.35
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.42

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.47	0.54	9.9	1.000	956	0.50	1.7	0.0	11.6	B	11.6	B
Westbound												
LTR	0.37	0.54	9.3	1.000	887	0.50	1.2	0.0	10.5	B	10.5	B
Northbound												
LTR	0.33	0.30	18.5	1.000	504	0.11	0.4	0.0	18.9	B	18.9	B
Southbound												
LTR	0.28	0.30	18.2	1.000	480	0.11	0.3	0.0	18.5	B	18.5	B

Intersection delay = 13.2 (sec/veh) Intersection LOS = B

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	11	37	54	36
Proportion of LT in LT lane group, PLT	0.024	0.112	0.327	0.271
Proportion of LT in opposing flow, PLTo	0.11	0.02	0.27	0.33
Adjusted opposing flow rate, Vo (veh/h)	331	450	133	165
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	0.21	0.71	1.03	0.69
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	6.34	8.63	2.55	3.16

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	20.8	12.5	3.7	5.6
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	2.94	5.30	1.86	3.09
gu=g-gq if gq>=gf, or = g-gf if gq<gf	16.21	24.49	17.28	15.37
n=Max(gq-gf)/2,0)	0.00	0.00	0.00	0.00
PTHo=1-PLTo	0.89	0.98	0.73	0.67
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.02	0.11	0.33	0.27
EL1 (refer to Exhibit C16-3)	1.94	2.19	1.58	1.64
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.00	1.00	1.00	1.00
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.12
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.99	0.92	0.87	0.89
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.990	0.922	0.868	0.892

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	9.9	0.00	0.0	0.0	11.6
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	9.3	0.00	0.0	0.0	10.5
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	18.5	0.00	0.0	0.0	18.9
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	18.2	0.00	0.0	0.0	18.5
	0.0						0.0	

Intersection Delay 13.2 sec/veh Intersection LOS B

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	450	331	165	133
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1783	1654	1657	1578
LnCapacity	956	887	504	480
Flow Ratio	0.25	0.20	0.10	0.08
v/c Ratio	0.47	0.37	0.33	0.28
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	5.4	3.7	2.4	1.9
kB	0.9	0.9	0.4	0.4
Q2	0.8	0.5	0.2	0.1
Q Average	6.2	4.2	2.6	2.1
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	7.6	5.2	3.1	2.5
QSRatio				
85th Percentile Output:				
fB%	1.5	1.5	1.6	1.6
BOQ	9.2	6.4	4.1	3.3
QSRatio				
90th Percentile Output:				
fB%	1.6	1.7	1.8	1.8
BOQ	10.1	7.2	4.6	3.7
QSRatio				
95th Percentile Output:				
fB%	1.9	2.0	2.0	2.0
BOQ	11.6	8.5	5.3	4.2
QSRatio				
98th Percentile Output:				
fB%	2.1	2.3	2.5	2.6
BOQ	13.2	9.8	6.6	5.3
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday p.m. peak (6:00-7:00)
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - No Build Sat Special

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	24	633	62	66	636	49	95	89	76	56	131	22
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	37.0					21.0			
Yellow	4.0					3.0			
All Red	2.0					2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	927	1729	0.86	0.54	24.2	C	24.2	C
Westbound								
LTR	850	1586	0.98	0.54	42.3	D	42.3	D
Northbound								
LTR	447	1468	0.65	0.30	24.0	C	24.0	C
Southbound								
LTR	455	1495	0.51	0.30	20.7	C	20.7	C

Intersection Delay = 30.8 (sec/veh) Intersection LOS = C

Phone:
E-Mail:
Fax:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	Saturday p.m. peak (6:00-7:00)
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007 - No Build Sat Special

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	24	633	62	66	636	49	95	89	76	56	131	22
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PK 15 Vol	7	176	17	18	177	14	26	25	21	16	36	6
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		799			834			289			232	
%InSharedLn												
Prop LTs		0.034			0.088			0.367			0.267	
Prop RTs		0.086			0.065			0.291			0.103	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	24	633	62	66	636	49	95	89	76	56	131	22
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj flow	27	703	69	73	707	54	106	99	84	62	146	24
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		799			834			289			232	
Prop LTs		0.034			0.088			0.367			0.267	
Prop RTs		0.086			0.065			0.291			0.103	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes 0	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.988			0.991			0.961			0.986		
fLT	0.959			0.881			0.775			0.846		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1729			1586			1468			1495		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	799	1729	0.46	0.54	927	0.86
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	834	1586	# 0.53	0.54	850	0.98
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	289	1468	# 0.20	0.30	447	0.65
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	232	1495	0.16	0.30	455	0.51
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.72
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.86

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.86	0.54	13.8	1.000	927	0.50	10.4	0.0	24.2	C	24.2	C
Westbound												
LTR	0.98	0.54	15.7	1.000	850	0.50	26.6	0.0	42.3	D	42.3	D
Northbound												
LTR	0.65	0.30	20.8	1.000	447	0.22	3.2	0.0	24.0	C	24.0	C
Southbound												
LTR	0.51	0.30	19.8	1.000	455	0.12	1.0	0.0	20.7	C	20.7	C

Intersection delay = 30.8 (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.

For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	27	73	106	62
Proportion of LT in LT lane group, PLT	0.034	0.088	0.367	0.267
Proportion of LT in opposing flow, PLTo	0.09	0.03	0.27	0.37
Adjusted opposing flow rate, Vo (veh/h)	834	799	232	289
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	0.52	1.40	2.03	1.19
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	15.98	15.31	4.45	5.54

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	15.0	6.8	0.5	3.1
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	12.08	11.50	5.49	7.40
gu=g-gq if gq>=gf, or = g-gf if gq<gf	22.04	25.50	15.51	13.60
n=Max(gq-gf)/2,0)	0.00	2.35	2.50	2.17
PTHo=1-PLTo	0.91	0.97	0.73	0.63
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.03	0.09	0.37	0.27
EL1 (refer to Exhibit C16-3)	3.18	3.08	1.76	1.86
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.00	2.30	2.02	1.72
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.12
gdiff=max(gq-gf,0)	0.00	4.71	5.00	4.34
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.96	0.88	0.77	0.85
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.959	0.881	0.775	0.846

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	13.8	0.00	0.0	0.0	24.2
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	15.7	0.00	0.0	0.0	42.3
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	20.8	0.00	0.0	0.0	24.0
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	19.8	0.00	0.0	0.0	20.7
	0.0						0.0	

Intersection Delay 30.8 sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	799	834	289	232
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1729	1586	1468	1495
LnCapacity	927	850	447	455
Flow Ratio	0.46	0.53	0.20	0.16
v/c Ratio	0.86	0.98	0.65	0.51
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	13.2	15.6	4.8	3.7
kB	0.9	0.8	0.4	0.4
Q2	4.4	8.4	0.6	0.4
Q Average	17.6	24.1	5.4	4.0
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	21.2	28.9	6.5	4.8
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.6	1.6
BOQ	24.8	33.8	8.4	6.3
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.7	1.7
BOQ	26.7	36.2	9.3	7.0
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.9	2.0
BOQ	28.7	38.7	10.6	8.0
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	2.4	2.4
BOQ	30.7	41.2	12.8	9.8
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: AM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	50	758	219	77	608	42	95	136	86	73	255	52
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		32.0						20.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 63.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	740	1456	1.59	0.51	289.4	F	289.4	F
Westbound								
LTR	781	1538	2.19	0.51	553.8	F	553.8	F
Northbound								
LTR	413	1300	0.87	0.32	38.7	D	38.7	D
Southbound								
LTR	471	1484	0.88	0.32	37.2	D	37.2	D

Intersection Delay = 359.6 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	AM Peak
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007 Build

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	50	758	219	77	608	42	95	136	86	73	255	52
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
PK 15 vol	14	218	63	22	393	12	27	39	24	20	69	14
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1180			1708			361			413	
%InSharedLn												
Prop LTs		0.048			0.052			0.299			0.191	
Prop RTs		0.214			0.028			0.271			0.138	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	32.0	20.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 63.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	50	758	219	77	608	42	95	136	86	73	255	52
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
Adj flow	57	871	252	89	1571	48	108	155	98	79	277	57
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1180			1708			361			413	
Prop LTs		0.048			0.052			0.299			0.191	
Prop RTs		0.214			0.028			0.271			0.138	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.958			0.961			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.971			0.996			0.963			0.981		
fLT	0.824			0.850			0.684			0.843		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1456			1538			1300			1484		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	V/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	1180	1456	0.81	0.51	740	1.59
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1708	1538	# 1.11	0.51	781	2.19
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	361	1300	0.28	0.32	413	0.87
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	413	1484	# 0.28	0.32	471	0.88
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.39
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.68

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/c	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
LTR	1.59	0.51	15.5	1.000	740	0.50	273.9	0.0	289.4	F	289.4	F
Westbound												
LTR	2.19	0.51	15.5	1.000	781	0.50	538.3	0.0	553.8	F	553.8	F
Northbound												
LTR	0.87	0.32	20.3	1.000	413	0.40	18.4	0.0	38.7	D	38.7	D
Southbound												
LTR	0.88	0.32	20.3	1.000	471	0.40	16.9	0.0	37.2	D	37.2	D

Intersection delay = 359.6 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	63.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g
Opposing platoon ratio, Rpo (refer Exhibit 16-11)
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]
gq, (see Exhibit C16-4,5,6,7,8)
gu=g-gq if gq>=gf, or = g-gf if gq<gf
n=Max(gq-gf)/2,0)
PTHo=1-PLTo
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]
EL1 (refer to Exhibit C16-3)
EL2=Max((1-Ptho**n)/Plto, 1.0)
fmin=2(1+PL)/g or fmin=2(1+Pl)/g
gdiff=max(gq-gf,0)
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt=[fm+0.91(N-1)]/N**
Left-turn adjustment, fLT

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	63.0 sec				
Total actual green time for LT lane group, G (s)		32.0	32.0	20.0	20.0
Effective permitted green time for LT lane group, g(s)		32.0	32.0	20.0	20.0
Opposing effective green time, go (s)		32.0	32.0	20.0	20.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		57	89	108	79
Proportion of LT in LT lane group, PLT		0.048	0.052	0.299	0.191
Proportion of LT in opposing flow, PLTo		0.05	0.05	0.19	0.30
Adjusted opposing flow rate, Vo (veh/h)		1708	1180	413	361
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.00	1.56	1.89	1.38
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		29.89	20.65	7.23	6.32

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	7.6	4.3	0.5	2.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.49	0.49	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	25.02	17.40	9.88	8.43
gu=g-gq if gq>=gf, or = g-gf if gq<gf	6.98	14.60	10.12	11.57
n=Max(gq-gf)/2,0)	8.73	6.56	4.67	3.23
PTHo=1-PLTo	0.95	0.95	0.81	0.70
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.05	0.05	0.30	0.19
EL1 (refer to Exhibit C16-3)	7.30	4.43	2.11	2.00
EL2=Max((1-Ptho**n)/Plto, 1.0)	7.16	5.74	3.29	2.28
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.07	0.07	0.13	0.12
gdiff=max(gq-gf,0)	17.46	13.13	9.34	6.46
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.82	0.85	0.68	0.84
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.824	0.850	0.684	0.843

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 63.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	15.5	15.5	0.00	110.0	0.0	289.4
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	15.5	15.5	0.00	231.7	0.0	553.8
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	21.5	20.3	0.00	0.0	0.0	38.7
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	21.5	20.3	0.00	0.0	0.0	37.2
	0.0						0.0	

Intersection Delay 359.6 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1180	1708	361	413
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1456	1538	1300	1484
LnCapacity	740	781	413	471
Flow Ratio	0.81	1.11	0.28	0.28
v/c Ratio	1.59	2.19	0.87	0.88
Grn Ratio	0.51	0.51	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	20.6	29.9	6.0	6.8
kB	0.7	0.7	0.3	0.4
Q2	56.9	117.2	1.8	2.0
Q Average	77.5	147.1	7.8	8.8
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	93.0	177	9.2	10.4
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.5	1.5
BOQ	109	206	11.9	13.4
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.7	1.7
BOQ	116	221	13.0	14.6
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.9	1.9
BOQ	124	235	14.7	16.5
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	2.3	2.2
BOQ	132	250	17.4	19.5
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	53	818	104	100	988	93	288	199	78	73	175	62
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		54.0						30.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	868	1527	1.32	0.57	172.7	F	172.7	F
Westbound								
LTR	772	1359	1.74	0.57	358.7	F	358.7	F
Northbound								
LTR	352	1114	1.96	0.32	473.5	F	473.5	F
Southbound								
LTR	448	1419	0.76	0.32	36.6	D	36.6	D

Intersection Delay = 289.5 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	PM Peak
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007 - Build

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	53	818	104	100	988	93	288	199	78	73	175	62
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
PK 15 Vol	16	241	31	28	281	26	88	61	24	20	48	17
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1146			1343			689			340	
%InSharedLn												
Prop LTs		0.054			0.085			0.509			0.235	
Prop RTs		0.106			0.079			0.138			0.200	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	54.0	30.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	53	818	104	100	988	93	288	199	78	73	175	62
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
Adj flow	62	962	122	114	1123	106	351	243	95	80	192	68
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1146			1343			689			340	
Prop LTs		0.054			0.085			0.509			0.235	
Prop RTs		0.106			0.079			0.138			0.200	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.986			0.989			0.981			0.973		
fLT	0.850			0.756			0.576			0.814		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1527			1359			1114			1419		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	1146	1527	0.75	0.57	868	1.32
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1343	1359	# 0.99	0.57	772	1.74
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	689	1114	# 0.62	0.32	352	1.96
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	340	1419	0.24	0.32	448	0.76
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.61
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.82

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.32	0.57	20.5	1.000	868	0.50	152.2	0.0	172.7	F	172.7	F
Westbound												
LTR	1.74	0.57	20.5	1.000	772	0.50	338.2	0.0	358.7	F	358.7	F
Northbound												
LTR	1.96	0.32	32.5	1.000	352	0.50	441.0	0.0	473.5	F	473.5	F
Southbound												
LTR	0.76	0.32	29.2	1.000	448	0.31	7.4	0.0	36.6	D	36.6	D

Intersection delay = 289.5 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)		54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)		54.0	54.0	30.0	30.0
Opposing effective green time, go (s)		54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		62	114	351	80
Proportion of LT in LT lane group, PLT		0.054	0.085	0.509	0.235
Proportion of LT in opposing flow, PLTo		0.08	0.05	0.24	0.51
Adjusted opposing flow rate, Vo (veh/h)		1343	1146	340	689
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.64	3.01	9.26	2.11
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		35.44	30.24	8.97	18.18

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	10.7	3.7	0.0	2.6
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	24.73	21.23	12.59	25.13
gu=g-gq if gq>=gf, or = g-gf if gq<gf	29.27	32.77	17.41	4.87
n=Max(gq-gf)/2,0)	7.00	8.78	6.29	11.28
PTHo=1-PLTo	0.92	0.95	0.76	0.49
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.05	0.08	0.51	0.24
EL1 (refer to Exhibit C16-3)	5.17	4.29	1.96	2.77
EL2=Max((1-Ptho**n)/Plto, 1.0)	5.45	7.14	3.46	1.96
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.04	0.04	0.10	0.08
gdiff=max(gq-gf,0)	14.00	17.55	12.59	22.55
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.85	0.76	0.58	0.81
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.850	0.756	0.576	0.814

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	69.5	0.0	172.7
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	142.7	0.0	358.7
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	32.5	0.00	84.3	0.0	473.5
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	29.2	0.00	0.0	0.0	36.6
	0.0						0.0	

Intersection Delay 289.5 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1146	1343	689	340
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1527	1359	1114	1419
LnCapacity	868	772	352	448
Flow Ratio	0.75	0.99	0.62	0.24
v/c Ratio	1.32	1.74	1.96	0.76
Grn Ratio	0.57	0.57	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	30.2	35.4	18.2	8.1
kB	1.1	1.0	0.4	0.4
Q2	38.7	73.6	42.9	1.3
Q Average	69.0	109.1	61.1	9.3
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.1	1.2
BOQ	82.8	131	68.5	11.0
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.3	1.5
BOQ	96.6	153	81.8	14.2
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.4	1.7
BOQ	103	164	86.7	15.4
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.5	1.9
BOQ	110	175	92.8	17.3
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	1.7	2.2
BOQ	117	185	104	20.4
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build-regular-68

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	52	1101	114	112	802	101	160	195	128	99	145	46
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		37.0						21.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	890	1660	1.56	0.54	275.3	F	275.3	F
Westbound								
LTR	624	1164	1.75	0.54	359.4	F	359.4	F
Northbound								
LTR	419	1376	1.19	0.30	130.4	F	130.4	F
Southbound								
LTR	345	1132	0.97	0.30	63.5	E	63.5	E

Intersection Delay = 259.9 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: Saturday Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - Build-regular-68
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	52	1101	114	112	802	101	160	195	128	99	145	46
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
PK 15 Vol	14	302	31	30	216	27	41	50	33	28	42	13
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1392			1091			498			334	
%InSharedLn												
Prop LTs		0.041			0.110			0.331			0.341	
Prop RTs		0.090			0.100			0.265			0.159	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	52	1101	114	112	802	101	160	195	128	99	145	46
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
Adj flow	57	1210	125	120	862	109	165	201	132	114	167	53
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1392			1091			498			334	
Prop LTs		0.041			0.110			0.331			0.341	
Prop RTs		0.090			0.100			0.265			0.159	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.988			0.987			0.964			0.979		
fLT	0.921			0.650			0.724			0.646		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1660			1164			1376			1132		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm Left Prot Perm Thru Right	LTR	1392	1660	0.84	0.54	890	1.56
Westbound							
Prot Perm Left Prot Perm Thru Right	LTR	1091	1164	# 0.94	0.54	624	1.75
Northbound							
Prot Perm Left Prot Perm Thru Right	LTR	498	1376	# 0.36	0.30	419	1.19
Southbound							
Prot Perm Left Prot Perm Thru Right	LTR	334	1132	0.30	0.30	345	0.97

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.30
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.55

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
LTR	1.56	0.54	16.0	1.000	890	0.50	259.3	0.0	275.3	F	275.3	F
Westbound												
LTR	1.75	0.54	16.0	1.000	624	0.50	343.4	0.0	359.4	F	359.4	F
Northbound												
LTR	1.19	0.30	24.0	1.000	419	0.50	106.4	0.0	130.4	F	130.4	F
Southbound												
LTR	0.97	0.30	23.7	1.000	345	0.48	39.9	0.0	63.5	E	63.5	E

Intersection delay = 259.9 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)		37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)		37.0	37.0	21.0	21.0
Opposing effective green time, go (s)		37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		57	120	165	114
Proportion of LT in LT lane group, PLT		0.041	0.110	0.331	0.341
Proportion of LT in opposing flow, PLTo		0.11	0.04	0.34	0.33
Adjusted opposing flow rate, Vo (veh/h)		1091	1392	334	498
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.09	2.30	3.16	2.18
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		20.91	26.68	6.40	9.55

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	8.9	2.7	0.0	0.1
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	16.18	20.71	8.84	13.77
gu=g-gq if gq>=gf, or = g-gf if gq<gf	20.82	16.29	12.16	7.23
n=Max(gq-gf)/2,0)	3.64	9.03	4.42	6.81
PTHo=1-PLTo	0.89	0.96	0.66	0.67
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.04	0.11	0.33	0.34
EL1 (refer to Exhibit C16-3)	4.07	5.41	1.95	2.29
EL2=Max((1-Ptho**n)/Plto, 1.0)	3.14	7.68	2.47	2.82
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.13
gdiff=max(gq-gf,0)	7.28	18.05	8.84	13.62
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.92	0.65	0.72	0.65
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.921	0.650	0.724	0.646

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	125.5	0.0	275.3
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	116.8	0.0	359.4
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	24.0	0.00	19.8	0.0	130.4
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	23.7	0.00	0.0	0.0	63.5
	0.0						0.0	

Intersection Delay 259.9 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1392	1091	498	334
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1660	1164	1376	1132
LnCapacity	890	624	419	345
Flow Ratio	0.84	0.94	0.36	0.30
v/c Ratio	1.56	1.75	1.19	0.97
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	26.7	20.9	9.5	6.3
kB	0.9	0.7	0.3	0.3
Q2	65.1	59.9	11.7	3.0
Q Average	91.8	80.8	21.3	9.3
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	110	97.0	24.6	11.0
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.4	1.5
BOQ	128	113	30.8	14.1
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.5	1.7
BOQ	138	121	32.7	15.3
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.7	1.9
BOQ	147	129	35.8	17.3
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	1.9	2.2
BOQ	156	137	40.3	20.3
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday a.m. peak (8:00-9:00)
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build-special event

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	10	357	51	64	237	28	50	66	37	32	82	12
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		37.0						21.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	951	1774	0.49	0.54	11.9	B	11.9	B
Westbound								
LTR	811	1513	0.45	0.54	11.6	B	11.6	B
Northbound								
LTR	501	1647	0.34	0.30	19.0	B	19.0	B
Southbound								
LTR	482	1585	0.29	0.30	18.7	B	18.7	B

Intersection Delay = 13.7 (sec/veh) Intersection LOS = B

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: Saturday a.m. peak (8:00-9:00)
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - Build-special event
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	10	357	51	64	237	28	50	66	37	32	82	12
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PK 15 Vol	3	99	14	18	66	8	14	18	10	9	23	3
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		465			365			170			140	
%InSharedLn												
Prop LTs		0.024			0.195			0.329			0.257	
Prop RTs		0.123			0.085			0.241			0.093	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	37.0	21.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	10	357	51	64	237	28	50	66	37	32	82	12
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj flow	11	397	57	71	263	31	56	73	41	36	91	13
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		465			365			170			140	
Prop LTs		0.024			0.195			0.329			0.257	
Prop RTs		0.123			0.085			0.241			0.093	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.959			0.958			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.983			0.989			0.967			0.987		
fLT	0.990			0.845			0.864			0.896		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1774			1513			1647			1585		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	465	1774	# 0.26	0.54	951	0.49
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	365	1513	0.24	0.54	811	0.45
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	170	1647	# 0.10	0.30	501	0.34
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	140	1585	0.09	0.30	482	0.29
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.37
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.43

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.49	0.54	10.1	1.000	951	0.50	1.8	0.0	11.9	B	11.9	B
Westbound												
LTR	0.45	0.54	9.8	1.000	811	0.50	1.8	0.0	11.6	B	11.6	B
Northbound												
LTR	0.34	0.30	18.6	1.000	501	0.11	0.4	0.0	19.0	B	19.0	B
Southbound												
LTR	0.29	0.30	18.3	1.000	482	0.11	0.3	0.0	18.7	B	18.7	B

Intersection delay = 13.7 (sec/veh) Intersection LOS = B

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.

* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.

** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.

For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)		37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)		37.0	37.0	21.0	21.0
Opposing effective green time, go (s)		37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		11	71	56	36
Proportion of LT in LT lane group, PLT		0.024	0.195	0.329	0.257
Proportion of LT in opposing flow, PLTo		0.19	0.02	0.26	0.33
Adjusted opposing flow rate, Vo (veh/h)		365	465	140	170
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		0.21	1.36	1.07	0.69
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		7.00	8.91	2.68	3.26

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	20.8	7.0	3.5	5.6
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	3.63	5.58	2.14	3.27
gu=g-gq if gq>=gf, or = g-gf if gq<gf	16.21	29.97	17.45	15.37
n=Max(gq-gf)/2,0)	0.00	0.00	0.00	0.00
PTHo=1-PLTo	0.81	0.98	0.74	0.67
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.02	0.19	0.33	0.26
EL1 (refer to Exhibit C16-3)	2.01	2.22	1.60	1.65
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.00	1.00	1.00	1.00
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.12
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.99	0.84	0.86	0.90
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.990	0.845	0.864	0.896

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm. For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
V/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	10.1	0.00	0.0	0.0	11.9
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	9.8	0.00	0.0	0.0	11.6
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	18.6	0.00	0.0	0.0	19.0
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	18.3	0.00	0.0	0.0	18.7
	0.0						0.0	

Intersection Delay 13.7 sec/veh Intersection LOS B

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	465	365	170	140
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1774	1513	1647	1585
LnCapacity	951	811	501	482
Flow Ratio	0.26	0.24	0.10	0.09
V/c Ratio	0.49	0.45	0.34	0.29
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	5.6	4.3	2.5	2.0
kB	0.9	0.8	0.4	0.4
Q2	0.9	0.7	0.2	0.2
Q Average	6.5	4.9	2.7	2.2
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	7.9	6.1	3.3	2.6
QSRatio				
85th Percentile Output:				
fB%	1.5	1.5	1.6	1.6
BOQ	9.6	7.5	4.3	3.5
QSRatio				
90th Percentile Output:				
fB%	1.6	1.7	1.7	1.8
BOQ	10.6	8.3	4.8	3.9
QSRatio				
95th Percentile Output:				
fB%	1.9	2.0	2.0	2.0
BOQ	12.1	9.7	5.5	4.5
QSRatio				
98th Percentile Output:				
fB%	2.1	2.3	2.5	2.5
BOQ	13.7	11.2	6.8	5.6
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday p.m. peak (6:00-7:00)
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build-special event

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	24	633	63	68	636	49	108	95	107	56	132	22
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
WB Left	P				SB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	37.0				21.0			
Yellow	4.0				3.0			
All Red	2.0				2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	927	1728	0.86	0.54	24.3	C	24.3	C
Westbound								
LTR	844	1574	0.99	0.54	44.9	D	44.9	D
Northbound								
LTR	441	1449	0.78	0.30	30.8	C	30.8	C
Southbound								
LTR	440	1447	0.53	0.30	21.1	C	21.1	C

Intersection Delay = 32.7 (sec/veh) Intersection LOS = C

Phone:
E-Mail:
Fax:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: Saturday p.m. peak (6:00-7:00)
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - Build-special event
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	24	633	63	68	636	49	108	95	107	56	132	22
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
PK 15 Vol	7	176	18	19	177	14	30	26	30	16	37	6
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		800			837			345			233	
%InSharedLn												
Prop LTs		0.034			0.091			0.348			0.266	
Prop RTs		0.087			0.065			0.345			0.103	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	
Green		37.0			21.0
Yellow		4.0			3.0
All Red		2.0			2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	24	633	63	68	636	49	108	95	107	56	132	22
PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj flow	27	703	70	76	707	54	120	106	119	62	147	24
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		800			837			345			233	
Prop LTs		0.034			0.091			0.348			0.266	
Prop RTs		0.087			0.065			0.345			0.103	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes 0	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.988			0.991			0.953			0.986		
fLT	0.959			0.874			0.771			0.818		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1728			1574			1449			1447		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	800	1728	0.46	0.54	927	0.86
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	837	1574	# 0.53	0.54	844	0.99
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	345	1449	# 0.24	0.30	441	0.78
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	233	1447	0.16	0.30	440	0.53
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.77
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.92

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
LTR	0.86	0.54	13.8	1.000	927	0.50	10.5	0.0	24.3	C	24.3	C
Westbound												
LTR	0.99	0.54	15.8	1.000	844	0.50	29.0	0.0	44.9	D	44.9	D
Northbound												
LTR	0.78	0.30	21.9	1.000	441	0.33	8.9	0.0	30.8	C	30.8	C
Southbound												
LTR	0.53	0.30	19.9	1.000	440	0.13	1.2	0.0	21.1	C	21.1	C

Intersection delay = 32.7 (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	27	76	120	62
Proportion of LT in LT lane group, PLT	0.034	0.091	0.348	0.266
Proportion of LT in opposing flow, PLTo	0.09	0.03	0.27	0.35
Adjusted opposing flow rate, Vo (veh/h)	837	800	233	345
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	0.52	1.46	2.30	1.19
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	16.04	15.33	4.47	6.61

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	15.0	6.4	0.0	3.1
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	12.13	11.51	5.52	9.19
gu=g-gq if gq>=gf, or = g-gf if gq<gf	22.04	25.49	15.48	11.81
n=Max(gq-gf)/2,0)	0.00	2.53	2.76	3.07
PTHo=1-PLTo	0.91	0.97	0.73	0.65
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.03	0.09	0.35	0.27
EL1 (refer to Exhibit C16-3)	3.19	3.08	1.76	1.97
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.00	2.47	2.16	2.10
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.13	0.12
gdiff=max(gq-gf,0)	0.00	5.07	5.52	6.13
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.96	0.87	0.77	0.82
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.959	0.874	0.771	0.818

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	13.8	0.00	0.0	0.0	24.3
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	15.8	0.00	0.0	0.0	44.9
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	21.9	0.00	0.0	0.0	30.8
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	19.9	0.00	0.0	0.0	21.1
	0.0						0.0	

Intersection Delay 32.7 sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	800	837	345	233
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1728	1574	1449	1447
LnCapacity	927	844	441	440
Flow Ratio	0.46	0.53	0.24	0.16
v/c Ratio	0.86	0.99	0.78	0.53
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	13.2	15.9	6.0	3.7
kB	0.9	0.8	0.4	0.4
Q2	4.4	9.0	1.2	0.4
Q Average	17.7	24.8	7.2	4.1
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	21.2	29.8	8.5	4.9
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.5	1.6
BOQ	24.9	34.8	11.1	6.4
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.7	1.7
BOQ	26.8	37.4	12.1	7.1
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.9	2.0
BOQ	28.8	39.9	13.7	8.1
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	2.3	2.4
BOQ	30.8	42.5	16.4	10.0
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: AM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 Build - mit-same st

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	50	758	219	77	608	42	95	136	86	73	255	52
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	32.0					20.0			
Yellow	4.0					3.0			
All Red	2.0					2.0			

Cycle Length: 63.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	114	221	0.50	0.51	25.0	C		
TR	863	1699	1.30	0.51	159.6	F	153.1	F
Westbound								
L	114	224	0.78	0.51	52.6	D		
TR	920	1812	1.76	0.51	361.9	F	345.8	F
Northbound								
L	226	711	0.48	0.32	18.9	B		
TR	500	1576	0.51	0.32	18.3	B	18.5	B
Southbound								
L	277	873	0.29	0.32	16.7	B		
TR	499	1572	0.67	0.32	22.1	C	21.1	C

Intersection Delay = 214.8 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	2/8/2006
Analysis Time Period:	AM Peak
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007 Build - mit-same st

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	50	758	219	77	608	42	95	136	86	73	255	52
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
PK 15 Vol	14	218	63	22	393	12	27	39	24	20	69	14
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900		1900	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0
Adj Flow	57	1123		89	1619		108	253		79	334	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs		0.224			0.030			0.387			0.171	
Peds Bikes		0			0			0			0	
Buses	0	0		0	1		0	0		0	0	
%InProtPhase												
Duration	0.25			Area Type: All other areas								

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Arriv. Type	3	3		3	3		3	3		3	3	
Unit Ext.	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext of g	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination	1	2	3	4	5	6	7	8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	32.0	20.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 63.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	50	758	219	77	608	42	95	136	86	73	255	52
PHF	0.87	0.87	0.87	0.87	0.39	0.87	0.88	0.88	0.88	0.92	0.92	0.92
Adj flow	57	871	252	89	1571	48	108	155	98	79	277	57
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj flow	57	1123		89	1619		108	253		79	334	
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs	0.224			0.030			0.387			0.171		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		L	TR		L	TR	
So	1900	1900		1900	1900		1900	1900		1900	1900	
Lanes	1	1	0	1	1	0	1	1	0	1	1	0
fW	0.967	0.967		1.000	1.000		0.933	0.933		0.900	0.900	
fHV	0.962	0.957		0.943	0.962		0.943	0.943		0.943	0.943	
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fBB	1.000	1.000		1.000	0.996		1.000	1.000		1.000	1.000	
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fLU	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRT		0.966			0.996			0.942			0.974	
fLT	0.125	1.000		0.125	1.000		0.425	1.000		0.541	1.000	
Sec.												
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000			1.000			1.000			1.000	
S	221	1699		224	1812		711	1576		873	1572	
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ MVmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm Left Prot	L	57	221	0.26	0.51	114	0.50
Perm Thru Right	TR	1123	1699	0.66	0.51	863	1.30
Westbound							
Prot Perm Left Prot	L	89	224	0.40	0.51	114	0.78
Perm Thru Right	TR	1619	1812	# 0.89	0.51	920	1.76
Northbound							
Prot Perm Left Prot	L	108	711	0.15	0.32	226	0.48
Perm Thru Right	TR	253	1576	0.16	0.32	500	0.51
Southbound							
Prot Perm Left Prot	L	79	873	0.09	0.32	277	0.29
Perm Thru Right	TR	334	1572	# 0.21	0.32	499	0.67

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.11
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.34

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
L	0.50	0.51	10.2	1.000	114	0.50	14.8	0.0	25.0	C		
TR	1.30	0.51	15.5	1.000	863	0.50	144.1	0.0	159.6	F	153.1	F
Westbound												
L	0.78	0.51	12.6	1.000	114	0.50	40.0	0.0	52.6	D		
TR	1.76	0.51	15.5	1.000	920	0.50	346.4	0.0	361.9	F	345.8	F
Northbound												
L	0.48	0.32	17.3	1.000	226	0.11	1.6	0.0	18.9	B		
TR	0.51	0.32	17.5	1.000	500	0.11	0.8	0.0	18.3	B	18.5	B
Southbound												
L	0.29	0.32	16.1	1.000	277	0.11	0.6	0.0	16.7	B		
TR	0.67	0.32	18.6	1.000	499	0.24	3.5	0.0	22.1	C	21.1	C

Intersection delay = 214.8 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	M	M	M	M
Cycle length, C 63.0 sec				
Total actual green time for LT lane group, G (s)	32.0	32.0	20.0	20.0
Effective permitted green time for LT lane group, g(s)	32.0	32.0	20.0	20.0
Opposing effective green time, go (s)	32.0	32.0	20.0	20.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	57	89	108	79
Proportion of LT in LT lane group, PLT	1.000	1.000	1.000	1.000
Proportion of LT in opposing flow, PLTo	0.00	0.00	0.00	0.00
Adjusted opposing flow rate, Vo (veh/h)	1619	1123	334	253
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.00	1.56	1.89	1.38
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	28.33	19.65	5.84	4.43
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0	0.0	0.0	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.49	0.49	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	32.00	32.00	4.80	2.03
gu=g-gq if gq>=gf, or = g-gf if gq<gf	0.00	0.00	15.20	17.97
n=Max(gq-gf)/2,0)	16.00	16.00	2.40	1.02
PTHo=1-PLTo	1.00	1.00	1.00	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00	1.00	1.00
EL1 (refer to Exhibit C16-3)	6.00	3.73	1.79	1.66
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.13	0.13	0.20	0.20
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.13	0.13	0.43	0.54
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.125	0.125	0.425	0.541

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 63.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g
Opposing platoon ratio, Rpo (refer Exhibit 16-11)
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]
gq, (see Exhibit C16-4,5,6,7,8)
gu=g-gq if gq>=gf, or = g-gf if gq<gf
n=Max(gq-gf)/2,0)
PTHo=1-PLTo
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]
EL1 (refer to Exhibit C16-3)
EL2=Max((1-Ptho**n)/Plto, 1.0)
fmin=2(1+PL)/g or fmin=2(1+Pl)/g
gdiff=max(gq-gf,0)
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt=[fm+0.91(N-1)]/N**
Left-turn adjustment, fLT

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 63.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00	15.5	10.2	0.00	0.0	0.0	25.0
TR	0.0	0.00	15.5	15.5	0.00	65.0	0.0	159.6
	0.0						0.0	
Westbound								
L	0.0	0.00	15.5	12.6	0.00	0.0	0.0	52.6
TR	0.0	0.00	15.5	15.5	0.00	174.7	0.0	361.9
	0.0						0.0	
Northbound								
L	0.0	0.00	21.5	17.3	0.00	0.0	0.0	18.9
TR	0.0	0.00	21.5	17.5	0.00	0.0	0.0	18.3
	0.0						0.0	
Southbound								
L	0.0	0.00	21.5	16.1	0.00	0.0	0.0	16.7
TR	0.0	0.00	21.5	18.6	0.00	0.0	0.0	22.1
	0.0						0.0	

Intersection Delay 214.8 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound		Westbound		Northbound		Southbound	
LaneGroup	L	TR	L	TR	L	TR	L	TR
Init Queue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flow Rate	57	1123	89	1619	108	253	79	334
So	1900	1900	1900	1900	1900	1900	1900	1900
No.Lanes	1	1 0	1	1 0	1	1 0	1	1 0
SL	221	1699	224	1812	711	1576	873	1572
LnCapacity	114	863	114	920	226	500	277	499
Flow Ratio	0.26	0.66	0.40	0.89	0.15	0.16	0.09	0.21
V/c Ratio	0.50	1.30	0.78	1.76	0.48	0.51	0.29	0.67
Grn Ratio	0.51	0.51	0.51	0.51	0.32	0.32	0.32	0.32
I Factor		1.000		1.000		1.000		1.000
AT or PVG	3	3	3	3	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

PF2	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00
Q1	0.7	19.7		1.3	28.3		1.5	3.6		1.0	5.1
kB	0.2	0.8		0.2	0.8		0.2	0.4		0.3	0.4
Q2	0.2	35.7		0.6	89.3		0.2	0.4		0.1	0.7
Q Average	0.8	55.3		1.9	117.6			1.7	4.0		1.1 5.8
Q Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0
Q Storage	0	0		0	0		0	0		0	0
Q S Ratio											
70th Percentile Output:											
fB%	1.3	1.2		1.3	1.2		1.2	1.2		1.2	1.2
BOQ	1.1	66.4		2.4	141		2.1	4.7		1.4	6.9
QSRatio											
85th Percentile Output:											
fB%	1.7	1.4		1.6	1.4		1.6	1.6		1.6	1.5
BOQ	1.4	77.4		3.0	165		2.7	6.2		1.8	8.9
QSRatio											
90th Percentile Output:											
fB%	1.9	1.5		1.8	1.5		1.8	1.7		1.8	1.7
BOQ	1.6	83.0		3.4	176		3.1	6.9		2.0	9.8
QSRatio											
95th Percentile Output:											
fB%	2.4	1.6		2.3	1.6		2.0	2.0		2.1	1.9
BOQ	2.1	88.5		4.2	188		3.5	7.9		2.4	11.2
QSRatio											
98th Percentile Output:											
fB%	3.0	1.7		2.7	1.7		2.6	2.4		2.6	2.3
BOQ	2.5	94.0		5.1	200		4.4	9.7		3.0	13.5
QSRatio											

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build -mit

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	53	818	104	100	988	93	288	199	78	73	175	62
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
WB Left	P				SB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	54.0					30.0		
Yellow	4.0					3.0		
All Red	2.0					2.0		

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	76	131	0.82	0.57	77.1	E		
TR	985	1732	1.10	0.57	80.7	F	80.6	F
Westbound								
L	76	133	1.50	0.57	302.2	F		
TR	1021	1796	1.20	0.57	121.6	F	137.0	F
Northbound								
L	253	802	1.39	0.32	229.4	F		
TR	506	1602	0.67	0.32	31.6	C	132.3	F
Southbound								
L	189	599	0.42	0.32	27.2	C		
TR	489	1550	0.53	0.32	27.8	C	27.7	C

Intersection Delay = 107.1 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: PM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - Build -mit
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	53	818	104	100	988	93	288	199	78	73	175	62
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
PK 15 Vol	16	241	31	28	281	26	88	61	24	20	48	17
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900		1900	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0
Adj Flow	62	1084		114	1229		351	338		80	260	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs		0.113			0.086			0.281			0.262	
Peds Bikes		0			0			0			0	
Buses	0	0		0	1		0	0		0	0	
%InProtPhase												
Duration	0.25			Area Type: All other areas								

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Arriv. Type	3	3		3	3		3	3		3	3	
Unit Ext.	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext of g	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P	NB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
WB	Left	P	SB	Left	A
	Thru	P		Thru	A
	Right	P		Right	A
	Peds			Peds	
NB	Right		EB	Right	
SB	Right		WB	Right	

Green	54.0	30.0
Yellow	4.0	3.0
All Red	2.0	2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	53	818	104	100	988	93	288	199	78	73	175	62
PHF	0.85	0.85	0.85	0.88	0.88	0.88	0.82	0.82	0.82	0.91	0.91	0.91
Adj flow	62	962	122	114	1123	106	351	243	95	80	192	68
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj flow	62	1084		114	1229		351	338		80	260	
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs	0.113			0.086			0.281			0.262		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		L	TR		L	TR	
So	1900	1900		1900	1900		1900	1900		1900	1900	
Lanes	1	1	0	1	1	0	1	1	0	1	1	0
fW	0.967	0.967		1.000	1.000		0.933	0.933		0.900	0.900	
fHV	0.962	0.959		0.943	0.962		0.943	0.943		0.943	0.943	
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fBB	1.000	1.000		1.000	0.996		1.000	1.000		1.000	1.000	
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fLU	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRT		0.983			0.987			0.958			0.961	
fLT	0.074	1.000		0.074	1.000		0.479	1.000		0.371	1.000	
Sec.												
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000			1.000			1.000			1.000	
S	131	1732		133	1796		802	1602		599	1550	
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm Left Prot Perm Thru Right	L TR	62 1084	131 1732	0.47 0.63	0.57 0.57	76 985	0.82 1.10
Westbound							
Prot Perm Left Prot Perm Thru Right	L TR	114 1229	133 1796	# 0.86 0.68	0.57 0.57	76 1021	1.50 1.20
Northbound							
Prot Perm Left Prot Perm Thru Right	L TR	351 338	802 1602	# 0.44 0.21	0.32 0.32	253 506	1.39 0.67
Southbound							
Prot Perm Left Prot Perm Thru Right	L TR	80 260	599 1550	0.13 0.17	0.32 0.32	189 489	0.42 0.53

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.29
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.46

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Del d2	Res Del d3	Lane Group Delay	LOS	Approach Delay	LOS
Eastbound												
L	0.82	0.57	16.5	1.000	76	0.50	60.6	0.0	77.1	E		
TR	1.10	0.57	20.5	1.000	985	0.50	60.2	0.0	80.7	F	80.6	F
Westbound												
L	1.50	0.57	20.5	1.000	76	0.50	281.7	0.0	302.2	F		
TR	1.20	0.57	20.5	1.000	1021	0.50	101.1	0.0	121.6	F	137.0	F
Northbound												
L	1.39	0.32	32.5	1.000	253	0.50	196.9	0.0	229.4	F		
TR	0.67	0.32	28.2	1.000	506	0.24	3.4	0.0	31.6	C	132.3	F
Southbound												
L	0.42	0.32	25.7	1.000	189	0.11	1.5	0.0	27.2	C		
TR	0.53	0.32	26.7	1.000	489	0.13	1.1	0.0	27.8	C	27.7	C

Intersection delay = 107.1 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	M	M	M	M
Cycle length, C 95.0 sec				
Total actual green time for LT lane group, G (s)	54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)	54.0	54.0	30.0	30.0
Opposing effective green time, go (s)	54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	62	114	351	80
Proportion of LT in LT lane group, PLT	1.000	1.000	1.000	1.000
Proportion of LT in opposing flow, PLTo	0.00	0.00	0.00	0.00
Adjusted opposing flow rate, Vo (veh/h)	1229	1084	260	338
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.64	3.01	9.26	2.11
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	32.43	28.61	6.86	8.92
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0	0.0	0.0	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	54.00	54.00	5.97	10.03
gu=g-gq if gq>=gf, or = g-gf if gq<gf	0.00	0.00	24.03	19.97
n=Max(gq-gf)/2,0)	27.00	27.00	2.99	5.01
PTHo=1-PLTo	1.00	1.00	1.00	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00	1.00	1.00
EL1 (refer to Exhibit C16-3)	4.12	3.59	1.67	1.79
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.07	0.07	0.13	0.13
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.07	0.07	0.48	0.37
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.074	0.074	0.479	0.371

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 95.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g
Opposing platoon ratio, Rpo (refer Exhibit 16-11)
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]
gq, (see Exhibit C16-4,5,6,7,8)
gu=g-gq if gq>=gf, or = g-gf if gq<gf
n=Max(gq-gf)/2,0)
PTHo=1-PLTo
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]
EL1 (refer to Exhibit C16-3)
EL2=Max((1-Ptho**n)/Plto, 1.0)
fmin=2(1+PL)/g or fmin=2(1+Pl)/g
gdiff=max(gq-gf,0)
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)];(fmin<=fm<=1.00)
or flt=[fm+0.91(N-1)]/N**
Left-turn adjustment, fLT

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00	20.5	16.5	0.00	0.0	0.0	77.1
TR	0.0	0.00	20.5	20.5	0.00	24.8	0.0	80.7
	0.0						0.0	
Westbound								
L	0.0	0.00	20.5	20.5	0.00	9.5	0.0	302.2
TR	0.0	0.00	20.5	20.5	0.00	52.0	0.0	121.6
	0.0						0.0	
Northbound								
L	0.0	0.00	32.5	32.5	0.00	24.5	0.0	229.4
TR	0.0	0.00	32.5	28.2	0.00	0.0	0.0	31.6
	0.0						0.0	
Southbound								
L	0.0	0.00	32.5	25.7	0.00	0.0	0.0	27.2
TR	0.0	0.00	32.5	26.7	0.00	0.0	0.0	27.8
	0.0						0.0	

Intersection Delay 107.1 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		L	TR		L	TR	
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate	62	1084		114	1229		351	338		80	260	
So	1900	1900		1900	1900		1900	1900		1900	1900	
No.Lanes	1	1	0	1	1	0	1	1	0	1	1	0
SL	131	1732		133	1796		802	1602		599	1550	
LnCapacity	76	985		76	1021		253	506		189	489	
Flow Ratio	0.47	0.63		0.86	0.68		0.44	0.21		0.13	0.17	
v/c Ratio	0.82	1.10		1.50	1.20		1.39	0.67		0.42	0.53	
Grn Ratio	0.57	0.57		0.57	0.57		0.32	0.32		0.32	0.32	
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3		3	3		3	3		3	3	
Pltn Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	

PF2	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00
Q1	1.3 28.6	3.0 32.4	9.3 7.7	1.7 5.6
kB	0.2 1.2	0.2 1.2	0.3 0.5	0.3 0.5
Q2	0.6 20.2	5.3 31.8	13.3 0.9	0.2 0.5
Q Average	1.9 48.8	8.3 64.2	22.5 8.6	1.9 6.2
Q Spacing	25.0 25.0	25.0 25.0	25.0 25.0	25.0 25.0
Q Storage	0 0	0 0	0 0	0 0
Q S Ratio				
70th Percentile Output:				
fB%	1.3 1.2	1.2 1.2	1.2 1.2	1.2 1.2
BOQ	2.5 58.6	10.1 77.1	26.1 10.2	2.2 7.3
QSRatio				
85th Percentile Output:				
fB%	1.6 1.4	1.5 1.4	1.4 1.5	1.6 1.5
BOQ	3.1 68.4	12.1 89.9	32.5 13.2	2.9 9.5
QSRatio				
90th Percentile Output:				
fB%	1.8 1.5	1.6 1.5	1.5 1.7	1.8 1.7
BOQ	3.6 73.3	13.2 96.4	34.5 14.4	3.3 10.4
QSRatio				
95th Percentile Output:				
fB%	2.3 1.6	1.8 1.6	1.7 1.9	2.0 1.9
BOQ	4.4 78.1	14.8 103	37.7 16.2	3.8 11.9
QSRatio				
98th Percentile Output:				
fB%	2.7 1.7	2.0 1.7	1.9 2.2	2.6 2.3
BOQ	5.3 83.0	16.5 109	42.3 19.1	4.8 14.3
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 2/8/2006
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007-Build-reg-68-mit-same st

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	52	1101	114	112	802	101	160	195	128	99	145	46
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination		1	2	3	4			5	6	7	8
EB	Left	P				NB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
WB	Left	P				SB	Left	A			
	Thru	P					Thru	A			
	Right	P					Right	A			
	Peds						Peds				
NB	Right					EB	Right				
SB	Right					WB	Right				
Green		37.0						21.0			
Yellow		4.0						3.0			
All Red		2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	104	191	0.55	0.54	29.7	C		
TR	932	1738	1.43	0.54	216.8	F	209.1	F
Westbound								
L	104	194	1.15	0.54	151.5	F		
TR	959	1789	1.01	0.54	48.2	D	59.6	E
Northbound								
L	291	955	0.57	0.30	22.8	C		
TR	479	1573	0.70	0.30	25.5	C	24.6	C
Southbound								
L	198	650	0.58	0.30	24.3	C		
TR	473	1555	0.47	0.30	20.2	C	21.6	C

Intersection Delay = 113.3 (sec/veh) Intersection LOS = F

Phone:
E-Mail:
Fax:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 2/8/2006
Analysis Time Period: Saturday Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007-Build-reg-68-mit-same st
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	52	1101	114	112	802	101	160	195	128	99	145	46
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
PK 15 Vol	14	302	31	30	216	27	41	50	33	28	42	13
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900		1900	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0
Adj Flow	57	1335		120	971		165	333		114	220	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs		0.094			0.112			0.396			0.241	
Peds Bikes	0			0			0			0		
Buses	0	0		0	1		0	0		0	0	
%InProtPhase												
Duration	0.25			Area Type: All other areas								

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Arriv. Type	3	3		3	3		3	3		3	3	
Unit Ext.	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext of g	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		37.0				21.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	52	1101	114	112	802	101	160	195	128	99	145	46
PHF	0.91	0.91	0.91	0.93	0.93	0.93	0.97	0.97	0.97	0.87	0.87	0.87
Adj flow	57	1210	125	120	862	109	165	201	132	114	167	53
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj flow	57	1335		120	971		165	333		114	220	
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs	0.094			0.112			0.396			0.241		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		L	TR		L	TR	
So	1900	1900		1900	1900		1900	1900		1900	1900	
Lanes	1	1	0	1	1	0	1	1	0	1	1	0
fW	0.967	0.967		1.000	1.000		0.933	0.933		0.900	0.900	
fHV	0.962	0.960		0.943	0.962		0.943	0.943		0.943	0.943	
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fBB	1.000	1.000		1.000	0.996		1.000	1.000		1.000	1.000	
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fLU	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRT		0.986			0.983			0.941			0.964	
fLT	0.108	1.000		0.108	1.000		0.571	1.000		0.403	1.000	
Sec.												
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000			1.000			1.000			1.000	
S	191	1738		194	1789		955	1573		650	1555	
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left	L	57	191	0.30	0.54	104	0.55
Prot							
Perm							
Thru	TR	1335	1738	# 0.77	0.54	932	1.43
Right							
Westbound							
Prot							
Perm							
Left	L	120	194	0.62	0.54	104	1.15
Prot							
Perm							
Thru	TR	971	1789	0.54	0.54	959	1.01
Right							
Northbound							
Prot							
Perm							
Left	L	165	955	0.17	0.30	291	0.57
Prot							
Perm							
Thru	TR	333	1573	# 0.21	0.30	479	0.70
Right							
Southbound							
Prot							
Perm							
Left	L	114	650	0.18	0.30	198	0.58
Prot							
Perm							
Thru	TR	220	1555	0.14	0.30	473	0.47
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.98
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.17

Control Delay and LOS Determination

Appr/ Lane Grp	Ratios v/c	Ratios g/C	Unf Del d1	Prog Adj Fact	Lane Grp Cap	Incremental Factor k	Incremental Del d2	Res Del d3	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound												
L	0.55	0.54	10.5	1.000	104	0.50	19.2	0.0	29.7	C		
TR	1.43	0.54	16.0	1.000	932	0.50	200.8	0.0	216.8	F	209.1	F
Westbound												
L	1.15	0.54	16.0	1.000	104	0.50	135.5	0.0	151.5	F		
TR	1.01	0.54	16.0	1.000	959	0.50	32.2	0.0	48.2	D	59.6	E
Northbound												
L	0.57	0.30	20.2	1.000	291	0.16	2.6	0.0	22.8	C		
TR	0.70	0.30	21.2	1.000	479	0.26	4.4	0.0	25.5	C	24.6	C
Southbound												
L	0.58	0.30	20.2	1.000	198	0.17	4.1	0.0	24.3	C		
TR	0.47	0.30	19.4	1.000	473	0.11	0.7	0.0	20.2	C	21.6	C

Intersection delay = 113.3 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	M	M	M	M
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	57	120	165	114
Proportion of LT in LT lane group, PLT	1.000	1.000	1.000	1.000
Proportion of LT in opposing flow, PLTo	0.00	0.00	0.00	0.00
Adjusted opposing flow rate, Vo (veh/h)	971	1335	220	333
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.09	2.30	3.16	2.18
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	18.61	25.59	4.22	6.38
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0	0.0	0.0	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	31.48	37.00	1.68	5.90
gu=g-gq if gq>=gf, or = g-gf if gq<gf	5.52	0.00	19.32	15.10
n=Max(gq-gf)/2,0)	15.74	18.50	0.84	2.95
PTHo=1-PLTo	1.00	1.00	1.00	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00	1.00	1.00
EL1 (refer to Exhibit C16-3)	3.23	4.56	1.61	1.79
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.11	0.11	0.19	0.19
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.11	0.11	0.57	0.40
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.108	0.108	0.571	0.403

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g
Opposing platoon ratio, Rpo (refer Exhibit 16-11)
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]
gq, (see Exhibit C16-4,5,6,7,8)
gu=g-gq if gq>=gf, or = g-gf if gq<gf
n=Max(gq-gf)/2,0)
PTHo=1-PLTo
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]
EL1 (refer to Exhibit C16-3)
EL2=Max((1-Ptho**n)/Plto, 1.0)
fmin=2(1+PL)/g or fmin=2(1+Pl)/g
gdiff=max(gq-gf,0)
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt=[fm+0.91(N-1)]/N**
Left-turn adjustment, fLT

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00	16.0	10.5	0.00	0.0	0.0	29.7
TR	0.0	0.00	16.0	16.0	0.00	100.8	0.0	216.8
	0.0						0.0	
Westbound								
L	0.0	0.00	16.0	16.0	0.00	4.0	0.0	151.5
TR	0.0	0.00	16.0	16.0	0.00	3.0	0.0	48.2
	0.0						0.0	
Northbound								
L	0.0	0.00	24.0	20.2	0.00	0.0	0.0	22.8
TR	0.0	0.00	24.0	21.2	0.00	0.0	0.0	25.5
	0.0						0.0	
Southbound								
L	0.0	0.00	24.0	20.2	0.00	0.0	0.0	24.3
TR	0.0	0.00	24.0	19.4	0.00	0.0	0.0	20.2
	0.0						0.0	

Intersection Delay 113.3 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		L	TR		L	TR	
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate	57	1335		120	971		165	333		114	220	
So	1900	1900		1900	1900		1900	1900		1900	1900	
No.Lanes	1	1	0	1	1	0	1	1	0	1	1	0
SL	191	1738		194	1789		955	1573		650	1555	
LnCapacity	104	932		104	959		291	479		198	473	
Flow Ratio	0.30	0.77		0.62	0.54		0.17	0.21		0.18	0.14	
v/c Ratio	0.55	1.43		1.15	1.01		0.57	0.70		0.58	0.47	
Grn Ratio	0.54	0.54		0.54	0.54		0.30	0.30		0.30	0.30	
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3		3	3		3	3		3	3	
Pltn Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	

PF2	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00
Q1	0.7 25.6	2.3 18.6	2.7 5.6	1.8 3.4
kB	0.2 0.9	0.2 0.9	0.3 0.4	0.2 0.4
Q2	0.2 53.2	3.0 11.4	0.4 0.8	0.3 0.3
Q Average	0.9 78.8	5.3 30.0	3.0 6.5	2.1 3.7
Q Spacing	25.0 25.0	25.0 25.0	25.0 25.0	25.0 25.0
Q Storage	0 0	0 0	0 0	0 0
Q S Ratio				
70th Percentile Output:				
fB%	1.3 1.2	1.2 1.2	1.2 1.2	1.2 1.2
BOQ	1.2 94.6	6.5 36.0	3.6 7.7	2.6 4.5
QSRatio				
85th Percentile Output:				
fB%	1.6 1.4	1.5 1.4	1.6 1.5	1.6 1.6
BOQ	1.6 110	7.9 42.0	4.7 10.0	3.4 5.9
QSRatio				
90th Percentile Output:				
fB%	1.9 1.5	1.7 1.5	1.7 1.7	1.8 1.7
BOQ	1.8 118	8.8 45.0	5.3 10.9	3.8 6.5
QSRatio				
95th Percentile Output:				
fB%	2.4 1.6	1.9 1.6	2.0 1.9	2.0 2.0
BOQ	2.3 126	10.3 48.0	6.1 12.4	4.3 7.4
QSRatio				
98th Percentile Output:				
fB%	2.9 1.7	2.2 1.7	2.5 2.3	2.5 2.4
BOQ	2.8 134	11.7 51.0	7.5 14.9	5.4 9.2
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	50	440	115	45	714	50	185	155	35	30	230	50
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	54.0					30.0			
Yellow	4.0					3.0			
All Red	2.0					2.0			

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	895	1575	0.73	0.57	20.2	C	20.2	C
Westbound								
LTR	961	1691	0.87	0.57	27.9	C	27.9	C
Northbound								
LTR	326	1032	1.29	0.32	184.7	F	184.7	F
Southbound								
LTR	517	1638	0.67	0.32	31.7	C	31.7	C

Intersection Delay = 55.6 (sec/veh) Intersection LOS = E

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 9/21/2007
Analysis Time Period: PM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	50	440	115	45	714	50	185	155	35	30	230	50
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
PK 15 Vol	13	118	31	12	184	13	52	44	10	8	65	14
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		651			834			421			348	
%InSharedLn												
Prop LTs		0.083			0.055			0.494			0.098	
Prop RTs		0.190			0.062			0.093			0.161	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		54.0				30.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	50	440	115	45	714	50	185	155	35	30	230	50
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
Adj flow	54	473	124	46	736	52	208	174	39	34	258	56
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		651			834			421			348	
Prop LTs		0.083			0.055			0.494			0.098	
Prop RTs		0.190			0.062			0.093			0.161	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.958			0.961			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.974			0.992			0.987			0.978		
fLT	0.888			0.938			0.530			0.934		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1575			1691			1032			1638		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	651	1575	0.41	0.57	895	0.73
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	834	1691	# 0.49	0.57	961	0.87
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	421	1032	# 0.41	0.32	326	1.29
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	348	1638	0.21	0.32	517	0.67
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.90
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.02

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.73	0.57	15.1	1.000	895	0.50	5.1	0.0	20.2	C	20.2	C
Westbound												
LTR	0.87	0.57	17.5	1.000	961	0.50	10.5	0.0	27.9	C	27.9	C
Northbound												
LTR	1.29	0.32	32.5	1.000	326	0.50	152.2	0.0	184.7	F	184.7	F
Southbound												
LTR	0.67	0.32	28.2	1.000	517	0.25	3.4	0.0	31.7	C	31.7	C

Intersection delay = 55.6 (sec/veh) Intersection LOS = E

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)		54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)		54.0	54.0	30.0	30.0
Opposing effective green time, go (s)		54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		54	46	208	34
Proportion of LT in LT lane group, PLT		0.083	0.055	0.494	0.098
Proportion of LT in opposing flow, PLTo		0.06	0.08	0.10	0.49
Adjusted opposing flow rate, Vo (veh/h)		834	651	348	421
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.43	1.21	5.49	0.90
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		22.01	17.18	9.18	11.11

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	12.4	14.4	0.0	8.4
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	15.37	11.70	12.90	15.70
gu=g-gq if gq>=gf, or = g-gf if gq<gf	38.63	39.56	17.10	14.30
n=Max(gq-gf)/2,0)	1.47	0.00	6.45	3.63
PTHo=1-PLTo	0.94	0.92	0.90	0.51
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.08	0.06	0.49	0.10
EL1 (refer to Exhibit C16-3)	3.18	2.67	1.98	2.13
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.45	1.00	4.96	1.85
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.04	0.04	0.10	0.07
gdiff=max(gq-gf,0)	2.93	0.00	12.90	7.26
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.89	0.94	0.53	0.93
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.888	0.938	0.530	0.934

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

ex-pm

Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	15.1	0.00	0.0	0.0	20.2
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	17.5	0.00	0.0	0.0	27.9
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	32.5	0.00	23.8	0.0	184.7
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	28.2	0.00	0.0	0.0	31.7
	0.0						0.0	

Intersection Delay 55.6 sec/veh Intersection LOS E

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	651	834	421	348
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1575	1691	1032	1638
LnCapacity	895	961	326	517
Flow Ratio	0.41	0.49	0.41	0.21
v/c Ratio	0.73	0.87	1.29	0.67
Grn Ratio	0.57	0.57	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

		ex-pm		
PF2	1.00	1.00	1.00	1.00
Q1	12.6	18.7	11.1	8.0
kB	1.1	1.2	0.4	0.5
Q2	2.7	5.6	13.3	0.9
Q Average	15.3	24.3	24.4	8.9
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	18.5	29.2	28.2	10.5
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.4	1.5
BOQ	21.7	34.1	35.0	13.6
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.5	1.7
BOQ	23.4	36.6	37.1	14.8
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.7	1.9
BOQ	25.2	39.1	40.4	16.6
QSRatio				
98th Percentile Output:				
fB%	1.8	1.7	1.9	2.2
BOQ	27.1	41.7	45.2	19.7
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	55	505	110	30	560	55	75	335	50	30	190	40
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left	P				NB	Left	A			
Thru	P					Thru	A			
Right	P					Right	A			
Peds						Peds				
WB Left	P				SB	Left	A			
Thru	P					Thru	A			
Right	P					Right	A			
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green	37.0						21.0			
Yellow	4.0						3.0			
All Red	2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	861	1606	0.89	0.54	27.9	C	27.9	C
Westbound								
LTR	912	1700	0.81	0.54	21.0	C	21.0	C
Northbound								
LTR	508	1668	1.03	0.30	71.7	E	71.7	E
Southbound								
LTR	467	1533	0.63	0.30	23.4	C	23.4	C

Intersection Delay = 35.0- (sec/veh) Intersection LOS = C

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst:	DB
Agency/Co.:	AKRF
Date Performed:	9/21/2007
Analysis Time Period:	Saturday Peak
Intersection:	Route 25 & Edwards Avenue
Area Type:	All other areas
Jurisdiction:	Calverton, NY
Analysis Year:	2007

Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	55	505	110	30	560	55	75	335	50	30	190	40
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
PK 15 Vol	16	145	32	9	161	16	21	95	14	9	54	11
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		769			741			523			295	
%InSharedLn												
Prop LTs		0.082			0.046			0.163			0.115	
Prop RTs		0.164			0.085			0.109			0.153	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination	1	2	3	4	5	6	7	8

ex-sat

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		37.0				21.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	55	505	110	30	560	55	75	335	50	30	190	40
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Adj flow	63	580	126	34	644	63	85	381	57	34	216	45
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		769			741			523			295	
Prop LTs		0.082			0.046			0.163			0.115	
Prop RTs		0.164			0.085			0.109			0.153	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.959			0.961			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.978			0.989			0.985			0.979		
fLT	0.902			0.946			0.858			0.873		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1606			1700			1668			1533		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

					ex-sat			
Perm								
Left								
Prot								
Perm								
Thru	LTR	769	1606	#	0.48	0.54	861	0.89
Right								
Westbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	741	1700		0.44	0.54	912	0.81
Right								
Northbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	523	1668	#	0.31	0.30	508	1.03
Right								
Southbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	295	1533		0.19	0.30	467	0.63
Right								

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 0.79
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 0.94

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	0.89	0.54	14.2	1.000	861	0.50	13.6	0.0	27.9	C	27.9	C
Westbound												
LTR	0.81	0.54	13.1	1.000	912	0.50	7.8	0.0	21.0	C	21.0	C
Northbound												
LTR	1.03	0.30	24.0	1.000	508	0.50	47.7	0.0	71.7	E	71.7	E
Southbound												
LTR	0.63	0.30	20.7	1.000	467	0.21	2.8	0.0	23.4	C	23.4	C

Intersection delay = 35.0- (sec/veh) Intersection LOS = C

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

ex-sat

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	69.0 sec				
Total actual green time for LT lane group, G (s)		37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)		37.0	37.0	21.0	21.0
Opposing effective green time, go (s)		37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		63	34	85	34
Proportion of LT in LT lane group, PLT		0.082	0.046	0.163	0.115
Proportion of LT in opposing flow, PLTo		0.05	0.08	0.12	0.16
Adjusted opposing flow rate, Vo (veh/h)		741	769	295	523
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.21	0.65	1.63	0.65
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		14.20	14.74	5.65	10.02

ex-sat

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	8.1	13.2	1.5	5.9
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	10.52	10.99	7.59	14.48
gu=g-gq if gq>=gf, or = g-gf if gq<gf	26.48	23.82	13.41	6.52
n=Max(gq-gf)/2,0)	1.24	0.00	3.03	4.30
PTHo=1-PLTo	0.95	0.92	0.88	0.84
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.08	0.05	0.16	0.12
EL1 (refer to Exhibit C16-3)	2.91	2.99	1.87	2.35
EL2=Max((1-Ptho**n)/Plto, 1.0)	1.23	1.00	2.69	3.28
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.11	0.11
gdiff=max(gq-gf,0)	2.47	0.00	6.07	8.59
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.90	0.95	0.86	0.87
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.902	0.946	0.858	0.873

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

	ex-sat
Cycle length, C	69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v	
v/c ratio from Capacity Worksheet, X	
Protected phase effective green interval, g (s)	
Opposing queue effective green interval, gq	
Unopposed green interval, gu	
Red time r=(C-g-gq-gu)	
Arrival rate, qa=v/(3600(max[X,1.0]))	
Protected ph. departure rate, Sp=s/3600	
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)	
XPerm	
XProt	
Case	
Queue at beginning of green arrow, Qa	
Queue at beginning of unsaturated green, Qu	
Residual queue, Qr	
Uniform Delay, d1	

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	14.2	0.00	0.0	0.0	27.9
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	13.1	0.00	0.0	0.0	21.0
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	24.0	0.00	3.7	0.0	71.7
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	20.7	0.00	0.0	0.0	23.4
	0.0						0.0	

Intersection Delay 35.0- sec/veh Intersection LOS C

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	769	741	523	295
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1606	1700	1668	1533
LnCapacity	861	912	508	467
Flow Ratio	0.48	0.44	0.31	0.19
v/c Ratio	0.89	0.81	1.03	0.63
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

		ex-sat		
PF2	1.00	1.00	1.00	1.00
Q1	13.1	11.7	10.0	4.9
kB	0.9	0.9	0.4	0.4
Q2	5.0	3.3	6.1	0.6
Q Average	18.1	15.0	16.1	5.5
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.2	1.2
BOQ	21.8	18.1	18.8	6.5
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.5	1.5
BOQ	25.5	21.2	23.8	8.5
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.6	1.7
BOQ	27.4	22.9	25.4	9.4
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.7	1.9
BOQ	29.4	24.8	28.1	10.7
QSRatio				
98th Percentile Output:				
fB%	1.7	1.8	2.0	2.4
BOQ	31.5	26.6	32.0	12.9
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - No Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	55	765	116	98	953	89	246	198	81	67	243	53
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4	5	6	7	8
EB Left	P				NB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
WB Left	P				SB Left	A		
Thru	P				Thru	A		
Right	P				Right	A		
Peds					Peds			
NB Right					EB Right			
SB Right					WB Right			
Green	54.0					30.0		
Yellow	4.0					3.0		
All Red	2.0					2.0		

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	885	1557	1.14	0.57	96.3	F	96.3	F
Westbound								
LTR	818	1439	1.44	0.57	223.9	F	223.9	F
Northbound								
LTR	320	1014	1.84	0.32	422.7	F	422.7	F
Southbound								
LTR	462	1463	0.88	0.32	48.8	D	48.8	D

Intersection Delay = 197.8 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 9/21/2007
Analysis Time Period: PM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - No Build
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	55	765	116	98	953	89	246	198	81	67	243	53
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
PK 15 Vol	15	206	31	25	246	23	69	56	23	19	68	15
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1007			1175			589			408	
%InSharedLn												
Prop LTs		0.059			0.086			0.469			0.184	
Prop RTs		0.124			0.078			0.154			0.147	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		54.0				30.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	55	765	116	98	953	89	246	198	81	67	243	53
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
Adj flow	59	823	125	101	982	92	276	222	91	75	273	60
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1007			1175			589			408	
Prop LTs		0.059			0.086			0.469			0.184	
Prop RTs		0.124			0.078			0.154			0.147	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.959			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.983			0.989			0.979			0.980		
fLT	0.869			0.801			0.525			0.833		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1557			1439			1014			1463		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	1007	1557	0.65	0.57	885	1.14
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1175	1439	# 0.82	0.57	818	1.44
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	589	1014	# 0.58	0.32	320	1.84
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	408	1463	0.28	0.32	462	0.88
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.40
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.58

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.14	0.57	20.5	1.000	885	0.50	75.8	0.0	96.3	F	96.3	F
Westbound												
LTR	1.44	0.57	20.5	1.000	818	0.50	203.4	0.0	223.9	F	223.9	F
Northbound												
LTR	1.84	0.32	32.5	1.000	320	0.50	390.2	0.0	422.7	F	422.7	F
Southbound												
LTR	0.88	0.32	30.8	1.000	462	0.41	17.9	0.0	48.8	D	48.8	D

Intersection delay = 197.8 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 95.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 95.0 sec				
Total actual green time for LT lane group, G (s)	54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)	54.0	54.0	30.0	30.0
Opposing effective green time, go (s)	54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	59	101	276	75
Proportion of LT in LT lane group, PLT	0.059	0.086	0.469	0.184
Proportion of LT in opposing flow, PLTo	0.09	0.06	0.18	0.47
Adjusted opposing flow rate, Vo (veh/h)	1175	1007	408	589
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.56	2.67	7.28	1.98
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	31.01	26.57	10.77	15.54

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	11.3	5.0	0.0	3.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	21.75	18.67	15.21	21.73
gu=g-gq if gq>=gf, or = g-gf if gq<gf	32.25	35.33	14.79	8.27
n=Max(gq-gf)/2,0)	5.21	6.85	7.61	9.37
PTHo=1-PLTo	0.91	0.94	0.82	0.53
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.06	0.09	0.47	0.18
EL1 (refer to Exhibit C16-3)	4.41	3.76	2.10	2.51
EL2=Max((1-Ptho**n)/Plto, 1.0)	4.35	5.78	4.28	2.13
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.04	0.04	0.10	0.08
gdiff=max(gq-gf,0)	10.41	13.70	15.21	18.73
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.87	0.80	0.53	0.83
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.869	0.801	0.525	0.833

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

nb-pm

Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	30.5	0.0	96.3
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	89.3	0.0	223.9
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	32.5	0.00	67.3	0.0	422.7
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	30.8	0.00	0.0	0.0	48.8
	0.0						0.0	

Intersection Delay 197.8 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1007	1175	589	408
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1557	1439	1014	1463
LnCapacity	885	818	320	462
Flow Ratio	0.65	0.82	0.58	0.28
v/c Ratio	1.14	1.44	1.84	0.88
Grn Ratio	0.57	0.57	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	26.6	31.0	15.5	10.2
kB	1.1	1.0	0.4	0.4
Q2	21.6	47.8	34.4	2.5
Q Average	48.2	78.8	49.9	12.7
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.1	1.2
BOQ	57.8	94.6	56.4	14.9
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.4	1.5
BOQ	67.4	110	67.8	19.0
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.4	1.6
BOQ	72.3	118	71.6	20.5
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.5	1.8
BOQ	77.1	126	76.8	22.8
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	1.7	2.1
BOQ	81.9	134	86.0	26.4
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - No Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	59	935	110	83	851	97	121	361	107	70	213	44
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	37.0					21.0			
Yellow	4.0					3.0			
All Red	2.0					2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	846	1577	1.50	0.54	247.2	F	247.2	F
Westbound								
LTR	744	1387	1.59	0.54	288.5	F	288.5	F
Northbound								
LTR	443	1456	1.51	0.30	266.0	F	266.0	F
Southbound								
LTR	347	1139	1.07	0.30	92.8	F	92.8	F

Intersection Delay = 248.4 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 9/21/2007
Analysis Time Period: Saturday Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - No Build
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	59	935	110	83	851	97	121	361	107	70	213	44
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
PK 15 Vol	17	269	32	24	245	28	34	103	30	20	61	13
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1269			1184			670			372	
%InSharedLn												
Prop LTs		0.054			0.080			0.206			0.215	
Prop RTs		0.099			0.094			0.182			0.134	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

nb-sat

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		37.0				21.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	59	935	110	83	851	97	121	361	107	70	213	44
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Adj flow	68	1075	126	95	978	111	138	410	122	80	242	50
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1269			1184			670			372	
Prop LTs		0.054			0.080			0.206			0.215	
Prop RTs		0.099			0.094			0.182			0.134	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.987			0.987			0.975			0.982		
fLT	0.877			0.773			0.757			0.647		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1577			1387			1456			1139		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

nb-sat

Perm							
Left							
Prot							
Perm							
Thru	LTR	1269	1577	0.80	0.54	846	1.50
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1184	1387	# 0.85	0.54	744	1.59
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	670	1456	# 0.46	0.30	443	1.51
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	372	1139	0.33	0.30	347	1.07
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.31
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.56

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.50	0.54	16.0	1.000	846	0.50	231.2	0.0	247.2	F	247.2	F
Westbound												
LTR	1.59	0.54	16.0	1.000	744	0.50	272.5	0.0	288.5	F	288.5	F
Northbound												
LTR	1.51	0.30	24.0	1.000	443	0.50	242.0	0.0	266.0	F	266.0	F
Southbound												
LTR	1.07	0.30	24.0	1.000	347	0.50	68.8	0.0	92.8	F	92.8	F

Intersection delay = 248.4 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET
for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	68	95	138	80
Proportion of LT in LT lane group, PLT	0.054	0.080	0.206	0.215
Proportion of LT in opposing flow, PLTo	0.08	0.05	0.22	0.21
Adjusted opposing flow rate, Vo (veh/h)	1184	1269	372	670
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.30	1.82	2.64	1.53
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	22.69	24.32	7.13	12.84

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	7.4	4.6	0.0	1.8
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	17.61	18.89	10.03	18.53
gu=g-gq if gq>=gf, or = g-gf if gq<gf	19.39	18.11	10.97	2.47
n=Max(gq-gf)/2,0)	5.11	7.17	5.01	8.35
PTHo=1-PLTo	0.92	0.95	0.78	0.79
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.05	0.08	0.21	0.22
EL1 (refer to Exhibit C16-3)	4.44	4.82	2.02	2.72
EL2=Max((1-Ptho**n)/Plto, 1.0)	4.33	6.09	3.27	4.15
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.11	0.12
gdiff=max(gq-gf,0)	10.22	14.33	10.03	16.71
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.88	0.77	0.76	0.65
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.877	0.773	0.757	0.647

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

nb-sat
Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	105.8	0.0	247.2
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	110.0	0.0	288.5
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	24.0	0.00	56.8	0.0	266.0
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	24.0	0.00	6.3	0.0	92.8
	0.0						0.0	

Intersection Delay 248.4 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1269	1184	670	372
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1577	1387	1456	1139
LnCapacity	846	744	443	347
Flow Ratio	0.80	0.85	0.46	0.33
v/c Ratio	1.50	1.59	1.51	1.07
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

		nb-sat		
PF2	1.00	1.00	1.00	1.00
Q1	24.3	22.7	12.8	7.1
kB	0.8	0.8	0.4	0.3
Q2	55.3	57.0	29.4	5.7
Q Average	79.6	79.7	42.2	12.8
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.1	1.2
BOQ	95.5	95.6	47.9	15.0
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.4	1.5
BOQ	111	112	58.0	19.2
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.4	1.6
BOQ	119	120	61.2	20.6
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.6	1.8
BOQ	127	128	65.8	23.0
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	1.7	2.1
BOQ	135	135	73.5	26.6
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	55	765	118	103	953	89	247	199	83	67	244	53
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	54.0					30.0			
Yellow	4.0					3.0			
All Red	2.0					2.0			

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	884	1556	1.14	0.57	97.7	F	97.7	F
Westbound								
LTR	805	1417	1.47	0.57	236.9	F	236.9	F
Northbound								
LTR	320	1014	1.86	0.32	431.0	F	431.0	F
Southbound								
LTR	462	1463	0.89	0.32	49.1	D	49.1	D

Intersection Delay = 205.0 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 9/21/2007
Analysis Time Period: PM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - Build
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	55	765	118	103	953	89	247	199	83	67	244	53
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
PK 15 Vol	15	206	32	27	246	23	69	56	23	19	69	15
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol		0			0			0			0	
Adj Flow		1009			1180			595			409	
%InSharedLn												
Prop LTs		0.058			0.090			0.467			0.183	
Prop RTs		0.126			0.078			0.156			0.147	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

b-pm

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		54.0				30.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	55	765	118	103	953	89	247	199	83	67	244	53
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
Adj flow	59	823	127	106	982	92	278	224	93	75	274	60
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1009			1180			595			409	
Prop LTs		0.058			0.090			0.467			0.183	
Prop RTs	0.126			0.078			0.156			0.147		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.959			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.983			0.989			0.979			0.980		
fLT	0.869			0.788			0.525			0.833		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1556			1417			1014			1463		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

b-pm

Perm								
Left								
Prot								
Perm								
Thru	LTR	1009	1556		0.65	0.57	884	1.14
Right								
Westbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	1180	1417	#	0.83	0.57	805	1.47
Right								
Northbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	595	1014	#	0.59	0.32	320	1.86
Right								
Southbound								
Prot								
Perm								
Left								
Prot								
Perm								
Thru	LTR	409	1463		0.28	0.32	462	0.89
Right								

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.42
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.61

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.14	0.57	20.5	1.000	884	0.50	77.2	0.0	97.7	F	97.7	F
Westbound												
LTR	1.47	0.57	20.5	1.000	805	0.50	216.4	0.0	236.9	F	236.9	F
Northbound												
LTR	1.86	0.32	32.5	1.000	320	0.50	398.5	0.0	431.0	F	431.0	F
Southbound												
LTR	0.89	0.32	30.9	1.000	462	0.41	18.2	0.0	49.1	D	49.1	D

Intersection delay = 205.0 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach					
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)					
Effective permitted green time for LT lane group, g(s)					
Opposing effective green time, go (s)					
Number of lanes in LT lane group, N					
Number of lanes in opposing approach, No					
Adjusted LT flow rate, VLT (veh/h)					
Proportion of LT in LT lane group, PLT					
Proportion of LT in opposing flow, PLTo					
Adjusted opposing flow rate, Vo (veh/h)					
Lost time for LT lane group, tL					
Computation					
LT volume per cycle, LTC=VLTC/3600					
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)					
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g					
Opposing platoon ratio, Rpo (refer Exhibit 16-11)					
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]					
gq, (see Exhibit C16-4,5,6,7,8)					
gu=g-gq if gq>=gf, or = g-gf if gq<gf					
n=Max(gq-gf)/2,0)					
PTHo=1-PLTo					
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]					
EL1 (refer to Exhibit C16-3)					
EL2=Max((1-Ptho**n)/Plto, 1.0)					
fmin=2(1+PL)/g or fmin=2(1+Pl)/g					
gdiff=max(gq-gf,0)					
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)					
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)					
or flt=[fm+0.91(N-1)]/N**					
Left-turn adjustment, fLT					

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

		EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach		S	S	S	S
Cycle length, C	95.0 sec				
Total actual green time for LT lane group, G (s)		54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)		54.0	54.0	30.0	30.0
Opposing effective green time, go (s)		54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N		1	1	1	1
Number of lanes in opposing approach, No		1	1	1	1
Adjusted LT flow rate, VLT (veh/h)		59	106	278	75
Proportion of LT in LT lane group, PLT		0.058	0.090	0.467	0.183
Proportion of LT in opposing flow, PLTo		0.09	0.06	0.18	0.47
Adjusted opposing flow rate, Vo (veh/h)		1180	1009	409	595
Lost time for LT lane group, tL		6.00	6.00	5.00	5.00
Computation					
LT volume per cycle, LTC=VLTC/3600		1.56	2.80	7.34	1.98
Opposing lane util. factor, fLUo		1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)		31.14	26.63	10.79	15.70

b-pm

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	11.3	4.4	0.0	3.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	21.84	18.71	15.25	21.94
gu=g-gq if gq>=gf, or = g-gf if gq<gf	32.16	35.29	14.75	8.06
n=Max(gq-gf)/2,0)	5.25	7.13	7.62	9.47
PTHo=1-PLTo	0.91	0.94	0.82	0.53
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.06	0.09	0.47	0.18
EL1 (refer to Exhibit C16-3)	4.43	3.76	2.10	2.52
EL2=Max((1-Ptho**n)/Plto, 1.0)	4.34	5.97	4.29	2.13
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.04	0.04	0.10	0.08
gdiff=max(gq-gf,0)	10.50	14.26	15.25	18.94
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.87	0.79	0.53	0.83
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.869	0.788	0.525	0.833

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

b-pm
Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	31.3	0.0	97.7
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	20.5	20.5	0.00	93.8	0.0	236.9
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	32.5	0.00	68.8	0.0	431.0
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	32.5	30.9	0.00	0.0	0.0	49.1
	0.0						0.0	

Intersection Delay 205.0 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1009	1180	595	409
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1556	1417	1014	1463
LnCapacity	884	805	320	462
Flow Ratio	0.65	0.83	0.59	0.28
v/c Ratio	1.14	1.47	1.86	0.89
Grn Ratio	0.57	0.57	0.32	0.32
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

		b-pm		
PF2	1.00	1.00	1.00	1.00
Q1	26.6	31.1	15.7	10.3
kB	1.1	1.0	0.4	0.4
Q2	21.9	49.9	35.1	2.5
Q Average	48.5	81.0	50.8	12.8
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.1	1.2
BOQ	58.2	97.2	57.3	15.0
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.4	1.5
BOQ	67.9	113	68.9	19.1
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.4	1.6
BOQ	72.8	122	72.8	20.6
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.5	1.8
BOQ	77.6	130	78.1	22.9
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	1.7	2.1
BOQ	82.5	138	87.4	26.5
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build-regular-68

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Volume	59	935	117	100	851	97	128	364	124	70	216	44
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	37.0					21.0			
Yellow	4.0					3.0			
All Red	2.0					2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
LTR	844	1574	1.51	0.54	253.0	F	253.0	F
Westbound								
LTR	690	1287	1.74	0.54	357.2	F	357.2	F
Northbound								
LTR	440	1446	1.59	0.30	300.5	F	300.5	F
Southbound								
LTR	343	1126	1.09	0.30	100.0	F	100.0	F

Intersection Delay = 281.5 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 9/21/2007
Analysis Time Period: Saturday Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - Build-regular-68
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	59	935	117	100	851	97	128	364	124	70	216	44
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
PK 15 Vol	17	269	34	29	245	28	36	103	35	20	61	13
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat		1900			1900			1900			1900	
ParkExist												
NumPark												
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
LGConfig		LTR			LTR			LTR			LTR	
Lane Width		12.0			12.0			15.0			12.0	
RTOR Vol			0			0			0			0
Adj Flow		1277			1204			700			375	
%InSharedLn												
Prop LTs		0.053			0.096			0.207			0.213	
Prop RTs		0.105			0.092			0.201			0.133	
Peds Bikes		0			0			0			0	
Buses		0			1			0			0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet		0.0			0.0			0.0			0.0	
Arriv. Type		3			3			3			3	
Unit Ext.		3.0			3.0			3.0			3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time		2.0			2.0			2.0			2.0	
Ext of g		2.0			2.0			2.0			2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		37.0				21.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	59	935	117	100	851	97	128	364	124	70	216	44
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Adj flow	68	1075	134	115	978	111	145	414	141	80	245	50
No. Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Lane group		LTR			LTR			LTR			LTR	
Adj flow		1277			1204			700			375	
Prop LTs		0.053			0.096			0.207			0.213	
Prop RTs		0.105			0.092			0.201			0.133	

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	LTR			LTR			LTR			LTR		
So	1900			1900			1900			1900		
Lanes	1	0	0	1	0	0	1	0	0	1	0	
fW	1.000			1.000			1.100			1.000		
fHV	0.960			0.960			0.943			0.943		
fG	1.000			1.000			1.000			1.000		
fP	1.000			1.000			1.000			1.000		
fBB	1.000			0.996			1.000			1.000		
fA	1.000			1.000			1.000			1.000		
fLU	1.000			1.000			1.000			1.000		
fRT	0.986			0.988			0.973			0.982		
fLT	0.876			0.717			0.754			0.640		
Sec.												
fLpb	1.000			1.000			1.000			1.000		
fRpb	1.000			1.000			1.000			1.000		
S	1574			1287			1446			1126		
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm							
Left							
Prot							
Perm							
Thru	LTR	1277	1574	0.81	0.54	844	1.51
Right							
Westbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	1204	1287	# 0.94	0.54	690	1.74
Right							
Northbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	700	1446	# 0.48	0.30	440	1.59
Right							
Southbound							
Prot							
Perm							
Left							
Prot							
Perm							
Thru	LTR	375	1126	0.33	0.30	343	1.09
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.42
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.69

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
LTR	1.51	0.54	16.0	1.000	844	0.50	237.0	0.0	253.0	F	253.0	F
Westbound												
LTR	1.74	0.54	16.0	1.000	690	0.50	341.2	0.0	357.2	F	357.2	F
Northbound												
LTR	1.59	0.30	24.0	1.000	440	0.50	276.5	0.0	300.5	F	300.5	F
Southbound												
LTR	1.09	0.30	24.0	1.000	343	0.50	76.0	0.0	100.0	F	100.0	F

Intersection delay = 281.5 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT				
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g				
Opposing platoon ratio, Rpo (refer Exhibit 16-11)				
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]				
gq, (see Exhibit C16-4,5,6,7,8)				
gu=g-gq if gq>=gf, or = g-gf if gq<gf				
n=Max(gq-gf)/2,0)				
PTHo=1-PLTo				
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]				
EL1 (refer to Exhibit C16-3)				
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g				
gdiff=max(gq-gf,0)				
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)				
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)				
or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT				

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	S	S	S	S
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	68	115	145	80
Proportion of LT in LT lane group, PLT	0.053	0.096	0.207	0.213
Proportion of LT in opposing flow, PLTo	0.10	0.05	0.21	0.21
Adjusted opposing flow rate, Vo (veh/h)	1204	1277	375	700
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.30	2.20	2.78	1.53
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	23.08	24.48	7.19	13.42

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	7.4	3.0	0.0	1.8
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	17.92	19.01	10.12	19.32
gu=g-gq if gq>=gf, or = g-gf if gq<gf	19.08	17.99	10.88	1.68
n=Max(gq-gf)/2,0)	5.26	8.01	5.06	8.75
PTHo=1-PLTo	0.90	0.95	0.79	0.79
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	0.05	0.10	0.21	0.21
EL1 (refer to Exhibit C16-3)	4.53	4.85	2.03	2.80
EL2=Max((1-Ptho**n)/Plto, 1.0)	4.29	6.66	3.30	4.19
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.06	0.06	0.11	0.12
gdiff=max(gq-gf,0)	10.52	16.01	10.12	17.51
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.88	0.72	0.75	0.64
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.876	0.717	0.754	0.640

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

SUPPLEMENTAL UNIFORM DELAY WORKSHEET

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	108.2	0.0	253.0
	0.0						0.0	
Westbound								
	0.0						0.0	
LTR	0.0	0.00	16.0	16.0	0.00	128.5	0.0	357.2
	0.0						0.0	
Northbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	24.0	0.00	65.0	0.0	300.5
	0.0						0.0	
Southbound								
	0.0						0.0	
LTR	0.0	0.00	24.0	24.0	0.00	8.0	0.0	100.0
	0.0						0.0	

Intersection Delay 281.5 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound	Westbound	Northbound	Southbound
LaneGroup	LTR	LTR	LTR	LTR
Init Queue	0.0	0.0	0.0	0.0
Flow Rate	1277	1204	700	375
So	1900	1900	1900	1900
No.Lanes	0 1 0	0 1 0	0 1 0	0 1 0
SL	1574	1287	1446	1126
LnCapacity	844	690	440	343
Flow Ratio	0.81	0.94	0.48	0.33
v/c Ratio	1.51	1.74	1.59	1.09
Grn Ratio	0.54	0.54	0.30	0.30
I Factor	1.000	1.000	1.000	1.000
AT or PVG	3	3	3	3
Pltn Ratio	1.00	1.00	1.00	1.00

PF2	1.00	1.00	1.00	1.00
Q1	24.5	23.1	13.4	7.2
kB	0.8	0.7	0.4	0.3
Q2	56.5	65.9	33.4	6.3
Q Average	81.0	89.0	46.9	13.5
Q Spacing	25.0	25.0	25.0	25.0
Q Storage	0	0	0	0
Q S Ratio				
70th Percentile Output:				
fB%	1.2	1.2	1.1	1.2
BOQ	97.2	107	53.0	15.8
QSRatio				
85th Percentile Output:				
fB%	1.4	1.4	1.4	1.5
BOQ	113	125	63.9	20.1
QSRatio				
90th Percentile Output:				
fB%	1.5	1.5	1.4	1.6
BOQ	121	133	67.4	21.6
QSRatio				
95th Percentile Output:				
fB%	1.6	1.6	1.5	1.8
BOQ	130	142	72.4	24.1
QSRatio				
98th Percentile Output:				
fB%	1.7	1.7	1.7	2.1
BOQ	138	151	80.9	27.7
QSRatio				

ERROR MESSAGES

No errors to report.

HCS2000: Signalized Intersections Release 4.1f

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: PM Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007 - Build -mit

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	55	765	118	103	953	89	247	199	83	67	244	53
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4		5	6	7	8
EB Left	P				NB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
WB Left	P				SB Left	A			
Thru	P				Thru	A			
Right	P				Right	A			
Peds					Peds				
NB Right					EB Right				
SB Right					WB Right				
Green	54.0					30.0			
Yellow	4.0					3.0			
All Red	2.0					2.0			

Cycle Length: 95.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	76	131	0.78	0.57	69.5	E		
TR	981	1726	0.97	0.57	41.7	D	43.3	D
Westbound								
L	85	149	1.25	0.57	198.5	F		
TR	1021	1796	1.05	0.57	63.3	E	75.5	E
Northbound								
L	199	630	1.40	0.32	238.7	F		
TR	505	1599	0.63	0.32	30.2	C	127.6	F
Southbound								
L	204	645	0.37	0.32	26.3	C		
TR	496	1570	0.67	0.32	31.8	C	30.8	C

Intersection Delay = 69.3 (sec/veh) Intersection LOS = E

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 9/21/2007
Analysis Time Period: PM Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007 - Build -mit
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	55	765	118	103	953	89	247	199	83	67	244	53
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
PK 15 Vol	15	206	32	27	246	23	69	56	23	19	69	15
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900		1900	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L		TR	L		TR	L		TR	L		TR
Lane Width	11.0	11.0		12.0	12.0		10.0	10.0		9.0	9.0	
RTOR Vol			0			0			0			0
Adj Flow	59	950		106	1074		278	317		75	334	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs		0.134			0.086			0.293			0.180	
Peds Bikes		0			0			0			0	
Buses	0	0		0	1		0	0		0	0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Arriv. Type	3	3		3	3		3	3		3	3	
Unit Ext.	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext of g	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		54.0				30.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 95.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	55	765	118	103	953	89	247	199	83	67	244	53
PHF	0.93	0.93	0.93	0.97	0.97	0.97	0.89	0.89	0.89	0.89	0.89	0.89
Adj flow	59	823	127	106	982	92	278	224	93	75	274	60
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj flow	59	950		106	1074		278	317		75	334	
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs	0.134			0.086			0.293			0.180		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		L	TR		L	TR	
So	1900	1900		1900	1900		1900	1900		1900	1900	
Lanes	1	1	0	1	1	0	1	1	0	1	1	0
fW	0.967	0.967		1.000	1.000		0.933	0.933		0.900	0.900	
fHV	0.962	0.959		0.943	0.962		0.943	0.943		0.943	0.943	
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fBB	1.000	1.000		1.000	0.996		1.000	1.000		1.000	1.000	
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fLU	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRT		0.980			0.987			0.956			0.973	
fLT	0.074	1.000		0.083	1.000		0.376	1.000		0.400	1.000	
Sec.												
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000			1.000			1.000			1.000	
S	131	1726		149	1796		630	1599		645	1570	
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm Left	L	59	131	0.45	0.57	76	0.78
Prot Perm Thru	TR	950	1726	0.55	0.57	981	0.97
Right							
Westbound							
Prot Perm Left	L	106	149	# 0.71	0.57	85	1.25
Prot Perm Thru	TR	1074	1796	0.60	0.57	1021	1.05
Right							
Northbound							
Prot Perm Left	L	278	630	# 0.44	0.32	199	1.40
Prot Perm Thru	TR	317	1599	0.20	0.32	505	0.63
Right							
Southbound							
Prot Perm Left	L	75	645	0.12	0.32	204	0.37
Prot Perm Thru	TR	334	1570	0.21	0.32	496	0.67
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.15
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.30

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
L	0.78	0.57	15.8	1.000	76	0.50	53.6	0.0	69.5	E		
TR	0.97	0.57	19.7	1.000	981	0.50	22.0	0.0	41.7	D	43.3	D
Westbound												
L	1.25	0.57	20.5	1.000	85	0.50	178.0	0.0	198.5	F		
TR	1.05	0.57	20.5	1.000	1021	0.50	42.8	0.0	63.3	E	75.5	E
Northbound												
L	1.40	0.32	32.5	1.000	199	0.50	206.2	0.0	238.7	F		
TR	0.63	0.32	27.7	1.000	505	0.21	2.5	0.0	30.2	C	127.6	F
Southbound												
L	0.37	0.32	25.2	1.000	204	0.11	1.1	0.0	26.3	C		
TR	0.67	0.32	28.2	1.000	496	0.25	3.6	0.0	31.8	C	30.8	C

Intersection delay = 69.3 (sec/veh) Intersection LOS = E

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	M	M	M	M
Cycle length, C 95.0 sec				
Total actual green time for LT lane group, G (s)	54.0	54.0	30.0	30.0
Effective permitted green time for LT lane group, g(s)	54.0	54.0	30.0	30.0
Opposing effective green time, go (s)	54.0	54.0	30.0	30.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	59	106	278	75
Proportion of LT in LT lane group, PLT	1.000	1.000	1.000	1.000
Proportion of LT in opposing flow, PLTo	0.00	0.00	0.00	0.00
Adjusted opposing flow rate, Vo (veh/h)	1074	950	334	317
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.56	2.80	7.34	1.98
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	28.34	25.07	8.81	8.37
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0	0.0	0.0	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.43	0.43	0.68	0.68
gq, (see Exhibit C16-4,5,6,7,8)	54.00	39.82	9.81	8.89
gu=g-gq if gq>=gf, or = g-gf if gq<gf	0.00	14.18	20.19	21.11
n=Max(gq-gf)/2,0)	27.00	19.91	4.90	4.45
PTHo=1-PLTo	1.00	1.00	1.00	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00	1.00	1.00
EL1 (refer to Exhibit C16-3)	3.56	3.17	1.79	1.76
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.07	0.07	0.13	0.13
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.07	0.08	0.38	0.40
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.074	0.083	0.376	0.400

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 95.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g
Opposing platoon ratio, Rpo (refer Exhibit 16-11)
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]
gq, (see Exhibit C16-4,5,6,7,8)
gu=g-gq if gq>=gf, or = g-gf if gq<gf
n=Max(gq-gf)/2,0)
PTHo=1-PLTo
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]
EL1 (refer to Exhibit C16-3)
EL2=Max((1-Ptho**n)/Plto, 1.0)
fmin=2(1+PL)/g or fmin=2(1+Pl)/g
gdiff=max(gq-gf,0)
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt=[fm+0.91(N-1)]/N**
Left-turn adjustment, fLT

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

_____SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET_____

Permitted Left Turns	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				
Permitted Right Turns				
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

_____SUPPLEMENTAL UNIFORM DELAY WORKSHEET_____

	EBLT	WBLT	NBLT	SBLT

b-pm-mit

Cycle length, C 95.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00	20.5	15.8	0.00	0.0	0.0	69.5
TR	0.0	0.00	20.5	19.7	0.00	0.0	0.0	41.7
	0.0						0.0	
Westbound								
L	0.0	0.00	20.5	20.5	0.00	5.3	0.0	198.5
TR	0.0	0.00	20.5	20.5	0.00	13.3	0.0	63.3
	0.0						0.0	
Northbound								
L	0.0	0.00	32.5	32.5	0.00	19.8	0.0	238.7
TR	0.0	0.00	32.5	27.7	0.00	0.0	0.0	30.2
	0.0						0.0	
Southbound								
L	0.0	0.00	32.5	25.2	0.00	0.0	0.0	26.3
TR	0.0	0.00	32.5	28.2	0.00	0.0	0.0	31.8
	0.0						0.0	

Intersection Delay 69.3 sec/veh Intersection LOS E

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		L	TR		L	TR	
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate	59	950		106	1074		278	317		75	334	
So	1900	1900		1900	1900		1900	1900		1900	1900	
No.Lanes	1	1	0	1	1	0	1	1	0	1	1	0
SL	131	1726		149	1796		630	1599		645	1570	
LnCapacity	76	981		85	1021		199	505		204	496	
Flow Ratio	0.45	0.55		0.71	0.60		0.44	0.20		0.12	0.21	
v/c Ratio	0.78	0.97		1.25	1.05		1.40	0.63		0.37	0.67	
Grn Ratio	0.57	0.57		0.57	0.57		0.32	0.32		0.32	0.32	
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3		3	3		3	3		3	3	
Pltn Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	

b-pm-mit

PF2	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00
Q1	1.2 24.1	2.8 28.3	7.3 7.1	1.5 7.7
kB	0.2 1.2	0.2 1.2	0.3 0.5	0.3 0.5
Q2	0.5 10.0	3.4 16.4	10.7 0.8	0.2 0.9
Q Average	1.7 34.1	6.2 44.8	18.1 7.9	1.7 8.6
Q Spacing	25.0 25.0	25.0 25.0	25.0 25.0	25.0 25.0
Q Storage	0 0	0 0	0 0	0 0
Q S Ratio				
70th Percentile Output:				
fB%	1.3 1.2	1.2 1.2	1.2 1.2	1.2 1.2
BOQ	2.2 40.9	7.7 53.7	21.0 9.4	2.0 10.1
QSRatio				
85th Percentile Output:				
fB%	1.6 1.4	1.5 1.4	1.5 1.5	1.6 1.5
BOQ	2.8 47.7	9.3 62.7	26.5 12.1	2.7 13.1
QSRatio				
90th Percentile Output:				
fB%	1.9 1.5	1.6 1.5	1.6 1.7	1.8 1.7
BOQ	3.2 51.1	10.2 67.2	28.2 13.2	3.0 14.2
QSRatio				
95th Percentile Output:				
fB%	2.3 1.6	1.9 1.6	1.7 1.9	2.0 1.9
BOQ	4.0 54.6	11.8 71.7	31.1 14.9	3.5 16.1
QSRatio				
98th Percentile Output:				
fB%	2.8 1.7	2.1 1.7	1.9 2.2	2.6 2.2
BOQ	4.8 58.0	13.3 76.2	35.2 17.8	4.4 19.0
QSRatio				

ERROR MESSAGES

No errors to report.

Analyst: DB
Agency: AKRF
Date: 9/21/2007
Period: Saturday Peak
Project ID: F-1 Sports Complex
E/W St: NY Route 25

Inter.: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisd: Calverton, NY
Year : 2007-Build-reg-68-mit-same st

N/S St: Edwards Avenue

SIGNALIZED INTERSECTION SUMMARY

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L	TR		L	TR		L	TR		L	TR	
Volume	59	935	117	100	851	97	128	364	124	70	216	44
Lane Width	11.0	11.0		12.0	12.0		12.0	12.0		9.0	9.0	
RTOR Vol			0			0			0			0

Duration 0.25 Area Type: All other areas

Signal Operations

Phase Combination	1	2	3	4			5	6	7	8
EB Left	P				NB	Left	A			
Thru	P					Thru	A			
Right	P					Right	A			
Peds						Peds				
WB Left	P				SB	Left	A			
Thru	P					Thru	A			
Right	P					Right	A			
Peds						Peds				
NB Right					EB	Right				
SB Right					WB	Right				
Green	37.0						21.0			
Yellow	4.0						3.0			
All Red	2.0						2.0			

Cycle Length: 69.0 secs

Intersection Performance Summary

Appr/ Lane Grp	Lane Group Capacity	Adj Sat Flow Rate (s)	Ratios v/c	Ratios g/C	Lane Group Delay	Lane Group LOS	Approach Delay	Approach LOS
Eastbound								
L	104	191	0.65	0.54	39.2	D		
TR	929	1733	1.30	0.54	159.5	F	153.1	F
Westbound								
L	104	194	1.11	0.54	135.6	F		
TR	961	1792	1.13	0.54	89.0	F	93.5	F
Northbound								
L	250	821	0.58	0.30	23.6	C		
TR	525	1724	1.06	0.30	79.2	E	67.7	E
Southbound								
L	104	307	0.77	0.30	50.7	D		
TR	478	1572	0.62	0.30	23.0	C	28.9	C

Intersection Delay = 103.0 (sec/veh) Intersection LOS = F

Phone: Fax:
E-Mail:

OPERATIONAL ANALYSIS

Analyst: DB
Agency/Co.: AKRF
Date Performed: 9/21/2007
Analysis Time Period: Saturday Peak
Intersection: Route 25 & Edwards Avenue
Area Type: All other areas
Jurisdiction: Calverton, NY
Analysis Year: 2007-Build-reg-68-mit-same st
Project ID: F-1 Sports Complex
E/W St: NY Route 25 N/S St: Edwards Avenue

VOLUME DATA

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume	59	935	117	100	851	97	128	364	124	70	216	44
% Heavy Veh	4	4	6	6	4	4	6	6	6	6	6	6
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
PK 15 Vol	17	269	34	29	245	28	36	103	35	20	61	13
Hi Ln Vol												
% Grade		0			0			0			0	
Ideal Sat	1900	1900		1900	1900		1900	1900		1900	1900	
ParkExist												
NumPark												
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
LGConfig	L		TR	L		TR	L		TR	L		TR
Lane Width	11.0	11.0		12.0	12.0		12.0	12.0		9.0	9.0	
RTOR Vol			0			0			0			0
Adj Flow	68	1209		115	1089		145	555		80	295	
%InSharedLn												
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs		0.111			0.102			0.254			0.169	
Peds Bikes		0			0			0			0	
Buses	0	0		0	1		0	0		0	0	
%InProtPhase												

Duration 0.25 Area Type: All other areas

OPERATING PARAMETERS

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Init Unmet	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Arriv. Type	3	3		3	3		3	3		3	3	
Unit Ext.	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
I Factor		1.000			1.000			1.000			1.000	
Lost Time	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ext of g	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Ped Min g		3.2			3.2			3.2			3.2	

PHASE DATA

Phase Combination 1 2 3 4 | 5 6 7 8

EB	Left	P		NB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
WB	Left	P		SB	Left	A
	Thru	P			Thru	A
	Right	P			Right	A
	Peds				Peds	
NB	Right			EB	Right	
SB	Right			WB	Right	
Green		37.0				21.0
Yellow		4.0				3.0
All Red		2.0				2.0

Cycle Length: 69.0 secs

VOLUME ADJUSTMENT AND SATURATION FLOW WORKSHEET

Volume Adjustment

	Eastbound			Westbound			Northbound			Southbound		
	L	T	R	L	T	R	L	T	R	L	T	R
Volume, V	59	935	117	100	851	97	128	364	124	70	216	44
PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.88	0.88	0.88	0.88	0.88	0.88
Adj flow	68	1075	134	115	978	111	145	414	141	80	245	50
No. Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Lane group	L	TR		L	TR		L	TR		L	TR	
Adj flow	68	1209		115	1089		145	555		80	295	
Prop LTs	1.000	0.000		1.000	0.000		1.000	0.000		1.000	0.000	
Prop RTs	0.111			0.102			0.254			0.169		

Saturation Flow Rate (see Exhibit 16-7 to determine the adjustment factors)

	Eastbound			Westbound			Northbound			Southbound		
LG	L	TR		L	TR		L	TR		L	TR	
So	1900	1900		1900	1900		1900	1900		1900	1900	
Lanes	1	1	0	1	1	0	1	1	0	1	1	0
fW	0.967	0.967		1.000	1.000		1.000	1.000		0.900	0.900	
fHV	0.962	0.959		0.943	0.962		0.943	0.943		0.943	0.943	
fG	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fP	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fBB	1.000	1.000		1.000	0.996		1.000	1.000		1.000	1.000	
fA	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fLU	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRT		0.983			0.985			0.962			0.975	
fLT	0.108	1.000		0.108	1.000		0.458	1.000		0.190	1.000	
Sec.												
fLpb	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
fRpb		1.000			1.000			1.000			1.000	
S	191	1733		194	1792		821	1724		307	1572	
Sec.												

CAPACITY AND LOS WORKSHEET

Capacity Analysis and Lane Group Capacity

Appr/ Mvmt	Lane Group	Adj Flow Rate (v)	Adj Sat Flow Rate (s)	Flow Ratio (v/s)	Green Ratio (g/C)	--Lane Group-- Capacity (c)	v/c Ratio
Eastbound							
Prot							

Perm Left	L	68	191	0.36	0.54	104	0.65
Prot Perm Thru	TR	1209	1733	# 0.70	0.54	929	1.30
Right							
Westbound							
Prot Perm Left	L	115	194	0.59	0.54	104	1.11
Prot Perm Thru	TR	1089	1792	0.61	0.54	961	1.13
Right							
Northbound							
Prot Perm Left	L	145	821	0.18	0.30	250	0.58
Prot Perm Thru	TR	555	1724	# 0.32	0.30	525	1.06
Right							
Southbound							
Prot Perm Left	L	80	307	0.26	0.30	104	0.77
Prot Perm Thru	TR	295	1572	0.19	0.30	478	0.62
Right							

Sum of flow ratios for critical lane groups, Yc = Sum (v/s) = 1.02
Total lost time per cycle, L = 11.00 sec
Critical flow rate to capacity ratio, Xc = (Yc)(C)/(C-L) = 1.21

Control Delay and LOS Determination

Appr/ Lane	Ratios		Unf Del	Prog Adj	Lane Grp	Incremental Factor	Del	Res Del	Lane Group		Approach	
Grp	v/c	g/C	d1	Fact	Cap	k	d2	d3	Delay	LOS	Delay	LOS
Eastbound												
L	0.65	0.54	11.4	1.000	104	0.50	27.7	0.0	39.2	D		
TR	1.30	0.54	16.0	1.000	929	0.50	143.5	0.0	159.5	F	153.1	F
Westbound												
L	1.11	0.54	16.0	1.000	104	0.50	119.6	0.0	135.6	F		
TR	1.13	0.54	16.0	1.000	961	0.50	73.0	0.0	89.0	F	93.5	F
Northbound												
L	0.58	0.30	20.3	1.000	250	0.17	3.4	0.0	23.6	C		
TR	1.06	0.30	24.0	1.000	525	0.50	55.2	0.0	79.2	E	67.7	E
Southbound												
L	0.77	0.30	21.8	1.000	104	0.32	28.9	0.0	50.7	D		
TR	0.62	0.30	20.6	1.000	478	0.20	2.4	0.0	23.0	C	28.9	C

Intersection delay = 103.0 (sec/veh) Intersection LOS = F

SUPPLEMENTAL PERMITTED LT WORKSHEET
for exclusive lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach	M	M	M	M
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)	37.0	37.0	21.0	21.0
Effective permitted green time for LT lane group, g(s)	37.0	37.0	21.0	21.0
Opposing effective green time, go (s)	37.0	37.0	21.0	21.0
Number of lanes in LT lane group, N	1	1	1	1
Number of lanes in opposing approach, No	1	1	1	1
Adjusted LT flow rate, VLT (veh/h)	68	115	145	80
Proportion of LT in LT lane group, PLT	1.000	1.000	1.000	1.000
Proportion of LT in opposing flow, PLTo	0.00	0.00	0.00	0.00
Adjusted opposing flow rate, Vo (veh/h)	1089	1209	295	555
Lost time for LT lane group, tL	6.00	6.00	5.00	5.00
Computation				
LT volume per cycle, LTC=VLTC/3600	1.30	2.20	2.78	1.53
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)	20.87	23.17	5.65	10.64
gf=G[exp(- a * (LTC ** b))]-tl, gf<=g	0.0	0.0	0.0	0.0
Opposing platoon ratio, Rpo (refer Exhibit 16-11)	1.00	1.00	1.00	1.00
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]	0.46	0.46	0.70	0.70
gq, (see Exhibit C16-4,5,6,7,8)	37.00	37.00	4.41	16.40
gu=g-gq if gq>=gf, or = g-gf if gq<gf	0.00	0.00	16.59	4.60
n=Max(gq-gf)/2,0)	18.50	18.50	2.20	8.20
PTHo=1-PLTo	1.00	1.00	1.00	1.00
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]	1.00	1.00	1.00	1.00
EL1 (refer to Exhibit C16-3)	3.61	4.05	1.73	2.19
EL2=Max((1-Ptho**n)/Plto, 1.0)				
fmin=2(1+PL)/g or fmin=2(1+Pl)/g	0.11	0.11	0.19	0.19
gdiff=max(gq-gf,0)	0.00	0.00	0.00	0.00
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)	0.11	0.11	0.46	0.19
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00) or flt=[fm+0.91(N-1)]/N**				
Left-turn adjustment, fLT	0.108	0.108	0.458	0.190

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

SUPPLEMENTAL PERMITTED LT WORKSHEET for shared lefts

Input

	EB	WB	NB	SB
Opposed by Single(S) or Multiple(M) lane approach				
Cycle length, C 69.0 sec				
Total actual green time for LT lane group, G (s)				
Effective permitted green time for LT lane group, g(s)				
Opposing effective green time, go (s)				
Number of lanes in LT lane group, N				
Number of lanes in opposing approach, No				
Adjusted LT flow rate, VLT (veh/h)				
Proportion of LT in LT lane group, PLT	0.000	0.000	0.000	0.000
Proportion of LT in opposing flow, PLTo				
Adjusted opposing flow rate, Vo (veh/h)				
Lost time for LT lane group, tL				
Computation				
LT volume per cycle, LTC=VLTC/3600				
Opposing lane util. factor, fLUo	1.000	1.000	1.000	1.000
Opposing flow, Volc=VoC/[3600(No)fLUo] (veh/ln/cyc)				

gf=G[exp(- a * (LTC ** b))]-tl, gf<=g
Opposing platoon ratio, Rpo (refer Exhibit 16-11)
Opposing Queue Ratio, qro=Max[1-Rpo(go/C),0]
gq, (see Exhibit C16-4,5,6,7,8)
gu=g-gq if gq>=gf, or = g-gf if gq<gf
n=Max(gq-gf)/2,0)
PTHo=1-PLTo
PL*=PLT[1+(N-1)g/(gf+gu/EL1+4.24)]
EL1 (refer to Exhibit C16-3)
EL2=Max((1-Ptho**n)/Plto, 1.0)
fmin=2(1+PL)/g or fmin=2(1+Pl)/g
gdiff=max(gq-gf,0)
fm=[gf/g]+[gu/g]/[1+PL(EL1-1)], (min=fmin;max=1.00)
flt=fm=[gf/g]+[gu/g]/[1+PL(EL1-1)]+[gdiff/g]/[1+PL(EL2-1)],(fmin<=fm<=1.00)
or flt=[fm+0.91(N-1)]/N**
Left-turn adjustment, fLT

For special case of single-lane approach opposed by multilane approach, see text.
* If Pl>=1 for shared left-turn lanes with N>1, then assume de-facto left-turn lane and redo calculations.
** For permitted left-turns with multiple exclusive left-turn lanes, flt=fm.
For special case of multilane approach opposed by single-lane approach or when gf>gq, see text.

_____SUPPLEMENTAL PEDESTRIAN-BICYCLE EFFECTS WORKSHEET_____

Permitted Left Turns

	EB	WB	NB	SB
Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Pedestrian flow rate, Vpedg (p/h)				
OCCpedg				
Opposing queue clearing green, gq (s)				
Eff. ped. green consumed by opp. veh. queue, gq/gp				
OCCpedu				
Opposing flow rate, Vo (veh/h)				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion of left turns, PLT				
Proportion of left turns using protected phase, PLTA				
Left-turn adjustment, fLpb				

Permitted Right Turns

Effective pedestrian green time, gp (s)				
Conflicting pedestrian volume, Vped (p/h)				
Conflicting bicycle volume, Vbic (bicycles/h)				
Vpedg				
OCCpedg				
Effective green, g (s)				
Vbicg				
OCCbicg				
OCCr				
Number of cross-street receiving lanes, Nrec				
Number of turning lanes, Nturn				
ApbT				
Proportion right-turns, PRT				
Proportion right-turns using protected phase, PRTA				
Right turn adjustment, fRpb				

_____SUPPLEMENTAL UNIFORM DELAY WORKSHEET_____

	EBLT	WBLT	NBLT	SBLT

Cycle length, C 69.0 sec
Adj. LT vol from Vol Adjustment Worksheet, v
v/c ratio from Capacity Worksheet, X
Protected phase effective green interval, g (s)
Opposing queue effective green interval, gq
Unopposed green interval, gu
Red time r=(C-g-gq-gu)
Arrival rate, qa=v/(3600(max[X,1.0]))
Protected ph. departure rate, Sp=s/3600
Permitted ph. departure rate, Ss=s(gq+gu)/(gu*3600)
XPerm
XProt
Case
Queue at beginning of green arrow, Qa
Queue at beginning of unsaturated green, Qu
Residual queue, Qr
Uniform Delay, d1

DELAY/LOS WORKSHEET WITH INITIAL QUEUE

Appr/ Lane Group	Initial Unmet Demand Q veh	Dur. Unmet Demand t hrs.	Uniform Delay Unadj. ds	Uniform Delay Adj. d1 sec	Initial Queue Param. u	Final Unmet Demand Q veh	Initial Queue Delay d3 sec	Lane Group Delay d sec
Eastbound								
L	0.0	0.00	16.0	11.4	0.00	0.0	0.0	39.2
TR	0.0	0.00	16.0	16.0	0.00	70.0	0.0	159.5
	0.0						0.0	
Westbound								
L	0.0	0.00	16.0	16.0	0.00	2.8	0.0	135.6
TR	0.0	0.00	16.0	16.0	0.00	32.0	0.0	89.0
	0.0						0.0	
Northbound								
L	0.0	0.00	24.0	20.3	0.00	0.0	0.0	23.6
TR	0.0	0.00	24.0	24.0	0.00	7.5	0.0	79.2
	0.0						0.0	
Southbound								
L	0.0	0.00	24.0	21.8	0.00	0.0	0.0	50.7
TR	0.0	0.00	24.0	20.6	0.00	0.0	0.0	23.0
	0.0						0.0	

Intersection Delay 103.0 sec/veh Intersection LOS F

BACK OF QUEUE WORKSHEET

	Eastbound			Westbound			Northbound			Southbound		
LaneGroup	L	TR		L	TR		L	TR		L	TR	
Init Queue	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate	68	1209		115	1089		145	555		80	295	
So	1900	1900		1900	1900		1900	1900		1900	1900	
No.Lanes	1	1	0	1	1	0	1	1	0	1	1	0
SL	191	1733		194	1792		821	1724		307	1572	
LnCapacity	104	929		104	961		250	525		104	478	
Flow Ratio	0.36	0.70		0.59	0.61		0.18	0.32		0.26	0.19	
v/c Ratio	0.65	1.30		1.11	1.13		0.58	1.06		0.77	0.62	
Grn Ratio	0.54	0.54		0.54	0.54		0.30	0.30		0.30	0.30	
I Factor		1.000			1.000			1.000			1.000	
AT or PVG	3	3		3	3		3	3		3	3	
Pltn Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	

PF2	1.00 1.00	1.00 1.00	1.00 1.00	1.00 1.00
Q1	0.9 23.2	2.2 20.9	2.3 10.6	1.4 4.8
kB	0.2 0.9	0.2 0.9	0.3 0.4	0.1 0.4
Q2	0.3 38.5	2.5 21.8	0.3 7.5	0.4 0.6
Q Average	1.3 61.7	4.7 42.6	2.7 18.1	1.8 5.4
Q Spacing	25.0 25.0	25.0 25.0	25.0 25.0	25.0 25.0
Q Storage	0 0	0 0	0 0	0 0
Q S Ratio				
70th Percentile Output:				
fB%	1.3 1.2	1.2 1.2	1.2 1.2	1.2 1.2
BOQ	1.6 74.0	5.8 51.2	3.2 21.1	2.2 6.5
QSRatio				
85th Percentile Output:				
fB%	1.6 1.4	1.5 1.4	1.6 1.5	1.6 1.6
BOQ	2.1 86.4	7.1 59.7	4.2 26.5	2.9 8.4
QSRatio				
90th Percentile Output:				
fB%	1.9 1.5	1.7 1.5	1.7 1.6	1.8 1.7
BOQ	2.4 92.6	8.0 64.0	4.7 28.3	3.2 9.3
QSRatio				
95th Percentile Output:				
fB%	2.4 1.6	2.0 1.6	2.0 1.7	2.0 1.9
BOQ	3.0 98.7	9.4 68.2	5.4 31.1	3.7 10.6
QSRatio				
98th Percentile Output:				
fB%	2.9 1.7	2.3 1.7	2.5 1.9	2.6 2.4
BOQ	3.6 105	10.7 72.5	6.8 35.3	4.6 12.8
QSRatio				

ERROR MESSAGES

No errors to report.

Level of Service Analysis
2006 Existing & 2007 No Build Conditions

Intersection	Weekday Conditions								Saturday (Non-Event) Conditions				Saturday Special Event Conditions							
	AM Peak Hour*				PM Peak Hour				Midday Peak Hour				AM Peak Hour*				PM Peak Hour			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
2006 Existing Conditions																				
Edwards Avenue and Route 25																				
Eastbound	LTR	1.17	103.0	F	LTR	0.73	20.2	C	LTR	0.89	27.9	C	LTR	0.34	10.1	B	LTR	0.50	12.0	B
Westbound	LTR	1.07	66.0	E	LTR	0.87	27.9	C	LTR	0.81	21.0	C	LTR	0.24	9.2	A	LTR	0.57	13.2	B
Northbound	LTR	0.52	18.6	B	LTR	1.29	184.7	F	LTR	1.03	71.7	E	LTR	0.24	18.3	B	LTR	0.38	19.4	B
Southbound	LTR	0.65	21.4	C	LTR	0.67	31.7	C	LTR	0.63	23.4	C	LTR	0.23	18.2	B	LTR	0.35	19.2	B
	Intersection		69.5	E	Intersection		55.6	E	Intersection		35.0	C	Intersection		12.3	B	Intersection		14.5	B
2007 No Build Conditions																				
Edwards Avenue and Route 25																				
Eastbound	LTR	1.59	288.6	F	LTR	1.14	96.3	F	LTR	1.50	247.2	F	LTR	0.47	11.6	B	LTR	0.86	24.2	C
Westbound	LTR	2.14	534.3	F	LTR	1.44	223.9	F	LTR	1.59	288.5	F	LTR	0.37	10.5	B	LTR	0.98	42.3	D
Northbound	LTR	0.87	37.7	D	LTR	1.84	422.7	F	LTR	1.51	266.0	F	LTR	0.33	18.9	B	LTR	0.65	24.0	C
Southbound	LTR	0.87	36.9	D	LTR	0.88	48.8	D	LTR	1.07	92.8	F	LTR	0.28	18.5	B	LTR	0.51	20.7	C
	Intersection		350.1	F	Intersection		197.8	F	Intersection		248.4	F	Intersection		13.2	B	Intersection		30.8	C

Notes: L = Left Turn, T = Through, R = Right Turn, DefL = Defacto Left Turn; LOS = Level of Service.
*AM peak hour data are based on February 2006 traffic volumes, which were higher than summer 2007 traffic volumes.

Level of Service Analysis -- 2006 Existing Conditions

Intersection	Weekday Conditions								Saturday (Non-Event) Conditions				Saturday Special Event Conditions							
	AM Peak Hour*				PM Peak Hour				Midday Peak Hour				AM Peak Hour*				PM Peak Hour			
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS
Edwards Avenue and Route 25																				
Eastbound	LTR	1.17	103.0	F	LTR	0.73	20.2	C	LTR	0.89	27.9	C	LTR	0.34	10.1	B	LTR	0.50	12.0	B
Westbound	LTR	1.07	66.0	E	LTR	0.87	27.9	C	LTR	0.81	21.0	C	LTR	0.24	9.2	A	LTR	0.57	13.2	B
Northbound	LTR	0.52	18.6	B	LTR	1.29	184.7	F	LTR	1.03	71.7	E	LTR	0.24	18.3	B	LTR	0.38	19.4	B
Southbound	LTR	0.65	21.4	C	LTR	0.67	31.7	C	LTR	0.63	23.4	C	LTR	0.23	18.2	B	LTR	0.35	19.2	B
	Intersection		69.5	E	Intersection		55.6	E	Intersection		35.0	C	Intersection		12.3	B	Intersection		14.5	B

Notes: L = Left Turn, T = Through, R = Right Turn, DefL = Defacto Left Turn; LOS = Level of Service.
*AM peak hour data are based on February 2006 traffic volumes, which were higher than summer 2007 traffic volumes.

APPENDIX G

Comments on the Draft Environmental Impact Statement (EIS) and 2008 Final EIS

TOWN OF RIVERHEAD
PLANNING DEPARTMENT
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Robert F. Kozakiewicz
Attorney at Law
P.O. Box 341
Riverhead, NY 11901

Re: SEQR Commentary, DEIS on Site Plan of F-1 Long Island.
SCTM 0600-117-1-4.2

October 25, 2007

Dear Mr. Kozakiewicz:

Please find a summary of the comment compiled by the Lead Agency on the above document for your response towards the creation of a FEIS and issuance of written findings by involved agencies.

First and foremost, the determination of the Zoning Board of Appeals that corporate meeting and dining facilities are not customarily accessory to the recreational use significantly alters the project description and use dynamics as analyzed by the DEIS. The FEIS should concisely redescribe the facility's composition and indicate in narrative and tabulated form how impacts such as sanitary flow, traffic and solid waste generation are affected and the effect on identified mitigations. References in the text to corporate uses and structural heights above the 35foot height relief awarded by the ZBA are inapplicable and the floor plans and elevations should be similarly altered. The plans should make it possible to differentiate between the three proposed track circuits and a rendering made of the open structure covering the concession track. Please also provide floor plans of the maintenance building and describe how the tracks will operate for one year prior to the construction of the clubhouse as stated on pages 1-7 and 13-1 of the DEIS. What services and facilities are to be provided for the patrons and where?

Erosion and sediment control is critical on this site due to the degree of project disturbance proposed coupled with the presence of a freshwater wetland having a large, steeply sloped contributory area. A far stronger demonstration of impact mitigation is called for than mere reference to practices determined to be appropriate by the site plan process. Control measures commensurate to the severity of erosion potentials on site and sufficient to protect both the wetland and adjacent lands and uses (including the public road) should be definitively described and depicted. A construction plan fashioned in accordance with the New York Standards and Specifications for Erosion and Sediment Control (the Blue Book) should be a part. Justification should be made for the export of 43,000cy of fill. A balanced cut and fill could reduce impacts on land and definitely reduces construction related traffic.

In addition to discussing appropriate mitigative measures during construction of the project, a further analysis is to be offered as to how the site wetland is to be protected in the long

term from the influence of the developed land. Creation of the hard track surface and even the cleared and landscaped areas within the pond's tributary area will significantly increase its runoff coefficient and the volume of overland flow may carry a burden of contaminants from materials employed in landscaping care or from the karts such as upset or chronic releases of gas and oil. Test hole data indicates the wetland to be an expression of groundwater (not perched) and not dependant on overland runoff. Implications that an additional volume of runoff is beneficial to the wetland's persistence has no rational basis and the use of a naturally occurring wetland for drainage relief is to be avoided; not provided for by design. The plan gives the pond's surface elevation as 26.2ft. and shows 47 massed drainage rings as close as 25ft. from the wetland at an elevation of about 32-34ft. Allowing for their profile depth in the ground, show there's a sufficient horizon of soil between their bottom and groundwater to adequately entrain and adsorb pollutants. Page S-23 of the DEIS describes how urban runoff contamination is exaggerated when drainage areas are large and concentrated in a single location.

Your aware from meetings with the Conservation Advisory Council and other Town representatives that the idea of using the wetland pond as a source of irrigation water and of a expansion of its area as mitigation is not favorably viewed. The historic use of the waterbody for that purpose referred to in the DEIS was for agriculture which enjoys some freedom from wetlands law this project does not. References to the notion should be stricken from the text and plans. It's suggested that a dedicated well tapped into the glacial aquifer might be a better irrigation source which would conserve the treated potable supply of the Water District and be free of the associated cost. Such a well would have to be located at a sufficient distance that its drawdown wouldn't impact the pond's level. The plans should clearly depict the wetland boundary and the extent of the CAC's 150ft. jurisdiction. They've indicated their opposition to the DEIS' depicted location of track surfaces as close as 30ft. to the wetland and related clearing and alterations even closer as an overly intensive use of the property that would unacceptably compromise the wetland. They reiterated displeasure with the revised location at 67ft. and their concerns were sufficiently substantial to believe that at most only limited disturbance should occur within their 150ft. interest. They and this office both note the very general nature of the natural history descriptions of the site. A detailed flora and fauna survey should be made to definitively answer the question of threatened and endangered plant species or of animal species of special concern. Information should be sought from the NYSDEC respecting the presence of Tiger salamanders and the US Army Corps. of Engineers asked to make a jurisdictional determination on the wetland. Justification should be given for the degree of clearing in favor of track improvements and landscaping. The DEIS asserts a significant impact on the site's flora and fauna isn't expected, apparently depending on nearly half the site being kept in what's described as open space. That area seems to consist almost entirely of landscaping including a large percentage of turf which hasn't habitat or other natural resource benefits equivalent to the lost wooded coverage. Discuss the potential to protect the wetland habitat with as wide an undisturbed band of forest as possible and to limit the site clearing overall for preservation of biotic and aesthetic benefits such as visual and noise buffering. Retaining the existing wooded coverage is preferred to making indigenous plantings "where feasible".

Provide details with respect to the conformance with Articles VII and XII of the County Sanitary Code of the storage facilities for toxic and hazardous materials used in cart operations. What specifically are the applicable rules and regulations governing the gas and oil storage which we understand to be within the maintenance building? Would all servicing and fueling take place in that building? Are there any floor drains? What sort of pre approved containers will

be employed and how is the concrete containment designed to the task? Is there anything proposed for the possibility of fire such as smoke or heat sensors and a deluge system?

The site soils are described in the County Soil Survey as constraining to the operation of sanitary systems. Discuss how the impediment will be dealt with. Also discuss the conformance of all systems proposed with the County Sanitary Code and (if still applicable) with the SPDES program delegated to County Health by the DEC as the DEIS had given two of the three systems as having discharges in excess of 1,000gpd. Call out the breakdown of septage and greywater that will result from the project as defined by the ZBA ruling.

The site plan ordinance (Section 108-133) considers wetlands, surface waters and slopes greater than 15% to be unbuildable and consequently their area may not be considered in calculation of performance standards. Further the ordinance directs that significant natural features are to be preserved whenever possible and that extensive grading, cut and filling excavating and tree removal shall be avoided. The project plans shall be revised to include the area of wetlands and a slope analysis which identifies the relevant grades at 0-5%, 6-10% and greater than 11% slopes. The plans shall then tabulate the Industrial C bulk requirements and the project's conformance with building and impervious coverage and floor area ratio computed after the restrictive areas have been extracted from the site's acreage. The layout of the facility's improvements upon the identified slopes would be expected to verify the claim that the project works with existing grades.

Upon the initial application for site plan approval, the Planning Department did not require the submission of an Agricultural Data Statement pursuant to Section 305-a of the New York State Agricultural District Law. Though the DEIS did assess the project impacts upon lands within an agricultural district, the relevant agricultural data statement must be submitted to the Planning Board prior to any further environmental review.

With respect to Lead Agency commentary upon noise and traffic impacts, please refer to the attached memoranda of A & C, Inc. and TRC Engineers, Inc., respectively.

I trust the above will serve to accurately represent to you the Town's interests on the FEIS for this project. Please contact the undersigned with any questions you may have in this matter.

Very truly yours,

Richard Hanley, Planning Director

A&C, INC.

Memorandum

To:	R. Hanley, Riverhead Planning Director	**From:**	V. Lee, Ph.D.
Date:	August 20, 2007	**CC:**	V. Gaudiello, P.E./Raynor
Subject:	F1 Long Island Sports Facility Site Plan Application Review of DEIS Noise Study		

A technical review of the noise study portions of the "F1 Long Island Sports Facility DEIS" dated March 22, 2006 prepared by AKRF was conducted per letter of authorization from Town Consultant – Raynor Group, LLC dated July 26, 2007.

There are three (3) areas of concern. The first and the most important is the issue of applicability of Town noise code, the second is the details of modeling and assessment, and the last is the issue of noise effects on horses and horse breeding.

1. Riverhead Town Noise Control Code

Town Noise Control Code - §81-5 L(2) (a) and (b) and L(4) states:

L(2). Continuous sound-in-air which has crossed the property line of such sound source site and enters property zoned for residential use or property within a noise-sensitive zone shall not exceed either of the following levels:

(a) During the hours of 7:00 a.m. and 8:00 p.m.:
[1]. A sound level in excess of sixty-five (65) dBA measures with slow response of sound-level meter,
[2]. An L_{10} in excess of sixty (60) dBA.
(b) During the hours of 8:00 p.m. and 7:00 a.m.:
[1]. A sound level in excess of fifty (50) dBA measures with slow response of sound-level meter,
[2]. An L_{10} in excess of forty-five (45) dBA.

L(3). Continuous sound-in-air which has crossed the property line of a sound source site and enters property which is zoned for business or property where the public in general congregates, except property zoned for industrial use, shall not exceed either of the following levels:

(a) A sound level in excess of sixty-five (65) dBA measures with slow response of sound-level meter,

(b) An L_{10} in excess of sixty (60) dBA.

L(4). The sound levels specified in Subsection L(2) and (3) above shall be decreased by five (5) decibels if the sound contains impulsive sound characteristics.

There are two residences adjacent or near the proposed facility site as shown in Figure 2-1 (following page 2-1) and Tabulated in Table 9-5 (page 9-8). They are the Residence at Gibb Horse Farm and 400 Edwards Avenue. Residences are typically considered as noise-sensitive land use, as are churches, libraries, schools, senior housings, and hospitals (e.g. NYSDEC, NYSDOT, FHWA, FAA, and FTA).

The Applicant, on page 9-4, made a literal interpretation of the Code with respect to "zone" and "noise-sensitive zone" and concluded that the Code is not applicable to these residences. It is a common professional practice to treat any residential use as "noise-sensitive" land use. Additionally, if the Application is other than "Use-of-Right", the Town Noise Control Code should apply to protect existing 'noise-sensitive" land uses – pending ruling by the Town.

Accordingly, since car racing have impulsive characteristics (e.g. backfiring), the facility sound level shall not exceed either of the following levels at the nearest residential property line:

(a) During the hours of 7:00 a.m. and 8:00 p.m.:
  [1]. A sound level no more than of sixty (60) dBA measures with slow response of sound-level meter,
  [2]. An L_{10} in excess of fifty-five (55) dBA.
(b) During the hours of 8:00 p.m. and 7:00 a.m.:
  [1]. A sound level in excess of forty-five (45) dBA measures with slow response of sound-level meter,
  [2]. An L_{10} in excess of forty (40) dBA.

2. Details of modeling and assessment

  a. Noise metric or parameter for modeling and assessment

The applicant used only the Equivalent Sound Level or L_{eq}(1 hour). The maximum noise level, L_{max}(1 hour), and 10-percentile level, L_{10}(1 hour) should also be used for measurement, prediction, and assessment against Town Code.

For relative (predicted future relative to existing) impact assessment such as NYSDEC Guidance, comparison should be made between the highest 1-hour future noise level and the lowest 1-hour existing level for each time period (day and night).

  b. Worst-case Scenario

The worst case assumed was detailed as Scenario B on pages 9-5 and 9-6; namely, 15 karts on each of the 3 tracks for 45 minutes out of the hour from 10 AM to 8 PM with the noisier kart

of 92.8 dBA at 7 meters on the northern track and operating from 11 AM to 5 PM, the southern track has the club karts of maximum level of 78 dBA at 7 meters, and the concession track has karts with maximum level of 76 dBA at 7 meters. Was the worst-case L_{eq} (1 hour) computed based on the 45 minutes out of 60 minutes? What was assumed for the remaining 15 minutes?

However, on page S-6, it is stated that there will be a national event that would draw between 400 and 500 drivers and spectators. It will take over the entire high speed track and continuous throughout the day from 9 AM to dusk. Why this is not the worst-case noise event?

c. Input to Cadna-A.

Source Sound Power Level or Sound Pressure Level: - need to provide documentation supporting the maximum Kart emission levels used; do they vary with speed or throttle/power settings?

Site terrain/topography: - how were ground contours/elevations taken into account? At what resolution – every 10' or 50' or..? Please provide input file. Does the model account for upgrades? if so how?

d. The Cadna-A model and modeling results.

Provide brief descriptions of the acoustic attenuation factors accounted for in Cadna-A: (e.g. distance decay, atmospheric absorption per ANSI S1.26-1995, barrier per Maekawa, traffic line source per FHWA). If other more sophisticated excess attenuation mechanism is used (e.g. multiple barriers/obstructions reflection/diffraction, ground impedance, wind and temperature gradient effects), please provide computation procedure. Brochure material is inappropriate.

Model results without and with noise barriers should be provided to gauge the reasonable expectation of the effectiveness of the proposed mitigation measure.

e. Measurement and use of Ambient Noise

Continuous measurements were made at 2 sites (M-1 and M-4) from 10 AM to 8 PM on one weekday and one weekend day both of which are on major roadways with noise levels in the upper 60 to lower 70s in dBA as to be expected for arterial roadways. 20-min spot measurements at 3 other locations including one at the southern property line (Table 9-3 on page 9-6). No data were shown to substantiate the lowest hourly noise levels used for impact assessment.

No direct hourly (from the facility opening to closing hours on weekdays and on weekend days) measurements were available corresponding to the positions of the residence on Gibb Horse Farm or 460 Edwards Avenue for impact assessment at the nearest noise-sensitive receptors. Justification of extrapolating the lowest hourly noise levels at M-2,-3, and -4 (Table 9-4 on page 9-7) was not provided.

Justification of extrapolating the lowest existing hourly noise levels Gibbs Horse Farm and 460 Edwards Avenue in Table 9-5 on page 9-8) was not provided.

The existing $L_{eq\,(1)}$ for B-Max in Table 9-5 on page 9-8 are much higher than those for A-Typical, how were they derived? If they are for weekdays, then is Scenario B events are to occur on weekdays only?

Does the "Project Generated Traffic" noise levels in Table 9-5 included contributions from traffic movements (customers coming onto or leaving the site and driving around for parking) on-site?

The impact analysis results (Table 9-5 on page 9-8) already indicated an impact per NYSDEC Guidance criteria of 6 dBA increase.

Compliance status with Town Code should be evaluated and included (if Town rules as discussed previously).

3. Effects of Noise on Horses and Horse Breeding

The US Environmental Protection Agency (EPA) in its report entitled "Effects of Noise on Wildlife and Other Animals – Review of Research since 1971" of July 1980 documented available researches on the auditory, masking, non-auditory, and behavioral effects on laboratory animals, domestic animals, and wildlife. It reported fright reaction by horses to loud noises as in most species of animals. Startle and fright reactions to impulsive noises such as gunfire (similar to backfire) are well known, when combined with sight in particular.

While no specific research is available on the specific effect of noise on horse breeding, the document did identify some adverse reproductive effects on laboratory animals.

TRC Engineers, Inc.
7 Skyline Drive
Hawthorne, NY 10532

Main 914.592.4040
Fax 914.592.5046

Memorandum

To:	Vincent Gaudiello The Raynor Group	**Date:**	August 13, 2007
From:	Stephan A. Maffia, P.E. Project Manager	**Project No.:**	150709
CC:	Richard O'Dea, Chairman – Planning Board – Town of Riverhead, NY		
Subject:	Review of Traffic Impact Study F1 Long Island Sports Facility		

TRC Engineers, Inc. has completed a preliminary review of the traffic section of the DEIS for the F1 Long Island Sports Facility (hereinafter F1 Facility). The document is dated March 2006 (resubmitted October 2006) and was prepared by a team of consultants for the applicant, F1 Long Island, LLC. The proposed project is the construction of a "kart" racing facility, incorporating paved tracks, club house facilities, maintenance buildings and parking areas.

TRC's initial review has resulted in the identification of four major issues that are discussed below. Please be advised that we also will undertake a more comprehensive review of the submitted DEIS as well as that additional information which we expect the applicant to submit in response to this memo. For now, we recommend detailed responses to the following issues:

1. The DEIS traffic study contains detailed capacity analyses of only one existing area intersection – Route 25 at Edwards Avenue. In order to address potential traffic impacts on the Calverton area, additional intersections must be analyzed. Of particular concern are intersections south of the project site, where Edwards Avenue crosses I-495 – the Long Island Expressway - at a grade-separated interchange just 1.5 miles away. This interchange will provide for direct access between the site and the regional highway system and cannot be ignored. Also, NYS Route 24 extends eastward from this interchange to numerous populated areas. Other intersections along Route 25 also are of concern, since Route 25 is the major east/west arterial serving this section of Riverhead. Therefore, at a minimum, the intersections of Edwards Avenue at the L.I.E. ramps, and Route 25 at Manor Road and Route 25 at Route 25A should be included in a revised impact study.

2. The DEIS Traffic Study contains traffic volumes collected by the applicant in February 2006. These volumes were then increased by a factor derived from data available from the New York State Department of Transportation (DOT) to account for seasonal variations. The adjustment procedure is not fully explained, leaving out such important information as the season to which the February counts are factored and whether the adjustment factor is

appropriate for Edwards Avenue – a Town road. TRC believes that summer time periods should be evaluated since they represent peak conditions for the proposed use as well as the adjacent street system. Summer counts at the key intersections should be undertaken to adequately evaluate project traffic impacts.

3. The applicant should provide detailed information regarding the source(s) of trip generation data. A vague reference to information supplied by the developer is not adequate. Another section of the DEIS refers to the developer's "sister" facility in the Boston area. TRC found information regarding an F1 Boston Facility on the internet, which was described as having indoor tracks; if this is the referenced facility, more detailed information should be provided so that we can determine the applicability of the Boston site to the proposed Long Island facility. Such specifics should include volume counts at the access to the sample site(s), and it would be preferred that this data be representative of peak conditions expected at the Riverhead location – i.e. summer conditions for an outdoor facility. Other similar existing kart track facilities could be used to formulate trip generation.

4. The traffic section references road improvements to be undertaken by the sponsors of other area developments at the Route 25 – Edwards Avenue intersection. This intersection has been described by the F1 Facility applicant as experiencing significant peak hour congestion. However, the status of the other projects and their commitment to implement these improvements is not clear with respect to the timing of construction of the F1 Facility and these other developments. TRC recommends that the F1 Facility participate in a fair-share construction cost program that ensures the funding of the necessary improvements – at this intersection and at other locations as may require mitigation of F1 Facility traffic impacts.

TOWN OF RIVERHEAD
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Robert F. Kozakiewicz
Attorney at Law
P.O. Box 341
Riverhead, NY 11901

Re: SEQR Commentary, DEIS on Site Plan of F-1 Long Island.
SCTM 0600-117-1-4.2

November 16, 2007

Dear Mr. Kozakiewicz:

This correspondence shall serve to summarize our discussions of Friday November 9th on the above matter and to clarify the content of our letter of October 9th regarding lead agency comment on the DEIS.

That letter identified response to comment as the basis for creation of a final EIS and findings. As you know, public commentary included the site plan's failure to adhere to Ag and Markets law with respect to submission of an agricultural data statement, location map and notice to ag district property owners within 500ft. The Town is concerned that this could be ruled as a potentially fatal procedural flaw of the SEQR process. Coupled with the fact that the submitted DEIS is descriptive and analytical of a project made irrelevant by the decision of the Zoning Board of Appeals, the Town desires the guidance of our previous letter and as outlined below to be used to submit a new DEIS which would be considered for adequacy and subjected to its own filing and public hearing. While this does set the SEQR process back, the effort made to date isn't wasted. The resubmitted document will be accurate to the actual project under consideration and immune to legal challenge on that basis and will also be attentive to agency comments on impacts common to the original and redefined projects on the subject site. Essentially the new DEIS will be pre commented upon and unlikely to trigger any new issues of concern which should speed its evolution into a final. It's the agency's intuition that certain of the project's use impacts will be reduced by the absence of the corporate meeting and dining facilities.

As discussed at our November 9th meeting, the maximum noise level to be demonstrated at the property lines of the project site is to be 65db; not 45. The basis for examining the intersection of the Long Island Expressway and SR24 (Nugent Dr.) for traffic impact was the assertion that the bulk of project generated trips would arrive by that route and not burden the Edwards Ave./SR25 (Middle Country Rd.) intersection. It will not be necessary to include intersections of SR25 and SR25A or SR25 and Manor Rd. in the revised traffic analysis. The

submissions enumerated above for satisfaction of Ag and Markets law are to be provided as well as demonstration of notice to the two area ag district property owners. The balance of our 10/9/07 letter remains appropriate to your response.

I trust the above will serve to accurately represent the Town's interests on the EIS for this project. I apologize for any confusion and delay resulting from these events but feel the project will ultimately enjoy an improved resistance to legal challenge. Please contact the undersigned with any questions you may have in this matter.

Very truly yours,

Richard Hanley, Planning Director

CC: Dick O'Dea
Dick Ehlers

TOWN OF RIVERHEAD
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August 1, 2008

Robert F. Kozakiewicz
P.O. Box 341
Riverhead, NY 11901

Re: FEIS of F1 Long Island, SCTM 0600-117-1-4.2

Dear Mr. Kozakiewicz:

Please accept this correspondence as a response to your letter of July 17, 2008. As you are aware, the Riverhead Planning Board acted by resolution dated July 8, 2008 to not accept the Final Environmental Statement ("FEIS") submitted by your client. You should be aware that the record of Planning Board review, which formed the basis for its action, is closed and may be subject to judicial review. An alternative available to your client is to revise the Final Environmental Impact Statement and submit it to the Planning Board. This letter is offered by the Planning Department staff in order to provide guidance to your client if they wish to submit a revised FEIS. The content of this is not to be considered binding upon the Planning Board which shall make the ultimate decision regarding the completeness and accuracy of any amended FEIS.

All of the requests of Dr. Lee must be studied and analyzed with the exception that the noise limit to be studied is 65db not 45db. The EIS attempted to demonstrate compliance to DEC guidelines; not to the db limits established by the Town of Riverhead noise ordinance. Noise levels were expressed in hourly (Leq) terms and not the maximum levels (Lmax or L_{10}) employed by the code. Noise impacts are to be handled by demonstration of compliance with Chapter 81 of the Riverhead Town Code.

Existing traffic counts at the LIE ramps were not taken during the worst case summer months. Please note the opportunity to make those counts will soon end until next summer season. It is not necessary for the traffic analysis to discuss the intersection of SR25 and 25A or of SR25 and Manor Rd.

Flora and Fauna must be inventoried with an accounting of seasonal variations. The very general nature of the natural history descriptions is not sufficient. The FEIS only mentions a site inventory in November of 2006. What other natural history information is there to evidence consideration of seasonal variation as requested?

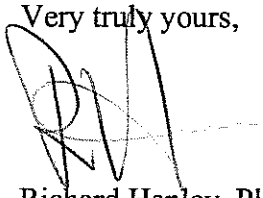
A demonstration of compliance with Industrial C performance standards after unbuildable attributes were extracted from the parcel area pursuant to Section 108-133 of the site plan ordinance is required. Slopes above 15% was accounted for but not the water surface and wetland margin. That code section also directs significant natural features be preserved

whenever possible and that extensive grading, cut and fill and tree clearing be avoided. The Lead Agency desires a calculation of total lot coverage after subtractions as a function of SEQRA discovery. The export of fill has risen from the DEIS's 43,000 to 51,700cy. This reflects increased construction impacts on the site and would result in increased construction related traffic and impact on area roads. Motor vehicle trip ends must be calculated.

Your response to our comment about the area and quality of open space preserved was to cite conformance to IC requirements respecting pervious surface preservation and open space area. Impervious coverage in the IC district is limited to 60% (which by default sets a 40% pervious minimum) and the district code (Section 108-279B.) calls for 20% of lot area as contiguous landscaped open space. The provision of a site plan depicting the proper contiguous open space would be helpful in this regard. Speaking more directly to our comment respecting the aesthetic and biotic value of forested open space vs. landscaping, we observe that Section 108-279 also states preference is given to preservation of existing habitat rather than clearing and creation of new. We also note reference to a 64ft. natural buffer surrounding the wetland which appears to be as measured from the downslope edge of the track. When the proposed wall and drainage trench is considered, the natural setback decreases to 55ft.

I trust that the aforementioned clearly sets forth the framework for an acceptable FEIS. Please contact me or Mr. Hall with any questions you might have.

Very truly yours,



Richard Hanley, Planning Director

JH

CC: Riverhead Town Board
Riverhead Planning Board
Anne Marie Prudenti, Esq.
Richard Ehlers, Esq.

A&C, INC.

Memorandum

To: R. Hanley, Riverhead Planning Director **From:** V. Lee, Ph.D.

Date: May 22, 2008 **CC:** V. Gaudiello, P.E./Raynor

Subject: F1 Long Island Sports Facility
Site Plan Application
Findings of FEIS Noise Study

A review of the noise study portions of the "F1 Long Island Sports Facility FEIS" dated March 2008 was conducted per authorization from Town Consultant – Raynor Group, LLC dated May 14, 2008. The following are the findings:

1. Non-compliance with Riverhead Town Noise Control Code §81-5 L(2):-

The applicant did not assess the compliance status of potential noise levels at the nearest two residences to the site against the Town Noise Control Code as required per project scoping and per DEIS review comments. The residences at Gibb Horse Farm and 400 Edwards Avenue are noise-sensitive receptors.

Applying Town Code to the F1 generated noise levels (from Table 9-5 with a typical 3 dBA adjustment for L_{10} from L_{eq}) at the Residence at Gibb Horse Farm and 400 Edwards Avenue, the F1 operational L_{10} noise levels of 66 and 68 respectively would clearly exceed the Town Code limits of 60 dBA with a wide margin without applying the more stringent 5 dBA lower limit of 55 dBA for impulsive sounds during the day.

2. Project has significant impact per NYSDEC Guideline criteria of 6 dBA or more increase:-

The NYSDEC Guideline states "In general, the EPA's 'Protective Noise Levels' guidance found that ambient noise levels of 55 dBA L_{dn} was sufficient to protect public health and welfare and, in most cases, did not create an annoyance (EPA 550/9-79-100, November 1978). In non-industrial settings the SPL should probably not exceed ambient noise by more than 6 dB(A) at the receptor. An increase of 6 dB(A) may cause complaints."

Table 9-5 of the FEIS clearly showed a 7 dBA increase at Gibbs Farm and thus results in significant noise impact by the fairly lenient NYSDEC guideline compared to EPA's criterion level of 55 dBA L_{dn}. Increase of 3 dBA are considered standard threshold of noise impact as employed in NYCEQR Technical Manual[1].

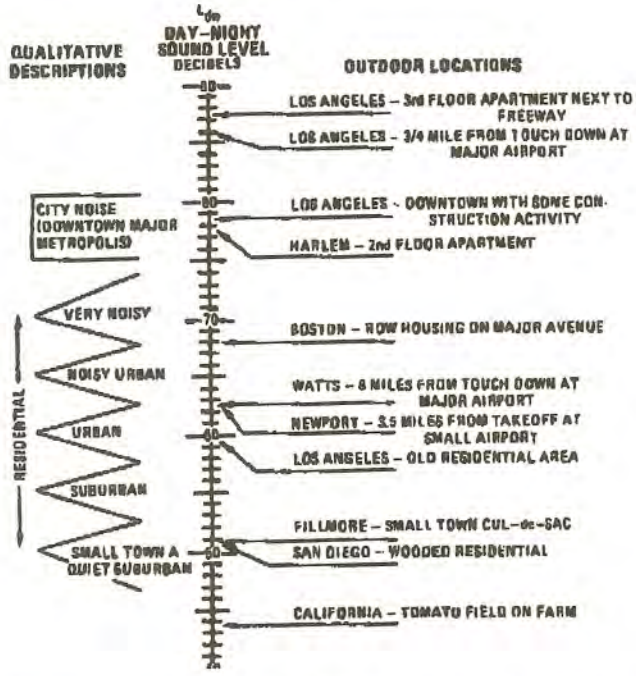
[1] City Environmental Quality Review Technical Manual. 2001.

In addition, the increases would be even greater if actual measured background noise level (the lowest daytime hourly noise levels) was used instead of extrapolated number from roadside measurements along Edwards Avenue and SR 25 (M-1 and M-4).

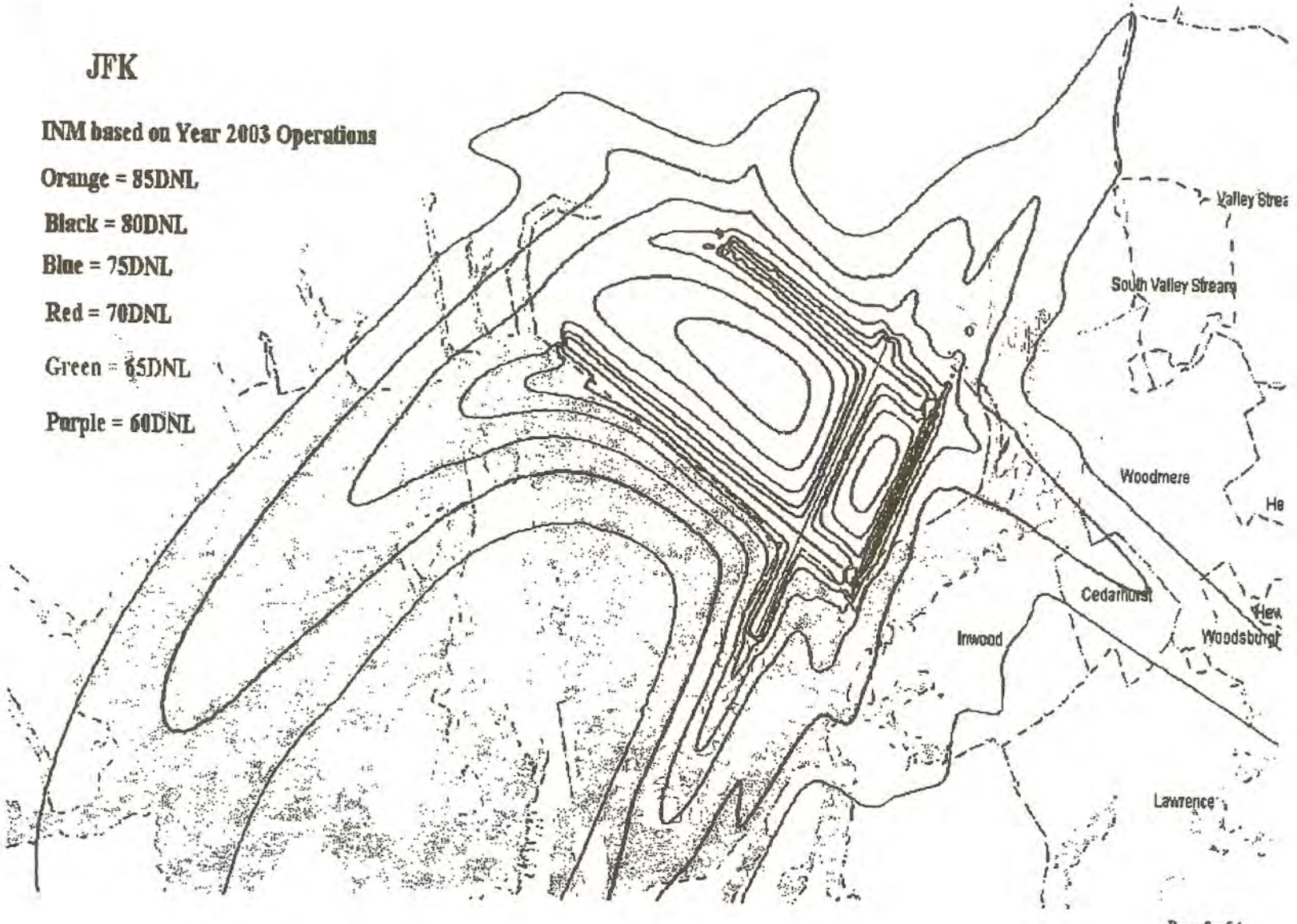
3. Rejection of Applicant's assumption that L_{dn} level of 65 dBA is the limit for residences:-

The NYSDEC guideline did not specify L_{dn} level of 65 dBA as an acceptable noise level limit for residences. In addition to the language above stated in NYSDEC Guideline, it followed with "There may be occasions where an increase in SPLs of greater than 6 dB(A) might be acceptable. The addition of any noise source, in a non-industrial setting, should not raise the ambient noise level above a maximum of 65 dB(A). This would be considered the "upper end" limit since 65 dB(A) allows for undisturbed speech at a distance of approximately three feet. Some outdoor activities can be conducted at a SPL of 65 dB(A). Still lower ambient noise levels may be necessary if there are sensitive receptors nearby."

There are areas in the country where noise levels are elevated above 65 dBA. Figure below from USEPA 550/9-79-100, 1978 shows that there are many major metropolitan areas and areas next to major highways and airports have L_{dn} level of 65 dBA or greater ("Noisy Urban" and above categories):



The Noise Exposure Contours below also shows the area immediately adjacent to JFK airport within the L_{dn} level of 65 dBA (the green line representing annotated as DNL = 65 dBA):



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The noise environment at the site and its surrounding area obviously cannot be equated to that neighboring JFK Airport or that of a Noisy Urban district. The assumption by the Applicant that L_{dn} level of 65 dBA is an acceptable limit for residences is rejected.

4. Proper existing noise measurements at Critical Receptors were not made:-

It is a standard professional practice to have continuous noise measurements over the times of proposed facility operation at the critical receptors for the project: i.e. at the residences on Gibb Horse Farm and 460 Edwards Avenue and using the lowest measured hourly ambient background levels for maximum impact assessment. This was not done in the Application. Therefore, no true evaluation of the noise impacts can be made.

5. Lack of noise mitigation study

No information on noise mitigation was provided other than stating that noise barriers were included in the facility layout even though DEIS review specifically asked for noise levels with and without the noise barriers at adjacent residences. It is standard professional practice to present such information and aid in the assessment of barrier effectiveness. No other alternative configurations or mitigation means were investigated.

6. Effects of Noise on Horses and Horse Breeding

Startle and fright reactions to impulsive noises are well known (EPA 1980), when combined with sight in particular.

The claim that horses would acclimate to the noise generated by the facility operation is stretched. While horses may acclimate to the drum of high noise levels in the city, the same cannot be said of the infrequent and sudden sounds resulting from the racing events at the site. Furthermore, no estimates of frequency of such occurrences or sound levels were provide or quantified in the FEIS.

APPENDIX H

Noise Analysis

- Results of the Noise Measurement Program
- Kart Manufacturer Noise Specifications

Continuous Measurement At Site M1: Edwards Avenue
Sunday, February 5, 2006

Date	Start Time	All Units in dBA							
		$L_{eq(30\ Minute)}$	$L_{eq(1\ Hour)}$	L_1	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
5-Feb-06	10:00 AM	67.3	67.8	76.2	72.6	57.8	48.7	41.9	81.3
5-Feb-06	10:30 AM	68.3		77.1	73.2	60.2	48.2	44.2	83.2
5-Feb-06	11:00 AM	67.8	68.2	76.5	73.0	58.7	48.2	44.5	79.9
5-Feb-06	11:30 AM	68.5		77.0	73.2	62.1	50.2	45.1	82.7
5-Feb-06	12:00 PM	69.0	68.7	77.7	73.5	63.3	49.6	44.7	82.1
5-Feb-06	12:30 PM	68.3		77.2	73.1	60.3	49.8	45.4	85.0
5-Feb-06	1:00 PM	68.0	69.4	76.4	72.8	60.7	49.3	45.8	83.9
5-Feb-06	1:30 PM	70.5		76.7	73.1	60.8	50.7	46.1	96.8
5-Feb-06	2:00 PM	69.4	69.2	78.2	73.5	64.1	51.1	48.1	86.1
5-Feb-06	2:30 PM	69.0		77.2	73.2	61.7	49.8	45.6	88.2
5-Feb-06	3:00 PM	69.2	69.5	77.1	73.7	63.3	50.9	45.6	86.9
5-Feb-06	3:30 PM	69.7		78.1	74.1	63.5	50.9	45.0	88.1
5-Feb-06	4:00 PM	69.6	69.1	77.8	73.9	64.7	51.8	46.1	86.1
5-Feb-06	4:30 PM	68.6		76.2	73.4	62.7	49.6	44.1	82.4
5-Feb-06	5:00 PM	68.2	67.4	76.5	73.1	61.0	47.1	42.8	81.1
5-Feb-06	5:30 PM	66.3		76.2	71.6	54.1	45.9	43.2	81.8
5-Feb-06	6:00 PM	66.2	65.8	75.2	71.7	56.3	46.4	41.1	79.0
5-Feb-06	6:30 PM	65.3		74.9	71.0	53.0	44.9	41.1	77.4
5-Feb-06	7:00 PM	64.0	63.8	74.6	69.5	48.3	42.3	39.5	80.8
5-Feb-06	7:30 PM	63.5		74.6	68.8	48.5	42.7	40.2	78.2

Continuous Measurement At Site M1: Edwards Avenue
Monday, February 6, 2006

Date	Start Time	All Units in dBA							
		$L_{eq(30\ Minute)}$	$L_{eq(1\ Hour)}$	L_1	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
6-Feb-06	10:00 AM	69.1	69.3	80.2	73.1	58.6	50.8	47.0	88.1
6-Feb-06	10:30 AM	69.5		80.5	73.5	61.5	51.5	46.9	84.5
6-Feb-06	11:00 AM	68.4	68.9	78.2	73.3	61.5	53.3	49.8	81.2
6-Feb-06	11:30 AM	69.3		79.5	73.1	60.0	51.7	46.1	91.1
6-Feb-06	12:00 PM	69.7	69.3	80.6	73.5	62.0	53.1	47.7	87.2
6-Feb-06	12:30 PM	68.9		78.8	73.2	61.0	52.3	47.1	87.7
6-Feb-06	1:00 PM	69.0	69.4	78.3	73.1	62.7	53.2	48.8	88.7
6-Feb-06	1:30 PM	69.7		79.9	73.9	62.4	51.9	47.7	84.1
6-Feb-06	2:00 PM	70.8	70.6	81.6	73.9	62.4	51.4	46.8	92.1
6-Feb-06	2:30 PM	70.3		80.6	73.8	63.9	52.2	48.4	88.2
6-Feb-06	3:00 PM	70.8	70.3	80.4	74.8	65.7	51.9	47.1	87.2
6-Feb-06	3:30 PM	69.7		78.2	74.2	64.2	50.9	46.9	84.6
6-Feb-06	4:00 PM	70.0	70.1	79.2	74.1	65.4	52.0	45.1	84.4
6-Feb-06	4:30 PM	70.1		78.7	74.3	65.6	51.9	47.1	85.1
6-Feb-06	5:00 PM	70.3	70.1	78.5	74.4	66.8	51.2	46.4	82.5
6-Feb-06	5:30 PM	69.9		78.9	73.9	63.9	51.0	47.5	90.4
6-Feb-06	6:00 PM	68.5	68.4	77.6	73.1	60.4	47.6	41.6	84.9
6-Feb-06	6:30 PM	68.2		77.5	72.8	59.3	47.0	42.7	85.8

Site	Location	Date	Start Time	dBA				
				L_{eq}	L_1	L_{10}	L_{50}	L_{90}
M2	Southern Property Line of Project Site	29-Jan-06	11:46 AM	51.8	57.4	54.4	50.6	46.8

Continuous Measurement At Site M3: Schullman Golf Course Property Line
Sunday, February 5, 2006

Date	Start Time	All Units in dBA							
		$L_{eq(30\ Minute)}$	$L_{eq(1\ Hour)}$	L_1	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
5-Feb-06	11:00 AM	46.9	47.0	55.5	49.9	44.7	41.8	38.8	64.1
5-Feb-06	11:30 AM	47.1		54.8	49.8	45.5	42.8	39.2	59.1
5-Feb-06	12:00 PM	48.3	49.5	58.9	50.2	45.5	42.8	40.7	64.8
5-Feb-06	12:30 PM	50.4		59.6	54.3	47.0	43.9	40.0	62.7
5-Feb-06	1:00 PM	49.5	49.4	57.8	52.6	47.3	44.0	41.8	62.5
5-Feb-06	1:30 PM	49.3		58.5	52.4	46.6	43.5	41.3	64.3
5-Feb-06	2:00 PM	49.8	49.7	59.8	52.7	46.7	43.4	41.3	64.4
5-Feb-06	2:30 PM	49.5		59.5	49.6	45.4	43.0	40.8	70.9
5-Feb-06	3:00 PM	48.7	47.5	59.8	50.0	45.9	42.9	39.9	67.2
5-Feb-06	3:30 PM	45.9		53.2	48.0	44.5	42.6	39.3	56.6
5-Feb-06	4:00 PM	48.6	47.1	58.8	50.7	46.0	43.7	41.3	64.6
5-Feb-06	4:30 PM	44.9		50.2	46.8	44.2	42.1	40.3	55.1
5-Feb-06	5:00 PM	44.5	44.5	54.9	45.5	42.1	40.0	36.5	58.7
5-Feb-06	5:30 PM	44.5		54.6	46.9	41.1	38.6	36.2	60.3
5-Feb-06	6:00 PM	43.8	44.3	53.7	46.6	40.9	38.6	35.8	58.4
5-Feb-06	6:30 PM	44.8		55.5	48.3	39.7	36.8	33.2	61.3
5-Feb-06	7:00 PM	43.2	44.8	53.8	46.4	38.6	35.8	33.2	62.4
5-Feb-06	7:30 PM	45.9		56.7	48.9	41.2	37.8	34.4	62.1

Continuous Measurement At Site M3: Schullman Golf Course Property Line
Monday, February 6, 2006

Date	Start Time	All Units in dBA							
		$L_{eq(30\ Minute)}$	$L_{eq(1\ Hour)}$	L_1	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
6-Feb-06	10:00 AM	51.1	50.7	60.5	54.6	47.4	42.2	39.8	67.1
6-Feb-06	10:30 AM	50.3		60.4	53.6	46.1	42.4	40.2	64.7
6-Feb-06	11:00 AM	55.3	56.9	65.0	57.6	50.6	45.6	42.0	79.6
6-Feb-06	11:30 AM	58.0		69.4	61.1	51.6	45.9	41.5	76.5
6-Feb-06	12:00 PM	55.7	56.5	65.1	59.3	52.0	46.3	40.5	72.5
6-Feb-06	12:30 PM	57.1		67.2	60.8	52.7	47.2	44.2	72.5
6-Feb-06	1:00 PM	54.5	53.7	65.6	57.5	49.6	46.3	42.9	70.1
6-Feb-06	1:30 PM	52.6		61.4	55.8	49.2	46.3	43.5	69.4
6-Feb-06	2:00 PM	54.1	53.2	62.7	58.2	51.0	45.4	41.0	67.9
6-Feb-06	2:30 PM	52.0		61.1	55.9	48.3	43.3	40.7	66.5
6-Feb-06	3:00 PM	50.7	50.8	60.7	54.1	47.1	43.9	41.1	64.1
6-Feb-06	3:30 PM	50.8		60.3	54.3	47.1	42.7	39.9	64.8
6-Feb-06	4:00 PM	49.8	48.6	60.1	53.1	45.7	41.7	39.6	64.6
6-Feb-06	4:30 PM	46.9		56.0	49.9	43.7	40.6	38.5	62.8
6-Feb-06	5:00 PM	44.6	45.3	53.9	46.2	42.2	40.3	38.4	62.9
6-Feb-06	5:30 PM	45.9		54.3	49.0	43.6	40.6	38.0	60.1
6-Feb-06	6:00 PM	42.4	42.2	51.7	44.6	39.9	37.2	35.1	59.4
6-Feb-06	6:30 PM	41.9		51.1	44.5	39.1	36.2	33.7	58.6

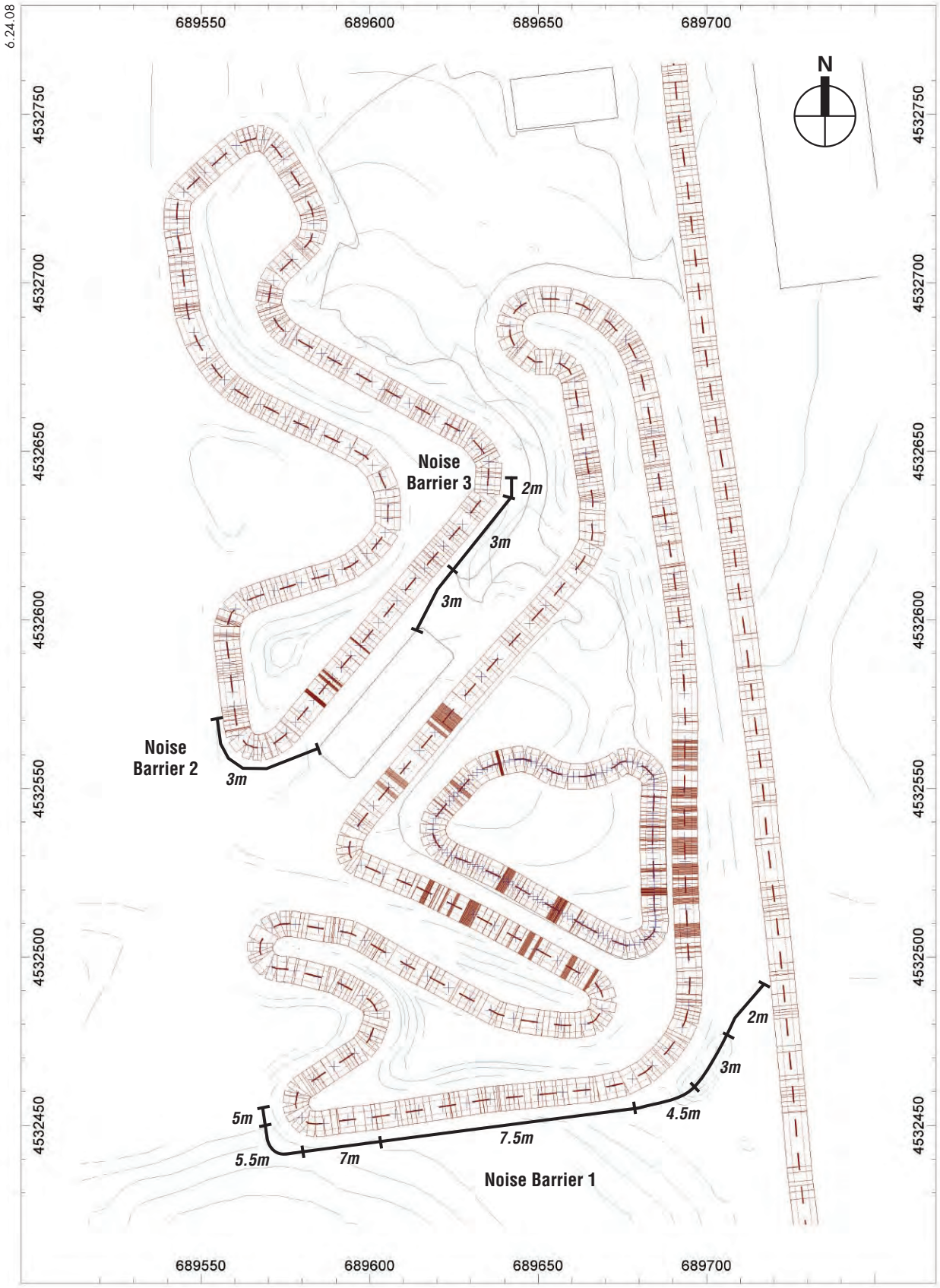
Continuous Measurement At Site M4: Zeh Residence on Route 25
Sunday, February 5, 2006

Date	Start Time	All Units in dBA							
		$L_{eq(30\ Minute)}$	$L_{eq(1\ Hour)}$	L_1	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
5-Feb-06	10:13 AM	70.2	70.4	77.9	74.7	66.2	54.4	47.9	81.1
5-Feb-06	10:30 AM	70.5		77.0	74.5	68.6	55.7	50.7	81.7
5-Feb-06	11:00 AM	70.1	70.0	77.0	74.1	67.7	54.5	44.4	85.2
5-Feb-06	11:30 AM	69.8		76.0	73.4	68.4	58.2	49.0	81.6
5-Feb-06	12:00 PM	70.7	70.7	77.3	74.4	69.1	57.0	46.4	80.7
5-Feb-06	12:30 PM	70.7		77.1	74.1	69.5	58.6	51.0	81.5
5-Feb-06	1:00 PM	70.7	71.1	77.0	74.3	69.6	56.0	45.3	80.8
5-Feb-06	1:30 PM	71.5		78.6	74.6	69.7	58.3	49.3	90.5
5-Feb-06	2:00 PM	71.3	71.3	78.1	74.6	69.9	59.1	51.1	86.4
5-Feb-06	2:30 PM	71.2		77.9	74.5	70.0	60.6	56.0	81.8
5-Feb-06	3:00 PM	70.8	71.0	77.3	74.3	69.8	59.4	52.4	81.0
5-Feb-06	3:30 PM	71.1		77.5	74.7	69.6	57.4	47.2	87.6
5-Feb-06	4:00 PM	70.6	70.7	77.2	74.3	69.5	57.3	47.1	81.5
5-Feb-06	4:30 PM	70.8		77.3	74.6	69.2	57.2	47.4	79.6
5-Feb-06	5:00 PM	69.9	69.7	77.0	74.0	67.6	53.8	45.9	79.5
5-Feb-06	5:30 PM	69.4		76.5	73.9	66.3	53.2	45.6	78.9
5-Feb-06	6:00 PM	68.9	68.5	76.6	73.2	64.7	49.8	40.9	81.4
5-Feb-06	6:30 PM	68.0		76.4	73.0	61.9	48.3	41.6	80.8
5-Feb-06	7:00 PM	67.7	67.2	75.8	72.6	61.9	48.3	41.1	78.7
5-Feb-06	7:30 PM	66.6		76.3	71.5	57.5	47.1	41.2	80.2

Continuous Measurement At Site M4: Zeh Residence on Route 25
Monday, February 6, 2006

Date	Start Time	All Units in dBA							
		$L_{eq(30\ Minute)}$	$L_{eq(1\ Hour)}$	L_1	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
6-Feb-06	10:00 AM	71.5	71.8	80.5	75.4	68.3	57.9	49.8	84.1
6-Feb-06	10:30 AM	72.0		81.4	75.8	68.3	58.0	51.8	85.8
6-Feb-06	11:00 AM	71.1	72.0	78.9	75.1	68.6	58.4	52.7	83.4
6-Feb-06	11:30 AM	72.8		81.1	75.6	68.1	57.4	51.0	95.6
6-Feb-06	12:00 PM	71.1	71.2	79.4	74.9	68.4	57.7	48.7	86.3
6-Feb-06	12:30 PM	71.2		79.2	75.2	68.8	58.0	50.8	82.2
6-Feb-06	1:00 PM	71.0	71.0	78.6	75.2	68.1	57.2	50.8	82.5
6-Feb-06	1:30 PM	70.9		79.4	74.8	68.1	56.4	51.5	82.5
6-Feb-06	2:00 PM	71.8	72.0	80.4	75.4	69.6	58.5	51.6	86.9
6-Feb-06	2:30 PM	72.1		79.5	75.1	69.1	56.0	49.6	93.5
6-Feb-06	3:00 PM	71.1	71.7	78.1	74.7	69.8	57.3	49.4	82.0
6-Feb-06	3:30 PM	72.3		80.2	75.6	70.9	60.1	52.0	83.3
6-Feb-06	4:00 PM	71.5	71.6	78.4	74.8	70.4	59.5	51.5	81.1
6-Feb-06	4:30 PM	71.6		78.1	75.1	70.1	58.9	48.9	81.8
6-Feb-06	5:00 PM	71.7	71.8	78.4	75.2	70.5	59.5	50.2	81.4
6-Feb-06	5:30 PM	71.8		78.7	74.8	69.3	56.5	46.3	93.9
6-Feb-06	6:00 PM	70.3	70.2	77.3	74.4	68.2	55.0	44.9	80.3
6-Feb-06	6:30 PM	70.0		78.1	74.3	65.9	51.5	42.3	83.9

Site	Location	Date	Start Time	dBA				
				L_{eq}	L_1	L_{10}	L_{50}	L_{90}
M5	Riverhead Charter School (Facing Towards Project Site)	29-Jan-06	10:36 AM	63.1	69.8	67.0	60.6	50.8



Noise Barrier

#m *Height of the top portion of each barrier section above ground*

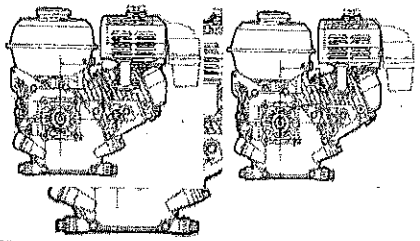
Note:

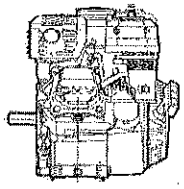
1. *All three barriers were modeled as absorptive barriers (absorption coefficient=1)*
2. *Noise barrier 3 is movable and is assumed to be utilized for Scenario B Opertions*

Proposed Noise Barrier Details

F1 Long Island Sports Facility

Figure 1





						GX 120K1	GX 160K1	GX 200	GX 240K1	GX270	GX 340K1	GX 390K1
EXHAUST	max. back pressure	3000 min-1	mmAq	full load	std muffler	130	385	540		490	480	870
		3600 min-1	mmAq	full load	no arrestor	154	505	680	380	595	605	1070
		3000 min-1	mmAq	full load	std muffler	200	470			645	725	1050
		3600 min-1	mmAq	full load	arrestor	220	600		504	778	395	1310
		3000 min-1	mmAq	full load	silent muffler	210	450			465	585	
		3600 min-1	mmAq	full load	no arrestor	250	545			562	730	
		3000 min-1	mmAq	full load	silent muffler	260	530			645	840	
		3600 min-1	mmAq	full load	arrestor	300	655			765	1040	
	exhaust gas temp.	3000 min-1	℃	full load		580	650	700	780	735	700	
		3600 min-1	℃	full load		620	690	720			746	
	exhaust gas composition	CO	g/HPh	EN		224	234	215	195	185 (227)	204	259
				CARB95		224	234	215	195	185 (227)	204	259
			%	EN								
				CARB95								
		CO2	g/HPh	EN								
				CARB95		-	-	-	-	-	-	-
			%	EN								
				CARB95								
		HC	g/HPh	EN		7.5	7.8	3.7	3.8	2.75 (3.8)	2.9 (4.0)	2.85 (3.2)
				CARB95		7.5	7.8	3.7	3.8	2.75 (3.8)	2.9 (4.0)	2.85 (3.2)
			%	EN								
			%	CARB95								
		NOx	g/HPh	EN		2.7	2.4	4	3.5	4.51 (4.1)	3.3 (4.2)	2.32 (4.0)
				CARB95		2.7	2.4	4	3.5	4.51 (4.1)	3.3 (4.2)	2.32 (4.0)
			%	EN								
				CARB95								
		Particulate										

NOISE DATA	std muffler, std A/C	at rated output	dB(A) / 1 meter			89	90	90	94	95	93	94
		at rated output	dB(A) / 7 meter			77	78	78	82	83	81	82
		EC regulation	LWa			97	98	98	104	104	102	103
		FRENCH REGULATION	dB(A) / 7 meter	no load, 3600rpm		70	72	72	75	76	78	78
	std muffler, silent A/C	at rated output	dB(A) / 1 meter									
		at rated output	dB(A) / 7 meter									
		EC regulation	LWa									
		FRENCH REGULATION	dB(A) / 7 meter	no load, 3600rpm								
	silent muffler, slt A/C	at rated output	dB(A) / 1 meter			87	89	-	90	91		
		at rated output	dB(A) / 7 meter			75	77	-	78	79		
		EC regulation	LWa			96	97	-	100	100		
		FRENCH REGULATION	dB(A) / 7 meter	no load, 3600rpm		N/A	N/A	-	N/A	N/A		
	super silent A/C	at rated output	dB(A) / 1 meter			-	-	-	87	88	89	90
		at rated output	dB(A) / 7 meter			-	-	-	75	76	77	78
		EC regulation	LWa		EC	-	-	-	97	97	98	99
		3600rpm, no load	dB(A) / 7 meter		FRANCE	-	-	-	N/A	N/A	N/A	N/A

APPENDIX I

Bird Species Identified During the 2000 Atlas Survey

Bird Species Identified During the 2000 Atlas Survey

Common Name	Scientific Name	Behavior Code[1]	NY Legal Status[2]
Green Heron	*Butorides virescens*	X1	Protected
Turkey Vulture	*Cathartes aura*	X1	Protected
Canada Goose	*Branta Canadensis*	FL	Game Species
Mute Swan	*Cygnus olor*	FL	Protected
Wood Duck	*Aix sponsa*	UN	Game Species
Mallard	*Anas platyrhynchos*	FL	Game Species
Northern Harrier	*Circus syaneus*	X1	Threatened
Cooper's Hawk	*Accipiter cooperii*	X1	Special Concern
Red-tailed Hawk	*Buteo jamaicensis*	FL	Protected
American Kestrel	*Falco sparverius*	P2	Protected
Ring-necked Pheasant	*Phasianus colchicus*	X1	Game Species
Wild Turkey	*Meleagris gallopavo*	FL	Game Species
Northern Bobwhite	*Colinus virginianus*	T2	Game Species
Killdeer	*Charadrius vociferous*	FL	Protected
Rock Pigeon	*Columba livia*	P2	Unprotected
Mourning Dove	*Zenaida macroura*	FL	Protected
Black-billed Cuckoo	*Coccyzus ertyropthalmus*	S2	Protected
Yellow-billed Cuckoo	*Coccyzus americanus*	FY	Protected
Eastern Screech-Owl	*Megascops asio*	T2	Protected
Great Horned Owl	*Bubo virginianus*	T2	Protected
Common Nighthawk	*Chordeiles minor*	X1	Special Concern
Whip-poor-will	*Caprimulgus vociferous*	T2	Special Concern
Chimney Swift	*Chaetura pelagica*	P2	Protected
Ruby-throated Hummingbird	*Archilochus colubris*	P2	Protected
Belted Kingfisher	*Ceryle alcyon*	X1	Protected
Red-bellied Woodpecker	*Melanerpes carolinus*	T2	Protected
Downy Woodpecker	*Picoides pubescens*	FL	Protected
Northern Flicker	*Colaptes auratus*	FL	Protected
Eastern Wood-Pewee	*Contopus virens*	T2	Protected
Eastern Phoebe	*Sayornis phoebe*	T2	Protected
Great Crested Flycatcher	*Myiarchus crintus*	T2	Protected
Eastern Kingbird	*Tyrannus tyrannus*	FY	Protected
White-eyed Vireo	*Vireo griseus*	X1	Protected
Yellow-throated Vireo	*Vireo flavifrons*	X1	Protected
Warbling Vireo	*Vireo gilvus*	T2	Protected
Red-eyed Vireo	*Vireo olivaceus*	T2	Protected
Blue Jay	*Cyanocitta cristata*	T2	Protected
American Crow	*Corvus brachyrhynchos*	FL	Game Species
Fish Crow	*Corvus ossifragus*	T2	Protected
Horned Lark	*Eremophila alpestris*	X1	Protected

Bird Species Identified During the 2000 Atlas Survey (continued)			
Common Name	**Scientific Name**	**Behavior Code[1]**	**NY Legal Status[2]**
Purple Martin	*Progne subis*	FY	Protected
Tree Swallow	*Tachycineta bicolor*	NY	Protected
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X1	Protected
Bank Swallow	*Riparia riparia*	X1	Protected
Barn Swallow	*Hirundo rustica*	FL	Protected
Black-capped Chickadee	*Poecile atricapillus*	FL	Protected
Tufted Titmouse	*Baeolophus bicolor*	FY	Protected
Carolina Wren	*Thryothorus ludovicianus*	T2	Protected
House Wren	*Troglodytes aedon*	FL	Protected
Blue-gray Gnatcatcher	*Polioptila caerulea*	P2	Protected
Eastern Bluebird	*Sialia sialis*	NE	Protected
Veery	*Catharus fuscescens*	T2	Protected
Hermit Thrush	*Catharus guttatus*	T2	Protected
American Robin	*Turdus migratorius*	FL	Protected
Gray Catbird	*Dumetella carolinensis*	FL	Protected
Northern Mockingbird	*Mimus polyglottos*	FY	Protected
Brown Thrasher	*Toxostoma rufum*	T2	Protected
European Starling	*Sturnus vulgaris*	FY	Unprotected
Cedar Waxwing	*Bombycilla cedrorum*	P2	Protected
Blue-winged Warbler	*Vermivora pinus*	FL	Protected
Yellow Warbler	*Dendroica petechia*	T2	Protected
Pine Warbler	*Dendroica pinus*	T2	Protected
Prairie Warbler	*Dendroica discolor*	FY	Protected
Black-and-white Warbler	*Mniotilta varia*	T2	Protected
Ovenbird	*Seiurus aurocapilla*	T2	Protected
Common Yellowthroat	*Geothlypis trichas*	FY	Protected
Scarlet Tanager	*Piranga olivacea*	P2	Protected
Eastern Towhee	*Pipilo erythrophthalmus*	FL	Protected
Chipping Sparrow	*Spizella passerina*	FY	Protected
Field Sparrow	*Spizella pusilla*	FY	Protected
Vesper Sparrow	*Pooecetes gramineus*	NE	Special Concern
Savannah Sparrow	*Passerculus sandwichensis*	S2	Protected
Grasshopper Sparrow	*Ammodramus savannarum*	FY	Special Concern
Song Sparrow	*Melospiza melodia*	FY	Protected
Swamp Sparrow	*Melospiza Georgiana*	T2	Protected
Northern Cardinal	*Cardinalis cardinalis*	FL	Protected
Blue Grosbeak	*Guiraca caerulea*	FY	Protected
Indigo Bunting	*Passerina cyanea*	T2	Protected

Bird Species Identified During the 2000 Atlas Survey (continued)

Common Name	Scientific Name	Behavior Code[1]	NY Legal Status[2]
Red-winged Blackbird	*Agelaius phoeniceus*	FY	Protected
Eastern Meadowlark	*Sturnella magna*	FY	Protected
Common Grackle	*Quiscalus quiscula*	FL	Protected
Brown-headed Cowbird	*Molothrus ater*	P2	Protected
Orchard Oriole	*Icterus spurious*	ON	Protected
Baltimore Oriole	*Icterus galbula*	FL	Protected
House Finch	*Carpodacus mexicanus*	P2	Protected
American Goldfinch	*Carduelis tristis*	P2	Protected
House Sparrow	*Passer domesticus*	ON	Unprotected

Notes: **Behavior Codes[1]**

X1—Species observed in possible nesting habitat or singing male(s) present in breeding season.
FL—Recently fledged young.
UN—Used nest found.
P2—Pair observed in suitable habitat in breeding season.
S2—Singing male present on more than one date in the same place.
FY—Adult(s) with food for young or feeding young.
T2—Bird (or pair) apparently holding territory.
NY—Nest with young.
NE—Nest and eggs, bird on nest or egg, or eggshells beneath nest.
ON—Adult(s) entering or leaving nest site indicating occupied nest.

NY Legal Status[2]

Protected Species are defined in ECL 11-0103 as all wild birds except those named as unprotected. Some of these birds, such as waterfowl and gallinaceous birds, are also listed as game species with seasons set, while others may not be taken at any time.

Game Species are defined as "big game," "small game," or "game bird" species in ECL 11-0103. For some species, there are seasons set when they may be legally hunted. For those species, there are no seasons set and the species may not be hunted or taken at any time in New York.

Threatened Species are determined by the DEC as likely to become endangered within the foreseeable future in New York State, or are federally listed as threatened. All such species are fully protected under the New York State ECL 11-0535.

Special Concern Species are those native species which are not yet recognized as endangered or threatened, but for which documented evidence exists relating to their continued welfare in New York State. The Special Concern category exists within DEC rules and regulations, but such designation does not in itself provide any additional protection. However, Special Concern species may be protected under other laws.

Unprotected Species are those that may be taken at any time without limit. However, a license to take may be required.

Sources: NYS Breeding Bird Atlas 2000

APPENDIX J

Standards and Specifications for Dust Control, Stabilized Construction Entrance, Straw Bale Dike, and Silt Fence

STANDARD AND SPECIFICATIONS FOR DUST CONTROL

Definition

The control of dust resulting from land-disturbing activities.

Purpose

To prevent surface and air movement of dust from disturbed soil surfaces that may cause off-site damage, health hazards, and traffic safety problems.

Conditions Where Practice Applies

On construction roads, access points, and other disturbed areas subject to surface dust movement and dust blowing where off-site damage may occur if dust is not controlled.

Design Criteria

Construction operations should be scheduled to minimize the amount of area disturbed at one time. Buffer areas of vegetation should be left where practical. Temporary or permanent stabilization measures should be installed. No specific design criteria is given; see construction specifications below for common methods of dust control.

Construction Specifications

Vegetative Cover - For disturbed areas not subject to traffic; vegetation provides the most practical method of dust control (see section 3).

Mulch (including gravel mulch) - Mulch offers a fast effective means of controlling dust.

Spray adhesives - Examples of spray adhesives for use on mineral soils are shown in the following table:

Material	Water Dilution	Type of Nozzle	Apply Gallons/Acre
Acrylic polymer	9:1	coarse spray	500
Latex emulsion	12.5:1	fine spray	235
Resin in water	4:1	fine spray	300

Water quality should be considered when materials are selected for dust control.

Sprinkling - The site may be sprayed until the surface is wet. This is especially effective on haul roads and access routes.

Stone used for construction roads is also effective for dust control.

Barriers - a fence or similar barrier can control air currents at intervals equal to fifteen times the barrier height. Preserve existing wind barrier vegetation as much as practical.

Maintenance

Maintain dust control measures through dry weather periods until all disturbed areas are stabilized.

STANDARD AND SPECIFICATIONS FOR STABILIZED CONSTRUCTION ENTRANCE

Definition

A stabilized pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right-of-way, street, alley, sidewalk or parking area.

Purpose

The purpose of stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights-of-way or streets.

Conditions Where Practice Applies

A stabilized construction entrance shall be used at all points of construction ingress and egress.

Design Criteria

See Figure 5A.38 on page 5A.74 for details.

Aggregate Size: Use 2 in. stone, or reclaimed or recycled concrete equivalent.

Thickness: Not less than six (6) inches.

Width: 12 foot minimum but not less than the full width of points where ingress or egress occurs. 24 foot minimum if there is only one access to the site.

Length: As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum would apply).

Filter cloth: To be placed over the entire area to be covered with aggregate. Filter cloth will not be required on a single family residence lot. Piping of surface water under entrance shall be provided as required. If piping is impossible, a mountable berm with 5:1 slopes will be permitted.

Criteria for Filter Cloth

The filter cloth shall be woven or nonwoven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals, hydro-carbons, mildew, rot resistant, and conform to the fabric properties as shown:

Fabric Properties[3]	Light Duty[1] Roads Grade Subgrade	Heavy Duty[2] Haul Roads Rough Graded	Test Method
Grab Tensile Strength (lbs)	200	220	ASTM D1682
Elongation at Failure (%)	50	60	ASTM D1682
Mullen Brust Strength (lbs)	190	430	ASTM D3786
Puncture Strength (lbs)	40	125	ASTM D751 modified
Equivalent Openning Size	40-80	40-80	US Std Sieve CW-02215
Aggregate Depth (in)	6	10	--

[1] Light Duty Road: Area sites that have been graded to subgrade and where most travel would be single axle vehicles and an occasional multi-axle truck. Acceptable materials are Trevira Spunbond 1115, Mirafi 100X, Typar 3401, or equivalent.

[2] Heavy Duty Road: Area sites with only rough grading, and where most travel would be multi-axle vehicles. Acceptable materials are Trevira Spunbond 1135, Miraft 600X, or equivalent.

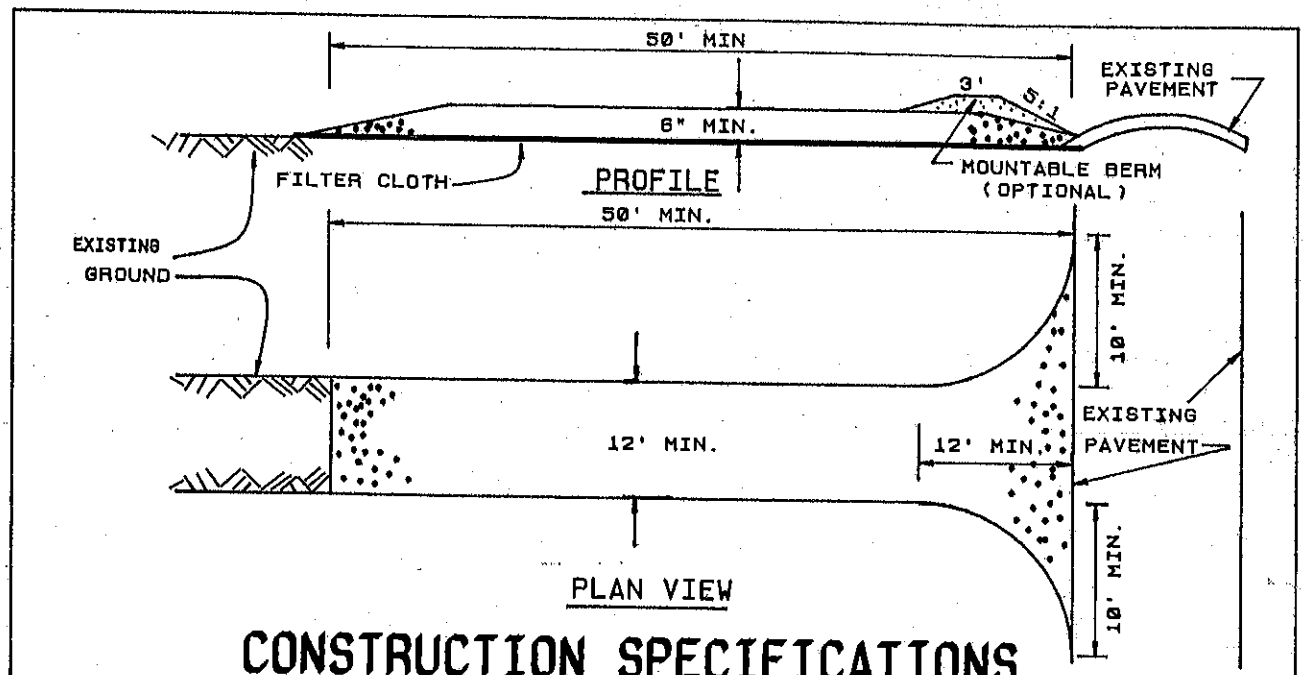
[3] Fabrics not meeting these specifications may be used only when design procedure and supporting documentation are supplied to determine aggregate depth and fabric strength.

Maintenance

The entrance shall be maintained in a condition which will prevent tracking of sediment onto public rights-of-way or streets. This may require periodic top dressing with additional aggregate. All sediment spilled, dropped, or washed onto public rights-of-way must be removed immediately.

When necessary, wheels must be cleaned to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with aggregate which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or watercourses.

Figure 5A.38
Stabilized Construction Entrance Details



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.

2. LENGTH - NOT LESS THAN 50 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).

3. THICKNESS - NOT LESS THAN SIX (6) INCHES.

4. WIDTH - TWELVE (12) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.

5. FILTER CLOTH - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.

6. SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.

7. MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACTED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

8. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

9. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	STABLIZED CONSTRUCTION ENTRANCE	STANDARD SYMBOL

STANDARD AND SPECIFICATIONS FOR STRAW BALE DIKE

Definition

A temporary barrier of straw or similar material used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a bale dike is to reduce runoff velocity and effect deposition of the transported sediment load. Straw bale dikes have an estimated design life of three (3) months.

Conditions Where Practice Applies

The straw bale dike is used where:

1. No other practice is feasible.
2. There is no concentration of water in a channel or other drainage way above the barrier.
3. Erosion would occur in the form of sheet erosion.
4. Length of slope above the straw bale dike does not exceed these limits.

Constructed Slope	Percent Slope	Slope Length (ft.)
2:1	50	25
2-1/2:1	40	50
3:1	33	75
3-1/2:1	30	100
4:1	25	125

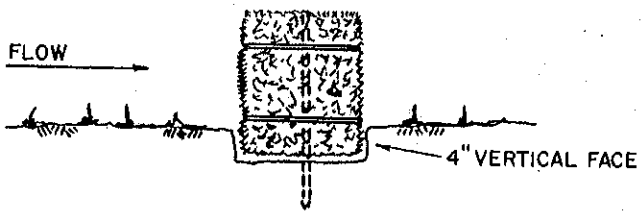
Where slope gradient changes through the drainage area, steepness refers to the steepest slope section contributing to the straw bale dike.

The practice may also be used for a single family lot if the slope is less than 15 percent. The contributing drainage area in this instance shall be less than one acre and the length of slope above the dike shall be less than 200 feet.

Design Criteria

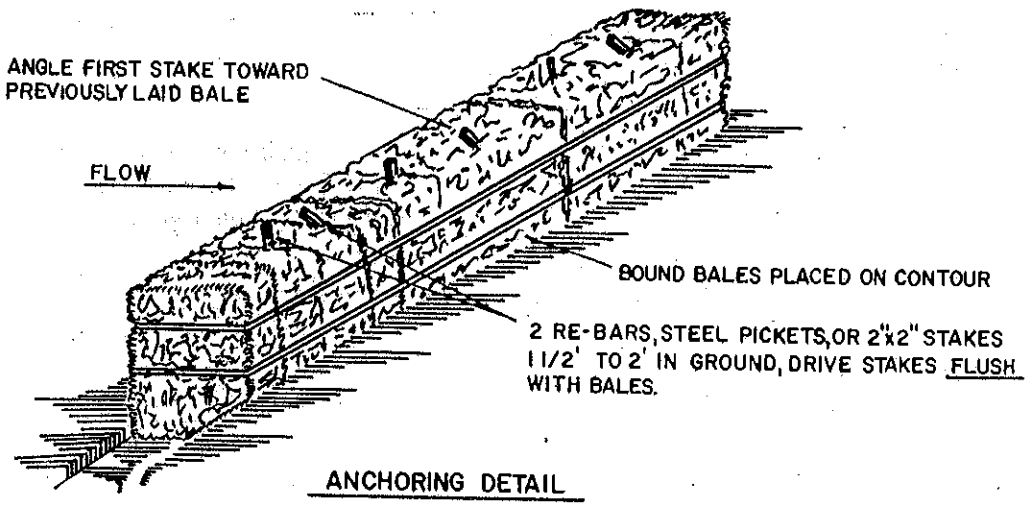
A design is not required. All bales shall be placed on the contour with cut edge of bale adhering to the ground. See Figure 5A.8 on page 5A.18 or details.

Figure 5A.8
Straw Bale Dike Details



BEDDING DETAIL

DRAINAGE AREA NO MORE THAN 1/4 ac. PER 100 FEET OF STRAW BALE DIKE
FOR SLOPES LESS THAN 25%



ANCHORING DETAIL

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED AT THE TOE OF A SLOPE OR ON THE CONTOUR AND IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF (4) INCHES, AND PLACED SO THE BINDINGS ARE HORIZONTAL.
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY EITHER TWO STAKES OR RE-BARS DRIVEN THROUGH THE BALE. THE FIRST STAKE IN EACH BALE SHALL BE DRIVEN TOWARD THE PREVIOUSLY LAID BALE AT AN ANGLE TO FORCE THE BALES TOGETHER. STAKES SHALL BE DRIVEN FLUSH WITH THE BALE.
4. INSPECTION SHALL BE FREQUENT AND REPAIR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	STRAW BALE DIKE	STANDARD SYMBOL SBD

STANDARD AND SPECIFICATIONS FOR SILT FENCE

Definition

A temporary barrier of geotextile fabric (filter cloth) used to intercept sediment laden runoff from small drainage areas of disturbed soil.

Purpose

The purpose of a silt fence is to reduce runoff velocity and effect deposition of transported sediment load. Limits imposed by ultraviolet stability of the fabric will dictate the maximum period the silt fence may be used.

Conditions Where Practice Applies

A silt fence may be used subject to the following conditions:

1. Maximum allowable slope lengths contributing runoff to a silt fence are:

Slope Steepness	Maximum Slope Length (Ft)
2:1	50
3:1	75
4:1	125
5:1	175
Flatter than 5:1	200

2. Maximum drainage area for overland flow to a silt fence shall not exceed 1/2 acre per 100 feet of fence; and
3. Erosion would occur in the form of sheet erosion; and
4. There is no concentration of water flowing to the barrier.

Design Criteria

Design computations are not required. All silt fences shall be placed as close to the area as possible, and the area below the fence must be undisturbed or stabilized.

A detail of the silt fence shall be shown on the plan, and contain the following minimum requirements:

1. The type, size, and spacing of fence posts.
2. The size of woven wire support fences.
3. The type of filter cloth used.
4. The method of anchoring the filter cloth.
5. The method of fastening the filter cloth to the fencing support.

Where ends of filter cloth come together, they shall be overlapped, folded and stapled to prevent sediment bypass. See Figure 5A.9 on page 5A.20 for details.

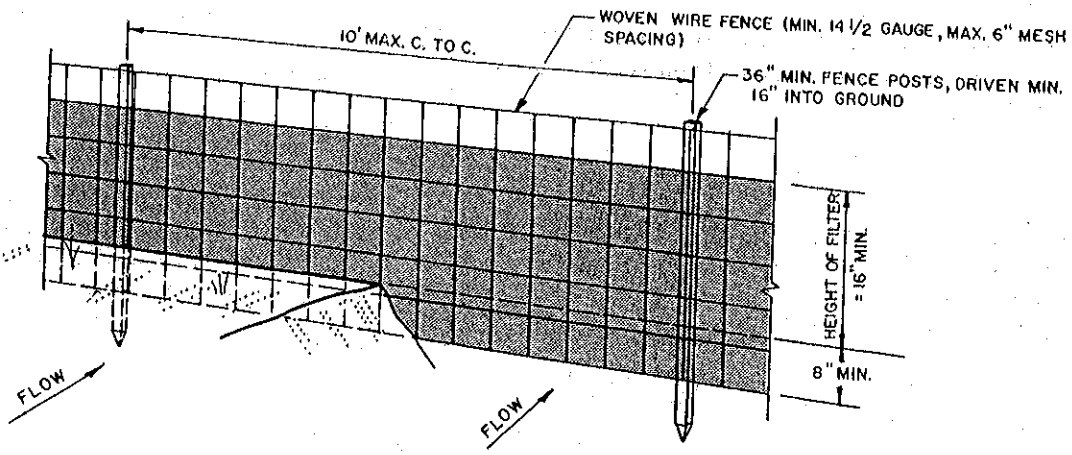
Criteria for Silt Fence Materials

1. Silt Fence Fabric: The fabric shall meet the following specifications unless otherwise approved by the appropriate erosion and sediment control plan approval authority. Such approval shall not constitute statewide acceptance. Statewide acceptability shall depend on in field and/or laboratory observations and evaluations.

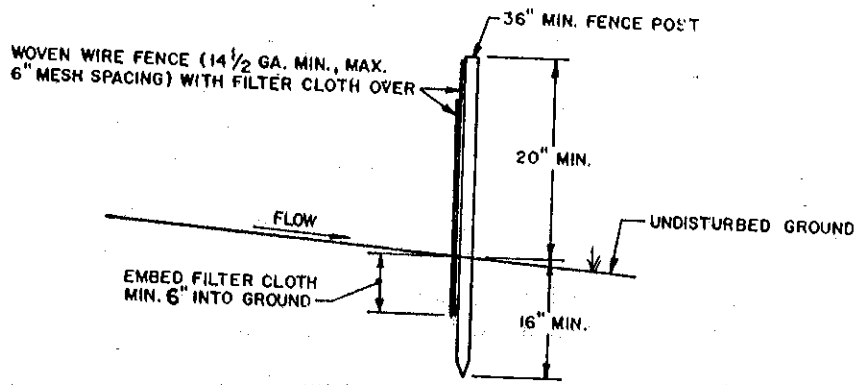
Fabric Properties	Minimum Acceptable Value	Test Method
Grab Tensile Strength (lbs)	90	ASTM D1682
Elongation at Failure (%)	50	ASTM D1682
Mullen Burst Strength (PSI)	190	ASTM D3786
Puncture Strength (lbs)	40	ASTM D751 (modified)
Slurry Flow Rate (gal/min/sf)	0.3	
Equivalent Opening Size	40-80	US Std Sieve CW-02215
Ultraviolet Radiation Stability (%)	90	ASTM G-26

2. Fence Posts (for fabricated units): The length shall be a minimum of 36 inches long. Wood posts will be of sound quality hardwood with a minimum cross sectional area of 3.0 square inches. Steel posts will be standard T and U section weighing not less than 1.00 pound per linear foot.
3. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14-1/2 gage with a maximum 6 in. mesh opening, or as approved.
4. Prefabricated Units: Envirofence or approved equal may be used in lieu of the above method providing the unit is installed per details shown in Figure 5A.9.

Figure 5A.9
Silt Fence Details



PERSPECTIVE VIEW



SECTION

CONSTRUCTION NOTES FOR FABRICATED SILT FENCE

1. WOVEN WIRE FENCE TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES OR STAPLES.
2. FILTER CLOTH TO BE TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
3. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVERLAPPED BY SIX INCHES AND FOLDED.
4. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE

POSTS: STEEL EITHER "T" OR "U" TYPE OR 2" HARDWOOD

FENCE: WOVEN WIRE, 14 1/2 GA. 6" MAX. MESH OPENING

FILTER CLOTH: FILTER X, MIRAFI 100X, STABILINKA T140N OR APPROVED EQUAL.

PREFABRICATED UNIT: GEOFAB, ENVIROFENCE, OR APPROVED EQUAL.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE SYRACUSE, NEW YORK	SILT FENCE	STANDARD SYMBOL

APPENDIX K

Agricultural Data Statement

03/17/08

Addendum to Site Plan of F1 Long Island

AGRICULTURAL DATA STATEMENT

Name of Applicant:	F1 Long Island LLC
Address of Applicant:	4 Indian Hill Court, Dix Hills, New York 11746
Description of project:	A commercial sports facility more particularly described as: State of the art karting venue, comprised of more than one mile of professionally designed kart race track; one (1) clubhouse to be made up of a restaurant, bar, out-sourced catering facility, retail space, and kart storage; and one (1) 5,000 square foot maintenance building; together with associated parking facilities.
Location of Project:	449 Edwards Avenue, Calverton, New York; also known as SCTM# 0600 – 117.00 – 01.00 -004.002.
Name and Addresses of Owners of Land within An Agricultural District:	Robin Gibbs & Jeffrey J. Miloski ("Gibbs") P.O. Box 809 Calverton, New York 11933 SCTM# 0600-117-1-5.1, 5.2, 5.3 Marian Elizabeth Zeh, et. al. c/o Paul M. Killian, Esq. ("Zeh") 85 Echo Avenue, Suite 1 Miller Place, New York 11764 SCTM# 0600-117-1-3
Location of the Agricultural District Parcels[1]:	Gibbs: 451 Edwards Avenue, Calverton. Within 500 feet of the proposed project and southerly of the proposed project. Truck crops. Zeh: 3795 Middle Country Road, Calverton. Within 500 feet of the proposed project and westerly of the proposed project. Other stock (horses).

[1] The locations of the Agricultural District parcels and the proposed project are also depicted on the attached tax map made part hereof.