The Metropolitan Transportation Authority
Acting By
The MTA Capital Construction Company

MTA CONTRACT #6240

DESIGN-BUILD SERVICES
FOR
LIRR EXPANSION PROJECT
FROM FLORAL PARK TO HICKSVILLE

CONFORMED DOCUMENTS

VOLUME 1 – DESIGN-BUILD AGREEMENT
EXHIBIT C – PART 3 (Book 5 of 9)

VOLUME 2: TECHNICAL
PACKAGE 2:
PROJECT DESIGN

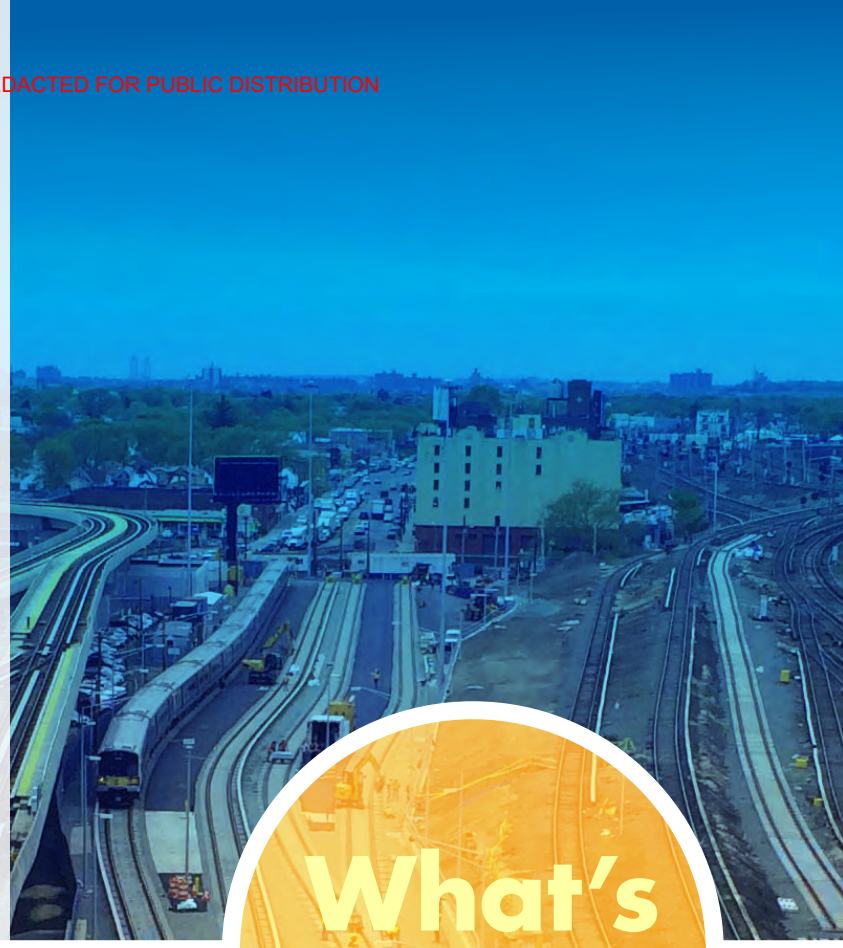
LIRR CONTRACT #6240

Design-Build Services for LIRR Expansion Project from Floral Park to Hicksville

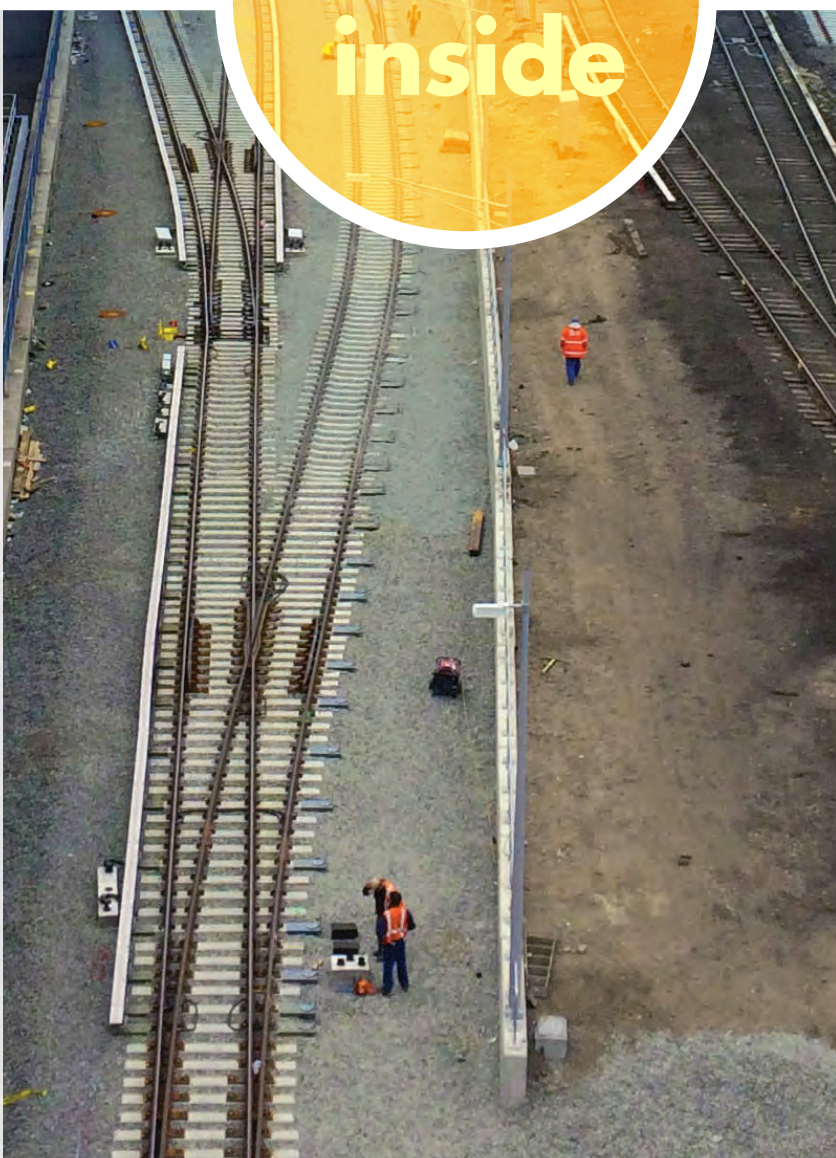
Long Island Rail Road

3rd TRACK CONSTRUCTORS
Picone | Dragados USA | CCA Civil | Halmar
In association with Stantec

VOLUME 2:
Package 2: Project Design



What's inside



2.1
Project Basis

Volume 2 - Package 2: Project Design

2.1 Project Basis

2.1.1) Understanding of the overall operation of the Rail Road and the implications of the new third track.

Background

Since its inception in 1834, the Rail Road has been instrumental in the development of Long Island and the New York Metropolitan area. Throughout the twentieth century and into the twenty-first, the population of Long Island has relied on the Rail Road for access to jobs, shopping and entertainment. As Long Island has continued to develop and the population of Nassau and Suffolk Counties continue to increase, commuter rail service has grown and expanded with it. The Mainline is the backbone of the commuter rail system.

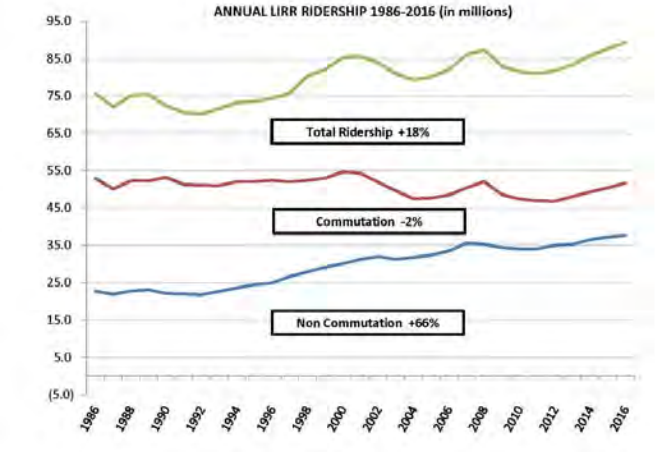
Based on the projected demand for future services and the constraints of the existing two-track Main Line corridor, the Rail Road seeks to add a third track to meet the operational needs of the future. The Rail Road Expansion Project from Floral Park to Hicksville (the Project) will allow express service between Jamaica and Hicksville during rush hour and provide capacity necessary to accommodate reverse commuter service and the ability to move trains from the west end to eastern terminals to accommodate the operational needs in the later part of the peak periods.

Ridership

Over the past 30 years, Rail Road system-wide ridership has grown by 18%. Non-commutation ridership (discretionary trips such as for summer, leisure, as well as the sports and entertainment travel) has climbed by 66% over the past 30 years, while commutation ridership has shown a small decline in overall growth. The Rail Road through its Jamaica hub continues to serve as an integral access route to the Port Authority's Air Train to JFK International Airport. This Project will continue to support and grow this vital link.

The proposed Project is responding to several Long Island demographic and economic trends that indicate a need for greater mass transit options. According to the New York Metropolitan Transportation Council, Long Island is projected to experience a 12% rise in population and 135,500 new jobs by 2040. These projections of population and job increases, coupled with the reduced barriers to enter the transit system (i.e., rise of transit-oriented development, TransitChek/commuter benefits, smartphone fare integration) support the Rail Road's projections of increased ridership. Within the project's Main Line segment, ridership exceeds 100,000 people per day. By 2020, background growth on the system will be approximately 7% westbound and over 8% eastbound. Factor in planned future service growth to Manhattan Terminals, increased service for reverse and intra-island commutes and the Rail Road should see increased ridership of 65% westbound and 76% eastbound by 2040.

In addition to accommodating an increased population and employment, and providing commuter relief through improvements in train headways, peak hour reliability and operational flexibility, the Project will provide a viable rail option for non-peak hour, non-work-related trips to and from New York City. Currently, options for Nassau County residents who want to travel by train east in the AM peak period to their jobs or schools are severely limited. Similarly, Suffolk County residents who want to travel by train west, including to New York City, in the PM peak period, also have limited service.



The Mainline

The Rail Road's Mainline runs from Long Island City east to Greenport. Trains operating in Amtrak's Northeast Corridor utilizing the East River Tunnels from Penn Station and join the Mainline at the Sunnyside Yard. The Rail Road Mainline is powered by an electrified [redacted] third rail from Penn Station to Ronkonkoma. At the Mainline split at Hicksville, the electrified line continues on the Port Jefferson Branch to Huntington.

Train movements in Amtrak's jurisdiction are controlled by the Penn Station Control Center (PSCC) that is run jointly by the Rail Road and Amtrak. The PSCC controls train movements to the Harold interlocking located in the Sunnyside Yard in Queens. Train movements around the Rail Road 's central hub in Jamaica are controlled by the Jamaica Control Center and its direct control of interlockings.

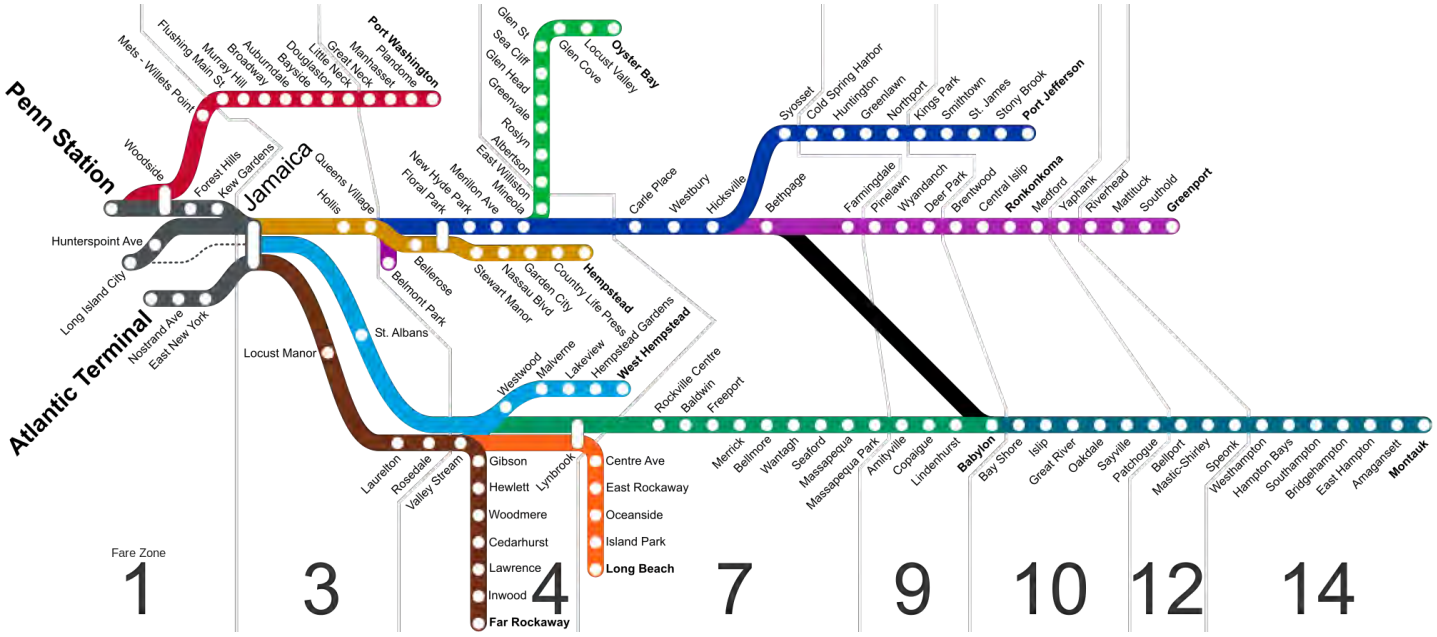
The Main Line extends from just east of Long Island City to the Harold Interlocking where the Northeast Corridor from Penn Station in Manhattan joins the Main Line after passing through the East River Tunnels. East of the Harold Interlocking, the Main Line runs adjacent to the Port Washington Branch until the Woodside station, where the Port Washington Branch splits northeastward. The Main Line continues southeast to the Jay Interlocking where it meets the Atlantic Branch and Montauk Branch at the west end of Jamaica station. At the Hall Interlocking, just east of Jamaica station, Montauk Branch trains split from the Main Line tracks and head southeast. At the Queens Interlocking, located between the Queens Village and Bellerose stations, the Main Line splits into the two-track Main Line and the two-track Hempstead Branch. These four tracks continue parallel to the Floral Park station where the Hempstead Branch turns southward.

The two-track Main Line continues east to Mineola where the two track Oyster Bay Branch begins and curves to the north. The two-track Main Line continues east from Mineola to Hicksville where the two track Port Jefferson Branch begins and curves to the north.

The Project, whose genesis dates back to 1959, is located within the heavily-utilized 2-track Main Line segment between Floral Park and Hicksville that services the Hempstead, Ronkonkoma, Oyster Bay, Port Jefferson Branches and some Montauk Branch trains with more than 250 trains carrying approximately 107,000 riders through this segment on a typical weekday.

This two-track Mainline segment is problematic for several reasons, including:

- Severe congestion during peak periods
- Frequent delays with rippling effects to other branches due to bottlenecks caused by emergency repair, a disabled train or other disruptions that would not allow trains to bypass during peak periods
- Insufficient track capacity to operate both eastbound and westbound service during peak periods
- Safety concerns related to railroad traffic, roadway traffic and pedestrians at grade crossings



- Traffic delays due to grade crossings (gate down times are as much as 50% during peak commuting times). This has a devastating effect on the north-south movement of vehicles during these periods with its associated loss of personal and business productivity, loss of non-renewable fuels and impacts to the environment
- Noise issues due to required horn blasts at grade crossings
- Local traffic congestion due to high volumes at times of train arrival and departure

New Third Track (The Project)

The Project, which extends approximately 9.8 miles from the village of Floral Park to the Hamlet of Hicksville, entails the installation of a third track within the existing ROW, elimination of seven street-level grade crossings, station improvements and modifications and related improvements to railroad infrastructure, including signal, power, and communication systems.

Overall the Project will reduce severe congestion during peak periods, provide operational flexibility, accommodate reverse and intra-island commuting service through this corridor, and provide additional capacity to service Grand Central Terminal and the east side of Manhattan that is currently under construction.

The Project goals, based on improving rail service and public safety, are as follows:

- Reduce delays, add operation flexibility eastbound and westbound
- Provide additional track capacity to accommodate projected system-wide growth
- Improve public safety and roadway conditions
- Reduce air and noise pollution and improve neighborhood quality-of-life
- Improve the Rail Road system-wide capacity to improve passenger service reliability during the peak train travel hours
- Improve system-wide reliability through new switches, signals and power equipment
- Enhance the commuting experience through upgraded stations serving all users and the addition of new station parking

As a system, the Rail Road operates at speeds of almost 80 mph moving over 300,000 people per day on approximately 750 trains. In addition, the Rail Road accommodates a limited number of freight movements by the New York and Atlantic Railway during off-peak periods. The most complex systems challenge is to ensure that the Rail Road continues to operate safely with minimal impact to commuters, revenue service and adjacent communities. Consequently, constructing within the ROW of the nation's busiest commuter rail service poses some unique challenges.

The Rail Road impacts will be limited to weekday off-peak hours and weekends. Some mid-day off-peak weekday outages may be required during construction activities. Bus service will be utilized during the limited number of allowable weekend double track outages and these needs to be coordinated and scheduled with the Rail Road far in advance to provide for notification to the public. It is imperative that these weekend outages be completed, temporary and or permanent structures are in place, and service restored before the Monday morning peak service demands, as evidenced by the liquidated damages that will be imposed if this does not happen. Our Team is fully committed to working within those restrictions, minimizing impacts to the Rail Road, and understands they are critical for achieving a successful project.

Our high-level approach with respect to the "traditional systems" is to sequence their installation and commissioning so they can either support the progress of construction or planned such that Rail Road FA work

is minimized both with the goal of attaining the project schedule. The focus on systems starts almost immediately as there are aspects of the systems that are needed early in project construction while other aspects continue through final acceptance and activation of a Third Track. Each has a role to play in support of progressing the project; for instance, the communications network is needed early in the construction to support retaining wall and track construction west of Mineola. Communication systems play an important role during platform reconstruction by maintaining important information for the Rail Road ridership. Traction power substations (with positive feeders and negative returns) are being treated as independent of other systems (signal power not withstanding) so their sequencing is not directly related to other construction, but have a major impact on project schedule. Signals, on the other hand, is not an independent system but we are utilizing signals as an aid to construction west of Mineola. Overall we are implementing the new system (with significant assistance from ATC 27, South Track Alignment) in the most efficient method as possible, relieving FA from significant volumes of rewiring and testing. The Plan we have for each system is laid out in detail throughout specific sections dedicated to each system, and additional detail is provided in the systems integration plan and the testing and commissioning plan.

The rail corridor is lined with mission-critical cable for signals and communications and [redacted] power line poles which must be maintained during construction. Some of these poles will require relocation to accommodate the new Third Track and the changes to utility layouts. 3TC will complete this work early in the project to facilitate future construction and minimize impacts to utility owners. Our comprehensive engineering will minimize the number of different construction stages and will allow for the proper coordination between track, traction power, signaling and communications at each stage. With the changes that our approved ATC invokes, keeping the Third Track construction along the south side, Rail Road operational, system and infrastructure impacts are significantly reduced. The existing subsystems will need to support the operation of the Rail Road during the phased construction process while maintaining passenger, crew, and pedestrian safety; this is done with significantly less impact due to our south Third Track alignment. Vehicle and truck traffic will be safely maintained during construction of the seven grade-crossing eliminations either on temporary roadways or neighboring arterials.

Rail Road WSSY Control System Upgrade

The replacement of the traction power substations will be sequenced in a manner that will minimize effects on train movements with a level of voltage on the third rail of significant magnitude to maintain normal operations. If low voltages become a hinderence to normal operation, the portable substation will be employed to help maintain adequate third rail voltage. Our subconsultant, LTK, is the designer of the [redacted] vehicles, and therefore well versed in the operating characteristics.

Coordination with Rail Road Force Account (FA) will need to be closely integrated with 3TC construction operations. The Project Force Account work includes the following: performing and testing tie-in circuits at existing signal locations, final equipment connections for signal and traction power, final testing and commissioning of signals and PTC, cutting and swinging of existing track, raising of existing track, installation and testing of signal SCADA at existing signal locations and tie-in for fiber optic lines to Queens and Divide interlocking locations. It is recognized that the Rail Road forces have numerous constraints due to multiple agency priorities and that close coordination will be necessary to maintain Rail Road and 3TC schedules.

Finding and securing convenient staging areas along the project is imperative. These staging areas must be sited to facilitate construction operations (in particular the Hicksville laydown area), while maintaining safety along the track corridor and with minimal if any impact to the surrounding community. The wise selection of cranes and equipment is also critical as there are a

limited number of approved rail cranes on Long Island that can work on the Rail Road ROW. Equipment must be approved and will be procured well in advance of any final operation start dates.

2.1.2) Understanding of the local communities and their Project concerns.

The Rail Road through its unprecedented level of outreach during the Draft Environmental Impact Statement (DEIS) phase of the Project, as well as past efforts on the East Side Access Project and Mineola Grade Crossing Elimination Program, has demonstrated its commitment to improving service while addressing the comments and concerns of its stakeholders. 3TC will maintain the goodwill throughout the design and construction of this Project as team members have done previously at our projects at Herricks Road, Mineola Boulevard and Roslyn Road. Rubenstein will build on the success of the outreach effort to date with the community and get it "right the first time and every time", so that this Project does not face any "showstoppers" on its path to completion.

This nearly 10-mile project traverses a series of diverse communities that share many needs and concerns regarding the design and construction of this Project.

3TC will build on our previously-mentioned experience in the Mineola grade crossing elimination projects to address the following general needs and concerns of these communities:

- **Safety Concerns at Grade Crossing:** Addressing the numerous instances of vehicle and pedestrian strikes at existing grade crossings.
- **Pre-Construction Home Inspections:** These will provide the project and the residences with the peace of mind, as well as a means to resolve damage claims should construction in close proximity to their residences have any adverse effects.
- **Construction Material Transport:** Using existing track to transport materials to and from work sites, so as to not additionally burden the existing primary arteries and residential streets.
- **Advance Notification:** Through our Community Outreach Team, early notification of any disruptive work or road closures to residents, municipalities, school districts and first-responders is critical. Residents need to know that they can get to work, their children can get safely to school and their first responders can respond in a timely fashion to community emergency needs.
- **School Bussing:** Concerns that construction will affect school bus routes in the area and the need for outreach to the bussing coordinators for the public and private schools in the area to determine routes and headways.
- **Construction Deliveries:** Scheduling construction deliveries outside of school and commuter traffic peak hours to the maximum extent possible.
- **Noise and Vibrations:** Creating and implementing a community noise and vibration monitoring program. Construction by its very nature can be intrusive, and residents need to be able to enjoy the comfort of their homes.
- **Air and Dust Pollution:** Implementing an air quality control plan to include dust control measures, ultra-low sulfur diesel fuel, the use of best available tailpipe technologies such as diesel particulate filters, and the utilization of newer equipment.
- **Parking:** Parking is at a premium in the Project's commuter lots and should not be affected by the introduction of worker vehicles, or the loss of capacity during the construction of the upgraded stations, five proposed parking structures and one surface lot.
- **Business Access:** Protecting access to existing businesses. These businesses are family livelihoods and they are the backbone of the community.
- **Construction Incursion:** Temporary construction "takes" to construct walls adjacent to homes.

Safety Concerns at Grade Crossing: ***Addressing the numerous instances of vehicle and pedestrian strikes at existing grade crossings.***

- **Street Maintenance:** Street cleaning as needed and general maintenance of the Project work zone. These communities take pride in their respective areas and wish to see them maintained.
- **Personalized Outreach:** The need for one-to-one and door-to-door outreach to maintain direct lines of communication to the community.
- **Continuous Updates:** Regular online updates to the public. We live in a modern 24/7 communication world and online and social media are now the norm for real-time communication.
- **Information Office:** Staffing the Project Information Office with on-site supervision for rapid response to neighborhood concerns.
- **Hotline:** 24/7 hotline assigned to a community outreach representative.
- **EJ/LEP Communities:** Concerns that the project encompass Environmental Justice Communities as well as Communities of Limited English Proficiency, and that they will have special needs for outreach.
- **Property Values:** Effect on property values. Residents need to view the Rail Road as a community asset and amenity, not as a degrader of their most important financial asset.
- **Rail Freight:** Increase in rail freight due to the added mainline capacity. Communities who live along the mainline are concerned with the possible introduction of more freight trains and the type of cargo they carry.
- **Retaining Walls:** Concerns about the height and length of retaining walls. These elements need to be integrated into the visual character of communities, and not become a public eyesore.
- **Cost and Schedule:** Adhering to cost and schedule. The community needs to know that their precious tax dollars have been spent wisely and cautiously and that the Rail Road commitments to being on schedule will be met.
- **Station Aesthetics:** Need for aesthetically pleasing and modern stations with amenities that are seen in other states and countries.
- **New Crossing Roadways:** Steep grades, narrow lanes and sidewalks at the grade crossing eliminations. The approach roadways to the proposed track bridges will be safe and passable during inclement weather for all users.
- **Past Use of Chemicals:** Concerns regarding past usage of harmful materials and chemicals along the Rail Road ROW.
- **Drainage:** Concerns about drainage problems at the existing grade crossing and the need for improved runoff management as part of the project design.
- **Noise:** The noise impact from trains traveling up to 80 mph and the effect of warning horns that disrupt the tranquility of the neighborhood.
- **Physical Barriers and Privacy:** The physical separation and isolation caused by a widened railroad mainline and the loss of privacy by the railroad abutters.
- **Visual Impacts:** Visual impacts to the community and people's backyards along the tracks.
- **Graffiti:** The potential for graffiti along the railroad ROW on retaining walls and noise barriers and future maintenance by municipal forces.
- **Vegetation:** Impacts to existing vegetation, particularly at the proposed grade crossing eliminations.
- **Staging Areas:** Disruption due to construction staging areas within the community.
- **Construction Lighting:** Impacts due to temporary construction lighting at night.
- **Water/Sewer:** Adherence to utility relocation regulations for water vs. sewer.
- **Pedestrian Safety:** Maintaining safe walking routes to neighborhood schools and for those commuters who walk to their train stations.
- **Crossings Traffic:** Understanding that gate down times at railroad crossings already affects these communities and that constructing activities can exacerbate the existing situations.

Participants get to "design their own project," using scaled project elements such as sidewalks, bike lanes, and travel lanes and fit them onto a scaled cross sections.

- **Community Cohesion:** Risks to community cohesion. The Rail Road ROW is a perceived barrier separating communities that will get worse with the addition of another track. Tracks are raised creating a larger perceived barrier. While these concerns are of concern to many of the communities along the route, each community has particular needs and concerns that will need to be addressed.

In addition, the local communities of Floral Park, New Hyde Park, Garden City, Mineola, Carle Place, Westbury and New Cassel, each have unique concerns specific to their respective areas as noted in the following graphics:

FLORAL PARK

Floral Park Recreation Center: Floral Park is particularly sensitive to impacts to their newly renovated recreational center and pool immediately adjacent to the tracks. Their primary concerns relate to noise and vibration impacts, loss of privacy during recreation hours, construction activities adjacent to the pool during peak seasons and the need for pre-construction inspection and survey of the pool for documenting potential damage due to construction.

Sidewalks: Width of sidewalks under bridges and the need for handrails/barriers to keep pedestrians safe.

Drainage at Structures: Rail Road ROW Drainage impacts on adjacent properties due to retaining walls/ noise barriers.

Schools: There are two elementary schools in Floral Park (one of which is the John Lewis Childs School that uses the Rail Road's Creedmore Spur for parking and play).

Tulip Avenue: Impacts during construction to the Tulip Avenue business district.

Plainfield Avenue: Traffic impacts along Plainfield Avenue.

NEW HYDE PARK

New Hyde Park Road Traffic: The need to safely accommodate the personal vehicle and truck volumes along New Hyde Park Road and to safely accommodate left turning vehicles at Clinch Avenue and Plaza Avenue

2nd Avenue: Traffic circulation concerns caused by the dead ending 2nd Avenue at New Hyde Park Road. Traffic Circulation: Traffic circulation concerns on NY25 (Jericho Turnpike), Old Country Road, 6th Avenue, and Stewart Avenue.

Underpasses: Concerns with underpass flooding, speeding, visibility and safety at New Hyde Park Road and Covert Avenue.

South 12th Street: Concern that South 12th Street will be a primary diversion route when New Hyde Park Road and Covert Avenue are being reconstructed. South 12th this is a residential street and its community is very sensitive to construction impacts.

Station Parking: New Hyde Park is critically short of station parking and is very concerned with the temporary loss of parking during construction.

GARDEN CITY

Merillon Avenue Station: Merillon Ave station needs to be better integrated into community.

Greenridge Circle: Garden City is sensitive to the Greenridge Avenue Circle that currently acts a community kiss and ride drop-off and its continued function as such.

Sensitive Areas: Garden City's Nassau Haven Park and Tullamore Playground, Garden City Bird Sanctuary and the potential impact that this project may have on these amenities.

School Traffic: Traffic and construction impacts at the primary school located near Clinch and Homestead Avenues.

Clinch Avenue: Maintaining traffic along Clinch Avenue during construction and increased traffic after completion of the grade -separation at New Hyde Park Road.

MINEOLA

East-West Traffic: Traffic impacts during construction along Mineola's primary east-west routes including NY25 (Jericho Turnpike), 2nd Street and Old Country Road (particularly for drainage runs).

North-South Traffic: Traffic impacts during construction along Mineola's primary north-south routes including Mineola Blvd and Roslyn Road.

Intermodal Center: Maintaining access to the Mineola Intermodal Terminal during the construction of the third track.

South Station Building: Elimination of southern station building.

Nassau Signal Tower: Loss of historic Nassau signal tower.

Mineola Hospital: Emergency access to Mineola Hospital during construction.

Verizon Facilities: Impacts to the Verizon facility on Main Street as this building is the central hub for fiber optic and old copper lines (thousands of pairs) that services the Nassau County Government Center on Old Country Road, Mineola Hospital and the community at large.

Davenport Press Restaurant: Maintaining the integrity and vitality of this landmark facility during the construction and after the permanent location of the third track adjacent to the building.

Drainage: Existing drainage issues along Main Street and Willis Avenue will also be addressed.

WESTBURY/NEW CASSEL

East-West Traffic: Traffic impacts during construction along Westbury/New Cassel's primary east-west routes of Prospect Avenue, Broadway, Railroad Avenue, Main Street and Old Country Road. (Westbury below/New cassel nest page)

Traffic Diversions: Traffic impacts during construction along Post Avenue as it will be a diversion route for the School Street. Grade separation construction. Post Avenue also serves as a secondary access to the Roosevelt Field Mall and shopping along Old Country Road.

Trucking Prohibitions: Will the construction of a grade separation at Urban Avenue make it more difficult to enforce the existing truck prohibition on this roadway north of the railroad tracks? Will these restrictions remain in force during the course of the Project?

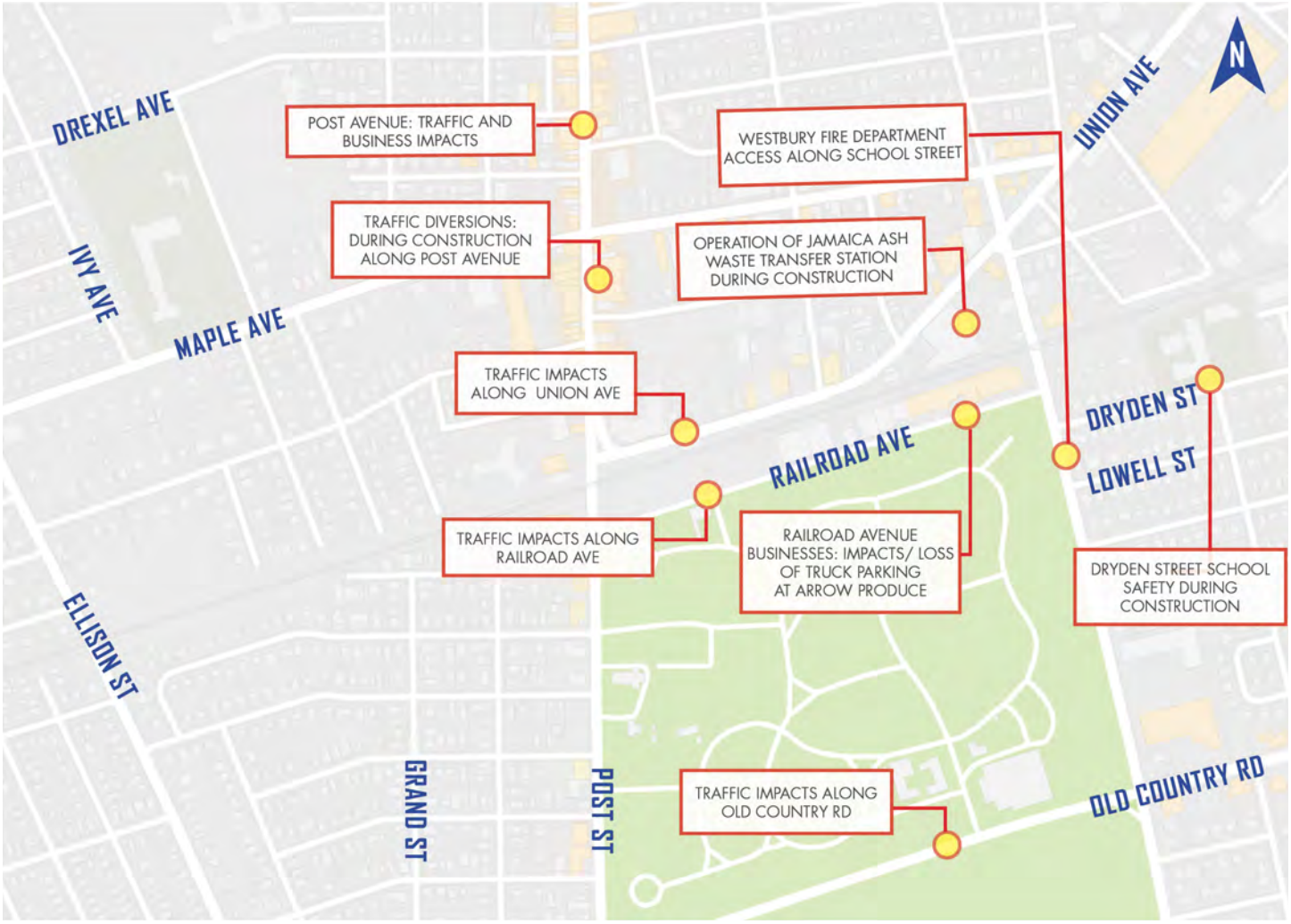
Vigliotti Landscaping: Impacts to Vigliotti Landscaping at 100 Urban Avenue. This facility acts as one of the two largest organic waste disposal sites on Long Island and supports many local and regional businesses.

Truck Traffic: Truck impacts along Sylvester and Kinkel Street as they will become the dominant commercial vehicle route during construction of Urban Avenue.

Community Center: Continued access to Railroad Avenue and in particular the Yes We Can Community Center.

Westbury FD: Adequate clearance for the Westbury Fire Department apparatus along School Street.

Jamaica Ash: Operation of Jamaica Ash, the waste transfer station on School Street/Union Avenue. This station services a large area of Nassau County.



School Access: Pedestrian access along School Street which has a number of children who walk across the tracks to go to the school in that area (Dryden Street).

Railroad Avenue Businesses: Construction impacts to the businesses along Railroad Avenue and the permanent loss of truck parking at Arrow Produce.

Post Avenue: Traffic and business impacts along Post Avenue, the main downtown shopping area of Westbury.

2.1.3) Understanding of the natural and human environment in the vicinity of the Project.

When governments and their transportation agencies or providers invest their scarce capital resources in expansion of their networks, these network enhancement projects must balance the relationship between the movement of people and goods and the impact upon the environment. Transportation agencies/providers and the engineering resources they deploy, have an obligation to preserve, protect and enhance the environment through their actions. In addition, transportation agencies/providers also have an obligation in maintaining the quality of life of the citizens and the communities through which their projects traverse. Finally, transportation project engineers need to understand that their actions have

potential impacts that can extend beyond the immediate vicinity of the work zone and should consider the cumulative and secondary impacts in and around the project corridor. With regards to these influences, the priority of the MTA, the Rail Road, NYSDOT, and 3TC is to develop a program that will increase the Rail Road ridership by making the Rail Road more comfortable, convenient and economical. This will in turn reduce the impacts of the other transportation choices that the region's residents and workers make.

The 3TC will partner with the Rail Road to address the following questions:

- How can the natural environment be enhanced by the project decisions rather than minimize, mitigate or compensate for its effects?
- How do we design and build in concert with the natural and human environment rather than just construct through it?
- How can we design and construct to minimize the environmental footprint of our choices while still increasing transit frequency and choices?
- How can our project design protect against climate variability and extreme weather events such as floods, droughts, hurricanes, windstorms and extreme heat and cold that will invariably challenge Long Island throughout this century?

3TC will design and construct the Mainline expansion through a collaborative approach that incorporates the third track and its associated improvements into the physical and human environment while respecting and preserving the aesthetic, historic, community, and natural environment of the Floral Park, New Hyde Park, Garden City, Mineola, Carle Place, Westbury New Cassel and Hicksville communities. This Context Sensitive Design approach is similar to what 3TC members did at Herricks Road, Mineola Boulevard and Roslyn Road and will ultimately contribute to the safety and mobility of the entire 10-mile project corridor. Stewardship of the natural and human environment through context sensitive design and use of modern construction practices is required for the Project. A project that jointly meets the need of the natural and human environment will be more readily accepted by the system users, project area communities and stakeholders at large.

The following discusses the human and natural environment identified in the Project area:

Neighborhoods, Communities, Homes and Business Districts

the Towns of Hempstead, North Hempstead, Oyster Bay and the Villages of Floral Park, New Hyde Park, Westbury, Garden City, Mineola, as well as the Hamlets of Carle Place and Hicksville. Each of these areas vary in their socio-economic conditions, population density, urban design/visual aspects and commercial characteristics. Each varies in their characteristics immediately adjacent to the Rail Road ROW.

Floral Park and Mineola tend to be the more urban-like areas. Floral Park, Mineola and Westbury feature walkable downtowns proximate to the rail line. This contrasts with the manicured residential and suburban character of Garden City, New Hyde Park and Hicksville. Mineola is unique in its density of multi-story apartment buildings.

Tulip Avenue in Floral Park and Post Avenue in Westbury are local business districts. Old Country Road, which is just south of the Rail Road mainline from Mineola to Hicksville, is a dominant commercial corridor featuring large regional malls and local business. Within Hicksville, the same could be said for the north-south corridor of Broadway (NY106/NY107). Jericho Turnpike (NY25)

is the dominant commercial east west corridor north of the Rail Road Mainline throughout the project area.

Old Country Road, Jericho Turnpike and NY106/ NY107 are also significant principal arterials in the corridor roadway network.

Pockets of heavy industry are present along the Mainline corridor, predominately in New Hyde Park, Garden City Park, eastern Mineola, New Cassel and Hicksville. The proposed grade crossing eliminations at School Street and Urban Avenue are also located in predominately industrial areas.

Environmental Justice

The communities along the corridor vary greatly in their economic, racial and cultural diversity. Communities where environmental justice concerns need to be addressed are located within Floral Park, New Hyde Park, and north of the mainline at Merillon Avenue, downtown Mineola, Westbury and Hicksville. In contrast Garden City is a relatively homogeneous and affluent suburban community. 3TC through their comprehensive Outreach Office will work with these communities to ensure that they are a vital voice in this Project.

Government Centers

Mineola is the County Seat of Nassau County and is the home of numerous government buildings and facilities. Local government offices in Floral Park, New Hyde Park, Mineola and Westbury are located in close proximity to the Rail Road Mainline.

Historic, Archeological and Cultural Resources

While there are no known archeological concerns, two historic buildings, the Nassau Tower and the former Mineola Electrical Substation, both of which are eligible for listing on the State/National Registers of Historic Places, will need to be removed by the expansion of the Mainline. Additionally, seven other State/National Register eligible structures are found within 100 feet of the project corridor and will need to be addressed.

Community Resources

The Project corridor is home to numerous community resources including schools, libraries, hospitals, cemeteries, places of worship, parks and recreation areas: Most noteworthy among these that are immediately adjacent to the Rail Road Mainline and grade crossings include the following:

- Floral Park Recreation Center and Playground: This facility is just south of the Mainline and its pool is immediately adjacent to the Rail Road ROW
- Floral Park Library located immediately north of the Floral Park station
- Garden City Bird Sanctuary is a 7-acre multi-use stormwater recharge basin that also serves as a nature preserve/ song bird sanctuary and passive park. It is located just south of the Rail Road ROW and adjacent to Tanners Pond Road
- Tullamore Playground and Strawberry Field in Garden City and located adjacent to the Mainline and the Merillon Avenue Station
- Winthrop University Hospital is major regional medical center located immediately adjacent to the Rail Road ROW and the Mineola train station
- Carle Place Park is adjacent to and south of the Rail Road Carle Place Station
- Dryden Street School located just south of the Rail Road ROW in Westbury
- Martin Bunky Reid Park located along the northern ROW boundary of the Mainline in Westbury

Safety and Security Facilities

There are numerous fire, first aid, police and hospital facilities in the vicinity of the Long Island Rail Road between Floral Park and Hicksville.

3TC's Outreach Office will immediately engage all first responders upon our Notice to Proceed (NTP) to review our construction schedule and provide them an opportunity to participate in the development of our Traffic Management Plans.

Near the Westbury Station, the Westbury Fire Department has a facility on Maple Avenue, between Post Avenue and School Street. Vehicles from here would likely use School Street to head south across the railroad, or Post Avenue, if they are under [redacted]. Grand Boulevard also provides a crossing to the southeast. The Nassau County Sheriff's Department has a facility on Old Country Road, to the east of Urban Avenue, and the Nassau County Public Safety Center is located off Prospect Avenue, just east of the Wantagh State Parkway.

In Floral Park, the Floral Park Police and Floral Park Fire Stations are located immediately south of the train station. Vehicles from these facilities would likely use the Carnation Avenue or Tulip Avenue underpasses to go to the northwest and the Plainfield Avenue underpass to go to the northeast.

SAFETY & SECURITY — FLORAL PARK LIRR STATION

New Hyde Park station, the New Hyde Park Fire Department has a station on 5th Street, northwest of the Covert Avenue crossing and on the Jericho Turnpike, north of the New Hyde Park Road crossing. Vehicles from these stations would likely use the Covert Avenue and New Hyde Park road crossings. The Stewart Manor Fire Department is on Covert Avenue, south of the Rail Road.

SAFETY & SECURITY — NEW HYDE PARK LIRR STATION

SAFETY & SECURITY — MERILLION LIRR STATION

In the area of the Merrilon Station, the Garden City Fire Department is located on the Jericho Turnpike, between Denton Avenue and Nassau Boulevard. Vehicles from this station may use the Nassau Boulevard crossing, however vehicles over 11'-6" must use the Herricks Road crossing.

SAFETY & SECURITY — MINEOLA LIRR STATION

In the area of the Mineola Station, there are multiple facilities. Winthrop University Hospital is immediately northwest of the Mineola Avenue crossing over the Rail Road . The Mineola Fire Department has locations on Washington Avenue, just west of Willis Avenue and on Elm Place, west of Roslyn Road. Vehicles crossing the tracks from the Washington Avenue station would likely use the Mineola Boulevard Crossing or the Willis Avenue crossing. The location on Elm Place connects to Roslyn Road, and vehicles would likely use that crossing. The Nassau County Police have a facility on Franklin Avenue (continuation of Mineola Boulevard), south of the Rail Road . There is also a Nassau County Police facility approximately 1.0 mile north of the Rail Road , on Mineola Boulevard.

Contaminated Materials

Soil sampling was conducted within the Project Corridor where soil disturbance is expected. All analytical results were well below the applicable standards except for one soil boring location that exceeded the standard for one contaminant. Soil sampling was also conducted at six additional sites where construction of parking garages is now proposed. All analytical results at those locations were also well below applicable standards, except for two samples that exceeded the commercial Soil Cleanup Objectives for two contaminants, consistent with the nature of the fill material present at those locations. With the control measures identified below, no significant adverse impacts from contaminated materials would result from the construction or operation of the Proposed Project. 3TC recognizes the potential presence of contaminated material and will have all construction contracts address this concern, and will have contractors develop a Remedial Action Plan (RAP) to address clean-up and a Construction Health and Safety Plan (CHASP) to address worker and public health and safety. A program will be put in place to inform contractors of the issues and to be sure that proper actions are taken to protect health, safety, and environment. This program will ensure each team member reads and signs-off on the CHASP, daily visual observation of remedial activity will be conducted, environmental sampling results will be reviewed, soil/spoil characterization for determining disposal requirements/destination will be conducted, record keeping for manifests and all reports occurs.

Electromagnetic Fields

The construction of the third track will require the upgrade and increase of traction power to the corridor as well as the relocation of EMF related utilities. These increases are not considered to be significant and are well below established exposure standards.

Utilities

The Rail Road Mainline and its grade crossing is host to a dense population of both public and private utilities. Included in this list are the following: Communications - Verizon, AT&T, Lightower, Crown Castle; Sanitary Sewer Systems - Nassau County Department of Public Works, Village of Garden City; Village of Mineola; Water- Water Authority of Western Nassau, Westbury Water District; National Grid Gas service; PSEG-LI electric service.

Transportation

The Rail Road Mainline is the dominant mode of public transportation in the Project Area. The other primary mode is the use of personal vehicles on the fully developed arterial roadway network in the corridor. These arterials also serve as the primary source of goods and services delivery via long-haul and local trucking. Also, these arterials are used by the Nassau Inter-County Express (NICE) bus service. In addition to the North-South arterials that are the subject of the Project's grade-crossing eliminations, the primary arterials in the area include the following:

- East-West Routes in the vicinity of New Hyde Park
  - NY25 (Jericho Turnpike) Old Country Road, 6th Avenue, Stewart Avenue
- East-West Routes in the vicinity of Mineola
  - NY25, 2nd Street, Old Country Road
- East-West Routes in the vicinity of Westbury
  - Prospect Avenue, Broadway, Railroad Avenue, Main Street, Old Country Road
- North-South Routes in the vicinity of New Hyde Park
  - Plainfield Avenue in Floral Park
  - Clinch Avenue in Garden City
  - North-South Routes in the vicinity of Mineola
  - Mineola Boulevard and Roslyn Road
- North South Routes in Westbury
  - Sylvester and Kinkel Street as they will become the dominant commercial vehicle route during construction
  - Post Avenue

Commercial and Residential Properties

The Rail Road through the leadership of the Governor's office has proposed a project that has minimized the loss of commercial property and requires no permanent residential property. 3TC is re committed to fulfilling this mandate.

Human Resources

The labor of many people will be used in the expansion of the Mainline. 3TC is committed to the fair use of its skilled tradesman, laborers, engineers, outreach staff, etc., in the creation of this infrastructure improvement that will benefit the New York metropolitan region. 3TC is fully committed to meeting the goals of the DWMBE program, including the Service Disabled Veteran Owned Business goals. See Volume 2, Package 4 for 3TC's plan for meeting these commitments.

Financial Capital

The MTA and New York State have committed significant financial resources to the expansion of the Rail Road mainline. 3TC has the financial strength to deliver the Project and is committed to building the highest quality improvement at the fairest possible cost.

The following discusses natural resources/environment identified in the Project area.

Fresh Drinking Water and the Long Island Aquafer

Protection of the Long Island Aquifer system is of paramount concern of the project. 3TC will employ a variety of best management practices including sub-surface detention and infiltration systems and swales, as well as positive drainage pre-treatment systems such as grit-chambers and oil separators in the design of its project corridor drainage system.

Floodplains, Wetlands and Groundwater/ Watershed Resources

The Project corridor does not contain any floodplains, or naturally occurring water bodies. Manmade recharge basins exist in the Project corridor that now exhibit freshwater wetland characteristics. Groundwater is typically 45 to 50 feet below the surface, which allows surface waters to percolate in the sub soil layers.

Visual and Aesthetic Resources

The main visual and aesthetic resources along the rail corridor is the built environment. Each area along the corridor has its own visual character relating to the prevailing land use and zoning, building typology and density, presence of cultural resources and open space and other features. 3TC will work to ensure that new hard structures (stations, pedestrian bridges, undergrade structures, retain and noise walls) are in keeping with and enhance their surroundings communities.

Natural Resources

Due to the highly-developed nature of the Project corridor, habitat wildlife is rather limited, and there is no known threatened, endangered or special concern species in the area. However, the Garden City Bird Sanctuary, located adjacent to the existing Rail Road mainline and Tanners Pond Road is a dual use recharge basin that provides for the storage of surface water runoff, but also acts as a bird sanctuary, nature preserve and parkland. The goal of the Garden City Bird Sanctuary is to provide a fully functioning nature refuge area for song birds using nature trees and plants. Trees and vegetation exist in limited areas along the industrialized ROW of the Rail Road . Loss of vegetation will occur in some areas but will be tightly controlled as directed in the RFP requirements by clearing and grubbing plans. Significant aesthetic view sheds are also limited along the corridor. 3TC will work to preserve and protect this community resource during the design and construction of the third track in this area.

Climate, Atmosphere, Noise and Air Quality

The expansion of the Rail Road Mainline and improving its reliability and convenience will support the transition away from an auto-centric transportation and more toward use of mass transit. This will have a generally positive affect on greenhouse gas emissions and on local air quality where grade crossings are eliminated. The Project will have a net positive effect on traffic congestion and consequently the improvement of air quality in the Region. Air quality impacts during construction will be temporary and would mostly involve dust and diesel emissions from equipment. Noise impacts from construction will be temporary and sporadic and will be controlled and monitored during construction activities.

Land and Soil

The Project requires the commitment of additional land as defined in the FEIS for the expansion of the Rail Road Mainline, as well as the expansion of the associated infrastructure (station, parking lots, grade separations). Much of this land was already committed to these uses. Soil and erosion conservation measures will be integral to the Project's construction and a Stormwater Pollution Prevention Plan (SWPPP) will be developed to avoid unintended erosion and sedimentation loss.

Energy Resources

Oil and gas based fuels as well as electricity will all be used in the creation of the third track. 3TC will use these consumables widely and sparingly.

Building Materials

A wide variety of building materials will be used in the construction of this project. Aggregate, sand, wood, steel, copper, glass, as well as other materials will be used wisely in the creation of the Mainline expansion.

2.2
Project Challenges, Risks and Opportunities

Volume 2 - Package 2: Project Design

2.2 Project Challenges, Risks & Opportunities

2.2.1) Design and construction challenges and proposed measures to eliminate or mitigate.

Topic:	Under-Grade Rail Road Crossing Construction
Challenges:	Minimizing the impact to Rail Road rail service and limiting the duration of the roadway closures.
Risks:	Failing to clear the tracks and restore service as required after a given track outage.
Opportunities:	Apply innovative design and staged construction methods.

The at-grade Rail Road crossings will be eliminated and converted into under-grade crossings as follows: Rail Road Mainline over Covert Avenue, New Hyde Park Road, Willis Avenue, School Street, & Urban Avenue and Rail Road Mainline and Oyster Bay Branch Over Willis Avenue. The challenges associated with construction of the Rail Road under-grade bridges are minimizing the impact to Rail Road Rail Road service and limiting the duration of the roadway closures, which has a direct impact on the local community.

3TC sees an opportunity to leverage our considerable design and construction experiences for building under-grade crossings. For this project, our team will use an innovative approach for constructing the crossings so that **only one double-track outage** will be required per crossing. Minimizing the need for track outages will in itself reduce the risk of failing to clear the tracks on time.

A U-shaped reinforced concrete substructure will be constructed adjacent to the proposed crossing, in an open excavation at the proposed final elevation. The structure will be constructed on a concrete launching slab and the steel superstructure will be set in place in advance of moving the bridge into place. During **ONE double track outage**, the tracks will be removed, the track bed will be excavated to below the bottom of the superstructure, and the entire structure will be jacked into place while the remaining excavation is completed. Once the structure is in place, the precast approach slabs, ballast, and tracks will be installed, and service will be restored.

Topic:	Retrofitting the existing Rail Road bridges for the applied Cooper E80 Lateral Loading
Challenges:	Minimizing the impacts to the Rail Road service during installation.
Risks:	Impacting the Rail Road operations by fouling the tracks.
Opportunities:	Install soil anchors to resist the lateral loading from the roadway below.

The lateral forces from the Cooper E80 surcharge, braking forces and traction forces are substantial, and the means for resisting these loads must consider minimizing the impacts to the Rail Road service during installation. 3TC will retrofit the existing abutments using soil tieback anchors at the following bridge crossings: Rail Road Mainline over South Tyson Ave, Plainfield Ave, Nassau Blvd, Glen Cove Rd, and Cherry Ln.

Using tieback anchors will provide 3TC an Opportunity to install the anchors below the superstructure from the local roadway by drilling through the front face of the existing abutments, resulting in no impact to Rail Road service.

Topic:	Constructing Retaining walls along the Rail Road Mainline ROW
Challenges:	Minimizing the impacts to the Rail Road Mainline Rail Road service and the local residents.
Risks:	Failing to clear the tracks and restore service as required. Excess noise.
Opportunities:	Develop a detailed work plan and coordinate all work with the Rail Road.

Approximately [redacted] retaining walls and [redacted] sound walls are to be constructed along the Rail Road ROW. Of the [redacted] of sound walls, [redacted] will be mounted on top of the retaining walls. Many of the walls will be constructed within a few feet from residential or commercial properties. The challenges are again to minimizing the impacts to the community and rail service while constructing the walls. The risks to consider are excessive noise during the work, especially in the residential neighborhoods, and disrupting Rail Road Rail Road service while accessing the ROW for mobilizing equipment and materials.

The walls can be grouped into two categories, walls in cut conditions and walls in fill conditions. The walls in cut conditions will be post and panel walls, and to minimize and mitigate noise, the wall posts will be augured into place; not driven. Walls constructed immediately adjacent to residential properties may need to be installed during daytime hours.

In the fill conditions, the T-wall precast concrete modular wall systems will be used. The advantages of these wall systems are the rapid rate of installing the units, the ease of transporting the units, and modular walls systems make for efficient and cost effective solutions.

To ensure the work operations do not impact Rail Road services, a detail work plan will be developed that will identify point of entry along the ROW, material laydown and equipment storage yards, and a detailed schedule that will be coordinated with the Rail Road.

Topic:	Constructing the Pedestrian Overpasses over the Rail Road Mainline
Challenges:	Minimize the impacts to the Rail Road Mainline service during construction.
Risks:	Fouling the track for an extended period of time.
Opportunities:	Pre-assemble bridge span prior to erecting.

It is the intent to install all the pedestrian bridge overpasses during flagging with no track outages. To achieve this, the pedestrian bridges will be fully assembled at the jobsite outside the Rail Road ROW, including the roof, walls, windows and gutters. The fully assembled structure will then be hoisted into place during flagging and the concrete slab will be cast-in-place under a fully shielded work condition.

Topic:	Drainage
Challenges:	Convey underpass runoff into stormwater management systems
Risks:	Overloading existing storm sewer systems and recharge basins
Opportunities:	Design conveyance systems that will feature pumping stations to lift the runoff at a higher elevation where it will be connected into an existing stormwater management system (storm sewer lines, recharge basins, etc).

The goal for all proposed drainage systems is to eliminate the risk of flooding within and outside of the Rail Road ROW by producing a stormwater management system to convey all on-site stormwater runoff at each new underpass locations to a pre-determined discharge point while not overloading Nassau County's existing stormwater collection/disposal system. Depressing the cross streets under the Rail Road overpasses will create roadway low points that will be significantly lower than

existing grade, thus creating a high flooding risk in these areas. Difficulties / risks associated with conveying this stormwater to existing Nassau County Recharge Basins, which are located approximately 3,000 FT to 6,000 FT from the new underpass locations, include:

1. Underpasses are significantly lower than the adjacent existing Nassau County storm water collection systems.
2. Existing recharge basins are not presently deep enough to accept stormwater flows from the new underpasses if conveyed by gravity sewers.
3. New conveyance sewers from the underpasses, provided the existing recharge basins are deepened or stormwater pumping is provided at each underpass location, will need to be routed within local county streets and will in most likelihood encounter major interferences / impacts with existing utilities and disrupt local traffic.

Topic:	Utilities
Challenges:	Coordinating the Third Party utilities with the Project and with one another. The at-grade Rail Road crossings will be eliminated and converted into under-grade crossings as follows: Rail Road Mainline over Covert Avenue, New Hyde Park Road, Willis Avenue, School Street, & Urban Avenue and Rail Road Mainline and Oyster Bay Branch Over Willis Avenue. The challenges associated with construction of the Rail Road under-grade bridges are minimizing the impact to Rail Road Rail Road service and limiting the duration of the roadway closures, which has a direct impact on the local community.
Risks:	Delays in Third Party utily owner relocation design approval.
Opportunities:	Utility relocation work will be designed, approved and relocated prior to the construction of the grade crossing elimination. Work directly with the Third Party utilities during the design to expedite the approval process. 3TC will utilize our local presence and relationships to to expedite the design and approval phase.

Transit infrastructure projects frequently involve coordination with outside entities not in a direct contractual relationship with the grantee, referred to as Third Parties. With regard to the Rail Road Expansion project, the Third Parties include utility companies, towns, villages and Nassau County. The following details the Third Parties:

- **Utilities**
  - Verizon
  - Verizon Business
  - Lightower
  - AT&T
  - Altice USA
  - Level 3
  - Crown Castle
  - PSEG-LI
  - National Grid
  - Water Authority of Western Nassau
  - Village of Mineola Water and Sewer
  - Garden City Park Water District
  - Village of Garden City Water and Sewer

- Carle Place Water District
- Village of Westbury Water District
- Nassau County Department of Public Works

- **Towns**
  - Town of Hempstead
  - Town of North Hempstead
  - Town of Oyster Bay
- **Villages**
  - Village of New Hyde Park
  - Village of Garden City
  - Village of Mineola
  - Village of Floral Park
  - Village of Westbury
- **Nassau County**

The Third Parties either hold permit or require similar approval authority over an element of the Project and can be a source of delay to advancing the project. The 3TC engages close coordination to ensure the Third Parties act in a timely manner and share the urgency of the Rail Road in completing the Project as planned. However, close coordination may not be sufficient since many Third Parties have competing demands and might not offer the Project the same level of priority as the Rail Road expects, or simply non-responsive. In the absence of a contract that would bind the Third Party to actions, such as meeting milestones according to a prescribed schedule, the 3TC anticipates coordination with the Third Parties well in advance of the utility relocation need, and we have already met with the Third Party utilities. The meetings have been of a technical nature to lay out acceptable and permittable relocation designs. The relocation designs are documented in Appendix 2.8.2.

Timely coordination and resolution of issues with Third Party stakeholders is critical to meeting the Project schedule. For this Project, we have coordinationed with utility companies, Towns, Villages and Nassau County.

Risks

Towns, Villages and Nassau County

Timely coordination and distribution of information to trhe communities is critical to maintain the relationships and cooperation that Rail Road has already established. The adjacent communities will be impacted directly by construction in their backyards' as well as indirectly by the mobility restrictions inherent in roadway construction. Our experience has shown that, on design-build projects, many of the questions typically asked by nearby residents have been deferred until the final design is completed. The 3TC is pro-active to the needs of the community, anticipates the community's concerns and answer their questions promptly. Early notification to the Communities regarding construction scheduling, implications of construction and mitigation measures will be communicated, discussed, and resolved.

Utilities

Coordination with utilities having facilities within or adjacent to the Project ROW, and identification of any unknown facilities, is critical to the progress of the Project. Each utility will be evaluated for impacts, protections, and relocations. Since all utility relocations are to be coordinated with the individual utility companies, early identification and scheduling of any required utility work is a priority. It may also be necessary for the 3TC to proceed with some work (such as clearing) before the utility work can commence. 3TC has coordinated with the utility companies to identify each utility company's best case scenario regarding utility relocation, identify and approve utility work arounds so utility impacts to the Communities are minimized, and so permit and Labor needs are identified and mitigated prior to the scheduled critical path.

3TC's approach to utility relocation for the Project prioritizes mitigating unknowns to keep the schedule on track. During the LNTP phase, 3TC plans to conduct our utility markout and location survey. We will compare the results with what was provided in the RFP and with what we have received from Nassau County DPW, the local water and sewer districts, and the third party utility companies. Pursuant to our review, and considering the critical areas of construction, test pit locations will be identified, permitted, conducted, and the results recorded. Identifying the discrepancies early in the design phase will allow 3TC to implement revisions of the present design early with no impact to the schedule.

Impact to the Schedule

Delays to the Project schedule can occur if redesign must be performed to accommodate community concerns, as well as utility requirements and/or Third Party utility disputes. This is particularly true if MPT measures, such as detours or closures, are unacceptable to the community, which may require reconsideration. Utility relocations could delay construction projects, and require collaborative integration for design-build projects to avoid schedule impacts.

Opportunities

- Third Party Utility involvement, particularly when it involves inspections, permits and/or approvals,
- Coordination with Third Parties will be carefully planned and coordination activities incorporated into the project schedule. Early involvement is key and one way to do this is have Third Parties review, if not help to establish, the important milestones that affect them. During the LNTP phase, 3TC will make sure each party is aware of pending dates. Inspection and permit milestones have been identified.
- Since the utilities that will be affected by construction or that are required to be replaced within the Contract Documents will be replaced in-kind or redundant utilities removed during construction, and since there may be no long term disruptions in the service area, the utility relocation aspect of the Project is deemed by the 3TC as having the upmost significance.
- The success of the Project is based in a well-planned and thought out staging and phasing of the work. The following measures are taken by the 3TC relating to utility relocation to assure that the Project stays on schedule:
- 3TC has identified the key work items, their predecessors, the activities that affect the critical path, and the interdependency of the work with respect to Third Party utilities. We have included these activities within our proposed schedule.
- All utilities and utility owners within the Project limits have been identified and contacted. Meetings have been attended with each of the utility owners, and the 3TC relocation plan has been discussed with the utility owners. As a result of the aforementioned action, 3TC understands each utility owner's needs, requirements, and response time and our schedule reflects such as a benefit, the utility owners understand the 3TC schedule and the importance assigned to a seamless relocation
- A set of concise utility relocation plans has been developed and will be shared with the utility owners. 3TC anticipates minor comments from the utility owners and has built the revision time into our schedule.
- Construction crews will work on multiple sites simultaneously, and move from one location to the next maintaining consistency and efficiency.
- Utility relocation at the grade crossings will take place prior to major construction work.
- A utility survey and field verification will take place prior to construction, during the LNTP phase.
- Existing utilities will be protected.
- The Lead Utility Coordinator, Andrew Narus, PE, and the Third Party Coordination Manager, Paul Duarte, are experts in their field and have substantial utility relocation experience. The design engineer and the construction personnel will work in partnership to assure communication is current and concise.

Topic:	Track
Challenges:	Limited working space in the ROW. Track outage restrictions and peak service requirements.
Risks:	Fouling of adjacent tracks. Impact to Rail Road and third-party utilities. Blockage of pedestrian or vehicular access within the ROW.
Opportunities:	ATC #27, which allows for construction of the new track along the south side of the ROW and a reduction of track outages required for construction.

The track work associated with the Mainline extension presents numerous challenges to the construction effort. Working within an existing corridor and an established ROW requires extensive coordination for construction staging, worker safety, and project scheduling. Additionally, Rail Road must be allowed to maintain revenue service and operational reliability throughout the project's duration. The proximity of existing infrastructure (stations, bridges, wayside equipment, etc.) will also pose challenges to construction access and phasing. The supporting earthwork will also require coordination to ensure accurate elevation at fixed points (stations, grade separations, existing bridges, etc.). Proposed trackwork also presents risks such as Rail Road service disruptions and utility impacts. Revenue service must be maintained at all times and single or double track outages granted to 3TC must terminate in time for subsequent rush hour service. Track work must not affect Rail Road or third-party utilities in or near the ROW and must be coordinated with all appropriate agencies to minimize these impacts.

3TC will implement many design and construction protocols to eliminate or mitigate these risks and challenges. The most significant of these is ATC #27,

which allows for construction of the third track on the south side of the ROW from Floral Park all the way to Urban Ave. This ATC eliminates two lengthy cut-and-throws which the RFP called for on either side of Carle Place Station. With this design, 3TC will reduce the amount of temporary tie-in signal work, will provide continuous use of the existing Nassau-1 and Nassau-3 interlockings, and will drastically reduce the amount of track shifting Rail Road Force Account will be required to perform. Effective coordination and trackwork scheduling will ensure minimal operational impact to Rail Road and help promote construction efficiency and worker safety. Track construction outages will be coordinated with outages needed for other work and with Rail Road 's Force Account capabilities to ensure that total service disruption is minimized. Utility work will be completed in advance of all track work to ensure that all utility companies maintain adequate service and/or network capacity. Trackwork staging will ensure that the relocation or installation of signal and traction power equipment minimizes construction delays or service disruptions. Wayside cases, signal huts, power feeders, DC disconnect switches and the like will be relocated, only where necessary, in a manner which will maintain existing service reliability and allow for efficient, uninterrupted track construction. During design, clearances to and effects on existing infrastructure will be assessed to ensure that impacts are minimized and safety is ensured at all times.

Topic:	Signals and Communication
Challenges:	Protection of existing signal and communication copper cable during construction.
Risks:	A break in the signal cable would seriously impact rail operations, a break in communications cable would disable emergency services and potentially platform services.
Opportunities:	Several mitigating protection methods have been developed including special box structures to house active cables out of the construction zone, strapping active cables to new retaining walls to separate from construction activity.

Maintaining the existing communication system for the stations and the existing signal system which currently both reside in copper cabling on the existing messenger is critical to the Rail Road due to the nature of the information being transmitted on those cables. Until they are replaced with a new permanent fiber optic cable backbone the copper cables must be protected during construction to maintain rail system operation. During the LNTP period, 3TC will complete the design of the fiber optic network as this backbone must be in place and operational to support construction. An added benefit of this new network being available is that we can progressively retire the copper thus reducing the overall system risk. Prior to this 3TC will provide various methods or devices to protect the cabling from damage which were described in the table above.

Topic:	Signals and Communication
Challenges:	Maintaining Master Location [redacted] during construction.
Risks:	ATC 27 South Track Alignement, has provided many advantages to completing this project more efficiently. [redacted] near Carle Place Station is now in the path of new track construction.
Opportunities:	There are several possible solutions to this issue including raising and shifting the current ML house out of the path of construction or installing a new ML on the north side.

To accomplish the work plan set out in ATC 27 South Track Alignement, an existing Master Location (ML) located at signal chaining [redacted] in the path of a needed retaining wall. This location, actually it functionality must be protected and available for service until the new signal system commissioning retires it from service. One mitigation methodology will involve raising the house off the current platform and moving it sufficiently out of the way of construction. The bulk of the cabling arrives and departs on the messenger and therefore enters the house through aerial outlets. The house sits below the messenger so the bulk of the cable could be salvaged during the house raising or shifting. The challenge will be to maintain the track leads. If there is sufficient slack in a nearby manhole or pull box then that would mitigate the issue. If the track leads are not sufficiently long enough then new leads could be run. The method we would recommend is that new ML 206 be installed on the north side of the tracks. As part of our communications network responsibility

we are required to drop fiber on both sides of the Rail Road that is run through manholes to conduit under the tracks at each entity including MLs. Since we already are running conduit for the communications network at this location we could add an extra conduit(s) to transfer the express cable and the track circuit connections in relay logic in the new house. Ideally we would only need to transfer active ML relay functions to the new ML and install a large junction box on the south side to manage all the through cabling. Once the field location has been surveyed and cable slack is determined we can adjust the plan to accommodate those conditions.

Topic:	Signals and Communication
Challenges:	Maintaining station legacy communications and security devices operational during platform construction.
Risks:	Demolition of a half platform could cause failures in legacy communication networks due to cutting cables.
Opportunities:	The method to keep these devices operational during construction will involve a rigorous field survey prior to any demolition including marking and clearly identifying critical cables, conduits, etc. to salvage.

During construction, except for Carle Place, platforms will be replaced one half at a time. The half that is not demolished will need to retain the VMS, TVM, CCTV, PA and other communications systems for passengers and Rail Road employees. The connecting cables are copper and are generally run from communication houses to the platform. Maintaining the cables and the devices housed in the Communication Room will take research to locate them and remove only those being retired from service while maintaining the needed connections. A written plan will be generated to accompany the survey that will be used to locate and protect needed existing infrastructure, all of which will be provided within our design documents.

The original concept drawings required several cut and throws of track and an especially critical one was near the new N3 interlocking. The N3 interlocking would have required several modifications to handle

Topic:	Signals and Communication
Challenges:	Wired signal enclosures are considered to have extremely long lead time.
Risks:	Signal enclosure lead time can severely impact the critical path of the project as they are the last devices to be commissioned and proper time must be made available to test.
Opportunities:	An advantage of ATC 27 South Track Alignment, is that it allows 3TC to take the delivery of signal enclosures off the construction critical path.

the changing route conditions due to construction. By eliminating the cut and throws, Nassau 3, along with the system around it, can be placed in service logically and methodically without the need for significant tie-in changes. The use of ATC 27 completely changes the order and the manner in which the signal system will be commissioned. Additionally this takes the delivery of the new signal locations off the critical path and will allow 3TC and Rail Road FA to proceed logically through the system from west to east.

Topic:	Signals and Communication
Challenges:	Installing and testing tie-ins at existing signal locations increases the waiting time for construction to proceed as well as increases FA workload.
Risks:	The risk is that the Project schedule would be uncontrollably extended as construction requires signal modifications prior to progressing construction work.
Opportunities:	An advantage of ATC 27, South Track Alignment is to reduce the need for existing circuit tie-ins and the use of temporary test racks.

As was stated in the previous risk, the need for extensive tie-in work was necessary using the original design concept. The use of ATC 27 reduces the number of tie-in circuits at Nassau-2, Nassau-,3 and Divide-1. In addition to the reduction in the number of temporary tie-ins needed for track construction, we are also using temporary Microlok II test racks to place current relay

locations on fiber during testing and until that relay interlocking is retired. The temporary Microlok II racks with network switches, isolators, and patch panels will allow the relay interlocking to pass vital point to point information to processor based interlockings eliminating the bulk of the copper cable from service. The temporary rack would be moved from interlocking to interlocking until all interlockings are completed. See the Signal Design Approach Section for more details.

Topic:	Signals and Communication
Challenges:	Locating ML 174 on Rail Road property.
Risks:	The study of aterial location on the Third Track project detemined that the placement of ML 174 which serves as a negative return location for the Mineola substation is within the boundary of the Mineola Station.
Opportunities:	ML 174 material could be placed in equipment cases.

During our review of the drawings provided by the Rail Road for the Project, it was determined that ML 174's stationing was in error on the drawings. At it proper location, the new ML would sit [redacted] into the Mineola platform. If the emergency walk way is maintained then there is only 8 feet from the walkway to the edge of the ROW which does not permit clear access completely around the house. Assuming that the elimination of the emergency walkway and placing any equipment on the station platform is unacceptable the only feasible solution will be to place this equipment in case(s). 3TC will work with the Rail Road to place the ML so it is accessible but not interfering with passenger movement.

Topic:	Traction Power
Challenges:	Moving large equipment through residential neighborhoods.
Risks:	Community resistance.
Opportunities:	Better coordination with neighbors.

Delivery of large pieces of equipment through residential streets. Our Team has reviewed these challenges and we will develop and specify delivery routes that limit community impacts and best suit delivery of these items. In some cases, our mitigation plan is to deliver such large pieces of equipment by rail, so as not to impact the community is areas of concern.

Topic:	Traction Power
Challenges:	Space available for substation replacement.
Risks:	Community resistance.
Opportunities:	Better coordination with neighbors.

Space required for equipment during replacement process, including the potential use of the portable substation. Our Team has reviewed all existing Traction Power Substation locations and we will create equipment layouts for this equipment that limits community impacts, yet provide clear access to the construction area.

Topic:	Traction Power
Challenges:	Ability to maneuver portable substation during emergencies .
Risks:	Difficulty to maintain service.
Opportunities:	Pre-planning for emergencies.

3TC has reviewed all substation locations and their space constraints, as part of our design process. 3TC intends to provide site layouts that show all temporary equipment placement so that we insure access to the work areas should emergencies occur.

Topic:	Stations
Challenges:	Functional issue with ADA compliance/accessibility, lighting, life safety during construction
Risks:	Providing a means of access to the trains, such as gangways, can appear to be unsafe, unstable, and is not ADA accessible. Insufficient lighting during construction can also create a sense of unease to the users.
Opportunities:	Provide temporary solutions that are safe and accessible.

3TC will construct temporary platforms in order for passengers to get on and off the trains safely. The locations and placement of the temporary platforms will be consistent at all stations so that passengers will have clear direction as to whether they will need to exit the train from the back of the train, or the front. We will provide sufficient temporary lighting during the construction of the stations so that station feels safe.

We will maintain ADA access by providing ramps from temporary platforms to the parking lots.

Topic:	Stations
Challenges:	Insufficient Tree Canopy. Planting along the Rail Road ROW has less than ideal growing conditions and limited maintenance capabilities.
Risks:	With heat being a majoy cause of deaths in the US, it is critical to reduce heat island and provide sufficient shade in neighborhoods. Many of the station areas are exposed to direct sunlight and are very hot in summer.
Opportunities:	Reduce heat island impact by increasing tree canopy.

A good planting stock reduces ambient temperatures and creates a better level of comfort for commuters and for the nearby community, reducing heat island impact. We have an opportunity to engage the community in a tree planting program that can provide new trees in the neighborhoods and streets adjacent to the Rail Road corridor.

Topic:	Stations
Challenges:	Station architecture needs to be integrated into the community.
Risks:	There is a risk of making the stations dull and boring by making architecture not consistent and unresponsive to the surrounding context of the neighborhoods.
Opportunities:	Integrate similar materials and design elements to create a sense of place.

A good architecture and landscape architecture design has the visual power to better integrate the stations into the community and make them more pleasant for commuters and, together with other design elements, to create a sense of place for each location.

Each station is unique in use and has a varying relationship to the landscape and its context. Nevertheless, if each of the current dissimilar station elements were to be part of one consistent kit of parts, the stations would command greater importance within the landscape and give each community a connecting set of transportation nodes.

2.2.2) Potential community and environmental impacts and proposed measures to eliminate or mitigate.

As noted in Sections 2..1.2 and 1.8, 3TC is well aware of the community and environmental impact challenges faced in the Project. From Floral Park's concerns with the continued vibrancy of its recreation center, Hicksville's need for additional commuter parking, which has been exaserbated by the deterioration of its relatively new parking structure, and each community's concerns for the potential of contaminated soils along the Rail Road ROW, 3TC stands ready to deliver the Project that will be become an amenity to each of the communities on the corridor.

At this time we do not anticipate any environmental impacts that are greater than those identified in the FEIS, nor have we identified additional impacts or environmental impacts greater than those disclosed in the environmental requirements. As the design proceeds, it is possible that changes in the design could result in increased environmental impacts or impacts that differ from those identified in the initial environmental requirements. As such, the Environmental Compliance Team (ECT), working with the Project Manager, will modify the environmental management plans as needed to facilitate construction and reduce environmental impacts across the project site.

A representative from the ECT will attend weekly progress meetings throughout the duration of the project to update the Team and Rail Road about any environmental issues or changes in environmental permits and conditions. Every attempt will be made to keep project changes to a minimum while addressing the approved ATCs.

The following are the areas of concern that we will focus on during the Project.

Parking Impacts

3TC is fully aware of the need to not to burden the Rail Road and its station patrons during construction with loss of parking. We are also aware that our construction forces should not utilize station parking during construction related activities.

The following table summarizes the potential impacts to parking expected along the Mainline.

Location	Permanent Surface Parking Lost during Construction	Temporary Surface Parking Lost during Construction	Temporary Parking Spaces Lost during Garage Construction	Total Loss of Parking During Construction	Parking Gained Due to New Surface Lot and Garages	Stage Notes	Max loss of Parking Due to Staged Construction (Max Temporary Spaces)
Floral Park Station	10			10			10
							Total = 10
New Hyde Park Station	[redacted]	[redacted]		162	80	One Side At a Time	99
Covert Avenue	[redacted]	[redacted]		87		One Side At a Time	45
							Total = 144
Merillon Avenue Station	10			10			10
							Total = 10
Mineola Station		[redacted]		78		One Side At a Time	40
Main Street	14	28		42	11	One Street Closure At a Time	
Willis Avenue	19	17		36		One Street Closure At a Time	36
Harrison Parking Garage			109	109	442	One Garage at a Time	109
Mineola South Parking Garage			80	80	303	One Garage at a Time	
							Total = 185
Carle Place Station		14		14			14
							Total = 14
Westbury North Parking Garage			249	249	534	One Garage at a Time	249
Westbury South Parking Garage	23		163	186	518	One Garage at a Time	
Railroad Avenue	2	39		41		One Garage at a Time	
Urban Avenue	9	7		16			16
							Total = 265
Hicksville Garage			306	306	726		306
							Total = 306

The previous table indicates the maximum number of parking spaces that may need to be mitigated at each of the station locations. As per the RFP requirements, staggered construction in the vicinity of the stations minimizes the need to replace all station parking at the same time. For example, work will be performed on one side of a station platform at a time, one new parking structure in the same station area may be constructed at a time (Mineola and Westbury), and work will be staggered at adjoining grade separations in the New Hyde Park, Mineola and Westbury areas. Furthermore, as the new permanent parking facilities are brought into service, parking impacts will be mitigated in the New Hyde Park, Mineola, and Westbury areas.

Consequently, in keeping with the promises made by the Governor and Rail Road during the EIS phase of this Project, we are proposing a comprehensive program to mitigate the loss of parking along the Rail Road Mainline resulting from station reconstruction, grade crossing eliminations and parking garage construction.

Auxiliary Parking

The 3TC Team has identified and begun preliminary negotiations for additional station parking within Nassau County. The following table indicates the location of the potential auxiliary parking areas, the potential areas (or spaces) available and the stations they will serve during construction.

Temporary Parking Area

Parking Area	Address	Stations Served	Approximate Negotiated Spaces
999 Gould Street	[redacted]	Floral Park & New Hyde Park	150
Former Nassau County Family Court	[redacted]	Mineola & Merillon Avenue	200 to 300
Merchants Concourse Shopping Area	[redacted]	Carle Place & Westbury	See Note Below
Long Island Industrial Management LLC	[redacted]	Hicksville	200
Steel Equities	[redacted]	Hicksville	200
1055 Stewart Avenue	[redacted]	Hicksville	200

3TC will provide shuttle service from these lots for construction staff to the Project work zones and for commuters to access their stations. Upon designation, 3TC will finalize these negotiations, the exact number of parking spots available, and the schedule and frequency of the shuttle bus services.

Please note that with respect to the Former Nassau County Family Court House, the County representative who we contacted indicated that the County would be willing to provide this parking facility for the purpose of mitigating the Project parking impacts. However, the County would need a formal request from and enter into an agreement with another government entity (MTA, Rail Road, NYSDOT) instead of a private party. 3TC would assist the Rail Road at the time of award to identify the appropriate government entity and reimburse that entity for any rental fee levied by Nassau County.

Shared Autonomous Vehicles

In addition to the conventional ways of getting local residents to the station during the time that the station parking is impacted, we will explore the implementation of Shared (12 person mini-buses) Autonomous Vehicles that operate at 25mph or less throughout the station area that is impacted. Stantec is currently involved with the testing of such vehicles at a 500-acre test facility in California and is also involved with pilot projects in Tennessee and at the Harrisburg International Airport in Pennsylvania. Since the vehicles have a moderate purchase price and have a very low operating cost because they are all electric and operate without a human driver, multiple units can be purchased and operated simultaneously and may ultimately help reduce the demand for permanent parking at the stations.

Temporary Auto Lifts/Concierge Parking

If additional temporary parking is necessary, 3TC will install temporary hydraulic auto lifts that are typical to the commercial parking lot industry at a portion of the station parking areas that are impacted during Mainline construction, or during the construction of the five proposed parking garages in the Mineola, Westbury and Hicksville Station areas.

Station patrons at these locations will be able to leave their vehicles with a parking attendant who will place

their vehicles on the auto racks and retrieve their vehicles upon return to the station. This service will be provided at no cost to the rider.

Rideshare Services

Through the use of GPS navigation, the advent of Smartphones and the dominance of social networks, rideshare services (such as Uber and Lyft) have become an integral part of the New York Metropolitan Area's transportation supply chain.

Recent State of New York legislation that went into effect at the end of June 2017, provides for a uniform statewide regulatory framework for rideshare services and is overseen by the New York State Department of Motor Vehicles. Although the legislation provided Nassau County with the right to opt-out of this framework, as of the date of submission of this Proposal, they have not exercised that option . Consequently point-to-point (intra-county) ride share services are now legal in Nassau County.

Currently, there are 3,000 registered vehicles and 700 licensed rideshare drivers within Nassau County. Uber and Lyft recently celebrated the legalization of their services by providing discount coupons at the Hicksville Mainline trains station. Upon designation, 3TC will engage the aforementioned services to provide similar ride subsidies to station patrons impacted by the loss of parking at their local station.

Via

3TC has discussed with Via Transportation, Inc. ("Via") a possible partnership whereby 3TC would leverage Via's best-in-class on-demand shared ride technology to establish a dynamic shuttle system to help mitigate parking losses during the project.

Using Via's technology, 3TC could set up a dedicated shuttle system that allows riders to request on-demand vehicle journeys to or from train stations affected by construction within a predefined geographic radius. Instead of using personal vehicles to travel to or from the station, customers would simply request shuttle journeys using the Via app, which would automatically dispatch a dedicated vehicle to fulfill the trip. Rather than running on a fixed route, these Via-powered shuttles would be dynamically routed to aggregate customer journeys in a highly-efficient manner, responding in real time to changes in traffic conditions or road closures. This system would harness the same world-class algorithms and software tools that Via uses in its diverse microtransit deployments - from dense areas like New York City, to suburban and even rural contexts in the US and abroad. More information about the Via app and user experience is included below.

If 3TC is awarded this bid, and MTA is interested in mitigating parking loss with an advanced, real-time on-demand transit platform, Via and 3TC will explore a business and licensing agreement to deploy and operate Via's technology. Since the MTA's interest in such a system is not yet known, a final Via-3TC business agreement and license will be subject to the mutual assent of all parties following a Notice to Proceed.

ABOUT VIA

Via is a developer and operator of on-demand microtransit systems. Founded in 2012 by Daniel Ramot and Oren Shoval, the New York City-based company has raised over [redacted] in venture capital funding and provided over [redacted] rides to hundreds of thousands of members. In addition to operating its own consumer-facing services in New York City, Chicago, and Washington, D.C., Via also licenses its world-class technology to other kinds of transportation providers, such as public transit agencies, cities, taxi companies, and private operators of public transit. Via's website is https://ridewithvia.com/.

Dynamic Sign Panels

In addition to the above measures, dynamic information panels will be installed in all stations and parking areas providing quick and relevant information to the users, reflecting construction news, upcoming changes, anticipated impacts, and the availability of other parking options.

Outreach

Finally, we will utilize our proposed Community Outreach Movement Bureau and its Project Ambassadors, as well as social media to publicize the availability of this parking mitigation program.

Minimizing Impacts to the Community and Rail Road Service

The 3TC approach to stakeholder coordination includes early, weekly, and transparent communication throughout the duration of the Project. Proactive outreach and open communication of design and construction progress will identify issues that require attention early.

Impact to the schedule can be minimized by meeting with the adjacent communities early in the design process, before final plans are complete. Because design-build progresses to construction very quickly, we must understand the communities concerns very early in order to integrate resolutions into the plans and avoid the schedule delays inherent in doing so after construction has commenced. We will provide information to the community regarding upcoming activities through our Community Outreach Team. Our construction staff will be empowered to take action to alleviate immediate concerns and develop solutions to long-term concerns.

Our key staff, along with our Community Outreach Team are trained and adept at communicating with local citizens, Third Party providers, and regulatory authorities regarding the details of the Project and the design-build process. See Outreach Management Section 1.5.

Our Team is very familiar with the adjacent communities from our previous work with Rail Road and with previous work with and within the communities themselves. The local communities in the project area are primarily concerned about construction durations, any traffic detours expected within the project, and construction noise and our team will proactively be responding positively using visualizations such as photo renderings and interactive mapping to show traffic flow and expected re-routing. We already have the contacts and resources necessary to initiate this type of coordination.

Utilities

3TC will utilize our pre-established relationships with the utility companies to facilitate early discussion and coordination. We have reviewed all Rail Road provided utility information and have obtained additional information necessary to identify any potential conflicts and/or potential setbacks. We will maintain a map of all utilities within the proposed ROW and provide to Rail Road and the Utility Owners. Where additional coordination is needed to evaluate potential impacts, we will provide plans, cross sections, and suggested locations for utility relocations. We will sequence our work to mitigate schedule delays where feasible.
esources necessary to initiate this type of coordination.

Landscape

The role of landscape design in this Proposal is to mitigate impacts of third track construction and create opportunities for the Project to benefit the community beyond the track itself. The challenges of this role are many. A narrow corridor where growing conditions are not ideal and maintenance capacity is limited, the necessary removal of significant numbers of established trees — further exposing neighbors to increasing impacts of rail traffic, minimal square footage available for landscape interventions, and the industrial nature of many adjacent uses. These challenges underscore how vital landscape design to project success. Throughout the corridor, dense multi-story plantings will diminish the visual impact of the retaining walls and partially satisfy tree replacement requirements. At the stations, shade trees and low maintenance, evergreen plantings will help to integrate the platforms into the community, reduce heat island effect, and make the areas around the stations more pleasant for commuters and neighbors. Together with design elements, the landscape design will create a sense of place at each station.

In addition to these mitigating functions of the landscape design, the entire corridor was assessed for strategic locations where landscape might serve as a more substantial community amenity, whether as green infrastructure for stormwater management in parking areas, or as dense plantings and recreational paths around the perimeter of new recharge basins. In one location, reorientation of New Hyde Park Road under the new crossing created a significant area of continuous landscape which was designed as a small neighborhood park adjacent to the Kiss and Ride.

The requirement to provide 1:1 replacement of removed trees over six inches in diameter at breast heigh (DBH) combined with the loss of available space within the ROW in which to do it, provides a significant opportunity to engage the Track's benefit to the adjacent neighborhoods. Communities would be asked to select streets within range of the Main Line for improvement, and Rail Road corridor replacement trees would be planted along chosen street corridors. This will beautify the streets, tie together neighborhoods, reduce head island effect, and satisfy the Rail Road 's need to find tree replacement opportunities, while giving the community a voice in the project. We will also plant trees on private property only if the owners give written consent and agree to take over the long term care and maintenance of the plant material.

Retaining walls and Sound Attenuation Walls

As previously mentioned, the placement of the retaining walls and sound attenuation wall are located on or near the property line of residential properties, screening of these walls have become necessary. Throughout the corridor, we will meet the requirement by planting arborvitae four feet on center; however it is our intent to exceed those requirements by providing a diversity of dense multi-story plantings that will diminish the visual impact of the retaining walls and partially satisfy tree replacement requirements. We will provide evergreen plantings to help screen the walls. Installation of vines, will also help minimize graffiti on the walls.

2.3 Design Approach

Volume 2 - Package 2: Project Design

2.3 DESIGN APPROACH

2.3.1) Principles and goals of the proposed design and how Project Requirements are to be achieved and exceeded.

A. Track and Rail Systems

Principles and Goals: Track

The proposed track design's goal is to provide the Rail Road with an alignment and profile which creates sufficient flexibility, high operational reliability, and a comfortable ride for passengers. Additionally, the track design and construction will be coordinated in order to minimize the number of required outages and retain the use of existing interlockings at all times until the new ones are in place. 3TC's track alignment will reflect the concept presented in ATC #27, which calls for the new mainline track to be constructed on the south side of the ROW from Floral Park to Urban Avenue. This is a significant improvement to the RFP's alignment, which called for three lengthy cut-and-throws and a complicated coordination and construction effort at the new Nassau-3 (N3) interlocking. The proposed alignment will eliminate two of the cut-and-throws, which significantly reduces the amount of work required by Rail Road Force Account (FA). Additionally, this alignment reduces the amount of temporary signal and tie-in work required to maintain operation on the mainline during the Project. Nassau-1 (N1) and N3 can be maintained for Rail Road's use at all times without temporary houses or equipment being installed. **This allows for faster construction, minimal track outages, and more efficient testing and commissioning processes.** The proposed alignment also significantly reduces the number of PSEG hybrid poles required to re-route existing Rail Road and third-party utilities because the existing poles will not interfere with the new track.

PROJECT REQUIREMENTS: TRACK

The proposed track alignment will meet or exceed all project requirements. The design and construction approach will consider and optimize the following:

- Minimizing Rail Road FA track shifting or re-alignment
- Horizontal and vertical curvature per design standards and agency practices
- Horizontal and vertical clearances to all structures and obstacles
- Use of existing interlockings while minimizing temporary circuitry and tie-ins
- Minimizing utility relocation, especially PSEG hybrid poles
- Increased track spacing at grade crossing eliminations to reduce structure depth
- Increased track spacing at stations to ensure safe through-train operation

Principles & Goals: Systems/ Communications/Signals/Traction Power/ Security Systems/SCADA

The signals, PTC, traction power, communications and security system designs are elements of the entire Third Track project corridor as they are essential to support the operations of the Rail Road and provide for the safety and security of passengers and Rail Road employees alike. The content of this statement alone highlights two critical principles which are also design goals 1.) Safety and 2.) Reliability. To have a successful project and to provide the Rail Road with the best system available we must not compromise our safety and reliability principles or we will not attain our goals.

As with any project especially one of this complexity there are additional goals set or other roles these systems can play to support the progress of the project including assisting the construction process. There are several instances of this type of support on this project. The early installation of the communications fiber backbone with the signal SCADA allows Rail Road uninterrupted control of rail operations from the JCC while existing signal locations are retired and frees construction forces to proceed with demolition when it is needed for track construction. The delivery of the new N1 1 location will be partially commissioned to provide a clear construction path for the retaining wall and track construction on the corridor from Floral Park to west of Mineola Station.

The use of ATC 27 also allows a much simpler and less time consuming testing and commissioning process to occur from Floral Park to D1. Instead of a series of changes at new N3 to accommodate construction the ATC allows a logical progression from west to east testing and commissioning signal locations with less temporary wiring, fewer partial cutovers and fewer retests in the new signal locations.

PROJECT REQUIREMENTS: SYSTEMS/ COMMUNICATIONS/SIGNALS/TRACTION POWER/ SECURITY SYSTEMS/SCADA

The design and construction approach of the traditional systems elements for the Third Track project must meet the safety and reliability parameters while at the same time are planned to implement optimization and efficiency that will accomplish the following:

- Minimizing temporary circuit tie-ins requiring less install and test time
- No copper messenger from Q4 to D1
- Only three phases of PTC application
- Reduced demand for Rail Road FA
- Support the progress of the construction process

B. Rail Road Crossings

Principles & Goals: Bridges and Walls

As directed within the Contract Documents, new bridge structures will be designed for a 100-year service life, existing bridge elements in need of repair will be based on a 20-year service life, and new retaining walls will be designed for a 75-year service life.

PROJECT REQUIREMENTS: NEW BRIDGES

For new Rail Road structures, steel girders will be designed following the AREMA fatigue design criteria projected for a 100-year life cycle analysis. Additionally, all steel designs will consider a 1/8-inch sacrificial thickness loss for webs and flanges as directed in the Technical Provisions. The steel structures will be weathering steel, or for the new Meadowbrook Parkway crossing, the span will receive a three-coat paint system with epoxy primer and epoxy intermediate coats, which will protect the structure to the highest of standards. The ends of the weathering steel girders will be painted to prevent staining of the substructure.

Prestressed concrete roadway bridge beams will be designed in accordance with the AASHTO LRFD Bridge Design Code, and the concrete cover over prestressing strands will be an additional inch more than required. Mild reinforcement will be stainless steel. Ballasted bridge decks will be waterproofed using a two-coat elastomeric waterproof system with asphaltic protection boards or an AREMA approved protective system, subject to Rail Road approval. The selected materials, and coatings will ensure a 100-year service life.

Existing structures will be brought into good repaired that will last for 20-years with routine maintenance. 3TC will repair the substructure concrete following established and proven spall repair details developed by NYSDOT using epoxy coated reinforcement bars and concrete bonding agents.

The reinforced concrete substructures will be analyzed using Life-365 Life-cycle software, which will determine the chloride protection system to be used, and it will consider the use of bar coatings, concrete corrosion inhibitors, concrete cover, and/or concrete penetrating sealercoats.

PROJECT REQUIREMENTS: UNDER-GRADE BRIDGES

The under-grade bridge design details developed for this Project are to minimize the impacts to the community and the Rail Road service. One way to achieve this goal is to minimize the structural depth of the superstructures such that the roadway profile can be set as high as possible. The result is less impacts to the surrounding properties and adjacent intersections from regrading.

The 3TC Team will employ an innovative approach for constructing the under-grade bridges that limits the required track outages to one double-track outage per crossing. A U-shaped reinforced concrete substructure will be constructed adjacent to the proposed crossing, in an open excavation at the proposed final elevation. The structure will be constructed on a concrete launching slab and the steel superstructure will be set in place in advance of moving the bridge into place. **During ONE double track outage,** the tracks will be removed, the track bed will be excavated to below the bottom of the superstructure, and the entire structure will be jacked into place while the remaining excavation is completed. Once the structure is in place, the precast approach slabs, ballast, and tracks will be installed, and service will be restored (see Drawings CONST-1 to CONST-16). This design approach will exceed any expectations for minimizing the impacts to the Rail Road's service.

A major goal is to develop cost efficient structural designs, and that savings will be passed along to the Rail Road. The innovative under-grade U-shaped bridge design previously discussed will result in significant cost savings. Constructing the entire bridge adjacent to the Rail Road crossing allows 3TC to avoid costly temporary works and numerous single track outages for constructing the substructure in place. The procedure for driving the structure into place using hydraulic jacks has proven to be an efficient means during limited work durations, which translates into a substantial construction cost savings.

C. Stations

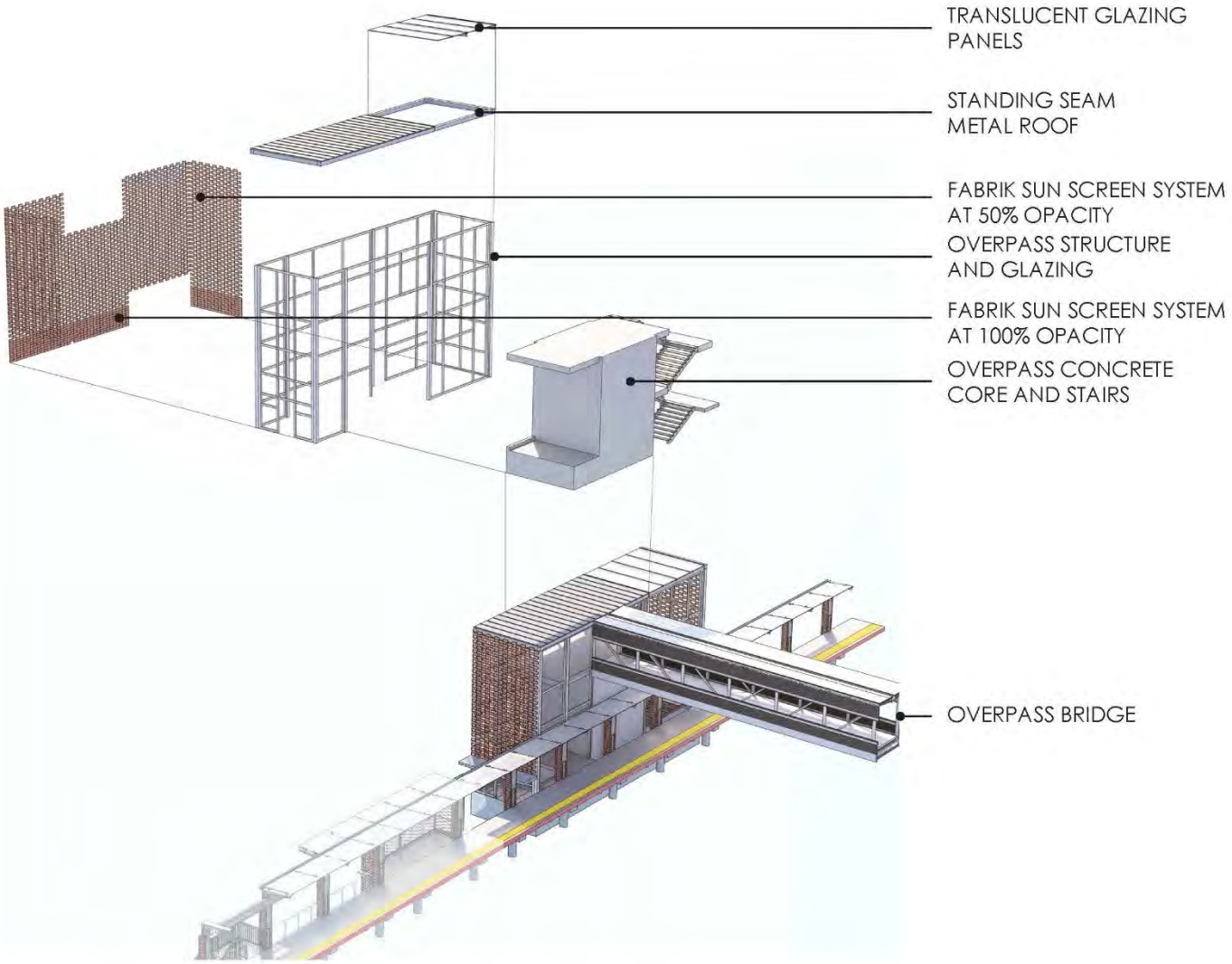
Principles & Goals: Stations

A good design has the visual power to better integrate the stations into the community and make them more pleasant for commuters and, together with other design elements, to create a sense of place for each location. The proposed strategy is that of a "kit of parts" (inventory of various station components). Once applied onto the five stations, the use of this kit will create a sense of continuity within the proposed stations and a connection to the existing context.

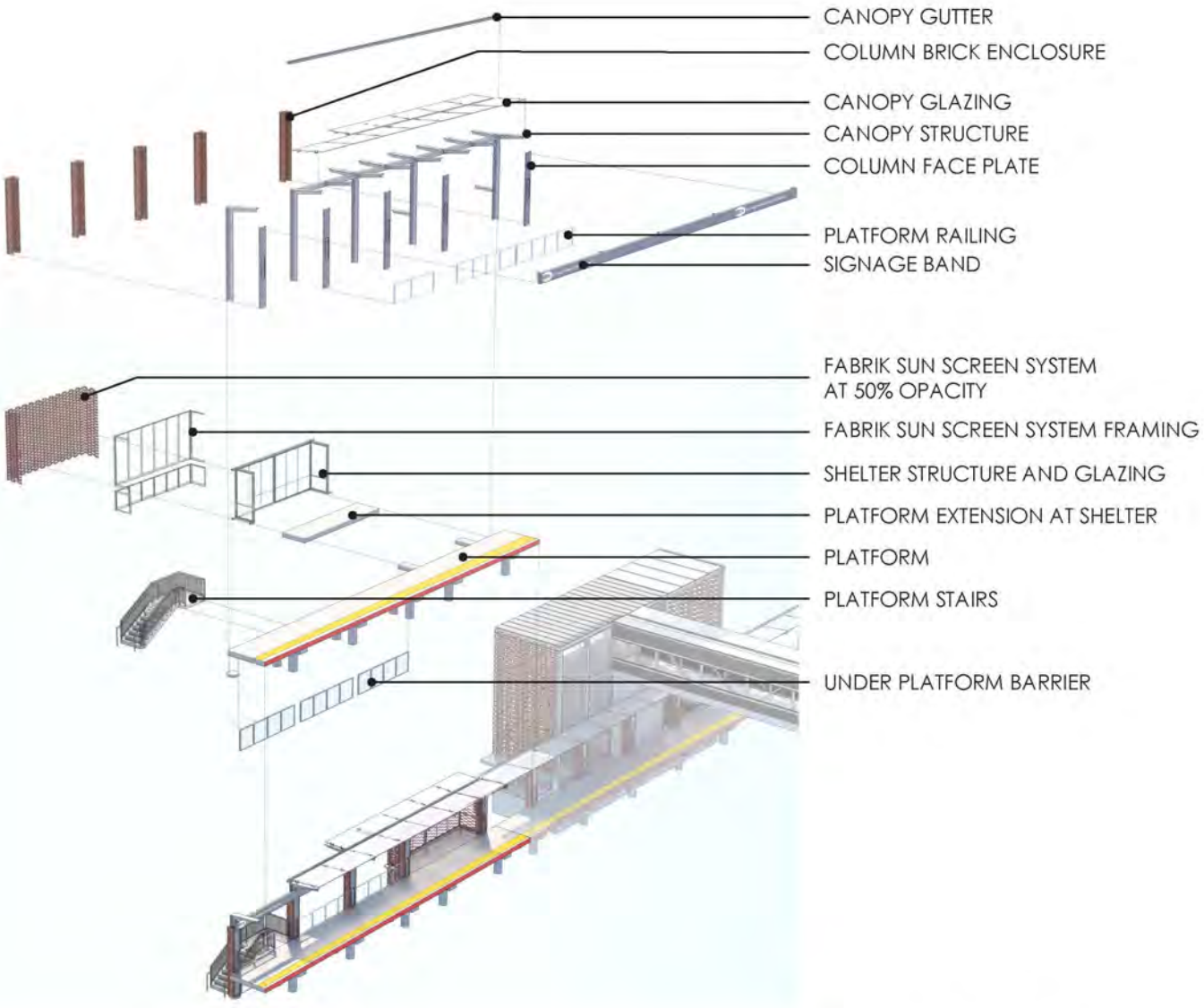
PROJECT REQUIREMENTS: STATIONS

The "kit of parts" is to include the following (visual depictions on the following pages):

- A set of canopies that address the different coverture requirements while optimizing the use of space along the platform and along walkway paths.
- A set of overpass building cores that respond to varying circulation and mechanical requirements at each station.
- A set of pedestrian overpass bridges of varying lengths depending on each station
- A terracotta sun screen that responds to the built context while acting as a connecting fabric on shelters, overpass structures and is matched with brick surrounds at canopy column as well as brick faced retaining walls.
- A signage band that fulfills wayfinding requirements while also providing an enclosure for conduit, lighting, cameras, speakers and other items.
- A lighting strategy to create consistency and interactivity
- A retaining wall and garage faced form liner design that incorporates terracotta used in sun screen



OVERPASS STRUCTURE



PLATFORM STRUCTURE

D. Site Civil

Principles & Goals: Roadway Design

The primary purpose of this Project is to improve rail service, reliability, public safety, and quality of life along the Rail Road Mainline between Floral Park and Hicksville. The goal in the Highway Design aspect of the Project is to eliminate the existing street level grade crossings within the project limits to mitigate safety concerns related to railroad traffic, roadway traffic and pedestrians at grade crossings, traffic delays due to grade crossings, and noise issues due to required horn blasts at grade crossings. While the crossings are to be eliminated, public safety and roadway conditions at these locations are subject to improvement by enhancing north-south vehicular and pedestrian connectivity. In mitigating the existing issues mentioned, the goal in the Highway Design aspect is aligned with the primary purpose of the Project. The existing street level grade crossings that are to be eliminated are listed below:

- Covert Avenue
- South 12th Street
- New Hyde Park Road
- Main Street
- Willis Avenue (Main Line and Oyster Bay Branch)
- School Street
- Urban Avenue

PROJECT REQUIREMENTS: ROADWAY DESIGN

The Roadway Design Criteria for this Project is presented in the following table below and conforms to the standards listed in table 3-1: Design Criteria Section L: Highway Design, in the Preliminary Engineering Technical Memorandum. The NYSDOT Highway Design Manual and the 2011 American Association of Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets" provide additional design guidance in the event where justifications are warranted for non-standard features. New underpass crossings will be constructed at five locations along the Project limits and will include five Mainline Rail Road bridges, one Oyster Bay Branch Rail Road bridge, as well as other local cross street and pedestrian bridges. The geometric design challenges associated with construction of these under-grade crossings include: overcoming tight ROW constraints, steep grades, multiple local and underpass roadways & sidewalks, and avoiding the creation of new non-standard features as well as maintaining private property driveway access. The two most critical design elements for the underpass alignments is the minimum vertical clearance (14') and the maximum grade which varies from 8% to 10%, depending on the grade crossing location, physical constraints and available ROW. The problems associated with steep 8% to 10% grades will require further study to mitigate and/or avoid non-conforming features such as Stopping Sight Distance, ADA compliant sidewalks, driveway access, etc.

Principles & Goals: Retaining Walls

New retaining walls are to have a 75-year service life.

PROJECT REQUIREMENTS: RETAINING WALLS

For post and panel walls, steel posts will be corrosive resistant weathering steel and for concrete H-pile posts, the reinforcement will be galvanized. All precast concrete lagging and reinforced concrete wall systems will be constructed using epoxy coated reinforcement, low permeability concrete, and will receive a concrete penetrating sealer coat.

Principles & Goals: Overall Drainage Design

The goal for all proposed drainage systems is to eliminate the risk of flooding within the Rail Road ROW limits, at the new grade crossing underpasses, at the new parking garage structures, and at the new Rail Road station/parking lot locations by producing a stormwater management system to store and/or convey all on-site runoff to a pre-determined discharge point while not overloading Nassau County's existing stormwater collection/disposal system. 3TC will comply with all codes and standards identified in the Technical Provisions of the RFP, such as the Nassau County Department of Public Works Drainage Criteria Requirements, New York State Storm Water Management Design Manual, and New York State Highway Design Manual. The Modified Soil Cover Complex Method utilizing NRCS TR-55 will be used to determine the design runoff volumes. The Rational Method will be used to determine peak design flows.

PROJECT REQUIREMENTS: OVERALL DRAINAGE DESIGN

As per the Technical Provisions, the design storm frequency will be based on the location of the drainage system. The stormwater drainage along the Rail Road ROW will be designed for a 100-year storm frequency; the underpass storm drainage system will be designed

Rail Road Expansion Project - Roadway Design Criteria (in accordance with HDM §2.7.2 & 2.7.3)

[redacted]

for a 10-year storm frequency; and the local roadway storm drainage system will be designed for a 10-year storm frequency. These storm frequencies will develop the stormwater peak flow rates, which will then determine the new drainage pipe sizes. Based on the technical provisions of the RFP, several acceptable storage facility options include underground detention systems and recharge basins (both new and existing). The new recharge basinwill be designed to store 8 inches of runoff from the immediate area tributary to that system over a 24 hour storm event. Detention systems will be designed for a 10 year design storm event while discharging to the Nassau County stormwater collection system at their allowable 3 year design storm rate. But as per the RFP, these detention systems will be oversized to accomodate 8 inches of runoff from the associated tributary areas. In addition, the pumping stations at each underpass are provided with 100% standby capacity will be capable of keeping up with a storm event much greater than the 10 year design storm event. Stormwater runoff design requirements will be discussed and reevaluated by 3TC and Nassau County DPW during the final design phase. As per the RFP, the use of underground infiltration galleries such as corrugated metal pipe and concrete arch infiltration systems for drainage/storm management purposes will no be used.

DRAINAGE DESIGN: ELIMINATION OF AT-GRADE CROSSINGS

There are seven at-grade crossings within the Project Area. These are at:

- Covert Avenue
- South 12th Street
- New Hyde Park Road
- Main Street
- Willis Avenue
- School Street
- Urban Avenue

The at-grade crossings at South 12th Street and Main Street will be eliminated by terminating these streets at the norther ad southern limits of the Rail Road ROW. The proposed drainage solution at these locations will be to utilize the nearby existing drainage conveyance and/or leaching systems. Existing structures drainage structures will be modified to accommodate the new street geometry and new drainage structures will be constructed where needed to provide positive drainage at these locations.

The at-grade crossings at the five remaining locations (Covert Ave, New Hyde Park Road, Willis Ave, School Street & Urban Ave.) will be reconstructed as grade separated crossings by depressing the streets under the Rail Road. The new depressed street crossings will provide 14' vertical clearance between the underpass low point and the bottom elevation of the Rail Road structure. Depressing the cross streets under the Rail Road overpasses will create roadway low points significantly lower than existing grades, thus creating a high flooding risk. Difficulties associated with conveying this stormwater to existing Nassau County Recharge Basins, which are located approximately 3,000' to 6,000' from the new underpass locations, include:

1. Underpasses are significantly lower than the adjacent existing Nassau County storm water collection systems.
2. Existing recharge basins are not presently deep enough to accept stormwater flows from the new underpasses if conveyed by gravity sewers.
3. New conveyance sewers from the underpasses, provided the existing recharge basins are deepened or stormwater pumping is provided at each underpass location, will need to be routed within local county streets and will in most likelihood encounter major interferences / impacts with existing utilities and disrupt local traffic.

3TC's proposed solution for providing drainage at the five underpass locations generally consists of stormwater pumping. Pumping stations will be in accordance with FHWA NH1007, Hydraulic Engineering Circular No. 24, "Highway Stormwater Pump Station Design" and will be subject to all Nassau County DPW requirements and Nassau County DPW approvals .

Project Requirements: Drainage at the Elimination of At-Grade Crossings

Peak flow and pumping rates for each of the five locations for both the 5-year and 10-year design storm events identified in the latest revision to the RFP, along with associated tributary areas and Total Dynamic Head (TDH), is shown in the following table. As per the RFP, stormwater pumping stations will consist of pump arrays sized to accommodate low flow (5year storm) and peak flow (10-year storm) events and will provide 100% standby capacity. Wet wells will be sized to accommodate four submersible stormwater pumps;

PUMP DESIGN CALCULATIONS FOR AT-GRADE CROSSING ELIMINATIONS					
Location	Tributary Area (Acres)	Design Storm	Peak Storm Flow (cfs)	Pump & Discharge Rate (GPM)	Total Dynamic Head (TDH)
Covert Avenue	[redacted]				
New Hyde Park Road					
Willis Avenue					
School Street					
Urban Avenue					

two rated at the 5 year design storm pump discharge rate (one service and one standby) and two rated at the 10 year design storm pump discharge rate (one service and one standby). Each station will be equipped with trash racks at the station's inlet, a small superstructure to house pump controls and manual transfer switches and receptacles to allow the connection of a portable generator to provide power to the pumps in the event of a power outage. Each pump station will be equipped with a permanent hoist to facilitate the removal and reinstallation of pumps for maintenance. The pump stations will be located on the high side of each underpass and will be from [redacted] deep.

As shown in the table, the 10-year storm event results in a peak storm flow and pump discharge rate approximately 25% larger than those generated by a 5-year design storm. Based on our conversations with representatives of GA Fleet/Flygt pumps, and because of the relatively small tributary areas associated with the underpasses, the 3TC Team would like to further investigate benefits of providing separate pumps for the 5 year and 10-year storm events versus providing a two-pump station with each pump rated at the 10 year discharge rate for each of the five pump station locations.

Specific solutions for providing drainage at the above locations varies based on existing conditions and the existing Nassau County drainage systems that collect stormwater from these streets at their crossing with the Rail Road. The following is a discussion of these solutions.

COVERT AVENUE, NEW HYDE PARK ROAD AND URBAN AVENUE UNDERPASSES

At each intersections, Nassau County storm sewers collect runoff from the existing at-grade crossings and discharge into existing Nassau County Recharge Basins. Depressing these roadways under the Rail Road makes gravity connections to sewers difficult. For these locations, catch basins collecting stormwater from the tributary areas associated with each of the underpasses will be discharged into a stormwater pump station wet well. The submersible pump stations themselves will be located adjacent to each underpass location within adjacent areas that have been acquired by the Rail Road for this Project. The pumps will discharge through a standard arrangement of check valves and gate valves to a new underground stormwater detention facility located adjacent to the pump station and within the new areas acquired by the Rail Road. As per the RFP, each of the detention facilities will be sized to store [redacted] of stormwater runoff from the associated tributary areas. They will be more than capable of holding stormwater generated by a 10 year design storm and will release it into the Nassau County stormwater collection system at each of the underpass areas at the rate of flow associated with Nassau County's standard 3 year storm event. There will, therefore, be no net increase in the quantity of stormwater discharging into existing Nassau County storm sewers or Recharge Basins. Each of the detention facilities will be a pre-cast modular system ("StormTrap" or similar) and will be equipped with an orifice controlled outlet pipe sized to restrict stormwater flow from the detention system to the County's 3-year

design storm event. The figure below depicts the general arrangement of the stormwater collection / stormwater management system proposed for these three locations.

SCHOOL STREET UNDERPASS

An existing stormwater collection system in the vicinity of the School Street underpass could not be confirmed. 3TC, therefore, proposes a submersible sewage pumping station adjacent to the underpass on the high side of the adjacent retaining wall (similar to the arrangement described above and shown in the above Figure) discharging to a new Recharge Basin, which would be relocated in the area adjacent to the School Street underpass in a land parcel being acquired for the Project. The Recharge Basin will be sized to accommodate [redacted] of run-off from its associated tributary area, maintain a minimum of [redacted] clearance above the Seasonal High Groundwater Table elevation and constructed in accordance with the requirements contained in the latest revision to the RFP and in conformance with Nassau County Criteria.

In lieu of a new recharge basin, a stormwater detention system will be considered as an alternative to manage stormwater runoff at this underpass location (ie: If an existing stormwater collection system can be confirmed on Union Avenue). The detention system will be located on the eastern edge of the newly acquired property and beneath the proposed access road, which will allow for traffic flow to the adjacent parking lot.

WILLIS AVENUE

Like to School Street, there does not appear to be an existing stormwater collection system near the Willis Avenue underpass. The Design Team proposes a submersible stormwater pumping station discharging to a new gravity sewer in Hinck Way which will run easterly for a distance of approximately 1,000 feet to the existing Nassau County Recharge Basin on the intersection of Roslyn Road and Hinck Way. We understand it has sufficient capacity to accommodate additional stormwater flow from this underpass. This Recharge Basin was designed for the Roslyn Road Grade Crossing Project for NYSDOT (Project No. 23699) by Stantec. After reviewing drainage calculations, the Design Team learned the Recharge Basin was designed to accommodate the runoff developed from an overflow

tributary area of the underpass rather than the direct tributary area. Based on the design criteria in the RFP, we are required to design for just the direct tributary area, which is smaller than the overflow area. 3TC has determined the difference in capacities of the direct and overflow tributary areas is larger than the required volume for Willis Avenue. This indicates that the existing Recharge Basin is capable of accommodating the additional runoff. Connection to the Recharge Basin will be made via an existing inlet structure.

PARKING GARAGES

The drainage design for the five proposed parking garage structures will collect stormwater runoff into a proposed detention system and later released at a reduced rate into a nearby storm sewer system. (ie: Assuming Nassau County/Town Jurisdiction).

EXISTING RECHARGE BASINS

As per the Technical Provisions of the RFP, there are several drainage requirements related to existing Nassau County recharge basins. To allieviate the drainage problems associated with Nassau County Recharge Basin #125 (Garfield Avenue and Saville Road), the Design Team will install a new gravity drainage system on 1st street in Mineola to allow for an overflow pipe connection to existing Nassau County Recharge Basin #123. Moreover, 3TC will clean and remove all sediment from existing Nassau County Recharge Basin #123 (Herricks Road and Old Country Road) to the satisfaction of Nassau County DPW.

TRACK DRAINAGE EXISTING DRAINAGE/HISTORY:

The existing Rail Road ROW drainage is generally handled by ditches or channels that run along both sides of the mainline tracks. The Rail Road validation maps indicate some areas where piping systems parallel the tracks although actual record drawings and as-built of the subsurface drainage network is not available. The FEIS also indicates that there are several culverts crossing the tracks which may connect these existing pipe systems or be used to distribute runoff between ditches on either side of the tracks. For the most part, the existing ditches appear to handle a typical rainfall, although NCDPW has indicated that there are some flooding issues at several locations along the ROW which occur during larger storms events. One of these locations includes occasional flooding in the area of Mineola near First Street and Second Street. A second location at Urban Avenue where the closed drainage system was clogged, possibly caused by washout from a nearby concrete plant, has since been corrected. In addition, there are several isolated areas where the railroad tracks in fill areas allow runoff to flow down the side slopes onto adjacent neighboring properties. Coordination with the NCPDW and/or local municipalities will be required to address these flooding issues, which occur within the work zone of the third track construction.

PROJECT REQUIREMENTS: TRACK DRAINAGE

The FEIS states that the Rail Road ROW drainage will be designed so that water surface elevation from a 100-year storm frequency event will be kept below the top of rail elevations throughout the project limits. The 100-year storm consists of an [redacted] rainfall within a 24-hour period. Based on the FEMA Effective Flood Insurance Study for Nassau County (dated 9/11/2009), there are no documented flood hazard areas within the project limits. Track elevations between Floral Park and Hicksville range between [redacted] near Tanners Pond Road to [redacted] near the Hicksville station. The proposed drainage system will consider soil infiltration. Percolation tests were performed at three locations along the Rail Road ROW with the following results:

An infiltration rate consistent with the preliminary percolation tests will be used to reduce the required storage volume for the 8-inch rainfall. Soil percolation rates will be verified during the Design Phase when a more substantial soil percolation test program is undertaken.

PERCOLATION TEST SUMMARY TABLE

Percolation Test No.	Location	Mainline Station	Average Soil Infiltration Rate
PT-1	East of Roslyn Road	[redacted]	[redacted]
PT-2	East of S. 12th Street	[redacted]	[redacted]
PT-3	East of Grand Blvd.	[redacted]	[redacted]

PRELIMINARY DESIGN:

The FEIS suggested a preferred option to drain the Rail Road ROW which consists of increasing the area of existing drainage ditches and channels to provide storage for the 100 year storm. Perforated pipes may also supplement the drainage ditches / channel if additional storage is require for the design storm. It was also suggested that side drainage channels be grass-lined to intercept oils and other contaminants to improve stormwater quality where feasible. Other potential alternatives included in the DEIS/FEIS is to consider closed systems that would connect to nearby Nassau County recharge basins. This option would require approval by NCDPW, supported with calculations indicating sufficient capacity within the recharge basins. Other initial suggestions included perforate pipes ranging between [redacted] and [redacted] diameter be installed along both sides of the mainline tracks to store runoff.

The 3TC proposes to store additional runoff within the limits of the third track construction zone. The width of the runoff tributary boundary was considered to be ROW width for the entire project length. The track drainage design proposes that runoff from an 8-inch 24 hours storm event will be stored within the stone ballast under the existing tracks, proposed third track and within crushed stone along the adjacent side slope. Stormwater runoff will infiltrate into the soil as it is temporarily stored within the voids of the ballast and crushed stone. Space to implement fully developed drainage channels / ditches between the third track and the ROW is limited for a majority of the Rail Road mainline. The narrow corridor would also make it difficult to maintain grass-lined channels. This design focuses on the crushed stone drainage layer for storage and will provide drainage swales within the side slopes where space permits. Additional storage will also be

[redacted]

provided within the stone backfill which will be placed beneath the drainage layer as needed for the proposed retaining walls in fill areas. Groundwater within the project area will not affect stormwater infiltration as the groundwater table is generally [redacted] below the existing ground surface.

Regrading the side slopes within the construction zones as required will also be performed to prevent runoff from flowing outside the Rail Road ROW. The existing drainage system outside the third track construction area will be maintained. Areas outside the work zones that require regrading or drainage improvements to keep runoff within the Rail Road ROW will be coordinated with Rail Road and NCDPW during construction. It was noted in the FEIS that existing culverts, ranging from [redacted] to [redacted], may or may not be active under the mainline tracks. Non active culverts will be plugged while active culverts will be encased in concrete, extended under the proposed third track, and connected to existing/proposed drainage pipes and/or ditches and channels located on either side of the tracks. Drainage plans, details and calculations will be included in Section 2.8.11A.

Principles & Goals: Planting

Our planting design will be based on achieving aesthetic goals while addressing the difficulties in each planting environment and in the limits of available plant care. 3TC will also develop details for good planting practice that maximizes the survival rate of newly planted trees, shrubs and ground covers.

PROJECT REQUIREMENTS: PLANTING

As an overall policy goal we will seek to diversify planting species to prevent monocultures which make areas more susceptible to plant diseases and monitor the DEC regulations on invasive species to ensure that no potential problem plants are used. We will create planting lists that "put the right plant in the right place" and that focus on native species which support local fauna including pollinators. And we will ensure that plants are selected to minimize maintenance requirements.

2.3.2)Identify how design will be saved from dullness. Where will the community or traveler be inspired by design?

While most of the effort on the Project is engineering-focused, across the site 3TC have looked for opportunities to create inspiring spaces – plazas, landscapes, and community gathering areas, and, where possible, to create architectural and landscape details that enhance the beauty of the stations, crossings, and corridor interventions and provide real neighborhood amenities. Where the Rail Road has the most substantial architectural presence, at the stations, the station structures will be detailed with a unique terra-cotta screen to filter light and views at the shelters and overpass structures. The warmth of the terra cotta will offer a friendly facade to the surrounding neighborhood, while standing as modern and forward-looking threshold to the improved Rail Road system. Where possible, areas around the stations have been conceived as community spaces – whether shady plazas, gardens, seating areas, or parks – that are flexible to accommodate a range of uses. Changing uses will keep make them a continual source of interest for passersby, commuters, and neighbors. The vehicular crossings provide many of these open space opportunities, from a skate park at Covert Avenue to a community green space at New Hyde Park.

2.3.3) Identify those elements of the project that are proposed to be developed as part of the Arts and Design Program.

Many of these open spaces provide potential locations for special interventions by artists. Our Team has considered several components of the project as potential locations for artist-intervention and anticipated a range of modes for collaborating with artists in developing these details. Retaining walls , pedestrian overpasses and underpasses, lighting interventions,

canopy glass, and plazas have all been considered as sites for potential intervention. Specific sites have also been considered for special commissions, such as a memorial at Merillon station for the shooting that occurred there in 1993. We are familiar with the Arts and Design program process and will work with the Rail Road to create a strategy for artist intervention. We will also work with the STEAM arts competition (see Section 1.5) to provide locations for the works of art submitted by local middle and high school aged children.

2.3.4) Describe how environmental commitments will influence design and construction.

The Civil/Roadway Design aspect of the Project is to consider and commit to several factors relating to the environment adjacent to the existing street level grade crossings. Irreversible and irretrievable commitments to land use within the vicinity for proposed physical elements and their long-term impacts on communities adjacent to the crossings are to be considered. The elimination of street level grade crossings will also commit to not only minimizing negative impacts to the current visual quality of the crossings but to enhance it. The proposed construction of underpasses at the existing crossings is to avoid any residential property acquisitions or additional ROW requirements beyond the properties listed in Table 3-4 Summary of Anticipated Property Acquisitions and Easements of the Preliminary Engineering Technical Memorandum Revision I, dated January 2017. After evaluating said factors and RFP documents, 3TC will propose underpasses at all locations excluding South 12th Street and Main Street, which will be subject to permanent closure.

The Drainage Design was developed to have minimal impact on the existing environment. All at-grade crossing elimination locations will feature either new detention systems or recharge basins nearby. Since these systems will be in close proximity to the new underpasses, the drainage will only require temporary support structures in a significantly reduced construction footprint. The new Recharge Basin at School Street will require coordination with NYSDEC, Nassau County, and the Town of North Hempstead to review all necessary environmental approvals. To prevent any negative environmental impacts, the existing conditions of the land acquisition will require environmental testing before construction. These tests will evaluate the land properties and determine the necessary action for any potential environmental remediation. The construction of the new recharge basin will have favorable impacts such as a reduction of impervious area, a reduction of stormflow in the local storm sewer systems, and an effective method to eliminate flooding at the new underpass low point.

Systems designs influence the environment in several ways. The traction power system, if the rails are not properly isolated from ground can emanate stray DC current which can cause corrosion and damage to metal objects in the ground from utility conduits to exposed rebar on foundations or structures. We have assigned the prevention of these detrimental occurrences to a specialist in stray current prevention who will ensure that the system design incorporates the best and state of the art defense mechanisms for these vulnerable structures. A second source of environmental disturbance that can be generated by the new systems is the introduction of Electromagnetic Interference (EMI) into the environment. The 3TC plan includes a pre-construction EMI survey to determine the levels that are currently acceptable to the local areas and then inject this data into the design process to ensure that the new designs are rated to generate similar or lower levels of EMI than are currently emitted. The process ends with a post installation EMI survey to verify that the EMI goals have been attained.

2.3.5) Identify, list and describe all Project Elements.

Project Elements as defined in the Technical Provisions of the RFP are those componenets of the Project that, when completed , can be tested, commissioned accepted by the Rail Road, and can be placed into service.
Each of the following items is anticipated to be a Project Element. Upon acceptance by the Rail Road, a separate

Certificate of Beneficial Use will be issued for each element.

- Track (Blocks 1,2,3)
- Grade Crossing Elimination (5 locations)
- Grade Crossing Closure (2 locations)
- Bridges (8 locations)
- Retaining Walls Sound Walls (Blocks 1,2,3)
- Stations (5 locations)
- Power Substations (7 locations)
- Garages (5 locations)
- Pedestrian Bridges and Tunnels (8 locations)
- SCADA/Communications (Blocks 1,2,3)
- Signals (Blocks 1,2,3)

In support of the completion of these Project Elements, the following is 3TC's list of Design Components/Units for the Project:

- Demolition
- Early Works-Utilities
- Track
- Grade Crossing Elimination
- Grade Crossing Closures
- Bridges
- Retaining/Sound Walls
- Signals
- SCADA/Communication
- Stations
- Power
- Garages
- Ped Bridges and Tunnels

A. Demolition

The following buildings and facilities will be demolished and removed:

- [redacted] – Auto Repair Building
- [redacted] – Self Storage Building
- [redacted] – Industrial Property
- [redacted] – Auto Repair Building
- Two Rail Road facilities located at the Southwest Quadrant of the Main Street Crossing to include the Nassau Tower and the Historic Station Building
- Merillion Avenue Station Building
- Carle Place and he Mineola Station Pedestrian Overpass
- Rail Road Nassau Tower

As part of the railroad bridge widening work, select demolition is required as follows:

- Floral Park Viaduct – The north concrete ballast retainer in eight (8) easternmost span will need to be remove to accommodate the widening of the bridge spans for the track turnout.
- South Tyson Avenue Bridge – The north bay of a two-bay bridge superstructure span will be removed to accommodate the new Third Track alignment. Portions of the existing retaining wall will be remove to widening the abutment.
- Plainfield Avenue Bridge - Minimal demolition work is required to the abutments to accommodate the new third track span and substructure widening.
- Denton Avenue Bridge – The existing superstructure, the abutment backwalls and the south wing walls will be removed to accommodate the new superstructure and the substructure widening.
- Nassau Boulevard Bridge - The existing superstructure, the bridge seats, and portions of the wing walls will be removed to accommodate the new superstructure and the substructure widening.
- Glen Cove Road Bridge - The existing superstructure, the bridge seats, and portions of the south wing walls will be removed to accommodate the new superstructure and the substructure widening.
- Meadowbrook Parkway Bridge – The south ballast retainer and portions of the south wing walls will be removed to accommodate the new Third Track superstructure span and the substructure widening.
- Cherry Lane Bridge - The existing superstructure, the abutment backwalls and the south wing walls will be removed to accommodate the new superstructure and the substructure widening.

B. Early Works-Utilities

1. 3TC has begun our "early works" during the Procurement Phase by reviewing the utility plans provided in the RFP, meeting with Nassau County DPW, PSEG-LI, and the private communication third party utility companies, 3TC will continue our early works program throughout the LNTP, where we will mitigate schedule risk. During the LNTP, 3TC plans to conduct our utility markout and location survey. We will compare the results with what was provided with the RFP, and with what we have received from the third party utilities. The discrepancies will be reviewed, and if needed, test pits will be conducted to confirm utility locations. 3TC will the finalize the design and submit for permitting

2. Utility relocation is the first construction phase activity to take place outside the Rail Road ROW. Utilities will be relocated such that there is no interference with the grade crossing elimination construction work phase

C. Track

3TC's track design will meet all project requirements and will include the following elements:

1. **Plan and Profile Drawings –** 3TC will provide a comprehensive track alignment design which will follow Rail Road and Federal specifications for train performance, passenger comfort, structural clearances, and other relevant guidelines
2. **Special Trackwork –** 3TC will design special trackwork based on Rail Road guidelines and will ensure that all turnouts and crossovers meet project specifications. The special trackwork will be designed, ordered, procured, and installed in sequence with track installation to ensure that work is completed quickly and that Rail Road can test, commission, and certify tracks as soon as possible
3. **Submittal Blocks –** 3TC will complete track design and installation in pre-determined Blocks. Block 1 runs from Floral Park to the proposed N1 interlocking. Block 2 runs from proposed N1 to proposed N3. Block 3 runs from proposed N3 to Hicksville. Breaking the Project down into these blocks will allow for faster, more focused construction sequencing and will allow Rail Road to commission the new mainline track in segments, allowing the Rail Road to benefit from the new operational flexibility immediately.

D. Grade Crossing Elimination

At Covert Avenue, New Hyde Park Road, Willis Avenue, School Street, and Urban Avenue, the following elements make up the design.

1. **General Plans**—3TC will develop general plans showing the limits of construction, existing and proposed roadway alignments, property limits, and other general characteristics of the grade crossing replacement projects.
2. **Typical Sections**—3TC will design roadway sections which provide adequate cross-slopes, and superelevation, allowing for comfortable driving. 3TC will also ensure that the sections provide cross slopes to allow for drainage that does not leave ponding or standing water in the travel lane.
3. **Profiles**—3TC will design roadway profiles to provide safe and comfortable sight lines and adequate clearance under the railroad structures. They will also account for drainage, and tie the new roadway into the existing roadway, while accounting for nearby cross streets and driveways.
4. **Grading Plans**—3TC will compile grading plans to allow for adequate drainage in the areas of the eliminated grade crossings, while also providing aesthetically pleasing landscaped areas.
5. **Signing and Striping Plans**—The signing and striping plans developed by 3TC will account for the new traffic patterns resulting from the new grade-separated crossings. These plans will be developed in accordance with the MUTCD.
6. **Parking and Bus Relocation Plans**—3TC will account for parking and bus stops near the closed grade crossings, and develop plans for relocated parking, if parked vehicles cannot be accommodated at their present locations. All existing bus stops will be catalogued, and if any stops cannot be maintained, they a new stop will be provided.
7. **Other Elements**—3TC will develop plans for accommodating traffic during the construction of the new underpasses. 3TC will also produce plans to provide aesthetically pleasing architectural features on the new grade-separated crossings. Plans will also include provisions for pavement repair; fencing, walls, and other structures near the crossings; and other elements necessary to complete the elimination of the grade crossings.
8. **Drainage Plans**—3TC will develop drainage plans that will identify new drainage structures, sewer lines, pump stations, detention systems, recharge basins, and other drainage related systems.

E. Grade Crossing Closures

At South 12Th Street and Main Street, the following elements will make up the design of the closed grade crossings.

1. **General Plans, Typical Sections, and Profiles—**3TC will design plans for the closed crossings to ensure that all vertical and horizontal alignments are sufficient with the crossing closed. Drainage, sight lines, and driver comfort will be considered.
2. **Signing and Striping Plans—**3TC will review the signing and striping in the area of the closed crossings, and provide revised plans the accommodate traffic movements with the crossings closed. For example, at Main Street in Mineola, the

one-way streets in the area may be re-evaluated and reversed, if necessary. Additionally, signage will be designed to alert drivers that the crossing is closed, allowing them to divert to alternate routes.

3. **Other Elements—**3TC will also produce plans to provide aesthetically pleasing architectural features around the closed crossings. Plans will also include provisions for pavement repair; fencing, walls, and other structures near the closures; and other elements necessary to complete the elimination of the grade crossings.

F. Bridges

Under-Grade Crossing Structures

The following structures are required at the Under-grade Crossings:

AT COVERT AVENUE

- Rail Road Mainline over Covert Avenue – A new single span bridge supporting three railroad tracks spanning over two roadway lanes and a sidewalk.
- 2nd Avenue over Covert Avenue – A new single span bridge supporting two roadway lanes and two sidewalks spanning over two roadway lanes and a sidewalk.
- 3rd Avenue over Covert Avenue – A new single span bridge supporting two roadway lanes and two sidewalks spanning over two roadway lanes and a sidewalk.
- New Retaining Walls along Covert Avenue.

AT NEW HYDE PARK ROAD

- Rail Road Mainline over New Hyde Park Road – A new single span bridge supporting three railroad tracks spanning over five roadway lanes and two sidewalks.
- North and South Pedestrian Connections over New Hyde Park Road – Two new walkway bridges spanning over five roadway lanes and two sidewalks.
- New Retaining Walls along New Hyde Park Road.

AT WILLIS AVENUE - AS PER 3TC'S ALTERNATIVE DESIGN

- Rail Road Mainline over Willis Avenue – A new single span bridge supporting three railroad tracks spanning over two roadway lanes.
- Rail Road Oyster Bay Branch over Willis Avenue – A new single span bridge supporting two railroad tracks spanning over two roadway lanes.
- Front Street over Willis Avenue – A new single span bridge supporting one roadway lane and a sidewalk spanning over two roadway lanes.

- Hinck Way over Willis Avenue – A new single span bridge supporting one lane of traffic over two roadway lanes.
- New Retaining walls along Willis Avenue.

AT SCHOOL STREET

- Rail Road Mainline over School Street – A new single span bridge supporting three railroad tracks spanning over two roadway lanes and a sidewalk.
- New Retaining Walls along School Street.

AT URBAN AVENUE

- Rail Road Mainline over Urban Avenue – A new single span bridge supporting three railroad tracks spanning over two roadway lanes and a sidewalk.
- Railroad Avenue over Urban Avenue – A new single span bridge supporting two roadway lanes and a sidewalk spanning over two roadway lanes and a sidewalk.
- New Retaining Walls along Urban Avenue.

Rail Road Bridges

The following Rail Road Bridges are included in the Scope of work:

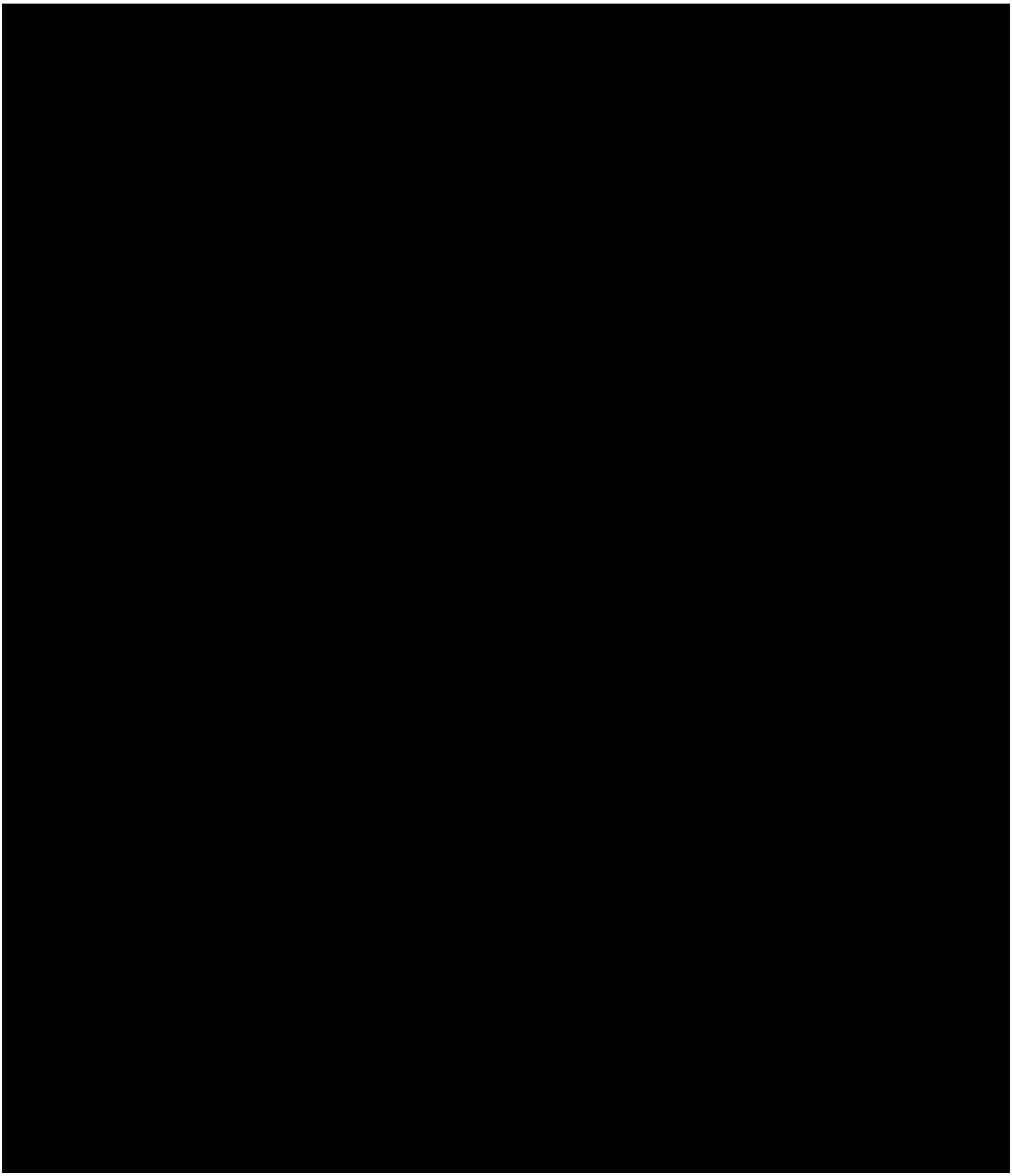
- Floral Park Viaduct Turnout – An existing viaduct bridge that will be widened in eight spans for the proposed Third Track turnout
- Rail Road Mainline over South Tyson Avenue (adjacent to Floral Park Viaduct) - A new single span bridge that will support the new Mainline Third Track and the northern track of the two track Hempstead Line. The portion of the adjacent Hempstead Line bridge that currently supports the north track will be removed
- Rail Road Mainline over Plainfield Avenue – A new adjacent single span bridge supporting the Third Track spanning over two roadway lanes and two sidewalks
- Rail Road Mainline over Denton Avenue - A single span bridge superstructure replacement and bridge widening that will support three tracks over a single lane road
- Rail Road Mainline over Meadowbrook State Parkway – A new adjacent two span bridge supporting the track spanning a six lanes highway.
- Rail Road Mainline over Glen Cove Road - A single span bridge superstructure replacement and bridge widening that will support three tracks over four roadway lanes and two sidewalks

- Rail Road Mainline over Nassau Boulevard - A single span bridge superstructure replacement and bridge widening that will support three tracks over two roadway lanes and two sidewalks
- Rail Road Mainline over Cherry Lane - A single span bridge superstructure replacement and bridge widening that will support three tracks over a single lane road

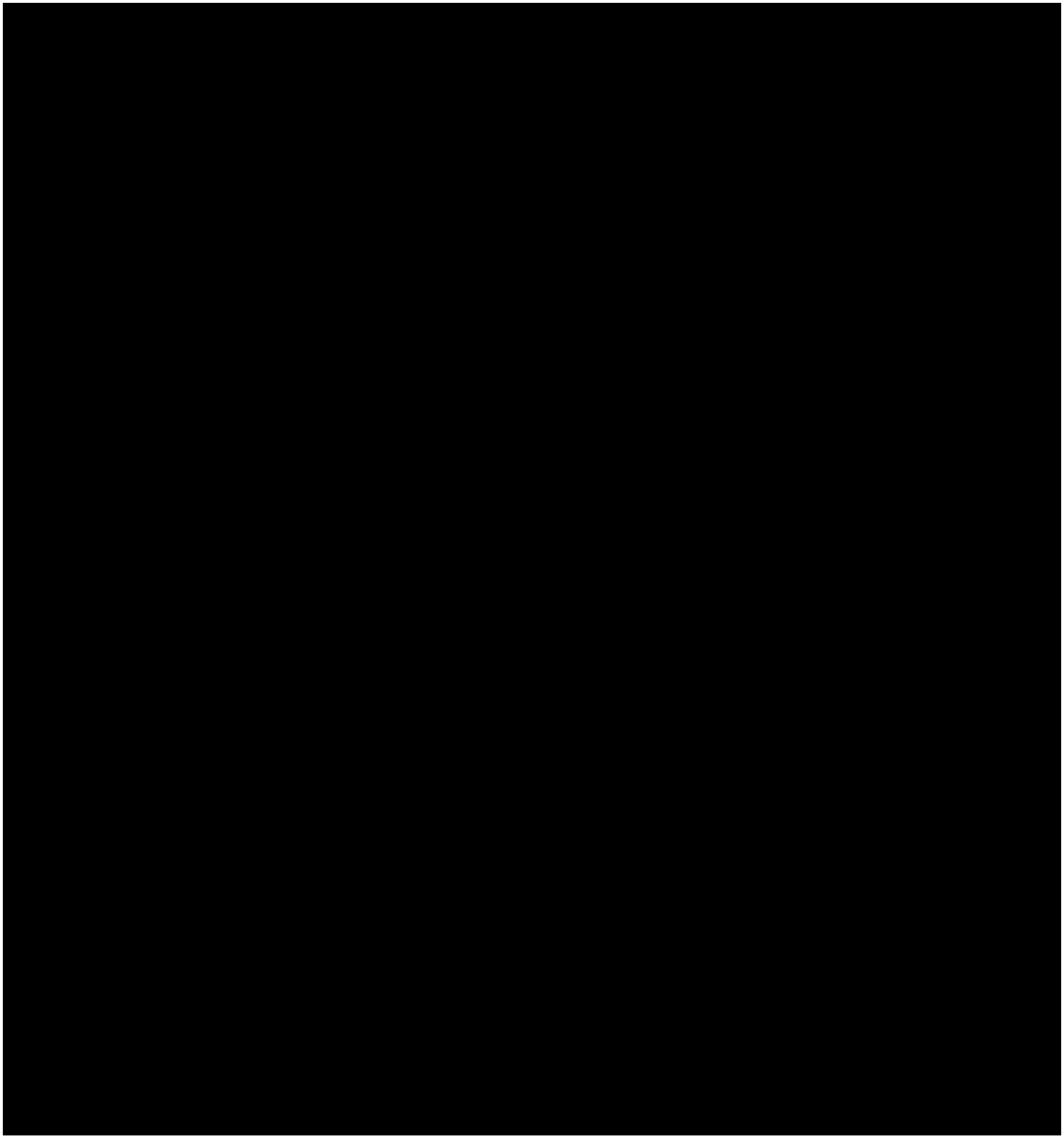
[redacted]

[redacted]

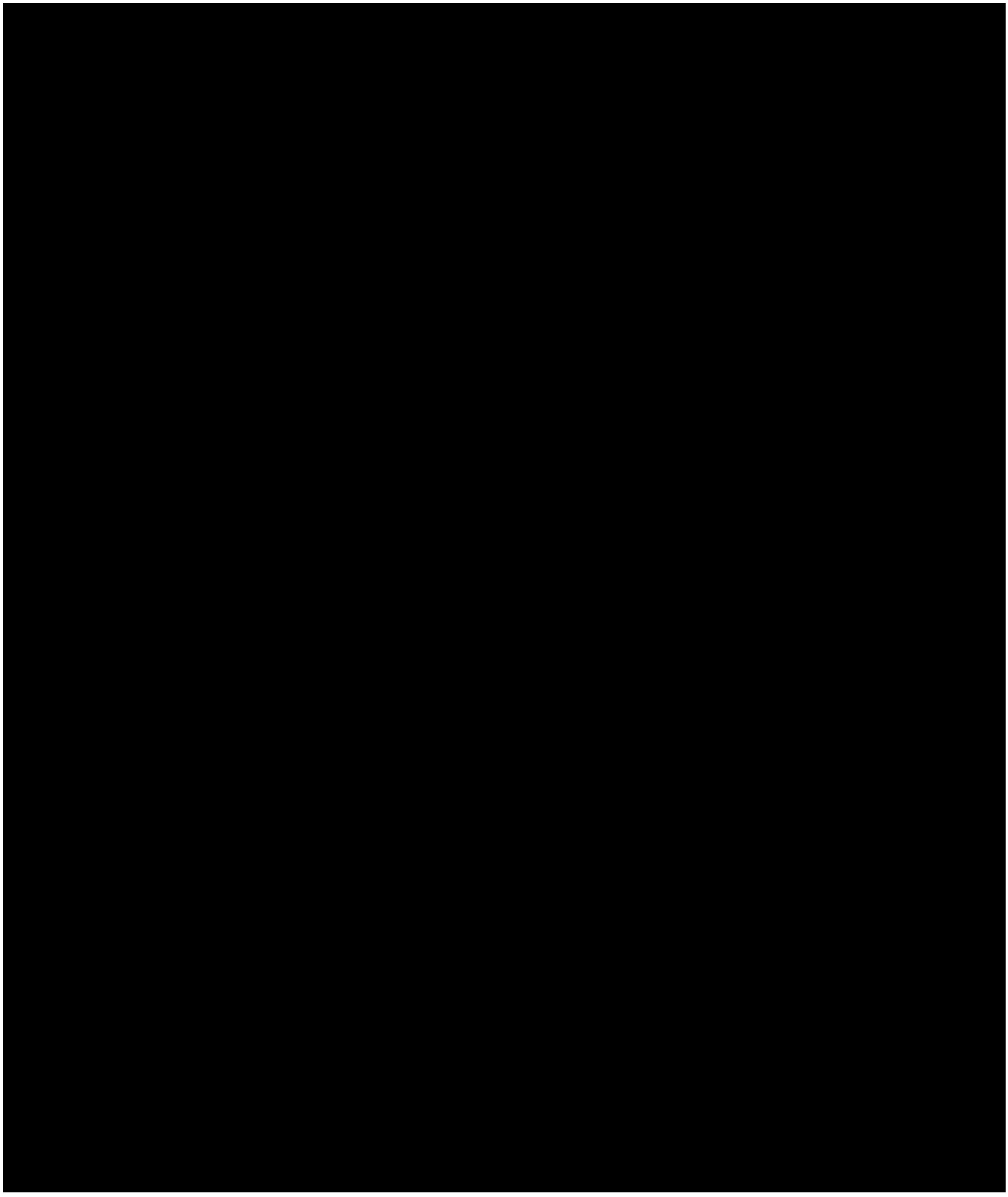
RAIL ROAD MAINLINE OVER DENTON AVENUE - A single span bridge superstructure replacement and bridge widening that will support three tracks over a single lane road



RAIL ROAD MAINLINE OVER GLEN COVE ROAD - A single span bridge superstructure replacement and bridge widening that will support three tracks over four roadway lanes and two sidewalks



RAIL ROAD MAINLINE OVER NASSAU BOULEVARD - A single span bridge superstructure replacement and bridge widening that will support three tracks over two roadway lanes and two sidewalks



RAIL ROAD MAINLINE OVER CHERRY LANE - A single span bridge superstructure replacement and bridge widening that will support three tracks over a single lane road

G. Retaining/Sound Walls

Retaining and Sound Attenuating Walls along the Mainline ROW

There is approximately [redacted] of retaining walls and [redacted] of sound attenuating walls proposed along the Project corridor and are as follows:

RETAINING WALLS ALONG NORTH SIDE				
ROW Stationing	Length [ft]	Height [ft]	Condition	Type
[redacted]				

RETAINING WALLS ALONG SOUTH SIDE				
ROW Stationing	Length [ft]	Height [ft]	Condition	Type
[redacted]				

RETAINING WALLS ALONG SOUTH SIDE				
ROW Stationing	Length [ft]	Height [ft]	Condition	Type
[redacted]				

SOUND ATTENUATING WALLS ALONG NORTH SIDE			
ROW Stationing	Length [ft]	Height [ft]	Type
[redacted]			

SOUND ATTENUATING WALLS ALONG SOUTH SIDE			
ROW Stationing	**Length [ft]**	**Height [ft]**	**Type**
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]

H. Signal

The following Table lists the items are considered Project Design Elements.

[redacted]

I. SCADA/Communication

The following Table lists the items considered major Project Design Elements.

[redacted]

J. Stations

All the Rail Road standards to be incorporated into the design with the integration of the proposed kit of parts will augment local urban cultural context. 3TC will provide adequate seating, bike racks, and security lighting at the entrances to the stations and the drop-off areas.

Floral Park Station

At this station three pedestrian elevators will be installed to service each of the three existing platforms. The existing freight elevator at the center platform will be repurposed as one of the pedestrian elevators.

New Hyde Park Station

New Hyde Park Station is located between South 12th Street and New Hyde Park Road. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and foundation will be removed and reconstructed. The proposed station will include a pedestrian underpass on the South 12th Street side of the station. The existing station building will be rehabilitated and a plaza area will be provided adjacent to the Eastbound platform. A new parking lot will be constructed at new Hyde Park Road. MTA Arts and Design (MTA A&D) artwork will be incorporated into the station.

Merillon Avenue Station

Merillon Avenue Station is located west of Nassau Boulevard. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and foundation will be removed and reconstructed. Two elevator towers connecting passenger flow from the station to Nassau Boulevard will be provided at the east end of the station. Artwork per MTA A&D will be included in the station design.

Mineola Station

Mineola Station (rendering below) is located between 5th Avenue and Main Street. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and foundation will be removed and reconstructed. The proposed station will include three pedestrian overpasses. The first pedestrian bridge will be located adjacent to the existing station building and will replace the existing overpass. The second overpass will be located on the west side of Main Street and the third overpass west of Willis Avenue. The existing station building will be rehabilitated and a plaza area will be provided adjacent to the Eastbound platform. A kiss and ride will be constructed at Main Street. MTA A&D artwork will be incorporated.

Carle Place Station

Carle Place Station is located between Cherry Lane and Carle Road. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and the foundation will be removed and reconstructed. The proposed station will include a pedestrian overpass aligned with the center of Stonehinge Lane. Artwork per MTA A&D will be included.

Westbury Station

Westbury Station is located between Post Avenue and School Street. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and foundation will be removed and reconstructed. The proposed station will include two pedestrian overpasses. The first pedestrian bridge will be located at the new parking structure. The second pedestrian bridge will be located at the east end of the station. The existing station building will be rehabilitated and plaza areas provided on the west side of the station. The existing underpass will be extended to connect with the new parking structure. The station will include MTA A&D artwork.

Project Elements at each of the stations include:

- **Pedestrian overpass cores**: To be glazed along vertical circulation and to receive 50% opacity terracotta sun screen demarcating entrance to stairs, elevators and views to the community.
- **Platform shelters**: To utilize canopy structure for the roof. Vertical enclosure will be fabricated from clear anodized aluminum framing and clear laminated and tempered glazing. Shelters are also to receive 50% opacity terracotta sun screen on the outer face of the aluminum/ glass enclosure to tie into the station aesthetic strategy.
- **Stair guards and handrails**: To be fabricated of corrosion resistant stainless steel, type 316 and [redacted] and [redacted] finish respectively. Guard infill to be vertical solid stainless steel bars ([redacted]) spaced no more than [redacted] on center.
- **Platform and accessible ramp guardrails**: To be composed of stainless steel wire mesh mounted on stainless steel framing supported on galvanized steel truss structure that spans between canopy columns without bearing on platforms or ramp planks. Guardrails to be fabricated of corrosion resistant stainless steel, [redacted].
- **Canopy structure**: To be galvanized steel with clear anti-graffiti top coat. Platform canopy and pedestrian walkway canopy to be consolidated into one foundation to minimize structural footprint in the crowded space between the platform and at grade walkways.
- **Pedestrian overpass bridge structure**: To be galvanized steel with clear anti-graffiti top coat.
- **Under-platform security barrier**: To utilize expanded metal (at select stations) or lightweight removable panel.
- Platform signage band to have a anodized aluminum finish and will house the lighting and other electrical services to simplify maintenance, installation and minimize visible hardware. LED down lighting will be recessed into the underside of the band to provide general lighting that meets required illumination levels. When the band is below a canopy structure, there will be dynamic linear LED (RGB) up lighting integrated into the top of the band. This dynamic changing up lighting will be connected to the arrival and departure of the trains on each side of the platform – this Dynamic Train Arrival Notification Lighting will provide arriving commuters with a clear visual cue for the impending arrival of a train.
- The Dynamic Train Arrival Notification Lighting will also be deployed at the pedestrian overpass cores and bridges (highest elements in the station design) to provide a high level signal of the arrival of a train.

K. Power

Power work will consist primarily of furnishing and installing 7 replacement traction power substations and one portable traction power substation. Three of the substations will have signal power feeds. Addition power work includes supply of power to stations and ancillary buildings. Sectionalization of the third rail is also included in the power work. Relocation of utility and railroad electrical feeders are part of this section of the work.

Structure	Proposed Car Count	Minumum per RFP	Proposed distance above grade to parking floor (ft)
Mineola			
Harrioson	551	551	43.33
South	381	365	43.33
Hicksville			
South	604	583	22
Westbury			
North	677	676	32.66
South	681	676	43.33

L. Garages

Overview

Collaboration between our team has allowed us to offer the Long Island Railroad design alternatives that will reduce initial capital costs as well as long-term maintenance costs. Our alternative fits within the program parameters identified by the Long Island Railroad. Materials and massing, building orientation, public spaces, and landscaping maintain the intended design criteria interaction with the community. Our designs provide the Long Island Railroad with the most durable and lasting structure possible while also reducing the general and carbon footprint of the facility. The intent of the design/build team is to conform to the requirements of the RFP in a cost-effective manner. The drawings have been prepared based upon the criteria identified the requirements of Section 3.14

Parking garages have been developed further from the concepts shown in the RFP into framing plans based upon the anticipated structural system to develop cost estimates and more defined parking capacity counts. As a result, the following car counts and building heights are proposed:

Philosophy

The parking structures have been designed to be classified as Open Parking Structures to the greatest extent possible. Thus, the maximum allowable height has been utilized in order to avoid basements wherever possible. This approach allows for the control of construction costs and long-term maintenance costs through the elimination of sprinkler and ventilation systems that would otherwise be required as part of an underground parking area.

STRUCTURAL

The selected structural system is precast concrete. Typically, the structures utilize:

- Twelve-foot-wide, [redacted] minimum depth, pre-topped double tees
- Typical precast columns are [redacted]
- Inverted tee girders are nominally [redacted] deep
- Horizontal load bearing light walls are used on interior grid lines adjacent ramps and provide lateral load resistance in the long direction of the structures.
- A combination of interior and/or exterior shear walls are utilized to provide lateral load resistance in the short direction of the structures

Durability of Design

Sealers, deck coatings, concrete additives, corrosion inhibitors, and selective epoxy coating of reinforcement will be included to provide a durable parking structure. Deck coatings (membrane) will be included over occupied space and over electrical and storage rooms.

The intent of our design is to conform to the American Concrete Institute's Guide for the Design of Durable Parking Structures (AC I 362). The design life of a parking structure should be 60 years.

Sustainability

The parking garages will be built using sustainable approaches to minimize impact on the environment while maximizing these benefits for users of the facilities. The U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) standards will be used to guide many aspects of the project. However, stand-alone parking garages are not eligible for LEED certification. One such approach includes optimizing design features to incorporate the greatest level of natural light possible to reduce the need for lighting during non-peak operational periods which helps reduce the carbon footprint of the facility.

Design For Future Adaptive Reuse

The Projects five proposed garages are coming on-line when more and more Rail Road users are getting to the train station through the use of alternative methods as opposed to the conventional means of driving a private vehicle to the station and parking the car. These alternative methods, whether they include such transportation modes as biking to the station or using ride-share service to access the station, will have an adverse affect on the demand for parking and if they continue will reduce the overall demand for parking at a station in the next generation. This reduction in demand would create numerous issues such as the potential loss of revenue for the garage operator and would inspire

the operator to seek alternative ways of obtaining revenue from the parking garage. This could result in repurposing the garage to encompass parking on the lower floors and residential or commercial uses on the upper floors.

As presented, each parking facility maintains a minimum floor to bottom of beam height of 7 FT with 8 FT-2 IN minimum provided for Van Accessible ADA parking on the street level. As each municipality maintains their respective zoning codes regarding the height of parking structures, this dimension allows for us to accommodate the design criteria set by Rail Road and meet the height restrictions adopted by each municipality. The Rail Road's design criteria only allow for minimum driving clearance for the heights and vehicle counts required.

To accommodate the reuse of the facility in the future, the floor to bottom of beam dimension would be required to be a minimum of [redacted] increasing the height of each floor by [redacted] for a total of [redacted] for a five-story garage and thus exceeding the maximum height adopted by each community.

With the Rail Road's approval and that of the local governments, we will integrate our adaptive reuse philosophy into our parking garage design/construction so that the garages will not only be affordable now, but provide for some cost recovery in the future. Rail Road approval would be at its discretion and we understand that no commitment has been made by the Rail Road. If 3TC does not obtain all the required approvals, before the final decision needs to be made according to our schedule, the original concept for parking garages included in the Request for Proposals will be implemented. The Rail Road will not assume any additional risk due to this opportunity.

The 3TC Team is certainly amenable to working with Rail Road to meet this need should Rail Road determine it is in their best interest and that of the local communities.

See Section 2.9 for further discussion of our Parking Garage alternative proposals.

Functional Concepts

The parking structures typically utilize [redacted] parking bay. For most locations, this is based upon [redacted] parking stalls with a [redacted] drive aisle. In Mineola and Westbury, the parking stalls, dictated by zoning code, are [redacted]. Since the drive aisle does not have a required dimension, the [redacted] bay has continued to be used. The [redacted] percentile design vehicle is only [redacted] long, thus the longer stalls appear to be a hangover from older zoning code and are not normally used as part of today's design standard.

The stall widths vary by municipality based upon local zoning codes. The following stall widths have been utilized based on these codes:

- Mineola: [redacted]
- Hicksville: [redacted]
- Westbury: [redacted]

Architectural Facades

In general, exterior facades utilize [redacted] high precast spandrels with picture framed thin set brick, this is similar to existing construction and provides the durability advantage of fewer exposed brick edges.

Stair/Elevator towers typically utilize precast concrete with limited brick as the exterior walls are dominated by curtain walls which are used to increase passive security of the stairs by providing good visibility of pedestrians using the stair towers.

Standing seam metal roofs are typically provided on top of the stair/elevator towers. This roofing system provides superior levels of durability and blend easily into the fabric of the surroundings.

Drainage

Floor drainage systems are critical in parking structures in any region of the country climates. Direct rain or snow may not enter all areas of the parking garage, but wind driven rain and snow and/or vehicles carrying ice, snow and rain water can distribute water throughout the garage. Heavy rains may also overload rooftop floor drains causing rain water may run down ramped floors to lower levels. Scheduled floor wash-downs that are part of a good maintenance program are also a source of water throughout a parking facility. If the floor is not adequately sloped, water will pond and deterioration will accelerate under the ponded areas. Design slopes of [redacted] are desire d, with a minimum design slope of [redacted] included as part of design standards. Water will be drained away from exterior columns, walls a n d

pedestrian pathways. Washes at the low end of double tees and adjacent inverted tee girders will be included to achieve the desired drainage slopes.

Drain locations will be finalized during the final stages of design. Roof top level drain systems will be designed to accept a 10-year design rainfall event or as required by the State code. Riser sizes will be determined based upon contributory area. See Civil for retention basin sizing.

Parking Access and Revenue Control Systems

The parking layout is based upon an ungated, pay-by-space or pay-by-plate revenue system. It is anticipated that most users will be permit holders but hourly parking will also be offered in consultation with the Rail Road and local government. Multi-space parking meters have been used at the other Rail Road Parking structures and they are becoming increasingly popular in structured parking facilities because they provide low initial capital costs as well as low long-term operational and maintenance costs when compared to other parking access and revenue control systems (i.e. gated systems). Thus, we have assumed that an ungated revenue control system will also be used for these parking structures. We are not sure whether a pay-by-plate or a pay by space model will be used. Since the pay by plate model is generally more cost effective to enforce, we have assumed that technology is being used in designing the parking structures. This will be verified with the Rail Road and local government.

In the Pay-by-Space application for multi-space meters, the hourly user parks in a numbered space, enters the corresponding space number in the multi-space meter and then pays the designated fee for the time

required. Parking enforcement officers perform parking enforcement. The officer simply requesting a printout from any Pay-By-Space parking meter for all paid spaces so the officer can issue a citation to any vehicle without a permit that occupies an unpaid parking space. A physical inspection of unpaid spaces must be conducted to confirm that the space is an unpaid hourly user and not a permit holder. Parking enforcement officers must return to the meter after making their rounds and pull a second report to distinguish if any users were in route between their vehicle and the meter to pay for their parking when the first report was printed. If this situation presents itself, then the enforcement officer must retrieve any citations from vehicles where this situation may have occurred and void the issuance of the citation.

In the pay-by-plate application, the user would be required to input their license plate and pay for the time desired. This technology would allow the owner to eliminate the need to issue permits as the license plate becomes the identifying credential. This technology will allow parking enforcement staff to monitor each parking space more times per day as it is a rapid method of performing parking enforcement patrols. This system also eliminates the need recording license plates in handheld devices.

Utilizing a multi-space parking meter system, the entrance and exit lane throughput is a product of what the respective feeder streets can handle for both ingress and egress. All queuing occurs as a pedestrian . Thus any delays at the vehicular entry/exits due to the Parking Access and Revenue Control system are avoided. The advantage of this approach is that there should be no vehicle queuing issues caused by the revenue control system.

Office/Support Facilities

Each parking garage includes an office space and utility rooms. The office space includes a [redacted] waiting area with large glass windows for visibility, [redacted] manager office, [redacted] counter room, and a [redacted] general office area with access to an ADA compliant restroom.

Utility rooms are typically located under the ramp leading up to the first supported level, and consist of; Communication room, IT room, electric room, and a storage room. Square footage and height meet or exceed the technical provisions requirements identified for these purposes.

MINEOLA – HARRISON AVENUE

The parking structure is primarily a 2-bay single thread parking structure with a two bay "L" on the north. The structure will have six levels including one basement level. A stair tower is provided in the northeast corner and a stair/elevator tower in the southeast corner. One elevator is provided for the parking structure. Vehicles can enter from Harrison Avenue on the north and 1st Street on the south. Because of the narrowness of the property, the east ramped bay utilizes parallel parking where the bay must be less than [redacted] wide.

The parking concept is based upon no setbacks from the streets or adjacent property lines. Because the site is constricted, fire walls are required for the portions of the east elevation which are within [redacted] of the adjoining property lines. These include the middle portion of the east ramp and the east edge of the north "L".

MINEOLA - SOUTH

Two bay rectangular parking structure with a parked-on ramp in each bay. The structure is [redacted] with four supported levels, which makes it two levels below the maximum height allowed. In addition, it is a completely open garage with no basement level. The foundations designed to accommodate three additional levels for future expansion. Stair/elevator towers are located at the northeast and southwest corners. The parking structure has two elevators. Vehicular access through a new side street accessed from either 2nd Street or on Station Plaza street running along the north side of the tracks under the Mineola Boulevard overpass.

Shear walls located at the exterior walls to allow for maximum visibility and parking efficiency. East side of the garage is less than [redacted] from the property line, thus it was designed as a fire wall.

HICKSVILLE

This is a three-bay single thread parking structure with two supported levels. Access to the structure is from West Barclay Street on the north. The property has room for a small, single bay of grade parking to the East of the parking structure. There will be a curb cut into this area which is anticipated to be the primary entry/exit to the facility. The ramp is in the north bay of the structure and rises as drivers proceed west. A second curb cut is provided in the northwest corner but it anticipated to be secondary and primarily serve the two flat bays on grade adjacent to the tracks.

The structure has two stair towers along the south side, however both elevators were located at the south-east corner to provide the pedestrians with a close access to the platform access underpass which is located to the east of the parking structure. The office area is located on the northwest side of the parking structure adjacent the primary vehicular entry/exit.

WESTBURY - NORTH

The parking structure is a four and a half level, four bays single thread with the two inner bays sloping up half a level in one direction, and the two outers bays sloping in the opposite direction. Vehicular access provided from the north and south sides of the garage. The north access from Scally Place is [redacted] higher than the street level and has a [redacted] setback, which allows for sufficient grade slope to make the North wall of the basement level completely open. The south entrance is through an adjoining parking lot off Union Ave.

There are four full levels and a half basement level in this garage. The half level basement is on the north side of the structure, adjacent a [redacted] setback from Scally Place. The basement walls project [redacted] above the basement slab and the adjacent landscaped area will slope down toward the parking structure so the openness of this basement level will be similar to that of a typical tier. Thus, this area will have sufficient openness to make it an open parking structure without the need to sprinkle or ventilate this area.

Stair/elevator towers located at the northeast and southwest corners allow for pedestrian access from Scally Place sidewalk and southern and western parking lots.

WESTBURY - SOUTH

This structure will be a five level, two bay single thread, open parking structure, stretching east -west along the railroad platform. The garage has a grade level with two entry/ exits from Railroad Ave, and four supported levels. The top level is one bay shorter than the typical level.

Elevations at grade level slopes down to provides an accessible path to the existing pedestrian underpass. The second level and first supported level, will match the proposed platform elevation to allow a direct access from the northern stair/ elevator lobby. Pedestrians can cross over to the westbound platform via either the

underpass or a pedestrian bridge connecting into the fourth Level of the parking structure. A second stair/ elevator tower is located at the southwest corner. The structure has a total of two elevators.

Shear walls located at the exterior east & west walls to allow for maximum visibility and parking capacity. There is an expansion joint near the center of the parking structure which is required because of the length of the parking structure. The architectural treatment of the thin brick inserts on the precast spandrels matches the station building design theme.

M. Ped Bridges and Tunnels

Pedestrian Bridges and Underpasses

The following New Pedestrian Bridges over Rail Road Mainline are required:

- Main Street (near Merillion Avenue Station)
- Willis Avenue (east of Mineola Station) - pictured
- Mineola Station
- Carle Place Station
- Westbury Station (East end of platform)
- Westbury Station (West end of platform)

The following Pedestrian Underpasses are in the Scope of Work:

- New Hyde Park station (12th Street)
- Westbury Station, extension of existing underpass
- Linden Avenue, extension of existing underpass

2.2.3.6) Proposed Project Elements that exceed Project Requirements .

The following is 3TC's list of Design Components/Units in support of the Project Elements that exceed the Project Requirments:

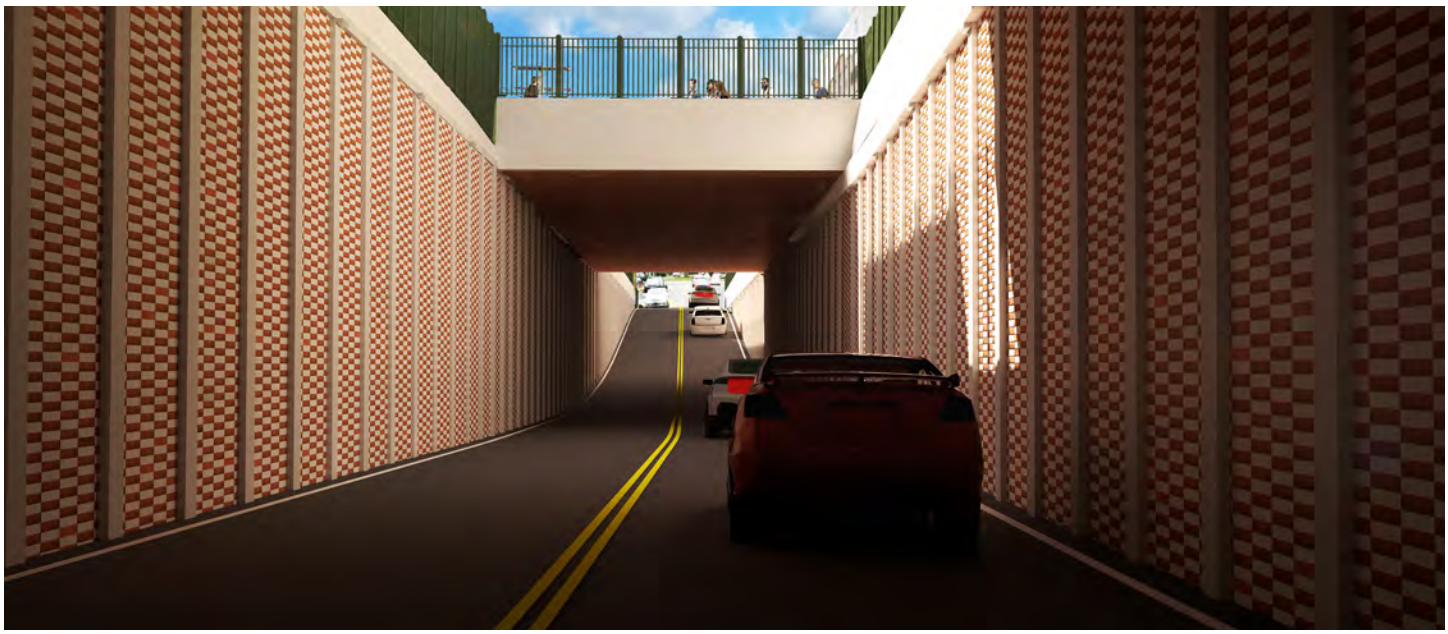
A. Grade Crossing Eliminations

Roadway Geometrics

Project requirements are to be achieved or exceeded by executing the goal of eliminating the existing street level grade crossings within the Project limits while enhancing public safety, roadway conditions, and north-south vehicular and pedestrian connectivity while meeting a certain design requirement. Project requirements are considered achieved when the proposed design elements comply with the standards established under the Project Design Criteria." Project Requirements are exceeded when design elements meet the "Desirable" criteria.

Reduction of impacts at grade crossings depicted in the Directive Drawings may also be considered exceeding project requirements. The reduction of impacts may be quantified with respect to the proposed and directive limits of work & reconstruction.

3TC's design approach to the Rail Road bridge structures at the locations of at-grade crossing eliminations presents the opportunity to exceed Project Requirements



MAXIMUM GRADES				
Crossing No.	Crossing Name	Roadway Classification	Max. Grade	Rail Road Design Criteria
1	Covert Avenue	Urban Minor Arterial	[redacted]	Absolute
2	New Hyde Park Road	Urban Minor Arterial		Desirable
3	Willis Avenue	Urban Minor Arterial		Absolute
4	School Street	Urban Major Collector		Desirable
5	Urban Avenue	Urban Major Collector		Desirable

Note: Roadway Classification from NYSDOT Functionality Classification & National Highway System Viewer.

in the highway category. With proposed 4-thru girder structural systems at these locations, the shallower depth floor beams allow for the reduction of structural depth below the track ballast to [redacted] than depths shown on Directive Drawings. The reduction presents the opportunity to raise highway underpass profiles and/or flatten approach grades to satisfy the desirable category, therefore exceeding project requirements. The table shown below depicts the achieved design criteria category based on proposed grades and roadway classification.

3TC has investigated an array of geometric configurations at grade crossing elimination locations to further enhance public safety, roadway conditions, and north-south vehicular and pedestrian connectivity from designs depicted in the RFP documents. The results include an array of alternative designs which 3TC believes will benefit communities adjacent to the Rail Road Mainline. This is the case in 3TC's proposed alternative design for the Willis Avenue crossing. Based on the Directive Drawings, achieving ADA compliancy in the north-south direction of the Willis Avenue crossing presented itself as a challenge. Unable to exceed a 5% grade on sidewalks, 3TC has proposed an alternative pedestrian walkway on the northwestern quadrant of the Willis Avenue & 2nd Avenue intersection to provide an ADA compliant walkway for north and southbound movements as shown in 3TC's At-Grade Crossing Elimination Plans.

3TC also identified geometric elements at the New Hyde Park Road crossing which can be modified to further improve safety and roadway conditions. The preliminary design depicted in the Directive Drawings features the intersection of New Hyde Park Road & Clinch Avenue situated approximately 100' from the edge of the proposed Rail Road bridge structure over New Hyde Park Road. Based on profiles provided in the Directive Drawings, providing adequate sight distances at the intersection's proposed location presents itself as a challenge. 3TC investigated the geometrics on the southeastern quadrant of the Rail Road at-grade crossing and have developed an alternative design which improves driving conditions, reduces earthwork, and utilizes public ROW exclusively. 3TC proposes relocating the intersection approximately [redacted], where the proposed grade is at [redacted] rather than the steeper grade depicted in the Directive Drawings. Clinch Avenue's geometry, approaching the intersection was also revised to provide a safer traffic operation, utilizing the same design parameters depicted in the directive. 3TC's proposed alternative designs enhance the design intents presented in the directive drawings, therefore exceeding the base project requirements.

Although having ultimately chosen to pursue the majority of the design concepts depicted in the Directive Drawings, 3TC explored several design alternatives which may be worth considering for instance the Willis Avenue Underpass modification scheme found in Section 2.9: Ingenuity. Outside of the Design Criteria, the Directive Drawings also establish the project requirements that are to be achieved and exceeded. 3TC proposed roadway underpass profiles comply with the requirements listed in the Design Criteria while reducing the limits of reconstruction and retaining walls from their directive counterparts, therefore exceeding the Project Requirements depicted in the Directive Drawings. Refer to 3TC Grade Crossing Eliminations Plan Set for proposed limits of reconstruction.

Storm Drainage Management

3TC has explored various methods to exceed Project requirements for drainage design. One basic method is to reduce the runoff volume developed at each grade crossing by decreasing the stormwater tributary area near the new underpasses. The team plans to install new catch basins/leaching basins along the outer, higher-elevated perimeter of the underpass to collect stormwater runoff before it travels downgrade into the low point of the underpass. The water captured before flowing downward will be redirected into the existing Nassau County storm sewer infrastructure via new conveyance pipes. If no existing storm sewer infrastructure is available for use, new leaching basins will be designed and installed to accommodate the additional required storage. These leaching basins will be separate systems from the deeper proposed storage facilities. By reducing the total required runoff volume, both the size and total cost of the underground detention system will be reduced.

3TC's proposed solution for providing drainage at the five underpass locations generally consists of stormwater pumping. As per the RFP, stormwater pumping stations will consist of pump arrays sized to accommodate low flow (5year storm) and peak flow (10year storm) events and will provide 100% standby capacity. Wet wells will be sized to accommodate four submersible stormwater pumps; two rated at the 5 year design storm pump discharge rate (one service and one standby) and two rated at the 10 year design storm pump discharge rate (one service and one standby). However, it should be noted that the 10 year storm event results in a peak storm flow and pump discharge rate that is only 25 percent larger than those generated by a 5year design storm. Based on our conversations with representatives of GA Fleet/Flygt pumps and because of the relatively small tributary areas associated with each of the underpasses, the 3TC Team would like to further investigate the benefits of providing separate pumps for the 5 year and 10-year storm events versus providing a two-pump duplex station with each pump rated at the 10 year discharge rate for each of the five pump station locations.

The pumping solution will reduce the depth of the conveyance pipe and the depth of the connection to underground detention systems and/or recharge basins (both new and existing). The shallower depth significantly decreases construction quantities linked to excavation, backfill, temporary support of excavation, construction duration and overall Project cost. Shallower construction also facilitates improved sewer slope, reducing the required sewer size to a smaller diameter pipe.

3TC has explored the option of utilizing both new and existing recharge basins. At School Street an existing stormwater collection system could not be confirmed. 3TC, therefore, propose a submersible sewage pumping station adjacent to the underpass on the high side of the adjacent retaining wall discharging to a new Recharge Basin, which would be relocated in the area adjacent to the School Street underpass in a land parcel being acquired for the Project. The Recharge Basin will be sized to accommodate 8 inches of run-off from its

NEW HYDE PARK ROAD & CLINCH AVENUE INTERSECTION – LOOKING NORTH

associated tributary area, maintain a minimum of 5 foot clearance above the Seasonal High Groundwater Table elevation and constructed in accordance with the requirements contained in the latest revision to the RFP and in conformance with Nassau County Criteria.

Similar to School Street, there does not appear to be an existing Nassau County Stormwater Collection System in the vicinity of the Willis Avenue underpass. The Design Team, therefore, proposes a submersible stormwater pumping station discharging into a new gravity sewer in Hinck Way which will run easterly for a distance of approximately [redacted], and will discharge into existing Nassau County Recharge Basins at the intersection of Roslyn Road and Hinck Way, which we understand to have sufficient surplus capacity to accommodate the additional stormwater flow generated from this underpass (ie: Based on the Immediate Tributary Area vs. Overflow Tributary Area). This existing Recharge Basin was designed for the Roslyn Road Grade Crossing Project for NYSDOT (Project No. 23699). After reviewing the drainage calculations for that project, the Design Team has learned that the Recharge Basin was designed to accommodate the runoff developed from the overflow tributary area of the underpass rather than the direct tributary area. Based on the design criteria in the RFP, we are required to design for just the direct tributary area, which is significantly smallter than the overflow area. 3TC has determined that the difference in the capacities of the direct and overflow tributary areas is larger than the required volume developed for Willis Avenue. This indicates that the existing Recharge Basin is capable of accommodating the additional runoff. Connection to the Recharge Basin will be made via an existing inlet structure.

Community Outreach/Tree Planting Program

Since the ROW area is being reduced due the installation of a third track and retaining and sound attenuation walls, there isn't sufficient space to plant the required amount of trees. There is an opportunity to engage the community in a tree planting program that can provide new trees in the neighborhoods and streets adjacent to the Rail Road corridor.

B. Track

1. **Track Geometrics** – 3TC has assessed the proposed Third Track geometry as shown in the RFP and has optimized its alignment by considering Rail Road's operational requirements and minimizing the amount of track shifting of the existing Mainline. 3TC plans to install the new Mainline track on the South side of the ROW from Floral Park to Urban Avenue, eliminating the proposed track shifts at the new [redacted] interlocking and around Milepost [redacted]. This realignment will facilitate third-track construction and interlocking installation and will allow Rail Road to retain the functionality of the existing N3 interlocking while construction is ongoing. Additionally, installing the new track on the South side of the ROW significantly reduces the work required by Rail Road FA and shortens the overall time needed for track construction.
2. **Constructability Improvements – 3TC's track design will significantly improve construction access and timeline. It will reduce the number of track outages and will allow Rail Road to maintain continuous operation of the existing Nassau-1, Nassau-3, and Divide-1 interlockings through the construction phase. The South Side alignment will allow for much faster completion of the new mainline track.**
3. **Rail Road Force Account Work Reduction** – The proposed track alignment will reduce the scope of Rail Road FA's work. The RFP design include three cut-and-throw locations where the proposed track switched sides of the ROW and required Force Account to shift more than [redacted] linear feet of track as much as [redacted] in some places. These shifts would have required extensive coordination with the DBJV and would have been constrained to very short time periods. Our ATC only requires one cut-and-throw which can be done over a much longer period of time with minimal track outages and no significant interruptions to Rail Road operations. Additionally, our ATC minimizess Force Account's responsibility and reduces the amount of shifted track to under 15,000 feet.
4. **Utility Improvements** – though not directly related to the track design, ATC #27 provides a significant benefit to the utility work required to

support the Project. The RFP specifies a requirement for approximately 200 steel-concrete hybrid utility poles. However, our track alignment eliminates the need for many of these poles since 3TC will not build the new mainline track on the north side of the Rail Road ROW. We anticipate that only 25 to 45 hybrid poles will be required.

C. Garages

Adaptive Re-use of Parking Garages

The parking garages mandated by the Rail Road for the project are a necessity in this second decade of the 21st century to make this project successful. The construction of the garages will help generate the ridership that will not only help with make this Third Track Project effective, but also will help the Rail Road with the sustainability of its other projects that will come on line within the next decade such as the East Side Access project.

3TC is proposing two alternative strategies to make transportation more sustainable, both with respect to the environment, and with respect to economics.
As an opportunity for future development, bringing, more value to the affected communities and potential revenues to Rail Road, after award, 3TC is committed to propose a development plan to convert some or all single- purpose/single-use parking structures in Mineola, Westbury and Hicksville into potential multi-purpose/ multi–use structures.

3TC will partner with RXR Realty, the preeminent developer on Long Island, and will seek the approval of the aforementioned villages to convert all or some of the proposed parking structures into multi–use facilities to incorporate other uses including commercial (office, retail, etc.), residential (optimal commuter locations) and recreational (soccer, lacrosse fields, etc.).

Beyond making the Rail Road a more robust transportation option for Long Islanders by implementing this progressive transit oriented development approach of incorporating multi-use garage structures into the downtowns, the Rail Road more fully realizes its stated goal of catalyzing significant economic development along the Third Track corridor and beyond.

Multi-purpose Transit Oriented Development structures present a number of benefits, not only to the Rail Road but to the affected communities. By incorporating this

innovative and progressive concept, the Rail Road can serve as a catalyst for economic development, a growth in the local tax base and become a welcome amendment to the community's critical infrastructure. Other valuable benefits include the addition of private development capital to the Project, and the reinforcement of the useful life of the garage structures.

Future Garage Adaptability

The Project's five proposed garages are coming on-line when more and more Rail Road users are getting to the train station through the use of alternative methods as opposed to the conventional means of driving a private vehicle to the station and parking the car. These alternative methods, whether they include such transportation modes as biking to the station or using ride-share service to access the station, will have an adverse affect on the demand for parking and if they continue will reduce the overall demand for parking at a station in the next generation. This reduction in demand would create numerous issues such as the potential loss of revenue for the garage operator and would inspire the operator to seek alternative ways of obtaining revenue from the parking garage. This could result in repurposing the garage to encompass parking on the lower floors and residential or commercial uses on the upper floors. Our designs will provide for this future adaptability by optimizing floor to floor height ratios, column spacing, floor slopes, etc. Our Team recognizes the overall goal of the project is to get the people of Nassau and Suffolk County to/from NYC and their

intra-island destinations as quickly, comfortably, safely and cost efficiently as possible. With the Rail Road's approval, we will integrate that philosophy into our parking garage design/construction so that the garages will not only be affordable now, but provide for some cost recovery in the future.

The aforementioned alternative plans will only move forward if we receive the approval from Rail Road and in the case of the RXR/Transit Oriented Development, all the affected local jurisdictions. Rail Road approval would be at its discretion and we understand that no commitment has been made by Rail Road. If 3TC does not obtain all the required approvals, before the final decision needs to be made according to our schedule, the original concept for parking garages included in the Request for Proposals will be implemented. Rail Road will not assume any additional risk due to these two opportunities.

D. Signals

Systems

The connection between existing Q3 signal location and new N1 for point to point vital communication between interlockings might well be copper messenger cable even as the fiber backbone is being extended across the entire Third Track project. This situation is created because the current Q4 is a relay based system. To remove that copper connection the 3TC team has decided that it will install a fiber communicating Microlok II rack set up for two tracks to send the relay information to Nassau 1 and to provide the new Nassau 1 information over fiber back to the Q4 interlocking. This one rack which simplifies the connections and testing will also provide the Rail Road with a starting point to upgrade the Queens territory from vital relay to fiber communicating vital processor control.

In an effort to reduce the number of hours the Rail Road FA would need to implement temporary tie-ins to the existing signal locations 3TC is providing temporary Microlok II racks to be installed in the next vital relay location east of the one being tested and commissioned so that many of the temporary circuit changes can be accomplished in pre-programmed application software (tested and verified) and additionally will allow the testing to occur on the fiber optic network rather than a mix of fiber optic and copper. This is additional material being incorporated into the 3TC plan to simplify testing and reduce the effort required by signal force account.

E. Stations

Dynamic Lighting

To further the connection between way-finding and brand distinction of each station, we will use dynamic lighting on automated controls that will be connected to the timing of a train's arrival and departure. The dynamic lighting will be utilized at the overpass cores/bridge (highest elements in the station design) to signal the arrival and departure of a train. Along with the overpass cores/bridge, each side of the platform will integrate the LED (RGB) lighting into the signage band to up light the canopy and reinforce which train is approaching the station. This system will provide all commuters in the surrounding area a visual beacon (overpass/bridge) that the train is about to arrive, and they can hasten or slow their approach to the specific platform, as required.

Combined Canopy Structure

The addition of a third track has created the opportunity to optimize minimal space along the platform. Currently, the directive design asks for two separate canopy structures: one for the platform canopy and another for the pedestrian walkway. In many cases, these two canopies run directly adjacent to one another. If not consolidated, these two separate structures will prove to create more site work and un-intentional material adjacencies that complicate the esthetics of the design. In addition, having two separate structures for both canopies will prove to occupy square footage in an already tight space. In response to this, our proposed kit of parts includes a consolidated foundation for both the platform canopy and pedestrian walkway canopy. This eliminates redundant structural members, optimizes space,simplifies design and construction, as well as minimizes future maintenance of these structures.

Terracotta Brick Sun Screen (Fabrik)

The urban fabric surrounding the stations should impact the aesthetics of the proposed design. Inspired by the use of brick within in the community, our proposed kit of parts includes the use of a terracotta sun screen at the platform shelters and overpass building cladding. The terracotta screen and form liners provide a contemporary aesthetically sensitive alternative to using actual brick as the latter would require significant initial cost and result in ongoing maintenance issues due to moisture intrusion, repointing, cracking, and graffiti. Aside from alleviating maintenance concerns, the terracotta screen provides a consistent visual language for the entirety of the proposed project with a material familiar to the community and can reduce the heat gain in these enclosures by providing shading without decreasing visual connection.

Landscape

TREE PLACEMENT

We will meet the planting requirements by planting arborvitae 4 feet on center. However, it is our intent to exceed requirements by proposing a diverse palette of species to prevent monocultures which make areas more susceptible to plant diseases. We will propose muli-story plantings at the stations, and along the sound walls that will diminish the visual impact of the walls.

Green Infrastructure

3TC will also explore opportunities for managing stormwater runoff through the use of green infrastructure wherever possible. This may include the implementation of bioswales and permeable pavement and planting strips along the roadways. We will also install shade trees to the greatest extent possible to help reduce solar heat gain, such as at the new park as New Hyde Park

2.4 Landscaping and Aesthetics

Volume 2 - Package 2: Project Design

2.4 Landscaping & Aesthetics

2.4.1) Identifies all Design Elements for which the Proposer intends aesthetic treatments.

The following design elements will receive aesthetic treatments:

- Existing Station Buildings (New Hyde Park, Mineola, Westbury) – Check supplement #11
- Platform Guardrails
- Ramp and Stair Handrails
- Platform Shelters
- Canopy structures
- Platform canopies
- Pedestrian walkway canopies
- Pedestrian overpass cores
- Pedestrian overpass bridge structures
- Pedestrian overpass bridge glazing
- Pedestrian Underpass (New Hyde Park)
- Elevator headhouse (Merillon)
- Under-platform security barrier
- Retaining/Sound walls
- Parking structure façade
- Bridges

2.4.2) Outlines the family of aesthetic treatments proposed across the Project or within specific communities for specific Project Elements.

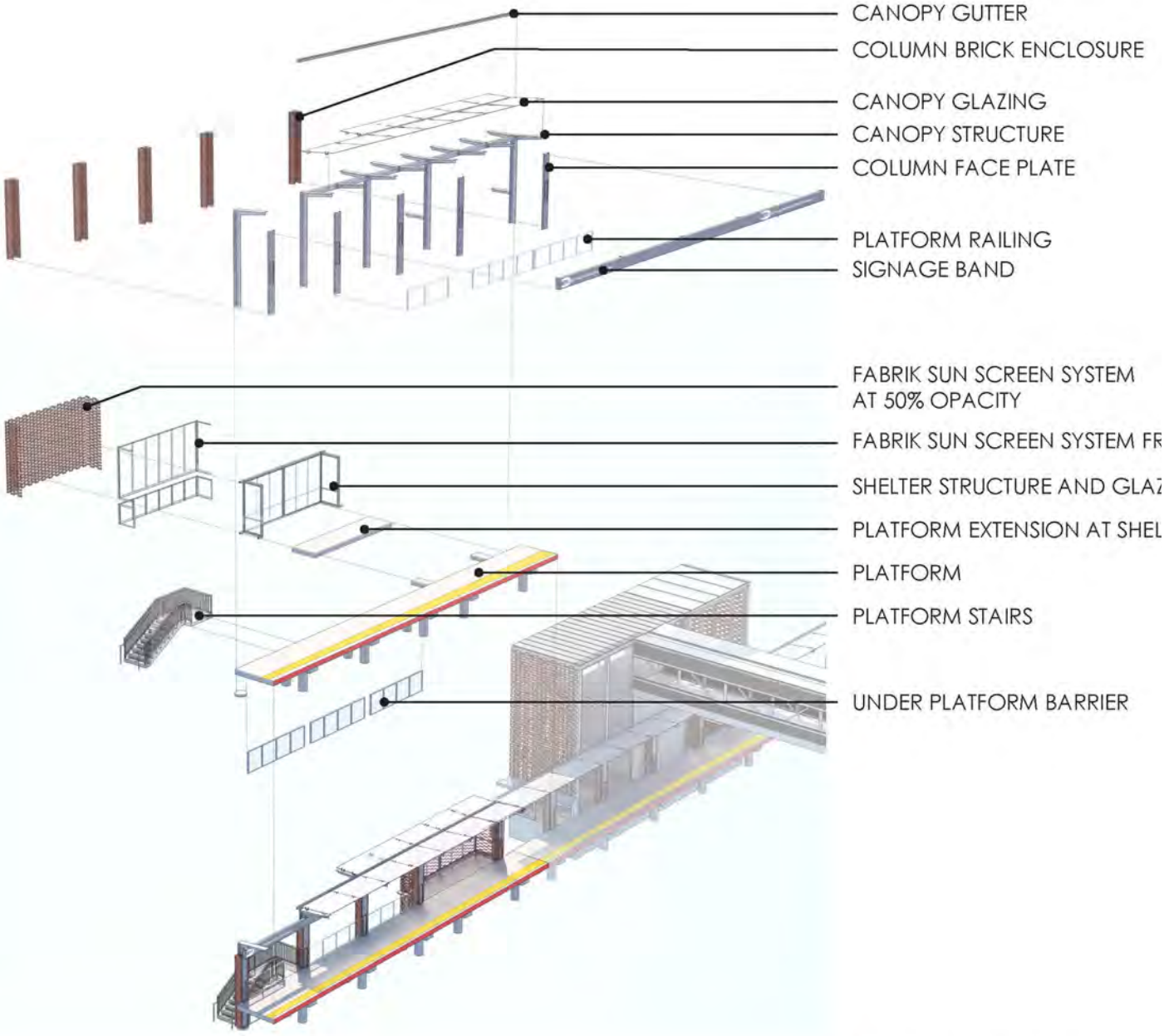
From the proposed kit of parts, the stations will have the following aesthetic treatments consistent throughout the Project:

- Pedestrian overpass cores: To be glazed along vertical circulation and to receive 50% opacity terracotta sun screen demarcating entrance to stairs, elevators and views to the community.
- Platform shelters: To utilize canopy structure for the roof. Vertical enclosure will be fabricated from clear anodized aluminum framing and clear laminated and tempered glazing. Shelters are also to receive 50% opacity terracotta sun screen on the outer face of the aluminum/ glass enclosure to tie into the station aesthetic strategy.
- Stair guards and handrails: To be fabricated of corrosion resistant stainless steel, [redacted] and No. [redacted] and No. [redacted] finish respectively. Guard infill to be vertical solid stainless steel bars ([redacted] diameter) spaced no more than [redacted] on center.
- Platform and accessible ramp guardrails: To be composed of stainless steel wiremesh mounted on stainless steel framing supported on galvanized steel truss structure that spans between canopy columns without bearing on platforms or ramp planks. Guardrails to be fabricated of corrosion resistant stainless steel, type 316 and No. 4 finish.

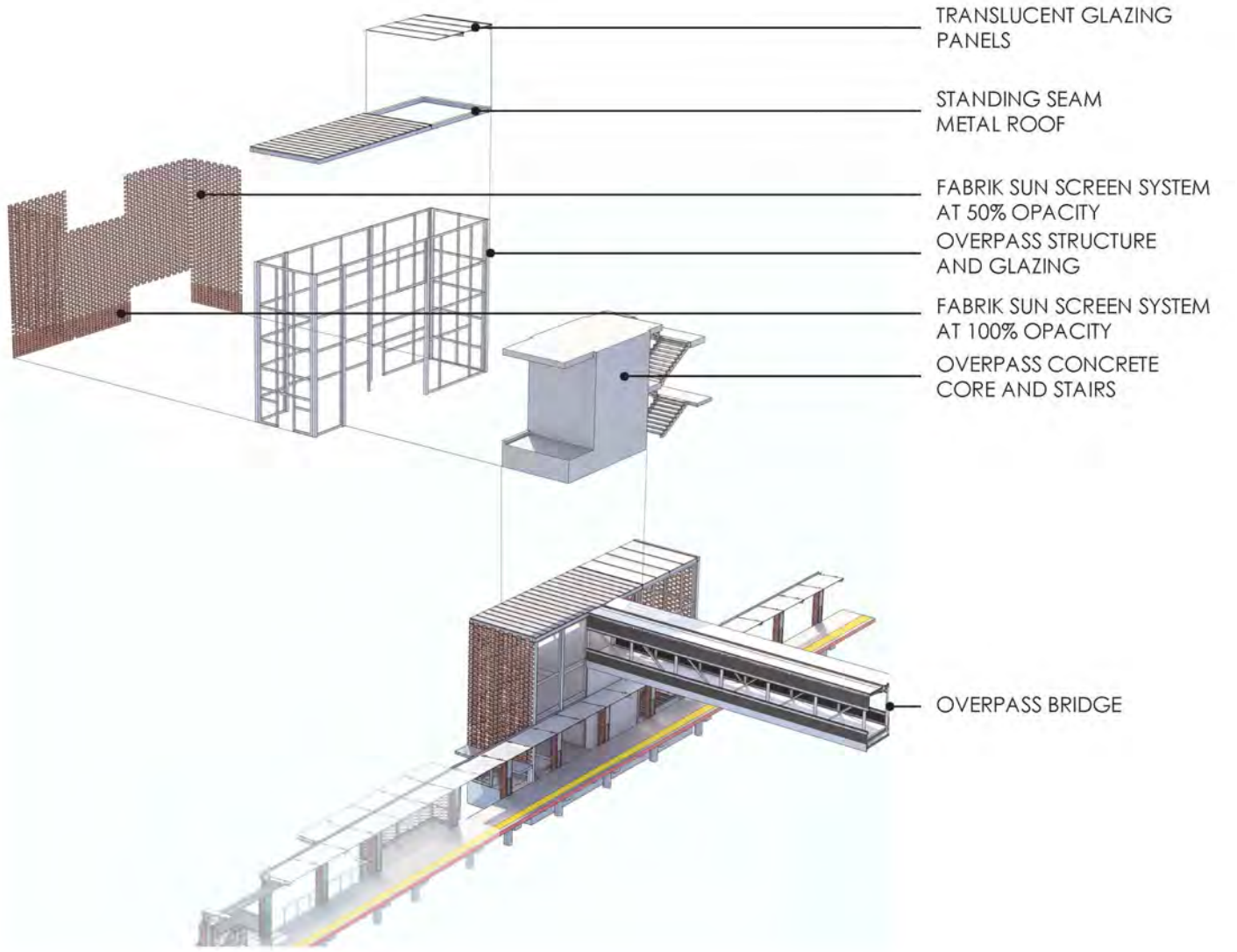
- Canopy structure: To be galvanized steel with clear top coat. Platform canopy and pedestrian walkway canopy to be consolidated into one foundation to minimize structural footprint in the crowded space between the platform and at grade walkways.
- Pedestrian overpass bridge structure: To be galvanized steel with clear anti-graffiti top coat.
- Under-platform security barrier: To utilize expanded metal (at select stations) or lightweight removable panel.
- Platform signage band to have an anadized aluminum finish and will house the lighting and other electrical services to simplify maintenance, installation and minimize visible hardware. LED down lighting will be recessed into the underside of the band to provide general lighting that meets required illumination levels. When the band is below a canopy structure, there will be dynamic linear LED (RGB) up lighting integrated into the top of the

band. This dynamic changing up lighting will be connected to the arrival and departure of the trains on each side of the platform – this Dynamic Train Arrival Notification Lighting will provide arriving commuters with a clear visual cue for the impending arrival of a train.

- The Dynamic Train Arrival Notification Lighting will also be deployed at the pedestrian overpass cores and bridge (highest elements in the station design) to provide a high level signal of the arrival of a train.



PLATFORM STRUCTURE



OVERPASS STRUCTURE

Stations will have the following aesthetics treatment individual to each station.

- Platform canopy: To be, tempered and laminated safety glazing and to receive patterned and frosted interlayer to provide shade and to be unique to each station. Pattern will both respond to specific context of neighborhood and also create a finish that is more likely to conceal dirt and debris on the glass.
- Pedestrian walkway canopy (Type 1): For all walkways canopies that have been mounted to station canopy structure, the roof material to be, tempered laminated safety glazing and to receive same patterned interlayer used at the platform canopies.
- Pedestrian walkway canopy (Type 2): For walkway canopies that require their own structure – the

construction of these canopies are as follows: steel posts and beams to be tubular galvanized steel with clear top coat. Roof to be frosted extruded polycarbonate standing seam panel system.

- Pedestrian Overpass Bridge glazing on vertical faces: To be clear tempered ¼" minimum tampered, Low-E, laminated safety glazing. Roof material to be frosted extruded polycarbonate standing seam panel system.
- Retaining walls at stations and at grade crossings: Precast, to include form liners to create textured architectural concrete face using the same material and module as the terracotta screen.
- Parking structures to be included into station design. Garage façade will include form liners in the same manner as the retaining walls – with terracotta colored thin brick form liner.
- Pedestrian underpass tunnel (below) at New Hyde Park to incorporate pattern used in terracotta rain screen – but without thin brick and all painted white. The pedestrian underpasses will utilize LED lighting integrated into reveals formed into the precast structure – this reveal will provide space for surface mounted fixtures and conduit feeds.

2.4.3) Provides color graphics/simulations indicating realistic representations of proposed aesthetic treatments.

See Project Design Appendix 2.6 for color graphic/simulations indicating realistic representations of the proposed aesthetic treatments.

2.4.4) The narrative will specifically address: a) Landscaping, streetscape and screening; b) Undergrade Crossings and Railroad Bridges; c) Retaining walls; d) Sound attenuation walls; e) Stations; f) Parking Structures; g) Permanent Facilities; & h) Traction Power Substations.

A. Landscaping, Streetscape and Screening

Governing standards for planting are included within Village Codes and will be followed in our design, as will the requisite ANSI standards governing nursery stock and safety requirements for plant care and removal operations. The NYSDOT Highway Design Manual will be followed for planting within the areas where underpasses will be constructed, as well as all street scape not covered by Village Codes.

Planting and Aesthetics

Planting along the Rail Road rail corridor has unique challenges: less than ideal growing conditions, limited maintenance capabilities, areas where there is no clear chain of responsibility. A good landscape architecture design, though, also has the visual power to make the stations better integrated into the community and more pleasant for commuters and, together with other design elements, to create a sense of place for each location. Many of the station areas are exposed to direct sunlight and are very hot in summer: good planting stock reduces ambient temperatures and creates a better level of comfort for commuters and for the nearby community.

Our planting design will be based on achieving aesthetic goals while addressing the difficulties in each planting environment and in the limits of available plant care. 3TC will also develop details for good planting practice that maximizes the survival rate of newly planted trees, shrubs and ground covers.

As an overall policy goal we will seek to diversify planting species to prevent monocultures which make areas more susceptible to plant diseases and monitor the DEC regulations on invasive species to ensure that no potential problem plants are used. We will create planting lists that "put the right plant in the right place" and that focus on native species which support local fauna including pollinators. We will ensure that plants are selected to minimize maintenance requirements.

3TC will explore opportunities for managing stormwater runoff through the use of green infrastructure wherever possible. This may include the implementation of bioswales and permeable pavement and planting strips along the roadways. We will also install shade trees to the greatest extent possible to help reduce solar heat gain.

Street ROW

New street trees will be a minimum of 2" caliper, and spaced a minimum of [redacted] on center to maximize tree canopy. Final locations will be determined by locations of utilities, light poles, site distance at intersections and other limiting conditions. Shade trees will be provided except where clearances limit the size of trees, in which case understory trees may be used. Where the opportunity exists for planting strips along the sidewalks, these areas will be seeded and maintained until final acceptance.

Low maintenance shrubs will be used in plant beds, with 3'-0" minimum spacing, and ground covers will be spaced 12 inches on center.

Station Area

Trees with a minimum size of 2" caliper will be planted within the station area, the surrounding site and parking lots. Within parking areas, tree planting beds will be the size of one parking stall. Shade trees will be the first choice for planting, with understory trees where restrictions make shade tree planting impossible.

Within the station limits all areas not paved, will be covered with a layer of decorative river stone five inches thick, in natural earth colors selected by the Rail Road from the supplier's sample color template.

Railroad ROW Corridor

All plant material that is outside the ROW that is removed due to construction operations will be replaced. We will comply with the RFP and provide arborvitae as required. However, 3TC will exceed these requirements by providing a diversity of trees and plants to prevent a monoculture of species: Trees outside the Rail Road ROW that are removed will be replaced with trees that total an equal caliper. The minimum size of replacement trees will be 2" caliper; Shrubs will be replaced at a one to one ratio with the same species and a minimum size of three-foot height, unless existing plants are smaller in which case they will be replaced with plants of the same size; Disturbed existing lawn areas will be repaired and reseeded; an installation of evergreen plantings and vines will be planted to help screen the retaining walls and sound attenuation walls.

Plant Palette

3TC will develop a plant palette that meets the requirements of the Rail Road for tough plantings that can survive the extremes of local climate conditions with minimal maintenance. Plants which require irrigation past the one-year period of establishment will not be considered. Those goals will be integrated with an emphasis on aesthetics and creation of site specific plant lists that help to create a station or streetscape identity.

In general, we will focus on native species, and specifically restrict the use of any invasive species currently on the NYS DEC Invasive Species list. We will also review the list against local municipal requirements and update it to ensure that the latest specific area restrictions, such as those due to plant disease or insect infestation, are met.

In general, our plant palette considerations will be based on micro-environmental conditions, pest and disease resistance, ability to withstand drought, heat, air pollution and road salts and other urban impacts. They will be species that area adapted to local soil conditions so that they do not require special soil amendments or conditioners.

Where plants have specific functions, such as preventing soil erosion at slopes, or toleration of the extreme conditions of bioswales and keeping them open to infiltration with long root systems, we will create specifically tailored plants lists, that not only work for their intended purpose but increase the visual quality of these types of spaces as well.

Trees within station areas and along walkways will be selected to have upright form, branched at seven feet or higher, and will be selected to be 'clean' so that they do not drop fruit or bark.

Screening

Since the placement of the retaining walls and sound attenuation walls are located on or near the property line of residential properties, screening of these walls

have become necessary. As previously mentioned, we will provide arborvitae as the RFP requires. However, it is our intent to exceed requirements by proposing a diverse palette of species to prevent monocultures which make areas more susceptible to plant diseases. We will propose muli-story plantings along the sound walls that will diminish the visual impact of the walls. We will provide evergreen plantings to help screen the walls. Installation of vines, will also help minimize graffiti on the walls.

Construction Requirements

Existing Vegetation

During the Design Phase 3TC will perform a selective tree removal assessment to explore all available opportunities along the Project corridor to reduce (to the extent possible) tree removal. We will minimize the removal and disturbance to existing vegetation within and beyond cut fill lines. All existing trees within the impacted area will be protected as per the requirements of the NYSDOT Highway Design Manual. All existing vegetation in the adjacent area will be protected with a temporary plastic barrier fence.

All disturbed areas will be restored with topsoil and turf, which is to be fully established prior to acceptance. The work will be custom tailored to specific areas based on slope, native soil, sun or shade conditions, based on location and adjacent use.

Before any work is begun in the area of existing vegetation, we will prepare a record, including size, location and species, of existing trees and shrubs for submittal to the Rail Road, including major deciduous trees 6" in caliper and above; evergreen trees 6 feet high and above; and shrubs from 3 to 6 feet in height.

Tree and Shrub Replacement

Where tree and shrub removal is necessary, every deciduous tree over 6-inch caliper removed will be replaced with new deciduous trees that add up to the same caliper, with new trees to be a minimum of 2" caliper. Every coniferous tree removed will be replaced with new coniferous trees equal to the total height and width of the tree removed. For every shrub removed that is over 3 feet a new shrub will be planted.

The minimum sizes of replacement plants is as follows: 2 inch caliper for major deciduous trees, 1½ inch caliper for minor deciduous trees, 6-foot high for coniferous trees, 3-foot high for deciduous shrubs and 2-foot height for evergreen shrubs. All plants will be of the same genus and species of the plants removed, except if they have been identified as invasive plant species per the NYCDEC Invasive Species List.

Replacement Locations

Although replacement of trees within the Rail Road ROW is not required, we will exceed requirements by installation new trees within the ROW, near the original locations of the species removed. Since the number of trees within the ROW area are being reduced due the installation of a 3rd track and retaining and sound attenuation walls, there may not be enough space to install the desired number of trees. There is an opportunity to engage the community in a tree planting program that can provide new trees in the neighborhoods and streets adjacent to the Rail Road corridor.

Proposed Planting

Planting design will consider lines of sight, proximity to pedestrians, cyclists and vehicles, potential branching height conflicts with pedestrians and cyclists, and other safe use of roadways and paths.

Plantings will be selected for seasonal characteristics such as flowering season, fall leaf color, winter interest whether evergreen, dramatic form or colored twigs. This must be accomplished with plants that meet other requirements here, from ease of maintenance to adaptability to environmental conditions.

After installation, planting will be maintained until establishment, and replaced as necessary during the guarantee period.

Landscape Establishment Period

All plantings will be installed as soon as the work areas in which they are located are complete; where the time of planting does not coincide with a permitted planting season, planting may be delayed until the next growing season but in no case will it be later than six months after completion of the other work in the area.

The warranty period will be one year. During the time between planting and the expiration of the one year

guarantee period, all plants that are not in healthy and thriving condition will be removed and replaced. The goal is for all plantings to achieve "Vegetative Success." The measures of vegetative success are:

- A minimum of 90% ground cover is thriving and adequately established to prevent erosion
- All plant materials are in a healthy and thriving conditions
- All plant materials are of the species and requirements of the Contract Documents

We will conduct the Vegetative Success Survey to determine where 90% of plant material is established and in healthy condition.

We will conduct the Vegetative Success survey within 30 Days of the end of the warranty period, and submit it promptly for review and approval.

B. Under Grade Crossings and Railroad Bridges

Where under grade crossings are being established, changes in the streetscape pattern will result in new views, and new drops at retaining walls and other grade controls. Any plantings that are disturbed as a result, will of course be replaced, but, in addition, new plantings should set a stage for the design of the underpass entries, adjacent pedestrian ways, whether ramps up to the station, 'kiss and ride' pathways, or walkways adjacent to the roadway. Street tree planting in these spaces should be maximized, and all embankments should be planted with seasonally changing materials.

Aesthetic treatment of the retaining walls at under grade crossings will be a form liner pattern consistent with the red brick façade at the stations.

C. Retaining Walls and D. Sound Attenuation Walls

Where under grade crossings are being established, The Aesthetic treatment of the walls will be a stone pattern design that may differ in locations, based on community and neighborhood input, to be conducted by Community Outreach Program. All walls will be precast concrete units that have the stone pattern applied during fabrication. The walls will be a non-pigmented and unpainted with an anti-graffiti coating applied. There will be opportunities to provide plantings and vines along the walls to soften its appearance and prevent graffiti.

E. Stations

All the Rail Road standards to be incorporated into the design with the integration of the proposed kit of parts will augment local urban cultural context. 3TC will provide adequate seating, bike racks, and security lighting at the entrances to the stations and the drop-off areas.

Floral Park Station

At this station three pedestrian elevators will be installed to service each of the three existing platforms. The existing freight elevator at the center platform will be repurposed as one of the pedestrian elevators.

New Hyde Park Station

New Hyde Park Station is located between South 12th Street and New Hyde Park Road. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and foundation will be removed and reconstructed. The proposed station will include a pedestrian underpass on the South 12th Street side of the station. The existing station building will be rehabilitated and a plaza area will be provided adjacent to the Eastbound platform. A new parking lot will be constructed at new Hyde Park Road. MTA Arts and Design (MTA A&D) artwork will be incorporated into the station.

Merillon Avenue Station

Merillon Avenue Station is located west of Nassau Boulevard. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and foundation will be removed and reconstructed. Two elevator towers connecting passenger flow from the station to Nassau Boulevard will be provided at the east end of the station. Artwork per MTA A&D will be included in the station design.

Mineola Station

Mineola Station is located between 5th Avenue and Main Street. Westbound, the platform slab will be replaced and the foundation will be upgraded/reconstructed. Eastbound, the platform slab and foundation will be

removed and reconstructed. The proposed station will include three pedestrian overpasses. The first pedestrian bridge will be located adjacent to the existing station building and will replace the existing overpass. The second overpass will be located on the west side of Main Street and the third overpass west of Willis Avenue. The existing station building will be rehabilitated and a plaza area will be provided adjacent to the Eastbound platform. A kiss and ride will be constructed at Main Street. MTA A&D artwork will be incorporated.

Carle Place Station

Carle Place Station is located between Cherry Lane and Carle Road. Westbound, the platform slab will be replaced and the foundation will be upgraded/ reconstructed. Eastbound, the platform slab and the foundation will be removed and reconstructed. The proposed station will include a pedestrian overpass aligned with the center of Stonehinge Lane. Artwork per MTA A&D will be included.

Westbury Station

Westbury Station is located between Post Avenue and School Street. Westbound, the platform slab will be replaced and the foundation will be upgraded/ reconstructed. Eastbound, the platform slab and foundation will be removed and reconstructed. The proposed station will include two pedestrian overpasses. The first pedestrian bridge will be located at the new parking structure. The second pedestrian bridge will be located at the east end of the station. The existing station building will be rehabilitated and plaza areas provided on the west side of the station. The existing underpass will be extended to connect with the new parking structure. The station will include MTA A&D artwork.

F. Parking Structures

Overview

Collaboration between our team has allowed us to offer the Long Island Railroad design alternatives that will reduce initial capital costs as well as long-term maintenance costs. Our alternative fits within the program parameters identified by the Long Island Railroad. Materials and massing, building orientation, public spaces, and landscaping maintain the intended design criteria interaction with the community. Our designs provide the Long Island Railroad with the most durable and lasting structure possible while also reducing the general and carbon footprint of the facility.

The intent of the design/build team is to conform to the requirements of the RFP in a cost-effective manner. The drawings have been prepared based upon the criteria identified the requirements of Section 3.14.

Parking garages have been developed further from the concepts shown in the RFP into framing plans based upon the anticipated structural system to develop cost estimates and more defined parking capacity counts. As a result, the following car counts and building heights are proposed:

STRUCTURE	PROPOSED CAR COUNT	MINIMUM PER RFP	PROPOSED DISTANCE ABOVE GRADE TO TOP PARKING FLOOR (FT)
Mineola Harrison	551	551	43.33
Mineola South	381	365	43.33
Hicksville South	604	583	22
Westbury North	677	676	32.66
Westbury South	681	676	43.33

Philosophy

The parking structures have been designed to be classified as Open Parking Structures to the greatest extent possible. Thus, the maximum allowable height has been utilized in order to avoid basements wherever possible. This approach allows for the control of construction costs and long-term maintenance costs through the elimination of sprinkler and ventilation systems that would otherwise be required as part of an underground parking area.

Structural

The selected structural system is precast concrete.

Typically, the structures utilize:

- [redacted] minimum depth, pre-topped double tees
- Typical precast columns are [redacted]
- Inverted tee girders are nominally [redacted] wide by [redacted] ft. deep
- Horizontal load bearing light walls are used on interior grid lines adjacent ramps and provide lateral load resistance in the long direction of the structures.
- A combination of interior and/or exterior shear walls are utilized to provide lateral load resistance in the short direction of the structures

Durability of Design

Sealers, deck coatings, concrete additives, corrosion inhibitors, and selective epoxy coating of reinforcement will be included to provide a durable parking structure. Deck coatings (membrane) will be included over occupied space and over electrical and storage rooms. The intent of our design is to conform to the American Concrete Institute's Guide for the Design of Durable Parking Structures (AC I 362). The design life of a parking structure should be 60 years.

Sustainability

The parking garages will be built using sustainable approaches to minimize impact on the environment while maximizing these benefits for users of the facilities. The U.S. Green Building Council's LEED (Leadership in Energy and Environmental Design) standards will be used to guide many aspects of the project. However, stand-alone parking garages are not eligible for LEED certification. One such approach includes optimizing design features to incorporate the greatest level of natural light possible to reduce the need for lighting during non-peak operational periods which helps reduce the carbon footprint of the facility.

Design For Future Adaptive Reuse

The Project's five proposed garages are coming on-line when more and more Rail Road users are getting to the train station through the use of alternative methods as opposed to the conventional means of driving a private vehicle to the station and parking the car. These alternative methods, whether they include such transportation modes as biking to the station or using ride-share service to access the station, will have an adverse affect on the demand for parking and if they continue will reduce the overall demand for parking at a station in the next generation. This reduction in demand would create numerous issues such as the potential loss of revenue for the garage operator and would inspire the operator to seek alternative ways of obtaining revenue from the parking garage. This could result in repurposing the garage to encompass parking on the lower floors and residential or commercial uses on the upper floors.

As presented, each parking facility maintains a minimum floor to bottom of beam height of [redacted] with [redacted] IN minimum provided for Van Accessible ADA parking on the street level. As each municipality maintains their respective zoning codes regarding the height of parking structures, this dimension allows for us to accommodate design criteria set by the Rail Road and meet the height restrictions adopted by each municipality. The Rail Road's design criteria only allow for minimum driving clearance for the heights and vehicle counts required.

To accommodate the reuse of the facility in the future, the floor to bottom of beam dimension would be required to be a minimum of [redacted] increasing the height of each floor by [redacted] for a total of [redacted] for a five-story garage and thus exceeding the maximum height adopted by each community.

With the Rail Road's approval and that of the local governments, we will integrate our adaptive reuse philosophy into our parking garage design/construction

so that the garages will not only be affordable now, but provide for some cost recovery in the future. Rail Road approval would be at its discretion and we understand that no commitment has been made by the Rail Road. If 3TC does not obtain all the required approvals, before the final decision needs to be made according to our schedule, the original concept for parking garages included in the Request for Proposals will be implemented. The Rail Road will not assume any additional risk due to this opportunity.

The 3TC Team is certainly amenable to working with the Rail Road to meet this need should the Rail Road determine it is in their best interest and that of the local communities.

See Section 2.9 for further discussion of our Parking Garage alternative proposals.

Functional Concepts

The parking structures typically utilize [redacted] parking bay. For most locations, this is based upon [redacted] parking stalls with a [redacted] drive aisle. In Mineola and Westbury, the parking stalls, dictated by zoning code, are [redacted]. Since the drive aisle does not have a required dimension, the [redacted] bay has continued to be used. The 85th percentile design vehicle is only [redacted] long, thus the longer stalls appear to be a hangover from older zoning code and are not normally used as part of today's design standard.

The stall widths vary by municipality based upon local zoning codes. The following stall widths have been utilized based on these codes:

- Mineola: [redacted]
- Hicksville:
- Westbury:

Architectural Facades

In general, exterior facades utilize [redacted] high precast spandrels with picture framed thin set brick, this is similar to existing construction and provides the durability advantage of fewer exposed brick edges.

Stair/Elevator towers typically utilize precast concrete with limited brick as the exterior walls are dominated by curtain walls which are used to increase passive security of the stairs by providing good visibility of pedestrians using the stair towers.

Standing seam metal roofs are typically provided on top of the stair/elevator towers. This roofing system provides superior levels of durability and blend easily into the fabric of the surroundings.

Drainage

Floor drainage systems are critical in parking structures in any region of the country climates. Direct rain or snow may not enter all areas of the parking garage, but wind driven rain and snow and/or vehicles carrying ice, snow and rain water can distribute water throughout the garage. Heavy rains may also overload rooftop floor drains causing rain water may run down ramped floors to lower levels. Scheduled floor wash-downs that are part of a good maintenance program are also a source of water throughout a parking facility. If the floor is not adequately sloped, water will pond and deterioration will accelerate under the ponded areas. [redacted] included as part of design standards. Water will be drained away from exterior columns, walls a n d pedestrian pathways. Washes at the low end of double tees and adjacent inverted tee girders will be included to achieve the desired drainage slopes.

Preliminary floor drain locations are shown on the plans. Drain locations will be finalized during the final stages of design. Roof top level drain systems will be designed to accept a 10-year design rainfall event or as required by the State code. Riser sizes will be determined based upon contributory area. See Civil for retention basin sizing.

Parking Access And Revenue Control Systems

The parking layout is based upon an ungated, pay-by-space or pay-by-plate revenue system. It is anticipated that most users will be permit holders but hourly parking will also be offered in consultation with the Rail Road and local government. Multi-space parking meters have been used at the other Rail Road Parking structures and they are becoming increasingly popular in structured parking facilities because they provide low initial capital costs as well as low long-term operational and maintenance costs when compared to other parking

access and revenue control systems (i.e. gated systems). Thus, we have assumed that an ungated revenue control system will also be used for these parking structures. We are not sure whether a pay-by-plate or a pay by space model will be used. Since the pay by plate model is generally more cost effective to enforce, we have assumed that technology is being used in designing the parking structures. This will be verified with the Rail Road and local government.

In the Pay-by-Space application for multi-space meters, the hourly user parks in a numbered space, enters the corresponding space number in the multi-space meter and then pays the designated fee for the time required. Parking enforcement officers perform parking enforcement. The officer simply requesting a printout from any Pay-By-Space parking meter for all paid spaces so the officer can issue a citation to any vehicle without a permit that occupies an unpaid parking space. A physical inspection of unpaid spaces must be conducted to confirm that the space is an unpaid hourly user and not a permit holder. Parking enforcement officers must

return to the meter after making their rounds and pull a second report to distinguish if any users were in route between their vehicle and the meter to pay for their parking when the first report was printed. If this situation presents itself, then the enforcement officer must retrieve any citations from vehicles where this situation may have occurred and void the issuance of the respective citation.

In the pay-by-plate application, the user would be required to input their license plate and pay for the time desired. This technology would allow the owner to eliminate the need to issue permits as the license plate becomes the identifying credential. This technology will allow parking enforcement staff to monitor each parking space more times per day as it is a rapid method of performing parking enforcement patrols. This system also eliminates the need recording license plates in handheld devices.

Utilizing a multi-space parking meter system, the entrance and exit lane throughput is a product of what the respective feeder streets can handle for both ingress and egress. All queuing occurs as a pedestrian. Thus any delays at the vehicular entry/exits due to the Parking Access and Revenue Control system are avoided. The advantage of this approach is that there should be no vehicle queuing issues caused by the revenue control system.

Office/Support Facilities

Each parking garage includes an office space and utility rooms. The office space includes a [redacted] waiting area with large glass windows for visibility, [redacted] manager office, [redacted] counter room, and a [redacted] general office area with access to an ADA compliant restroom.

Utility rooms are typically located under the ramp leading up to the first supported level, and consist of; Communication room, IT room, electric room, and a storage room. Square footage and height meet or exceed the technical provisions requirements identified for these purposes.

Mineola – Harrison Avenue

The parking structure is primarily a 2-bay single thread parking structure with a two bay "L" on the north. The structure will have six levels including one basement

level. A stair tower is provided in the northeast corner and a stair/elevator tower in the southeast corner. One elevator is provided for the parking structure. Vehicles can enter from Harrison Avenue on the north and 1st Street on the south. Because of the narrowness of the property, the east ramped bay utilizes parallel parking where the bay must be less than 60 feet wide.

The parking concept is based upon no setbacks from the streets or adjacent property lines. Because the site is constricted, fire walls are required for the portions of the east elevation which are within 10 ft. of the adjoining property lines. These include the middle portion of the east ramp and the east edge of the north "L".

Mineola - South

Two bay rectangular parking structure with a parked-on ramp in each bay. The structure is [redacted] high with four supported levels, which makes it two levels below the maximum height allowed. In addition, it is a completely open garage with no basement level. The foundations designed to accommodate three additional levels for future expansion. Stair/elevator towers are located at the northeast and southwest corners. The parking structure has two elevators. Vehicular access through a new side street accessed from either 2nd Street or on Station Plaza street running along the north side of the tracks under the Mineola Boulevard overpass.

Shear walls located at the exterior walls to allow for maximum visibility and parking efficiency. East side of the garage is less than [redacted] from the property line, thus it was designed as a fire wall.

Hicksville South

This is a three-bay single thread parking structure with two supported levels. Access to the structure is from West Barclay Street on the north. The property has room for a small, single bay of grade parking to the East of the parking structure. There will be a curb cut into this area which is anticipated to be the primary entry/exit to the facility. The ramp is in the north bay of the structure and rises as drivers proceed west. A second curb cut is provided in the northwest corner but it anticipated to be secondary and primarily serve the two flat bays on grade adjacent to the tracks.

The structure has two stair towers along the south side, however both elevators were located at the south-east corner to provide the pedestrians with a close access to the platform access underpass which is located to the east of the parking structure.

The office area is located on the northwest side of the parking structure adjacent the primary vehicular entry/ exit.

Westbury North

The parking structure is a four and a half level, four bays single thread with the two inner bays sloping up half a level in one direction, and the two outers bays sloping in the opposite direction. Vehicular access provided from the north and south sides of the garage. The north access from Scally Place is [redacted] higher than the street level and has a [redacted] setback, which allows for sufficient grade slope to make the North wall of the basement level completely open. The south entrance is through an adjoining parking lot off Union Ave.

There are four full levels and a half basement level in this garage. The half level basement is on the north side of the structure, adjacent a [redacted]. setback from Scally Place. The basement walls project [redacted] above the basement slab and the adjacent landscaped area will slope down toward the parking structure so the openness of this basement level will be similar to that of a typical tier. Thus, this area will have sufficient openness to make it an open parking structure without the need to sprinkle or ventilate this area.

Stair/elevator towers located at the northeast and southwest corners allow for pedestrian access from Scally Place sidewalk and southern and western parking lots.

Westbury South

This structure will be a five level, two bay single thread, open parking structure, stretching east -west along the railroad platform. The garage has a grade level with two entry/ exits from Railroad Ave, and four supported levels. The top level is one bay shorter than the typical level.

Elevations at grade level slopes down to provides an accessible path to the existing pedestrian underpass. The second level and first supported level, will match the proposed platform elevation to allow a direct access from the northern stair/ elevator lobby. Pedestrians

can cross over to the westbound platform via either the underpass or a pedestrian bridge connecting into the fourth Level of the parking structure. A second stair/ elevator tower is located at the southwest corner. The structure has a total of two elevators.

Shear walls located at the exterior east & west walls to allow for maximum visibility and parking capacity. There is an expansion joint near the center of the parking structure which is required because of the length of the parking structure. The architectural treatment of the thin brick inserts on the precast spandrels matches the station building design theme.

G. Permanent Facilities

Permanent facilities will be modular and pre-fabricated. Exterior walls will utilize same pattern as terracotta screens to establish connection with station aesthetics.

H. Traction Power Substations

Traction Power Substations and Signal Houses will be pre-fabricated from Rail Road approved companies such as Myers or Powell and to be situated on a full concrete vault structure.

2.5
Reliability and Maintainability

Volume 2 - Package 2: Project Design

2.5 Reliability & Maintenance

2.5.1) Describes in detail Design-Builder's approach to developing a RAM Plan.

The basis for any Reliability, Availability, and Maintainability Plan (RAM Plan or Plan) is determining and using client goals to develop the process that supports the design and the selection of products for use on the project. The goals supplement within the technical requirements ensure that the Rail Road receives not only a system that works but is also maintainable and sustainable. The Rail Road has established ten System Availability goals for the Proposer to target during the design and product selection process. (See Availability Table below). The RAM goals like other technical requirements will be traced and tracked by the Systems Integrator to ensure the design groups are attentive to these Rail Road needs. The RAM Plan for this project will be developed and integrated into the engineering design process. The Plan will focus on several basic elements which are traditionally used for RAM analysis.

1. Start with a clear statement of the Rail Road goals, in this case system availability
2. Developing a methodology for selecting the important components to be evaluated in each of the ten specified systems (RAM Allocation Report)
3. Develop a process whereby reasonable failure rates can be determined for each of the selected components of each system that will project system reliability (not every component will impact the system availability, an example of this is provided in the next Section)
4. Develop a process for evaluating the maintainability, both the Preventative and Reparability (Reactive) facets of maintenance for system components which is utilized in the development of the Mean Time to Restore (MTTR) for all system components.
5. Determine a measurement system that can test actual field results against the projected reliability and maintainability projections to confirm attainment of the Rail Road's Availability Goals.
6. Development of Maintenance and Reliability Plans, again focusing on both preventative and reactive maintenance requirements. These are coupled with Maintainability and Reliability Reports.

There are other subjects pertinent to the overall program that will be described in the Plan including the project deliverables, calculations of Mean Time Between Failure (MTBF), Mean Time Between Service Failure (MTBSF), Failure Mode Effects Analysis (FMEA) which will be used as required, along with Maintenance Manuals and the Maintenance Concept. Additionally, the Plan will address how the RAM process will interact with the Rail Road FRACAS analysis.

We believe that It is essential that this program be implemented early in the design process and reviewed at the internal design reviews so that issues can be pinpointed and mitigated well before system deployment. Although each of these steps can be concisely written as they are above, the next section provides more insight into some of the details of the processes and activities that will be either described in the Plan or are taken because of the implementation of the Plan.

2.5.2) Describe the processes to be used to establish RAM requirements.

Using the Plan as the roadmap to perform the work this section gets into some of the details involved in establishing the RAM requirements. This process is iterative and involves tradeoffs in design, product selection and maintenance impact including lifetime cost. Below we discuss several scenarios which will arise on this project as they have arisen on other projects. The issues are not new but each solution and choice must be customized to the needs of the Rail Road.

Using these established goals as a subset of the system design requirements and interwoven into the design process will determine how to effectively meet these goals. The first step of the design teams is to develop an Allocation Report (AR) for each category listed in the Availability Table X (copied from Technical Provisions Section 3.16.5.4). The AR will list the basic components of each system that are to be included in the analysis.

For instance, in the Traction Power Substation (TPSS) AR the components selected may be rectifiers, transformers, or sectionalizing switches. The selection of the items is critical to the outcome of the analysis and must be developed in cooperation with the Rail Road to assure that the availability goals apply to the subsystems that are critical to analysis as well as the operation of the Rail Road. This provides guidance and focus for the design teams that are tasked with attaining the goals. This selection process is necessary because every component can't be included in the analysis, for instance consumables (fuses, breakers, arrestors, etc.) and subassemblies where there is no mitigating action that the designer can implement to overcome the impact of an individual subassembly on the availability calculation. As an example, a track circuit added to the Train Control System list will ensure that the 99.9995% availability goal can't be obtained. The designer has no alternative product that will significantly lower the failure rate of the track circuit components while abiding with contract requirements, nor can the designer implement a practical redundant failover scheme that is consistent with track circuits currently deployed on the Rail Road today. Therefore, the careful selection of parts or subsystems to be included in the AR is necessary to ensure that the designers can impact the availability umbers by the change in design methodology and/or product selection.

The allowable downtime shown in the Table is calculated based on operational hours per day of the system and it is the amount of time a system can be down during a year for a failure or maintenance and impact the system operations. Repairing of failed devices or performance of preventative maintenance that can executed during system downtime or during operational hours without impacting train service do not impact Availability. But it is clear from the Table that a failure impacting operations occurring during system operating hours will likely cause the availability goal to not be met.

Once the AR has been developed for each system, it creates a baseline for the calculation of the system's availability. To calculate that the projected availability each element on the AR will be assigned a failure rate based on sources of data including historical industry data, material supplier data, Rail Road failure records or a calculated failure rate based on established standards. The failure rates will be considered in the availability calculation only if the components failure causes a system operational impact (i.e. impacts train performance). Once the design has progressed so that quantities can be determined then the composite failure rate for each component can be determined and when all the component failure rates included in the AR list then the composite system failure rate is calculated. The composite system failure rate is determined by summing the failure rates of all the components that comprise

the AR. Mathematically then the more components the higher the system failure rate. The final portion of the Availability equation is the determination of the mean time to repair or restore. This can be developed using the same types of sources as the failure data. Working with the Rail Road this projected restoration time can include the time to repair once maintenance has arrived at site or can include the time for the maintainer to get to the site, determine the problem and then repair the failure. A mathematical formula using the failure rates and the MTTR determine the system's availability.

As was promised previously a practical example of how a failure may not impact the availability projection is presented. Assume an isolated failure of a network switch in the vital communication between vital processor (i.e. no two simultaneous failures are used in the availability prediction) renders that network connection completely unavailable. But despite the potential enormity of the failure the control of any of the three tracks is not impacted because the network switches and the vital processors are connected in a redundant configuration which compensates for the lost network switch. This redundancy or failover design capability ensures that vital communications are not impacted and no reduction of performance of the system can result under these conditions. The component does register a failure in the Reliability Report but the failure does not impact system availability as the Rail Road operational performance is not impacted. Conversely if the network switches s functioned independently then the focus of the design effort would be in the selection products that are more reliable or can be sustained with additional preventative maintenance. The RAM Plan is the map that guides the engineers through a process which considers all aspects of the impact of the design on the final system rather than just focusing on system functionality.

Significant portions of these detail processes regarding establishing the requirements have been discussed including the sourcing of RAM requirements but there are still some important pieces of the process to be described. The procedures to obtain data and the mathematical calculations performed all conform to standardized procedures, but the important part of the RAM is the implementation.

Once the RAM Plan has been written and approved the Design Team will incorporate the RAM process into their design cycles including design reviews, design submittals and eventually procurement specifications and testing requirements. The tradeoffs that may exist between product lifetime, failure rate projections and the level of preventive maintenance required must be balanced to provide the Rail Road with the best possible system. These evaluations will provide solutions that will be incorporated into the design. In addition, their input will be forwarded to the SIE to independently verify the individual team's work. This provides an independent review of the work the design teams have performed. Additionally, the SIE will evaluate the data and compare to the contract requirements and review with the Rail Road .

Verifying compliance to the stated goals is provided to the Rail Road before the design is implemented and/or delivered to site. Any issues with products selected or specified for use will be reviewed with the Rail Road prior to RFC to gain a waiver or require a new product selection.

2.5.3) Describe the methods, procedures, and controls to be used to demonstrate compliance with requirements.

The record keeping starts when the first components are being tested in the factory as a history for each component is initiated. This history continues until the components have completed their warranty requirement. If a significant number of failures are attributed to any one component then the FMEA process is invoked. The FMEA process requires the analysis of each failure for the component and searches for trends which can come from production, design, subcomponent failure, application issues etc. If the product failures demonstrate a trend then action can be determined and implemented. If the failures are not indicating a trend and the failure rate is significant then a replacement must be found. The key element of this process is comprehensive failure reporting system which in this case can utilize the FRACAS process.

As was previously described the RAM Plan will require the generation of the testing and/or monitoring required to verify that the design and the work that performed incorporating the RAM was indeed successful. Benchmark measurements will be established in the Maintainability and Reliability Test Plans that will provide validation that the system that was provided meets the requirements of the Rail Road.

[redacted]

Once the system is installed and operational, the RAM demonstrations will be performed to validate the predictions provided during the Design Phase. The RAM Demo Plan will be developed to track the activity in the field and evaluate any failure that occurs during the specified test period (usually the warranty period). Any failure will be analyzed to determine if the failure is infant mortality, random, caused by external factors or inherent to the design. The result and the action taken will be reviewed with the Rail Road before implementation. The RAM Report will document any incidents or idiosyncrasies found in the operation of the system during the RAM Demo and this information will be provided to the Rail Road.

Reliability and Availability are only two thirds of this equation, the selected products should be maintainable and preferable have a preventative maintenance cycle that can avoid system downtime. During the product selection process the ability to prevent failures or correct failures in a reasonable amount of time (MTTR) is critical to Rail Road operations. The service literature and maintenance data will be obtained from the OEMs so that the Rail Road has a library of information to use to maintain the system. The deliverables will be described in the Maintainability Plan and the Preventive Maintenance Plan. Any special tools and equipment required to maintain the equipment will be listed in the Plan.

The analysis provided during the RAM process is designed to provide the most economical and available system for the Rail Road mainline. Additionally, the analysis provides the Rail Road with a projection of the level of effort required by their personnel to maintain the overall system.

A final element of the RAM Plan is to assure the Rail Road that the new system will not electromagnetically impact the surrounding environment or the surrounding environment will not electromagnetically impact the new system. 3TC will provide an EMI evaluation, per the Contract Documents, of the current environment and perform a reevaluation after portions of the system have been deployed to ensure that no degradation of performance of the system or of surrounding Rail Road neighbors have been impacted. The evaluation will include a study of pre-construction EMI conditions and will complete with a post in service study of the changes to the surrounding environment to ensure that no discernable impacts have occurred. The study will be performed by a certified laboratory in Long Island.

2.6
Graphics

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2.6 Graphics

2.6.1) Photo realistic representations from 3-D models of each of the new underpasses showing general views, user views and aesthetic treatments.

2.6.2) Photo realistic representations from 3-D models of each station showing general views, user views and aesthetic treatments.

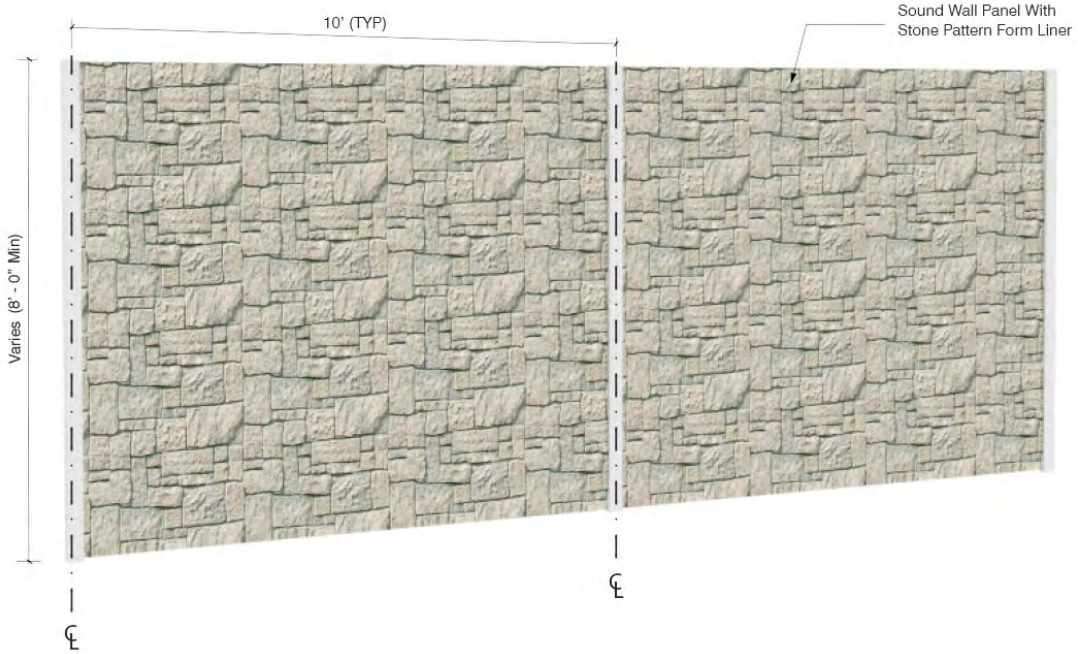
2.6.3) Photo realistic representations from 3-D models of representative retaining and sound wall proposed in each community

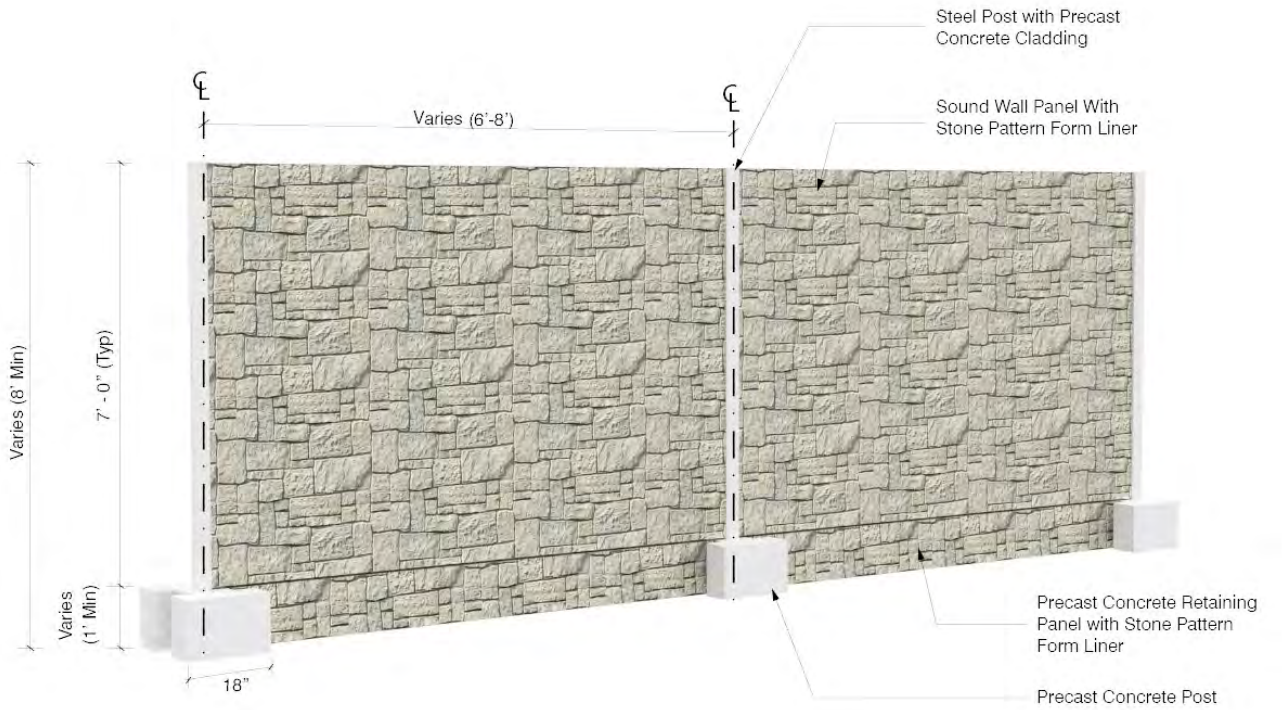
2.6.4) Photo realistic representations from 3-D models of any other proposed aesthetic treatments.

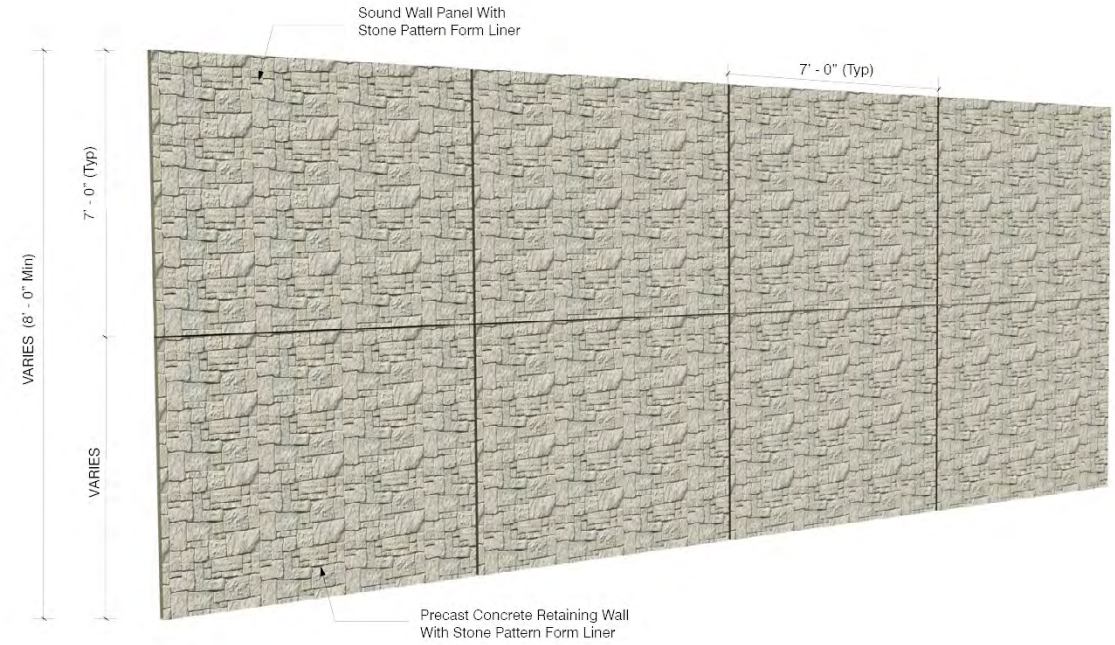
1. Refer to Project Design Appendix 2.6 for graphic renderings of the five new grade crossing eliminations, and two closed streets. Sample renderings are shown below.

2. Refer to Project Design Appendix 2.6 for graphic renderings of each new station. A sample rendering is shown below.

3. Refer to Project Design Appendix 2.6 for graphic renderings of the retaining and sound walls. Sample renderings are shown below.




Steel Post with Precast Concrete Cladding
Sound Wall Panel With Stone Pattern Form Liner
Varies (6'-8')
Varies (8' Min)
7' - 0" (Typ)
Varies (1' Min)
18"
Precast Concrete Retaining Panel with Stone Pattern Form Liner
Precast Concrete Post


Sound Wall Panel With Stone Pattern Form Liner
7' - 0" (Typ)
VARIES (8' - 0" Min)
7' - 0" (Typ)
VARIES
Precast Concrete Retaining Wall With Stone Pattern Form Liner

4. Refer to Project Design Appendix 2.6 for graphics renderings on the following elements with proposed aesthetic treatments, including the combined canopy structure, pedestrian underpasses, pedestrian overpasses, retaining walls at the grade crossing eliminations, and the parking garages. Sample renderings are shown below and to the right.

2.7
Video

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2.7 Video

2.7.1) One 2 to 5-minute video showing a video realistic aerial overlay of the completed new project over that existing. Video will run from west to east and will extend to include all work.

2.7.2) Video will include all existing physical features within the Project Limits modified as per final Project Elements.

3TC has provided a video that is approximately 5 minutes long showing a realistic aerial overlay of the completed new project, running west to east.

2.8 Project Components

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2.8 Project Components

2.8.1) Provide description, supplemented by plans and drawings as necessary to set out what the proposer intends to build in each of the following work types:

Project Plans

1) Project Plans: a) 1"=50ft plan drawings for entire corridor showing all Project Elements including existing and new features; b) 1"=50ft plan drawings at stations, underpass crossings and parking structures including existing and new features; & c) Typical cross-sections along the Railroad showing all features, specifically including all earth retaining or similar structure, at all key locations.

3TC will provide 50-scale Project Plans outlining all proposed work and illustrating the final condition of the Project corridor. These Project Plans, including plan drawings and typical sections, are included inProject Design Appendix 2.8.1.

Utilities

a. Conceptual utility relocation plans The Utility Conceptual Relocation Plans are attached in Appendix 2.8.2.
b. List of all individual utility elements within Project Limits including extent of modifications, materials and key details.

Fiber Optic and Communication

Companies maintaining underground and aerial fiber optic and telephone lines through the Project corridor include:

Verizon maintains overhead telephone lines on Verizon owned utility poles as well as on PSEG-LI utility poles. There are existing service connections into the Rail Road ROW throughout the project. Overhead relocations will be coordinated with PSEG-LI, other communication companies, and the Rail Road prior to the start of construction.

Verizon Business Solutions maintains underground fiber optic lines and overhead cables within the Rail Road ROW. Verizon Business Solutions fiber optic cable is typically bundled with Altice fiber optic cable. Overhead cable relocations will be coordinated with PSEG-LI and the Rail Road.

AT&T maintains overhead and underground fiber optic facilities at seven locations along and across the Rail Road ROW. Of the seven locations, four locations run perpendicular to the Rail Road ROW, and one occurs at a grade crocking elimination, Main Street. The proposed underpass will expose the buried fiber optic cable at the Main Street grade crossing elimination.

Lightower maintains overhead fiber optic lines at four crossings of the Rail Road ROW:

- Covert Avenue – bypass routing is proposed
- School Street – overhead lines to be relocated underground
- New Hyde Park Road – overhead fiber optic crossing the tracks will be relocated to the new utility corridor
- Grand Boulevard – No conflicts

Relocations will be coordinated with PSEG-LI, and where applicable, completed prior to the start of construction.

Crown Castle leases fiber optic facilities from Lightower at Covert Avenue, New Hyde Park Road, and School Street. Crown Castle will follow the Lightower relocations.

Altice provides cable television to the various municipalities. The Altice lines usually follow the alignments of overhead and underground facilities of PSEG-LI and Verizon. In addition, Altice facilities are tied to Verizon Business Solutions fiber optic facilities located on Rail Road poles within the Rail Road ROW. Relocation requirements and relocation strategy will be determined on a case by case basis in conjunction with PSEG-LI, Verizon and the Rail Road

Verizon

Verizon maintains overhead telephone lines on Verizon owned and PSEG-LI owned utility poles. Additionally, there are service connections into the Rail Road ROW throughout the Project limits. The following is a summary of the Verizon conflicts:

South Tyson Avenue

1. There are underground fiber optic facilities in the road along the east curb. The two fiber optic cables may be in conflict with the abutment construction. The fiber optic facilities will be protected, service maintained, and /or relocated as necessary.

Plainfield Avenue

1. There is overhead telephone cable beginning at Plainfield Road and running parallel to the south tracks. The facility may be in conflict with the abutment construction. The facilities will be protected, service maintained, and /or relocated as necessary.
2. There is underground fiber optic cable running in the sidewalk along the west curb line, north and south. The facility may be in conflict with the abutment construction. The facilities will be protected, service maintained, and /or relocated as necessary.

Covert Avenue

1. There is overhead and underground fiber optic in the southbound lane crossing and north and south of the tracks and at Wayne Avenue. The proposed under grade crossing would expose the fiber optic duct. The facilities will be relocated to follow the path from Covert Avenue to Wayne Avenue, South 5th Street and 1st Avenue back to Covert Avenue.
2. There is overhead fiber optic that crosses the roadway at 3rd Avenue south of the tracks. The poles will be relocated to the east side.

South 12th Street

1. There is underground fiber optic in the southbound lane south f the tracks. The underground fiber optic

duct will be relocated as necessary to eliminate conflicts with the pedestrian bridge.
2. There is underground fiber optic in the northbound lane north of the tracks. The underground fiber optic duct does not interfere with the grade crossing elimination

New Hyde Park Road

1. There is underground fiber optic in the southbound lane that crosses and is north and south of the tracks. The proposed under grade crossing would expose the fiber optic duct. The fiber optic duct will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.
2. There is underground fiber optic along the west sidewalk south of the tracks. The proposed under grade crossing would expose the fiber optic duct. The fiber optic duct will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.
3. There is underground fiber optic duct along Greenridge Avenue. The proposed under grade will not impact the underground fiber optic duct.
4. There are overhead cables at the southbound sidewalk area north and south of the tracks that drop to underground duct as it approaches the railroad. The cable will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.
5. South of the tracks there are overhead transfer cables servicing the local neighborhood to the east. The proposed under grade crossing will require pole replacement due to the change in grade and the minor alignment changes at Clinch and Greenridge Avenues.
6. There are overhead cables on and at Plaza Avenue. Due to the change in vertical grades, the pole will be replaced.

Main Street

1. There is underground fiber optic duct in the roadway that crosses and is north and south of the tracks. The proposed grade crossing elimination would not impact the fiber optic duct.

Willis Avenue

1. There is underground fiber optic in the east sidewalk south of the tracks and along 3rd Avenue. The proposed under grade crossing will not impact the fiber optic duct.

School Street

1. There is underground and overhead fiber optic at School Street. The overhead approaches the tracks on the west sidewalk from the south and drops underground to go under the tracks. After crossing the tracks, the fiber optic comes back up on the north side of the tracks at a pole immediately south of Union Avenue along School Street. The proposed under grade crossing would expose the fiber optic duct. The trunk lines will be relocated underground and services reestablished via relocated service lines south of the tracks and through alternate roadway routes (Union Avenue or Center Street to Grant Street) north of the tracks.
2. There is an overhead telephone lie running [redacted] away parallel to the railroad north side of the north tracks terminating at School Street Sta. [redacted] to Sta. [redacted]. The telephone line is in conflict with the proposed wall on the west side. The telephone line will be relocated behind the proposed wall.
3. There is an overhead telephone line running parallel on the west side of School Street for the full length of the street crossing north and south of the tracks. The telephone line is in conflict with the proposed wall on the north side of the tracks. The telephone line will be relocated behind the proposed wall.
4. There is an overhead telephone line running 50-feet away parallel to the railroad south side of the tracks then crossing north and south tracks at Sta. [redacted] to Sta. [redacted]. The overhead telephone line will be rerouted as needed.

Urban Avenue

1. There is underground fiber optic in the northbound lane crossing and north and south of the tracks. The underground fiber optic duct conflicts with the proposed east retaining wall. The fiber optic duct will be rerouted between Broadway and Main Street to Sylvester Street.

Herricks Road

1. There are underground fiber optic facilities running north south along the west curb. The facilities may

be in conflict with the construction of the sound attenuation wall. The facilities will be protected, service maintained, and/or relocated as necessary.
2. There are underground fiber optic facilities running north south along the east curb. The facilities may be in conflict with the construction of the sound attenuation wall. The facilities will be protected, service maintained, and/or relocated as necessary.

Mineola Station and Mineola Boulevard

1. There are underground fiber optic facilities crossing and north and south of the tracks at Sta. 288+75. The facility may be in conflict with track and platform construction. The facilities will be protected, service maintained, and/or relocated as necessary.
2. There is fiber optic hung on the bridge at the railroad station over the tracks at Sta. 289+45. The facilities will be protected, service maintained, and/or relocated as necessary.

Roslyn Road

1. There are underground fiber optic facilities crossing and north and south of the tracks that may be in conflict with retaining wall construction. The facilities will be protected, service maintained, and/or relocated as necessary.

Glen Cove Road

1. There are underground fiber optic facilities crossing and north and south of the tracks along the west side. There are 25 ducts that may be in conflict with the abutment wall construction. The facilities will be protected, service maintained, and/or relocated as necessary.
2. There is overhead telephone on the west side of Glen Cove Road and ending approximately 20-feet north of the tracks. The facilities will be protected, service maintained, and/or relocated as necessary.

Cherry Lane

1. There is underground fiber optic crossing and north and south of the tracks on the west side that may be in conflict with the abutment construction. The facilities will be protected, service maintained, and/or relocated as necessary.
2. There is underground fiber optic crossing and north and south of the tracks on the east side that may be in conflict with the abutment construction. The facilities will be protected, service maintained, and/or relocated as necessary.

Ellison Avenue

1. There is overhead copper and fiber optic facilities crossing and north and south of the tracks on the west curb line of the bridge. The facilities will be protected, service maintained, and/or relocated as necessary.
2. There is overhead copper and fiber optic facilities outside the Rail Road ROW parallel to and on the north side of the tracks. The facilities will be protected, service maintained, and/or relocated as necessary.

Grand Boulevard

1. There is overhead telephone on the west side of Grand Boulevard crossing and north and south of the tracks. The facilities will be protected, service maintained, and/or relocated as necessary.

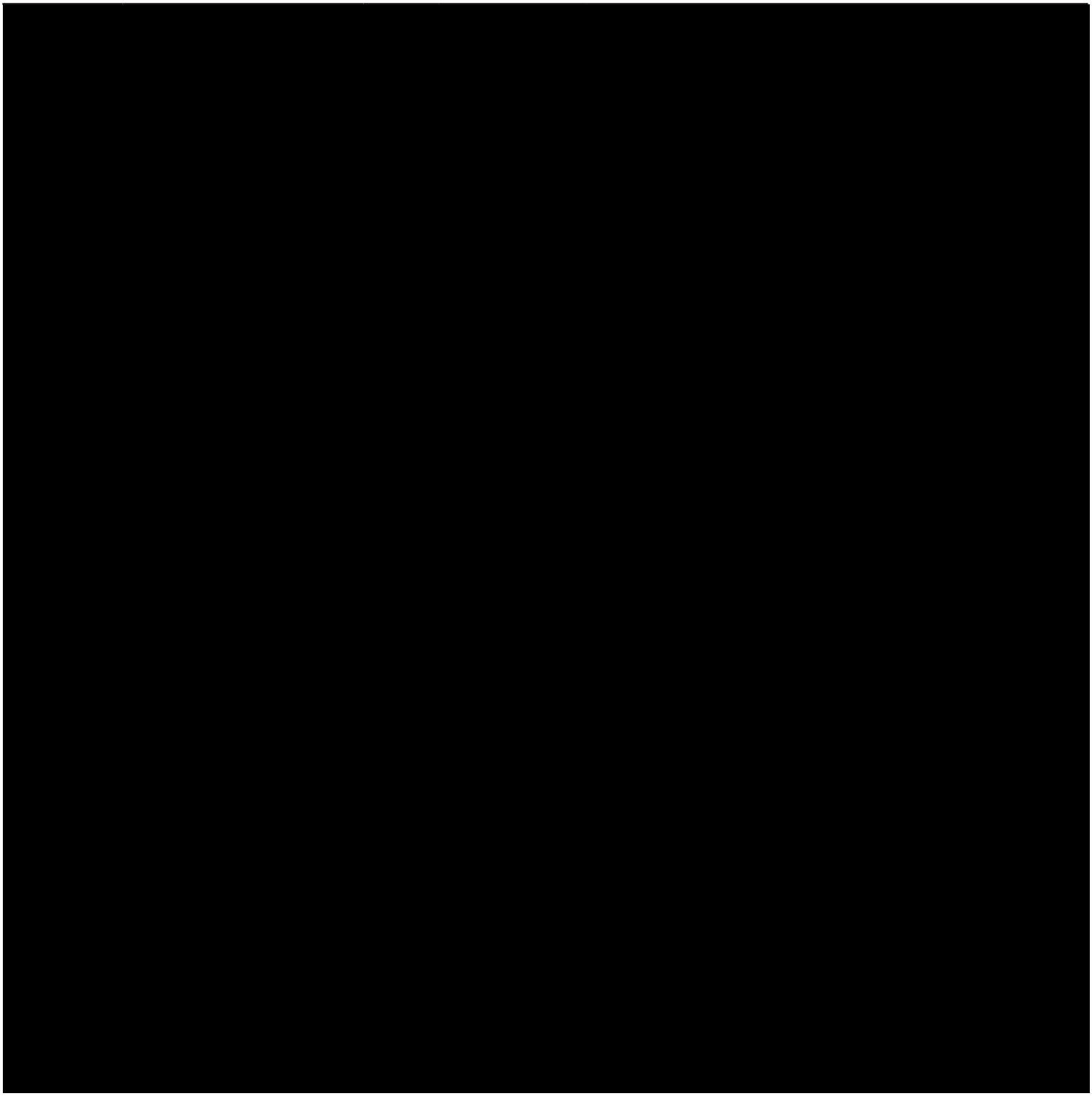
Verizon Business Solutions (VBS)

Verizon Business Solutions, formally MCI, underground fiber optic lines and overhead lines are located within the Rail Road ROW. VBS is typically bundled with Altice fiber optic cable. Due to the existing locations with the Rail Road ROW, the underground VBS cables and underground bundled cables with Altice will be relocated to poles. The overhead VBS cables and overhead bundled cables with Altice will remain. However, the overhead and underground VBS cables and bundled cables with Altice between Sta. [redacted] to [redacted] will be relocated to new PSEG-LI or Rail Road poles to the north of the tracks. From Sta. [redacted] to Sta. [redacted] the facilities will be relocated to new PSEG-LI or Rail Road poles on the south. From [redacted] to [redacted], and from Sta. [redacted] to the end the facilities will remain as is.

AT&T

AT&T maintains overhead and underground fiber optic facilities at seven locations along ad across the Rail Road ROW that carries their Local Network Service (LNS):

1. Underground fiber optic crossing the Rail Road ROW along South Tyson Avenue. – No Conflicts



2. Underground fiber optic facilities in three sets of duct banks; one owned by Verizon and two owned by AT&T in the center of South Tyson Avenue – No Conflicts
3. Underground fiber optic crossing the Rail Road ROW along Herricks Road – No Conflicts
4. Underground fiber optic in the southbound lane of Herricks Road - No Conflicts
5. Underground fiber optic cable crossing the Rail Road right-of way along Cherry Lane. The existing underground fiber optic will be protected during the construction of the abutment.
6. Underground fiber optic facilities carried in a Verizon conduit along the northbound lane of Cherry Lane will be protected during the construction of the abutment.
7. Main Street – There is underground fiber optic in the roadway that crosses and is south of the tracks. There is no impact to the underground fiber optic duct due to the proposed grade crossing elimination.
8.

Lightower and Crown Castle

Lightower maintains overhead fiber optic lines at four crossings of the Rail Road ROW. Crown Castle leases fiber optic facilities from Lightower. Crown Castle conflicts and relocations will follow the Lightower relocations.

South Tyson Avenue

1. There is overhead fiber optic cable crossing and north and south of the tracks along the east side of the street. The facility will be protected and service maintained during the construction.

Covert Avenue

1. There is overhead fiber optic crossing the Rail Road ROW along the west side of the southbound lane and running north and south of the tracks. Utility pole for the overhead fiber optic will be relocated due to proposed under grade crossing.
2. There is overhead fiber optic on the east and west sidewalks crossing and north and south of the tracks. The utility poles servicing the overhead fiber optic cables will be relocated due to the proposed under grade crossing vertical grade change and alignment.

New Hyde Park Road

1. There is overhead fiber optic crossing the tracks along the west side of the southbound lane running north and south. The cable will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.

Herricks Road

1. There is overhead fiber optic along the west curb line crossing and north and south of the tracks. The fiber optic facilities will be protected and service maintained. The fiber optic facilities will be relocated as necessary.

Glen Cove Road

1. There is overhead fiber optic along the west curb line crossing and north and south of the tracks. The fiber optic facilities will be protected and service maintained. The fiber optic facilities will be relocated as necessary.

Cherry Lane

1. There is overhead fiber optic along the east curb line crossing and north and south of the tracks. The fiber optic facilities will be protected and service maintained. The fiber optic facilities will be relocated as necessary.

School Street

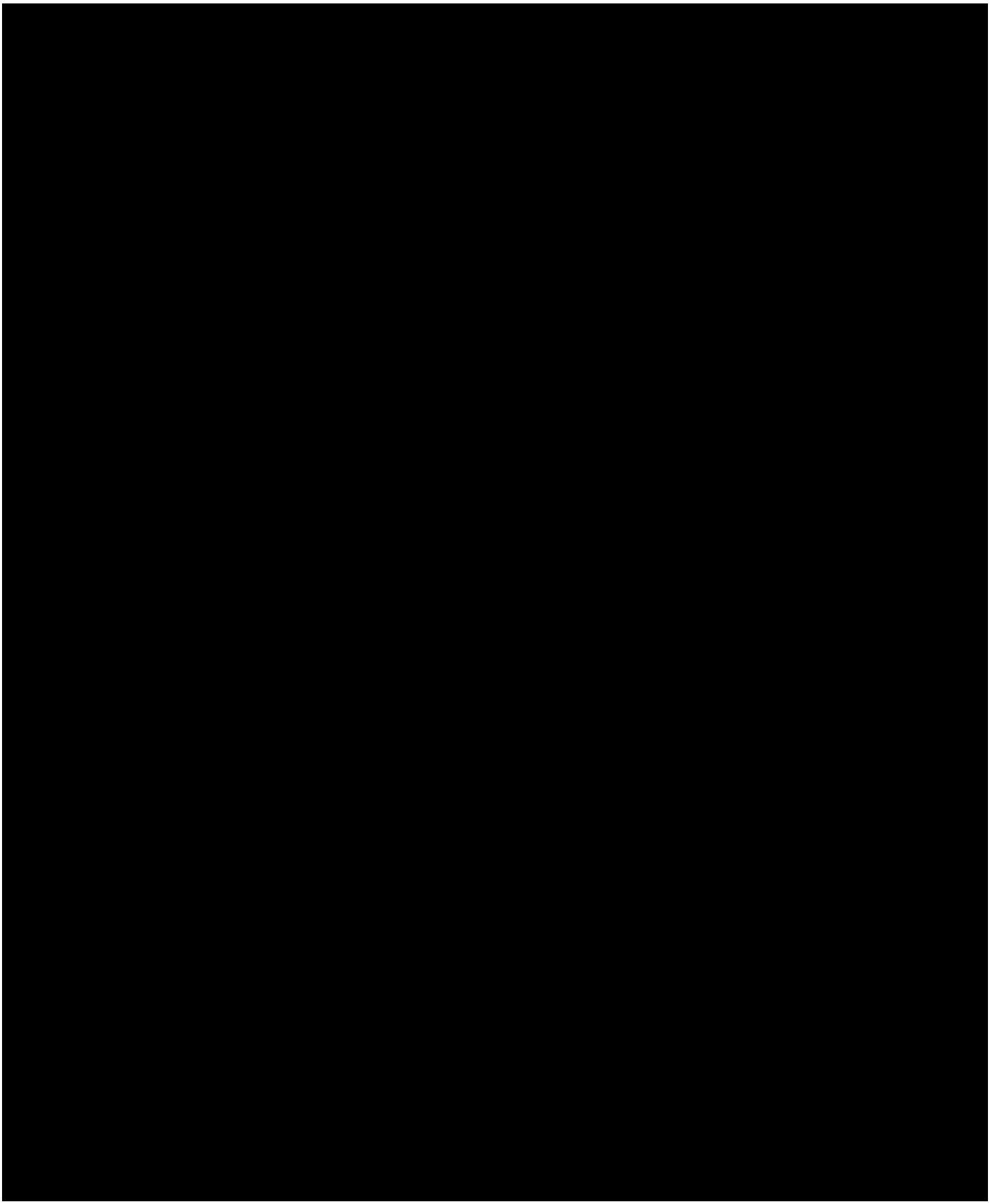
1. There is overhead fiber optic at the west sidewalk crossing and north and south of the tracks. The fiber optic will be relocated behind the proposed wall.

Grand Boulevard

1. There is overhead fiber optic crossing and north and south of the tracks. The fiber optic facilities will be protected and service maintained.
2.

Altice

Altice is formally Cablevision. Altice provides cable television to the various municipalities along the Rail Road Expansion Project. Altice lines usually follow closely the alignments of overhead and underground PSEG-LI and Verizon facilities. Additionally, Altice's facilities are tied to Verizon Business Solutions fiber optic facilities located on Rail Road poles within the Rail Road ROW.



Construction of Altice's facility relocations within the Rail Road ROW will be coordinated with the relocation of the Rail Road poles and Verizon Business Solution's fiber optic relocations.

In the off Rail Road ROW areas, relocations will be coordinated with PSEG-LI's pole relocations required at the grade crossing eliminations and bridge widening, where applicable, and completed prior to the start of the Rail Road Expansion Project track and under grade crossing construction.

Covert Avenue

1. There are overhead cables along the west side. The overhead cables will e relocated to follow the path from Covert Avenue to Wayne Avenue, South 5th Street and 1st Avenue back to Covert Avenue.

South 12th Street

1. There are overhead cables along the southbound lane south of the tracks. The overhead cables will be raised and the pole will be relocated to avoid conflict with the proposed pedestrian overpass.
2. There are overhead cables along the northbound lane north of the tracks. There are no conflicts with the proposed grade crossing elimination.

New Hyde Park Road

1. There are overhead cables along the southbound sidewalk north and south of the tracks. The cables will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.
2. There are overhead cables south of the tracks that transfer service into the neighborhood to the east. The pole will be relocated due to change in grades and alignment changes at Clinch Street and Greenridge Avenue.
3. There are overhead cables on and at Plaza Avenue. The pole will be relocated due to the change in vertical grades.

Denton Avenue

1. There is overhead fiber optic that may conflict with the track and abutment construction. The facility will be protected and service maintained. The facility will be relocated as necessary.

Roslyn Road

1. There is overhead fiber optic along the east side of the road crossing the tracks that may conflict with the retaining wall construction. The facility will be protected and service maintained. The facility will be relocated as necessary.

Glen Cove Road

1. There is overhead fiber optic along the east and west curb north of the tracks. The facility may conflict with the construction of the abutment. The facility will be protected and service maintained. The facility will be relocated as necessary.
2. There is overhead fiber optic along the west curb south of the tracks. The facility may conflict with the construction of the abutment. The facility will be protected and service maintained. The facility will be relocated as necessary.

Cherry Lane

1. There is fiber optic cable crossing and north and south of the tracks along the east curb. The facility will be protected and service maintained. The facility will be relocated as necessary.

Ellison Avenue

1. There is fiber optic along the northern Rail Road ROW. The facility may conflict with the sound attenuation wall construction. The facility will be protected and service maintained. The facility will be relocated as necessary.
2. There is overhead fiber on poles on the bridge on the west side crossing and north and south of the tracks. The facility will be protected and service maintained. The facility will be relocated as necessary.

Note: there are seven (7) fiber optic cable drop offs:

1. New Hyde Park Substation
2. N1 Hut
3. Merillon Avenue Station
4. Mineola Communications Hut
5. N3 Hut
6. Westbury Substation
7. New Cassel Substation

The fiber optic facilities will be protected and service maintained. The fiber optic facilities will be relocated as necessary.

Nassau County Department of Public Works (NCDPW)

NCDPW has sanitary sewer lines that run parallel to or cross the Railroad ROW at the grade crossing eliminations:

- Covert Avenue – Proposed underpass will expose sewer.
- South 12th Street – No sewer conflicts.
- New Hyde Park Road – Proposed underpass will expose sewer.
- School Street – No known sewer conflicts.
- Urban Avenue – Proposed underpass will expose the sewer.

The following identifies the NCDPW sanitary sewer relocation, protection, and maintenance of service within the project area:

Covert Avenue North of Tracks

a. Approximately [redacted] of [redacted] sanitary sewer in 2nd flowing easterly across Covert Avenue will be demolished and redirected around the Covert Avenue underpass.
b. Approximately [redacted] of [redacted] sanitary sewer will be reconstructed to redirect 2nd Avenue flow under west sidewalk of Covert Avenue, and cross connecting to the east side of Covert Avenue within the construction zone where minimum cover can be maintained.
c. Approximately [redacted] of [redacted] sanitary sewer under the northbound lane of Covert Avenue will be reconstructed in the north bound lane crossing the post and panel wall to the acquired lot at the S/E corner of 2nd Avenue and Covert Avenue to a reconnection point in 2nd Avenue completing the redirection of 2nd Avenue flow.

Covert Avenue South of Tracks

a. Existing sanitary sewer within the north bound lane of Covert Avenue will be unaffected by construction.
b. Approximately [redacted] of [redacted] sanitary sewer under the southbound lane south of the tracks will be relocated to under the west sidewalk.
c. The sanitary sewer manhole at Wayne Ave and Covert Ave will be remediated as necessary.
d. Water mains will be adjusted as necessary. Water mains do not present mitigation difficulties as the utility is not gravity dependent.

3rd Avenue

a. There is an [redacted] sanitary sewer south of the Rail Road ROW from east of South 8th Street to west of South 10th Street. The [redacted] sanitary sewer will be maintained and protected during construction.
b. There is an [redacted] sanitary sewer south of the Rail Road ROW from east of South 10th Street to west of South 11th Street. The [redacted] sanitary sewer will be maintained and protected during construction.
c. There is an [redacted] sanitary sewer south of the Rail Road ROW from South 12th Street to west of Baer Place. The [redacted] sanitary sewer will be maintained and protected during construction.

South 12th Street

a. South 12th Street will result in a permanent crossing closure. The closure will result in no impacts to the gravity sanitary sewer system. Manhole rims affected by the regarding of the street will be adjusted where necessary.

New Hyde Park Road

a. The sanitary sewer line that crosses New Hyde Park Road at 2nd Avenue north of the tracks will be rerouted to accommodate the new underpass. The sanitary sewer will be lowered accordingly and routed down New Hyde Park Road to meet the appropriate invert within the ROW. Approximately [redacted] of [redacted] sanitary sewer is to be rerouted.
b. Water mains will be adjusted as necessary. Water mains do not present mitigation difficulties as the utility is not gravity dependent.

School Street

a. There are no NCDPW associated sanitary sewer mitigation measures necessary for School Street.
b. Water mains will be adjusted as necessary. Water mains do not present mitigation difficulties as the utility is not gravity dependent.

Urban Avenue South

a. Sanitary sewer running under the roadway south of the tracks will be impacted by the grade crossing elimination. The sanitary sewer will be relocated on the east and west side of

Covert Avenue to maintain service to adjacent lots. It is anticipated that approximately [redacted] feet of sanitary sewer main will be reconstructed in the east and west sidewalks and reconnect to the existing main. The existing main will be demolished to the new manhole location at approximately station [redacted].

Urban Avenue North

a. The sanitary sewers running east and west at Broadway north of the tracks will not be affected by the grade crossing elimination. The sanitary sewer will be maintained and protected.
b. The sanitary sewer flows on Railroad Avenue converge at Urban Avenue and will be affected by the construction. To maintain services on Broadway and Urban Avenue, flow will be re-routed on the east and west sides of Urban Avenue flowing north to Broadway intersection and reconnect to the existing northerly flow in Urban Avenue.
c. The 8" sanitary sewer in the center of Urban Avenue north of the tracks will be affected by the grade crossing elimination and will be demolished up to Broadway.
d. Water mains will be adjusted as necessary. Water mains do not present mitigation difficulties as the utility is not gravity dependent.

Crossing at approximate Sta. [redacted]

a. There is a [redacted] sanitary sewer running perpendicular to and under the tracks to manholes outside the ROW. The [redacted] sanitary sewer and manholes will be maintained and protected during the construction of the track, retaining wall and sound wall.

6th Avenue

b. There is a sanitary sewer line running parallel to the tracks to manholes outside the southerly ROW. The facilities will be maintained and protected during the construction of the retaining wall and sound wall.

5th Avenue

a. There is a sanitary sewer line running parallel to the tracks to manholes outside the southerly ROW. The facilities will be maintained and protected during the construction of the retaining wall and sound wall.

Denton Avenue

a. There is a sanitary sewer running perpendicular to and under the tracks to manholes outside the ROW. The sanitary sewer and manholes will be maintained and protected during the construction of the track, retaining wall and sound wall.

Glen Cove Road

a. There is a sanitary sewer running perpendicular to and under the tracks to manholes outside the ROW. The sanitary sewer and manholes will be maintained and protected during the construction of the abutment wall.

Crossings at Various Locations

a. There is a [redacted] sanitary sewer running perpendicular to and crossing the tracks north and south of Sta. [redacted] (approximately). The sanitary sewer and manholes will be maintained and protected during the track construction.
b. There is a [redacted] sanitary sewer running perpendicular to and crossing the tracks north and south of [redacted] (approximately). The sanitary sewer and manholes will be maintained and protected during the track and sound wall construction.
c. There is a [redacted] sanitary sewer running perpendicular to and crossing the tracks north and south of [redacted] (approximately). The sanitary sewer and manholes will be maintained and protected during the track and retaining wall construction.
d. There is a [redacted] sanitary sewer running perpendicular to and crossing the tracks north and south of Sta. [redacted] (approximately). The sanitary sewer and manholes will be maintained and protected during the track, retaining wall, and sound wall construction.
e. There is a [redacted] sanitary sewer running perpendicular to and crossing the tracks north and south of Sta. [redacted] (approximately). The sanitary sewer and manholes will be maintained and protected during the track and platform construction.

Carle Road

a. There is a [redacted] sanitary sewer running perpendicular to and crossing the tracks north and south. The sanitary sewer and manholes will be maintained and protected during the track, retaining wall, and sound wall construction.

Village of Garden City

The Village has water mains and sanitary sewer lines that cross and are parallel to the Rail Road ROW:

New Hyde Park Road

a. The FEIS reports that the proposed grade crossing elimination would expose the [redacted] sanitary sewer at Clinch Ave south of the tracks. However, the proposed road profile indicates that the sanitary sewer will not be exposed. The manhole rim and cover will be adjusted accordingly to match the new grade.
b. The FEIS reports that the proposed grade crossing elimination would expose the [redacted] sanitary sewer in the northbound lane of New Hyde Park Road south of the tracks. However, the proposed road profile indicates that the sanitary sewer will not be exposed. The manhole rim and cover will be adjusted accordingly to match the new grade.
c. Water mains will be adjusted as necessary. Water mains do not present mitigation difficulties as the utility is not gravity dependent.
d. There is a Village of Garden City Water interconnect with the Water Authority of Western Nassau south of the tracks located between Clinch and Greenridge Avenues. The interconnect will be adjusted and/or relocated accordingly due to grade alignment changes.

Main Avenue

a. There is an [redacted] water main located along the south side of Main Avenue from Tanners Pond Road to Nassau Boulevard. The [redacted] water main feeds [redacted] line connections to the south along each intersecting street. The [redacted] water main and [redacted] line connections will be maintained and protected during construction.
b. South of the Rail Road ROW, each side of the street begins a sanitary sewer line immediately south of Main Avenue from Tanners Pond Road to Nassau Boulevard. The sanitary sewer lines will be maintained and protected during construction.

Plainfield Avenue

a. There is a sanitary sewer line that parallels the south side of the Rail Road ROW (approximately [redacted] off) from Plainfield Avenue to Sta. [redacted] (approximately). The sanitary sewer line will be maintained and protected during the abutment construction.

Sta. 132+50 (approximately)

a. There is a [redacted] sanitary sewer crossing the tracks. The sanitary sewer line will be maintained and protected during construction of the proposed retaining wall. Should a conflict occur, as determined during final design, the [redacted] sanitary sewer will be realigned as necessary.

5th Avenue

a. There is a sanitary sewer in the road south of and parallel to the Rail Road right-of way. The sanitary sewer line will be maintained and protected during construction of the proposed retaining wall. Should a conflict occur, as determined during final design, the sanitary sewer will be realigned as necessary.

Denton Avenue

a. There is a [redacted] sanitary sewer in the center of the roadway crossing and north and south of the tracks. The proposed construction would expose the sanitary sewer. The sanitary sewer will be maintained and protected during construction.

Nassau Boulevard

a. There is a sanitary sewer crossing and north and south of the tracks. The sanitary sewer will be maintained and protected during the construction of the abutment.

East of Herricks Road at [redacted] (Approx.)

a. There is a [redacted] sanitary sewer crossing and north and south of the tracks. The 30" sanitary

sewer ill be maintained and protected during the construction of the tracks.

12th Avenue at Sta. 261+00 (Approx.)

a. There is a 36" sanitary sewer crossing and north and south of the tracks. The 36" sanitary sewer ill be maintained and protected during the construction of the tracks.

Railroad Avenue:

a. The sanitary sewer parallels the north side of the Rail Road ROW from Denton Avenue to 5th Avenue providing connections to the north along each side street. The sanitary sewer and associated connection laterals will be maintained and protected during construction.

Village of Mineola

The Village has water mains and sewer lines with the project corridor that cross and run parallel to the Rail Road ROW grade crossing eliminations:

Main Street

a. Main Street will result in a permanent crossing closure. The closure will result in no impacts to the gravity sanitary sewer system. Manhole rims affected by the regarding of the street will be adjusted where necessary. The existing utilities will be appropriately protected during construction.

Willis Avenue South

a. The [redacted] sanitary sewer located in the center of Willis Avenue south of the tracks will be exposed due to the grade crossing elimination. The sanitary sewer main will be relocated/split to the east and west side of Willis Avenue as needed to maintain services.

a. The [redacted] sanitary sewer located in the center Front Street (east) is in conflict with the proposed east retaining wall. The [redacted] sanitary will be rerouted behind the retaining wall, within the ROW and reconnected to the existing sanitary with a doghouse manhole at approximately station [redacted]

Willis Avenue North

a. The sanitary sewer in the center of Willis Avenue from 2nd Street to Front Street (west) has been abandoned and plugged according to NCDPW record plans and Village of Mineola record plans does no acknowledge its existence. This pipe will be demolished.

b. The sanitary sewer in the center of Willis Avenue between 2nd Street & 1st Street will be reconstructed in the east and west sidewalks. The flow will be reversed to connect to the existing manhole in 1st Street and Willis Avenue accordingly.

c. There is a sanitary sewer line within the proposed approach along the south sidewalk on 2nd Street that will be impacted by the proposed road alignment. The house connection for the commercial property on the S/W corner of Willis and Second Street will be modified accordingly.

d. There is a sanitary sewer line that will fall within the approach to the under grade crossing along the north sidewalk on 2nd Street. This section of sanitary sewer may be eliminated.

e. There are water main relocations necessary on Willis Avenue crossing north and south sides of the tracks, along Front Street (west) and 2nd Street. A temporary main and services will be required during construction. The existing main running north and south on Willis Avenue can be permanently abandoned and replaced by a relocated section sleeved under the tracks west near main line [redacted], and connecting mains on Front and Second Streets. The water mains within Willis Avenue crossing and on the north and south sides of the tracks will be relocated to the proposed west sidewalk. There is no conflict with the [redacted] water main on Front Street (west). The [redacted] water main along 2nd Street north of the tracks will be lowered to meet the cover requirements for the proposed roadway grade. A temporary main and temporary services will be required during construction. The [redacted] water main along Front Street (east) south of the tracks will terminate at Willis Ave intersection. All water services will be maintained.

Glen Cove Road Sta. [redacted] (Approx)

a. There is a sanitary sewer crossing and north and south of the tracks. The sanitary sewer may be in conflict with the proposed abutment. The sanitary sewer will be maintained, protected, and if necessary, relocated if determined during final design.

Glen Cove Road Sta. 355+35 (Approx)

a. There is a [redacted] water line crossing and north and south of the tracks. The [redacted] water line may be in conflict with the proposed abutment. The water line will be maintained, protected, and if necessary, relocated if determined during final design.

[redacted] (Approx)

a. There is a sanitary sewer crossing and north and south of the tracks. The sanitary sewer will be maintained and protected during the construction of the retaining wall and track.

Cherry Lane Sta. [redacted] (Approx.)

a. There is a water line crossing and north and south of the tracks. The water line will be protected and maintained during the construction of the abutment.

East of Cherry Lane Sta. [redacted] (Approx.)

b. There is a [redacted] sanitary sewer crossing and north and south of the tracks. The [redacted] sanitary sewer will be maintained and protected during the construction of the retaining wall.

Carle Road

c. There is sanitary sewer crossing and north and south of the tracks. The sanitary sewer will be maintained and protected during the construction of the retaining wall.
d. There is a [redacted] water main crossing and north and south of the tracks. The [redacted] water main will be maintained and protected during the construction of the retaining wall.
e. There is a [redacted] water main crossing and north and south of the tracks. The [redacted] water main will be maintained and protected during the construction of the retaining wall

West of Post Avenue Sta. [redacted] (Approx.)

a. There is sanitary sewer crossing and north and south of the tracks. The sanitary sewer will be maintained and protected during the construction of the proposed platforms.

School Street North

a. The FEIS notes that there is an [redacted] sanitary sewer down the center of School Street passing under the north and south tracks. The Village of Mineola record drawings for the grade crossing show that there are flush sanitary manholes both north and south of the tracks; that the [redacted] sanitary sewer does not pass under the tracks. The flush manholes on the north and south side of the tracks will be impacted by the proposed grading of the underpass.
b. To service the properties north of the tracks, the sanitary sewer will be reconstructed in the northbound lane of School Street. Approximately [redacted] of [redacted] sewer will be reconstructed to maintain service.

School Street South

a. To service the properties south of the tracks, the sanitary sewer will be rerouted on the east and west sides of School Street. Approximately [redacted] of [redacted] sewer will be reconstructed to maintain service.

Urban Avenue South

a. Sanitary sewer running under the roadway south of the tracks will be impacted by the grade crossing elimination. The sanitary sewer will be relocated on the east and west side of Covert Avenue to maintain service to adjacent lots. It is anticipated that approximately [redacted]-feet of sanitary sewer main will be reconstructed in the east and west sidewalks and reconnect to the existing main. The existing main will be demolished to the new manhole location at approximately station [redacted].

Urban Avenue North

a. The sanitary sewers running east and west at Broadway north of the tracks will not be affected by the grade crossing elimination. The sanitary sewer will be maintained and protected.
b. The sanitary sewer flows on Railroad Avenue converge at Urban Avenue and will be effected by the construction. To maintain services on Broadway and Urban Avenue, flow will be re-routed on the east and west sides of Urban Avenue flowing north to Broadway intersection and reconnect to the existing northerly flow in Urban Avenue.
c. The [redacted] sanitary sewer in the center of Urban Avenue north of the tracks will be affected by the grade crossing elimination and will be demolished up to Broadway.
d. Water mains will be adjusted as necessary. Water mains do not present mitigation difficulties as the utility is not gravity dependent.

Station Road

a. There is approximately [redacted] of sanitary sewer running parallel to the tracks and station platform. The sanitary sewer will be maintained and protected during construction. If necessary, and determined during final design, the sanitary sewer will be relocated.
b. There is approximately [redacted] of water main running parallel to the tracks and station platform in the road from [redacted] to Sta. [redacted]. The water main will be maintained and protected during construction. If necessary, and determined during final design, the water main will be relocated.

Water Authority of Western Nassau County (WAWNC)

WAWNC has several water mains serving the Villages of New Hyde Park and Garden City that cross and are parallel to the Rail Road ROW:

South Tyson Avenue

a. There is a [redacted] water main crossing and north and south of the tracks. The [redacted] water main will be maintained and protected during the construction of the abutment wall.

Plainfield Avenue

a. There is a [redacted] water main crossing and north and south of the tracks. The [redacted] water main will be maintained and protected during the construction of the abutment wall. The [redacted] water main will be relocated if necessary and as determined during final design.

Covert Avenue

a. There is a [redacted] water main crossing the tracks and on the west side of Covert Avenue. The [redacted] water main also crosses 2nd Avenue on the north side of the tracks and 3rd Avenue on the south side of the tracks. The [redacted] water main terminates in an [redacted] water main on the south side of tracks where 3rd and Covert Avenues intersect. The [redacted] water main will be impacted by the construction of the proposed under grade crossing. The [redacted] water main may be permanently eliminated between 2nd and 3rd Avenues with the re-routing of its replacement main on Wayne Avenue. The water supplier needs this transmission main active north and south across the tracks and cannot be out of service for an extended period of time. The points south served by the eliminated [redacted] water main will be supplemented by a new [redacted] water main from the pump station via Wayne Avenue to the [redacted]" water main at the intersection of Covert Avenue and 3rd Avenue.
b. There is an [redacted] water main in the southbound lane of Covert Avenue south of the tracks and at Wayne Avenue. The proposed underpass will expose the water main. The new water main will be rerouted. Rerouting will include reroute the water main the water mains south of the tracks from the water tower at S. 6th Street, through a sleeve under the tracks to Wayne Avenue bringing the main services back in the east and west sidewalks along Covert Avenue. A temporary main and temporary services will be required during construction.
c. An [redacted] water main crosses Covert Avenue at 2nd Avenue north of the tracks. The proposed underpass would expose the water main. The new water main will be depressed below the underpass. A temporary main and temporary services will be required during construction.
d. The [redacted] water main that crosses the roadway at 3rd Avenue south of the tracks will be exposed.

The water main will be depressed to compensate for the change in grade at Covert Avenue. This section can be eliminated during construction and does not have to be replaced. A new pipe link across Covert Avenue can be installed as part of the Wayne Avenue main.

e. The [redacted] water main on 2nd Avenue west of Covert Avenue and on the north side of the tracks that ties into the [redacted] water main on the west side of Covert Avenue will be impacted by the proposed under grade crossing. The water main will be depressed to compensate for the change in grade at Covert Avenue.
f. There is a [redacted] water main on 3rd Avenue south of the tracks east of Covert Avenue. The water main will be impacted by the proposed under grade crossing. The water main will be depressed to compensate for the grade change on Covert Avenue.

South 12th Street

a. There is a water service connection that crosses the roadway south of the tracks. The service connection would not be affected by the proposed grade crossing elimination.
b. There is a [redacted] water main that crosses the roadway at 3rd Avenue south f the tracks. The water main would not be affected by the proposed grade crossing elimination.
c. There is an [redacted] water main in the southbound lane that crosses north and south of the tracks. The water main would not be affected by the grade crossing elimination.
d. There is a water main that crosses the roadway at 2nd Avenue north of the tracks. The water main would not be affected by the proposed grade crossing elimination.
e. There is a [redacted] and an [redacted] water main on 2nd and 3rd Avenues east and west of 12th Street. The proposed grade crossing elimination will not affect the water mains.
f. It is noted that relative to water main relocation, the water mains do not need to be relocated due to grade changes. The existing water mains and water services will be maintained and protect during the construction phase.

Plainfield Avenue

a. There is a water main along the southbound lane. The water main will be maintained and protected during the construction of the abutment.

Mineola Station Sta. [redacted] (Approx.)

a. There are two water mains running along and south of the Mineola station platform between 4rth Avenue and 3rd Avenue. The water mains will be maintained and protected during the platform construction. During final design, if it is determined that the water mains conflict with the construction of the platform, the water mains will be relocated.

Mineola Boulevard

a. There is a water main running along and south of the Mineola station platform between 4rth Avenue and 3rd Avenue. The water main will be maintained and protected during the track construction. During final design, if it is determined that the water main conflicts with the track construction, the water main will be relocated.

New Hyde Park Road

a. There is a Village of Garden City Water interconnect with the Water Authority of Western Nassau south of the tracks located between Clinch and Greenridge Avenues. The interconnect will be adjusted and/or relocated accordingly due to grade alignment changes. A temporary main and temporary services will be required during construction.
b. There is a [redacted] water main in the southbound lane south of the tracks. The proposed under grade crossing would expose the water main. The water main will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.
c. There is q a [redacted] water main that crosses the roadway north of the tracks at Plaza Avenue. The proposed under grade crossing would expose the water main. The water main will be lowered and extended to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.
d. There is a [redacted] water main that crosses Clinch Avenue. The proposed under grade crossing

would expose the water main. The new water main will be relocated to follow the proposed depressed roadway profile.

e. There is an [redacted] water main in the southbound lane that crosses the tracks north and south of the tracks. The proposed under grade crossing would expose the water main. The water main will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW. The water main location will adjusted to follow the road profile grade change north of Plaza Avenue.
f. There is a [redacted] water main I the westbound lane on Plaza Avenue. The proposed under grade crossing would expose the water main. The water main will be relocated to follow the proposed depressed roadway profile.
g. There is an [redacted] water main in the northbound lane south of the tracks. The water main will be relocated to the proposed utility corridor west of New Hyde Park Road within the acquired ROW.
h. There is a [redacted] water main down the center of Greenridge Avenue. The proposed under grade crossing does not impact this water main.
i. There is a [redacted] water main in Plaza Avenue running east and west north of the tracks. The water main will be adjusted accordingly due to roadway grade.
j. There is a [redacted] water main in the center of Greenridge Avenue and Clinch Avenue. The water main will be relocated to the west sidewalk along Clinch Avenue, then cross Clinch Avenue and reconnect at Greenridge Avenue.

Westbury Water District

The Westbury Water District has several water mains serving the Village of Westbury that cross and are parallel to the Rail Road ROW:

Ellison Avenue

a. There is an [redacted] water main that crosses and north and south of the tracks east of Ellison Avenue at [redacted] The [redacted] water main runs parallel to the tracks on the south side. The [redacted] water main will be maintained and protected during the construction of the tracks and the sound attenuation wall.

School Street

a. There is a water main in the southbound lane north of the tracks extending south of the tracks. The water main will be relocated to the west sidewalk following the grade change. This main can be cut/capped and abandoned for an extended period and replaced following the grade change. Temporary services will be required during construction.
b. There is an existing water main in the westbound lane of Railroad Avenue. The proposed under grade crossing would expose the water main. The water main will be connected to the relocated water main in the west sidewalk. A temporary main and temporary services will be required during construction.
c. There is a service connection at [redacted] that will be impacted. A new services connection will be established on Grant Avenue to the Railroad Avenue Extension.

Urban Avenue

a. There is a [redacted] water main in the southbound lane that crosses the tracks north and south of the tracks. The proposed under grade crossing would expose the water main. The [redacted] water main will be relocated to follow the depression of the proposed new road grading of the under grade railroad crossing. This main can be cut/capped and abandoned for an extended period and replaced following the grade change. Temporary services will be required during construction. Where the services connections cannot be reestablished due the depressed water main, the services will be rerouted through the alternate roadway routes, Kinkle Street and/or Sylvester Street to Main Street and reconnected to Urban Avenue, to provide service for the south side of the tracks. Grand Boulevard

Grand Boulevard

a. There is a [redacted] water main within a [redacted] that crosses and is north and south of the tracks. The [redacted] water main will be maintained and protected during the construction of the track, sound attenuation wall, and retaining wall.

State Street

a. There is a water main crossing the tracks along the west curb line. The water main will be maintained and protected during the construction of the track, sound attenuation wall, and retaining wall.

Carle Place Water

The Carle Place Water District has several water mains serving the Village of Carle Place that cross and are parallel to the Rail Road ROW:

Sta. [redacted]

a. There is a [redacted] water main crossing and north and south of the tracks. The [redacted] water main will be maintained and protected during the construction of the tracks.

Glen Cove Road

a. There is a [redacted] water main crossing and north and south of the tracks under the east sidewalk. The [redacted] water main will be maintained and protected during the construction of the abutment.

Sta. [redacted]

a. There is a [redacted] water main crossing and north and south of the tracks and parallel to the tracks. The [redacted] water main will be maintained and protected during the construction of the tracks and retaining wall.

Cherry Lane

a. There is a [redacted] and [redacted] water main crossing and north and south of the tracks in the center of the road. The [redacted] and [redacted] water mains will be maintained and protected during the construction of the abutment wall.

Carle Road

a. There is a [redacted] water main crossing and north and south of the tracks.. The [redacted] water main will be maintained and protected during the construction of the track and retaining wall.

National Grid

National Grid gas lines are located throughout the project corridor. The gas lines are typically 30-inches below roadway elevations. National Grid has 60psi gas lines under roadways paralleling and abutting the Rail Road ROW throughout the project corridor. Gas lines that cross the tracks are typically placed in a steel sleeve. National Grid has several gas lines that cross and are parallel to the Rail Road ROW:

Plainfield Avenue:

a. There is a gas line along the east curb north of the tracks. The proposed construction will not affect the existing gas line. The gas line will be maintained and protected during construction.

Covert Avenue:

a. The proposed grade crossing elimination would expose:
   i. The [redacted] gas main on Covert Avenue north of the tracks,
   ii. The [redacted] gas main on 2nd Avenue north of the tracks,
   iii. The [redacted] gas main south of the tracks and at Wayne Avenue,
   iv. Service connections where the gas main crosses Covert Avenue south of the tracks.
b. Mitigation measures include:
   i. Relocating/splitting the [redacted] gas main to each side of the new underpass as needed to maintain services.
   ii. For the two services on the north and south side of Second Avenue west of Covert Avenue, service may be provided from South 6th Street.
   iii. For the service connections that will be exposed; the [redacted] gas main will be relocated or split to each side of the underpass to maintain services.

South 8th Street:

a. There is a [redacted] gas line south of the tracks that turns east along 3rd Avenue. The proposed construction will not affect the existing gas line. The gas line will be maintained and protected during construction.

South 12th Street

a. There are no anticipated impacts to the [redacted] gas lines or the service connections north and crossing the tracks based on the anticipated implementation of Option 1, Permanent Grade Crossing Closure.
a. Gas service will be maintained and protected during the construction phase.

Millers Place

a. There is a [redacted] gas line that crosses the tracks. The [redacted] gas line is within a [redacted] steel sleeve and ties into 3rd Avenue. The gas line will be maintained and protected during platform and track construction.

2nd Avenue Sta. [redacted]

a. There is a gas service connection to the station from the north. The new gas load demand may require an upgrade in service, to be determined during final design.

New Hyde Park Road

a. There is a [redacted] gas main in the southbound lane south of the tracks. The proposed under grade crossing would expose the gas main. The gas main will be relocated to follow the proposed depressed roadway profile.
b. There is an [redacted] gas main in the southbound lane that crosses and is north of the tracks and plaza Avenue. The proposed under grade crossing would expose the as main. The gas main will be relocated to follow the proposed depressed roadway profile.
c. There is an [redacted] gas main in the southbound lane north and south of the tracks. The proposed under grade crossing would expose the gas main. The gas main will be relocated to the propose utility corridor west of New Hyde Park Road within the acquired ROW. North of Plaza Avenue, an adjustment will be made to gas main depth due the proposed roadway profile change.
d. There is a gas main in Plaza Avenue running east/west. The gas main will be replaced to follow the profile of the proposed depressed grade change.
e. There is a [redacted] gas main in the northbound lane of Clinch Avenue. The proposed under grade crossing would expose the gas main. The gas main will be replaced to follow the profile of the proposed depressed grade change.
f. There is a [redacted] gas main in the southbound lane of Greenridge Avenue. The proposed under grade crossing would expose the gas main. The gas main will be replaced to follow the profile of the proposed depressed grade change.

Tanner's Pond Road

a. There is a [redacted] steel gas main near the west abutment crossing and north and south of the tracks. The [redacted] steel gas main will be relocated during construction. Gas service will be maintained during the abutment construction.

Denton Avenue

a. There is a [redacted] high-pressure polyethylene gas main crossing the road diagonally under the bridge. The [redacted] steel gas main will be relocated during the abutment construction. Gas service will be maintained during construction.

Main Avenue Sta. [redacted] (Approx.)

a. There is a gas service connection to the station from the north. The new gas load demand may require an upgrade in service, to be determined during final design.

Nassau Boulevard

a. There is a [redacted] steel gas main along the east curb. The [redacted] steel gas main will be protected, relocated and replaced as necessary during the abutment construction.

Herricks Road

a. There is a [redacted] high-pressure polyethylene gas main along the east curb. The 6" high-pressure polyethylene gas main will be protected, relocated and replaced as necessary during the sound attenuation wall construction.

Main Street

a. There are gas mains under Main Street:
   i. [redacted] gas main in the center of the roadway south of the tracks
   ii. A gas main along the west sidewalk north

of the tracks
iii. Gas service connections that cross the roadway north of the tracks
iv. It is noted that the gas mains do not cross under the tracks on Main Street

b. Due to the grade crossing elimination not resulting in an under grade crossing, there is no impact on the gas mains or the service connections.

Willis Avenue

a. There is an 8" gas main in the center of the north and south of the tracks, and crosses the tracks. The proposed under grade crossing would expose the gas main. The gas main will be relocated to the east sidewalk.
b. There is a 6" gas main in the center of the road north of the tracks. The proposed under grade crossing would expose the gas main. The gas main will be relocated to the east sidewalk.
c. There is a 4" gas main in the eastbound lane of Front Street. The gas main is in conflict with the proposed east retaining wall. The gas main will be reconnected to the relocated 8" gas main on the east sidewalk.
d. There is an 8" gas main in the center of the roadway south f the tracks. The proposed under grade crossing would expose the gas main. The gas main will be relocated to the west sidewalk.

School Street

a. There is a 4" gas main in the northbound lane north of the tracks. The proposed under grade crossing would expose the gas main. The gas main will be relocated to the east sidewalk. Service to #172 School Street will be provided from Union Avenue.
b. There is a 2" gas main along Railroad Avenue west of the tracks. The proposed under Grade crossing would expose the gas main. The gas main will be lowered to meet the cover requirements.
c. There is a gas main in the northbound lane south of the tracks. The proposed under grade crossing would expose the gas main. The gas main will be relocated to the east sidewalk.

Urban Avenue

a. There is a 2" gas main in the northbound lane south of the tracks. The proposed under grade crossing would expose the gas main and service connections. The proposed gas main will be split east and west of Urban Avenue. The gas main will follow the profile of the depressed road. The service connections will access the properties from the east and west sides of the road.

10th Avenue

a. There is a 2" steel gas line along the western curb. The 2" steel gas line will be protected and maintained during the construction of the proposed retaining wall.

5th Avenue

a. There is a gas service that ends south of the track ROW. The gas service will be protected and maintained during the construction of the proposed retaining wall.

4th Avenue Sta. 281+20 (Approx.)

a. There is a 4" steel gas main crossing the tracks. The 4" steel gas main is within a steel casing. The gas main will be protected and maintained during the track and platform construction.

Roslyn Road Sta. 306+05 (Approx.)

a. There is a 12" steel gas main in an 18" steel sleeve running in the old roadbed crossing and north and south of the tracks. The gas main will be protected, relocated and replaced as necessary, and service maintained during the retaining wall construction.

Glen Cove Road

a. There is a gas line crossing and north and south in the northbound lane. The gas main will be protected, relocated and replaced as necessary, and service maintained during the abutment wall construction.

East of Grand Boulevard Sta. 481+40 (Approx.)

a. There is a gas line crossing and north and south

in the northbound lane. The gas main will be protected, relocated and replaced as necessary, and service maintained during the track and sound attenuation wall construction.

Railroad Avenue Sta. [redacted] to [redacted] (Approx.) and beyond

a. There is a gas line running parallel to the track ROW. The gas line will be protected and service maintained during the construction of the track and the proposed sound attenuation wall.

Approximately Sta. [redacted] to Sta. [redacted]

a. There is a gas service near the southern Rail Road ROW line. The gas service will be protected and maintained during construction.

Atlantic Avenue from Silver Lake Boulevard to Cherry Lane

a. There is a gas line near the northern Rail Road ROW and Rail Road southern ROW from Sta. [redacted] (Approx.). The gas lines will be protected and maintained during construction.

Cherry Lane

a. There is a gas line along the eastern curb and sidewalk running north and south. The gas line will be protected, relocated and replaced as necessary, and service maintained during the abutment wall construction.

Carle Road

a. There is a gas line running north south. The gas line will be protected, relocated and replaced as necessary, and service maintained during the track and proposed retaining wall construction.

Ellison Avenue:

a. There is a gas line in the road at the Rail Road ROW that deviates easterly from the road at [redacted] (Approx.) and crosses the tracks. The gas line will be protected, relocated and replaced as necessary, and service maintained during track and retaining wall construction.

Madison Avenue near [redacted] (Approx.)

a. There is a gas line along the southerly Rail Road ROW. The gas line will be protected and service maintained during construction.

PSEG-LI

PSEG-LI has a leasing arrangement with the Rail Road and maintains an existing pole line and underground conduit within the Rail Road ROW. There are five transmission districts through the project area which provide transmission and distribution to the Rail Road and customers bordering the Rail Road ROW. The overhead and underground power lines are operated and maintained by PSEG-LI under a contract with LIPA. LIPA owns the equipment. PSEG-LI's transmission lines carry [redacted] (distribution) and [redacted] (transmission) services. There are both high tension steel and high tension wood poles along the corridor. Power poles 50-feet or higher are considered high tension poles. The RFP documentation calls for approximately [redacted] PSEG-LI poles to be upgraded to hybrid steel-concrete poles in order to carry additional services and upgrade the overall system. ATC 27 (South Track Alignment) eliminates a number of pole relocations since the new third track no longer conflicts with pole lines. Unless requested by PSEG-LI and the Rail Road to upgrade all poles (regardless of construction impacts), 3TC will be able to significantly reduce hybrid poles required. 3TC expects that only 25 new steel-concrete hybrid-poles will be required, which presents a huge improvement to construction cost and timeline. PSEG-LI has several lines that cross, are parallel to, and are within the Rail Road ROW. The affected grade crossing eliminations:

- Covert Avenue – Overhead transmission on the east/south of Covert Avenue are to remain in place with the understanding that the poles mat need to be supported, made temporarily taller or require an offset as a result of final design and construction methods. The primary and secondary overhead cables on west/south of Covert Avenue will need to be relocated.
- South 12th Street – Raise overhead electric lines or shift to underground service to eliminate conflicts with the pedestrian overpass. Also, poles will need to be relocated. House services may need to be fed from underground.
- New Hyde Park Road – The proposed underpass

will impact utility poles. Pole relocation will be necessary

- Main Street – The proposed underpass will expose the underground electrical duct and impact the utility poles; relocation necessary.
- Willis Avenue – The proposed underpass will impact the existing utility pole location; relocation will be necessary.
- School Street – Relocate overhead trunk lines and re-establish services via relocated service lines south of tracks and through alternate roadway routes north of tracks.
- Urban Avenue – The proposed underpass will impact the utility poles. Temporary relocation of the overhead trunk line will be necessary until completion of the retaining wall, then relocated.

Covert Avenue

a. There is overhead electric at the east and west sidewalks crossing and north and south of the tracks. The proposed under grade crossing will not impact the overhead electric. The overhead electric will remain in place. However, the poles may need to be held, made temporally taller, or require an offset as a result of the final design and construction methods.
b. There is an overhead transmission line on the east/south of Covert Avenue. The overhead electric will remain in place. However, the poles may need to be held, made temporally taller, or require an offset as a result of the final design and construction methods.
c. There are primary and secondary cables on the west/south of Covert Avenue. All the primary cables will be relocated from Covert Avenue between Wayne Avenue and north of 2nd Avenue. Poles for the secondary cables will be located south from 1st Avenue and north from Wayne Avenue.

South 12th Street

a. There is overhead electric at the east and west sidewalks crossing and north and south of the tracks. No impact is indicated in this area.
b. There is overhead electric pole at the northeast corner at the 3rd Avenue intersection. The pole is in the footprint of the proposed pedestrian overpass. The pole will be relocated to inside the Rail Road ROW.
c. There are overhead electric poles along the southbound lane south of the tracks. The overhead lines will be raised to eliminate conflicts with the proposed pedestrian overpass.
d. There are overhead electric poles on the northbound lane north of the tracks. Under the preferred option 1, there is no impact.

New Hyde Park Road

e. There are overhead electric poles on the west sidewalk south of the tracks. The poles will be relocated to follow the proposed depressed roadway profile.
f. There are overhead electric poles along Greenridge Avenue with overhead lines crossing New Hyde Park Road that are not impacted by the proposed under grade crossing.
g. There are overhead electric poles along the west sidewalk crossing and north of the tracks; and crossing New Hyde Park Road that are not impacted by the proposed under grade crossing.
h. There are overhead electric poles on the Plaza Avenue north sidewalk. The proposed under grade crossing will impact these pole locations. The poles will be relocated to follow the proposed depressed roadway profile.
i. There are overhead primary and secondary electric poles within the southbound sidewalk area. The poles will be relocated to the proposed utility corridor west f New Hyde Park Road and within the acquired ROW.
j. There are overhead electric transfer cable poles south of the railroad. The transfer cables feed the neighborhood to the east. The poles will be replaced due to change of grade and minor alignment changes.
k. There is an overhead electric pole on and at Plaza Avenue. Due to the change in vertical grade the pole will be replaced.

Main Street

a. There is below grade electric duct along the west sidewalk and crossing the roadway west of the tracks. The proposed grade crossing elimination does not impact the electric duct.
b. There is below grade electric duct along the east sidewalk south of the tracks. The proposed grade crossing elimination does not impact the electric duct.

c. There is below grade electric duct along 3rd Street. The proposed grade crossing elimination does not impact the electric duct.
d. There is overhead electric along the east and west sidewalks south of the tracks. The proposed grade crossing elimination does not impact the overhead electric.
e. There is overhead electric crossing the roadway south of the tracks. The proposed grade crossing elimination does not impact the overhead electric.
f. There is overhead electric along the east sidewalk north of the tracks. The proposed grade crossing elimination does not impact the overhead electric.
g. There is below grade electric duct along the east sidewalk north of the tracks. The proposed grade crossing elimination does not impact the electric duct.
h. There is overhead electric crossing the sidewalks and roadway north of the tracks. The proposed grade crossing elimination does not impact the overhead electric.
i. There is below grade electric duct in the southbound lane north of the tracks. The proposed grade crossing elimination does not impact the electric duct.

Willis Avenue

j. There is overhead electric along the west sidewalk crossing the roadway north and south of the tracks. The trunk lines north and south of the tracks will be relocated.
j. There is overhead electric along the east sidewalk crossing and north and south of the tracks. The service lines north and south of the tracks will be adjacent to the east sidewalk will be relocated to maintain service to the buildings.
k. There is overhead electric along 2nd Avenue. The utility poles along 2nd Avenue will be relocated and realigned for the vertical changes.

School Street

a. There is overhead electric along the north and south sidewalks and crossing the tracks. The proposed under grade crossing has no impact on these utility poles.
b. There is overhead electric along the west sidewalk north and south and crossing the tracks. The trunk lines will be relocated to underground and services will be reestablished via the relocated service lines south of the tracks and through alternate roadway routes north of the tracks.
c. There is overhead electric along the east sidewalk south of the tracks. The trunk lines will be relocated to underground and services will be reestablished via the relocated service lines south of the tracks and through alternate roadway routes north of the tracks.

Urban Avenue

a. There is overhead electric along the west sidewalk that crosses and is south of the tracks. The proposed under grade crossing will impact the utility pole locations. The trunk lines will be temporarily relocated on the west side within the acquired ROW then relocated permanently relocated adjacent to the retaining walls upon completion of construction. All services will be reestablished on the east side.
b. There is overhead electric along the west sidewalk north of the tracks. The proposed under grade crossing would impact the utility pole locations. The trunk lines will be relocated to west within the park boundary and the service connections on the east side will be reestablished.

Sta. [redacted] to Sta. [redacted] (Approx.)

a. There is underground electric crossing and north and south of the tracks from the Floral Park substation. The underground electric will be protected during construction.

Plainfield Avenue

a. There are three underground electric ducts crossing and north and south of the tracks. The [redacted] underground electric cabling will be protected during construction and/or relocated as necessary.
b. There is a [redacted] overhead electric crossing and north and south of the tracks. The utility will be protected during construction.

Linden Avenue Sta. [redacted] (Approx.)

a. There is underground electric utility service wire running north/south near the tunnel near

Linden Avenue. The utility will be protected and maintained during construction

Miller's Lane Sta. [redacted] (Approx.)

a. There are one [redacted] and two service wires crossing and north and south of the tracks. The utilities will be protected and maintained during construction.

Denton Avenue / Tanners Pond Road

a. There are underground electric (primary and secondary lines) crossing and north and south of the tracks. The utilities will be protected during construction and/or relocated as necessary.
b. There is overhead electric along Main Avenue at Sta. [redacted] to Sta. [redacted] outside of the Rail Road ROW. The utility will be protected and service maintained during construction, and/or relocated as necessary.

5th Avenue Sta. [redacted] (Approx.)

a. There are two underground primary and one secondary underground electric lines crossing and north and south of the tracks. The utilities will be maintained and protected during construction.

Nassau Boulevard Sta. [redacted] (Approx.)

a. There is underground electric crossing and north and south on the east abutment. The utilities will be protected and service maintained during construction.

Sta. [redacted] (Approx.)

a. There is overhead electric, [redacted] crossing and north and south of the tracks. The utility will be protected and service maintained during construction

Herricks Road Sta. [redacted] (Approx.)

a. There is underground electric crossing an north and south of the tracks at the east and west curb line under the tracks. The utilities will be protected and service maintained during the construction of the sound attenuation wall.

Sta. [redacted] (Approx.)

a. There is overhead electric crossing and north and south of the tracks. The utility will be protected and service maintained during the construction of the new platform.

3rd Avenue Sta. [redacted] (Approx.)

a. There is underground electric crossing and north and south of the tracks. The utility will be protected and service maintained during the construction of the new platform.

Sta. [redacted] (Approx.)

a. T1. There is overhead electric south of and outside the Rail Road ROW. The utility will be protected and service maintained during the demolition of the substation.
a. There is underground electric serving the distribution lines south and outside the Rail Road ROW. The utility will be relocated during the demolition of the substation

Roslyn Road Sta. [redacted] (Approx.)

a. There is an underground electric crossing north and south of the tracks. The utility will be protected and service maintained during the construction of the new retaining wall and new sound attenuation wall.
b. There is overhead electric crossing and north and south of the tracks. The utility will be protected and service maintained during the construction of the new retaining wall and new sound attenuation wall.

Russell Drive Sta. [redacted] (Approx.)

a. There is overhead electric crossing and north and south of the tracks. The utility will be protected and service maintained during track construction.
b. There is overhead electric crossing and north and south of the tracks on steel towers. The utility will be protected and service maintained during track construction.
c. There is underground electric crossing north and south of the tracks connecting to ducts within the Rail Road ROW. The utility will be protected and service maintained during track construction.

d. There is overhead electric crossing and north and south of the tracks. The utility will be protected and service maintained during track construction.

Glen Cove Road

a. There is overhead electric crossing and north and south of the tracks on the west sidewalk. The utility will be protected and service maintained, and/or relocated as necessary, during the construction of the new retaining and new abutment walls.
b. There is underground electric coming from the north into the Rail Road ROW diagonally crossing under the tracks from [redacted] to [redacted], approximately. At [redacted] the utility crosses the tracks northerly to a pole on the north. The utility will be protected and service maintained, and/or relocated as necessary, during the construction of the new retaining and new abutment walls.
c. There is underground electric from the south and runs parallel to and along the southern ROW from [redacted] to [redacted]. At [redacted] the utility crosses the tracks to a pole on the north. The utility will be protected and service maintained, and/or relocated as necessary, during the construction of the new retaining and new abutment walls.

Sta. [redacted] (Approx.)

a. There is underground electric crossing and north and south of the tracks to a substation. The utility will be protected and service maintained, and/or relocated as necessary, during track construction.
b. There is overhead electric parallel and north of the tracks outside the Rail Road ROW. The utility will be relocated as necessary during track and sound attenuation wall construction.

Cherry Lane

a. There is overhead electric crossing and north and south of the tracks along the east curb line. The utility will be protected and service maintained, and/or relocated as necessary during construction.

Carle Road

1. There is overhead electric crossing north and south of the tracks. The utility will be protected, service maintained, and/or relocated as necessary during construction.

Ellison Avenue

a. There is overhead electric crossing and north and south of the tracks along the west curb on the bridge. The utility will be protected and service maintained, and/or relocated as necessary during construction.

Grand Boulevard

a. There is overhead electric crossing and north and south of the tracks. The utility will be protected and service maintained during construction.

Magnolia Boulevard

a. There is overhead electric crossing and north and south of the tracks. The utility will be protected and service maintained, and/or relocated as necessary during construction

Hopper Street

a. There is overhead electric crossing and north and south of the tracks. The utility will be protected and service maintained, and/or relocated as necessary during construction

Swalm Avenue

a. There is overhead electric at Sta. [redacted] crossing and north and south f the tracks going to the substation. The utility will be protected and service maintained during construction.
b. There is underground electric at Sta. [redacted] crossing and north and south of the tracks going to the substation. The utility will be protected and service maintained during construction.
c. There is underground electric at Sta. [redacted] crossing and north and south of the tracks going to the substation. The utility will be protected and service maintained during construction.
d. There is overhead electric at Sta. [redacted] crossing and north and south of the tracks going to the substation. The utility will be protected and service maintained during construction.

New York Power Authority (NYPA)

In Roslyn Road, NYPA has an underground 322kV electric cable in a [redacted] steel casing crossing and north and south of the tracks. We believe there is no impact to this facility during construction.

c) Identification of any utility re-locations on the critical path of the Project schedule

According to the Initial Baseline Schedule (IBS) no utility re-locations will be on the critical path.

d) A narrative description addressing how utility relocation work will be approached with minimal disruptions to utility operations and other activities on the Project

Utilities located within and near the Project corridor present challenges in terms of coordinating the reconfiguration to accommodate infrastructure improvement. Construction operations of the Project will affect, and require, relocation or protection of utility infrastructure that share space within the project corridor. Utility work associated with the Rail Road's Expansion Project presents challenges. In most cases, the Rail Road will not directly manage utility relocations because the utility owner and/or operator directly supervise the process. The utility owners and operators maintain direct oversight because a wide range of complexities can emerge during the relocation; dealing with these complexities can pose challenges for even the most experienced utility planner. While utility relocations are controlled by permit, contractual, and legislative regulations, there are tools and procedures available that, when strategically employed, can assist the relocation process. 3TC plan's to employ a combined effort of world class constructors and engineers' best practices to streamline and implement utility relocations.

3TC will utilize strategies and practices that will mitigate, as well as improve, the utility relocation process. These practices include:

1. Early design involvement
2. Fiscal incentives/disincentives for expedient relocation
3. Incorporation of utility corridors
4. Increased utilization of Subsurface Utility Engineering to promote utility avoidance
5. The use of utility relocation management software built into Civil 3D
6. Clearing ROW prior to utility relocations
7. Exploring the four C's (communication, cooperation, collaboration, coordination)
8. Adopting trenchless technologies to expedite utility relocations
9. Use of advanced sensing technologies to improve the accuracy of locating existing utility lines
10. Development of utility conflict matrices
11. Use of Civil Information Models for improved visualization of utility conflicts in 3D CAD models

Communication and Coordination: 3TC acknowledges insufficient communication, scheduling, and coordination in planning and construction phases negatively impact the utility relocation process. These difficulties lead to delays and inconvenience to the public. The most significant problem related to utility relocation is lack of cooperation, coordination, and communication among stakeholders. 3TC regard the "four C's" a high priority for a seamless utility relocation transition. And make every effort to improve our coordination and seize opportunities to bolster communication between the parties involved. The coordination process is broken into two phases: preliminary coordination, which takes place before project implementation, and coordination, which occurs during construction.

Coordination and communication are both central factors that impact whether a utility relocation occurs in a timely and seamless manner. Coordination among the utility companies, agencies and 3TC is necessary for utility relocation planning and identification of potential barriers or long lead efforts that might prevent or slow utility relocation. 3TC best practices relating to coordination and communication are:

1. Have frequent joint meetings with utility owners
2. Recognize the importance of long-range utility coordination
3. Provide utility companies and agencies with long range and short term look ahead schedules
4. Conduct on-site utility plan-in-hands meetings with the utility companies and agencies
5. Invite the utility companies and agencies to pre-construction meetings and encourage input

Preliminary coordination: Where utility relocation is needed, 3TC engineers begin the relocation design effort. To involve the utility companies as early as possible, design plans are distributed to them so they can pinpoint conflicts with the onsite utilities. Meetings with the utility companies and agencies are scheduled during the conceptual phase, and conceptual plans are distributed and reviewed. Plans are again circulated when the design phase is approximately 30 percent complete. 3TC engineers will again contact the utilities at this time. The objective of preliminary coordination is to resolve a need in a way that minimizes potential conflicts.

Coordination in Construction Phase: On large projects such as the Rail Road Expansion Project that has complex impacts on utilities, 3TC offer the utility companies and agencies an anticipated construction schedule. Once this has been circulated identifying significant utility issues a preconstruction meeting is scheduled to discuss and resolve any and all issues. Utility and agency representatives are invited to participate in progress meetings. Under such scenarios, coordination and usually daily communication is encouraged. Coordination seeks to alleviate the following complications: Utility company and agency compliance with relocation schedules, schedule changes due to the constructor, and validity of resolutions to previously unknown conflicts.

Experience: Utility networks are very complex. With an increasingly young and inexperienced workforce, many utility companies, agencies and contractors lack the skill set needed to implement a seamless utility relocation. 3TC has assembled a team of local, experienced engineers and constructors who understand the utility and agency needs, have been involved in successful major utility movement projects, and have a relationship with the local utility agencies.

Subsurface Utility Engineering: Subsurface utility engineering is an engineering process used to accurately identify the quality of subsurface information needed to develop the utility relocation plans, identify the ROWs, and manage the design and construction aspects of the project. The Rail Road has provided 3TC with plans that have identified utility locations. To supplement the provided information 3TC has initiated pre-award utility company and agency meetings to confirm the provided information, inform the utility companies and agencies of our expertise and potential involvement with the Project, and confirm the utility relocation strategy.

e) Identify innovative or unique design and/or construction methods that will be implemented to minimize the impacts on existing utilities and facilities as a result of construction activities.

Willis Avenue is a particularly challenging grade crossing elimination due to the congestion of the utilities at Willis Avenue and Main Street, the lack of existing condition information, and the general future road and property alignment.

The lack of adequate information about the location and characteristics of the existing utility facilities has the potential to result in a number of problems, including damages to utilities, disruptions to utility services and traffic, and "lost" utility facilities as construction alters the landscape and pre-existing benchmarks are removed.

To resolve the challenges during the proposal phase 3TC set out to detect utility conflicts and ascertain existing condition information by meeting with the cooperating Third Party providers. Also, for verification, 3TC sent field personal to Willis Avenue and Main Street to inspect the manholes. Information gleaned from 3TC's reconnaissance is reflected in our proposed design.

Noting that construction can remove known benchmarks, 3TC is establishing new benchmarks which will be tied to the established benchmark system.

Innovatively, 3TC is anticipating the use of jacking and directional drilling in the appropriate areas and for the appropriate applications. The effective use of jacking and directional drilling will minimize the disruption to the community, reduce the erosion environmental issues associated with trenching, and reduce the time spent on the placement of the conduit and/or utility pipe.

Another innovative option under consideration, and subject to approval by the Third Party provider, is the replacement of the copper cable with fiber optic cable, where appropriate, where utilities are being relocated. Fiber optic cable carries more data per cable resulting in less and faster splicing, a time savings to the utility relocation process.

The intent of the utility relocation design is to move the utilities out of way of the grade crossing elimination and bridge widening construction well before the heavy road and track work begin at the grade crossing eliminations and bridge expansions.

Due to the dependency of gravity to properly operate, the sanitary sewer system provides the most challenges throughout the grade crossing elimination design process. Early meetings with Nassau County Department of Public Works served as a base to establish open communication and trust between the 3TC Team and NCDPW. The Village of Mineola also operates sanitary sewer system within the project limits. However, the Village of Mineola DPW is not prepared to discuss their system at this time. 3TC field reconnaissance provided much of the information necessary for preliminary design, but will be confirmed with Mineola DPW upon award of the contract.

3) Railroad Structures:

List of all railroad structures affected by the Project with outline statements of extent of work to be completed

1. Floral Park Viaduct
2. Rail Road Mainline Bridge over South Tyson Avenue
3. Rail Road Mainline crosses over Plainfield Avenue
4. Rail Road Mainline crossing over Denton Avenue
5. Rail Road Mainline crossing over Nassau Boulevard
6. Rail Road Mainline crossing over Glen Cove Road
7. Rail Road Mainline crosses over Meadowbrook State Parkway
8. Rail Road Mainline over Cherry Lane

The following Rail Road Bridges are affected on the Project:

1. The **Floral Park Viaduct** requires eight spans to be widened to accommodate the proposed Third Track turnout. The existing viaduct is a reinforced concrete slab with reinforced concrete ballast retainers supported on concrete column piers. The north fascia ballast retainer will be removed and a similar reinforced concrete span will be constructed adjacent to the existing viaduct to accommodate the new track alignment. The new span will be supported on a new independent foundation with pier column supports that are aesthetically like the existing structure (see Drawings FP-01 thru FP-10).

All foundation work can be completed without impacting railroad service. Single-track outages will be required during the removal of the existing north ballast retainer and during construction of the new superstructure immediately adjacent to the existing structure.

2. The proposed **Rail Road Mainline Bridge over South Tyson Avenue**, just east of the Floral Park Viaduct, will conflict with the existing Hempstead Line bridge over Tyson Avenue. The existing Hempstead Line bridge is a single span two bay through-girder structure that supports one track in each bay. The north through-girder of the span conflicts with the proposed Mainline Track turnout alignment and will have to be removed and consequently the floorbeams in that bay will also be removed. A new two girder through-girder span will be installed just north of the remaining Hempstead Line span, and the new single bay span will support the Mainline Track and the north Hempstead Line track. Geometric conflicts with the new span requires the west bearings of the remaining span to be replaced with elastomeric bearings.

The substructure of the existing Hempstead Line bridge will be widened and retrofitted to support the new

Mainline/Hempstead Line span. At the west pier, the spread footing foundation will be widened, and new pier columns and pier cap will be constructed to aesthetically match the existing pier. The fixed bearings will be located at the east abutment, which will be widened and tieback anchors will be install to resist the Cooper E80 surcharge, traction forces, and braking forces (see Drawings FP-01 thru FP-10).
The new foundation will be constructed without impacting the railroad services, and the proposed superstructure will be assembled on site outside the ROW. During one single-track outage the west half of the existing bridge will be removed and the new superstructure will be rolled and set into place using a Self Propelled Modular Transporter (SPMT).

3. Where the **Rail Road Mainline crosses over Plainfield Avenue,** a new Third Track 2-girder through-girder span will be constructed to the south, adjacent to the existing bridge. An independent drill shaft foundation will be constructed behind the abutment wingwalls to support the new span. The existing abutment will be retrofitted as required with tieback anchors to accommodate lateral surcharge, traction forces, and braking forces for Cooper E80 design loading.

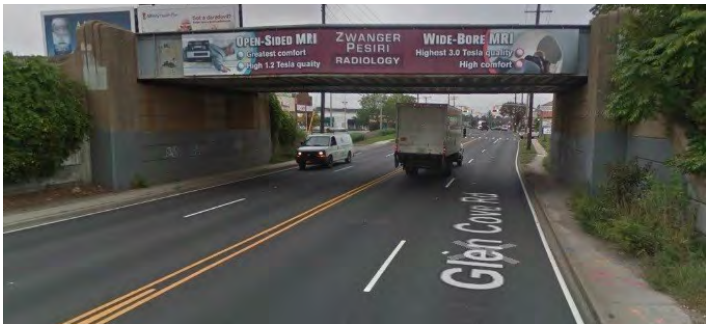
The drilled shaft foundation and wingwalls will be installed during flagging or single-track outages. The proposed superstructure will be assembled on site outside the ROW, and during one single-track outage the new superstructure will be rolled and set into place using a SPMT (see Drawings PL-01 thru PL-04).

4. At the **Rail Road Mainline crossing over Denton Avenue**, the superstructure is to be replaced and the bridge will be widened for the Third Track. The existing abutments will be widened and designed to retain the earth fill only. An independent drill shaft foundation will be installed behind the abutment walls between the existing tracks under flagging or single track outage, prior to removing the existing superstructure. The new superstructure will be assembled on site, and during double-track outage the existing superstructure will be removed, a precast concrete pier cap will be installed on top of the drilled shafts, and the new through-girder superstructure and precast approach slabs will be set in place (see Drawings DN-01 thru DN-06).

5. At the **Rail Road Mainline crossing over Nassau Boulevard**, the superstructure is to be replaced and widened for the third track. The existing abutments are of adequate width to accept the Third Track, and will be retrofitted with soil anchors drilled through the abutment face into the fill behind to accommodate lateral surcharge, traction forces and braking forces for Cooper E80 design loading. The existing bridge seats will be completely reconstructed using pre-cast reinforced concrete elements to accommodate the new superstructure and elastomeric bearings. The new superstructure will be assembled on site. During a double-track outage the existing superstructure will be removed, the new precast concrete bridge seat will be installed, and the new through-girder superstructure and precast approach slabs will be installed (see Drawings NAS-01 thru NAS-09).

6. At the **Rail Road Mainline crossing over**

Glen Cove Road, the superstructure is to be replaced and widened for the Third Track, and the existing abutments will also be widened to accept the third track. Soil anchors will be used to retrofit the existing abutments and proposed abutment widening to accommodate lateral surcharge, traction forces and braking forces for Cooper E80 design loading. At the existing abutments, soil anchors will be installed through the abutment face into the fill behind without impacting railroad service. At the widened section of abutments, soil anchors will be installed through prepositioned sleeves in the abutment stem into the fill behind. The proposed widened abutments will be founded on spread footings and will match the size and shape of the existing abutment. At the portion of the existing abutment remaining, the existing bridge seats will be reconstructed as needed to accommodate the new superstructure and bearings. The new superstructure will be assembled on site and during a single double-track outage the existing superstructure will be removed, the new precast concrete bridge seat installed and the new through-girder superstructure and precast approach slabs will be installed (see Drawings GC-01 thru GC-08).



7. Where the **Rail Road Mainline crosses over Meadowbrook State Parkway**, the existing bridge will be widened to accommodate a new two span continuous Third Track steel girder superstructure. The new portion will utilize similar features of the existing structure in order to provide continuity of the structure's function and appearance. The ballasted deck structure will be a cast-in-place concrete supported by wide flange steel stringers.

Fixed bearings on the existing structure are located at the center pier while expansion bearings are at the abutments. This configuration will be maintained for the new Third Track structure. The existing pier will be retrofitted to provide for traction, braking and vertical forces of a Cooper E80 design load as well as well as those forces imposed by wind and seismic events. Pier retrofitting will include installation of mini piles and additional reinforced concrete on top of the footing and at each pier face.

The abutments will be widened and founded on spread footings having dimensions similar to those of the existing spread footings. The existing abutment configuration has been reviewed and found to have sufficient load resisting capacity to accommodate Cooper E80 and other code prescribed loading. Widened abutments will be similar to the existing and wing walls will be provided to accommodate the sloped grades leading away from the track alignment.

It is anticipated that the substructure will be constructed utilizing traffic shifts and lane closures on Meadowbrook Parkway while the superstructure will be erected in place on site using a crane (see Drawings MP-01 thru MP-07).

8. At the **Rail Road Mainline over Cherry Lane**, the superstructure is to be replaced and the bridge will be widened for the third track. The existing abutments will be widened and retrofitted with tieback anchors to accommodate lateral surcharge, traction forces and braking forces for Cooper E80 design loading. The new superstructure will be assembled on site, and during a single double-track outage the existing superstructure will be removed, a precast concrete pier cap will be installed on top of the drilled shafts, and the new thru-girder superstructure will be rolled into place using a SPMT. Precast approach slabs will be put in place (see Drawings CH-01 thru CH-07).

Conceptual plans for all major structures within Project limits, and a description structure types and sizes. Refer to Appendix 2.8.2.

4) Retaining Walls and Sound Attenuating Walls

a) List of all walls affected by the Project with outline statements of extent of work to be completed

Existing Retaining Walls

Several existing retaining walls are impacted by the addition of the Cooper E80 surcharge loading resulting from the new Third-Track and/or the addition of sound attenuators. The following wall may need to be replaced or strengthen, shown in the table below:

The need for replacing, strengthening, and/or repairing the retaining walls will be determined after a hands on inspection is performed and any possible design drawings are obtained.

Proposed Under-Grade Crossing Retaining Walls

Retaining walls are required along the roadway approaches at the under-grade crossings, where the profile will be lowered by as much as 18'-6" to achieve the minimum 14'-0" vertical clearance under the new bridges. Additional walls may be required along the adjacent roadways that intersect with the under-grade crossing, if the intersection is lowered.

The following walls (listed on the next page) will be constructed as part of the under-grade bridge crossings:

Approximately 6.6 miles of retaining walls and 6.4 miles of sound attenuating walls are required along the Mainline ROW to accommodate the track bed widening, the raising of the track profile, and to mitigate noise levels in the various communities along the line.

The following retaining walls and sound walls (table follows the one on the next page) will be constructed along the Mainline ROW:

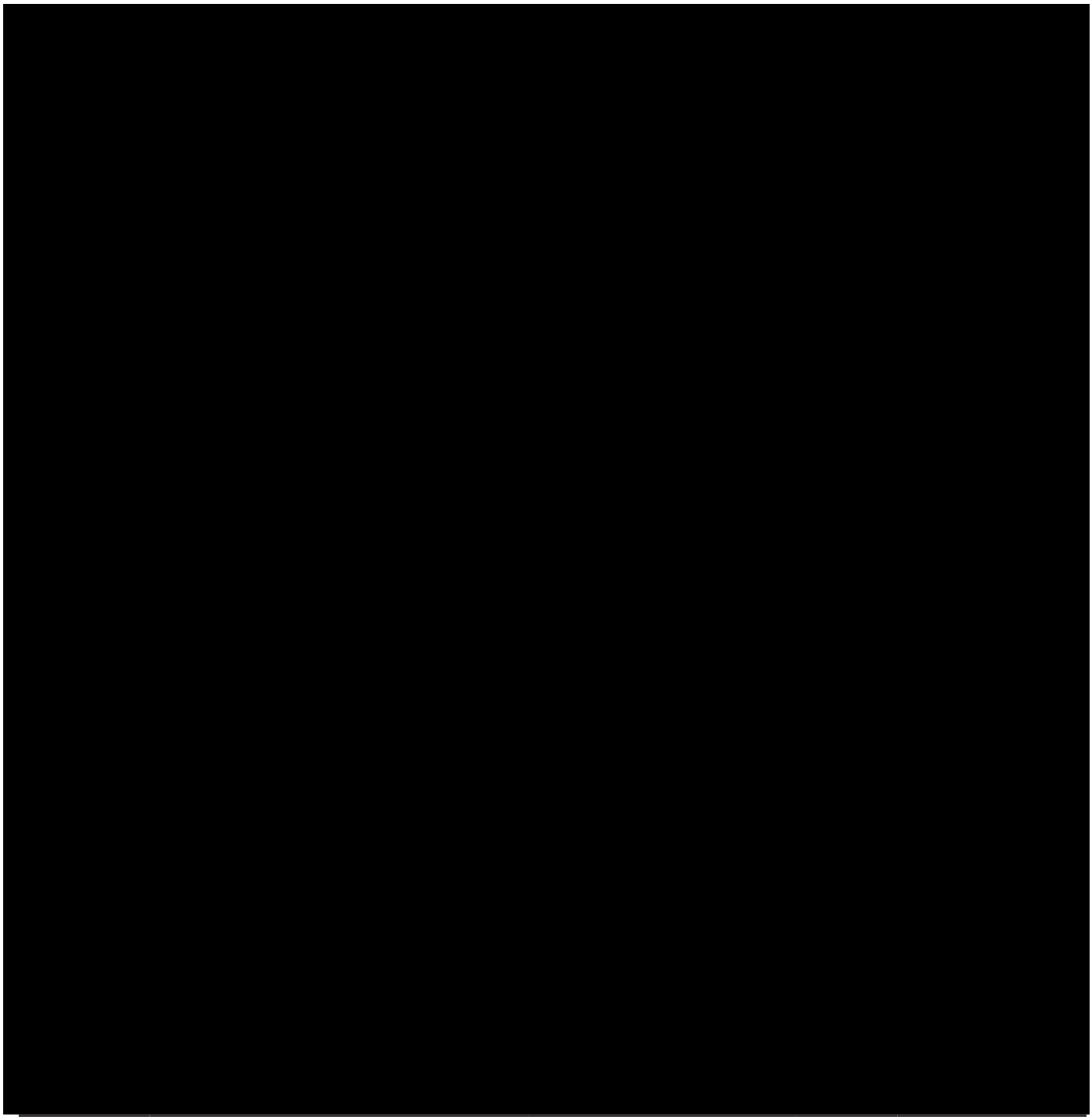
b) A narrative description addressing how retaining and sound attenuation wall work will be approached. Include details of construction means and methods including proposed construction equipment, site access and construction logistics

Design Approach

The **retaining walls** can be grouped into two categories, walls in cut conditions and walls in fill conditions. (See Drawing Package 2.8.4 Retaining Walls and Impact Attenuating Barriers).

In **cut conditions**, post and panel walls is the preferred wall system because no over-excavation in needed during constructing. Many of the walls in cut condition are located tight to the property lines, which limits the available thickness for the wall and makes the thin (2-ft+/-) post and panel wall an ideal system. Posts will be steel or precast concrete and the panels will be precast concrete; ideal for rapid construction and ease of transporting and assembling the walls, which is ideal when working in the ROW.

Existing Walls					
ROW Stationing	Length [ft]	Height [ft]	ROW Condition	Additional Loading	Side of ROW
[redacted]					



[redacted]

[redacted]

[redacted]				
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

The wall will be constructed by installing the posts from existing grade prior to excavating. Posts will be spaced typically at 1[redacted] on center and installed by auguring a [redacted] diameter hole to the proposed tip elevation in a temporary steel casing. The post will be placed in the hole and the concrete socket will be poured to one foot below the proposed finished grade while the temporary casing is partial pulled to above the pour. After the concrete sets, the remainder of the hole will be filled with a self-compacting flowable fill and the casing will be removed.

Excavating can begin in the cut sections and temporary pressure treated timber lagging will be installed behind the posts as the excavation progresses to final grade. The concrete panels will be installed and the gap between the timber lagging and the precast panels will be filled with crushed stone. The wall will be fitted with a top coping, fence, sound attenuator, or barriers as needed.

In **fill conditions**, the T-Wall precast concrete modular wall system will be used along the Mainline ROW. The advantages of this wall system are the quick rate of installing the units, the ease of transporting the units to the site within the ROW using work trains, and modular walls systems make for a cost-efficient design solution.

To install the wall, the subbase will be compacted and a precast leveling pad will be placed [redacted] below the finished grade. The T-wall Units will be set in place on the leveling pad and the keyways between the units will be grouted. The newly developed inverted T-Wall system will be used, which sets the panels with the shortest anchored stem lengths at the base of the wall, and the anchor stem lengths progressively increases as the wall height increases. This geometric configuration will minimize the required excavation needed to install the units, and limits the need for a temporary support of excavation where the wall units falls within the load influence line of train.

Where temporary support of excavation is needed along the Mainline ROW for installing the permanent walls, a soldier pile and lagging wall with temporary tieback anchors will be used.

Sound Attenuator Walls are required along the Mainline ROW and will need to be constructed on top of the post and panel retaining walls, on top of the T-Walls system, and as free standing walls mounted on grade. At the post and panel retaining walls, the sound wall posts will be mounted directly to the retaining wall posts, and precast concrete sound panels will span the posts. At the locations of the T-wall system, the sound walls will be supported by a continuous spread footing behind the face of the retaining wall, in an "L" configuration. For walls mounted directly on grade, a post and panel system will be used similar to the post and panel retaining wall system, and the posts will be installed in augured holes filled with concrete.

Construction Means and Methods Coordination and Logistics

The approach for constructing the walls within the ROW will be critical to the project schedule Milestones and to the completion of the entire project. Wall construction will be coordinated with the proposed drainage, signals, traction power, utility and track work. The retaining wall work will be broken into three sections and constructed prior to installation of the new traction power, signals, and track work.

Site Access

Access and egress in all sections of the ROW will be from the following at grade crossings:

1. Covert Avenue
2. South 12th Street
3. New Hyde Park Road

4. Main Street
5. Willis Avenue
6. School Street
7. Urban Avenue

Access from the grade crossings will need to be coordinated with the construction of the under-grade crossing structures at these locations. Limiting access to the ROW from the seven grade crossings is not practical because of the length of the project. 3TC plans to immediately coordinate our proposed work plans with the local communities to access the ROW from a number of dead-end and parallel streets adjacent to the railroad.

Section	Limits	Track Turnouts & Crossovers
1	Floral Park to Nassau Blvd.	Existing #26 Crossover – Nassau-1 Interlock
2	Nassau Blvd. to Mineola Station	Existing #10 Crossover - Nassau-2 Interlock
3	Mineola Station to Hicksville	Existing #26 Crossover – Nassau-2 Interlock
		Existing #15 Crossover – Divide-3 Interlock

Critical to the work plan is obtaining as much real-estate space possible along the project for storing materials. 3TC plans to utilize the Hicksville Rail Road siding and the yard east of Charlotte Avenue to the greatest extent permitted. These yards are located at the far eastern end of the project and alone will not adequately supply the job with materials. During track outages, trucks will be unloaded onto work trains adjacent to the ROW at the grade crossings and/or from the streets adjacent to the ROW, where access is coordinated with and permitted by the local communities.

The western end of the Project is mostly located in residential communities and access to the ROW will be challenging. 3TC plans to rent commercial property just east of the residential areas to supply, store, and transfer material from arriving trucks, and to load Hi-Rail trucks that can drive on both the road and the railroad tracks. The Hi-Rail equipment will access the ROW from the yards and at-grade crossings.

Construction Equipment

The size and type of construction equipment used along the ROW will be dictated by the room available to work safely; both horizontally and vertically, as well as the proximity to the active tracks. Approximately 80% of the retaining walls and sound attenuator walls to be installed will be done between 18-ft. and 30-ft. from the centerline of the nearest track. Under these conditions rubber tire mounted hydraulic cranes, excavators, drill rigs, "lull" extendable hydraulic fork lifts, and steel drum compaction rollers coupled rubber tires will be used. Work trains will be used to bring equipment and materials to each location.

When working in close proximity to the tracks Hi-Rail vehicles, capable of driving on the road and operating on the rails, and/or track mounted equipment trains having drill rigs, hydraulic cranes, and hydraulic excavators will be used along with work trains for transport materials. The specialized rail equipment and rail car usage will be planned and used during the Rail Road approved outage windows and/or at a safe distance from the fouling envelope.

c) Conceptual plans showing extent of all walls plus program of wall finishes, materials, top of wall elevations.
The concept plans are contained in Appendix 2.8.2.

d) Concept plans showing all representative walls types and details proposed within each community.
The concept plans are contained in Appendix 2.8.2.

5) Under-grade Crossing Structures

a) List of all under-grade crossing structures affected by the Project with outline statements of extent of work to be completed, and a description structure types and sizes.

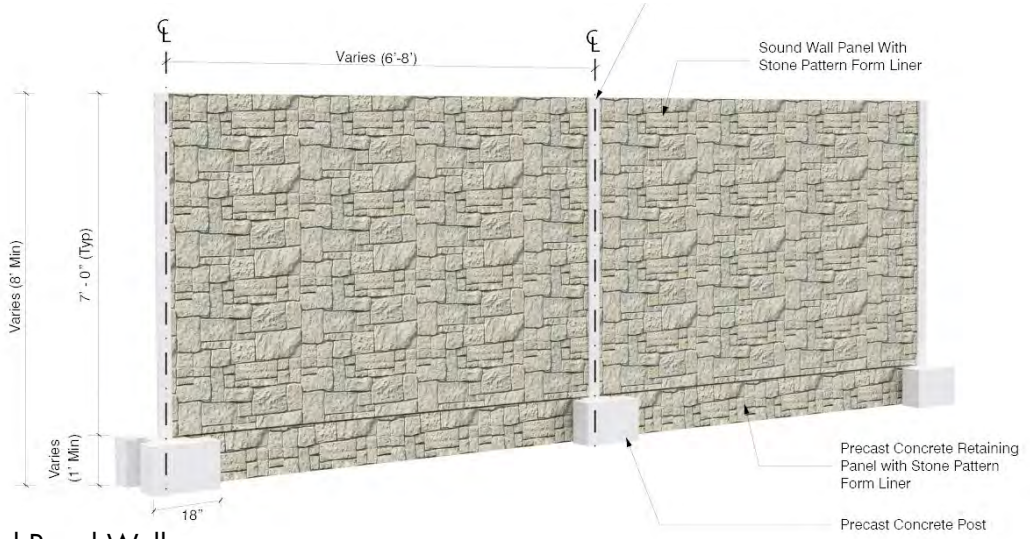
The 3TC team will employ an innovative approach for constructing the under-grade bridges that limits the required track outages to one double-track outage per crossing. A U-shaped reinforced concrete substructure will be constructed adjacent to the proposed crossing, in an open excavation at the proposed final elevation. The structure will be constructed on a concrete launching slab and the superstructures will be set on the substructure in advance of moving the bridge into place. During ONE double track outage, the tracks will be removed, the track bed will be excavated to below the bottom of the superstructure, and the entire structure will be jacked into place while the remaining excavation is completed.

Once the structure is in place, the precast approach slabs, ballast, and tracks will be installed, and rail service will be restored.

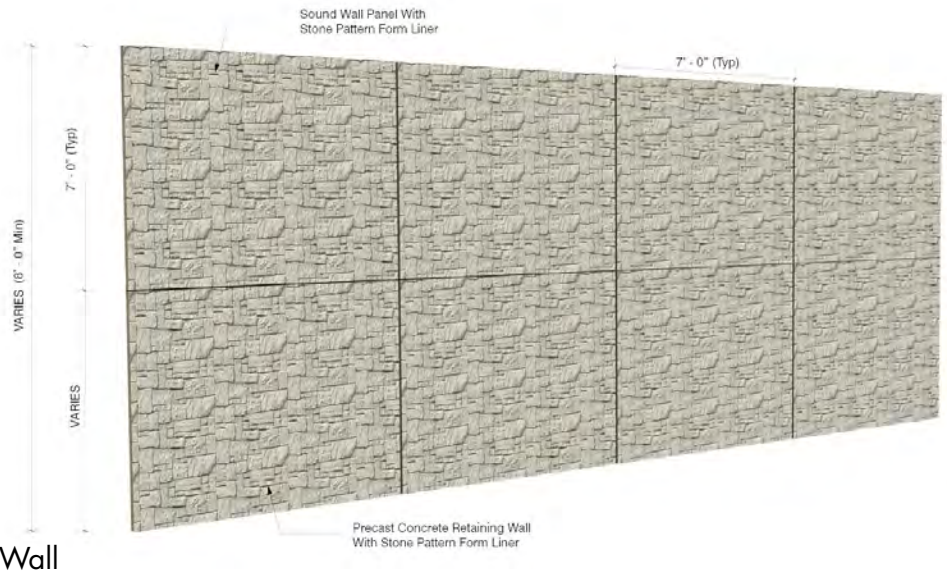
At the **Covert Avenue at-grade crossing elimination**, three new single span bridges having a minimum clear span length of [redacted] will be constructed as follows:

Bridge	Superstructure
LIRR Mainline over Covert Avenue	A four-girder, steel through-girder span with transverse floor beams and a ballasted steel deck, supporting three tracks.
2nd Avenue over Covert Avenue	A multi-prestressed concrete slab beam span, integral with the substructure, supporting two lanes of traffic and two sidewalks.
3rd Avenue over Covert Avenue	A multi-prestressed concrete slab beam span, integral with the substructure, supporting two lanes of traffic and two sidewalks.

The three bridge spans will be supported by a common 157-ft. long U-shaped substructure that will be constructed north of the railroad grade crossing in an open excavation and jacked into place. Retaining walls will be required along the Covert Avenue approaches,



Typical Post and Panel Wall



Typical Inverted T-Wall

2nd Avenue, 3rd Avenue and Wayne Avenue as a result of the regrading.

At the **New Hyde Park Road at-grade crossing elimination**, three new single span bridges having a minimum clear span length of [redacted] will be constructed as follows:

Bridge	Superstructure Type
LIRR Mainline over New Hyde Park Road, new bridge	A four-girder, steel through-girder span with transverse floor beams and a ballasted steel deck, supporting three tracks.
North Pedestrian Connection over New Hyde Park Road	The superstructure will be a steel truss bridge having a concrete deck slab and a clear width of 5'-0". The bridge will be a proprietary span by Contech or an approved equal.
South Pedestrian Connection over New Hyde Park Road	The superstructure will be a steel truss bridge having a concrete deck slab and a clear width of 5'-0". The bridge will be a proprietary span by Contech or an approved equal.

The three bridge spans will be supported by a common 78-ft. long U-shaped substructure that will be constructed south of the railroad grade crossing in an open excavation and jacked into place to the north. Once the substructure is in place, micro piles will be installed along the abutment walls to reduce the loading and required thickness of the invert slab. Rail Road service will need to be restore prior to the installation of the micro piles, therefore a temporary center pier bent will be install at mid span to reduce slab loading in the interim. The invert slab will be design for both the temporary and final loading conditions.

Retaining walls will be required along the New Hyde Park approaches, Clinch Avenue, Plaza Avenue East and Plaza Avenue West.

At the **Willis Avenue at-grade crossing elimination**, five new single span bridges having a minimum clear span length of [redacted]. will be constructed as follows:

Bridge	Superstructure Typ
LIRR Mainline over Willis Avenue	A four-girder, steel through-girder span with transverse floor beams and a ballasted steel deck, supporting three tracks .
LIRR Oyster Bay Branch over Willis Avenue	A shallow and tightly spaced multi plate-girder superstructure. The girders will be encased in concrete and will be located below the ballasted deck to clear the structural clearance envelop at the track curve.
Front Street over Willis Avenue	A multi-prestressed concrete slab beam span, integral with the substructure, supporting one lane of traffic and a sidewalk.
Commercial Driveway over Willis Avenue	A multi-prestressed concrete slab beam span, integral with the substructure that provides vehicle access to the property just north east of the Mainline crossing.
Hinck Way over Willis Avenue	A multi-prestressed concrete slab beam span, integral with the substructure, supporting one lane of traffic.

The Front Street, Rail Road Mainline, and Hinck Way spans over Willis Avenue will be supported on a common U-shaped substructure. The substructure will be constructed south of the Mainline railroad grade crossing in an open excavation and jacked into place to the north. The Rail Road Oyster Bay Branch and the adjacent Commercial Driveway spans over Willis Avenue will also be supported on a common U-shaped substructure. The substructure will be constructed in an open excavation to the north of the Oyster Bay Branch crossing and jacked into place to the south.

Retaining walls will be required along Willis Avenue between the two substructures and along the roadway approaches. Additionally, retaining walls are required along 2nd Avenue because of the regrading.

At the **School Street at-grade crossing elimination** a single [redacted] clear span bridge will be constructed.

Bridge	Superstructure Typ
LIRR Mainline over School Street	A four-girder, steel through-girder span with transverse floor beams and a ballasted steel deck, supporting three tracks.

The bridge span will be supported by a 55-ft. long U-shaped substructure that will be constructed south of the railroad grade crossing in an open excavation and jacked into place to the north. Retaining walls will

be required along the School Street approaches and along the adjacent properties because of the roadway regrading.

At the **Urban Avenue at-grade crossing elimination**, two new single span bridges having a minimum clear span length of [redacted]" will be constructed as follows:

Bridge	Superstructure Type
LIRR Mainline over Urban Avenue	A four-girder, steel through-girder span with transverse floor beams and a ballasted steel deck, supporting three tracks.
Railroad Avenue over Urban Avenue	A multi-prestressed concrete slab beam span, integral with the substructure, supporting two lanes of traffic and a sidewalk.

The two bridge spans will be supported by a common 109-ft. long U-shaped substructure that will be constructed south of the railroad grade crossing in an open excavation and jacked into place to the north. Retaining walls will be required along the Urban Avenue under-grade approaches.

6) Conceptual plans for all major structures affected

This will include proposed foundation, a bridge plan and elevation, typical bridge section and staged construction sections (if applicable). The Structures Preliminary Plan Checklists as shown in NYSDOT Bridge Manual Chapter 3 Appendix should be used as a reference.

The conceptual plans are located in Appendix 2.8.2

7) Parking Structures

a) Conceptual plans for all parking structure including roadways layout, street layouts and alignments, floors layouts, parking layouts, access and circulation movements, typical sections and details, typical MEP, lighting layout, elevators and stair cores layout, security provisions, substation or other similar requirements, external façade elevations.

The parking structures have been designed to be classified as Open Parking Structures to the greatest extent possible. Thus, the maximum allowable height has been utilized in order to avoid basements wherever possible. This approach allows for the control of construction costs and long-term maintenance costs through the elimination of sprinkler and ventilation systems that would otherwise be required as part of an underground parking area.

The conceptual plans are located in Appendix 2.8.2

8) Highways, Parking Lots

a) Layouts and alignments of all affected highways and parking lots including alignment details, typical sections, highway and sidewalk details, lighting provisions, signage, roadway and lot markings, security provisions.

Please refer to 3TC's plans which include, but not limited to Grade Crossing site layouts, alignment table & details, typical sections, highway & sidewalk details, lighting provisions, signage, and roadway markings.

These plans are located in Appendix 2.8.2

b) Schedule of minimum vertical clearance at all Rail Road crossings.

Please refer to the Table of Roadway Vertical Clearances below for minimum clearances at the five proposed underpass crossings.
c) Drainage layout.

The drainage layout plans are located in Appendix 2.8.2

9) Stations and Pedestrian Overpasses

a) Layouts for each station identifying before and after station features.

a) Layouts for each station identifying before and after station features.

The station layouts are located in Appendix 2.8.2

b) Schedule of all Project Elements within each station to be modified.

c) Representative sections at all key locations; & d) General arrangement drawings of all pedestrian overpasses or underpasses.

Please refer to Appendix 2.8.2 for the sections and drawings.

10) Track:

a) Provide a narrative and concept for the proposed approach to trackwork.

3TC's track work will be completed in compliance with the requirements in the Contract Documents as well as the Rail Road Manual of Recommended Practice for the Inspection, Maintenance and Construction of Track, Special Trackwork and Miter Rails (MW-2000); the Rail Road Manual CE-1, Specifications for Design and Construction of Track, Third Rail and High Tension System; Rail Road Track and Third Rail Systems Design Guidelines; and American Railway Engineering and Maintenance of Way Association (AREMA) Manual for Railway Engineering and Portfolio of Trackwork Plans (current edition) as required. The specified criteria will be applied to all track work elements, including track gage, turnouts, track type, track components (running rail, welds, rail fastening system, special trackwork, tie, and ballast materials).

Rail will be designed with [redacted] measure [redacted] below top of rail. Curves will be design with an underbalance of [redacted] where practical and will not exceed [redacted] of underbalance. Design super-elevation will be between [redacted]

3TC will install [redacted] of subballast on subgrade to meet AREMA specifications. Track will be constructed using concrete ties laid on [redacted] center to center with a minimum of [redacted] of ballast conforming to AREMA size [redacted] placed below the bottom of tie. Shoulder width will be a minimum of [redacted] beyond the end of tie for tangent track and [redacted] for curved track.

Running rail section will be [redacted] with HBW between [redacted] for special trackwork, tunnels, curves, spirals, and on grades exceeding [redacted]. A minimum HBW of 285 will be used in all other locations. Rail will be CWR with a neutral temperature of 100°F.

The design will include turnouts using AREMA standard frog numbers [redacted].
Track will be constructed to the following maximum tolerances:

- [redacted]

The track design will be coordinated with the traction power and signal system design.

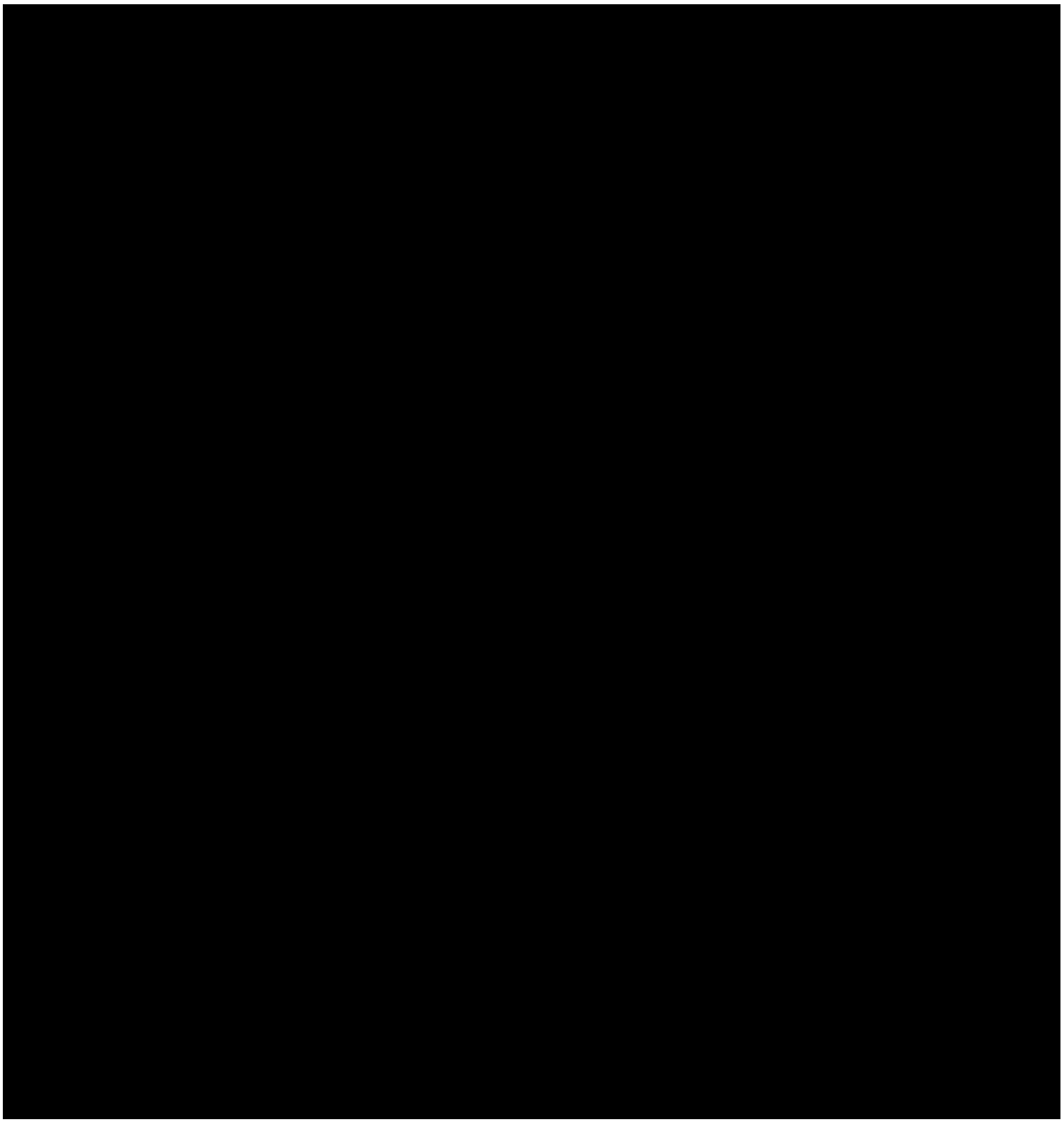
b) Alignment and layout drawings for all trackwork within the Project limits
Track alignment and profile drawings can be found in Appendix 2.8.10.

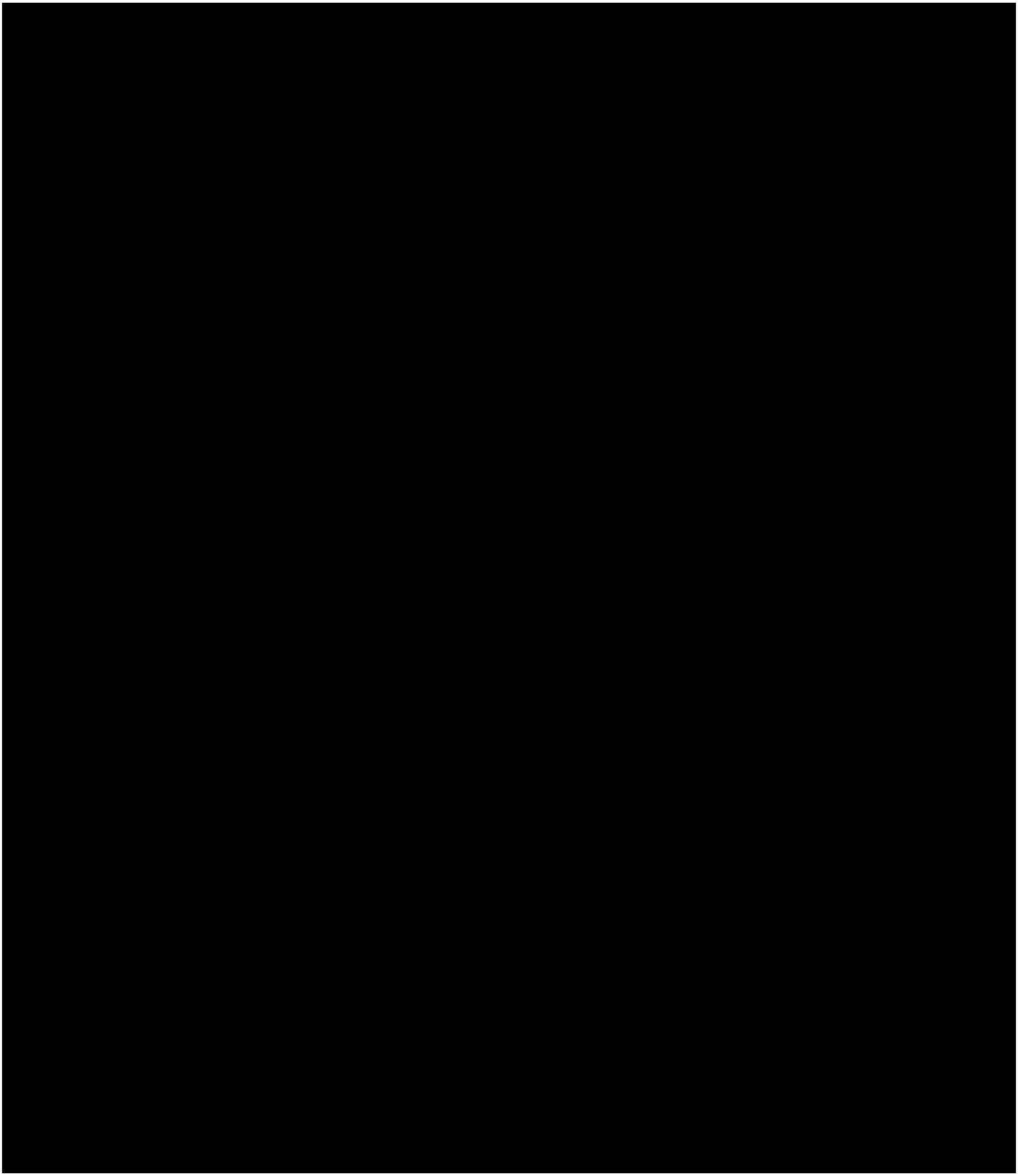
c) Schedule of all special trackwork to be provided and/or supplied to the Rail Road.

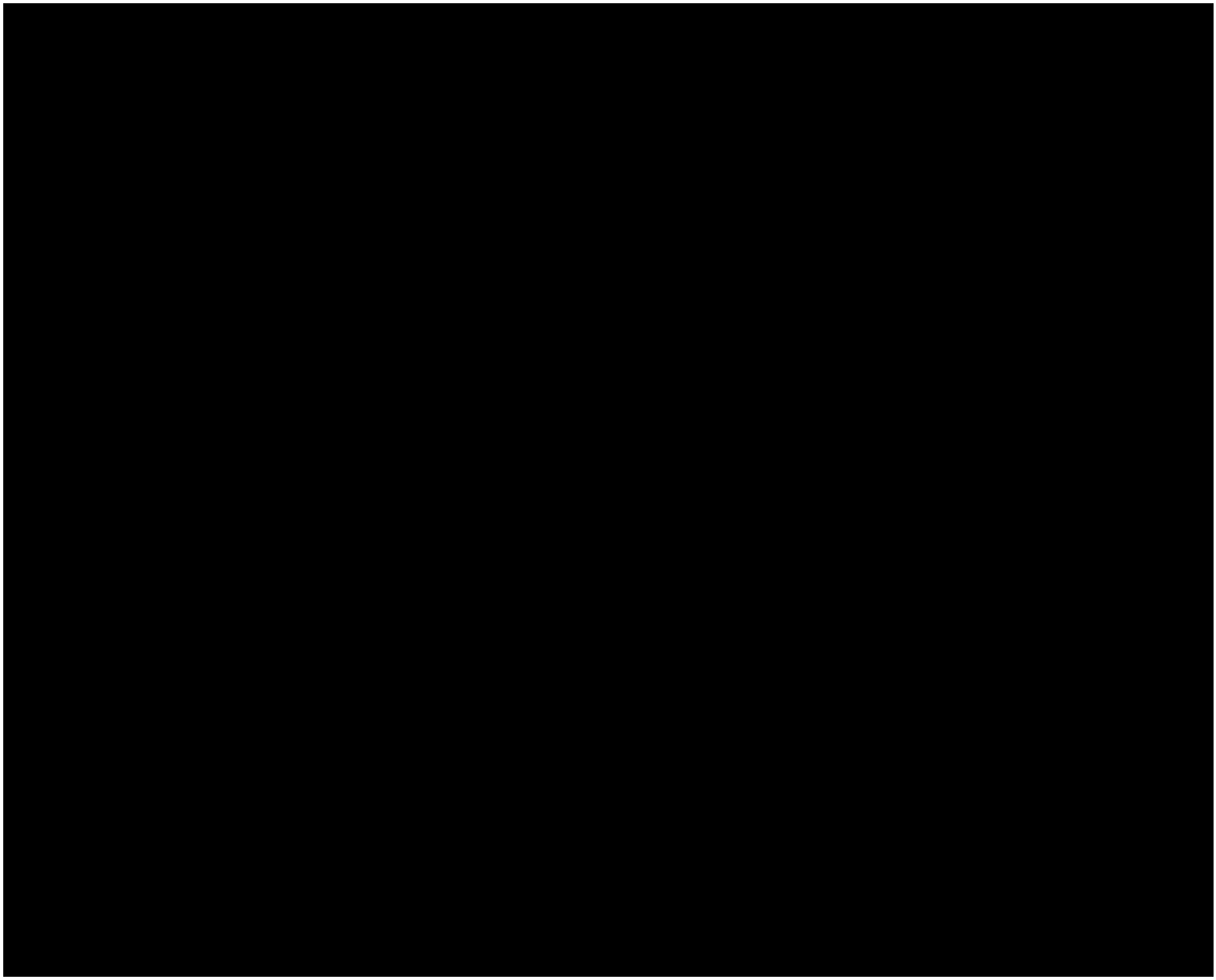
Turnouts to be provide with electrical switch machines and switch layouts:

- [redacted]

[redacted]







11) Drainage

a) Provide concept drainage plans, including plan sheets, notes and concept for stormwater management facilities, drainage divides and ground elevations, drainage areas and flow directions, flow rate and volume calculations, major conveyance structures, culverts and existing structures and pipes within the Project Limits; & b) Major conveyance structures, include all storm drains and/or cross drains (pipe culverts, box culverts, and bridges) necessary to convey stormwater runoff to the stormwater management facilities and/or receiving water bodies. Identify whether pump stations are required

Please refer to the Appendix 2.8.2.

12) Traction Power

a) Provide a narrative and concept for the proposed approach to traction power, provide details including proposed major equipment Manufacturers (AC Switchgear/Breakers, DC Switchgear/ Breakers, Rectifiers, Rectifier Transformers, SCADA System, Signal Power Motor/Generator, and Negative Return and equalization system) and provide drawings of concept layouts.

The traction power substation design will follow the preliminary design provided as part of the RFP. The final detailed design will be completed by the supplier of the traction power substations (a Rail Road approved supplier), based on their past experience with Rail Road substations, the requirements in the specification, the Rail Road preference for subassembly product selection and interface to the site requirements all coordinated with the construction schedule and with design oversight by the 3TC lead electrical engineer. The new substations will be installed at the site of the existing substations and connected to the existing PSEG feeds with any modifications to the feeds that may be required.

It is the intent of 3TC to remove and replace all substations (except New Hyde Park) with a portable or mobile substation during the replacement process in order to maintain Rail Road operation performance levels. Since mobile [redacted] substations are impractical we will manage the situation as described later in this section. In all cases the existing substation will be retired and removed from site. The current vault will be demolished and removed from site and replaced with one designed to suit the new substation layout. Transformer oil overflow retention pits will be designed and installed on site.
The design process will include the Load Flow Analysis (LFA) simulations to forecast the available voltage available to operating trains in order to maintain "specified levels of service reliability".

1. 3TC will perform the required Load Flow Simulations of the final design configuration by updating the load flow model built during the proposal phase. First, the load flow model will be revised to include any data that was not available or provided during the proposal phase. The revised model will be used to confirm that the proposed schedule for upgrading the traction power substations will continue to provide acceptable train voltage profiles during the construction process. The Rail Road has recently provided a LFA performed by Gannett Fleming that indicates the current operating voltages on the Rail Road under various conditions. 3TC will use these as baseline for acceptable train and rail voltage levels during the substation construction process. Our own analysis indicates that we can remove the New Hyde Park [redacted] substation and remain above the levels shown in the Gannett Fleming report, therefore allowing us to decommission this substation without need for portable unit replacement. After analysis of the existing system is complete, the model will be modified to include the 3rd track alignment and the existing peak operating schedule will be revised to represent the future proposed peak operating schedule. The results of the Load Flow Simulation scenarios will confirm that the final configuration of the Traction Power System will provide acceptable train voltage profiles for the proposed peak operating schedule under both normal and single contingency outages as described in the RFP.

It is important to confirm through Load Flow Simulation that both the traction power configuration during construction as well as the final 3rd track configuration will adequately support the specific prescribed schedules during both normal and required contingency outage configurations. If any deficiencies are discovered during the Load Flow Study, they will be reported to Rail Road for potential mitigating action. Necessary modifications can be designed and developed for approval by Rail Road and re-simulated with additional simulation scenarios. This will allow any necessary changes to be incorporated during the design phase and not interfere or extend the construction phase.

2. With no minimum train voltage criteria, 3TC will compare scenario results to the train voltage cut-out value of [redacted] and flag any voltages that drop below [redacted]. The [redacted] buffer allows for possible variations in system or train performance not included in the model. NOTE: per the M7 vehicle specification "The maximum acceleration performance, up to a maximum based speed of [redacted], can be achieved when the line voltage is above [redacted]. If the line falls between [redacted] the maximum base speed is reduced by an amount that is proportional to the line voltage level. If the line voltage falls between [redacted] and [redacted], the maximum tractive effort is reduced by an amount that is proportional to line voltage. If the line voltage is less than [redacted], the level is detected by voltage detector VD1 and the propulsion is shut down. The tractive effort is reapplied when the line voltage rises to [redacted] Therefore, at vehicle voltages between [redacted] and [redacted] Vdc, the vehicle will operate in degraded performance for the duration of the reduced voltage condition, which could have a negative impact on operating schedules. Considering there is no official minimum train voltage criteria in the RFP, 3TC will assume these degraded service conditions are acceptable to Rail Road and will only flag voltages below [redacted] as described above.

3. With no maximum rail voltage rise criteria defined in the RFP, 3TC will flag rail voltage values that exceed [redacted] as noted by Gannett Fleming in their Load Flow Study, dated 5/19/2017.

4. In most locations the lack of available space to construct the new substation while maintaining the existing is not feasible. Therefore, the existing substation must be demolished before the replacement can be installed. The existing substation will be demolished after it is decommissioned by the Rail Road forces and all salvageable material is removed.

The new substation will then be installed, commissioned, burned in for 60 calendar days and placed into service before an adjacent substation is taken out of service. During the time that a substation is out of service for replacement, the adjacent two substations or in the case where two substations have been removed simultaneously three substations between those two will remain in service to facilitate a voltage level required to maintain specified levels of service reliability.

Two of the first substations to be manufactured and delivered will be the mobile substations. One unit will be on standby in the event there is another, unplanned, substation outage, allowing for continued normal operation. The other mobile substation will be utilized as a replacement for substations being decommissioned until the replacement unit goes to burn-in (except New Hyde Park). The new substations will be placed in service with the feeders for the third track locked out until the third track is ready to be energized, depending on sectionalizing this could take place as each section is complete. Complete installation of equalizers and negative returns will be completed before final substation commissioning takes place.

Three of the new substations will have [redacted] signal power generators installed, Integration of these units into the signal system will be coordinated with Rail Road signal staff. Signal power will be maintained at all time during the substation replacement process. Traction power to the OBB will be maintained at all times when the Mineola substation is being replaced.

69kV Equipment

Substation G14 is unique when compared to the other substations in this project. The primary voltage of [redacted] requires ancillary equipment and breakers which are different than the other substations. All of the [redacted] equipment, including the gantry, will be removed and replaced as part of the Project. The large outdoor transformers, including oil containment, indoor GIS switchgear, other [redacted] equipment, as well as manholes, and the prefabricated dc substation, will require careful attention to placement of equipment to ensure not only that all the equipment will fit on this very tight site, but also provide a layout that will make operation of the equipment efficient while not restricting access for maintenance.

Traction power concept layouts can be found in Appendix 2.8.2 to this proposal.

Contact/Third Rail System

The proposed Third Track Project will greatly improve the ability for Rail Road to provide the level of service necessary to support future revenue service needs. The design of the contact rail system for the third track will utilize all the Rail Road standard drawings and specifications related to contact rail. These same

drawings and specifications will be applied to new and relocated interlockings and any modifications to the existing tracks for the layout of contact rail. The contact rail layout will be designed to minimize the number of breaks in the rail without exceeding any of the criteria provided in the Standard Drawings and Specifications.

The contact rail layout will be based on the two existing tracks and our team will look for specific sections of contact rail which may be optimized and reconfigured since the contact rail and ancillary equipment will be removed during the track tie replacement. Typically the types of enhancements to the contact rail system would be to provide continuous runs of contact rail up to the maximum length identified in the Rail Road Standard drawings. This reduces arcing when the contact rail shoe transitions from end approach to end approach, minimizes transitions from one side of the track to the other while meeting required contact rail placement for interlockings and passenger stations, and also reduces transition duct banks to route cables under the track structure. Once the contact rail layout is acceptable to Rail Road, the layout drawings will be used to locate the related ancillary equipment (i.e. end approaches, anchors, transition and longitudinal duct banks for continuity cables, third rail heaters, etc.). In the end, the contact layouts drawings will include the contact rail layout, end approaches, contact rail anchors, longitudinal & transition duct banks, and necessary stationing for key components.

Portable Substations

The 3TC plan for the replacement of the current substations includes the need for portable traction power substations beyond the one deliverable unit specified in the contract documents. Due to their importance to the project their delivery could easily reside on the project critical path. The trailers for the portable unit have a 7-9 month delivery cycle. Therefore, the mobile units will be the priority for the design and review process so that the material can be ordered. The mobile(s) will all be [redacted] units as the feasibility for a [redacted] unit is not only impractical but the site of the current substation in New Hyde Park would not be able to contain a portable and support new construction.

Third Rail Heaters

The contact rail heating system will be provided on separate layout drawings that will use the contact rail layout as a background layer. The contact rail heaters and other ancillary equipment will be placed on these drawings using the background layer to determine the individual heater locations. The heaters and other individual components will be identified with stationing as necessary.

Traction Substation Material List

The material to be used for the replacement traction power substations are shown in the attached preliminary bills of material. The actual part and manufacturer selection will be based on the approved materials outlined in the Technical Specifications for Traction Power and will have shown a successful history of usage on the Rail Road. For instance the SCADA wil be the Siemens model specified and in current use on the Rail Road. In the event those materials are not available or obsolete 3TC will work with the Rail Road to find an acceptable substitute.

BILLS OF MATERIAL TYPE A
TYPE A (Typical for Garden City, Carle Place, Westbury & New Cassel) Equipment Summary:

[redacted]

BILLS OF MATERIAL TYPE BTYPE B (Typical for Mineola)
Equipment Summary:

[redacted]

BILLS OF MATERIAL TYPE D
TYPE D (Typical for New Hyde Park) Equipment Summary:

ITEM	QUANTITY	DESCRIPTION
[redacted]		

b. Provide a schedule for the full replacement of a modular traction power substation;

3TC has worked very closely with the approved traction power suppliers to provide a delivery schedule to the site which will support the overall project schedule. We have generated a detail schedule which includes compliance with all of the Rail Road restrictions including the two month burn-in which in of itself adds 8 months to the overall schedule. The order of delivery for each substation is in the same sequence as the in-service times shown. Based on the requirements and the level of effort required the proposed schedule for in-service for each of the replacement substations is as follows:

If this schedule needed to be accelerated to support construction or testing schedules then we are prepared to work with the substation OEM to produce units in parallel in multiple facilities using the same designs, materials and testing procedures.
The material for G13 (Floral Park) will be delivered and the Rail Road installation of this material will be coordinated such that the G14 replacement schedule is not impacted.

c. Provide a narrative of their understanding of the sequencing of the 6 substations replacements and the signal power motor generator; [2]

Prior to the first existing substation outage, the following work must be performed at the two substation locations adjacent to the one to be taken out of service by Rail Road (Design Builder to furnish material) in accordance with spec section 3.17.4.L.5:

- Installation of a third 2[redacted] positive feeder cable per track
- Installation of a third [redacted] negative return cable per track
- Installation of negative equalization with reactors at substation taken out of service
- Installation of negative equalization with reactors at mid-span between adjacent substations and substation taken out of service

The emergency backup mobile traction power substation will be manufactured and available for deployment to the site within 48 hours of a substation failure prior to taking any existing substations out-of-service for replacement as required by spec section 3.17.4.M.1. Additionally, an emergency response plan will be provided to detail the mobile substation deployment plan before a substation outage of greater than two weeks is proposed. The emergency mobile substation and temporary substation being deployed at G16 will fully controlled from the ESO in Jamaica and will include a complete SCADA system as required by spec section 3.17.4.L.7.

Starting, as directed in the RFP with replacing New Hyde Park (G14) and New Cassell (G19) as directed by the Rail Road, substations are replaced one or two at a time to maintain Rail Road instructions to have three operating substations between substations being replaced with the intent of maintaining normal operating voltage on the contact rail. The load flow study will help the decision as to which substations follow in which sequence. Given that no limitations are communicated in the specifications, 3TC assumes that G13 modification work is not prerequisite to the G14 Substation outage, but will coordinate the start of the G14 outage with the G13 upgrade work done by Rail Road.

In determining the specifics of substation outage sequencing 3TC understands and will consider the following restrictions in any adjustments to sequencing that may be dictated by the load flow analysis and/or any latent system operating anomalies:

- Three substations must remain in service between any two to be taken out-of-service
- When Substation G16 (Mineola) is taken out of service a temporary mobile substation must be installed and commissioned to feed the "dead end" electrified section of the Oyster Bay branch.
- The existing [redacted] substations at New Hyde Park (G14) and New Cassell (G19) must be replaced prior to taking any other substations out-of-service

Substations at G13 (Floral Park), G16 (Mineola), and G19 (Hicksville) all provide signal power so Signal Power Motor Generator Sets will be provided to support their 100hz signal power . Continuity of operation of the signal power system must be maintained throughout the project.

Substation G14 is unique when compared to the other substations in this project. The primary voltage of [redacted] requires ancillary equipment and breakers which are different than the other substations. All of the [redacted] equipment, including the gantry, will be removed and replaced as part of the Project. The large outdoor transformers, including oil containment, indoor GIS switchgear, other [redacted] equipment, as well as manholes, and the prefabricated dc substation, will require careful attention to placement of equipment to ensure not only that all the equipment will fit on this very tight site, but also provide a layout that will make operation of the equipment efficient while not restricting access for maintenance.

This will be managed by maintaining either the existing or the new equipment in service at G16 or G19 always, and coordinating outages at these locations with Rail Road operation of G13. TTC acknowledges that this may require providing temporary medium voltage power to existing equipment when the existing substation is taken out of service. Provide a narrative to and identify their plan to utilize temporary substations for the phasing of the substations replacement for the Project[3] .

The first substation to be ordered will be the mobile [redacted] fully contained substation mounted on a flatbed trailer for use at various locations on the system. This unit will be employed as a temporary substation in cases where the third rail voltage is too low for normal operations when the existing substation is decommissioned or in the event an adjacent substation is off line due to a utility or other issue. This unit will allow for normal operation during the substation replacement phase of the Project. The use of the temporary mobile substation will be dictated by the loss of a substation during an outage of one of the existing substations or in the event such traction power supply supplementation is dictated by the 3TC load flow analysis.

d. Provide a narrative to and identify their plan to utilize temporary substations for the phasing of the substations replacement for the Project

Besides the mobile emergency substation, 3TCs plans on installing a [redacted] temporary unit at Mineola to power the Oyster Bay branch as required by the specifications. The intent is to use a single [redacted] unit at this location the load flow analysis will dictate the size required to sufficiently support the project. 3TC plans on utilizing a mobile substation to replace retired substations until the new unit is ready to burn-in for every substation replacement except G14 (New Hyde Park).

13) Corrosion Control

a) Provide a narrative and concept setting out its approach to comply with corrosion control requirements.

1.0 Introduction

The need to address sustainability is a major focus of this project. Corrosion is a major enemy of sustainability and corrosion control must be implemented in the design and recommended practices for future maintenance. This document outlines the corrosion control concept, which will ensure that project designs and construction methods will control corrosion of project related metallic infrastructure in contact with corrosive environments, and via control and mitigation of stray-currents associated with the operation of the railway system in the project area. It includes site investigations, testing and monitoring to assist in system design, as well as, to ensure that the corrosion and stray-current mitigation objectives are met.

The design will be in compliance with Section 3.18 "Corrosion Control" of the technical provisions and contract specification.

2.0 Codes and Standards

- ASTM G165-99 Standard Practice for Determining Rail-to-Earth Resistance
- NACE SP0169 Control of External Corrosion of Underground of Submerged Metallic Piping Systems.
- IEEE 81 Guide for Earth Resistivity and Ground Impedance Measurements
- ANSI/AWWA C105/A21.5-10 Polyethylene Encasement for Ductile-Iron Pipe Systems
- ASTM G57 Standard Test Method for Field measurement of Soil Resistivity Using the Wenner Four-Electrode Method.

3.0 Background - Various corrosion issues are discussed

3.1 STRAY CURRENT

On a DC transit system, stray current is potentially a major source of corrosion and stray current must be mitigated. Two basic concepts are usually applied to mitigating stray current corrosion. The first is limiting the source of the stray current corrosion and the second is to provide a preferential electrical path for the stray DC current already in the foreign conductor (i.e. watermain, gasmain, or pipeline) back to the source of the stray current.

3.2 ATMOSPHERIC AND SOIL BASED CORROSION

These types of corrosion are caused by components in the atmosphere and/or soil that tend to corrode metallic structures above ground and below ground. This type of corrosion must also be mitigated by material selection, application of surface coatings, and/or the use of cathodic protection for underground corrosion control systems.

4.0 Pre-design corrosion control survey

The following testing and investigation will be performed in the pre-design stage of the project:

1. Investigation to determine the chemical make-up of the existing atmospheric conditions at the site. This data will be used to determine the atmospheric corrosion control strategies to be utilized in the design.

2. A soil corrosivity investigation will also be performed along the project area. Soil resistivities will be measured at each substation location and at a minimum of every 1000 feet along the 10 miles of track. Soil resistivities will be measured in-situ via the [redacted] at [redacted] depths (pin spacings).

3. Soil sample retrieval will be coordinated with geotechnical boring activities. The soil samples will be sent to laboratory for testing. The following analysis will be performed on each sample:

a. Soil type and make-up
b. Soil resistivity (As-found and saturated performed in a soil box)
c. Moisture content
d. pH
e. Chloride content
f. Sulfate ion concentration
g. Oxidation-reduction potential
h. Sulphide concentration

4. A baseline stray-current survey will be performed on existing buried metallic structures (i.e. watermains, gas lines, pipelines, telecommunications and powerline infrastructure) in proximity to any substations and yards and at any crossings with the Rail Road in the project area. This survey will involve extensive coordination with the affected utilities and collection and review of relevant utility data.

5.0 Stray-current Control Plan

5.1 GENERAL

The primary means of stray-current control will be via electrical isolation of the traction power system from ground. This will minimize the amount of stray-current that enters the ground and ensures that there is minimal interference with other buried metallic structures in the area.

The stray-current control plan will conform to the Technical Provisions of the RFP and will be designed in accordance with all relevant industry and project codes and standards.

5.2 ELECTRICAL ISOLATION OF TRACTION POWER SYSTEM

The new track will consist of welded rail and be concrete tie and ballast construction . Insulated track plates and/or tie-plates (10 M ohm dry resistance), isolated rail clips, and concrete ties will be utilized to provide isolation from the ground. The two existing tracks will also be upgraded by others, incorporating the same type of construction and isolation as described above

for the new track. It is expected that these upgrades will greatly reduce the stray-current levels that are presently experienced on the existing structures in the project areas.

All rail equipment in contact with the running rails (switch machines, communication systems, etc.) will be electrically isolated from earth.

The rail system will be designed to ensure good drainage, and prevent accumulation of free standing water contact with the rails and rail appurtenances.

The minimum in-service track-to-earth resistance will be [redacted] per 1000 feet of track (2 rails).

Track-to-earth resistance testing will be performed on the project track during both the construction and commissioning phases of the project, to ensure compliance to the isolation criteria. A testing procedure will be developed which will conform to ASTM-G-165-99 (2012). An AC test may also be incorporated into the procedure, particularly for shorter sections of track.

Test facilities will be installed to facilitate track-to-earth resistance testing during, system commissioning and in-service operation. These facilities will be installed at the end of each test section and consist of test boxes containing connections to each rail, to electrical ground and to a permanent reference electrode. Test sections will be approximately 2 miles in length.

Track-to-earth resistance testing will be performed on each track section between isolation joints, which are typically spaced at approximately 1000' intervals, after completion of construction and prior to installation of the rail bonds and cross-bonds. After installation of the bonds across the isolation joints on the project track, and prior to tie-in to the existing Rail Road system, additional track-to-earth resistance tests will be performed on the two mile test sections. Note that any testing of project track sections will require them to be isolated from the rest of the Rail Road system (i.e. all bonds to other tracks will need to be opened/removed).

5.3 CONCRETE REINFORCING AND EMBEDDED STRUCTURES

In general, reinforcing and embedded steel will be made electrically continuous in reinforced concrete structures to ensure electrical continuity and an electronic path for the stray current to return to the negative bus. Continuity will be achieved via welding, the use of ties, and via bonding and collector bars. Testing and monitoring facilities will be provided as required by the project specifications.

Ballasted bridge decks will be waterproofed using a two-coat elastomeric waterproof system with asphaltic protection boards or an AREMA approved protective system, subject to the Rail Road approval. A stray-current collection grid will be used on existing structures where deemed necessary.

For bridge structures with direct fixation track, isolation will be maintained between the deck reinforcing and the exposed superstructure steel.

All precast concrete lagging and reinforced concrete wall systems will be constructed using epoxy coated reinforcement, low permeability concrete, and will receive a concrete penetrating sealer coat.

Stray current corrosion control on existing bridge structures will rely on elimination of stray-current at the source. The existing bridge structures will be reviewed to ensure that they are compatible with the methods utilized for stray-current control on this project. If not compatible, alternate methods for stray-current control will be proposed.

5.4 STRAY-CURRENT MITIGATION ON BURIED EXISTING AND NEW UTILITIES AND STRUCTURES

The primary means of stray-current control on metallic existing, relocated, replacement and new buried utilities and infrastructure will be to minimize current leakage into the soil at the source via isolation of the rails and negative return system.

Where possible, non-metallic materials should be selected for utilities in proximity to the substations, yards and mainline railway.

If additional mitigation is deemed necessary, the use of sacrificial anodes at current discharge locations, coating of the structures at the current pick-up locations, and/or the use of potential control impressed current rectifiers may be required, based on the Utility Owner's requirements. For electrically discontinuous structures (such as cast iron watermains), bonding across

mechanical joints is recommended.

Stray current testing and control facilities will be installed for utilities crossing or proximal and parallel to the project ROW, and utilities proximal to the Project traction power substations.

All existing test, monitoring and cathodic protection facilities on existing utilities will be inspected to ensure that they are in good condition and suitable for evaluation and mitigation of stray-current interference. Recommendations related to upgrades and replacement will be made where and if required.

DC coupons will be specified at key test locations to further facilitate monitoring of stray-current levels. The DC coupons simulate a holiday in the structures coating, and allows the measurement of current discharge and pick-up, and the measurement of polarized potentials (i.e. by disconnection of the coupon), without interruption of all of the influencing current sources. Some coupons with built-in internal references facilitate the measurement of virtually IR free potential recordings.

5.5 MONITORING AND TESTING

Review locations of existing stray-current mitigation, monitoring and test facilities and ensure they are adequate for mitigation and monitoring of the stray current levels on both Project and foreign structures and utilities. Install additional facilities as required.

Perform a stray-current survey during both start-up and revenue service. Perform DC potential recordings over a minimum 24-hour period at all locations tested during the baseline survey, as well as, at all new test locations related to new, relocated, and replaced infrastructure.

6.0 Corrosion Control for Buried Metallic Structures

6.1 GENERAL

Corrosion control for all buried structures will be in accordance to section 3.18.10 of the Technical Provisions and will comply with all relevant industry and project codes and standards.

Where possible, non-metallic materials will be used for utilities and other structures to mitigate corrosion and stray-current interference risks.

A combination of coatings and cathodic protection (CP), as well as electrical continuity (i.e. via bonding) along the structure, and isolation from other facilities will be utilized for corrosion control on new buried metallic structures. Corrosion control systems for structures belonging to others are the responsibility of the owners, but will be coordinated to ensure that stray current interference from the foreign CP systems is minimized on the Project infrastructure.

Electrical continuity of non-welded metallic pipe will be achieved via bonding across each pipe joint via two insulated bond cable. Bond cable connections to the pipe will be via thermite weld.

Galvanic anode systems will be utilized for CP wherever feasible as they are typically more cost effective, require less maintenance and monitoring, and will also mitigate stray-current interference. All galvanic anodes, will be connected to the structures via a test station. Direct connection of anodes will be avoided with the exception of metallic fittings on non-metallic piping systems.

Impressed current CP systems will only be utilized in locations where galvanic systems are not economically or technically feasible.

All CP systems will be designed based on theoretical calculations and in accordance with parameters identified in Section 3.18.10.7 item E.

CP design of regulated steel or iron pressure piping will conform to all Federal, State and local codes including Rail Road and Local AHJ's standards and specifications. All new ferrous pressure piping will be cathodically protected.

Cathodically protected piping will be isolated from other structures via the use of non-metallic inserts, isolating flanges, couplings or unions, and/or non-metallic inserts.

Permanent testing and monitoring facilities will be provided to facilitate monitoring of cathodic protection and stray-current interference levels on Project structures. These facilities will be placed in accessible locations and will include one reference electrode and a minimum of two test leads connected to the structure. DC coupons will be specified at key test locations to further facilitate monitoring CP levels. The DC coupons simulate a holiday in the structure's coating, and allows the measurement

of current discharge and pick-up, as well as, the measurement of polarized structure potentials (i.e. by disconnection of the coupon), without interruption of all of the influencing current sources. Some coupons with built-in internal references facilitate the measurement of virtually IR free potential recordings.

Copper piping will be isolated from other piping of different material, and buildings and electrical systems, and will be coated and cathodically protected.

Concrete pressure pipe will not be used in the vicinity of Project tracks and substations.

6.2 REINFORCED CONCRETE STRUCTURES

Buried reinforced concrete structures will be designed in compliance with the criteria in Section 3.18.10.13.

Reinforced concrete retaining walls will be designed with electrically continuous rebar, as per provision 3.18.9.2.6. Mechanically Stabilized Earth (MSE) retaining walls less than 200 feet from a rail will meet the requirements in provisions 3.18.10.13 and 3.18.10.14.

6.3 SUPPORT PILES

Support piles providing permanent support require corrosion control provisions, such as barrier coatings, additional wall thickness, and in some cases, special measures such as electrical isolation, monitoring devices, and CP.

6.4 ELECTRICAL CONDUITS

Direct-buried electrical galvanized steel conduits will be coated both externally and internally, and be made electrically continuous as per provision 3.18.10.16.
Piping and conduits in the tunnel will not be routed in earth where possible.

6.5 CASINGS

The use of casings will be avoided where possible. Where casings are required, they will be constructed of bare steel. Casing isolators, spacers and end seals will be used isolate the carrier pipe from the casing and prevent soil and water from entering the annulus between the casing and carrier pipe. Test facilities will be provided at each end of the casing to facilitate monitoring of the electrical isolation between the carrier pipe and casing.

6.6 ELEVATORS

Steel hydraulic elevator and lift cylinders will be coated and cathodically protected via galvanic anodes as per provision 3.18.10.19. A permanent test facility will be installed including permanent reference electrodes, anodes and two test leads.

6.7 SOIL CORROSION CONTROL MATERIALS

Non-metallic materials will be used where possible. Aluminum or aluminum alloys will not be used for direct-burial purposes.

Non-native backfill for concrete or ferrous structures will comply with provision 3.18.10.30.1.
Coatings for buried metallic or concrete facilities will comply with provision 3.18.10.30.2.

7.0 Atmospheric Corrosion Control Materials and coatings

7.1 GENERAL

Atmospheric corrosion will be controlled by the use of non-metallic materials, coatings, and material selection.

For post and panel walls, steel posts will be corrosion resistant weathering steel and for concrete H-pile posts, the reinforcement will be galvanized.

For new steel railroad structures, the steel girders will be weathering steel, or at Meadowbrook Parkway, receive a three-coat paint system with epoxy primer and epoxy intermediate coats.

7.2 MATERIALS

As per provision 3.18.11.2, barrier coatings will be used on carbon steel, ductile and cast iron exposed to the atmosphere with the exception of track, track fasteners and weathering steel. Stainless steel exposed to chlorides will also require a barrier coating.

Aluminum, copper, magnesium and zinc alloys will be coated as required as per provisions 3.18.11.3 to 3.18.11.6. Bimetallic coupling will be avoided for copper, magnesium and zinc alloys.

Electrical enclosures will be non-metallic where possible. Metallic enclosures will be coated, and vapor phase inhibitors used in sealed cabinets as required in provision 3.18.11.8.

For post and panel walls, steel posts will be corrosion resistant weathering steel and for concrete H-pile posts, the reinforcement will be galvanized. For new steel railroad structures, the steel girders will be metalized or galvanized and receive a three-coat paint system with epoxy primer and epoxy intermediate coats.

7.3 COATINGS

Coatings with established performance records for atmospheric exposure and a life expectancy of 15 to 20 years will be utilized for exposed metal surfaces. Coatings will comply with provisions 3.18.11.9 to 3.18.11.15.

8.0 Installation and Testing

Corrosion control materials and coatings, including cathodic protection and monitoring facilities will be incorporated into the construction as per the Released for Construction Design Documents. Inspection will be performed to ensure the correct use of materials and coatings, and correct installation.

The following inspection and testing will be performed:

1. Measurement and testing of cathodic protection systems and assessment of cathodic protection levels, based on the NACE criteria.
2. Testing of ground mats and electrodes.
3. Isolation Testing of each section of Third Rail isolation
4. Track-to-earth resistance testing of each isolated track section as per ASTM G165-99. This will be performed on each track section between isolation joints (typically approximately 1000') prior to tie-in, where possible. One additional test will be performed on the each of the 2 mile long test sections for project track prior to tie-in to the Rail Road system. The testing results will be submitted no later than 30 days after completion of the testing.
5. The stray-current survey performed pre-design (prior to construction) will be repeated after construction and prior to energization of the third rail. The post construction survey will involve data-logging of DC potentials at test locations over a minimum 24-hr period. Test locations will include all of those locations from the pre-design survey as well as all additional stray-current test locations installed on the Project. This testing will need to be coordinated with local utilities and owners of structures adjacent to the project.
6. The stray current survey will be repeated during revenue service operation of the project rail system, utilizing all of the test points from the Post Construction survey. The data recordings will be compared to the post construction data recordings to ensure that the time-weighted fluctuations in potentials are less than [redacted]
7. A survey will be performed on all corrosion control systems on all Project related structures and Utilities and will include the following:
   a. Impressed Current CP systems:
      i. Rectifier voltage and current output
      ii. All influencing rectifiers should be interrupted while the test station survey is being performed on the protected structure
      iii. Measure the ON and Instant Off potential at each test point along the structure
      iv. DC interference testing to be performed on adjacent structures that are not electrically continuous with the protected structure.
   b. Galvanic systems:
      i. Anode DC current
      ii. Anode disconnect potential to portable reference
      iii. Structure ON and instant OFF potential with local anode disconnected to buried and/or portable reference
      iv. No DC interference testing required
   c. Test Stations with DC coupons:
      i. Measure the coupon DC current
      ii. Measure the coupon ON potential
      iii. Measure the coupon instant disconnect (i.e. OFF) potential
   d. All potential measurements are to be taken with respect to a buried permanent reference electrode (if available) and a portable copper-copper/sulfate reference electrode placed at grade.
   e. The corrosion control measurements will be performed on a regular basis, as required by industry standards. This is typically annually for test point measurements, and monthly for critical CP rectifiers, CP bonds and mitigation systems.

9.0 Corrosion Control Submittals

The following submittals related to corrosion control will be provided, as a minimum:

1. Stray Current Corrosion Control Preliminary Design
2. Stray Current Corrosion Control Final Design
3. Soil Corrosion Control Preliminary Design

4. Soil Corrosion Control Final Design
5. Grounding System Preliminary Design
6. Grounding System Final Design
7. Test Program Plan: To be provided immediately after IFC Design Drawings, and to include a description of all corrosion control and grounding tests to be performed.
8. Test Procedure for each corrosion control and grounding test identified in the Test Program Plan.
9. Test Report for each test within 30 days of test completion.

14) Signals and Train Control and Supervisory

a) Provide a narrative and concept, for the proposed approach to the signal systems work, including approach to supervisory systems, staging and cut overs, plan sheets, notes and concept. Also, provide details of major equipment and provide drawings showing concept layouts

The signal system to be supplied for this project is made up of six interlockings, utilizing zoned Microlok II microprocessors, a new supervisory system (signal SCADA) which will be connected to five of those new interlockings (D1 will be supervised form the Divide Tower). The Signal SCADA (SCS) system will be connected to a new office at the Jamaica Control Center JCC. Additionally, the SCADA system will be connected to four existing Queens interlocking locations, Garden, and Locust Interlockings, and all four of the existing Nassau Interlockings. The four existing Nassau locations will be retired as they are replaced by their newer peers. The provision of materials will also include new "RSA" LED signals, M23 switch machines, AC track circuits, third rail and switch heater systems and a PTC overlay (which will be discussed independent of the other systems work).

Switch and Third Rail Heaters

The switch and third rail heater system will be independent of the signal system and the SCS as it will function primarily via a dedicated [redacted] spread spectrum radio system and will have a backup via its own SCADA system which will be transmitted along the communication backbone. Both primary and backup systems will be controllable from the JCC. The power to drive the heating elements will be taken from the third rail and the return of the negative energy will be through a connection to an impedance bond center tap or a to the running rails. The heater console in the JCC will be independent of the SCS console for train control. The heating system will be tested once field equipment is installed. This testing is totally independent of the signal system so it can be performed when FA is available.

The Signal Plan

When 3TC started its review to determine how to manage this critical portion of the project it became clear that if it was not carefully controlled the signal system could become a very complex field issue and the delivery and testing of the system would be on the project critical path. So, in planning this project it became evident that we needed to mitigate the pressure of the delivery and the testing that could be caused by the signal system. It was quite apparent that high level goals be set and the following ones were developed:

- Minimize the tie-in work between signal locations
- Test as many new interlockings in their final design configuration in the field one time
- Simplify the installation and test of N3
- Take deliveries of the signal locations off the critical path

After a considerable amount of analysis, the team developed a plan which would simplify the entire project construction process and in doing so greatly simplified the signal delivery and testing process. This revelation became ATC 27 which was submitted in two forms, both providing a significant improvement of schedule and a dramatic reduction in Rail Road FA work providing tremendous benefit to the Rail Road. ATC 27 in either revision is extremely important for the overall construction schedule, the reduction of Rail Road FA work, limiting disruptions to service but it becomes extremely valuable to the installation, testing and commissioning of the signal system. Using this strategy can allow new interlockings (D1, N2, N3, Floral Park, and Hempstead) to be installed and tested as they were tested in the factory with only minimal tie-in work to the existing system. Nassau 1 is the only new interlocking that will require two phases of testing and commissioning but provides an important service to project construction as it must be installed earlier in the project to allow the existing Nassau 1 to be retired and removed thus allowing southern west end construction of retaining wall and track to proceed.

Ultimately, implementation of ATC 27 allows the signal system to be installed, activated and commissioned west to east (Floral Park to Divide) with only the early commissioning of two tracks of new N1 not performed in that sequence. A significant number of temporary tie-ins with their accompanying testing is eliminated from the process which not only reduces FA time but also safety risks.

One additional idea was conceived by the team to save time for testing and to make the design much cleaner and complete for the Rail Road which is the addition of a Microlok II rack(s) at the existing Q4 location that will allow the Q 4 house to communicate with N1 and the new Floral Park locations by fiber optic cable. This alleviates the need to maintain copper messenger between Q4 and the other locations and simplifies the testing process when N1 is cutover partially (2 tracks) then completely (all three tracks) later in the project. This racks would be a permanent installation at Q4 as it will remain when the project is complete. It will be designed similar to the other Microlok II racks: one unit per track. Q4 will already have a communication node with SCADA so the addition of a Microlok II to communicate over the fiber only makes logical sense.

Signal SCADA System

Prior to any new interlocking installations or retirements, the Signal Design Plan calls for signal SCADA system to be initiated. Modeled after the new Divide Office, the JCC office design and delivery can be accomplished in approximately 15 months from NTP. In parallel with the design of the new office the construction team will be installing the fiber backbone and all the necessary drops to accommodate all the specified locations including the existing and new signal locations. Additionally, in parallel the individual interface designs for each locations SCS will be developed tested and provided to Rail Road for their installation and commissioning. It is expected that the installation and testing of new processors into existing houses will require 2 weeks for each location. The locations will be commissioned as required to support the construction process and maintaining Rail Road operations. The Queens locations, which don't impact Third Track construction and can still be supported from Queens Tower can be placed in-service as FA time becomes available. Another upside derived from the accelerated implementation of the fiber backbone is the positive schedule and labor impact the fiber network will have relative to testing, integration and commissioning of the new signal system. The network will now interconnect the existing and new signal systems by placing all entities upon the same fiber network. The fiber now becomes the shared communication mode eliminating the need for the existing copper cable connections. This is discussed in more detail in the Testing and Commissioning section of the proposal.

Signal Progression Utilizing ATC 27

ATC 27 has been adjusted to accommodate the added requirement placed in the final RFQ which requires the DB to install the Rail Road maintenance siding between Urban Ave. and Divide 1 (D1) interlocking first. This modification does not eliminate any of the major benefits of the ATC but, in fact, reduces the amount of track cut and swing work the Rail Road will need to perform on the project (see ATC 27 discussion concerning reduction of Rail Road FA work). This cut and swing near Urban Ave is the only one that Rail Road will need to perform on the project due to ATC 27. If the Rail Road can perform the north track cut and swing in parallel with the short 3TC north track construction from D1 to Urban Ave and the addition of the Rail Road maintenance track then the signal changes at D1 and 2 and to the Divide Office can all be made simultaneously. If this coordination can be accomplished then the signal changes will require a two-step process. In either event the modifications at Divide (modified relay circuits) and the Divide Office will be minimal.

Signal Design Progression

As was discussed previously, it the intent of 3TC to progress the design and commissioning in an easterly flow from Floral Park to Divide but the need to support construction requires that the N1 new location be the first location designed and sent to site. It is critical to construction as the existing N1 is in the way of track construction. The plan is deliver a completely wired and tested location from the factory but to only place in service the single crossovers on the two existing tracks to replace the existing N1 operational functionality. The third track will not be available for service until later in the project and the balance of new N1 will fall back into the easterly testing process. The necessity of installing the fiber backbone now allows the new N1 interlocking to be tested with existing Floral Park and existing N2 by fiber. A Microlok II rack will be installed at existing

Queens 4 to the backbone to act as an I/O converter between the relays at Q4 and the new N1 interlocking. The Microlok II racks can be set up in hot-standby or in zones. In the Nassau 2 location a temporary Microlok II rack will be installed to connect N2 to the new N1 by fiber. These racks will be reused as needed on subsequent interlocking cutovers.

The table on the following page shows the configuration of signaling houses that must be delivered and tested for the Third Track Project.

As the construction team modifies the bridge structure at Tyson Ave. and installs the new switch the Signal Plan is to install the new Floral Park location run it through all the pretesting requirements and make it ready for Rail Road final testing and commissioning. The new switch at Floral Park will be blocked and clamped and the new signal will be bagged and the Floral Park location will be left inactive but ready for the next phase.

The delivery of N2, N3, D1 and finally Hempstead complete new interlocking deliveries. No new interlockings except for two tracks of new N1 need to be cutover to support construction. This allows signal cutovers to occur from Floral Park through D1 and Hempstead in an orderly sequential and less complicated manner. Importantly, N3 can be installed and tested without the need for track cut and throws, temporary tracks or partial in service to support construction.

Master Locations (ML) will be delivered starting from the west end of the project through to the east based positioning determined by the block design and the location of substations. This is done to facilitate the flow of west to east cutover of signal locations in the final design configuration. The MLs will be processor based and will be configured as are the interlockings which is one unit for each track (3 units). 3TC's preference is to use the hot-standby approach as no one Microlok II failure will send a track down but this issue can be discussed during the design process after contact award.

As required, the grade crossing track cases will be provided and installed as grade crossing are taken out of service to supplant the equipment that was in the existing grade crossing locations.

Hand throw switch locations will all be protected by electric lock (EL) and switch position circuitry. Where electric locks are within appropriate cable distances the EL equipment will be mounted in that house. If they are not in a reasonable distance the EL protection equipment will be cabled to the nearest processor location for communication of status to other necessary locations.

There are some other designs required to complete the project which include D2, D3 and D4 modifications (including corresponding changes at Divide Tower) that will be factored into the design schedule so that Rail Road FA can install and commission them. Except for the Signal SCADA installation testing and commissioning it is not anticipated that any other changes will be required at N4.

The following Table provides the current schedule for delivery for each of the wired signal enclosures on the Third Track project based on the LNTP.

So, in summary let's review the goals 3TC established at the beginning of the process:

- Minimize the tie-in work between signal locations – *Accomplished*
- Test as many new interlockings in the field only one time - *Accomplished*
- Simplify the installation of N3 - *Accomplished*
- Take deliveries of the signal locations off the critical path – *Accomplished*

3TC firmly believes that the plan for signals allows for major benefits to the Rail Road including reduced FA resources, reduced future maintenance, cleaner and more manageable cutovers and less schedule and safety risk during the project as well as making a four-year construction project feasible. It will also simplify the ASCES application to the project.

The final testing and commissioning cycle for signals is the application of PTC overlay. ATC 27 again makes the application of PTC much simpler because there will be fewer changes to software and transponder locations due to the reduced number of signal system configurations that must be addressed. We currently envision that the initial pass will through the system with the existing system in place will be performed entirely by the MTA System Integrator for PTC (MTA SI) and that all material software would be in place prior to our initiating any signal work. This effort is not included in our design effort.

The ACSES technology for the MTA is a proprietary technology of the MTA SI so lacking any firsthand experience with the system we have contacted them and will contract them to perform the necessary PTC design and testing to support Third Track. ATC 27 has simplified the application of the signal system and in turn the application of the PTC overlay for the signal system. We plan on having two phases of PTC deployment under the 3TC contract. The first pass that 3TC would lead would be to alter the original track configuration by adding the two crossovers on the existing tracks at new N1 and retiring the two crossovers at existing N1. Once the signal changes have been made the PTC alterations ca be incorporated by the MTA SI and the Rail Road. As with every change to the track configuration, signal system change or cutover between interlockings there will be a time lag to revise and recommission the PTC system so it is intended that construction transponders be used to bridge this time gap until the updated PTC update can be completed. The second phase or set of cutovers of PTC will follow the west to east progression of the commissioning of the new interlockings which includes commissioning the new third track.

3TC will, under direction of the PTC systems integrator, leave enough space in the signal houses to accommodate mounting of the WIUs, connect the necessary wiring and place the programmed transponders on the new third track. The MTA SI will prepare all the test plans and procedures for the limited factory test and the field testing and commissioning. The MTA SI will, after the signal system is commissioned will be directly involved with the Rail Road to perform the testing and commissioning field functions for the PTC overlay.

It has also been agreed that if radio cases or antennae must be moved from the original installation to accommodate the new track configurations that new

cases or antenna would be provided and installed prior to retiring the original equipment. This was decided in an effort to maximize coverage of the PTC system during track change events.

When completed the PTC overlay will have been installed and tested from the new Floral Park interlocking to the Hempstead Interlocking, from Floral Park Interlocking through D1 interlocking control area and from N2 to N4 Interlockings. It is not anticipated that the Third Track contract will perform any work in the current Queens Interlocking area or in the Divide Interlocking area beyond the control zone of Divide 1 (I.e. 2, 3, 4, 5) or at Garden Interlocking or Locust Interlocking.

Refer to Appendix 2.8.2 for drawings/details.

b) Provide a single line block plan

The single-line block plan can be found in Appendix 2.8.14.

c) Provide a narrative of their plan to use pre-wired enclosures

3TC plans to use prewired enclosures for all CIH, auxiliary houses, MLs, switch heater cases, battery huts, electric locks and other signal related materials. The field wiring connections at enclosure terminal boards, field installed appurtenances and fiber terminations are the field connection requirements. The pre-wired enclosures will be factory tested either as independent devices or connected as they would be in the field. Interlockings should be tested as a unit in the factory with the appropriate test equipment and test wires to verify that the requirements of the design are met prior to going to the field.

Factory testing includes continuity of point-to-point wiring, tag checks, circuit breakdown and operational simulation testing. All wayside devices including signals, switch machines, track circuits are simulated in the factory using test panels or testing simulation software. The operation testing exercises the processor and any other active components in the enclosures to allow the engineer to verify the design.

All locations once tested are disconnected and packed for shipment for delivery to site or a storage location provided by 3TC. All plug-in relays will be removed and packed for shipment on pallets to prevent damage during shipment. Heavier objects in the enclosures such as transformers, or converters will be secured for shipment.

Houses and cases will be provided with lifting eyes to allow lifting by crane at the site. Houses will require the use of spreader bars to adequately spread the house load during unloading or setting at site which protects the houses from damage.

It is not anticipated that any prewired enclosure will need to arrive in more than one piece thereby making the internal connections necessary in the field will be incoming cables and fiber from the field.

d) Provide a narrative describing the plan for the integration of signal control system.

As was described previously in the Design Approach to Signals the integration is critical to the success of the project. The major items of integration for the Third Track Project are:

1. Ensuring the JCC office is up and running as described
2. The fiber optic backbone is installed, tested and all the necessary communications nodes are in place
3. The site-specific software for the signal SCADA is available when new Nassau 1 is needed
4. The replacement of substations that provide signal power
5. House and case foundations are installed and ready for house or case installation
6. Local conduits, trough, and cables are available when houses are installed
7. Wayside signal equipment is delivered (signals, switch machines, impedance bonds, etc.)
8. Availability of traction power on the third track for cutovers

ATC 27 simplifies the overall signal integration plan as most of the existing system can continue to support the Rail Road's current system performance until the process of commissioning the third track's new signal system from west to east commences.

The schedule for the signal system provided in the proposal demonstrates a methodical, systematic process to ensure that the sequence of activity supports the description present in the Design Approach.

The following steps show the way 3TC has planned the testing and cutover of the new signal system.

Step 0 – Electric Lock controls are installed on Rail Road maintenance siding and tied in to Divide 1 existing location so that siding can be utilized by Rail Road
Step 1 – The JCC design is installed tested and available for connection to required locations
Step 2 – A permanent Microlok II rack is installed in existing Q4, the Microlok II rack will be equipped to communicate over the fiber backbone and will be a zoned rack
Step 3 – A temporary Microlok II rack will be installed in N2 to act as a west bound I/O box over the fiber backbone
Step 4 – N1 is installed and tested while interfaced to the Q4 and N2 Microlok II racks
Step 5 – N1 is commissioned for two track operation and existing N1 is retired, JCC activates N1 partially and retires existing N1
Step 6 – The new Floral Park house is installed and pretested while the new switch is blocked and clamped
Step 7 – New N2 is installed
Step 8 – New N3 is installed
Step 9 – New D1 is installed
Step 10 – New Hempstead is installed

As the trackwork is completed (which will occur during the period of Step 6 through Step 10) then the interlockings can be commissioned in sequence:

- FP to Nassau 1 including the third track
  - Temporary rack remains at N2
  - JCC activates FP and entire N1 location
  - New MLs are activated and existing MLs are retired
- N1 to N3 including new N2
  - A new temporary rack will be required in existing D1 to communicate over fiber to N3
  - JCC activates new N2 and N3 and existing N2 and N3 are retired
  - New MLs are activated and existing MLs are retired
  - Existing N2 and N3 locations are retired
- Nassau 3 to D1 (new)
  - Changes implemented at Divide Tower
  - Changes implemented to relay logic at existing D2, D3 and D4
  - D1 to D2 interface remains copper
  - New MLs are activated and existing MLs are retired
  - Existing D1 is retired
- Floral Park to Hempstead to Garden
  - Hempstead to Garden interface by copper

Again, the benefit of ATC 27 allows the minimum amount of tie-in work as new interlockings are communicating with existing and other new interlockings over fiber through vital processors. This will simplify pre-test and final testing for 3TC and Rail Road FA.

The integration of the Rail Road Positive Train Control (PTC) system into the Third Track is similar to the integration process and testing sequences of other ACSES (Alstom and Ansaldo) systems used on other Rail Roads. The WIUs can be mounted, the radio cases can

be set, a radio coverage study can be performed and the transponders can be mounted (although they should be programmed prior to mounting). The major questions are how the software and hardware is to interface to the vital processors, where the tags are placed, how the tags are programmed, the format of the communication protocols necessary to communicate throughout the radio system. Therefore the subcontracting of the Rail Road PTC Systems Integrator is an absolute necessity to maintain schedule and perform the PTC System's implementation. They will need to work with the Rail Road personnel to perform final testing and commissioning of the PTC overlay system.

Fortunately due to ATC 27, the roll out of PTC is much more straightforward than it would have been using the original design concept. The Rail Road SI will only be required to touch the project at three times during the project and would not impact construction or signal system testing and commissioning. The following are the major steps that include the involvement of the Rail Road SI for the application of PTC through the project limits:

- Phase 1 – Apply to the existing system as it is now configured
- Phase 2 – Update the design to accommodate the removal of existing N1 and the insertion of new N1
- Phase 3 – Follow the cutover sequence described above and apply PTC changes after interlockings cutovers.

The schedule duration required to test and commission the PTC overlay utilizing the ATC 27 scenario is much simpler and significantly less complex than attempting to piecemeal PTC into a series of non-sequential cutovers as would be necessary under the original project plan.

Tthere are other interfaces to consider such as placement of cross-bonds versus broken rail protection, using track and train performance data to create an efficient block design, information from the TPSS SCADA concerning dead sections of third rail, and information passed to the station communication system to provide passenger information.

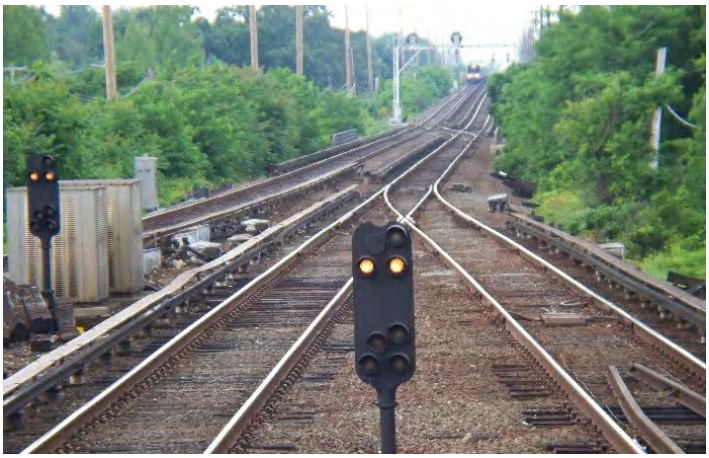
The process 3TC will employ to ensure these and all other interfaces are properly defined and integrated is described in the Systems Engineering section of this Proposal.

15) Communications

a) Provide a narrative and concept, for the proposed approach to the communications work, including approach to construction, staging and cut overs, plan sheets, notes and concept. Also, provide details of major equipment and provide drawings of concept layouts.

The Project will require significant communications system design, construction, and integration effort to add the Third Track to the alignment while maintaining railroad operations, station services, and passenger amenities throughout the project. The design and phased cutover of these communications systems will have a significant impact on the seamless operation of all critical subsystems and facilities, including signals and train control, positive train control, traction power, and passenger stations. While these systems will be designed and installed in accordance with the Rail Road design guidelines, technical provisions, specifications, and other Contract Documents, 3TC will provide continuous feedback to the Rail Road where we feel updates could be made to avoid obsolete products and reflect more contemporary technologies or where value added improvements could be made to enhance our designs, improve reliability and maintainability, or provide a better service to the Rail Road patrons. All new systems will be qualified through a rigorous series of progressive tests that will include Factory Acceptance Testing (FAT), On-Site Stand-Alone Testing (SAT), and Systems Integration Testing (SIT) to prove their functionality and successful operation at every phase of implementation.

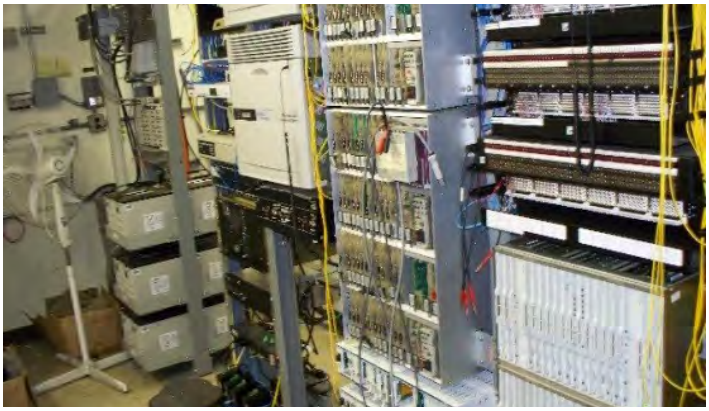
To support the railroad's critical operational subsystem data requirements, wayside communications equipment and materials will be designed and installed in communication rooms at stations and parking facilities, in communications racks in central instrument locations (CIL's), and at traction power substations. Backbone communications system cabling and networking systems will be designed and installed with redundancy and power protection in order to provide high levels of reliability, availability, security, and resiliency to critical subsystem data. The New fiber optic backbone communications cables will be installed and tested on both sides of the ROW on existing or relocated poles with redundant 'drop' cable connections to provide two spatially diverse paths from each backbone fiber to each communications room, CIL, substation and other wayside locations. This will be accomplished by installing and testing a new backbone network on these existing and new poles prior to migrating from the existing network system which will remain operational during and after the construction phase. Only after the new network is tested can our team begin removing the poles and older cables to make way for the new track. This specifically will include the installation of new equipment, tested to full capability for each subsystem and brought online when no operating revenue services can be affected and returned to an off-line condition until testing and phased commissioning are approved by the Railroad Engineer. This approach to cutovers supports a reliable implementation strategy for vital systems to protect the safety of the Rail Road stakeholders, the Rail Road's FA, Contractors, and patrons.



Underground conduits, and manholes, will be designed to allow [redacted] (or drop) fiber optic cable access to each communications system facility, wayside CIL and substation, as well as other locations. Major communications systems network equipment will consist of Cisco 10G wide area network nodes serving as network interfaces to the signal house and traction power substation networks. These nodes will be configured with Multiprotocol Label Switching using Label Distribution Protocol for a simple non-constrained routing protocol without traffic engineering; Open Shortest Path First and Virtual routing forwarding will also be used to allow multiple instances of routing tables for communications from the signal houses and substations to the communications facilities in Hillside, Mineola, Hicksville, RSCC and CNOC, as well as SCADA communication from the OTN XTRANs and RTU's to Jamaica Central Control (JCC). The OTN XTRAN network nodes at the signal houses to support non-vital supervisory network will be configured in a redundant and parallel MPLS-TP rings using the primary and backup paths of the backbone for a packet oriented transport that has similar deterministic connections like SONET networks providing automatic protection switching in a 1:1 or 1+1 configuration. Cisco ONS Multiservice Provisioning Platform will be configured at stations and parking facilities to facilitate operational data transfer to back-office and head-end subsystem control equipment located in the Communications Network Control Center (CNOC) and Regional Security Command Center (RSCC). The phasing and installation of the new system shall be done in coordination with the new Signal systems, substations, stations and parking.

The new SCADA system will include a new office system at Jamaica Control Center (JCC) to control the following existing and new interlockings: Existing Q1, Q2, Q3, Q4, Locust and Garden interlockings; the new interlockings at Floral Park and Hempstead, and new Interlockings for N1, N2, N3 and the existing Nassau 4. Additional SCADA service changes will be designed at the Divide Tower to include modifications for switch and signal revisions at Interlockings D4, D3, D2, and D1. The new SCADA system at JCC will include track and location indications for each interlocking, master location and electric lock between Q1 and N3 on the Rail Road mainline. Installers will deploy communications systems in accordance with a detailed phasing and cutover plan that will ensure uninterrupted service for operational traction power and signal systems and supporting infrastructure to facilitate and permit the early stage train control diversions and changes necessary to begin the construction of new utility poles,

interlockings, substations, PTC Base Communications Packages (BCP), and station platforms. These SCADA systems will also provide remote monitoring of facilities and systems equipment to allow maintenance personnel to quickly ascertain and respond to intrusion, trouble, or alarm conditions.



3TC will survey and analyze coverage of the existing VHF radio system to determine modifications that will be necessary to relocate the existing Mineola radio cabinet, equipment, and tower to a new location that will meet or exceed coverage of the existing system. An installation and cutover plan will be created for this radio work to ensure uninterrupted service in support of railroad operations. In addition, our Team will work closely with the Rail Road's current PTC System Integrator to coordinate and ensure successful integration, where necessary, of wayside [redacted] radio systems, transponders, and Base Communications Package components required for Positive Train Control (PTC) deployment.

In addition to the criticality of the communications network backbone one other major communications issue will need to be addressed. The construction plan requires that at all stations except Carle Place construction must not interrupt passenger service. To make this happen each platform will be demolished one half at a time. The issue is how do you maintain the existing passenger and Rail Road communications systems available on the remaining half platform. Experience in this type of process tells us that the best solution is to not trust drawings but take a physical survey or each station and confirm which cables, junction boxes, service panels supply the remaining half of the platform. Clearly mark them physically at the site and on the drawings so that the construction forces are aware of what must be protected and what can be retired. This is a painstaking process but will preserve the existing passenger service until new equipment is ready to replace it.

Separate Communications and IT Data Network rooms will be furnished and installed at each station to house networking and control equipment and facilitate communications between stations and the Rail Road Jamaica Communications Network Control Center (CNOC). Systems supported at stations will include relocated ticket vending machines (TVM), parking payment systems, CCTV security cameras, audio visual paging system (AVPS) signs and public address speakers, and relocated telephone boxes (T-Boxes). Our communications system and station MEP designers will work together closely to ensure adequate pathways are designed to the right locations to support current as well as future cable capacities.

Because the lengths of station platforms [redacted] exceed the operational limit of Category [redacted] cabling from a switch to end device ([redacted] or roughly [redacted]), intermediate access nodes (AN) and application nodes (AAN) must be installed at intervals along the platforms to establish a station local area network (LAN) and support IP-based equipment such as CCTV cameras and VoIP telephones over copper cabling.

16) Security Systems

a) Provide a narrative and concept, for the proposed approach to the security systems work, including approach to construction, staging and cut overs, plan sheets, notes and concept. Also, provide details of major equipment and provide drawings of concept layouts.

Security elements required on this project are closely tied to and integrated over the communications system. The

most prominent security subsystem is the closed-circuit television or CCTV system, which will not only consist of cameras and cabling, but video recording devices, video management systems, and analytic software. IP-based, Power-over-Ethernet (PoE) pan-tilt-zoom (PTZ) cameras will be designed and installed as defined in the Technical Provisions at key locations on stations, pedestrian overpasses and underpasses, parking lots and parking structures, and traction power substations. Coordination with the platforms architectural designs will be done to ensure an aesthetically pleasing installation of conduit runs for both communications and power to the platform devices.

Conduits and cabling for fire alarm systems will be furnished and installed at substations, station buildings, rooms, closets, and other areas as required by applicable codes and NFPA 70. Our D-B team will coordinate the design of the fire alarm and protection system with the Rail Road's current fire alarm contractor to ensure alarm data is successfully integrated into the Rail Road JCC central fire alarm system over the communications backbone. All cabling and devices will be installed, terminated, and activated by the current fire alarm contractor.

Lenel electronic access control (EAC) hardware will be designed and installed using an IP controller topology on station platforms, in communications rooms, and in each new traction power substation. These systems will be integrated to head-end control systems over the backbone communications network. Intrusion detection systems will be designed and installed as part of the SCADA subsystem to provide remote monitoring of facility entrances and exits and equipment cabinet doors and will raise an alarm upon unauthorized entry or access.

Three Boyce Technologies help point intercoms (HPI) will be furnished and installed linearly along each platform, roughly [redacted] away from each other. These IP-based intercoms will be integrated into the access nodes station LAN and will source dial-tone from an existing Rail Road IP-PBX located at the CNOC or a local call manager. Our communications systems designers will coordinate closely with station architects to ensure that these intercoms, as well as all other station mounted communications equipment, are installed in aesthetically pleasing locations that have been specifically designed to integrate into the station platforms as opposed to haphazardly externally mounted to the nearest available surface.

Parking structures will require separate Communications and IT Data Network rooms integrated into the structure design. Communications systems, including a backbone node and intermediate distribution frames (IDF) on each floor of these facilities will be designed to support security elements on that floor including CCTV cameras, Help Point intercoms, VMS signs and flush mounted ADA compliant speakerphones with built-in auto dialer and ringer in elevator cabs to permit two-way conversations.

17) Landscaping

a) Identify the Landscape Architectural team proposed in the organization chart and additional personnel and provide a narrative outlining the quality and suitability of the proposed personnel, their proposed approach to Landscape Architectural design and the anticipated roles and responsibilities.

Please see the organization chart on the next page.

b) Describe the approach that will be used to ensure that Work will be conducted in a way that complies with standard Landscape Architectural requirements set out in the Contract Documents and is coordinated and consistent with the Aesthetics Manual Design Guide;

The Contract Documents and Aesthetics Manual require both adherence to the highest standards for planting that are used throughout the industry such as the American Standard for Nursery Stock, and project specific requirements that meet the Rail Road's standards for aesthetics, site lines, maintenance requirements, and robustness. We understand that these aspects are important to ensure that the stations and the other areas where the railroad interfaces with the public are well designed and maintainable. When planting abuts private property, we shall avoid materials that will encroach on neighbors.

We will develop plant lists for specific site area types, whether station plazas, retaining wall cover in shade and in sun, steep slopes, bioswales and retention basins, parking lots and enhancements at residential areas. Our focus will be on species that are native to Long Island for similar specific site conditions. Among these we will incorporate species that support local pollinators.

Our planting decisions will consider the aesthetic impact at all seasons and the future growth of the material. While it is imperative to select the right species for the right conditions and the right aesthetic, it is equally important to ensure that planting practices are of the highest standard to ensure good growth and healthy conditions. This will include specific soil types and tree pit conditions for trees in paved areas, specific practices for sloped planting, and good cultural practices during the establishment period. Guarantee periods and requirements will be instituted

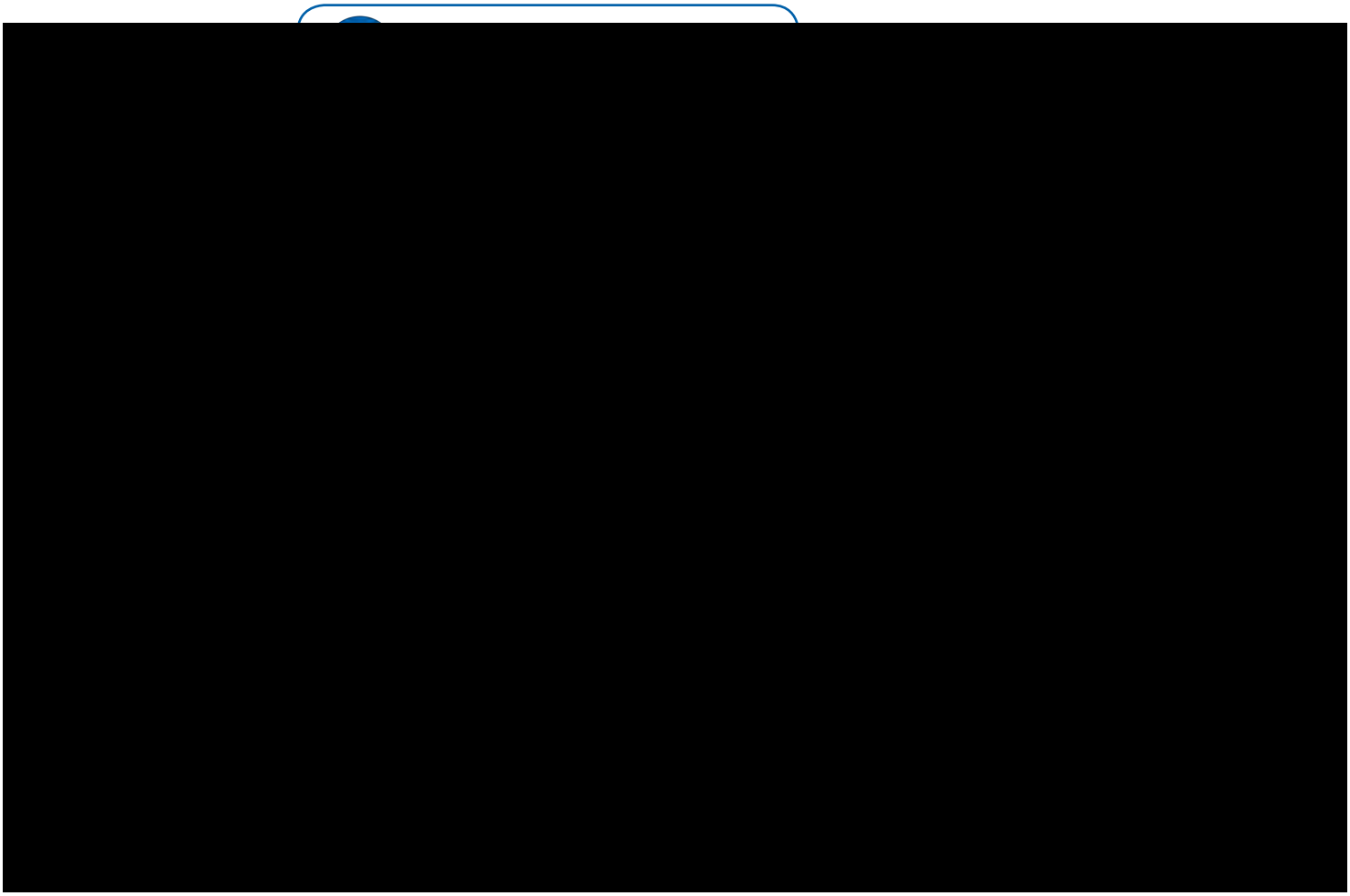
c) Identify the landscape mitigation plans and innovation in tree preservation that the Proposer will develop for the community sensitive aspects of the Work, addressing potential work activities related to re-establishing vegetative buffers.

3TC's goal throughout the project will be to ensure the healthy survival of as many of the existing trees as possible. To achieve this aim, we will look in detail at the new construction and existing conditions that impact each tree and vegetative buffer. As we develop our understanding of the impacts throughout the site, we will work with the project arborist to develop mitigation details. This will begin with overall guidelines, such as "any roots exposed during construction shall be immediately covered with moist mulch and tarps' and establishment of root zones where parking of vehicles or storage of equipment is forbidden.

Specimen trees will be identified early and will be tagged for inspection by the arborist, who will work with the designers to develop a tree-specific plan for best practices to mitigate damage and support tree survival and future growth.

18.) Geotechnics

a) Describe the geotechnical aspects of the Project site as they relate to the Project and identify critical issues and how these critical issues such as settlement and vibration will be addressed. This narrative will include discussion on the design and construction of bridge foundations,



walls, slopes, shorings, at a minimum and the proposed approach to monitoring during construction; & b) Describe any geotechnical investigation and testing that will be provided by the Proposer to substantiate its design.

c. Identify the additional information relied upon by the Proposer, beyond that included in the RFP, to establish site conditions in advance of the Contract award to reduce the potential for Differing Site Conditions during execution phase. Explain how such additional information was obtained and provide copies of all documentation of such additional information.

18. Geotechnical

3TC understands that geotechnical investigations is an early task item and must be done quickly, completely and accurately in support of the Team and finalizing designs to meet the Rail Road's project schedules. This includes coordinating field borings, performing the proper laboratory tests, and preparing reliable and cost-effective geotechnical foundation recommendations. 3TC's geotechnical engineers and designers will work together to complete the optimum designs for the various site conditions that will be encountered over the length of the Project corridor.

18.1 Geotechnical Conditions

Subsurface geotechnical information that was available with the RFP documents included the geotechnical conceptual engineering study for Rail Road Expansion Project by Matrix New World Engineering, Land Surveying and Landscape Architecture, P.C. (Matrix) in 2016, soil boring logs for all crossings for Rail Road Expansion Project by AECOM in 2016, and the geotechnical report for Rail Road Hicksville Station North Track Siding Project by AECOM in 2014. The data in these reports typically included measurements and observations for the upper 50 feet of soil, with several selected borings at proposed crossing locations advanced to about 120 feet.

Based on the available data, the subsurface conditions beneath the site can be characterized by predominantly sand fill material with varying amounts of silt, clay and gravel. Natural sand was typically encountered beneath the fill, consisting generally of sand with varying amounts of silt, clay, and gravel. The sand density varied erratically from very loose to very dense. Thin clay strata were reported at several locations.

The following table summarizes the estimated design soil parameters. The soil parameters provided are based on the subsurface field exploration, laboratory test results, and published material cited below.

1) Laboratory Results
2) Table 8-20-3 AREMA
3) Table 3.11.5.3-1 AASHTO

[redacted].

18.2 Foundations

The project will require new foundations for new bridge construction, modifications to bridges, station structures, parking garages, and retaining walls. These foundations are expected to consist primarily of deep foundations (driven pipe piles, drilled micropiles and drilled shafts) with conventional spread footings for lightly loaded structures and jacked undergrade crossings. Based on the rock depth noted above, foundations will derive support through end bearing and/or friction in soil. Pile depths of up to about 120 feet are anticipated.

Typical preliminary foundation design parameters, based on the RFP information, are as follows:

Soil Anchors:

[redacted]

Drilled Shafts:

[redacted]

Micropiles:

Design load: axial up to 50 kips, uplift up to 10 kips, [redacted]

18.2.1 DEEP FOUNDATIONS

We anticipate that deep foundations will be required to support bridges, retaining walls, and other structures with considerable axial and/or lateral loads. The type of deep foundation is dependent on the loading, the geotechnical resistance, and the logistics associated with the installation locations. In areas with low headroom or limited access, drilled micropiles will typically be an efficient foundation type. For heavier loads or for significant lateral design loads, drilled shafts are typically an efficient choice. In areas with relatively high structural loads and where vibration and/or noise concerns are not prevalent, driven pipe piles or H-piles are an efficient deep foundation choice.

For preliminary evaluation of deep foundation resistances, we used the available subsurface geotechnical information provided with the RFP, supplemented with our understanding of the general geological and geotechnical conditions in the project vicinity. The subsurface conditions are understood to be predominately granular (sands and gravels).

18.2.2 SHALLOW FOUNDATIONS

For lightly loaded structures such as platforms and relatively low bearing pressures at jacked under-grade crossings, spread footings and/or strip footings can efficiently provide sufficient geotechnical resistance. We will also consider the estimated settlement (total and differential) for shallow foundations.

18.2.3 GEOTECHNICAL PROJECT CONSTRAINTS

The geotechnical design constraints associated with the project include:

- A relatively deep bedrock profile. Bedrock is greater than 500 feet deep and it will not be practical to provide high end bearing resistance. The project will need to use deep foundations that develop geotechnical resistance through a combination of friction and end bearing in soils.
- The existing railroad infrastructure, and in some cases surrounding infrastructure, will limit the types and sizes of equipment that can be used to install deep foundations.
- The selection of deep foundation installation and construction techniques and equipment will need to account for limited outage windows provided by the railroad.
- Obstructions, which includes man-made material in shallow fill, boulders, and cobbles, may affect the installation of deep foundations and jacked under-grade crossings.

18.3 Geotechnical Risks

The primary geotechnical risks associated with the project include:

- Differential settlement of new project structures relative to existing railroad infrastructure.
- Reduction in foundation geotechnical resistance due to soil disturbance associated with foundation installation or jacking of under-grade crossings.
- Potential foundation installation difficulties due to boulders or cobbles.

Each of these risks will require management and mitigation during design and construction.

18.4 Geotechnical Investigation

A Geotechnical Investigation Plan will be developed in accordance with the Technical Provisions. The plan will include development and submission of a single document covering the geotechnical investigation scope required for the entire project.

A geotechnical investigation that meets and/or exceeds the requirements of technical provisions will be performed by the Design-Builder to supplement the geotechnical information provided with the RFP.

We plan to perform test borings at selected, targeted locations to provide information for geotechnical design and to satisfy the requirements for the number of explorations provided in the draft technical provisions. In order to perform the test borings efficiently, and to reduce disruptions to the roadways, surrounding communities, and railroad operations, we will incorporate the boring information provided with the RFP and we will look to "share" borings in some locations amongst project elements that are in close proximity to one another.
The proposed exploration program is summarized in the Planned Test Borings Table. The exploration program table provides the location, depth, and intended purpose for each boring.

We expect to use data from the planned geotechnical investigation to evaluate several key geotechnical issues that include:

- The density of the sand and gravel which is understood to be the predominant component of the subsurface material at the project site. This will help to better estimate pile and drilled shaft lengths, geotechnical resistances, installation criteria, and liquefaction susceptibility.
- The presence and extent of silt and clay material, which is known to be present sporadically within the Long Island outwash sand and gravel that underlies the project site.
- The presence of boulders, nested cobbles, or other obstructions that will impact pile and drilled shaft installation.
- The compressibility of the soils in areas where shallow foundations are planned.

Borings will be performed to about 125 feet at locations where new deep foundations are required for bridges, and to depths of 25 to 50 feet elsewhere. Soil sampling will be performed using the Standard Penetration Test (SPT) in accordance with ASTM D1586. SPT samples will be collected continuously in the upper 15 feet of each test boring and at 5-foot intervals thereafter, as required in the draft technical provisions. If clay, organic clay/silt, or peat is encountered, Shelby tubes will be advanced to attempt to collect relatively undisturbed soil samples for laboratory testing. Boring logs will be prepared utilizing Bentley gINT® in accordance with the technical provisions. Each boring log will include the information required in the technical provisions.

We will coordinate a laboratory testing program to provide additional subsurface design data. We intend to perform up to [redacted] and up to [redacted] and [redacted] tests on selected soil samples. If clay, organic clay/silt, or peat samples are recovered with Shelby tubes during the test borings, up to three consolidation tests on selected Shelby tube samples may be performed. Up to 26 samples will be tested for corrosion characteristics, including sulfate and chloride concentration, organic content, pH, and electrical resistivity.

18.5 Pile Load Test Program

We propose a deep foundation load testing program to satisfy the technical provisions. The objective of the load testing program will be to check the design nominal resistance for each type of deep foundation (driven piles, drilled micropiles, and drilled shafts) planned for the project.

We will prepare a written protocol with regards to the testing and evaluation procedures for static axial and lateral pile load tests, dynamic testing for driven piles, and Osterberg load cell tests for drilled shafts. The protocol will describe the means and methods to be implemented. At least 1% of piles will be statically load tested and 5% of driven piles will be dynamically tested. If re-strike dynamic testing is contemplated for driven piles, it will be described in the protocol. For demonstration drilled shafts, we anticipate that strain gages or similar instrumentation will be used to measure load transfer and crosshole sonic logging and thermal integrity profiling will be used to evaluate the quality of the concrete.

Pile or Shaft Geotechnical Nominal Resistance Test Implementation Reports will be provided which will include the geometry and installation information for the tested pile or shaft, the testing procedures, the measured test data, and our interpretation of the results.

18.6 Site-Specific Seismic Design Approach

Seismic analysis for the project requires design seismic motions at required seismic hazard levels (e.g., 1,000-year and 2,500-year return periods) and consideration of the subsurface conditions at the Site. The seismic motions are developed by performing site specific response analyses, which require bedrock response spectra and acceleration time histories, and soil profiles.

A Seismic Assessment Report will be prepared in accordance with the technical provisions. It will include the preparation of a single preliminary and final report encompassing the entire project limits. The report will include evaluation of liquefaction potential, site-specific seismic response analysis performed to develop design free-field response spectra in accordance with FHWA-NHI-11-032, and seismic soil structure interaction evaluation of deep foundations.

18.7 Geotechnical Instrumentation & Construction Monitoring Plan

A Geotechnical Instrumentation & Construction Monitoring Plan will be prepared in accordance with Section RFP Volume 3 Section 2.4.3.10. The Plan will address how the design-builder will monitor vibrations, settlement, and lateral movement of existing infrastructure and temporary support structures during construction. The Plan will also provide the threshold values and monitoring frequency for each parameter to be monitored. A website will be established to provide monitoring data on a near real-time basis. Particular emphasis will be focused on any sensitive community or business operations that may be affected and the serviceability of the railroad infrastructure.

The instrumentation program will:

- Identify baseline conditions prior to construction
- Monitor existing structures and utilities
- Check the gage and grade of the railroad tracks in the vicinity of construction activities
- Provide early warning of movements likely to cause distress such that mitigation measures can be implemented
- Provide field measurements that document actual performance of buildings, structures and utilities as a result of construction
- Relate observed movements to the Geotechnical Design
- Advise the Project Team if changes to the project design and construction procedures are needed

This monitoring program will consist of various types of geotechnical and structural instrumentation placed in the surrounding ground or on existing structures.

PLANNED TEST BORINGS TABLE			
Approximate Station No.	Boring Number	Planned Depth (ft)	Structure or Feature
[redacted]			Floral Park Viaduct Modification
			Floral Park Viaduct Modification
			Floral Park Viaduct Modification and S. Tyson Bridge
			Retaining/Sound Wall and Plainfield Ave. Bridge
			Retaining/Sound Wall and Plainfield Ave. Bridge
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall and Linden Ave. Ped. Tunnel
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining Walls
			Retaining walls and Underpass
			Retaining walls and Underpass
			Retaining Walls
			Retaining/Sound Wall
			Retaining/Sound Wall
			New platform
			Pedestrian structure and new platform
			New Platform
			New Platform
			New Platform
			Retaining Walls
			Retaining Walls and Underpass
			Retaining Walls and Underpass
			Retaining walls
			Retaining Walls
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Denton Ave Bridge
			Denton Ave Bridge
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			New Platform and Retaining/Sound Wall
			New Platform and Retaining/Sound Wall
			New Platform
			New Platform

PLANNED TEST BORINGS TABLE			
Approximate Station No.	Boring Number	Planned Depth (ft)	Structure or Feature
[redacted]			Nassau Blvd Bridge
			Nassau Blvd Bridge
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			New Platform
			New Platform/Pedestrian Overpass
			New Platform/Pedestrian Overpass
			New Platform
			Pedestrian Bridge
			Pedestrian Bridge and Main Street Underpass
			Retaining Wall and Underpass
			Retaining Wall, Underpass and pedestrian structure
			Retaining Wall and Underpass
			Retaining Walls
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Glen Cove Bridge
			Glen Cove Bridge
			Retaining/Sound Wall
			Retaining/Sound Wall and Meadowbrook State Pky
			Meadowbrook State Pky
			Retaining/Sound Wall and Meadowbrook State Pky
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Cherry Lane Bridge
			Cherry Lane Bridge and New Platform
			New Platform
			New Platform and Pedestrian Bridge
			New Platform and Pedestrian Bridge

PLANNED TEST BORINGS TABLE			
Approximate Station No.	Boring Number	Planned Depth (ft)	Structure or Feature
[redacted]	[redacted]	[redacted]	New Platform
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	New Platform
[redacted]	[redacted]	[redacted]	New Platform and Westbury South Garage
[redacted]	[redacted]	[redacted]	New Platform and Westbury South Garage
[redacted]	[redacted]	[redacted]	New Platform and Westbury South Garage
[redacted]	[redacted]	[redacted]	New Platform, Westbury South Garage and Ped. Bridge
[redacted]	[redacted]	[redacted]	New Platform and Ped. Bridge
[redacted]	[redacted]	[redacted]	New Platform and Westbury South Garage
[redacted]	[redacted]	[redacted]	New Platform and Westbury South Garage
[redacted]	[redacted]	[redacted]	New Platform and Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	Westbury South Garage
[redacted]	[redacted]	[redacted]	New Platform
[redacted]	[redacted]	[redacted]	New Platform and Ped. Bridge
[redacted]	[redacted]	[redacted]	New Platform and Ped. Bridge
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Underpass and Retaining Walls
[redacted]	[redacted]	[redacted]	Retaining Walls
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall
[redacted]	[redacted]	[redacted]	Retaining/Sound Wall

PLANNED TEST BORINGS TABLE			
Approximate Station No.	Boring Number	Planned Depth (ft)	Structure or Feature
[redacted]			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining Wall and Urban underpass
			Retaining Wall and Urban underpass
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Retaining/Sound Wall
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Harrison Ave. Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Mineola South Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage

PLANNED TEST BORINGS TABLE			
Approximate Station No.	Boring Number	Planned Depth (ft)	Structure or Feature
[redacted]			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
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			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Westbury North Parking Garage
			Hicksville North Parking Garage
			Hicksville North Parking Garage
			Hicksville North Parking Garage
			Hicksville North Parking Garage
			Hicksville North Parking Garage
			Hicksville North Parking Garage
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			Hicksville North Parking Garage
			Hicksville North Parking Garage

PLANNED TEST BORINGS TABLE			
Approximate Station No.	Boring Number	Planned Depth (ft)	Structure or Feature
[redacted]			Hicksville South Parking Garage
			Hicksville South Parking Garage
			Hicksville South Parking Garage
			Hicksville South Parking Garage
			Hicksville South Parking Garage
			Hicksville South Parking Garage
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			Hicksville South Parking Garage
			Willis Ave Yards
			Willis Ave Yards
			Willis Ave Yards
			Willis Ave Yards

2.9
Ingenuity

Volume 2 - Package 2: Project Design

2.9 Ingenuity

2.9.1) Provide description of Technical Solution innovations and explain how they will contribute to improved implementation of the Project.

The Project Team has developed and submitted to the Rail Road over 30 ATCs (many of which have been incorporated into the RFP) for consideration that demonstrate our ability to bring design and construction innovation to the Project. In addition to the ATCs, we have also developed technical solutions that reduce design and construction duration, allowing for increased flexibility in the overall schedule, reduce risk, enhanced safety to both the public and contractor, enhance the environment and/or community, and decrease construction and long-term operation and maintenance costs. These solutions are listed and described below.

INGENUITY SUMMARY MATRIX						
	Enhanced Safety	**Positive Schedule Impact**	**Reduced Risk**	**Enhancing the Community & Environment**	**Decreased Construction Costs**	**Decreased Operation & Maintenance Costs**
3rd Track on South Side	X	X	X		X	X
Multi-Purpose Parking Garages				X	X	
Adaptive Reuse Parking Garages				X	X	
Dynamic Lighting	X			X		
Combine Canopy Structure	X		X		X	X
Terracotta Brick Sunscreen		X		X	X	X
Signage Strip					X	X
Clinch Ave. Mod	X			X	X	
Willis Avenue Tunnel Modification	X	X	X		X	X
Rail Road Avenue Extension				X	X	
New Recharge Basin				X	X	X
Jacked Under-Grade Bridge		X	X		X	
Tree Planting Program/ Plant Diversity				X		

Third-Track on South Side

The Track Plan and Profile (T-PP) Drawings provided by Rail Road indicate a need to construct new track from Floral Park to N3 on the south side of the ROW, from N3 to the west of the Westbury Station on the north side of the ROW, then from the west to the east of Westbury Station on the South side of the ROW and then from east of Westbury Station to the connection at Divide on the North side of the ROW. This causes the need for three major track cut-and-throw moves and a very complex construction process at the N3 Interlocking. These three moves create significant interface between Rail Road Force Account and the DB Contractor's field forces. 3TC have optimized the proposed third-track alignment to allow continuous construction of the third-track on the South side of the ROW from Floral Park to Urban Avenue before tying into Divide-1 Interlocking on the North side of the ROW. This Technical Solution requires minor adjustments to existing track alignment and includes a revision to the Meadowbrook Parkway overpass and the modification of the existing Nassau-3 signal location. Eliminating two major cut-and-throws and relocating one to Divide-1 Interlocking (instead of at Westbury Station), as described above, significantly reduces the work required by Rail Road Force Account and reduces the number of hybrid poles required to relocate existing PSEG and Rail Road utilities along the ROW. The RFP specified that approximately 200 hybrid poles would be required, but ATC 27 reduces this number to approximately 25 to 45. This ATC also eliminated several temporary signal and communications tie-ins required to phase in the new interlockings and allows two-track revenue service during third-track construction with use of the existing interlockings.

Multi-Purpose Parking Garages

The parking garages mandated by the Rail Road for the project are a necessity in this second decade of the 21st century to make this project successful. The construction of the garages will help generate the ridership that will not only help with make this Third Track Project effective, but also will help the Rail Road with the sustainability of its other projects that will come on line within the next decade such as the East Side Access project.

3TC is proposing two alternative strategies to make transportation more sustainable, both with respect to the environment, and with respect to economics.

As an opportunity for future development, bringing, more value to the affected communities and potential revenues to the Rail Road, after award, 3TC is committed to propose a development plan to convert some or all single- purpose/single-use parking structures in Mineola, Westbury and Hicksville into potential multi-purpose/ multi–use structures.

The 3TC would partner with RXR Realty, the preeminent developer on Long Island, and would seek the approval of the aforementioned villages to convert all or some of the proposed parking structures into multi–use facilities to incorporate other uses including commercial (office, retail, etc.), residential (optimal commuter locations) and recreational (soccer, lacrosse fields, etc.).

Beyond making the Rail Road a more robust transportation option for Long Islanders by implementing this progressive transit oriented development approach of incorporating multi-use garage structures into the downtowns, the Rail Road more fully realizes its stated goal of catalyzing significant economic development along the Third Track corridor and beyond.

Multi-purpose Transit Oriented Development structures present a number of benefits, not only to the Rail Road but to the affected communities. By incorporating this innovative and progressive concept, the Rail Road can serve as a catalyst for economic development, a growth in the local tax base and become a welcome amendment to the community's critical infrastructure. Other valuable benefits include the addition of private development capital to the Project, and the reinforcement of the useful life of the garage structures.

The aforementioned alternative plan will only move forward if we receive the approval from the Rail Road and all the affected local jurisdictions. Rail Road approval would be at its discretion and we understand that no commitment has been made by the Rail Road. If 3TC does not obtain all the required approvals, before the final decision needs to be made according to our schedule, the original concept for parking garages included in the Request for Proposals will be implemented. Rail Road will not assume any additional risk due to this opportunity.

Parking Garage Adaptive Reuse

The Project's five proposed garages are coming on-line when more and more Rail Road users are getting to the train station through the use of alternative methods as opposed to the conventional means of driving a private vehicle to the station and parking the car. These alternative methods, whether they include such transportation modes as biking to the station or using ride-share service to access the station, will have an adverse affect on the demand for parking and if they continue will reduce the overall demand for parking at a station in the next generation. This reduction in demand would create numerous issues such as the potential loss of revenue for the garage operator and would inspire the operator to seek alternative ways of obtaining revenue from the parking garage. This could result in repurposing the garage to encompass parking on the lower floors and residential or commercial uses on the upper floors. Our designs will provide for this future adaptability by optimizing floor to floor height ratios, column spacing, floor slopes, etc. Our team recognizes the overall goal of the project is to get the people of Nassau and Suffolk County to/from NYC and their intra-island destinations as quickly, comfortably, safely and cost efficiently as possible.

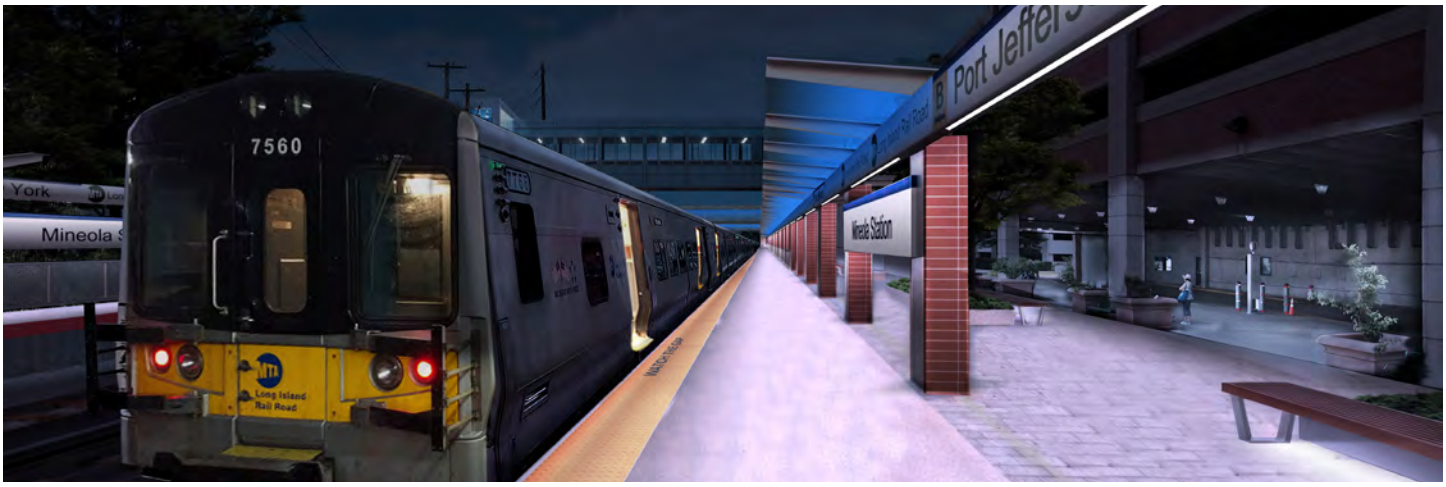
With the Rail Road's approval, we will integrate that philosophy into our parking garage design/construction so that the garages will not only be affordable now, but provide for some cost recovery in the future. Rail Road approval would be at its discretion and we understand that no commitment has been made by the Rail Road. If 3TC does not obtain all the required approvals, before the final decision needs to be made according to our schedule, the original concept for parking garages included in the RFP will be implemented. The Rail Road will not assume any additional risk due to this opportunity.

Dynamic Lighting

To further the connection between way-finding and brand distinction of each station, we will use dynamic lighting on automated controls that will be connected to the timing of a train's arrival and departure. The dynamic lighting will be utilized at the overpass cores/bridge (highest elements in the station design) to signal the arrival and departure of a train. Along with the overpass cores/bridge, each side of the platform will integrate the LED (RGB) lighting into the signage band to uplight the canopy and reinforce which train is approaching the station. This system will provide all commuters in the surrounding area a visual beacon (overpass/bridge) that the train is about to arrive, and they can hasten or slow their approach to the specific platform, as required.

Combined Canopy Structure

The addition of a third track has created the opportunity to optimize minimal space along the platform. Currently, the directive design asks for two separate canopy structures: one for the platform canopy and another for the pedestrian walkway. In many cases, these two canopies run directly adjacent from one another. If not consolidated, these two separate structures will prove to create more site work and un-intentional material



adjacencies that complicate the esthetics of the design. In addition, having two separate structures for both canopies will prove to occupy square footage in an already tight space. In response to this, our proposed kit of parts includes a consolidated foundation for both the platform canopy and pedestrian walkway canopy. This eliminates redundant structural members, optimizes space and simplifies design and construction, as well as minimizing future maintenance of these structures.

Terracotta Brick Sun Screen (Fabrik)

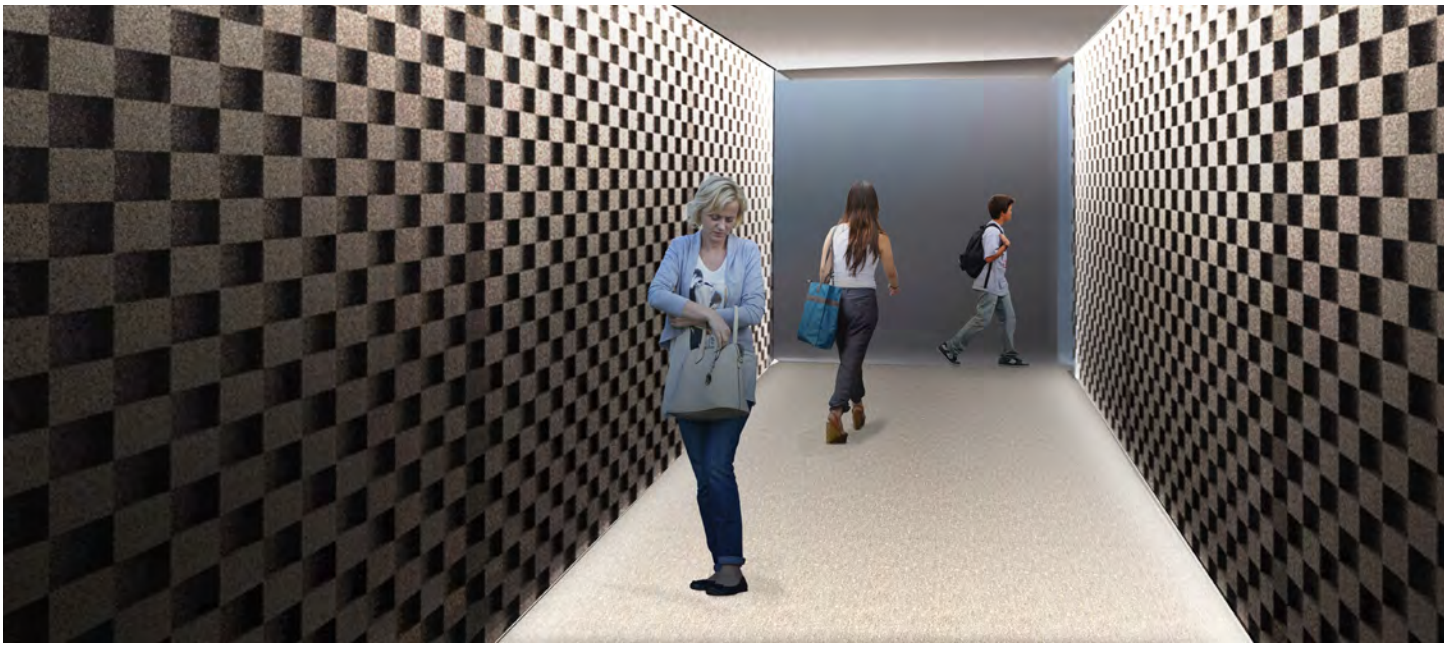
The urban fabric surrounding the stations should impact the aesthetics of the proposed design. Inspired by the use of brick within in the community, our proposed kit of parts includes the use of a terracotta sun screen at the platform shelters and overpass building cladding. The terracotta screen and form liners provide a contemporary aesthetically sensitive alternative to using actual brick as the latter would require significant initial cost and result in ongoing maintenance issues due to moisture intrusion, repointing, cracking, graffiti . Aside from alleviating maintenance concerns, the terracotta screen provides a consistent visual language for the entirety of the proposed project with a material familiar to the community and can reduce the heat gain in these enclosures by providing shading without decreasing visual connection.

Signage Strip

Currently, station design does not account for the placement of devices such as speakers, cameras, lighting and conduit into the larger design. Differing from current station design, the proposed scheme integrates signage, lighting, security, audio and conduit into a single enclosure. This way, the design is simplified by consolidating these devices and eliminating any need for additional structure that would been used to support these individually.

Clinch Avenue Horizontal Geometry Modification

3TC sought to implement innovative approaches to mitigating existing operational imperatives identified in RFP phase. In the Highway Design aspect of the project, 3TC's proposed modification to the intersection of New Hyde Park Road and Clinch Avenue to enhance vehicular and pedestrian safety serves as an example of their ingenuity. Shifting the Clinch Avenue-New Hyde Park Road intersection south of the proposed location shown



in the Directive Drawing not only reduces the length of the retaining walls on the southeastern quadrant of the Rail Road crossing, but it also improves intersection sight distance as the intersection would no longer be situated at a location along New Hyde Park Road where it's proposed grade is at a maximum. The revised geometry will feature a T-intersection as opposed to the skewed geometry dictated in the directive drawings and intersect New Hyde Park Road where it's proposed grade is approximately [redacted]. In addition to these improvements, the proposed alignment shift on Clinch Avenue will be consistent with the design parameters followed by the directive ([redacted]). This approach also presents the opportunity to enhance the surrounding landscaping aesthetics due to the reduction in retaining wall lengths. Shifting Clinch Avenue also reduces cost as there is a reduction in earthwork, limits of reconstruction, and retaining walls. The proposed modifications to Clinch Avenue are all situated within municipal ROW. 3TC will meet with the Village of Garden City soon after a Limited Notice to Proceed to discuss this revision and seek their approval.

Willis Avenue & Oyster Bay Branch Crossing Modification

3TC evaluated several alternatives to enhance the underpass depicted in the directive drawings. Although the [redacted] underpass tunnel depicted in the directive drawings does not warrant ventilation and lighting systems, the tunnel's length presents unfavorable and confined driving conditions. Through a context-sensitive design approach to enhance public safety, driving conditions, and north-south vehicular & pedestrian connectivity, 3TC has proposed an alternative concept to the Willis Avenue crossing in ATC No. 28: "Willis Avenue Mainline and Oyster Bay Branch Crossing Modifications." The proposed deviations from the concepts depicted in the directive drawings include:

- Provide two openings within the [redacted] long tunnel, one being approximately [redacted] long.
- Provide an [redacted] wide one-way at-grade access roadway running parallel, alongside the underpass to provide access to the Rail Road maintenance lot between the Mainline & Oyster Bay Branch, and the commercial property situated on Block [redacted].

The walkways on the southwestern quadrant of the Willis Avenue & 2nd Street intersection are modified to accommodate ADA compliant sidewalks and approximately and a [redacted] wide roadway to the one-way at-grade access road.

The modifications to the crossing will provide openings for motorists traveling through the underpass tunnel while maintaining access to all properties adjacent to Willis Avenue. The turns into driveways accommodate an AASHTO SU-30 design vehicle. The proposed grades on the walkways along Willis Avenue leading to 2nd Street will also comply with PROWAG 2011 Guidelines.

173 School Street Access

Several of the proposed underpass crossings significantly impact adjacent properties, for instance the parking lot on [redacted]. Parking at the office building on [redacted] will be severely compromised by the proposed steep profile on School Street. 3TC has investigated in not only minimizing the impact inflicted upon the property but also reducing the amount of earthwork to be conducted at the crossing. 3TC proposes an alternative design in which an access road off Grant Street, east of School Street will provide access into the parking lot. The access roadway will traverse over across properties acquired by the Rail Road [redacted]). The acquired lots will also accommodate a recharge basin. The grade and elevation at which the access road intersects [redacted]'s parking lot will be at approximately existing ground to minimize earthwork.

New Stormwater Recharge Basins

Each new underpass will collect the developed stormwater runoff at its low point and convey the flow to existing Nassau County sewer lines via pump stations and detention systems. However, 3TC has explored the option of installing a new recharge basin at School Street as an innovative drainage design. The location of the new recharge basin will be based on available property and storage facility sizing constraints. The design team is proposing to utilize the acquired land parcels listed in the Technical Provisions of the RFP to provide sufficient area for the proposed recharge basin footprints. The proposed recharge basin will store and recharge a 100-year 24-hour storm event of [redacted] of rainfall for all contributing areas. To provide a factor of safety for this objective, allowances for infiltration will not considered. The sizing of this basin will be developed to provide protection to the traveling public by preventing future

flooding at the low point of the new underpass. This design will eliminate vehicular flow interruptions along the local roads as it is not within the roadway ROW and will only require temporary support structures in a significantly reduced construction footprint. Since they will be located outside of the roadway ROW, the new recharge basin option will eliminate the vehicular flow interruptions and will only require temporary support structures in a significantly reduced construction footprint. Coordination with NYSDEC, Nassau County, and other local municipalities will be required to review all necessary environmental approvals. To prevent any negative environmental impacts, the existing conditions of the land acquisition will require soil and water testing before construction. These tests will evaluate the land properties and determine the necessary action for any potential environmental remediation.

Under-Grade Bridges Jacked-into-Place

The 3TC team will employ an innovative approach for constructing the under-grade bridges that limits the required track outages to one double-track outage per crossing. A U-shaped reinforced concrete substructure will be constructed adjacent to the proposed crossing, in an open cut excavation at the proposed final elevation. The structure will be constructed on a concrete launching slab with a thrust block and the superstructures will be set on the substructure in advance of moving the bridge into place.

During ONE double track outage, the tracks will be removed, the track bed will be excavated to below the bottom of the superstructure, and the entire structure will be jacked into place while the remaining excavation is completed. Once the structure is in place, the precast approach slabs, ballast, and tracks will be installed, and rail service will be restored.

The ingenuity of this approach eliminates the need to have multiple single track outages to construct the substructure. Minimizing the number of required track outages to just one double track outage will reduce the risk of failing to clear the tracks on time.

Tree Planting Program

Since the ROW area is being reduced due the installation of a third track and retaining and sound attenuation walls, there may not be enough space to install the desired number of trees. There is an opportunity to engage the community in a tree planting program that can provide new trees in the neighborhoods and streets adjacent to the Rail Road corridor.

Planting Diversity

Since the ROW area is being reduced due the installation of a third track and retaining and sound attenuation walls, there may be insuffiencet spa; we will meet this requirement by planting arborvitae four feet on center throughout the corridor. However, as an overall policy goal, we will seek to exceed those requirements by providing a diversity of dense multi-story plantings to prevent monocultures which make areas more susceptible to plant diseases.