Proposed Property Boundary Description

Beginning at a point on the north side of South Frontage Road at the intersection with the Proposed Temple Street Extension;

thence running N 53°44'36" W a distance of 363.59 feet along the north side of South Frontage Road to a point at the intersection with College Street;

thence running on a curve to the right having a delta angle of 83°07'00" a radius of 15.00 feet and an arc length of 21.76 feet to a point;

thence running N 29°21'26" E a distance of 153.50 feet along the east side of College Street to a point at the intersection with Rev. Dr. Martin Luther King Jr. Boulevard;

thence running on a curve to the right having a delta angle of 92°04'55" a radius of 15.00 feet and an arc length of 24.11 feet to a point;

thence running S 54°21'46" E a distance of 416.94 feet along the south side of Rev. Dr. Martin Luther King Jr. Boulevard to a point at the intersection with the Proposed Temple Street Extension;

thence running on a curve to the right having a delta angle of 98°28'34" a radius of 10.00 feet and an arc length of 17.19 feet to a point;

thence running on a curve to the right having a delta angle of 12°43'40" a radius of 808.78 feet and an arc length of 179.66 feet to a point along the west side of the Proposed Temple Street Extension;

thence running on a curve to the right having a delta angle of 69°29'38" a radius of 1.00 feet and an arc length of 1.21 feet to the point and place of beginning;

Proposed Property Area = 76,085 S.F. (1.75 Acres)



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Exhibit C Modifications to the College Street Bridge Page 1 of 3



Exhibit C Modifications to the College Street Bridge Page 2 of 3









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Exhibit F

City of New Haven Base Technical Concept for Downtown Crossing – Phase 3 Temple Street dated August 2019 and Addenda through No. 13

PROJECT DESCRIPTION

The Downtown Crossing - Phase 3 Temple Street Design-Build project (Phase 3)("City's Traffic Improvements" as titled in the Development Agreement) includes a Base Bid element as well as three Bid Alternates. The decision to award bid alternates shall be made by the City of New Haven at the time of award of the Phase 3 project

The total scope of the Phase 3 project includes the following:

- 1. South Frontage Road roadway work includes: bike lane installation, concrete sidewalk construction, lane additions, profile raising, maintaining horizontal alignment, south abutment installation, permanent and temporary retaining wall installations, signing revisions, pavement marking revisions, milling, full depth construction, pedestrian accommodation enhancement, turf establishment, drainage installation, abutter parking restoration, signal installation at Temple Street.
- 2. Martin Luther King Boulevard roadway work includes: bike lane installation, concrete sidewalk construction and realignment, lane additions, profile raising, maintaining horizontal alignment, permanent retaining wall installations, signing revisions, pavement marking revisions, milling, full depth roadway construction, pedestrian accommodation enhancement, driveway apron reconstruction, parking garage profile raise, turf establishment, guiderail installation, drainage installation, signal installation at Temple Street
- 3. Temple Street roadway work includes: bike lane installation, ADA Ramps, full depth roadway construction, grading, bridge installation, guiderail installation, concrete sidewalk construction
- 4. Temple Street Parking Garage modifications include: shortening of the entrance ramp on MLK Boulevard, repositioning of the existing Parking Access and Revenue System (PARCS) equipment at that entrance, permanent closure of the exit on the corner of MLK Boulevard and Temple Street, relocation of Temple Street Garage "lollipop" sign, installation of permanent retaining wall to support the increased roadway profile on MLK Boulevard, and drainage system modifications at the MLK Boulevard exit and reset manholes. Modifications to the interior of the Garage will be performed under separate Contracts by the New Haven Parking Authority.
- 5. Service Drives work includes demolition of existing roadway, realignment (horizontally south and lower vertically), median installation, pavement markings, drainage installation, guiderail installation. This is limited to the western fascia of the proposed Temple Street bridge to the Church Street bridge.
- 6. George Street pavement marking reconfiguration, signal updates, transformation from one way to two-way traffic operations between Temple Street and Church Street.
- 7. Congress Ave Profile raise, Bike Lane installation, permanent wall installation, abutter parking restoration, pavement marking restriping, milling, full depth construction, lighting
- 8. Washington Ave Milling, pavement marking restriping

Base Bid

The Base Bid shall include ALL project elements described above except as noted below in the Bid Alternates. Other elements for consideration when establishing the Base Bid are as follows:

- 1. Temple Street bridge
 - a. Construction of the south abutment of the Temple Street bridge and construction of the foundation for the central pier/separation wall for the bridge shall be included in the Base Bid.
 - b. While Bid Alternate 3 includes the construction of the Temple Street crossing other than as noted above, the final design costs associated with the entire Temple Street bridge and crossing shall be included as part of the Base Bid.
- 2. Retaining Wall 314 shall be constructed of steel sheeting and shall be located at the back of the proposed sidewalk east of the Temple Street crossing. The limits of wall 314 could be minimized to the extent possible based on the ability for the Contractor to transition to grading the slopes east of the Temple Street crossing. The work associated with these walls shall be paid as a unit price in the Base Bid.
- 3. Service Drive improvements from the west fascia of the proposed Temple Street bridge to the Church Street bridge shall be included in the Base Bid.

Bid Alternate 1 – 101 College Street Parcel

- Service Drives within the 101 College Street parcel As of Addendum No. 11, it shall be assumed that the work associated with this line item is being performed by the 101 College Street Development Contractor and shall therefore NOT be included in the Project.
- Drainage improvements within the 101 College Street parcel As of Addendum No. 11, it shall be assumed that the work associated with this line item is being performed by the 101 College Street Development Contractor and shall therefore **NOT** be included in this Project.
- 3. Retaining Wall 313 located along the north of South Frontage Road between College Street and the proposed Temple Street crossing. This wall shall be constructed of steel sheeting and shall be located at the back of the proposed sidewalk beginning east of College Street. The limits of wall 313 could be minimized to the extent possible based on the ability for the Contractor to transition to grading the slopes to the east. The work associated with these walls shall be paid as a unit price in BID ALTERNATE NO. 1. Any design costs associated with wall 313 shall be included in the Lump Sum Design-Build Price Proposal for BID ALTERNATE NO. 1.
- 4. Retaining Wall 312 located at the north west corner of the 101 College Street parcel. This wall shall be located at the back of the proposed sidewalk beginning east of College Street. The limits of wall 312 could be minimized to the extent possible based on the ability for the Contractor to transition to grading the slopes to the east. The work associated with these walls shall be paid as a unit price in BID ALTERNATE NO. 1. Any design costs associated with wall 312 shall be included in the Lump Sum Design-Build Price Proposal for BID ALTERNATE NO. 1.
- 5. Sidewalks along the south of MLK Boulevard and the north of South Frontage Road between College Street and the proposed Temple Street crossing. These sidewalks shall be constructed of bituminous concrete.
- 6. R-B MASH Metal beam rail and end anchorage/attachment along the south of MLK Boulevard and the north of South Frontage Road between College Street and the proposed Temple Street crossing as required. 6' black polyvinyl coated chain link fence shall also be included in these locations.
- 7. Topsoil, slope and turf establishment shall be required for the snow shelf and roadway slope along:

- a. The south side of MLK Boulevard between College Street and the proposed Temple Street crossing where appropriate based on slope conditions.
- b. The north side of South Frontage Road between College Street and the proposed Temple Street crossing where appropriate based on slope conditions.

Bid Alternate 2 – Traffic Signals

The final design, procurement and installation of traffic and pedestrian signal equipment at the locations indicated below has been separated out as Bid Alternate 2:

- 1. MLK Boulevard at Temple Street intersection
- 2. South Frontage Road at Temple Street intersection
- 3. George Street at Temple Street intersection
- 4. George Street at Church Street intersection
- 5. All proposed roadway, signage and pavement marking improvements along George Street shall be included in Bid Alternate 2.
- 6. All proposed signage and pavement marking improvements at the intersections of MLK Boulevard at Temple and South Frontage Road at Temple Street that can only be installed along with a Traffic Signal (e.g. crosswalks, etc.).

Bid Alternate 3 – Temple Street Crossing

The following elements have been separated out as Bid Alternate 3:

- 1. Temple Street crossing fill section north of proposed bridge
- 2. Topsoil, slope and turf establishment shall be required for the snow shelf and roadway slope along the east side of the Temple Street fill section where appropriate based on slope conditions. As of Addendum No. 11, it shall be assumed that the work associated with the slope improvements along the west side of the Temple Street fill section is being performed by the 101 College Street Development Contractor and shall therefore **NOT** be included in this Project.
- 3. Guardrail, concrete sidewalks, fencing and handrails as required along the east side of the Temple Street fill section. As of Addendum No. 11, it shall be assumed that the work associated with above improvements along the west side of the Temple Street fill section is being performed by the 101 College Street Development Contractor and shall therefore NOT be included in this Project.
- 4. Temple Street bridge north abutment and pier stem / separation wall construction
- 5. Temple Street bridge superstructure installation
 - a. Concrete sidewalk as well as any vertical and horizontal expansion joints between the Temple Street bridge and the sidewalk along the west side shall be installed by the 101 College Street Development Contractor
 - b. All other bridge joints are to be installed by the Phase 3 Contractor
 - c. The joint between the 101 College Street closure wall and the abutment shall be installed by the 101 College Street Development Contractor

Below please find a link where the latest Phase 3 documents included in this Table of Contents can be found:

BOOK 1 – INSTRUCTIONS TO PROPOSERS

Appendix S: Required Forms

- S0.1 Schedule of Submissions (REV. A13)
- S0.2 Conflict of Interest and Unfair Competitive Advantage Certification
- S0.3 Escrow Agreement (REV. A13)
- S0.4 Escrow Document Assembly Certification
- S0.5 Non-Collusion Affidavit
- S0.6 Price Proposal Form
- S0.7 Statement of Work Under Contract
- S0.8 Stipend Agreement (REV. A13)
- S0.9 Bid Bond
- S0.10 DBE Participation Form
- S0.11 Anticipated Source of Materials
- S0.12 Forms Available from Other Locations

BOOK 2 – TECHNICAL PROVISIONS

Appendix A.01: Mandatory Special Provisions

List of Notice to Contractors (NTC):

Contract Time and Liquidated Damages

- NTC All-Inclusive Drainage
- NTC Archaeological Monitoring Procedures
- NTC City Fiber Communications
- NTC Cold Weather Concrete Activities
- NTC Contractor Parking
- NTC Coordination with Maintenance
- NTC Early Submittals
- NTC Proprietary Items (REV. A6)
- NTC Environmental Investigations (REV A12)
- NTC Federal Wage Determinations (Davis Bacon Act)
- NTC General Permit for Stormwater Discharge
- NTC Locating Trailers on Project Site
- NTC Use of Municipal Police Officer
- NTC Potential for Asbestos Containing Materials
- NTC Salvage
- NTC Traffic Signals
- NTC Tree Removal
- NTC Yale ERUV

List of Contract Provisions

- 1. Federal Highway Administration (FHWA) Form 1273 (Revised May 1, 2012)
- 2. Title VI of the Civil Rights Act of 1964 / Nondiscrimination Requirements
- 3. Contractor Work Force Utilization (Federal Executive Order 11246) / Specific Equal Employment Opportunity
- 4. Requirements of Title 49, CFR, Part 26, Participation by DBEs
- 5. Contract Wage Rates
- 6. Americans with Disabilities Act of 1990, as Amended
- 7. Connecticut Statutory Labor Requirements
 - a. Construction, Alteration or Repair of Public Works Projects; Wage Rates
 - b. Debarment List Limitation on Awarding Contracts
 - c. Construction Safety and Health Course
 - d. Awarding of Contracts to Occupational Safety and Health Law Violators Prohibited
 - e. Residents Preference in Work on Other Public Facilities (Not Applicable to Federal Aid Contracts)
- 8. Tax Liability Contractor's Exempt Purchase Certificate (CERT 141)
- 9. Executive Orders (State of CT)
- 10. Non-Discrimination Requirement (pursuant to section 4a-60 and 4a-60a of the Connecticut General Statutes, as revised)
- 11. Whistleblower Provision
- 12. Connecticut Freedom of Information Act
 - a. Disclosure of Records
 - b. Confidential Information
- 13. Service of Process
- 14. Substitution of Securities for Retainages on State Contracts and Subcontracts
- 15. Health Insurance Portability and Accountability Act of 1996 (HIPAA)
- 16. Forum and Choice of Law
- 17. Summary of State Ethics Laws
- 18. Audit and Inspection of Plants, Places of Business and Records
- 19. Campaign Contribution Restriction
- 20. Tangible Personal Property
- 21. Bid Rigging and/or Fraud Notice to Contractor
- 22. Consulting Agreement Affidavit
- 23. Federal Cargo Preference Act Requirements (46 CFR 381.7(a)-(b))

Index of Exhibits

EXHIBIT A – FHWA Form 1273 (Begins on page 14)

EXHIBIT B - Title VI Contractor Assurances (page 26)

- EXHIBIT C Contractor Work Force Utilization (Federal Executive Order 11246) / Equal Employment Opportunity (page 28)
- EXHIBIT D Health Insurance Portability and Accountability Act of 1996 (HIPAA) (page 35)

EXHIBIT E - Campaign Contribution Restriction (page 43) EXHIBIT F - Federal Wage Rates (Attached at the end) EXHIBIT G - State Wage Rates (Attached at the end)

Mandatory Sections

Section 1.06 - Control of Materials (REV A12) Section 1.10 - Environmental Compliance Section 2.86 - Drainage Trench Ex and Rock in Drainage Ex Section 4.06 - Bituminous Concrete (REV. A2, A9, A12) Section 5.86 - Catch Basins Manholes and Drop Inlets Section 6.01 - Concrete for Structure (REV A12) Section 6.03 - Structural Steel Section 6.86 - Drainage Pipes and Drainage Pipe Ends Section 12.00 - GPS Coordinates Section M.03 - Portland Cement Concrete Section M.04 - Bituminous Concrete Materials Section M.06 – Metals

Mandatory Specifications

Item #0101000A - Environmental Health and Safety Item #0101117A - Controlled Materials Handling (REV A12) Item #0101128A - Securing, Construction and Dismantling of a Waste Stockpile and Treatment Area (REV A12) Item #0202315A - Disposal of Controlled Materials (REV A12) Item #0202318A - Management of Reusable Controlled Material (REV A12) Item #0204213A - Handling Contaminated Groundwater (REV A12) Item #0212300A - Processed Aggregate Subbase Item #0219011A - Sedimentation Control System at Catch Basin Item #0401101A - Mat Reinforcement for Concrete Pavement Item #0406999A - Asphalt Adjustment Cost Item #0813012A - 5" X 18" Granite Stone Curbing Item #0813013A - 5" X 18" Granite Curved Stone Curbing Item #0813451A - 5" X 18" Granite Stone Transition Curbing Item #0921001A - Concrete Sidewalk Item #0921005A - Concrete Sidewalk Ramp Item #0921039A - Detectable Warning Strip Item #0922001A - Bituminous Concrete Sidewalk Item #0924006A - Concrete Driveway Ramp Item #0944101A - Placing Topsoil (NEW A8) Item #0944102A - Placing Bio-Retention Soil (NEW A8) Item #0949132A - Root Pruning (NEW A8)

Item #0949436A - Tree Watering (NEW A8) Item #0949XXXA - Parthenocissus Tricuspidata, Boston Ivy (NEW A8) Item #0949XXXA - Iris Versicolor, Blue Flag Iris (NEW A8) Item #0949XXXA - Carex Muskingumensis, Palm Sedge (NEW A8) Item #0949XXXA - Salix Purpurea 'Nana', Dwarf Arctic Willow 18"-24" HT. B.B. (NEW A8) Item #0949XXXA - RHUS Aromatica 'Gro-Low', Fragrant Sumac 18"-24" HT. B.B. (NEW A8) Item #0949XXXA - Salix Babylonica, Weeping Willow 5" CAL. B.B. (NEW A8) Item #0949XXXA - Ulmus Americana, American Elm 'Princeton' 5" CAL. B.B. (NEW A8) Item #0949962A - Platanus Acerifolia, London Planetree 5" CAL. B.B. (NEW A8) Item #0945301A - Mulching (NEW A8) Item #0969030A - Project Coordinator (Minimum Bid) (REV. A2, A12, A13) Item #0969049A - Document Control Specialist (REV A12) Item #096905xA - Quality Control Plan (Minimum Bid) (REV A12) Item #096905xA - Quality Management Plan (Minimum Bid) (REV A12) Item #0970006A - Traffic Person (Municipal Police Officer) Item #0971001A - Maintenance and Protection of Traffic (REV. A2) Item #0973725A - Work Site Supervisor (REV A12) Item #1002202A - Traffic Control Foundation- Mast Arm Item #1002214A - Traffic Control Foundation-Controller - Type IV Modified Item #1002300A - Light Standard Item #1003585A - Decorative Light Pole with Single Luminaire (REV. A2, A12) Item #1015041A - Pull Box Item #1017032A - Service (Metered) Item #1017033A - Service Cabinet Item #1017034A - Install Service Item #1020021A - Pole Hardware Item #1102002A - 8' Aluminum Pedestal Item #1102008A - 4'-4" Aluminum Pedestal Item #1102009A - 10'Aluminum Pedestal Item #1102010A - 12'Aluminum Pedestal Item #1104504A - Mast Arm Assembly, 35-1W Item #1104505A - Mast Arm Assembly, 40-1W Item #1104507A - Mast Arm Assembly, 50-1W Item #1104516A - Mast Arm Assembly, 45-2W Item #1105101A - 1 Way, 1 Section Mast Arm Traffic Signal Item #1105103A - 1 Way, 3 Section Mast Arm Traffic Signal Item #1105180A - 1 Way, 1 Section Bi-colored Arrow Item #1105303A - 1 Way, 3 Section Pedestal mounted Traffic Signal Item #1106001A - 1 Way Pedestrian Signal Pole Mounted

Item #1106002A - 2 Way Pedestrian Signal Pole Mounted Item #1106003A - 1 Way Pedestrian Signal Pedestal Mounted Item #1106004A - 2 Way Pedestrian Signal Pedestal Mounted Item #1107011A - Accessible Pedestrian Signal and Detector (Type A) Item #1108187A - System Integration Item #1108637A - Traffic Controller Cabinet Base Mounted Item #1108650A - Advanced Transportation Controller, Model 980 ATC Item #1108651A - Snow Emergency Blue Light Item #1108660A - Ethernet Switch Item #1108725A - Phase Selector (Modified) Item #1112413A - Detector (Type A) (Modified) Item #1112471A - Pre-emption System Chassis (Modified) Item #1113552A - Detector Cable (Optical) (Modified) Item #1108805A - System Testing (REV. A2, A12) Item #1108808A – Training (REV. A2, A12) Item #1108991A - Connected Vehicle Traffic Signal System Item #1111200A - Temporary Detection Item #1111600A - Extension Bracket Item #1112286A - 360-degree Camera Assembly Item #1112289A - 360-degree Closed Loop Video Detection Processor Item #1113725A - 23 AWG - 4 Twisted Pair Category 6 Cable Item #1112221A - CCTV System Item #1112241A - Fiber Optic Cable Splice Enclosure Item #1113030A - 12 Strand Fiber Optic Drop Cable Item #1113606A - Optical Fiber Cable Single Mode Loose Buffer Tube Cable, 12 Fiber Item #1113185A - 2 Strand Fiber Optic Interconnect Cable Item #1112284A - Vehicle Detection Monitor Item #1112288A - IP Video Detection Camera Assembly Item #1113506A - Relocated Interconnect Cable Item #1118012A - Removal and/or Relocation of Traffic Signal Equipment Item #1118101A - Temporary Signalization Item #1118123A - Internally Illuminated Street Sign Item #1206023A - Removal and Relocation of Existing Signs Item #1208902A - Sign Face - Sheet Aluminum (Enclosed Lens) Item #1208930A - V-LOC Sign Post & Socket Item #1208931A - Sign Face - Sheet Aluminum (Type IX) Item #1209467A - Hot Applied Thermal Plastic Legends, Arrows, and Markings Item #1209475A - Green & White Bike Facility Markings Item #1210101A - 4-inch White Epoxy Resin Pavement Markings Item #1210102A - 4-inch Yellow Epoxy Resin Pavement Markings

Item #1220003A- Public Information Sign (NEW A2, REV A12) Item #1504010A - Temporary Support of Utilities

Appendix A.02: Guidance Special Provisions

Guidance Specifications

Item #0000310A - Bird Spike Item #0201001A - Clearing and Grubbing Item #0202451A - Test Pit Excavation Item #0202491A - Removal of Granite Stone Curbing Item #0202512A - Cut Concrete Sidewalk Item #0202513A - Removal of Concrete Sidewalk Item #0202574A - Reset Monument Item #0406272A - Milling of Bituminous Concrete – (0 - 4 inches) Item #0507594A - 15" Catch Basin Trap Hood Item #050759xA - 18" Catch Basin Trap Hood Item #050759xA - 24" Catch Basin Trap Hood Item #050759xA - 30" Catch Basin Trap Hood Item #0520036A - Asphaltic Plug Expansion Joint System Item #0520041A - Preformed Joint Seal Item #0587xxxA - Infiltration Basin Item #0601780A - Graffiti Control Item #0755009A - Geotextile Item #0819002A - Penetrating Sealer Protective Compound Item #0822061A - Temporary Precast Concrete Barrier Curb (Left in Place) Item #0822072A - Temporary Precast Concrete Barrier Curb (Pinned) Item #0822073A - Relocated Temporary Precast Concrete Barrier Curb (Pinned) Item #0945005A - New England Conservation Wildlife Mix Item #0969066A - Construction Field Office Extra Large Item #1001001A - Trenching and Backfilling Item #1002110A - Decorative Light Pole Foundation Item #1002151A - Light Standard Foundation – City Item #1003906A - Remove Light Standard Item #1003912A - Remove Concrete Light Standard Base Item #1003916A - Remove and Relocate Light Standard Item #1008015A - 2" Rigid Metal Conduit - Surface Item #1008115A - 2" Rigid Metal Conduit in Trench Item #1008117A - 3" Rigid Metal Conduit in Trench Item #1008217A - 3" Rigid Metal Conduit under Roadway Item #1008317A - 3" Rigid Metal Conduit in Structure Item #1008456A - 2" Rigid Metal Conduit under slope Protection

Item #1008908A - Clean Existing Conduit Item #1010060A - Clean Existing Concrete Handhole Item #1019053A - Aerial Cable (3 No. 2) Item #1302061A - Adjust Gate Box (Water) Item #1403501A - Reset Manhole (Sanitary Sewer)

Appendix B: Project Reference Documents

- B.01 Base Technical Concept Plans
- B.02 Existing Traffic Volumes
- B.03 Geotechnical Information (See B.13 and B.14)
- B.04 Existing Data
 - B.04-1 Church Street Bridge As-Builts
 - B.04-2A Phase I As-Builts (part 1)
 - B.04-2B Phase 2 As-Builts (part 2)
 - B.04-3 Frontier Test Pits
 - B.04-4 Frontier Survey
 - B.04-5 SNET Duct Bank Location
 - B.04-6 Phase 2 Geotechnical Report
 - B.04-7 Phase 1 Preliminary Geotechnical Report A2 (Added in Addendum No. 2)
 - B.04-8 Phase 1 Task 210 Subsurface Soil Investigation Report_A2 (Added in Addendum No. 2)
 - B.04-9 Phase 2 Conformed Plans_A2 (Added in Addendum No. 2)
 - B.04-10 Phase 3 Supporting Documentation for NEPA Approval_A2 (Added in Addendum No. 2)
 - B.04-11A Century Link Plans CT-New Haven-018 to 023 (Added in Addendum No. 2)
 - B.04-11B City of New Haven Signal Communications Plan (Added in Addendum No. 2)
 - B.04-11C Comcast Plans 183-371 and 184-371 (Added in Addendum No. 2)
 - B.04-11D Crown Castle Plans (40-60 Temple and 100 College) (Added in Addendum No. 2)
 - B.04-11E Frontier Communications Plans (Print 2A, 3A, 17A, 18A) (Added in Addendum No. 2)
 - B.04-11F GNHWPCA Design Criteria and GIS Facility Map (Added in Addendum No. 2)
 - B.04-11G Regional Water Authority (RWA) Project Limits Map (Added in Addendum No. 2)
 - B.04-11H Southern Connecticut Gas (SCG) Plans (0-100 George Street, 0-300 Congress Avenue, 26-50 North Frontage Road, 51-100 North Frontage Road, 101-300 George Street, 0-50 College Street Ext., 51-300 College Street) (Added in Addendum No. 2)
 - B.04-111 United Illuminating (UI) (BTC Utility Key Plan Markups, Drawing Nos. P-1, PP-1, PP-2 (Phase 5A), PP-2 (Phase 3), PP-3, PP-4, PP-5) (Added in Addendum No. 2)
 - B.04-11J Century Link Plan CT New Haven IXC Fiber Optic Route NH2-01 through NH2-12 (Added in Addendum No. 5)

- B.04-12 Supplemental Survey From AECOM Temple Street Pedestrian Bridge (Added in Addendum No. 2)
- B.04-13 Supplemental Survey From AECOM Frontier Structures and Drainage (Added in Addendum No. 2)
- B.04-14 Temple Street Parking Garage As-Built Drawings (Added in Addendum No. 5 and Supplemented in Addendum No. 9)
- B.04-15 Phase 2 Geotechnical Report (Added in Addendum No. 6)
- B.04-16 George Street at Church Street Traffic Control Signal Plan As-Builts, Mast Arms Shop Drawings and Calculations (Added in Addendum No. 8)
- B.04-17 George Street at Temple Street Traffic Control Signal Plan As-Builts, Mast Arm Shop Drawings and Calculations (Added in Addendum No. 8)
- B.04-18 Existing Plans for 2 Church Street South, Doctors Building (Added in Addendum No. 9)
- B.04-19 Existing Plans for 40 Temple Street (Added in Addendum No. 9)
- B.04-19-1 Existing Plans for Pedestrian Bridge Over Temple Street (Added in Addendum 13)
- B.04-20 Existing Plans for 200 George Street, Temple Street Medical Center (Added in Addendum No. 9)
- B.04-21 Existing Plans for 230 George Street (Added in Addendum No. 9)
- B.04-22 Existing Plans for Gateway Community College (Added in Addendum No. 9)
- B.04-23 Test Pit Data Frontier Ductbank and MLK Test Pits Pre-Conveyance Drainage Work (Added in Addendum No. 9)
- B.05 Drainage Report
- B.06 WSP MPT Plans (Deleted in Addendum No. 2)
- B.07 WSP USA Inc Temple St. Garage Modification Plans
- B.08 WSP USA Inc George Street Signal Plans
- B.09 Phase 2 Task 2.10 Subsurface Investigation
- B.10 CTDOT Traffic 2036 Volumes- Full Build
- B.11 Phase 2 Urban Design and Landscape Concept
- B.12 2007 ERUV Map
- B.13 Phase 3 Geotechnical Data Report (Added in Addendum No. 5 and Supplemented in Addendum No. 6)
- B.14 Phase 3 Geotechnical Technical Requirements (Added in Addendum No. 5)
- B.15 Downtown Crossing Phase 2 Baseline Schedule Rev 3 (Added in Addendum No. 6)
- B.15-1 Downtown Crossing Phase 2 Baseline Schedule Rev 6 (Added in Addendum No. 11)
- B.16 Conceptual Landscape Plans (Added in Addendum No. 6 and updated in Addendum No.8)
- B.17 101 College Street Development Schematic Drawings (Added in Addendum No. 8)
- B.17-1 Additional 101 College Street Plans Supplemental info (Added in Addendum No. 11)
- B.17-2 101 College Street Traffic Data: 2020 and 2025 TMCs (Added in Addendum No. 11)
- B.17-3 101 College Street 60% Tunnels and Drives Submission PDF (Added in Addendum No. 12)

- B.17-4 101 College Street 60% Tunnels and Drives Submission CADD (Added in Addendum No. 12)
- B.18 Pre-Conveyance Drainage Design for MLK Boulevard and South Frontage Road
 (Preliminary Revised) (Added in Addendum No. 8) (Replaced in Addendum No. 11)
- B.19 Draft Property Map 2 Church Street South (Added in Addendum No. 9)
- B.20 Draft Property Map 35 College Street (Added in Addendum No. 9) B.21 Supplemental Survey for Drainage Inverts East of Church Street (Added in Addendum No. 9)
- B.22 Point in Time Studies (2015 and 2018) (Added in Addendum No. 9)
- B.23 Non-Vibratory Compaction Guidelines (Added in Addendum No. 9)
- B.24 Phase 2 Change Order No. 1 (Added in Addendum No. 9)
- B.25 UI Distribution Concept Plan Phase 3 (Added in Addendum No. 11)
- B.26 Phase 3 CADD Files (Added in Addendum No. 12)
- B.27 2036 AM and PM Peak Synchro Analysis (Added in Addendum No. 13)

BOOK 3 – CONTRACT GENERAL PROVISIONS

<u>Plans</u>

Drawing	Sheet No.	Drawing Title
	01.01	Title Sheet
REV-01	02.01.A13	Revisions
IND-00	04.02.A11	Index Plan & Existing Conditions Subset Cover Sheet
IND-01	04.02.A11	Index Plan-1
IND-02	04.02-1.A.11	Index Plan 2 with Bid Alternative No. 1
IND-03	04.02-2.A6	Index Plan 3 with Bid Alternative No. 1 (SHEET DELETED)
IND-03	04.02-3.A11	Index Plan 3 with Bid Alternative No. 1
IND-04	04.02-3.A6	Index Plan 4
EXC-01	04.03	Existing Conditions Plan 1
EXC-02	04.04	Existing Conditions Plan 2
EXC-03	04.05	Existing Conditions Plan 3
EXC-04	04.06	Existing Conditions Plan 4
GEN-00	05.01	General Notes Subset Cover Sheet
GEN-01	05.02	General Notes
TYP-00	06.01	Typical Sections Subset Cover Sheet
TYP-01	06.02.A2	Typical Sections MLK Boulevard
TYP-02	06.03.A3	Typical Sections South Frontage Road
TYP-03	06.04	Typical Sections Service Drives
TYP-04	06.05	Typical Sections Temple Street
TYP-05	06.06.A2	Typical Sections Temple Street
MDS-00	07.01	Miscellaneous Details Subset Cover Sheet
MDS-01	07.02	City of New Haven Miscellaneous Details
MDS-02	07.03	City of New Haven Miscellaneous Details
MDS-03	07.04	City of New Haven Miscellaneous Details
MDS-04	07.05	City of New Haven Miscellaneous Details

Drawing	Sheet No.	Drawing Title
MDS-05	07.06	Miscellaneous Details
MDS-06	07.07	Miscellaneous Details
MDS-07	07.08	Miscellaneous Details
MDS-08	07.09	Miscellaneous Details
MDS-09	07.10	Miscellaneous Details
MDS-10	07.11	Miscellaneous Details
MDS-11	07.12	Miscellaneous Details Sidewalk Ramps Sheet 1
MDS-12	07.13	Miscellaneous Details Sidewalk Ramps Sheet 2
MDS-13	07.14	Miscellaneous Details Sidewalk Ramps Sheet 3
MDS-14	07.15	Miscellaneous Details Sidewalk Ramps Sheet 4
MDS-15	07.16	Miscellaneous Details Sidewalk Ramps Sheet 5
MDS-16	07.17	Miscellaneous Details Sidewalk Ramps Sheet 6
MDS-17	07.18	Miscellaneous Details Sidewalk Ramps Sheet 7
MDS-18	07.19	Miscellaneous Details Sidewalk Ramps Sheet 8
MDS-19	07.20	Miscellaneous Details Sidewalk Ramps Sheet 9
MDS-20	07.21	Miscellaneous Details Sidewalk Ramps Sheet 10
MDS-21	07.22	Miscellaneous Details Sidewalk Ramps Sheet 11
MDS-22	07.23	Miscellaneous Drainage Details
ALN-00	08.01	Baseline Layout Plans Subset Cover Sheet
ALN-01	08.02	Baseline Layout Plan 1
ALN-02	08.03	Baseline Layout Plan 2
ALN-03	08.04	Baseline Layout Plan 3
ALN-04	08.05	Baseline Layout Plan 4
ALN-05	08.06	Baseline Curve Data Tables
HWY-00	12.01	General Roadway Plans Subset Cover Sheet
HWY-01	12.02.A2	General Roadway Plan 1 (SHEET DELETED)
HWY-01	12.02-1.A11	General Roadway Plan 1
HWY-02	12.03.A8	General Roadway Plan 2
HWY-03	12.04.A2	General Roadway Plan 3
HWY-04	12.05	General Roadway Plan 4
PRO-00	13.01	Profiles Subset Cover Sheet
PRO-01	13.02	Profile Temple Street (SHEET DELETED)
PRO-02	13.03	Profile Rev Dr MLK Jr Blvd
PRO-03	13.04	Profile South Frontage Road
PRO-04	13.05	Profile North Service Drive (SHEET DELETED)
PRO-05	13.06	Profile South Service Drive (SHEET DELETED)
PRO-06	13.07	Profile CL Service Drive Washington Avenue
DRN-00	14.01	Drainage Plans Subset Cover Sheet
DRN-01	14.02.A6	Drainage Plan 1 (SHEET DELETED)
DRN-01	14.02-1.A11	Drainage Plan 1
DRN-02	14.03.A2	Drainage Plan 2 (SHEET DELETED)

Drawing	Sheet No.	Drawing Title
DRN-02	14.03-1.A11	Drainage Plan 2
DRN-03	14.04	Drainage Plan 3
SPM-00	16.01	Signing and Pavement Marking Plans Subset Cover Sheet
SPM-01	16.02.A2	Signing and Pavement Marking General Notes
SPM-02	16.03.A2	Pavement Marking Plan 1
SPM-03	16.04.A2	Pavement Marking Plan 2
SPM-04	16.05.A2	Pavement Marking Plan 3
SPM-05	16.06	Sign Face Sheet Aluminum R Series Signs Typical Details
SPM-06	16.07	Sign Face Sheet Aluminum S & W Series Typical Details
SPM-07	16.08	Sign Face Sheet Aluminum D,E,I & M Series Signs Typical Details
SPM-08	16.09	City of New Haven Miscellaneous Details
SPM-09	16.10	City of New Haven Miscellaneous Details
SPM-10	16.11	City of New Haven Miscellaneous Details
ILL-01	18.01	Illumination Plans Subset Cover Sheet
ILL-02	18.02	Illumination Notes
ILL-03	18.03.A2	Illumination Details
ILL-04	18.04.A2	Conceptual Lighting Plan
INX-01	19.01	Traffic Control Signa Plan Subset Cover Sheet
TCS-01	19.02.A13	City of New Haven – Traffic Control Signal Plan
TCS-02	19.03.A13	City of New Haven – Traffic Control Signal Plan
TCS-03	19.04.A2	City of New Haven – Traffic Control Signal Plan
TCS-04	19.05.A11	City of New Haven – Traffic Control Signal Plan
TCS-05	19.06.A2	Traffic Signal Improvements Plan College Street at South Frontage Road
TCS-06	19.07	Concrete Handholes & Appurtenances
TCS-07	19.08	Pullbox and Vault Details
TCS-08	19.09	Traffic Controller Foundation – Controller Type IV (Modified)
TCS-09	19.10	Traffic Controller Cabinet City of New Haven
TCS-10	19.11	Traffic Controller Cabinet City of New Haven
TCS-11	19.12	Mast Arm Assembly Foundation
TCS-12	19.13	Mast Arm Assembly Elevations
TCS-13	19.14	Mast Arm Assembly Details
MPT-00	21.00.A2	Maintenance and Protection of Traffic Subset Cover Sheet
MPT-01	21.01.A6	MPT - Bypass
XSC-00	23.01	Cross Section Plans Subset Cover Sheet
CXS-01	23.02	Critical Cross Section S. Frontage Rd 114+00 – 115+50
CXS-02	23.03	Critical Cross Sections MLK Blvd 213+31 – 213+77
CXS-03	23.04.A2	Critical Cross Sections MLK Blvd 217+00 – 218+00
CXS-04	23.05.A2	Critical Cross Sections Congress Ave & Temple Street 305+00 – 306+50
CXS-05	23.06	Critical Cross Sections Temple Street 307+50 – 310+00
CXS-06	23.07	Critical Cross Sections North Service Drive 310+50 – 312+00

Drawing	Sheet No.	Drawing Title
CXS—7	23.08	Critical Cross Sections Service Drives 901+36 (SHEET DELETED)
STR-00	24.01	Structural Plans Subset Cover Sheet
STR-01	24.02.A6	Temple St Bridge, Schematics, Elevations & Typical Section

RFP CNHBOP Standard IT Instruction (A11)
























Exhibit G – Master Project Schedule (DLD	А Сору) – 5	5.12.2020
	Submission	Substantial
Developer's Actions	/Commence Construction	Completion
Closing Date		6-Aug-2020
Tunnels and Driveways Milestone/Critical Target Dates		
Design of Tunnel Systems		
Concept 10% and Schematic Design 30% submissions		5-Feb-2020
Design Development 60%		30-Mar-2020
Final Design - 90% complete		15-Jul-2020
Contract documents		15-Sep-2020
Construction of Tunnel Systems		
Air Rights Garage Construction Traffic Improvements	17-Aug-2020	4-Sept-2020
Temporary code condition for service drives in the south tunnel location; service drives open to traffic		23-April-2021
Eastern Garage wall complete		8-June-2021
North service drive opens to construction traffic & public during peak hours		15-Aug-2021
North service drive opens to public traffic		15-Aug-2022
Temple Street extension streetscape complete		11-Nov-2022
Substantial completion		11-Nov-2022
Streetscape and Onsite Public Improvements	1-Oct-2021	1-Nov-2022
Developer's Private Improvements Milestone/Critical Target Dates		
Permits	TBD	TBD
Development Commission		13-May-2020
City Plan Site Plan Approval and Development Commission Approval	6-Jun-2020	15-Jul-2020
Office of State Traffic Administration Administrative Decision		1-Jun-2020
Building Permits		10-Aug-2021
Construction		14-Aug-2022
Site work Dreparation	17 Aug 2020	15 Dec 2020
Complete SEP Foundation spread footing/wall & return to existing grade	17-Aug-2020	10-Dec-2020
Complete MLK Foundation spread footing/wall & return to existing grade		14-041-2021
Construction of Building	3-Aug-2020	15-Mar-2021
Construction of pedestrian connection (optional)	TBD	TBD
City of New Haven's Actions	Submission/ Commence	Substantial Completion
	Construction	
City's Minimum Traffic Improvements complete per Exhibit R		10-Jul-2020
Final Acceptance of Tunnels and Drives by City Engineer		14-Aug-2022
Commissioning Tunnels and Drives	1-Aug-2021	14-Aug-2022
Route 34 DTX Phase 2 Milestone/Critical Target Dates	45 1 1 00 10	
Mobilization	15-Jul-2019	7-Aug-2019
Construct MLK to Parcel B slip ramp east of Temple Street extension (Pre-	14-Jul-2020	10-Aug-2020
DTV Phase 2 MPT (Stage 1 work)	1_Aug_2020	1-Oct-2020
Stage 2A work	1-Aug-2020	18-May-2021
Stage 2B work	19-May-2021	9. Jul-2021
Substantial completion	12- Jul-2021	12_ Jul_2021
Route 34 DTX Phase 3 (DB) Milestone/Critical Target Dates	12 001 2021	
Procurement and design		
Design-Builder concepts due and review starts (Review by selection panel		21-Apr-2020
and stakeholders including the Development team)	2 1010 2020	2 1.1 2020
Estimated Contract Award	3-JUIY-2020	3-JUIY-2020
Design Paried	14-Aug-2020	14-Aug-2020
Design Period	14-Aug-2020	20-Apr-2021
		שטו

Construction Period		
South Frontage Road (SFR) Bypass (early start construction work)	1-Sept-2020	20-Nov-2020
Completion of Work Zone #1 per DLDA (Target date to complete will be added upon Phase 3 DB contractor selection)	????	????
South Drives opens to construction traffic & public during peak hours		23-Apr-2021
South Drives in their final location and open to traffic*		11-Nov-2022
Completion of Work Zone #2 per DLDA (Target date to complete will be added upon Phase 3 DB contractor selection)	????	????
Reconstruct/Lift MLK to finished grade		11-Nov-2022
Reconstruct/Lift MLK/Temple St. intersection*		11-Nov-2022
Complete construction & Signalization @ new MLK/Temple intersection*		11-Nov-2022

Bold * = Tasks tied to LDs

Exhibit H

Critical Milestones associated with Liquidated Damages

City of New Haven's Critical Milestones

- No later than November 11, 2022: Complete the raising and reconstruction of South Frontage Road into its final condition as per the Downtown Crossing, Phase 3, Base Bid as described in the Base Technical Concept documents herein under Exhibit F
- 2) No later than November 11, 2022: Complete construction of a new Temple Street & MLK Blvd intersection as per the Downtown Crossing, Phase 3 Base Bid as described in the Base Technical Concept documents herein under Exhibit F
- 3) No later than November 11, 2022: Complete installation of signalization, pedestrian controls & structures to accommodate pedestrian crossing at the new Temple/MLK Blvd. intersection

Exhibit I - Email from SCRWA re: existing 30" encased 16" supply line at College St. bridge. (Page 1 of 3)

From: Robert Ellis <rellis@edcnewhaven.com>

Sent: Thursday, February 6, 2020 11:17 AM

To: Kone, Carolyn W.; Ted DeSantos (tdesantos@fando.com)

Cc: cwinstanley@winent.com; John Ward; Mike Piscitelli

Subject: FW: 101 College St. Development - Follow-up on 30" Concrete encased 16' Cast Iron east of College St.

Carolyn/Ted...

See below for RWA response re: subject water line. This can be used as a DLDA Exhibit.

R. Ellis

Sent from Mail for Windows 10

From: Kone, Carolyn W. <ckone@bswlaw.com> Sent: Friday, December 13, 2019 12:01:01 PM To: Robert Ellis <rellis@edcnewhaven.com> Cc: cwinstanley@winent.com <cwinstanley@winent.com>; Ted DeSantos (tdesantos@fando.com) <tdesantos@fando.com>; Mike Piscitelli <mpiscite@newhavenct.gov>; Aicha Woods <AWoods@newhavenct.gov>; John Ward <JWard@newhavenct.gov> Subject: RE: 101 College St. Development - Follow-up on 30" Concrete encased 16' Cast Iron east of College St.

I will make that change. Carolyn

From: Robert Ellis [mailto:rellis@edcnewhaven.com] Sent: Friday, December 13, 2019 11:57 AM To: Kone, Carolyn W. Cc: cwinstanley@winent.com; Ted DeSantos (tdesantos@fando.com); Mike Piscitelli; Aicha Woods; John Ward Subject: RE: 101 College St. Development - Follow-up on 30" Concrete encased 16' Cast Iron east of College St.

The line is already capped per RWA. Any need to demolish a/o further cut back this line should be done by the development team.

R. Ellis

Sent from Mail for Windows 10

From: Kone, Carolyn W.
Sent: Friday, December 13, 2019 11:38 AM
To: Robert Ellis
Cc: cwinstanley@winent.com; Ted DeSantos (tdesantos@fando.com)
Subject: RE: 101 College St. Development - Follow-up on 30" Concrete encased 16' Cast Iron east of College St.

Thank you. The Development Agreement states that the City will cap the Water Main. Is that no longer necessary? Carolyn

Exhibit I - Email from SCRWA re: existing 30" encased 16" supply line at College St. bridge. (Page 2 of 3) From: Robert Ellis [mailto:rellis@edcnewhaven.com] Sent: Friday, December 13, 2019 11:28 AM To: Kone, Carolyn W.

Subject: FW: 101 College St. Development - Follow-up on 30" Concrete encased 16' Cast Iron east of College St.

Here it is....It was sent to the technical team members.

R. Ellis

Sent from Mail for Windows 10

From: Robert Ellis Sent: Friday, December 13, 2019 11:00 AM To: Jeffrey Thereault; Jacob Argiro; Ted DeSantos (tdesantos@fando.com) Cc: Aicha Woods; Mike Piscitelli; Donna Hall Subject: FW: 101 College St. Development - Follow-up on 30" Concrete encased 16' Cast Iron east of College St.

RWA drawing of abandoned 16" on east side of College St.

R. Ellis

Sent from Mail for Windows 10

From: Larry Marcik Sent: Friday, December 13, 2019 9:28 AM To: Robert Ellis Cc: Rose Gavrilovic; Ted Szczech Subject: RE: 101 College St. Development - Follow-up on 30" Concrete encased 16' Cast Iron east of College St.

Robert,

As requested, we have reviewed our records and we have the following comments:

* We have an abandon transmission watermain just southeast of College Street (see attached). It is shown on our GIS diagram as a dashed red line highlighted in yellow marker.

* We capped the ends of this abandon watermain on both ends. We do have ties to the caps if needed.

* It's our understanding that the portion of our abandon watermain that is under the Route 34 Connector (now parking garage travel ways) is encased in a 30" diameter concrete pipe sleeve. Not sure of its total length but it goes from just beyond the edge of old Rt. 34 roadway (East Bound) to just beyond the edge of old Rt. 34 roadway (West Bound).

* Not sure if the College Street Bridge contractor removed any of this abandon watermain during his work program.

If you have any questions with the above, please contact me.

Larry

Lawrence J. Marcik, Jr., P.E. Capital Program Lead South Central Connecticut Regional Water Authority Exhibit I - Email from SCRWA re: existing 30" encased 16" supply line at College St. bridge.

(Page 3 of 3)

90 Sargent Drive | New Haven, CT 06511 Phone: 203-401-6709 | Fax: 203-603-4917 Email: lmarcik@rwater.com | Website: http://www.rwater.com

Our STARS Values Service | Teamwork | Accountability | Respect | Safety

Please consider the environment before printing this email

Exhibit I - South Central Regional Water Authority drawing showing existing 30" encased 16" supply line at College St. bridge.

































1/10/2020

101 College Street PUBLIC IMPROVEMENTS

Plaza	
Sitework	\$2,076,817
Concrete	\$67,448
Masonry	\$258,381
Metals	\$308,414
Wood & Plastics	\$233,367
Thermal & Moisture	\$302,526
Plumbing	\$64,827
Electrical	\$345,689
Total Trade Costs	\$3,657,468
Subguard Insurance	\$40,232
Precon Services	\$10,000
GC's - Staff	\$300,000
General Requirements	\$80,000
Construction Contingency	\$91,437
Subtotal	\$4,179,136
Building Permit	\$126,461
CCIP	\$127,015
Sub Credit for CCIP	(\$88,652)
Builder's Risk	\$3,970
Fee	\$73,135
Subtotal	\$4,421,065
P&P Bond	\$27,397
Plaza Total	\$4,448,462

City Streetscape	
Sitework	\$749,156
Concrete	\$45,382
Metals	\$93,000
Wood & Plastics	\$122,703
Electrical	\$230,107
Total Trade Costs	\$1,240,348
Subguard Insurance	\$13,644
Precon Services	\$10,000
GC's - Staff	\$300,000
General Requirements	\$80,000
Construction Contingency	\$31,009
Subtotal	\$1,675,001
Building Permit	\$50 <i>,</i> 686
CCIP	\$50 <i>,</i> 908
Sub Credit for CCIP	(\$35,532)
Builder's Risk	\$1,591
Fee	\$29,313
Subtotal	\$1,771,967
P&P Bond	\$10,981
City Streetscape Total	\$1,782,948

Tunnels / Drives	
Trade Support Costs	\$380,342
Sitework	\$4,035,960
Concrete	\$1,491,651
Masonry	\$69,072
Metals	\$42,000
Wood & Plastics	\$122,703
Thermal & Moisture	\$205,521
Doors, Frames & Hardware	\$12,786
Finishes	\$71,516
Specialties	\$90,000
Sprinkler	\$324,135
HVAC	\$1,050,000
Electrical	\$1,029,306
Total Trade Costs	\$8,924,992
Subguard Insurance	\$98,175
Precon Services	\$10,000
GC's - Staff	\$300,000
General Requirements	\$80,000
Construction Contingency	\$223,125
Subtotal	\$9,636,291
Building Permit	\$291,594
CCIP	\$292,873
Sub Credit for CCIP	(\$204,415)
Builder's Risk	\$9,154
Fee	\$168,635
Subtotal	\$10,194,132
P&P Bond	\$63,173
Tunnels / Drives Total	\$10,257,305

EXECUTIVE SUMMARY

Grand Total	\$16,488,715
Tunnels / Drives Total	\$10,257,305
City Streetscape Total	\$1,782,948
Plaza Total	\$4,448,462



	Semantian and a second se	300 George Street New Haven, CT 06511
		203 624 5317
	- Con	.a
<u> </u>		STRUCTURAL ENGINEERS
GRANITE STONE SLAB RETAINING	a An	Structural Engineer 101 Federal Street, suite 1100 Boston, MA 02110
GRANITE STEPS WITH STAINLESS		617 737 0040
SIEEL HANUKAILS		
		AHA
MOVEABLE TABLES AND CHAIRS (TYP)	G.	ENGINEERS MEP Engineer
OUTDOOR MOVEABLE LOUNGE FURNITURE (TYP)		18 Tremont St, Suite 1040 Boston, MA 02108 781 402 6000
		V FUSSKU NI
		Civil Engineer / Landscape 146 Hartford Road
SUPPORT POLE (14" HT. TYP)		Manchester, CT 06040 860 646 2469
520		wante o
GRANITE STONE		
CLADDING RETAINING WALL WITH 42" HT. /GLASS RAILING		Code Consultant
\mathbf{b}		1661 Worcester Road, Suite 501 Framingham, MA 01701
		508-273-8484
NQUET TABLE D CHAIRS (TYP)		
edestrian Level	and the second second	
TP.)		
LE TABLE AIRS (TVP)		
BENCHES DER MOUNT (TYP)		
SS (TMP)		
ITING		PROJECT NUMBER:
E (TPP.)-	Development and an an article	DATE: DEC
- Bioretention Area - 1.311 SF	THE STREET ST	SCHEMATIC DESIGN
- Concrete Base Below Granite Pavers - 1,395 S	SF	REVISIONS:
- Soil Cells Conc Can - 14 282 SE	AE DAA	
	(deletar - I kalendelet)	
- Granite Pavers - 6,369 SF	(c) A to be a set of the set o	
- Conc Base Below Wood Decking - 3,139 SF	ang ng ng Pantan Santa Sant	
- Bioretention Curb, 6"x36" - 849 LF		
- Street Trees - 20 EA	DECKING	SCALE:
0 - Plaza Area - 20,547 SF		
4 - Groundcover - 632 SF		Site avout Plan
5 - Wood Decking - 5,365 SF		Ground Floor Level
6 - Concrete City Walks - 17,177 SF	T WOOD	
7 - Wood Block Pavers - 15 EA	TREE	
8 - Concrete Drive Apron - 365 SF		
EE PITS TO BE	LANTERS WITH & PERENNIALS	DRAWING NUMBER:
		CS-10







ARCHITECTS

19050

DECEMBER 6, 2019

1/16" = 1'-0"

EXHIBIT L

SCHEDULE OF TERMS OF DISBURSEMENTS OF PUBLIC FINANCING

SECTION 1 DEFINITIONS

As used in this Exhibit L (unless otherwise specified therein), the following terms shall have the following meanings. All other capitalized terms not otherwise defined herein shall have the meaning ascribed to them in the Agreement.

1.1 "Developer's Engineer" means the professional engineering company engaged by the Developer with respect to the Developer's Site and Traffic Improvements.

1.2 "**Direct Construction Costs**" means direct construction costs incurred by the Developer as set forth in the Developer's Site and Traffic Improvements Budget in connection with the construction of the 101 Tunnels and Driveways, the relocation of the Drainage Pipe (if required), the construction of the Streetscape Improvements, the construction of the Developer's On-Site Public Improvements, and the traffic maintenance and protections improvements to be undertaken by the Developer described in Section 5.4(B) of the Agreement (collectively the Developer's Site and Traffic Improvements).

1.3 "General Contractor" means any general contractor or construction manager engaged by the Developer for the Developer's Site and Traffic Improvements providing construction management and supervisory services.

1.4 "**Other Developer's Site and Traffic Improvements Costs**" means costs (other than Direct Construction Costs) incurred by Developer in connection with the construction of the Developer's Site and Traffic Improvements., including, but not limited to, soft costs and fees payable to professionals and consultants, as itemized in the Developer's Site and Traffic Improvements Budget.

1.5 "**Plans and Specifications**" means the plans and specifications, including, without limitation, all maps, sketches, diagrams, surveys, drawings and lists of materials, for the construction of the Developer's Site and Traffic Improvements, prepared by the Developer's Engineer and/or the architect engaged by the Developer and approved by the City and/or any other applicable Reviewing Authority , and any and all modifications thereof approved by the City and/or an any other applicable Reviewing Authority.

"Developer's Site and Traffic Improvements Budget" means the budget of Direct 1.6 Construction Costs and Other Developer's Site and Traffic Improvements Costs for the Developer's Site and Traffic Improvements setting forth line items and costs to be funded by Public Financing and the Developer and the reimbursement guidelines and/or regulations of the applicable Reviewing Authority, if any to be developed and agreed upon by the City and the Developer. Line item amounts may be reallocated by Developer from time to time if allowed by applicable guidelines above, but the total amount of the City's disbursements of Public Financing to or on behalf of the Developer as set forth in the Developer's Site and Traffic Improvements Budget shall not exceed \$10 million based upon drawings for the 101 College Tunnels and Driveways dated 12/6/19 (Exhibit D) and a budget for the same dated 1/10/20(Exhibit K) plus the Contingency of \$2 million funded by Public Financing which may be disbursed to the Developer for the costs of the Developer's Site and Traffic Improvements under the circumstances set forth in Section 4.1(E)(2) of the Agreement, and, if the City requires changes to the Developer's Site and Traffic Improvements which result in costs in excess of the foregoing amounts, the City shall disburse the costs of such additional changes to the Developer as provided in Section 4.1(E)(2) of the Agreement. The City and the Developer agree that extensive coordination has occurred following the schematic design drawings dated December 6, 2019 (Exhibit D) and the budget dated January 10, 2020 (Exhibit K). The Developer has continued to advance the design, and has made subsequent submissions of the 10%/30%, and 60% plan sets to the City (the 60% plan set is behind Exhibit J). The City has reviewed and responded with comments to the 10%/30% plan set submission. The Working Group has met bi-weekly during this period and has addressed many issues of coordination on the Developer's design, as well as the City's procurement documents for the solicitation of the City's Design-Build Contractor. The

City has worked with the City's Program Manager for Downtown Crossing, HNTB, to produce a draft update to the Air Rights Improvements Guidelines (Exhibit V). The Developer has since submitted a 60% plan set to the City (Exhibit J). The 60% plan set is currently under review by the City and its Program Manager, and the January 10, 2020 budget has not been revised at this time. The Working Group has begun discussing the design implications in view of Exhibit V, and the Developer continues to review the budget (Exhibit K) relative to the 60% plan set (Exhibit J). All of these updates and interactions have been completed in the spirit of collaboration to advance the mutually shared objective of completing the Development, and the City's Traffic Improvements to enable the Project in a coordinated fashion..

1.7 "**Retainage**" means the amount actually held back by Developer from the General Contractor and each subcontractor and supplier engaged in the construction of the Developer's Site and Traffic Improvements, but in no event less than five percent (5%) of the contract sum as it is advanced as work progresses, and in accordance with applicable law.

1.8 **"Reviewing Authority"** means that for the particular work being contemplated, the City and/or any Agency whose review and input is necessary for some aspect of the work or the funding of the work as per applicable statute, regulation, ordinance, guideline, or agreement.

1.9 "Verified Developer's Site and Traffic Improvements Costs" means the aggregate, from time to time, of costs actually incurred by the Developer for work in place as part of the Developer's Site and Traffic Improvements, as set forth in the Developer's Engineer's certificate for payment from time to time pursuant to the provisions of this Schedule, minus a sum equal to the Retainage.

1.10 "**Approval**" or "**Approve**" means a person's consent, such consent not to be unreasonably withheld, conditioned or delayed and to be deemed granted if a request for an approval is made in writing and such request is not disapproved in writing within ten (10) business days after receipt of such request, notwithstanding any provision regarding the Review Period in the Agreement with such disapproval setting forth in reasonable detail the reasons for such disapproval

3

SECTION 2 DISBURSEMENTS OF PUBLIC FINANCING

2.1 **Disbursements**. The City shall make disbursements of Public Financing for the construction of the Developer's Site and Traffic Improvements ("Disbursements") to the Developer for Direct Construction Costs and Other Developer's Site and Traffic Improvements Costs up to a maximum of \$10 million, which sum is based upon drawings of the 101 Tunnels and Driveways dated 12/6/19 and a budget for the same dated 1/10/20. In addition, the City shall make disbursements from the Contingency to the Developer for the costs of the Developer's Site and Traffic Improvements in excess of \$10 million resulting from any of the circumstances set forth in Section 4.1(E)(2), and the City shall make additional disbursements from public financing to the Developer for the costs of changes to the Developer's Site and Traffic Improvements resulting from requests from the City which cost in excess of \$12 million (the "Additional Disbursements"). The Disbursements and the Additional Disbursements shall be subject to retainage from each advance of an amount equal to the Retainage. Upon the earlier of the completion of the relocation of the Drainage Pipe (if required) or the satisfaction of the conditions set forth in Section 2.3 herein, the Retainage for the Drainage Pipe relocation work shall be disbursed to the Developer. Similarly, upon the earlier of the acceptance the 101 Tunnels and Driveways by the City Engineer in accordance with Article IV of the Agreement or the satisfaction of the conditions set forth in Section 2.3, the Retainage for the construction of the 101 Tunnels and Driveways shall be disbursed to the Developer. Likewise, upon the earlier of the completion of the Streetscape Improvements and the Developer's On-Site Public Improvements or the satisfaction of the conditions set forth in Section 2.3, the Retainage for such work shall be disbursed to the Developer. Likewise, upon the earlier of the completion of the traffic maintenance and protections improvements to be undertaken by the Developer described in Section 5.4(B) of the Agreement or the satisfaction of the conditions set forth in Section 2.3, the Retainage for such work shall be disbursed to the Developer. The disbursement of the Retainage shall be in accordance with the regulations (if any) of any Reviewing Authority. Notwithstanding the foregoing, the Retainage for any of the foregoing work shall not be distributed to the Developer, if such disbursement is in conflict with the requirements of any Reviewing Authority.

2.2 <u>Conditions Precedent to Disbursements</u>. Upon satisfaction of the following conditions, which shall be conditions precedent to making Disbursements and Additional Disbursements, the City shall make Disbursements and Additional Disbursements as follows:

2.2.1 The Developer or the General Contractor, acting on behalf of the Developer, shall have submitted to the Developer's Engineer for certification, an itemized and verified application for payment for Direct Construction Costs and Other Developer's Site and Traffic Improvements Costs which have been incurred as of such date in accordance with the Developer's Site and Traffic Improvements Budget (the "Request") and in compliance with the reimbursement guidelines and/or regulations of any applicable Reviewing Authority. The Request shall be submitted using AIA Document G-702, Application and Certification for Payment, or other form approved by the City. Each Request must specify the cost of the labor that has been performed and the materials that have been incorporated into the Developer's Site and Traffic Improvements since the date of the previous Request, if any. The Request must be certified to be true and correct by the General Contractor and must be accompanied by the General Contractor's application for payment, all applicable invoices that the Developer's Engineer may request to substantiate the application for payment, including executed releases and/or lien waivers or partial releases and waivers, as the case may be, from the General Contractor, subcontractors, equipment suppliers and material suppliers for work performed or equipment or material supplied to the job as of the date of the application for payment, and any and all other documentation required by the guidelines or regulations of the applicable The Developer further agrees to provide such additional Reviewing Authority. documentation/back-up as is reasonably requested by the City to substantiate the Request.

2.2.2 The Developer's Engineer will, within seven (7) days after receipt of the Request, either issue to the City a certificate for payment, with a copy to the Developer and the General Contractor, for such amount as the Developer's Engineer determines is properly due, or notify the General Contractor and the Developer in writing of the Developer's Engineer's reasons for withholding certification in whole or in part as provided below;

2.2.3 Prior to submitting the Request, the Developer shall have delivered to the Developer's Engineer, the City and any other Reviewing Authority, if required for the review and approval of the City and any other Reviewing Authority, if required, any proposed material modifications to the Developer's Site and Traffic Improvements Budget, including any changes

5

due to the circumstances set forth in Section 4.1(E)(2) of the Agreement, and/or any proposed material modifications to the Plans and Specifications for the Developer's Site and Traffic Improvements, which have not been approved by a Reviewing Authority, and any changes orders, and in the case of the initial application for payment, copies of any permits required by law as a condition to commencing such construction work;

2.2.4 The issuance of a certificate for payment will constitute a representation by the Developer's Engineer to the City and the Developer based on the Developer's Engineer's periodic observations at the site, the Developer's Engineer's attendance at weekly construction meetings convened by the Developer and the data comprising the Request, that the work on the Developer's Site and Traffic Improvements has progressed to the point indicated and is in substantial accordance with the Plans and Specifications. Such representations are subject to an evaluation of the work for conformance with the Plans and Specifications by the City and any other Reviewing Authority at any time, and also upon substantial completion of the work. Such representations are also subject to (i) the results of subsequent tests and inspections, (ii) identified variations from the Plans and Specifications which are minor and correctable prior to the completion and (iii) specific qualifications expressed by the Developer's Engineer. The issuance of a certificate for payment will further constitute a representation that the Developer or General Contractor is entitled to payment of the amount certified provided that it will not be a representation that the Developer's Engineer has made an exhaustive or continuous on-site inspection of the site to check the quality or quantity of the work, has reviewed construction methods, procedures or reviewed copies of requisitions received from subcontractors and material suppliers to substantiate the Developer or the General Contractor's right to payment or made examination to ascertain how or to what purpose the General Contractor or the Developer has used the money previously paid for the Developer's Site and Traffic Improvements.;

2.2.5 The Developer's Engineer may withhold a certificate for payment in whole or in part to the extent reasonably necessary, if in the Developer's Engineer's opinion, the representation to the City required by Section 2.2.4 above cannot be made. If the Developer's Engineer is unable to certify payment in the amount of the Request, the Developer's Engineer will notify the Developer, the General Contractor and the City of the same within seven (7) days of receipt of the Request. If the Developer and the Developer's Engineer cannot agree on a revised amount, the Developer's Engineer will promptly issue a certificate for payment for the amount for which the Developer's Engineer is able to make such representation to the City.

2.3 <u>Conditions Precedent to Final Advance</u>. The City's obligations hereunder to make the final advance of proceeds of the Public Financing, including, but not limited to, the Contingency (if applicable) and the Retainage, are conditioned upon the satisfaction of each of the following conditions:

2.3.1 The Developer shall cause to be furnished to the City such permits, lien waivers and releases and/or certificates (including a certificate of substantial completion from the Developer's Engineer as described below), consents of surety, as-built record documents (both digitally and in hard copy), job records (inspections, testings, etc.), signed change orders, contractor warranties and guarantees for work performed and materials supplied as required under Section 4.1(A)(8) of the Agreement, and other documents as shall be reasonably required to establish to the City's reasonable satisfaction that the Developer's Site and Traffic Improvements have been properly completed;

2.3.2 The Developer's Site and Traffic Improvements shall have been substantially completed in all material respects in accordance with any applicable Plans and Specifications, as verified by a certification to the City and the Developer from the Developer's Engineer that subject to the matters described in Section 2.2.4, it is the Developer's Engineer's belief that the Developer's Site and Traffic Improvements have been constructed in substantial accordance with the Plans and Specifications;

2.3.3 The 101 Tunnels and Driveways shall have been accepted by the City Engineer in accordance with the provisions of Article VI of the Agreement and a Certificate of Completion shall have been issued for the Developer's Private Improvements, Developer's On-Site Improvements and the Streetscape Improvements.

2.4 **Procedures**. All Disbursements and Additional Disbursements made hereunder shall be disbursed from time to time by the City as the work progresses upon receipt by the City from the Developer's Engineer of the Developer's Engineer's certificate of payment. The Developer or the General Contractor will make the Request, and the Developer's Engineer shall prepare and deliver to the City certificates for payment no more frequently than monthly, covering work performed since the prior application for payment. The City shall pay the amount set forth in the certificate for payment within ten (10) business days after its receipt of same or

within such time, it shall notify the Developer and the Developer's Engineer of its reasons for disapproving such advance setting forth such reasons in detail.

2.5 **<u>Funding</u>**. Disbursements shall be made by City check or wire transfer to the order of Developer.

2.6 <u>Conflicts.</u> Notwithstanding the paragraphs of this Exhibit N, the City and the Developer agree that this Schedule and Terms of Disbursements of Public Financing may conflict with and is subject to specific requirements of Reviewing Authorities other than the City and that the terms of this Exhibit N and the Agreement, where in conflict with those requirements, will be superseded by those requirements, which shall control the application for payment and disbursement process. Further, in the event of a conflict between this Exhibit N and the Agreement, the terms of this Exhibit N shall govern.



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Exhibit N

100 College Street Bridge DRAFT

| ELKUS MANFREDI ARCHITECTS



New Haven, Connecticut

WINSTANLEY ENTERPRISES, LLC Commercial Development & Asset Management

ELKUS MANFREDI Architects

40 20

CONCEPT PLANS SCHEME 2


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Exhibit Q - Attachment

Proposed Property Boundary Description

Beginning at a point on the north side of South Frontage Road at the intersection with the Proposed Temple Street Extension;

thence running N 53°44'36" W a distance of 363.59 feet along the north side of South Frontage Road to a point at the intersection with College Street;

thence running on a curve to the right having a delta angle of 83°07'00" a radius of 15.00 feet and an arc length of 21.76 feet to a point;

thence running N 29°21'26" E a distance of 153.50 feet along the east side of College Street to a point at the intersection with Rev. Dr. Martin Luther King Jr. Boulevard;

thence running on a curve to the right having a delta angle of 92°04'55" a radius of 15.00 feet and an arc length of 24.11 feet to a point;

thence running S 54°21'46" E a distance of 416.94 feet along the south side of Rev. Dr. Martin Luther King Jr. Boulevard to a point at the intersection with the Proposed Temple Street Extension;

thence running on a curve to the right having a delta angle of 98°28'34" a radius of 10.00 feet and an arc length of 17.19 feet to a point;

thence running on a curve to the right having a delta angle of 12°43'40" a radius of 808.78 feet and an arc length of 179.66 feet to a point along the west side of the Proposed Temple Street Extension;

thence running on a curve to the right having a delta angle of 69°29'38" a radius of 1.00 feet and an arc length of 1.21 feet to the point and place of beginning;

Proposed Property Area = 76,085 S.F. (1.75 Acres)

EXHIBIT Q

Quit Claim Deed

KNOW ALL PEOPLE BY THESE PRESENTS, THAT:

The **CITY OF NEW HAVEN**, a Connecticut municipality (the "City") for Five-Hundred Dollars (\$500.00) and other valuable consideration received to its full satisfaction from **WE 101 COLLEGE STREET LLC**, a Delaware limited liability company having a place of business at 150 Baker Avenue Extension, Suite 303, Concord, Massachusetts 01742 (the "Releasee") does remise, release and forever QUIT CLAIM unto the said Releasee and its successors and assigns forever, all of the right, title, interest, claim and demand which the City (the "Releasor") has or ought to have in and to all that certain piece or parcel of land, together with all buildings thereon, situated in the Town of New Haven, County of New Haven and State of Connecticut to be known as **101 College Street**, being more particularly bounded and described on **Exhibit A** attached hereto and made a part hereof (the "Premises").

TO HAVE AND TO HOLD the above remised, released and QUIT CLAIMED Premises with the appurtenances thereof, unto the said Releasee, and Releasee's successors and assigns forever, to them and their proper use and behoof, so that neither the Releasor nor Releasor's successors or assigns, nor any other person claiming in its or their name or behalf, shall hereafter have any claim, right or title in or to the Premises or any part thereof, but therefrom the Releasor and they are by these presents forever barred and excluded.

The Premises are conveyed subject to the terms and conditions of that certain Development and Land Disposition Agreement among the City, the New Haven Parking Authority and WE 101 College Street LLC dated as of _____ being recorded together herewith on the New Haven Land Records (the "Development and Land Disposition Agreement"). Without limiting the preceding sentence, the agreements and covenants contained in Article III, Article IV, Article V, Article VI, Article VIII, Article IX, Article X, Article XI, Article XII, Article XIII and Article XIV of the Development and Land Disposition Agreement shall be covenants running with the Premises for the term of the Development and Land Disposition Agreement (or earlier if in accordance with the express provisions of the Development and Land Disposition Agreement as set forth therein) and are enforceable by the City against Releasee and any successor in interest to the Premises, in each case without regard to whether the City has at any time been, remains, or is an owner of any land or interest therein to or in favor of which such agreements and covenants relate, and are enforceable by the Releasee and its successors and assigns against the City as applicable. The covenants contained in Section 12.4 shall run with the Premises without limitation as to time and be enforceable by the City against Releasee and its successors and assigns as above provided. In accordance with the provisions of Section 1(a) of Special Act 15-1 of the June Special Session of the General Assembly of the State of Connecticut, the Premises are being conveyed to the Releasee for economic development purposes as set forth more particularly in the Development and Land Disposition Agreement.

The Premises are further conveyed together with any right, title and interest the City has or may have in any pipes, conduits and underground drainage facilities running on, through, over or under the Premises, including without limitation, the pipes and conduits shown on a map entitled "SUVEY OF COLLEGE STREET PARCEL 101 COLLEGE STREET NEW HAVEN CONNECTICUT SCALE 1"=40' 2020. FUSS & O'NEILL to be recorded in the New Haven Land Records subject, however, to a reservation by the City of all rights, interest and title to a 48" drainage pipe as shown on said map and a nonexclusive easement for the maintenance, repair and replacement of said pipe and to such other easements, licenses, rights and agreements as are more particularly set forth in Exhibit U to the Development and Land Disposition Agreement, all of which shall be set forth with specificity in the final Quit Claim Deed [or in a separate easement instrument to be recorded contemporaneously therewith], which shall include, without limitation, the metes and bounds and legal descriptions thereof.

Said premises are conveyed together with the easements, licenses and agreements from the Releasor to Releaseee, all as more particularly set forth on Exhibit T to the Development and Land Disposition Agreement all of which shall be set forth with specificity in the final Quit Claim Deed [or in a separate easement instrument to be recorded contemporaneously therewith], which shall include, without limitation, the metes and bounds and legal descriptions thereof

IN WITNESS WHEREOF, the Releasor has hereunto set its hands and seal this ____ day of _____, 2020.

Signed, sealed and delivered in the presence of:

CITY OF NEW HAVEN

Print Name

By:

Justin Elicker Its Mayor Duly Authorized

Print Name:

Approved as to form and correctness:

John R. Ward Special Economic Development Counsel

Seal Impressed and Attested:

City/Town Clerk

STATE OF CONNECTICUT)) ss. New Haven ______, 2020 COUNTY OF NEW HAVEN)

Personally appeared, Justin Elicker as Mayor of the City of New Haven, the signer and sealer of the foregoing instrument, and acknowledged the same to be the free act and deed of the City of New Haven, and of himself as Mayor thereof, before me.

Notary Public My Commission Expires:_____



EXHIBIT T

LICENSES, EASEMENTS AND AGREEMENTS FROM THE CITY TO THE DEVELOPER AND TO THE OWNERS OF 100 COLLEGE STREET AND 300 GEORGE STREET

As used in this <u>Exhibit T</u>, all capitalized terms not otherwise defined herein shall have the meanings ascribed to them in the Agreement.

The following is a description of the licenses, easements and agreements to be granted by the City to the Developer and to the owners of the 100 College Street and 300 George Street, as applicable, in connection with the Project:

1. Construction Related Easement from the City. A construction related license/easement in favor of the Developer over, under and across South Frontage Road, MLK Blvd, College Street, Temple Street, including the Temple Street Extension, if built, and Parcel B for the purposes of (i) constructing the Project, including inter alia the Developer's Site and Traffic Improvements, the Developer's Private Improvements, and the Pedestrian Connections and (ii) constructing portions of the City's Traffic Improvements undertaken by the Developer under Sections 3.2(E) of the Agreement, including constructing, installing, repairing, locating, and maintaining earth retention systems, installing, locating and maintaining utility lines to connect water, sewer, stormwater, and other utilities to the Development, temporarily closing certain lanes of MLK Blvd., South Frontage Road, College Street, Service Drives, Temple Street, the Service Drives, for installing, repairing and maintaining footings, foundations, support, signage, roadway, curbs, sidewalks, walls, stairs, landscaping, grading, the Pedestrian Connections, providing temporary access and egress over, under and across Parcel B on the

Service Drives (as they may be relocated during the construction of the Project), for travel by Developer's construction manager/general contractor, subcontractors and suppliers and for the public to and from Route 34 to the 101 College Street Parcel, permitting staging of construction equipment and materials and for other similar purposes as may be necessary or appropriate for the Project.

2. <u>Construction Related Easement from the City over the Air Rights Garage</u> <u>Property</u>

A construction related license or easement in favor of the Developer from the City over, under and across a portion of land known as 60 York Street, New Haven, Connecticut upon which a parking facility known as the Air Rights Garage is located for the purpose of constructing a temporary driveway and a stop sign from the Air Rights Garage to the tunnels and driveways located on the 100 College Street Property, as depicted on <u>Exhibit M</u>. Such license and easement shall provide that the Parking Authority shall have the opportunity to review and approve the design of the temporary driveway and that the Developer will obtain a payment bond from its contractors with respect to the construction of such temporary driveway naming the City and the Parking Authority as additional obligees. The Parking Authority shall provide that the Developer shall restore the area on the 60 York Street property that it has disturbed to its condition prior to undertaking the foregoing improvements, if requested to do so by the Parking Authority.

3. <u>Construction Related Easement from the City to Connect the Temple Medical</u> <u>Pedestrian Connection to the Temple Medical Garage</u> A construction related license or easement in favor of the Developer from the City, and any other third party as required, to permit the Developer to connect the Temple Medical Pedestrian Connection to the Temple Medical Garage structure. The Parking Authority shall consent to the granting of such easement or license. Such license and easement shall provide that the Parking Authority shall have the opportunity to review and approve the structural design of the Temple Medical Pedestrian Connection and the design of the manner in which the Temple Medical Pedestrian Connection connects to and functions with the Temple Medical Garage and that the Developer will obtain a payment bond from its contractors with respect to the construction of such Pedestrian Bridge naming the City and the Parking Authority as additional obligees.

4. Permanent Easements for Pedestrian Connections from the City

(a) A permanent easement in favor of the Developer from the City to connect the 101 College Street Parcel and/or the improvements thereon to a location on South Frontage Road by means of an underground Pedestrian Connection from the 101 College Street Parcel under South Frontage Road and to operate, use, repair, replace, reconstruct, and maintain such Pedestrian Connection.

. (b) A permanent easement in favor of the Developer from the City to connect the Temple Medical Pedestrian Connection to the Temple Medical Garage over MLK Blvd and the sidewalks adjacent thereto, and to operate, use, repair, replace, reconstruct, and maintain such Pedestrian Connection, any connections of such Pedestrian Connection to the Temple Medical Garage and all such footings, foundations, piers, and supports. Such

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easement shall provide that in the event of reconstruction of the Temple Medical Pedestrian Connection, the City and the Parking Authority shall have the opportunity to review and approve the structural_design of the reconstructed Pedestrian Connection and the design of the manner in which the Temple Medical Pedestrian Connection connects to and functions with the Temple Medical Garage and with respect to any construction work on the Temple Medical Garage, the Developer will obtain a payment bond from its contractors naming the City and the Parking Authority as additional obligees. The Parking Authority will consent to such easement.

(c) A permanent easement in favor of the owner of the 100 College Street Parcel to connect the 100 College Street Parcel and/or the building thereon to 333 Cedar Street by means of a Pedestrian Connection over South Frontage Road and the sidewalks adjacent to the southern boundary of 100 College Street Parcel and the northern boundary of 333 Cedar Street, to install all necessary footings, foundations, piers and supports for such Pedestrian Connection in such sidewalks and to operate, use, repair, replace, reconstruct, and maintain such Pedestrian Connection and such footings, foundations, piers, and supports.

(d). A permanent easements in favor of the owner of the 100 College Street Parcel or the owner of the 300 George Street Parcel, to connect the 100 College Street Parcel and/or the building thereon to the 300 George Street Parcel by means of a Pedestrian Connection over MLK Blvd. and the sidewalks adjacent to the northern boundary of the 100 College Street Parcel and the southern boundary of the 300 George Street Parcel, to install all necessary footings, foundations, piers and supports for such Pedestrian Connection in the public rights of way and to operate, use, repair, replace, reconstruct, and maintain such Pedestrian Connection and such footings, foundations, piers, and supports

4. <u>Utility Easement from the City</u>. A temporary easement to construct and reconstruct and a permanent easement to operate, use, repair, maintain, and replace utility lines under and across portions of MLK Boulevard, South Frontage Road, College Street, and Temple Street for the Development and the Pedestrian Connections.

Other Licenses/Easements and Agreements. The City will grant and the Parking 5. Authority will consent to such additional licenses, easements or agreements for similar and related purposes as may be reasonably required to construct, complete and operate the Project. The City and the Parking Authority, as applicable, shall have the opportunity to review and approve any such additional licenses, easements, or agreements.. The City is hereby authorized to execute and the Parking Authority is hereby authorized to consent to such additional licenses, easements or agreements, as may be required, provided that the Developer shall provide the City and/or the Parking Authority, as applicable, with detailed plans of those improvements that will be the subject of the easements, agreements and licenses and consents in question for final approval by the City, acting through its Economic Development Administrator, and for final approval, if applicable, by the Parking Authority, acting through its Chairman of its Board of Commissioners and its Board of Commissioners, which approval will not be unreasonably withheld, conditioned or delayed and provided further that with respect to any such license, agreement or easement granted by the City and consented to by the Parking Authority, if applicable, the Developer will comply with customary City or Parking Authority requirements with respect to insurance and indemnification, including without limitation

obtaining payment bonds from its contractors naming the City and the Parking Authority as additional obligees.

General. Any licenses, easements or agreements granted by the City over, under 6. and through the City's public rights-of-way and the City's property, including Parcel B, the tunnels and driveways located on the 100 College Street Property, the Temple Medical Garage, and 60 York Street shall provide that the Developer will indemnify and hold the City and the Parking Authority with respect to the licenses, easements or agreements granted with respect to 60 York Street and the Temple Medical Garage and such other third parties as applicable harmless against any third-party claims brought against the City or against the Parking Authority, as the case may be, arising out of the Developer's exercise of its rights under the easements, licenses or agreements described in this Exhibit T, inclusive of reasonable attorneys' fees and costs, except to the extent any such claims arise out of the City's and/or, if applicable, the Parking Authority's and/or such applicable third parties' own respective negligence or intentional misconduct or omissions and shall further require the Developer to maintain general liability insurance with at least \$5,000,000 limits in coverage for risks associated with its exercise of its rights under the foregoing licenses, easements or agreements, which names the City and the Parking Authority, if applicable, and any applicable third parties, as additional insureds. Such policies shall provide that the insurers waive subrogation.







EXHIBIT U

LICENSES, AGREEMENTS AND EASEMENTS FROM THE DEVELOPER TO THE CITY

As used in this <u>Exhibit U</u>, all capitalized terms not otherwise defined herein shall have the meanings ascribed to them in the Agreement.

The following is a description of the licenses, agreements and easements to be granted by the Developer to the City (or reserved in the Quit Claim Deed) in connection with the Project:

1. Construction Related Easements from the Developer (i) A temporary construction related license/easement in favor of the City over, under and across the southeastern portion of the 101 College Street Parcel as shown on the schedules attached hereto and for the time periods set forth on such schedules for constructing, installing, and locating the westerly side of the Temple Street, if such bridge is constructed; (ii) a temporary easement over the southern portion of the 101 College Street Parcel to and from the Service Drives on Parcel B for public travel to and from the tunnels and driveways located on the 100 College Street Parcel as shown on the schedules attached hereto and for the periods of time set forth on such schedules, (iii) a construction related easement in favor of the City to undertake the improvements set forth on Exhibit R if such improvements are not completed on the Closing Date; (iv) temporary construction easements along certain portions of the 101 College Street Parcel which border MLK Blvd and South Frontage Road for the purposes of widening each of these roadways, the location and duration of which shall be set forth in such easements, (v) a temporary construction easement for the purpose of taking corrective action with respect to the construction of the Development under Section 14.2(E)(6) if such corrective action is permitted under the Agreement; and (vi) temporary construction and slope easements for the purpose of installing sheeting on the southern boundary and/or the northern boundary of the 101 College Street Parcel as described in Sections 5.3(B) and 5.3(D) of the Agreement.

2. <u>Permanent Easement for the Drainage Pipe</u>. The Developer will grant to the City such nonexclusive licenses, easements and agreements over, under and across the 101 College Parcel as the City may require for the City to maintain, repair and replace the Drainage Pipe.

3 Permanent 101 Tunnels and Driveways Easement. (i) a permanent easement through the 101 Tunnels and over the Driveways for public vehicular passage and (ii) a permanent easement over that portion of the 101 College Street Parcel situated below grade upon which the 101 Tunnels and Driveways will be constructed and located and over and across the 101 College Street Parcel, the Building, the 101 College Street Plaza and the Parking Structure as are necessary to repair, maintain, reconstruct, and replace the 101 Tunnels and Driveways in accordance with the City's repair, replacement and maintenance obligations under the Agreement, but subject to such rights in the Developer over, under, with and through the 101 Tunnels and Driveways as shall be required for the construction, repair, maintenance, reconstruction and use of the Development, including but not limited to the Building, the Parking Structure, the Developer's On-Site Public Improvements, the Pedestrian Connections from the 101 College Street Parcel, and all utilities serving the improvements on the 101 College Street Parcel, and for the repair to, replacement, reconstruction, and maintenance of the 101 Tunnels and Driveways as may be required of or allowed by the Developer under the Agreement.

4. <u>Permanent Easements for Public Rights-of- Way Adjacent to the 101 College</u> <u>Street Parcel</u>. Such licenses, easements or agreements as the City may require for the City to construct, operate, maintain, repair, replace, and reconstruct the public rights-ofway adjacent to the 101 College Street Parcel and the Streetscape Improvements thereon. 4. <u>General Easement Terms</u>. All easements, licenses and agreements granted by the Developer to the City shall delineate the scope of such easements and the times when such easements may be used and shall provide that the City shall not interfere with any of the Developer's operations on the 101 College Street Parcel when exercising its rights under such licenses, easements and agreements. All easements, licenses and agreements shall provide that the City will indemnify and hold the Developer harmless against any third-party claims brought against the Developer arising out of the City's exercise of its rights under such easements, licenses or agreements, inclusive of reasonable attorneys' fees and costs, except to the extent any such claims arise out of the Developer's own negligence or intentional wrongful acts.



101 College Street Work Zone / Easements - Phase I







101 College Street Work Zone / Easements - Phase IIA







101 College Street Work Zone / Easements - Phase IIB, III & IVA







101 College Street Work Zone / Easements - Phase IVB







Route 34 Downtown Crossing Project Air Rights Implementation Guidelines

New Haven, Connecticut

In Cooperation with

City of New Haven

September 26, 2011 REVISED March 12, 2020



PARSONS BRINCKERHOFF

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Chapter 1 Introduction

1.1 GENERAL

These guidelines were developed by the City of New Haven to assist Downtown Crossing development proponents in understanding the complex issues involved in construction over and adjacent to the operating facilities located within the City of New Haven's right-of-way. The major point that must be understood in the preparation of a proposal for and/or design of facilities within this corridor is that the rights and safety of the roadway must be protected both during construction of any proposed facility and in its built condition. It should also be carefully noted that specific criteria identified are intended to be guidelines for preparation of design and construction documents. Current standards for each system must be verified with the City of New Haven's Authority Having Jurisdiction (AHJ). The AHJ could be the City Engineer, City Architect, Fire Chief/Marshal, Building Inspector, Commissioning Agent, and/or the City Engineer depending the element being discussed. For the purposes of this report, all below grade construction is considered and referred to a tunnel.

1.2 USE OF THE IMPLEMENTATION GUIDELINES

The function of the implementation guidelines is to identify basic criteria to be used in the planning and design of developments within and/or adjacent to the facilities located within the City of New Haven's right-of-way. These guidelines include minimum criteria for the planning, design, and implementation of the infrastructure systems required to support air rights development as they relate to the City of New Haven's existing facilities and operations.

The guidelines are based on pertinent federal, state, agency, and local standards, regulations, and codes. Agencies having authority over design criteria to be used in the planning and design of air rights projects along all or parts of the Downtown Corridor include the City of New Haven, the Federal Highway Administration (FHWA), and Connecticut Department of Transportation (CTDOT), and public and private utility agencies.

The implementation guidelines are intended to assist design professionals in determining the technical feasibility of development proposals within the corridor and in developing infrastructure systems that may be required to support either the proposed development or the operations of the City of New Haven facilities. The terminology used within each section of the guidelines is, or may be, specific to the infrastructure system(s) discussed in that section.

The implementation guidelines are presented in twelve distinct chapters. Each chapter addresses an infrastructure system that has its own separate





technical criteria. It should be understood that these systems must be planned and designed in concert and must be developed and presented to the City as an integrated package.

The implementation guidelines are intended to be guidelines only and are not expected to address all of the design problems that a development proponent will encounter. Each section of the corridor and each proposed development will present the designer with unique technical challenges. Designers are encouraged to develop and analyze alternative approaches to solving planning and design concerns as they relate to the specific proposal being developed. The implementation guidelines are intended, however, to establish the basic criteria for the evaluation of each alternative design solution proposed. The guidelines are also intended to establish consistent criteria for the design of elements that are constant throughout the length of the study area or can be anticipated to be constructed on adjacent air rights parcels and must be considered in the design of each proposal.

1.3 CODES, STANDARDS, POLICIES, REGULATIONS, AND BEST PRACTICES

The design shall be governed by all the latest standards, policies, and specifications listed below with all addenda, supplements, and revisions thereto. The designer is responsible for determining and using the latest version or the adopted version of all design and construction standards applicable to this work. This guidance document does not serve to freeze the version of codes that are to be used for the facility design and construction. The designer will be responsible for updates to meet current codes as they become available or are adopted and become applicable to the project.

Where the documents below do not provide minimum requirements, the design shall be in accordance with the design standards from other federal state, or local government agencies or from nationally known professional organizations as approved by the AHJ.

In the case of a conflict between any of the design codes, standards, policies regulations, or requirements the more stringent requirement should govern the design unless approved by the AHJ

Any exceptions to or interpretations of the design criteria/guidelines referenced or contained herein shall be submitted in writing in the form of a marked of version of this document explicitly noting the sections and how the language is proposed to be modified. This information shall be submitted to the AHJ for consideration.

Each chapter includes a statement of the applicable codes, jurisdictional requirements and design criteria and/or objectives where applicable. Reference is also made in each chapter to engineering design manuals that should be used in the design of specific infrastructure and building systems





associated with each development proposal.

As a general rule, all infrastructure systems must conform to the pertinent elements of the most current industry best practices, design codes and guidelines including but not limited to the following:

- American Association of State Highway and Transportation Officials (AASHTO)
 - A Policy on Geometric Design of Highways and Streets, latest edition
 - Technical Manual for Design and Construction of Road Tunnels - Civil Elements, latest edition
- U.S. Department of Transportation Federal Highway Administration - Manual on Uniform Traffic Control Devices (MUTCD), latest edition
- The Connecticut State Building Code, latest edition
- The International Building Code, latest edition
- The International Plumbing Code, latest edition
- The Occupational Safety and Health Act (OSHA), latest edition
- The National Fire Protection Association (NFPA)
 - NFPA 502 Standard for Road Tunnels, Bridges, and Other Limited Access Highways, latest edition
 - NFPA 88 Standard for Parking Structures, latest edition
 - NFPA 70 National Electric Code along with applicable State and local electrical codes
- Connecticut Department of Transportation (CTDOT)
 - Highway Design Manual, latest edition
 - Drainage Manual, latest edition
- City of New Haven, Complete Streets Design Manual, latest edition

In the case of conflict between the above design codes, the more stringent requirement should govern the design.

1.4 CITY REVIEWS AND PROCEDURES

It should be anticipated that review submittals of drawings, specifications, and calculations commissioning documentation as well as supplemental information as may be requested will be required on the following schedule:





- Conceptual Design 10% Complete
- Schematic Design 30% Complete
- Design Development 60% Complete
- Final Design 90% Complete
- Contract Documents 100% Complete
- Review of Commissioning Documents
- Shop Drawings (for confirmation purposes only)
- As Built Documentation

Developer shall obtain special permitting from the City of New Haven for all lane closures.

1.4.1 Conceptual Design (10%)

This shall be the initial submittal by the project proponent to the City of New Haven. The submittal shall include all materials necessary to allow the City Engineer or his designee to review all basic elements of the design as perceived and/or anticipated by the proponent. The submittal shall include, as a minimum, the following:

Site plan for the project at a scale not less than 1" = 40', indicating vehicular and pedestrian access to the proposed project and the relationship of the project to existing facilities within and adjacent to the City of New Haven right of way.

Longitudinal and perpendicular sections through the project indicating proposed structure locations, types and relationships to existing and proposed facilities and operations.

A discussion of the relationship to and impact of the proposed facility on each of the existing infrastructure systems within the area of the proposed project.

A discussion of the infrastructure systems required to be put in place in conjunction with the proposed project to maintain the existing, or desired, level of service of operations within the City of New Haven right of way.

An identification of structures and systems that are adjacent to the project that will be affected by the project. For example, the adjacent sections of the tunnel comprise a single long structure. Lighting, ITS, ventilation, control, and other systems in adjacent tunnel sections or under adjacent overpasses may require modifications or changes to operation for the new condition after construction.





The Developer shall provide a list identifying all permits and approvals other than those required by the City of New Haven.

Provide an outline of "Concept of Operations"

A preliminary schedule for implementation of the project identifying anticipated time frames for major design, permitting, approval and construction activities.

1.4.2 Schematic Design (30%)

The Schematic Design Submittal shall consist of the documentation required to indicate the layout and function of all major systems for the project as they impact City of New Haven facilities and operations. The submittal shall include:

Responses to comments received on the Conceptual Design submittal, including any additional information requested.

Plans and sections showing the graphic layout of all proposed structures and their relationships to existing facilities.

Geotechnical data and design reports adequate to understand the intent of proposed foundations and identifying major elements to be considered in design.

Preliminary layout plans for structures relative to horizontal and vertical clearance requirements as they impact existing operations and indicating allowances for proposed systems.

Plans and sections indicating relationship/impact of proposed facilities on adjacent utilities and streets.

Preliminary design reports for all systems impacting Power and Communication serving the City of New Haven operations including structures, foundations, lighting, drainage, ventilation, emergency systems (fire detection and fire suppression systems), and construction operations. These reports must discuss the design approach for proposed facilities, relationships to existing adjacent facilities and allowances for future facilities required to support both currently planned and potential adjacent projects by the City of New Haven or others.

Update list of all permits and approvals other than those required by the City of New Haven.

Project implementation schedule showing all principal elements of design, permitting, approvals, and construction activities.

Meet with the AHJ for the various project elements and key project stakeholders and provide meeting notes. Contents should include key features driving the design configuration including the following:





- Concept of Operations
- First Responder Activities
- Fire Apparatus Dispatch
- Fire Department Connection Locations
- Hydrant Locations
- Facility Exit Discharge Locations
- Preliminary design report documenting the engineering analysis as required by the latest standard of NFPA 502 Section 4.3.
- Preliminary design report documenting the emergency response plan as required by the latest standard of NFPA 502 Section 4.4.

1.4.3 Design Development (60%)

The Design Development submittal shall consist of design documentation adequate to precisely locate each design element and the interrelationships between elements. The submittal shall include:

Responses to comments received on the Schematic Design submittal including any additional information requested.

Plans adequate to define all work elements on systems impacting City of New Haven facilities and operations including adjacent existing facilities.

Copies of substantially complete design computations for all work elements (including equipment item and performance lists).

Draft technical specifications, special provisions and general conditions.

Update list of all permits and approvals other than those required by the City of New Haven.

A construction schedule and operations plan showing principal and secondary construction activities by stage with milestones identified. The schedule and plans shall identify all activities that may impact City of New Haven facilities and operations and will show how those facilities and operations are maintained and protected during each phase of construction.

An operations report detailing the anticipated means and methods to be used in construction of the proposed project as it relates to existing City of New Haven facilities and operations.





Written statements from all public and private agencies owning or operating facilities impacted by the proposed project stating that they agree to the concept(s) proposed for the interface between their systems and the proposed project.

Updated design report documenting the engineering analysis as required by the latest standard of NFPA 502 Section 4.3.

Updated design report documenting the emergency response plan as required by the latest standard of NFPA 502 Section 4.4.

1.4.4 Final Design (90%)

The Final Design Submittal shall consist of substantially complete contract documentation for all proposed facilities. The submittal shall include:

Responses to comments received on the Design Development submittal including any additional information requested.

Substantially complete contract drawings for the entire project.

Substantially complete technical specifications, general conditions and special provisions for the entire project.

Copies of complete design computations for all facilities located within the City of New Haven right of way.

Update list of all permits and approvals other than those required by the City of New Haven.

An updated construction schedule and detailed construction operations plans.

Written statements from all public and private agencies owning or operating facilities impacted by the proposed project stating their approval of the project as it relates to their facilities.

Written agreement by the proponents as to all operations, restrictions and requirements requested by the City of New Haven as they relate to construction of the proposed facility.

Updated design report documenting the engineering analysis as required by the latest standard of NFPA 502 Section 4.3.

Updated design report documenting the emergency response plan as required by the latest standard of NFPA 502 Section 4.4.

1.4.5 Contract Documents (100%)

The Contract Document submittal shall incorporate responses to all comments by the City of New Haven on previous submittals and shall consist of the complete contract documents as issued for



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construction for all proposed facilities. The submittal shall include:

Responses to comments received on the Final Design submittal.

Copies of the specifications and contract drawings checked, stamped and signed by a Registered Engineer and/or Architect as appropriate.

Copies of all necessary approvals and permits required to build the facilities located within the City of New Haven right of way.

A final construction schedule and operations plan.

Review of Approved commissioning plan.

Final design report documenting the engineering analysis as required by the latest standard of NFPA 502 Section 4.3.

Final design report documenting the emergency response plan as required by the latest standard of NFPA 502 Section 4.4.

1.4.6 Shop Drawings

Copies of shop drawings, catalog cuts and other required contractor submittals as approved for fabrication for all facilities located within the City of New Haven right-of-way and for all facilities required to maintain the approved level of operation on City of New Haven facilities shall be submitted to the City of New Haven for review relative to conformance with approved design. Submission to the City of New Haven for final approval shall not occur until the Engineer of Record for the Developer has approved of the submission as submitted by the Contractor.

1.4.7 As Built Documents

As built documentation of all facilities constructed within the City of New Haven right of way and/or required to maintain adequate levels of operation upon facilities located within the right- of-way will be submitted to the City of New Haven upon completion of the project. The format of this submittal will be established by the City of New Haven prior to initiation of design.

A minimum of 30 days should be allowed for review by the City of each of the submittals identified above. If the proponent for construction contracting methodology, or other reasons, desires release from the submittal/review program identified, a request must be made to the City Engineer identifying the proposed submittal program and schedule at the time the Conceptual Design submittal is made to the City of New Haven.

Presentations of the design project to City of New Haven staff should be anticipated at each of the major submittals.





Supplemental information such as vehicular and traffic generation, shadow and light studies, etc. may be required by the City of New Haven depending on the scope and complexity of the proposal.



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Chapter 2 Geometric Design

2.1 GENERAL

This section establishes the basic design criteria for geometric controls and clearance requirements for the access drives for use in the development of design for Downtown Crossing developments.

The intent of this design criteria is to provide guidance to the designer by referencing a required and recommended range of values for critical dimensions. Minimum values are given or implied by the lower value in a given range of values. These minimum design values represent the minimum requirements per codes, standards, and/or best practices. Therefore, it is important that these basic minimum requirements are met. Tunnel geometric design will depend on a number of factors including but not limited to roadway grade, sight distance, Average Daily Traffic (ADT), projected traffic use, availability of route bypass options.

Any exceptions to or interpretations of the design criteria contained herein shall be submitted to the City of New Haven's City Engineer for approval.

2.2 CODES AND STANDARDS

The geometric design shall be governed by the standards, policies, and specifications listed below with all addenda, supplements, and revisions thereto.

- American Association of State Highway and Transportation Officials design policies as stated in "A Policy on Geometric Design of Highways and Streets," latest edition
- American Association of State Highway and Transportation Officials, "Roadside Design Guide", latest edition
- U.S. Department of Transportation Federal Highway Administration - "Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition
- Connecticut Department of Transportation, Highway Design Manual, latest edition
- City of New Haven, Complete Streets Design Manual, latest edition



2.3 FUNCTIONAL CLASSIFICATION

The roadway is functionally classified as an Urban Local Street under the Department's Roadway Functional Classification System and is located in an Urban Built-up area.

2.4 DESIGN CONTROL

2.4.1 Design Vehicle

Design vehicle for the Access Drives is a WB-67 (Larger Tractor-Semitrailer). Width of traveled way on horizontal curves shall be designed to accommodate this class of vehicle. On two-lane roads, either one-way or two-way, width of traveled way shall be designed to accommodate two WB-67 side by side and in opposing directions at the same time. This shall be verified by the submission of Auto Turn turning movement diagrams to the City for their review and approval.

2.4.2 Design Speed

The design speed is either: maximum functional class speed or a speed based on the anticipated (post-construction) off-peak 85th percentile speed within the range of functional class speeds as shown below:

For roadways located in Urban Built-up area: 20 mph minimum, 25 mph maximum.

2.5 CROSS SECTION ELEMENTS

2.5.1 Travel Lane Width

10' minimum, 11' desirable.

2.5.2 Shoulder Width

2' minimum, 4' desirable.

2.5.3 Cross Slope

Travel Lane, 1.5% - 2.0% (1.5% - 3.0% with curbing) Shoulder (width less than 4'), same as adjacent travel lane Shoulder (width greater than or equal to 4'), 4% - 6%





2.5.4 Turn Lanes

Lane Width 10' minimum, 11' desirable. Adjacent Shoulder Width 2' minimum, 4' desirable.

2.5.5 Bridge Width / Cross Slope

Meet Approach Roadway Width and Cross Slope

2.5.6 Underpass Width

Meet Approach Roadway width plus Clear Zones Tunnel Section - See Section 2.7.4

2.5.7 Roadside Clear Zones

Per requirements of Highway Design Manual Section 13-2.0

2.6 ALIGNMENT ELEMENTS

Alignment elements below are based on 20 mph design speed.

2.6.1 Stopping Sight Distance

115' minimum.

2.6.2 Minimum Radius

80 feet.

2.6.3 Superelevation

4% maximum

2.6.4 Grade

0.5% minimum, 11% maximum.

2.6.5 Vertical Curvature (K-Value)

Crest Curve - 7, Sag Curve - 17. With Minimum length of curve = 3 x V (design speed in mph).

2.6.6 Minimum Vertical Clearance

Local Street Under New Highway Bridge - 14'-6"





Local Street Under Existing Highway Bridge - 14'-3" Local Street Over Railroad (Electrified) - 22'-6"

Local Street Over Railroad (Others) - 20'-6"

2.7 TUNNEL SECTIONS

The roadway design criteria for cross section elements and alignment elements indicated in the previous sections also apply to tunnels.

2.7.1 Roadway Width

For a two-lane tunnel, the overall roadway width should be a minimum 2 feet greater than the approach traveled way width, but not less than 24 feet.

The roadway cross section shall be suitable to accommodate two lanes of traffic. During maintenance operations in one tunnel or in the event of an incident that requires one tunnel to be closed, the other tunnel shall be converted to one lane of travel in each direction. Under these conditions the tunnel shall be designed to accommodate the design vehicle operating in opposing directions at the same time. This shall be verified by the submission of Auto Turn turning movement diagrams to the City for their review and approval.

2.7.2 Shoulder

Shoulders are not required in tunnels.

When provided, full left shoulder and right shoulder widths of the approach roadway desirably should be carried through the tunnel. The desirable width is a 10' right shoulder and a 5' left shoulder.

2.7.3 Sidewalk/Emergency Egress Walkway

Although pedestrians are typically not permitted in road tunnels, walkways for emergency egress are required in road tunnels. Walkways must be designed to be accessible to and usable by pedestrians with disabilities.

For short tunnels (less than 200 feet in length), 3.5 feet minimum (per AASHTO), 3.7 feet minimum (per NFPA). For design, a 3.7' minimum width shall be used.

For long tunnels (200 feet or more in length), 4 feet minimum (per AASHTO) with a 5 feet wide passing section every 200 feet.

Note that the width requirement under NFPA applies to all tunnel length which is 3.7' minimum.





2.7.4 Tunnel Width

Total clearance between walls of a tunnel:

33 feet minimum for short tunnels (less than 200 feet in length)

34.5 feet minimum for long tunnels (200 feet or more in length)

2.7.5 Minimum Vertical Clearance

16' minimum for freeways, a 6" allowance should be added for future repaving. 14'-6" minimum for other highways.

The height should not be less than the maximum legal height of load and should not be less than that on the approach roadway.

Any obstacles or proposed tunnel appurtenances such as signage, fire suppression, ventilation systems etc. should not encroach into the roadway envelope. Such elements, when installed above the roadway may require increasing the tunnel height to meet the minimum vertical clearance requirements.

2.8 NFPA 502, LATEST EDITION

Special attention shall be taken regarding the requirements for the Means of Egress, Section 7.16 under Chapter 7 Road Tunnels of NFPA 502.



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Chapter 3 Drainage Design

3.1 GENERAL

Highway drainage shall be designed to keep the traveled ways usable and free from flooding during design storms and shall be adequate to accommodate water from firefighting and maintenance wash down operations.

The designer should be aware of and shall comply with federal, state and local legal requirements related to drainage design, and shall perform the design such that there will be no substantial adverse effects on adjacent properties or drainage systems.

The designer should be aware of and shall take into consideration in the design future land use plans, expected changes to existing water courses and drainage systems, and future federal, state and local actions affecting drainage.

The designer must also prepare and retain adequate documentation as part of the drainage design process.

The surface elevation and drainage inlets of the proposed driveway/roadway drainage system shall not be lower than the inlet in the existing Air Rights Garage

3.2 HYDROLOGY

3.2.1 Underground (Tunnel) Conditions

It is expected that firefighting water will be used to determine the peak discharge or runoff within enclosed facilities. Design frequency will be a minimum of two deluge zones operating simultaneously.

The water spread of gutter flow on the pavement during the design deluge event shall conform to the requirements outlined in Chapter 11 of the Connecticut Department of Transportation Drainage Manual for town roads.

All Hydrology and Drainage on portal roadways exposed to rain events shall comply with applicable federal, state, and local requirements and guidelines

3.3 STORM DRAIN SYSTEM

3.3.1 General

Storm drain systems shall be provided to convey runoff. A storm drain system shall consist of inlets, collector pipes, manholes, trunk





line, and outfall.

The storm drain system shall have sufficient capacity to accommodate the runoff flow during a design storm event from highway pavement, bridge decks, medians and/or air rights platforms.

3.3.2 Inlets

Inlet Types

Catch basins with grate inlet shall be used for paved area drainage.

Where the installation of catch basins would not be possible because of obstructions, gutter inlets, i.e., grate inlets without sumps, may be used.

Inlet Spacing

Inlets shall be spaced such that the flow in paved areas meets the design water spread specified herein.

Spacing between inlets or area drains should not exceed 200 feet Special attention shall be given to the following conditions in the location of inlets:

- Concentrated flows should not cross the roadway pavement.
- Flow concentrations should not outlet onto the roadway pavement.
- Where a gutter inlet is used, a catch basin with a manhole frame and cover should be installed between the inlet and the trunk line manhole.
- No more than two inlets should be connected together before outletting into a trunk line manhole.

3.3.3 Collector Pipes

The minimum diameter of collector pipes between inlets and the trunk line shall be 12 inches.

Other design criteria specified for trunk line pipes in Section 3.3.5 shall apply to the collector pipes.

3.3.4 Manholes

Manholes shall be provided at pipe junctions, at intermediate points on long tangent pipe runs, at changes in pipe size, and at changes in grade or alignment.





Manholes should be located outside of the vehicle wheel path in outside lanes.

Spacing between manholes should not exceed 200 feet.

3.3.5 Trunk Line

Discharge Criteria

The following discharge criteria shall apply to the design of a trunk line:

- The trunk line should have sufficient capacity to accommodate the runoff flow during the design deluge event.
- The trunk line pipe system should flow full for the calculated total flow.
- The hydraulic grade line (HGL) shall not rise to within one foot of any manhole cover or top of any inlet for the desired discharge.
- The hydraulics of the lateral pipes should not be influenced by the HGL of the trunk line.

Flow Velocity

The minimum desirable design flow velocity shall be 3 feet per second (3 ft/sec.). The maximum desirable design velocity should be 10 feet per second (10 ft/sec). In extreme cases, higher velocities may be permitted.

3.3.6 Discharge

Drainage retention vault may be required for flammable liquid or contaminate cargo drainage for pretreatment or offsite disposal. The underground drainage system shall only be connected to existing sanitary sewer systems or existing combination sanitary sewer storm drain systems. Pumping facilities may be required to facilitate drainage where gravity flow cannot be achieved.

The location where the proposed drainage/sewer system is to be connected into the existing sanitary sewer shall be coordinated with the Greater New Haven Water Pollution Control Authority (GNHWPCA). The Developer shall also coordinate with GNHWPCA to confirm that the existing pipe has sufficient capacity to support the additional load. Any required upgrades to the existing sanitary sewer infrastructure or addition of support system such as pump stations etc. shall be as required by the GNHWPCA in conjunction with the City Engineer and shall be required to be completed by the Developer.





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Chapter 4 Utility Systems Design

4.1 GENERAL

These criteria govern the design of projects that impact utilities in order to maintain, support, or relocate existing utility facilities that will be affected by the construction of projects within the Downtown Crossing corridor.

Utility facilities are defined as facilities belonging to state, city governmental agencies, and privately-owned companies for the provision of sanitary sewer, storm drain, water, gas, electric, telecommunication, telegraph, and cable television services; street lighting; traffic signalization; and fire, police and emergency alarm systems. The various services and systems may consist of transmission facilities, distribution facilities and service connections to adjacent properties as well as services to the proposed development.

In the performance of construction impacting on utility systems, due consideration shall be given to the needs of the requirements and obligations of the facility owners, traffic requirements and the service needs of adjoining properties.

Several utility facilities presently exist within the limits of, or cross, the roadways. Such utility facilities may pass above or beneath the roadway. The designer shall determine which facilities must be maintained in place during project construction.

Existing utilities that are in physical conflict with proposed facilities shall be relocated. Such relocations may cross the roadway at different locations, or in utility corridors where several utilities cross at one location.

Whenever practical, utility crossings shall be perpendicular to the roadway alignment or as nearly perpendicular as possible.

Utility services will be maintained at all times unless specific authorization by the City of New Haven and the facility owner is obtained for a shutdown of service.

Design for the maintenance and protection of existing utility facilities shall be performed by using one of the following alternative procedures:

- Support the existing facility in place and maintain it during construction.
- Replace the existing facility, support the replacement in place and maintain It during construction.
- Permanently replace the existing facility beyond the construction impact limits.
- Permanently relocate the facility within the construction impact





limits with the new facility being supported and maintained in place during construction.

• Temporarily relocate the facility beyond the construction impact limits and maintain service. Upon completion of construction, restore the existing facility or replace it with a new facility at its original location.

All facilities must be accessible to the facility owner to the fullest extent feasible during and after construction.

Utility services to adjoining properties shall not be interrupted without permission from the facility owner and notification to the customer.

4.2 STORM DRAINS

The storm drain facilities affected by air rights construction may be owned and maintained by any one of the following agencies:

- City of New Haven
- Connecticut Department of Transportation

When no additional flow is added to an existing storm drain, conditions downstream and upstream of the manhole at the end of the modification need not be studied. Where increase in flow or reduction in system capacity takes place as a result of the construction, conditions downstream and upstream shall be evaluated. The extent of this evaluation shall be determined on an individual basis by the City Engineer.

The pipe sizes for storm drains shall be determined by calculating the discharge from the upstream contributory area considering the future development trends of the area. The resulting flows shall be used to size the storm drains.

The design of storm drains shall be in accordance with Chapter III of the Requirements, and the current standards and criteria of the facility owners.

4.3 SANITARY SEWERS

Sanitary and combined sewers affected by the construction may be owned and maintained by one of the following Agencies:

- City of New Haven
- Greater New Haven Water Pollution Control Authority (GNHWPCA)

The size and materials of new facilities shall be selected to give best service under local conditions and the requirements of the design. Both size and materials selected shall meet or exceed those of existing sewer pipes. Special consideration shall be given to the character of industrial wastes, possibilities of septicity, exceptionally heavy external loads, abrasion, infiltration and exfiltration, soil conditions and pipe bedding, and similar





problems.

Pipe materials for City of New Haven sewers shall be either reinforced concrete pipe or polyvinylchloride (PVC) pipe. Pipes 18 inches inside diameter or larger shall be reinforced concrete pipe; pipes 12 inches and 15 inches inside diameter shall be either reinforced concrete pipe or PVC pipe; pipes 10 inches inside diameter shall either be non-reinforced concrete pipe or PVC pipe; pipes less than 10 inches inside diameter shall be ductile iron pipe meeting the class requirements set by the City of New Haven for their sizes.

Pipe materials for GNHWPCA sewers shall be as required by the GNHWPCA.

Where sewers must be permanently replaced and surcharge conditions are known to exist, consideration shall be given to increasing the size of the proposed conduit to improve hydraulic capacity, if requested by facility owner.

The minimum diameter for sewers shall be 10-inches, except for individual building connections required by the facility owner.

Wherever possible, sewers shall be designed with sufficient slope to give mean velocities of not less than 2.0 feet per second based on Manning's formula with pipe flowing full or half full.

Sewers with a diameter of 24 inches or less shall be laid with straight alignment between manholes.

For larger sizes, curved alignments, if proposed, shall be reviewed and accepted by the City of New Haven or GNHWPCA before completion of the design.

Unless otherwise approved by the facility owner, manholes shall be installed at the end of each sewer line; at all changes in grade, pipe size, junctions, and intersections; and at changes in alignment, except where an approved curved alignment is involved. Manhole spacing shall not be greater than 300 feet, unless approved by the facility owner.

Manholes shall preferably be precast concrete units with a minimum diameter of 48 inches conforming to ASTM C478. The internal diameter of the base section shall be at least 1 foot larger than the outside diameter of the largest pipe connected to the structure. A minimum wall space of 1 foot for precast units and 6-inches for brick units, measured circumferential on the internal surface of the riser, shall be provided between the outside diameters of each pair of pipes connecting to a manhole. When the above design criteria cannot be met by using precast concrete sections, a cast-in-place reinforced concrete junction box shall be used unless otherwise required by the facility owner.

Water-tight manhole covers shall be used wherever the manhole tops may be flooded by street runoff or high water. Manhole joints shall be waterproofed on the exterior with coal tar epoxy where ground water





conditions are unfavorable, or as required by facility owner.

Manhole covers shall conform to street grade and cross-slope. The elevation shall be given for the center of the cover or for the rim, in accordance with the facility owner's requirements.

Manhole covers shall have centered pick holes.

The flow channel through manholes shall conform in shape and slope to that of the connecting sewers.

Force mains shall normally be constructed of ductile iron pipe with mechanical or other approved joints. If approved or required by owner other materials such as prestressed concrete cylinder pipe, steel pipe, or PVC pipe may be used.

Water pipe and sewer lines shall not be laid in the same trench. A lateral separation of at least 10 feet and, in the case of crossings, a vertical separation of at least 18 inches shall be maintained between the bottom of the water pipe and the top of the sewer line. Where these separations are impossible, consideration shall be given to relocating the water main, reconstructing it with mechanical joint pipe for a distance of 10 feet on each side of the sewer, or encasing a portion of either the sewer or the water main in concrete.

4.4 WATER MAINS

The water facilities affected by air rights construction owned and maintained by one of the following agencies:

- City of New Haven
- Southern Connecticut Regional Water Authority (RWA)

All replacements and relocations of sections of any water distribution systems are subject to approval by the City of New Haven or RWA and shall be in conformance with the current standards and practices of the facility owner.

Temporary piping or other methods of temporary supply shall be used to provide water service during construction, as required by the facility owner.

The following design standards shall apply to all replacement and relocations of the City of New Haven water distribution system, unless otherwise directed by the City of New Haven Fire Chief/Marshal.

4.4.1 Minimum Pipe Sizes

Minimum Domestic Service Connection	2-inch
Minimum Fire Protection Service Connection	6-inch
Minimum Hydrant Connection	6-inch





Minimum Local Distribution Main

8-inch

4.4.2 Pipes and Fittings

Unless otherwise required by special design considerations or by facility owner, replacement of piping in the existing and relocated municipal waterworks distribution systems shall be made using mechanical joint type pipe.

Ductile iron pipe and fittings shall conform to the following specific requirements and exceptions to the aforementioned standards insofar as they apply:

- The minimum thickness class for ductile iron pipe shall be Class 52 for pipe sizes 4-inch through 16-inch and Class 53 for pipe sizes 18-inch through 48-inch, except as noted herein.
- The minimum thickness class for flanged joint ductile iron pipe shall be Class 55.
- Fittings for pipe sizes 4-inch through 12-inch shall be gray cast iron having a minimum working pressure rating of 250 psi. Fittings for pipe size 16-inch through 48-inch shall be ductile iron having a minimum working pressure rating of 250 psi.

The pipe thickness design for standard conditions of new ductile iron pipe, required for alterations to, or relocations of the existing pipe systems, shall be based on the design system used in ANSI Standard A21.50. The design for pipe thickness shall be based on a working pressure of 200 psi with an allowance of 100 psi for water hammer.

The pipe thickness design for pipe supported at intervals above ground or underground shall be based the latest version of the International Plumbing code. The design shall be based on the working pressure and water hammer as stated above.

In general, the top of all water main, branches, and service connections shall be at least five feet below the finished street grade or other surfaces.

Accessibility shall be provided for in the design for the purpose of repair and maintenance of water mains and appurtenances located within easements and in or on structures.

Fire hydrant installation shall comply with the City of New Haven standards and requirements. The following is a list of major requirements to consider in the design of fire hydrants.

• Hydrants shall be located at street intersections for





visibility and accessibility, with intermediate hydrants spaced at approximately equal distance along the streets at intervals of from 200 to 300 feet. Hydrants shall be located off the traveled way, on the side of the street nearest to the main.

- Hydrants shall be installed on hydrant tees with a six-inch lateral and shall have a six- inch gate valve attached to the hydrant tee and located between the hydrant and the main.
- Hydrants shall be anchored in accordance with City of New Haven.
- In general, all mains shall have valves at points of intersections. Each main shall have valves on each side of the intersection.
- Intermediate valves shall be located along local distribution mains at intervals of approximately 500 feet. Each hydrant branch and building service larger than 2-inch in size shall be controlled by a gate valve the same size as the branch. A valve shall be located on either side of the Tunnel at a crossing.
- Unbalanced forces in water mains (as occur at horizontal or vertical elbows, tees, and dead ends) shall be counterbalanced by means of the following:
- Concrete thrust blocks shall bear against undisturbed earth and shall be designed for a main pressure of 200 psi.

Relocations and replacements of existing service connections required by construction shall be as required by facility owner.

All pipe joints and fittings which are to be aerially supported over or under a bridge or similar structure shall be thoroughly restrained against both longitudinal and lateral movement through the use of NFPA approved restraining devices. Each crossing shall have a valve on each side located in proximity to the crossing.

When a new water main installation is designed, particular attention shall be paid to high and low spots in the profile of the proposed water main. All drainage branches, blow offs, air vents, and appurtenances shall be provided with gate valves.

Provision shall be made at high points in the system for the release of air to prevent reduction of capacity and for the intake of air to prevent a vacuum from forming. Pitometer cocks shall be used as air vents on the. water mains. Pitometer cocks are required at high spots,





if there are any, and at points determined by the City during the design of the water main. Venting arrangements shall be subject to the approval of the facility owner.

Drainage branches or blow-offs shall not be connected to any sewer, submerged in any stream, or installed in any other manner which will permit backward flow into the distribution system.

Whenever possible, hydrants shall be the principal means of providing the necessary air relief at high spots on the main, and either drainage branches or hydrants shall be utilized at the low spots for drainage of water from the water main.

Blow-off connections shall be provided at low points in the system for removing accumulated sediments, for flushing lines, and for dewatering the lines.

Water pipes with less than five feet of cover shall be insulated, and exposed water pipes shall have insulation jackets as well as insulation.

In no case shall publicly owned water facilities be placed upon private property. Should the area within the public right-of-way be insufficient for facility installation, sufficient right-of-way or an easement shall be provided.

4.4.3 Sanitization

All new pipe systems, temporary bypass or permanent, shall be sanitized as required by the owner. Sanitization procedures performed by the proposer shall be subject to the approval of the facility owner

4.5 GAS FACILITIES

The design and relocation of gas facilities shall be approved by facility owner and shall be in accordance with the following criteria and standards (Laterals only shall be Double Walled Piping):

- Natural Gas Pipeline Safety Act, U.S. Department of Transportation, Code of Federal Regulation, Minimum Federal Safety Standards Part 192 - Title 49, Transportation of Natural and Other Gas by Pipelines.
- A.N.S.I. B31.8 Standard for Gas Transmission and Distribution Piping System, including supplement B31.8b.
- American Petroleum Institute Standards for Welding Pipelines and Related Facilities,
- A.P.I. Standard 1104.
- Williams-Steigler Occupational Safety and Health Act of 1970,





O.S.H.A., U.S. Department of Labor.

4.6 UNDERGROUND FUEL STORAGE

Fuel storage and flammable gas storage shall not be allowed under any tunnel areas or any special use areas that are directly connected to the tunnel with no 2-hour separation. No fueling procedures shall be allowed within the tunnel or special use areas.

4.7 TELECOMMUNICATION FACILITIES

The following types of telecommunication facilities may be encountered:

- Aerial wires and cables mounted on wood or metal poles operated and maintained by one of the previously listed agencies.
- Underground conduit and manhole systems containing copper cables, long line copper cables and fiber optics belonging to one of the previously listed agencies.

The designer shall design and prepare contract documents subject to the review and approval by the City of New Haven and the facility owner for the layout of the conduit and manhole systems. The remaining design related to the installation of copper cables and fiber optics facilities will be performed by the facility owners subject to reimbursement by the developer.

The construction of the conduit and manholes will normally be by the proponent contractors subject to approval by the owner. The installation of new copper cables and fiber optics and the splicing of these new facilities to existing facilities will be performed by the facility owners subject to reimbursement by the developer.

The design shall be in accordance with the relevant criteria and standards of the facility owners.

The following are some general guidelines for material to be used and other design information related to conduits and manholes for telecommunications installations.

4.7.1 Conduits and Manholes

- Conduits shall be a minimum of four inches in diameter and shall be constructed of one of the following materials:
- Galvanized Rigid Steel
- Fiberglass rigid epoxy (FRE)
- Buried conduit shall generally be encased in concrete.
- Except where other alignments are approved by the agencies, conduit banks shall be straight between



manholes. Large-radius changes in the profile may be used where necessary.

- Maximum length of conduit between manholes shall be 600 feet unless otherwise approved by the facility owner.
- Conduits beneath the roadway shall be Galvanized Rigid Steel conduits encased in concrete.
- Manholes shall be of reinforced concrete and, wherever possible, standard types will be used. Manholes shall meet the loading requirements of the Latest Edition of the "Standard Specifications for Highway Bridges" of the American Association of State Highway and Transportation Officials (AASHTO).
- Conduits supported on bridges shall be Fiberglass Rigid Epoxy (FRE) conduit.

4.8 ELECTRIC FACILITIES

Electrical power transmission and distribution facilities may be located within the limits of impact of air rights construction. The owner of electrical facilities is listed below:

• United Illuminating Company (UI)

The types of facilities may include, but not be limited to the following:

- Aerial wires and cables, which may be mounted on wood or metal poles.
- Underground conduit and manhole systems containing electrical power transmission and distribution cables.

The designer shall design and prepare contract documents subject to the review and approval by the City of New Haven and the facility owner for the layout of the conduit and manhole systems. The remaining design effort related to cable sizing and circuit layouts will be done by the facility owners.

The construction of the conduit and manholes will be by the proponent's contractors subject to approval by the owner. The installation and splicing of new cables will be performed by the facility owners subject to reimbursement by the developer.

United Illuminating Company (UI) owned electrical power facility relocations will be designed to comply with the standard details and specifications of the company.

The following are some general guidelines for materials and other design information related to conduits and manholes for electrical power installations.





4.8.1 Conduits and Manholes

- Conduits shall be a minimum of five inches in diameter and shall be constructed of one of the following materials:
- Galvanized Rigid Steel
- Fiberglass Reinforced Epoxy (FRE).
- Buried conduit shall generally be encased in concrete.
- Conduits shall normally be straight between manholes. Where curvature of conduits in plan or profile is necessary to avoid obstructions, such alignments shall be approved by the facility owner.
- Maximum length of conduit between manholes shall be 600 feet, or as required by the facility owner.
- Conduits encased in concrete installed beneath the roadway shall be Galvanized Rigid Steel conduits
- Manholes shall be of reinforced concrete and, wherever possible, shall be of the configuration shown on the United Illuminating Company (UI) Standards, or as required by the facility owner.
- Conduits hung from the decks shall be Fiberglass reinforced epoxy.

4.9 HIGHWAY/STREET LIGHT FACILITIES

Highway and/or street lighting will be affected by the air rights construction. Ownership of lighting facilities is by one of the following agencies:

- United Illuminating Company (UI)
- City of New Haven

In general, all lighting fixtures will be supplied by cables located in underground conduits, with the possible exception of temporary lighting, which may be fed overhead.

The design of all lighting systems will be in accordance with the Lighting Design Criteria: Chapter 9, and the relevant criteria and standards of the various facility owners.

4.10 TRAFFIC SIGNALIZATION FACILITIES

Traffic signalization and other traffic-related facilities will be affected by air rights construction. Ownership of the traffic-related facilities is by the City of New Haven.





Traffic signalization facilities may be interconnected by cables attached to the traffic signal system installed in conduits located under the sidewalk or under the roadway connecting traffic signals. Where signals are interconnected, a master controller may be provided in addition to the individual controller at each set of signals. Intersection signal installations shall be connected to an intersection control mechanism, with the necessary auxiliary equipment, by means of an underground circuit.

All traffic signal design shall be in accordance with the City of New Haven standards and the Manual on Uniform Traffic Control Devices, latest edition.

4.11 FIRE, POLICE AND EMERGENCY ALARM FACILITIES

Fire, Police and Emergency alarm facilities operated and maintained by the City of New Haven Fire and Police Departments may be affected by construction of the Project.

The facilities consist of fire, police and emergency alarm boxes connected in circuits to various monitoring stations. Fire, police and emergency alarm circuits must be maintained in service at all times.

4.12 CABLE TELEVISION FACILITIES

Cable television facilities owned and maintained by the Comcast Communications may be affected by the air rights construction. These facilities will be located in below ground duct banks. The cable company will be responsible for the design and construction of any relocation of their facilities that conflict with the air rights construction.

4.13 TRAFFIC SIGN FACILITIES

Variable message and other guidance and traffic control signing owned and maintained by the City of New Haven will be affected by air rights construction. These facilities may include the message board, its structural support, foundation, a power supply system and a communications system.

All existing message boards may be maintained in place, replaced in kind or relocated to an alternative location approved by the City Engineer and/or the Director of Transportation, Traffic, and Parking. All facilities including communications must be maintained at all times during air rights construction.

All variable message sign systems shall be in accordance with the City of New Haven design requirements or as approved by the City Engineer and/or the Director of Transportation, Traffic, and Parking.





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Chapter 5 Geotechnical Design

5.1 GENERAL

This section describes some of the major geotechnical design and construction issues associated with potential air-rights development. All geotechnical design parameters shall be provided by a Professional Engineer licensed in the State of Connecticut. Geotechnical design recommendations shall be in accordance with the latest edition of AASHTO for bridge foundations and the Connecticut State Building Code for Building Foundations.

5.2 GENERAL SOIL CONDITIONS AND SUBSURFACE EXPLORATION

A general subsurface profile shall be developed based on site-specific subsurface investigation program to ascertain existing subsurface conditions including groundwater levels.

5.3 EXISTING FACILITIES

Major existing facilities considered to be at risk during air rights construction include the following:

- Bridge Abutments and Piers (Generally pile supported; typically, timber piles)
- Retaining Walls
- Utilities
- Adjacent Buildings

Prior to any construction, a comprehensive inventory of existing adjacent structures and an in-depth study of the existing foundations must be conducted. This data will be used as input for subsequent assessment performed under Section 5.6 Construction Impacts. The foundations of all existing facilities, which are considered to be within the zone of influence of the proposed construction must be researched. The zone of influence could vary significantly based on proposed construction procedures, sub-surface conditions and existing facilities; therefore, it is necessary that a Professional Engineer, licensed in the State of Connecticut, estimate the zone of influence based on standard engineering practices, including empirical estimates of settlement and lateral strain as well as more sophisticated numerical modeling techniques as required. Should the monitoring program indicate that the zone of influence is greater than anticipated, additional instrumentation and foundation research may be required. Based on construction impact assessment, develop a structurespecific instrumentation and monitoring plan including threshold values of





displacement and lateral strain requiring modification of construction procedures up to and including stoppage of work.

In addition to fully researching the type and condition of existing facilities, a detailed analysis and explanation of the types of subsurface changes that the existing facilities are sensitive to must be provided. The Developer shall be aware of and account for the potential sensitive nature of the testing, research, imaging, and procedures being performed within the project area. The land use and building uses associated with the area surrounding the development shall be included in the vibration mitigation plan to be submitted to the City for review and approval.

5.4 PROPOSED FOUNDATIONS

It is likely that air-rights foundation loads will typically be supported on a deep foundation system bearing on the soil and/or bedrock. Low displacement foundation systems such as drilled shafts or load bearing elements appear reasonable. H-piles end bearing piles may also be feasible at specific locations where existing facilities are not at risk from vibrations and/or ground heave.

Drilled shafts and/or load bearing elements may assume friction in soil and rock in addition to end bearing, with the exception that no end bearing will be allowed in soil when visual inspection of the bottom of foundation is not possible. Site specific geotechnical design parameters must be determined based on code requirements and/or lab and field testing performed under the direction of a Geotechnical Engineer licensed in the state of Connecticut.

Where applicable, shallower foundations may be founded in sand and gravel stratum or the stiff clay stratum, provided a detailed analysis of the effects of construction dewatering on existing structures is performed and accepted by the City of New Haven. Acceptable bearing pressure for the sand and gravel or stiff clay are typically as the range of 2 TSF. Shallow foundations shall include an analysis of calculated settlements and the effects the settlements, if any, will have on existing facilities. Provide all applicable geotechnical design parameters for analysis and design of foundation and ground-retaining structures.

Foundation design shall include a seismic analysis for every proposed structure, including but not limited to:

- Liquification analysis
- Providing dynamic lateral earth pressure and water pressure coefficients
- Providing appropriate seismic design coefficients for all structural design.





5.5 GROUNDWATER

Maintaining groundwater levels at acceptable elevations is an important consideration of many construction procedures. Water levels will generally be required to be maintained at their existing levels in the vicinity of existing structures founded on timber piles. Where construction procedures require a temporary lowering of the existing groundwater levels, the dewatering procedure shall be as localized as possible and limit drawdown to within tolerances per settlement analysis to lessen the risks of damage to existing facilities. Upon completion of construction, groundwater levels must be returned to, and maintained at, existing levels.

All existing groundwater removed as part of the temporary lowering of the groundwater levels shall be subject to all handling and disposal requirements as set forth by the appropriate federal, state, or local agency or as required by the environmental permits obtained for the project.

5.6 CONSTRUCTION IMPACTS

Prior to any construction, a complete and detailed analysis will be made, which will explain the methodology of the construction procedures, the risks associated with the proposed construction procedures, and an analysis of the impacts the proposed construction might have on existing facilities. The analysis may be required to include the following:

- Anticipated groundwater drawdown
- Anticipated soil deformations
- Anticipated deformations of existing facilities
- Anticipated vibratory impacts and proposed monitoring plan

In addition, a detailed explanation of mitigative measures will be implemented if the actual effects of construction are different or are more severely impacting the existing facilities than originally anticipated.

5.7 MONITORING

Prior to any construction, an instrumentation monitoring program will be submitted to and approved by the City of New Haven. The monitoring programs should be tailored to the proposed construction procedures. Possible instrumentation may include but not be limited to the following:

- Utility, Building and ground surface settlement points
- Observation wells and piezometers
- Inclinometers
- Extensometers

Data shall be collected and submitted to the City of New Haven and any





others designated by the City of New Haven on a regular basis as agreed to by the City of New Haven during active construction. All survey data must be collected and stamped by a registered land surveyor licensed in the state of Connecticut.

Instrumentation data will also be provided to adjacent property owners on a regular basis if requested.

Video condition surveys should be performed of adjacent facilities within the zone of influence prior to and following construction. Copies of the survey must be submitted to the City of New Haven and to the adjacent property owners.

A program should be put in place prior to construction commencing that identifies methodologies and procedures for implementing remedial actions if required to correct unacceptable impacts. This program shall identify the monitoring process, the key elements determining 'acceptable' measurements, the person or persons responsible for interpretation of field data, and the person or persons responsible for implementation of remedial actions. The program will also identify specific remedial actions that will be taken in the case of unacceptable reactions to construction activity.



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Chapter 6 Structural Design

6.1 GENERAL

This section describes the structural design requirements for improvements to be constructed in conjunction with air rights development over the Route 34 and/or City Row, comprising cut-and-cover tunnels, U-walls (Boat Structures), retaining walls and bridges.

The proposed alignment is to integrate the future development's platform with a segment of Route 34 by a combination of at-grade roadways, earthretaining structures and tunnels. Because of the relatively short lengths and shallow profiles of the tunnel structures, cut-and-cover construction is identified as the appropriate solution.

All structural elements shall be designed to comply with fire durability design requirements set forth by NFPA 502, latest edition, American Society of Civil Engineers (ASCE), American Society for Testing and Materials (ASTM) and/or American Concrete Institute (ACI).

6.2 SYSTEM COMPONENTS

The dominant structure related to this project will be the platforms and below platform structures and foundation. These platforms will support proposed air rights developments including but not limited to roadways, open space parks, parking garages, and buildings for various uses. It is anticipated that the platforms will be designed to span over the City Row structures roadway and adjacent structures. Substructure units will be located between these and will support the platform superstructure. Crash barriers will be constructed to provide protection for the substructure units that are adjacent to visitors operations.

The proposed development over the platform may also involve changes in highway vertical and horizontal alignments. Substantial modification to existing retaining walls, culverts, and bridge superstructures and substructures may be associated with this work.

Other structural improvements covered by these criteria include the construction of tunnels, underground structures, new retaining walls, culverts, bridges, temporary construction structures, and other miscellaneous structures.

The design of a structure that is owned or maintained by an agency other than the City of New Haven shall be in accordance with standards and specifications utilized by that agency and as approved by City of New Haven, except that highway facilities shall be designed according to AASHTO specifications, and building facilities shall be designed in accordance with applicable specifications (see below).





6.3 CODES, STANDARDS AND REGULATIONS

Unless otherwise specified, the structural design of the various structure types shall be performed in accordance with the latest edition of the codes, standards, and specifications listed below including all addenda, supplements, interim specifications, and revisions thereto. Where requirements differ among the listed codes, standards, and specifications, the more restrictive requirement shall govern unless otherwise specified in these criteria.

- State of Connecticut "State Building Code" (State Code) and all applicable supplements.
- American Institute of Steel Construction (AISC), "Specification for Structural Steel Buildings" load and resistance factor design" (AISC Specification)
- American Concrete Institute (ACI) "Building Code Requirements for Reinforced Concrete," ACI 318.
- American Welding Society, "Structural Welding Code," AWS D1.1. (AWS)
- American Welding Society, "Bridge Welding Code," AWS D1.5. (AASHTO Welding) CTDOT
- American Association of State Highway and Transportation Officials (AASHTO), "LRFD Bridge Design Specifications." (AASHTO Bridges)
- AASHTO, "LRFD Road Tunnel Design and Construction Guide Specifications"
- AASHTO, "Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals." (AASHTO Signs)
- AASHTO "Standard Specifications for Transportation Materials and Methods of Sampling and Testing" (AASHTO Materials) and Part 11, (AASHTO Testing).
- AASHTO, Guide Specifications for Fracture Critical Non-Redundant Steel Bridge Members." (AASHTO Fracture Critical).
- AASHTO, "Guide Specifications for Horizontally Curved Highway Bridges." (AASHTO Curved Bridges).
- AASHTO, "Guide Specifications for Fatigue Design of Steel Bridges." (AASHTO Fatigue Design).
- AASHTO, "Guide Specifications for Bridge Railings." (AASHTO Bridge Railings).
- AASHTO, "Guide Specifications for Structural Design of Sound Barriers." (AASHTO Sound Barriers).





- ACI 201.2R "Guide to Durable Concrete".
- ACI 224R "Control of Cracking in Concrete Structures".
- American Society for Testing and Materials (ASTM), "Annual Book of ASTM Standards."
- American Institute of Timber Construction (AITC) Timber Construction Manual."
- National Fire Protection Association NFPA 101, latest edition
- National Fire Protection Association NFPA 502, "Standard for Road Tunnels, Bridges and Other Limited Access Highways"
- Precast Concrete Institute (PCI).
- International Building code as dictated by the latest Connecticut Building Code
- U.S. Green Building Council "Sustainable Design"
- U.S. Department of Transportation (USDOT) Federal Highway Administration (FHWA) - "Technical Manual for Design and Construction of Road Tunnels - Civil Elements", Publication No. FHWA-NH-10-034.
- Research Council on Structural connections "Specifications for Structural Joints Using ASTM A325 or A490 Bolts"
- Concrete Reinforcing Steel Institute (CRSI)
- National Concrete Masonry Association (NCMA)
- American Society of Civil Engineers (ASCE)
- ASCE/SEI Minimum Design Loads for Buildings and Other Structures
- ASCE, and ASTM requirements for fire durability

6.4 CLEARANCE DIAGRAMS

Internal dimensions for U-wall and tunnels structures shall be established in accordance with Section 2.3 "Travel Clearance" and Section 2.4.3 "Sidewalk/Emergency Walkway" of the USDOT-FHWA Publication No. FHWA-NH-10-034, as described in Chapter 2 "Geometric design" and modified for the current roadway application.

Additionally, adequate spaces for utilities, and MEP equipment shall be provided.



6.5 DURABILITY

General durability requirements as described in ACI 201.2R shall be met.

6.5.1 Fire Protection

All structural steel members shall be protected from direct fire exposure. If steel members are protected by concrete encasement, the minimum concrete cover shall be as indicated in Table 6-1 below.

Table 6-1 Minimum Thickness of Concrete Cover for Structural Steel

Element	Cast-in-Place	Precast
	Concrete	Concrete
Encased Steel	3 inches	2 ¹ / ₂ inch
Ties or Wiremesh in Encasement	1 ¹ / ₂ inch	N/A

For reinforced concrete walls and slabs of tunnels, where concrete cover to reinforcing steel necessary to meet the fire protection requirements of NFPA 502, Section 7.3.4 exceeds the concrete covers specified in ACI 344, Section 20.6.1, such greater cover shall govern.

The thickness of reinforced concrete walls and slabs separating tunnel structures from structures owned by other parties shall be at least 8 inches.

6.5.2 Watertightness

The following waterproofing requirements apply to tunnels and earth retaining structures:

- The structures shall be provided with membrane waterproofing, and nonmetallic waterstops and hydrophilic seals at construction joints. Waterproofing membranes shall be required to be protected at their interface with ground and backfill materials and shall be detailed on structural drawings.
- Drainage system for relieving groundwater pressure shall not be allowed for tunnel structures, the walls and slabs of tunnels shall be designed to withstand full hydrostatic pressure and uplift in addition to earth pressures.
- Cantilever stems of retaining walls and U-structures may be designed with drainage systems with provision of suitable well-draining backfill, and a geocomposite lining and perforated drainage pipe installed behind the walls. Weep holes shall not be allowed, drained water shall be collected in adequately sized pipes at the bottom of the



backfill and directed to sumps for discharge. Reduced hydrostatic pressure distribution for design shall be provided by the Geotechnical Engineer.

• The waterproofing membrane shall be discounted in assessing durability; the design of reinforced concrete walls and slabs that are in contact with the ground shall comply with the ACI 224R crack width limitations for the condition designated as "exposure to deicing chemicals".

6.6 MATERIALS

6.6.1 General

Unless otherwise approved, materials shall conform to the applicable specifications and codes listed in this Section. If, in the opinion of the designer, savings can be achieved by the use of different materials than those specified in this Section, while providing the same or a better level of performance and durability, the designer may substitute alternate material standards after receiving written approval from the City of New Haven.

6.6.2 Structural Steel

Bridges: Unless otherwise specified, structural steel shall conform to ASTM A709 (AASHTO M270), Grade 50. High Strength bolts for structural steel connections shall conform to ASTM A325 (AASHTO M1 64), Hardened Washers ASTM F436, Nuts ASTM A563. Anchor bolts shall conform to ASTM F1554, Grade 50 or higher.

Buildings: Unless otherwise specified, structural steel shall conform to ASTM A992, Grade 50 for W-Shapes. ASTM A572, Grade 50 for HP-Shapes, M-Shapes, S-Shapes, Channels and Angles. Rectangular and Square HSS (Hollow Structural Sections) Shapes shall conform to ASTM A500 Grade C. Steel Pipes shall conform to ASTM A53, Grade B. Structural steel connections shall conform to ASTM A325, or ASTM A490, Hardened Washers ASTM F436 and Nuts ASTM A563.

6.6.3 Reinforced Concrete

Unless otherwise specified, concrete shall have a minimum specified compressive strength (f'c) of 4,000 psi at 28 days. And shall conform to the requirements of the American Concrete Institute.

6.6.4 Prestressed Concrete

Unless otherwise specified, concrete for prestressed members shall





have a minimum specified compressive strength (f'c) of 6,000 psi at 28 days and a minimum compressive strength at time of initial prestress (f'ci) of 4,000 psi.

Prestressing reinforcement shall be high-strength steel wire, highstrength seven-wire strand, or high strength alloy bars.

- High-strength steel wire shall conform to AASHTO M204 (ASTM A421).
- High-strength seven-wire strand shall conform to the requirements of AASHTO M203 (ASTM A416), grade 270, including supplement for low relaxation strand.
- High-strength alloy bars shall conform to the requirements of ASTM A799. Bars with greater minimum ultimate strength but otherwise produced and tested in accordance with ASTM A722 may be used provided they have no properties that make them less satisfactory than the specified material and are approved by the City of New Haven.

6.6.5 Timber

Timber for bridges and temporary structures shall be in accordance with the provisions of Section 8 of the "AASHTO Bridges," using the appropriate allowable stresses. Timber for buildings shall be in accordance with the provisions of AITC.

Timber for buildings shall be in accordance with the provisions of AITC (American Institute of Timber Construction) and NDS (National Design Specifications).

6.7 LOADS AND FORCES

6.7.1 General

Unless noted otherwise, the general loads contained in this chapter refer to the loads and forces for the purpose of designing the structures included in this project in accordance with Section 3 of AASHTO LRFD Bridge Design Specifications.

Loads that concern specific structures are further defined in the applicable sections.

6.7.2 Dead Loads (D)

The dead load shall consist of the estimated weight of the entire structure such as pavement, walls, building components, foundations, soil, water, partitions, signs, safety walks, parapet walls, pipes,





conduits, cables, and other utility services.

Calculation of dead loads shall be in accordance with the International Building Code (IBC)" State Code," "AASHTO Bridges," "AISC/SEI," as applicable.

6.7.3 Live Loads (LL)

Live loads shall consist of any non-permanent loads including the weight of machinery, equipment, stored materials, pedestrians, motor vehicles, elevators, escalators or other moving objects, construction loads, and loads due to maintenance operations.

Unless otherwise noted, roadway live loads on bridge structures shall be based on a HL-93 loading system consisting of the Design Truck, Design tandem and Design Lane Load defined in Articles 3.6.1.2.2, 3.6.1.2.3 and 3.6.1.2.4 of "AASHTO Bridges", respectively.

Building live loads shall be calculated as specified in the International Building Code (IBC), Connecticut "State Code", and "AISC/SEI," as applicable for the building's intended use.

6.7.4 Impact (IM)

Impact loads are statically equivalent dynamic loads resulting from vertical acceleration of the live loads.

- Impact considerations for bridges shall be in accordance with Article 3.6.2 "Dynamic Load Allowance: IM", Table 3.6.2.2-1 of the "AASHTO Bridges."
- Design of the top slab of underground structures supporting roadway loading shall include impact according to the AASHTO Bridge Specifications equation 3.6.2.2-1.
- Structures supporting other moving equipment or dynamic loadings that would cause significant impact shall conform to the International Building Code (IBC), Connecticut "State Code.", and "AISC/SEI" Minimum Design Loads for Buildings and Other Structures, as applicable. For unspecified conditions, independent analysis shall be carried out to determine the extent of the loading.

6.7.5 Vehicular Collision Force

All tunnel and building structural elements exposed to vehicular traffic shall be designed for or protected against vehicular collision forces (CT) as specified in AASHTO LRFD Bridge Design Specifications Article





3.6.5.

6.7.6 Live Load Surcharge (LS)

Highway live load surcharge, as well as surface live load imposed by heavy equipment loads based on permitted construction methods shall be determined analytically considering the depth of soil cover, the weight distribution, extent and intensity of loading, soil type and the assumed construction staging. Unbalanced loading shall be analyzed for the staged construction condition specified in the design documents

6.7.7 Earth Pressures (E)

Earth pressures used in design shall be established by the Geotechnical Engineer using accepted engineering practice based on geotechnical data obtained from subsurface investigations. Symmetrically and if applicable, unsymmetrically applied earth pressures conditions shall be included in design loading combinations.

6.7.8 Hydrostatic Load (WA)

- Site-specific groundwater conditions shall be considered for determining hydrostatic loading on tunnel and Ustructure walls and slabs, and on retaining walls. These effects shall consider recorded as well as site-specific geotechnical investigation data. Unsymmetrical water pressure on side walls, if present shall be added to unbalanced earth pressure described above.
- Buoyancy forces shall be computed for 62.4 psf/ft of depth below the water table as determined by the Geotechnical Baseline Report (GBR). Adequate resistance to floatation shall be ensured for the maximum probable height of water table. For the completed structure, resistance to uplift will consist of dead weight of the structure and for tunnels, the weight of backfill above it bound by the width of the structure. A factor of safety of 1.10 shall be required for this condition. The weight of street pavement and interior walls, pavement and finishes shall be excluded from the dead weight computations. For the condition of backfill removal, a factor of safety of 1.06 shall be required with the dead weight including interior walls, sidewalks and pavement.
- Live load and side wall friction shall be ignored in computing resistance to uplift.




- Unit weight of backfill shall be obtained from the GBR.
- Hydrostatic loading for strength and resistance to uplift shall be checked as stated above for 100-year and 500-year flood predictions of groundwater levels, with redundancy factors η_R of 1.10 and 1.05, respectively. Flood condition shall be considered an extreme loading condition.

6.7.9 Seismic Loads (EQ)

The earthquake loading (EQ) criteria shall be based on a site-specific seismic hazard assessment which establishes design acceleration response spectra (ARS) representative of local rock outcrop and ground surface motions. The seismic design shall be performed using site-specific ground motion for two performance levels: Safety Evaluation Earthquake (SEE) with a return period of 2500 years (2% probability of exceedance in 50 years) and Functionality Evaluation Earthquake (FEE) with a return period of 500 years (10% probability of exceedance in 50 years).

Seismic loads for buildings and other above-ground structures shall be determined in accordance with IBC and Connecticut State Code and shall take into account the combined structural systems consisting of air rights buildings and the platform.

Seismic loads for retaining walls and bridges shall be determined in accordance with "AASHTO Bridges."

Tunnel segments lying outside of the building envelope shall be analyzed considering soil-structure interaction.

6.7.10 Other Loads and Forces

Other loads and forces to be considered, including wind loads and snow loads, shall be in accordance with the appropriate provisions of "AASHTO Bridges," the (IBC) and Connecticut "State Code."

> • Expansion and contraction strains and stresses due to thermal variations, shrinkage, creep and differential settlement shall be considered per AASHTO LRFD requirements. Uniform temperature variations causing axial strains and stresses in the longitudinal direction, as well as thermal gradients causing flexural strains and stresses through the thickness of walls and slabs of box structures (tunnels) shall be considered based on construction and site conditions. Recorded average temperatures for the project site range from 85° to 30°. Thermal gradients across the thickness of walls and slabs



are given in Table 6-2.

Location	Construction	Completed Structure	
	Phase	Summer	Winter
Outer Surface	55°	60°	40°
Middle Surface	55°	75º	35°
Inner surface	55°	8 5∘	30°

Table	6-2	Thermal	Gradients
Tuble		THCT III GI	ordulents

• The effect of extreme thermal loading on the tunnel structures due to the design fire specified in Chapter 7 - Ventilation shall be analyzed. The thermal analysis shall be performed for a typical cross section of the tunnels subjected to a steady-state thermal gradient through the thickness of the tunnel walls, and invert and roof slabs as determined by the appropriate heat transfer analyses. The structural analysis shall be conducted to ascertain the stability of the tunnel structure.

All structural elements shall be designed to account for forces caused by vehicular fuel tank explosions.

> • Fire and explosion loads shall be considered nonconcurrent extreme loading conditions.

6.8 REINFORCED CONCRETE STRUCTURES

Unless otherwise noted, reinforced concrete bridge structures subject to highway loadings shall be designed in accordance with "AASHTO Bridges," Strength Design Method (Load Factor Design).

Reinforced concrete culvert structures shall be designed in accordance with "AASHTO Bridges."

Reinforced concrete retaining walls which are independent from transition structures shall be designed in accordance with "AASHTO Bridges."

Reinforced concrete transition (boat) structures and tunnel structures subject to highway loadings shall be designed in accordance with "AASHTO Bridges."

Reinforced concrete structures not subject to highway loadings (including parking structures and buildings) shall be designed in accordance with "ACI





318" and with the requirements of (IBC) and Connecticut "State Code."

Where required, corrosion protection measures shall be provided for reinforced concrete structures. These measures may include corrosioninhibiting admixtures low-permeability concrete, epoxy-coated rebars, silane surface treatment, cathodic protection of selected rebars, and Monitoring facilities.

6.9 PRESTRESSED CONCRETE STRUCTURES

Prestressed concrete structures subjected to highway loadings shall be designed in accordance with "AASHTO Bridges.

Prestressed concrete structures not subjected to highway or railroad loadings (including parking structures and buildings) shall be designed in accordance with IBC, ACI and PCI.

Where required, corrosion protection measures shall be provided for prestressed concrete structures as described for reinforced concrete structures.

6.10 STEEL STRUCTURES

Unless otherwise noted, steel bridge structures and other structures subject to highway loadings shall be designed in accordance with "AASHTO Bridges," Strength Design Method (Load Factor Design).

Steel structures not subject to highway or railroad loadings (including parking structures and buildings) shall be designed in accordance with "LRFD Specifications," Load and Resistance factor designing and with the requirements of CT "State Code."

6.11 BRIDGE STRUCTURES

6.11.1 General

Except as indicated herein, highway and pedestrian bridges shall be designed in accordance with "AASHTO Bridges"

6.11.2 Materials

Concrete

Concrete for Bridge deck shall have a minimum specified compressive strength (f'c) of 4,500 psi at 28 days. Concrete for other cast-in-place members shall have a minimum specified compressive strength (f'c) of 4,000 psi at 28 days. Higher strength concrete may be used if approved by the City of New Haven.

Reinforced Concrete

Reinforcing steel, including ties and spirals, shall conform to





AASHTO-M31 (ASTM A615) Grade 60 requirements. All highway bridge superstructure reinforcement and all backwall, beam seat and pier cap reinforcement shall be epoxy coated in accordance with AASHTO-M284 (ASTM A775). Bars in exposed faces of substructure members within 30 feet of a traveled way, or where steel reinforcement may be subject to a corrosive environment due to salt or deicing agents, shall also be epoxy coated.

Prestressed Concrete

Precast, prestressed concrete members shall conform to "AASHTO Bridge" Unbonded and ungrouted prestressing strands shall not be. Prestressing strands shall be coated for corrosion protection as per AASHTO Bridges." Non-corrosive or corrosion-resistant ducts and post-tensioning anchorage hardware should be used for posttensioned concrete elements.

Steel

Structural Steel

Generally, AASHTO M270 (ASTM A709) Steel, Grade 50, shall be used for bridge structures on this project.

<u>Connections</u>

In addition to the provisions of Sections 10.18 and 10.19 of "AASHTO Bridges," the following shall also apply:

- Shop connections shall be designed for welding, and field connections shall be designed for high-strength bolts, unless otherwise approved by the City of New Haven.
- High strength bolts shall be a minimum of 7/8 inch diameter AASHTO M164 (ASTM A325) bolts.
- All connections shall be designed and detailed by the project designer.

Timber

Timber structures shall be designed in accordance with "AASHTO Bridges," Section 13, for highway loadings, and "AREA," Chapter 7, for railroad loadings, using the appropriate allowable stresses.

6.11.3 Loads and Forces

Components in the bridge structures shall be proportioned to withstand applicable loads and forces as specified in Section 3 of "AASHTO Bridges" for highway loadings.





6.11.4 Design

The design of bridge structures subjected to highway loadings shall comply with the following provisions.

Strength Design Method

Bridge structure elements subject to highway loadings shall be designed using the Strength Design Method (Load Factor Design).

Seismic Design

Seismic design for highway bridges shall be in accordance with "AASHTO Bridges."

Deflections

Deflection limitations for highway bridges shall be in accordance with "AASHTO Bridges."

Bridge Railings

Bridge railings shall be designed in accordance with "AASHTO Bridge Railings."

6.11.5 Horizontally Curved Bridges

The design of horizontally curved bridges shall conform to "AASHTO Curved Bridges."

6.11.6 Substructure

In addition to the requirements stated in Section 7 - Substructures of "AASHTO Bridges," the following provisions shall apply.

Approach Slabs

Except where the abutting at-grade structure includes a structural roadway slab, an approach slab shall be provided at each abutment to insure a smooth transition from the at-grade section to the bridge structure. The approach slab shall have a length of not less than 10 feet measured perpendicular to the abutment and shall be designed in accordance with "AASHTO Bridges."

Abutments and Wingwalls

Abutments and wingwalls founded on spread footings shall be so designed that the resultant load falls within the middle third of the base of a footing resting on rock or the middle half of the base of a footing resting on rock. These structures shall be designed with the following factors of safety:





- Overturning about the toe of footing resting on soil: 2.0
- Overturning about the toe of footing resting on Roc R: 1.75
- Sliding on the footing base: 1.50, assuming no passive resistance from the soil in front of the structure.

Crash Barriers

Crash barriers shall be incorporated into substructures abutting railroad and adjacent facilities. The design and construction of the barriers shall conform to the requirements specified in AASHTO Bridge.

6.12 RETAINING WALLS

6.12.1 General

The retaining walls shall be designed in accordance with section 11 of AASHTO LRFD Bridge Design Specifications.

6.12.2 Loads and Forces

Lateral Earth Pressure (EH)

Earth pressures for retaining wall design shall be determined by the Geotechnical Engineer based on subsurface investigations, as provided by the Geotechnical Baseline Report (GBR).

Conventional retaining walls founded on soils are structures which are free to yield to earth pressure in an amount sufficient to develop the active pressure condition. Retaining walls founded on rock and/or piles foundation including battered piles are considered rigid and designed for at-rest earth pressures. Retaining walls shall be designed with the procedures outlined in AASHTO, or as recommended by the project Geotechnical Engineer.

If a situation arises where the use of mechanically stabilized earth walls is considered appropriate, the design criteria will be provided by City of New Haven.

Loads from Adjacent Structures (ES)

The retaining walls shall be designed to support lateral earth surcharge load from adjacent buildings or other structures, including both existing structures and future construction as allowed under current zoning and land-use regulations.

Live Loads (LL, IM)

Live loads may be roadway traffic, but also other non-permanent loading conditions, including construction loads.





Live loads due to roadway traffic shall be based on the HL-93 loading as defined in Article 6.5.3 of these criteria.

Live load surcharge shall not include the effects of impact.

Live loads for building air-right development and from adjacent structures or other sources shall be analyzed on a case-by-case basis and applied as uniform surcharge, point load, or line load, depending on the specific circumstances.

6.12.3 Base Pressure

Base pressures shall not exceed the allowable soil bearing capacity determined by the Geotechnical Engineer based on data obtained from the projects site geotechnical investigation and provided in the GBR. In order to minimize differential settlement, walls on spread footings shall be proportioned so that the resultant of all forces will fall within the middle third of the base.

6.12.4 Stability

Overturning

Retaining walls constructed on spread footings shall be designed with the following factors of safety:

- Overturning about the toe of footing resting on soil: 2.0
- Overturning about the toe of footing resting on rock: 1.75

Sliding

Safety against sliding for walls on spread footings shall be achieved by providing a factor of safety of at least 1.50, assuming no passive resistance from the soil in front of the wall.

6.12.5 Walls on Deep Foundations

Design Philosophy

It is common practice to design retaining walls to resist the vertical dead and live loads supported by them, plus a single horizontal pressure produced by the retained earth. While this combination of loads usually defines the critical design condition and is usually satisfactory for spread footing design, it may not be satisfactory for the design of walls on deep foundations. Variations of horizontal earth pressures significantly affect the load resultant location and consequently cause an adverse redistribution of foundation loadings. The designer shall investigate various horizontal loading conditions to satisfy structural compatibility. A critical condition can exist if the total assumed horizontal pressure is not realized. A horizontal load





reduction to two-thirds of the active condition shall be assumed to represent such a contingency. Also, if the retaining wall system is relatively unyielding, horizontal earth pressures in excess of the active pressure condition can act on the wall. The design shall consider such variations in lateral wall pressures based upon the wall structural configuration.

Pile Foundation Design

Pile foundations shall be designed in accordance with Section 10 of "AASHTO Bridges."

6.12.6 Deep-Seated Failure Investigation

For both spread footings and deep foundations, investigations shall be made of the possibility of deep-seated failures in soft soils.

6.12.7 Seismic Design

Seismic design of retaining walls shall be in accordance with Section 11 of AASHTO LRFD Specifications. Seismic pressures may be estimated by the Mononobe-Okabe method.

6.12.8 Construction Details

Expansion Joints

Expansion joints extending the full height of the wall stem shall be provided in all walls over 72 feet long. Reinforcing steel shall not extend through the joints. Waterstops extending the full height of the wall stem shall be provided in all expansion joints. Spacing of expansion joints in retaining walls shall not exceed 90 feet. Joints in counterfort walls should be located between counterforts such that the wall moments at the exterior and interior supports are equal. Expansion joints shall be provided for the footing.

Contraction Joints

Cantilever walls shall have contraction joints extending the full height of the wall stem at a maximum spacing of 30 feet. Contraction joints shall be unbonded. Reinforcing steel shall not be continuous through contraction joints. Contraction joints shall not be provided for the footing. Waterstops extending the full height or the wall stem shall be provided in all contractionjoints.

Construction Joints

Construction joints may be provided to divide the walls into convenient working units for concrete placement. Construction joints shall be bonded joints. Reinforcement shall be continuous through the joint. Construction joints, where provided in the face slab of





counterfort walls, shall be located at quarter points between counterforts. Waterstops extending the full height of the wall stem shall be provided in all construction joints.

BaseKey

Walls other than those supported on rock, piles, or drilled-piers may have a base key. Base keys may be unreinforced and cast monolithically with the base slab. They shall be poured against undisturbed soil and shall not exceed a depth of two-thirds of the footing thickness. Key width at the base slab shall not be less than twice the key depth, nor less than 16 inches. Keys shall be located in the heel between the midpoint of the base and the third point of the base measured from the heel, except that in no instance shall the key be closer to the toe than the back of the stem.

WallStem

Stem thickness at the top of the wall shall not be less than one foot. The exposed face of all walls shall be inclined back from the vertical at a slope of not less than 1/4 inch per foot of wall height to compensate for any outward deflection at the top of the wall. The inner face of all gravity and cantilever wall stems shall be battered as required to provide sufficient thickness at the base of the stem. The difference in elevation between the top of the wall and the top of the retained material behind the wall shall not be less than one foot for walls with level or sloping backfill.

Footings

Footing thickness shall not be less than two feet for spread footings. Minimum cover above the top of footings shall be one foot. The bottom of footings shall be at least one foot below the frost line and shall be placed against undisturbed compacted earth, compacted fill, or non-structural concrete. For design purpose, the frost line shall be assumed at a depth of four feet below proposed finished ground in all project areas.

Footing Steps

Where the wall footing is stepped more than two feet, the wall stem or face slab shall have an expansion joint from the top of the wall to the top of the lower footing.

6.13 U-WALL STRUCTURES

U-wall structures shall be designed by the same principles as the retaining walls, with the following exceptions.

- Stability against overturning does not apply.
- Stability against sliding shall apply for unsymmetrical earth fill condition.





• Stability against uplift (floatation) shall be ascertained by achieving a factor of safety of 1.10, considering dead weight of the structure and no skin friction.

6.14 CUT-AND-COVER TUNNEL STRUCTURES

The permanent and transient design loads, limit states, load factors and resistance factors required for LRFD of the cut-and-cover tunnels shall be taken in accordance with Sections 1 and 3 of AASHTO LRFD Bridge Design Specifications, and as specified in paragraphs below.

Permanent Vertical Loading (DC, EV, ES, DD)

• Dead Load (DC) - The dead load to be used for the design of cut-andcover tunnel structures shall consist of the weight of base structure slabs and walls, the weight of elements permanently supported by the structure, including weight of utilities, system equipment, and weight of earth cover above the tunnel roof.

The analysis shall include the maximum dead load described above, and the minimum dead load that may result from future removal of the earth cover.

The design unit weight of backfill material shall not be less than 140 pcf for the analysis of the structural frame, unless specified by the GBR and Landscape specifications. For verifying stability against floatation, the unit weight used for backfill shall not be greater than 120 pcf.

- Minimum Earth Cover (EV) The cut-and-cover tunnel shall be designed for the deepest actual cover. The depth of cover used for design shall not be less than 4 feet at the highest point of the structure. The design checks for construction stage and stability against uplift (floatation) shall consider the condition of no backfill cover.
- Loads from Adjacent Structures (ES) The tunnels shall be designed to support lateral earth surcharge load from adjacent buildings or other structures, including both existing structures and future construction as allowed under current zoning and land-use regulations.
- Design loads on the tunnels and underpinning loads from existing structures shall be based on the actual weight, and the maximum occupancy for which the building is suitable in accordance with the State of Connecticut Building Code. The greater of the occupancy loads specified by the State Code or as specified in the ASCE/SEI Minimum Design loads for Buildings and Other Structures shall be



used.

Live Load (LL, IM, CT, PL)

- Design live load shall consist of non-permanent load placed on or in the tunnels. Where vehicles can gain access above the tunnels and depth of fill over the tunnel roof is less than 10 feet, the tunnel roof shall be designed for the AASHTO HL-93 truck loading, as well as a live load of 300 psf, taken non-concurrently. Vehicular live load applied to the tunnel invert shall correspond to HL-93 loading. The possibility of access by State Special Permit vehicles shall be investigated, and used for design live load, as applicable.
- The minimum live load applied to the roof of the tunnels shall meet the requirements for wheel load distribution provided in Table 6-2.

Soil Cover Thickness d (ft)	Distribution on Roof Area
Less than 2	Per Article 4.6.2.10 of AASHTO LRFD Bridge Design Specifications
Between 2 and 10	Over a square area of width equal to 1.75d
Greater than 10	300 psf

Table 6-2 Live Load Distribution

Where the distribution areas overlap, the total load shall be uniformly distributed over an area defined by the outside limits of the aggregate areas.

• Impact Allowance (IM) for traffic loading on tunnels shall be provided in accordance with AASHTO LRFD Bridge Design Specifications Article 3.6.2.2 as:

IM=33(1-0.125D_E)%,

where D_E represents the minimum earth cover above the structure (ft). Impact is ignored for depths of earth cover exceeding 8 feet.

- Building columns exposed to vehicular traffic shall be designed for or protected against collision impact forces (CT) as specified in AASHTO LRFD Bridge Design Specifications Article 3.6.5.
- Pedestrian live load (PL) shall be taken as 100 psf.

Lateral Earth Pressure (EH)

• The cut-and-cover tunnels shall be designed for lateral pressure imposed by the earth abutting against the sides of the structures. The structures shall be designed for long-term symmetrical as well as short-term unsymmetrical (unbalanced) loading conditions, as illustrated in Figure 6-1 and Figure 6-2.





To account for the influence of rigid support-of-excavation elements such as slurry diaphragm walls and secant pile walls in resisting lateral earth pressures, and for the behavior of the tunnel structures during tunnel excavation, soil-structure interaction modeling analysis methods may be used.



NOTE: DEAD LOAD AND LIVE LOAD ARE NOT INCLUDED IN THE DIAGRAMS.

LEGEND:

- UNIT WT OF SOIL UNIT WT OF SUBMERGED SOIL UNIT WT OF WATER COEFFICIENT OF LATERAL EARTH PRESSURE AT REST
- Yo Ys Yw
- ко
- COEFFICIENT OF ACTIVE κ_A
- s
- VERTICAL INTENSITY OF SURCHARGE DEPTH OF OVERBURDEN HEIGHT OF OVERBURDEN LATERAL PRESSURE OF UNVEATHERED LIMESTONE.
- HO HB PH
- DEPTH OF WATER LEVEL TO THE BOTTOM OF BOX SECTION D

Figure 6-1 Symmetrical Loading Conditions for Cut-and-Cover Tunnels





NOTE: DEAD LOAD AND LIVE LOAD ARE NOT INCLUDED IN THE DIAGRAMS.

LEGEND:

- UNIT WT OF SOIL UNIT WT OF SUBMERGED SOIL UNIT WT OF WATER COEFFICIENT OF LATERAL EARTH PRESSURE AT REST Yo Ys
- Y٧
- КO
- КΑ COEFFICIENT OF ACTIVE LATERAL EARTH PRESSURE
- VERTICAL INTENSITY OF SURCHARGE DEPTH OF OVERBURDEN HEIGHT OF OVERBURDEN LATERAL PRESSURE OF UNVEATHERED LINESTONE.
- HO HB PH
- D DEPTH OF WATER LEVEL TO THE BOTTOM OF BOX SECTION
- Figure 6-2 Unsymmetrical Loading Conditions for Cut-and-**Cover Tunnels**

Hydrostatic Load (WA) as defined in Paragraph 6.7.7.

Seismic loads (EQ)

The seismic design of the tunnel structures shall be conducted for the two performance levels defined in Paragraph 6.7.8 conforming to the deformation-based racking analysis design approach as outlined in Chapter 10 of AASHTO LRFD Road Tunnel Design and Construction Guide Specifications.

The general seismic performance parameters that govern the design are





defined as follows:

FEE: Repairable damage with or without traffic restrictions, and immediate access to emergency vehicles following inspection.

SEE: Significant damage without collapse, limited service.

These conditions shall be ascertained by satisfying the Limits of concrete and reinforcement strain corresponding to these respective performance levels specified in Table C10.4.2-1 of the aforementioned AASHTO Guide Specifications.

6.15 ABOVE GROUND STRUCTURES

6.15.1 General

Except as indicated herein, above ground structures other than bridge structures shall be designed in accordance with the International Building Code and Connecticut "State Code"

6.15.2 Loads and Forces

Above ground structures shall be designed to withstand, the loads and forces, and the combinations thereof as required by the IBC and Connecticut "State Code."

6.15.3 Foundation Design

The design of foundations for above ground structures, when independent from roadway structures will be in accordance with the site-specific geotechnical parameters.

6.15.4 Construction Details

Expansion Joints

Provisions for expansion shall be made in all above-ground structures. Where a structural element is partially underground and partially above-ground, particular care shall be taken in detailing to accommodate differential thermal movements.

Expansion joints shall be designed to transmit the forces that may occur under any design condition. Reinforcing steel shall not be continuous through the joint. Shear forces shall be transferred across the joint by a key.





Contraction Joints

To control shrinkage stresses in concrete slabs and walls and to minimize cracking, contraction joints shall be provided in all structures at intervals of not greater than 32 feet. They shall also be provided at locations of major change in structural section. A closer spacing shall be used if appropriate to the framing system.

Contraction joints shall be unbonded joints, designed not to transmit the forces perpendicular to the joint that may occur under any design condition. Reinforcing steel shall not be continuous through the joint. Shear forces shall be transferred across the contraction joints by a key.

Construction Joints

Construction joint locations may be indicated by the designer to divide the structure into convenient working units for concrete placement. Such joints shall be detailed on the plans, together with an indication of whether they are optional or mandatory. They shall be designed to transmit all the forces that may occur under any design condition.

Construction joints through which moment is transferred shall be bonded joints, i.e., prior to placing concrete in the adjacent pour, the 'joint shall be cleaned in accordance with "ACI 318" requirements. Reinforcement shall be continuous through the joint.

All tunnel and foundation joint shall be waterproofed.

Joints in Steel Frames

Provisions shall be made in structural steel frameworks of aboveground structures for the temporary accommodation of fabrication and erection tolerances without introducing significant distortions in the frame. Temporary joints, if required, shall be permanently connected after the entire framework has been plumbed and aligned. They shall be designed to accommodate all design loads.

Crash barriers

Crash barriers shall be incorporated into substructures abutting other structure. The design and construction of the barriers shall conform to the requirements specified in AASHTO.

6.16 PROTECTION OF CITY OF NEW HAVEN PROPERTY

6.16.1 Bracing

Construction of air rights improvements shall be performed such that City of New Haven property is protected during all phases of design and construction. Shoring and bracing of existing structures shall be





utilized as necessary, and protective shields shall be installed to provide positive protection from all demolition and construction operations.

6.16.2 Surveys

Topographic surveys, settlement platforms, inclinometers, and other such methods shall be implemented during construction to monitor settlement, or other movement of City of New Haven structures, as approved by the City. Photographic pre-construction and postconstruction surveys must be completed to document the condition of City of New Haven facilities to remain.

6.16.3 Drilled or Excavated Deep Foundations

Deep foundations located adjacent to sensitive City of New Haven facilities for buildings, bridges, or platforms shall be drilled or excavated under necessary to limit vibrations to minimize risk to existing facilities from construction vibrations.

6.16.4 Excavation Bracing and Support

Excavation support systems shall be provided for the protection of existing buildings, streets, walks, utilities, and other improvements. The contractor shall retain the services of an engineer licensed in the State of Connecticut to design the excavation supports, which shall include soldier piles and lagging, interlocking sheet piles, slurry walls, or other structured supports systems as may be necessary. The design shall be submitted for review by the City of New haven. Construction may not proceed before final approval by the City of New Haven.

6.16.5 Survey of Existing Conditions

The contractor shall retain the services of a land surveyor registered in the State of Connecticut to survey existing conditions prior to excavation and installation of excavation support systems and to monitor any movement in existing conditions during construction activities. The surveyor shall establish horizontal and vertical benchmarks on the excavation support structure, as well as on adjacent buildings, walks, and other structures as required. The surveyor shall monitor these benchmarks on a weekly basis and promptly report the findings to the City of New Haven and the contractor. Excavation support systems, and anchorage, shall not extend beyond the limits of work unless approved by the City of New Haven. Prior to the installation of such approved systems, the contractor's surveyor shall verify the location of all subsurface utility





lines indicated on the drawings or documented by the utility companies to protect these utilities from interruption or damage. The design of the excavation support system shall be submitted for review by the City of New Haven. Construction may not proceed before final approval by the City of New Haven. At the completion of work requiring excavation support, all components of the excavation support system shall be removed unless the contractor has received prior approval from the City of New Haven to wholly or partially abandon these systems, or selected components, in place.

6.16.6 Instrumentation and Monitoring

Requirements concerning monitoring of existing buildings in proximity of the Project are stated in Section 5.7. Damage criteria with related deformation thresholds to be complied with during construction and dewatering activities shall be included in the instrumentation monitoring program.



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Chapter 7 Ventilation Design

7.1 GENERAL

This chapter establishes the basic criteria to be used for the design of roadway tunnel ventilation systems in conjunction with development of Air Rights over the Route 34 Corridor.

The roadway tunnel ventilation system shall be designed to provide a safe environment within the tunnel. For normal operating conditions, the ventilation system must be able to limit the concentration of vehicle emitted pollutants such as carbon monoxide (CO) and oxides of nitrogen (NOx) to acceptable levels. The system must also be able to maintain visibility by controlling the accumulation of smoke particulates (haze). However, modern car fleets with motor management, hybrid cars and electrical cars do not have relevant CO emissions. It is advised to use visibility additionally which covers dust as well from tires (the most important particle sources in modern tunnels).

During an emergency condition involving fire, the system must be able to mitigate the effects of smoke and heat to facilitate the evacuation of people and to allow for fire-fighting operations. In the event of a total electrical power failure, adequate supply and exhaust within each zone shall be operated on standby power.

In order to meet these requirements, the ventilation system shall be able to distribute supply air along the length of the roadway in accordance with acceptable design practices appropriate to site-specific conditions. System design/operations shall be evaluated to mitigate dispersion of pollutant concentrations for remote sensitive receptors adjacent to tunnel exit portals. The ventilation system shall also be capable of exhausting smoke in the event of a vehicle fire along the roadway.

The developer shall propose a reliable ventilation concept with the minimum impact on capital costs and maintenance costs. Ventilation system capacity and configuration shall be designed to manage pollutant concentration emissions at exit and entrance portals. National standards for acceptable concentration conditions for emissions shall be utilized for evaluating conditions for sensitive receptors in close proximity of portals. Evaluation shall include differentiation between commercial and residential occupancies in sensitive receptor conditions.

The developer shall provide for an easement for access within the building for all roadway ventilation systems for the City of New Haven. No other building systems shall be allowed within the easement.





7.2 CODES, STANDARDS AND REGULATIONS

The road tunnel ventilation system design shall be governed by the latest editions of the codes, standards, and regulations of the agencies listed below.

National Standards:

- United States Environmental Protection Agency (USEPA)
- American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE)
- National Fire Protection Association (NFPA -502 Standard for Road Tunnels, Bridges, and Other Limited Access Highways, latest edition
- Federal Highway Administration (FHWA) Design Guidelines for Carbon Monoxide Levels in Tunnels
- Federal Highway Administration (FHWA) Technical Manual for Design and Construction of Road Tunnels - Civil Elements

Internationally Recognized Technical Rules for Information Purposes Only

- World Road Association / PIARC 2019R02RN: Road Tunnels: Vehicle Emissions and Air Demands for Ventilation
- World Road Association / PIARC 2011R202: Road Tunnels: Operational Strategies for Emergency Ventilation

7.3 LAYOUT OF TUNNEL VENTILATION SYSTEM

The layout of the tunnel ventilation system shall be based on an engineering process, considering:

- The traffic concept (uni-directional / bi-directional traffic)
- The traffic forecast
- A Traffic control system
- A reasonable design fire based on the traffic assumptions
- Emission rates of cars (actual and forecast)
- Wind pressure on the portals (95 % percentiles)
- Egress distances and time required for self-evacuation

7.4 SYSTEM COMPONENTS

7.4.1 System Components

System components depends on the chosen ventilation system. The





minimum road tunnel ventilation system includes the following:

- Jet Fans, vibration isolation devices and transmission drive systems
- Fan motors and fan starters
- CO monitors
- Visibility detectors
- Conduit and wiring
- Variable Speed Drive
- Anemometers
- Redundant power supply
- Control concept
- However, if longitudinal ventilation is not enough, then the following elements are required additionally: Axial fans with inlet nozzles, diffusors and sound attenuators
- Ductwork
- Fan dampers
- Damper operators

7.4.2 Revisions to Codes, Standards and Regulations

System design requirements necessary to accommodate the latest revisions, modifications, supplements, etc., to any of the publications listed in this chapter which are effective at the time of the design of each development shall be submitted for approval.

7.5 BASIS OF DESIGN

7.5.1 Normal Conditions

The exhaust products of vehicle engines are a mixture of carbon monoxide, carbon dioxide, oxides of nitrogen, sulfur dioxides, and unburned hydrocarbons. In order to maintain a satisfactory atmosphere and adequate visibility within the tunnel, the concentrations of these contaminants shall be diluted to acceptable levels in the case of reaching or exceeding threshold values.

The ventilation system performance for normal operation shall be determined based on vehicular emissions either by an appropriate computer program, e.g. USEPA's MOBILE6 computer program, latest edition or an adequate engineering analysis using other methods





acceptable to the City.

Carbon Monoxide (CO)

Although CO is not the only toxic constituent in vehicular exhaust gases, it is historically the dominant toxic gas and is usually the controlling factor in establishing the supply air requirements for normal operation. The following CO levels and exposure times shall serve as the basis for establishing the capacity and operation of the ventilation system to meet CO dilution requirements:

Maximum Average Concentration and Exposure Time for		
Parts per Million (ppm) Time (minut		
120	15	
65	30	
45	45	
35	60	

The above requirements are applicable during normal peak hour traffic operations. Given the potential for changing characteristics of the extension tunnel segments and traffic profiles (i.e., lengths of tunnels, and delays in the tunnels corresponding to design normal peak-hour traffic), the ventilation supply of air capacity should be designed to dilute the concentration of CO to 120 ppm with bumper-to-bumper congested traffic in the tunnel. The ventilation system operation should be designed to meet the time exposure criteria noted above and to mitigate the effects of congestion due to any cause. In general, under free-flowing normal traffic operations, the system should be operated to maintain an average CO level of 50 ppm.

The developer is also required to identify any incident management techniques which can or must be used to assure that CO exposure levels of the traveling public are kept to a minimum during accidents and breakdowns.

Oxides of Nitrogen (NOx)

The primary pollutants emitted by diesel engines are oxides of nitrogen. The main constituents of NOx are nitric oxide (NO) and nitrogen dioxide (NO2). Using a breakdown of all NOx by weight as 90% and NO and 10% NO2, the maximum concentrations which shall not be exceeded are:

Maximum Concentration of Oxides of		
NO 25 pm		
NO2 3 ppm		



Haze

Exhaust emissions, principally from diesel-powered vehicles, can severely limit visibility within a tunnel. Visibility can be measured in terms of the amount that a beam of light is attenuated over a given distance. The amount of attenuation is given in terms of an extinction coefficient.

Visibility shall not be less than that given using an extinction coefficient of $5x10^{-3}$ per meter.

Exterior sensitive receptor location concentrations shall be limited to criteria listed in CT legislation Title 22a (10/31/95 edition listed below for reference)

Maximum Average Concentration and Exposure Time for Carbon Monoxide		
Parts per Million (ppm) Time Period for Average Exposure (hrs)		
35	1	
9	8	

Maximum Concentration of Oxides of Nitrogen		
NO ₂ 53 ppm		

7.5.2 Emergency Conditions

During congested or emergency conditions, the ventilation system will establish airflows in roadway enclosure to mitigate the spread of pollutants and to control the spread of smoke and heat in the event of a fire. Design configuration of the system will account for potential for future construction and modification to enclosed roadway. Most likely maximum ventilation demand flows for the system will be determined from ventilation operations to mitigate fire hazards developed from emergency incident. Identification and quantification of design fire scenario is a key parameter for determining ventilation system sizing. Once the fire scenario is known, the appropriate ventilation concept shall be designed with respect to minimize capital costs and maintenance costs.

7.5.3 Interface to Underground Parking Lot

The interface to the adjacent underground parking lot shall be





considered for the tunnel ventilation layout. Smoke penetration from the parking lot to the tunnel and vice versa should be avoided by mechanical means (smoke / heat barrier) and by ventilation means (ventilation / pressurizing).

7.5.4 System Operation

The ventilation system shall be capable of being controlled either automatically or remote manually from an Operations Control Center (OCC) or local manually from within a ventilation room. Two automatic modes of operation shall be available: preprogrammed daily histogram and CO monitoring. Under the histogram mode, fan operation in a particular zone will be controlled as a function of the time of day. Under the CO monitoring mode, the fans in a particular zone are to be controlled to maintain a maximum CO concentration of approximately 50 ppm during normal traffic conditions. An operator at the OCC shall be given the capability of overriding either of the automatic modes as circumstances require.

7.5.5 Duct Systems

If ducts are required for the ventilation concept, the ducts shall be sized so that the maximum air velocity does not exceed 4,000 feet per minute (fpm) (20 m/s). Duct shapes and changes in duct sizes shall be designed to minimize the aerodynamic resistance of the ventilation system.

7.5.6 Temperature Rating

Normally the temperature of the exhaust air from the roadways is effectively the temperature of the outside air that is supplied to the roadways. In a fire emergency mode of operation, the exhaust air (hot gas/air mixture) can be several hundred degrees higher. Therefore, the fire rating for the tunnel ventilation equipment shall be assessed with regard to the volume flow rates, maximum ambient air temperatures and the convective Heat Release Rate (MW) of the design fire. The fastening (anchoring) of the tunnel equipment such as jet fans shall withstand 840 degrees Fahrenheit (450 degrees Celsius) for 2 hours.

7.6 DESIGN OF SPECIAL COMPONENTS

The road tunnel ventilation system includes the design of special components which are site- specific for a particular development.

7.7 DUCTWORK

Provisions shall be incorporated in the design of the metal ductwork to





facilitate the installation and removal of the ventilation system components. Access doors and panels shall be located to service, inspect, and maintain the equipment. Access doors for maintenance of the interior of any ductwork system shall be provided. Changes in duct sizes shall be gradual was stated in Section 7.4.5.

7.8 SUPPLY/EXHAUST OPENINGS

If ducts are required, the designer shall determine the spacing of the ventilation openings based upon the total air quantities established. A minimum static duct pressure of 0.5 inches w.g. is required at the most remote opening.

7.9 AXIAL FANS (if required)

It is recommended that tunnel ventilation fans are controlled by variable speed drive units. Fan plants (if required) shall be designed to facilitate removal of large components of fans for equipment replacement or repair activities. System design shall include some measures for equipment redundancy to allow tunnel/parking facility to remain operational during periods when components are replaced or repaired.

7.10 MONITORING DEVICES

7.10.1 Fans and Motors

The fans and motors of the road tunnel ventilation system shall be provided with monitoring devices to detect alert and shutdown conditions and to transmit them in the form of general or specific alarms to the Operations Control Room. Conditions to be monitored shall include:

- Fan Vibration Alert (on each bearing)
- Fan Vibration Shutdown (on each bearing)
- Fan Bearing Deterioration Alert (on each bearing)
- Fan Bearing High Temperature Shutdown (on each bearing)
- Motor Vibration Alert (on each bearing)
- Motor Vibration Shutdown (on each bearing)
- Motor Bearing High Temperature Shutdown (on each bearing)
- Motor Winding High Temperature Alert (on each winding)

Under an emergency condition involving a fire, the Operations





Control Room will output an emergency mode indication to the exhaust fans serving the ventilation zone containing the fire. The indication shall serve to preclude fan shutdown due to normal shutdown conditions and allow the fans to operate to destruction.

7.10.2 Carbon Monoxide

The road tunnel ventilation system shall include devices for monitoring CO levels and visibility levels in the roadways and for transmitting these levels to the Operations Control Room for continuous recording and for controlling the ventilation system. The monitoring system shall be as approved by the City Engineer.

7.11 TESTING

All testing shall be in harmony with the commissioning chapter. Additionally, the designer shall develop and specify the following tests for approval:

- Factory Acceptance Tests
- Site Acceptance Tests
- Site Integration Tests
- Fire and Smoke Tests with smoke extraction (if applicable)

Additionally, testing of the tunnel ventilation equipment shall be performed regularly during normal operation (e.g. ramp up of fans, opening / closing dampers, etc.). The anemometers shall perform plausibility tests during normal operation to identify mismatching values.



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Chapter 8 Emergency Systems Design

8.1 GENERAL

Emergency systems will be identified through an engineering analysis in accordance with NFPA 502, latest edition Section 4.3. The following list is comprised of additional design requirements that will need to be considered while developing the performance requirements of the emergency systems in the engineering analysis.

- Review pertinent codes, specifications, regulations, design handbooks, and other sources of design guidance for applicability to the design of the system. Most recent edition of the following codes to be referenced: NFPA 13, NFPA 14, NFPA 72, NFPA 510 and NFPA 2001.
- Eliminate or control hazards identified by analyses or related engineering efforts through design solution, material selection, or substitution. Potentially hazardous material (e.g., hydraulic fluids, solvents, lubricants, or fuels) shall be selected to provide optimum safety characteristics.
- Isolate hazardous substances, components, and operations from other activities, areas, personnel, and incompatible materials.
- Locate equipment so that access during operations, maintenance, repair or adjustment minimizes exposure to hazards (e.g., hazardous chemicals, high voltage, cutting edges, or sharp points.
- Minimize hazards resulting from excessive environmental conditions (e.g., temperature, noise, acceleration, and vibration).
- Design to minimize human error in the operation and support of all systems.
- Consider alternative approaches to minimize hazards that cannot be eliminated. Such approaches include interlocks, redundancy, failsafe design, system protection, fire suppression, and protective clothing, equipment, and devices.
- Protect the power sources, controls, and critical components for redundant subsystems by physical separation or shielding.
- Provide suitable warning and caution notes in assembly, operations, maintenance, and repair instructions, and distinctive markings on hazardous components, equipment, or facilities to ensure personnel and equipment protection.
- Review individual system design criteria for. requirements





regarding safety. Recommendations should be made for new design criteria supported by study, analyses, or test data.

• Operations Control Center room shall be provided. This room shall be set up to hold a representative of all over-build entities (Approximately 5 people). This room shall be (approximately) 25 feet by 25 feet inside dimensions.

8.2 FIRE PROTECTION

All systems shall be designed and constructed in conformance with pertinent requirements of the City of New Haven Fire Department. Express, written approval of all systems shall be obtained prior to construction being allowed to commence.

The following systems represent industry standard level of care configuration when considering design fire load of a heavy goods vehicle (HGV) (i.e. WB67 semi-truck with cargo predominantly containing cellulosic materials (i.e. wood, paper, and other man-made solid materials).

Designer shall develop a complete evaluation of ventilation and fire life safety systems to identify how the following fire protection systems may be incorporated into system design to optimize installation and operations and maintenance costs. Project shall also identify required confidence testing intervals for proposed system.

8.2.1 Deluge Sprinkler System

The developer shall provide an engineering assessment about the need of a Deluge Sprinkler System. If the outcome is, that such a system is required, then the developer shall provide a fully functional manual deluge system to protect the roadway areas. This system shall comply with NFPA 13 -Standard for the Installation of Sprinkler Systems and shall comply with the requirements of NFPA 502 -Standard for Road Tunnels, Bridges, and Other Limited Access Highways. The design for this system shall provide sufficient length zones (typically 100 feet long) and each zone shall have its own on/off deluge valve. The operation of the system shall be semi-manual with positive alarm sequence operation and according to the City of New Haven Fire Chief/Marshal direction. Complete design of the systems shall be developed including calculated water supply (based on 100foot-long zone this may be close to 1250 gpm). The calculation area shall consist of two deluge sprinkler zones plus 750 gpm for a hose stream. The designer shall identify fire load criteria used for selection of overhead fixed fire spray system and confirm with AHJ (typical design be based on system density of 0.25 gpm per square foot). All Hydraulic calculations shall be based on the stated criteria and shall be approved by the City of New Haven Fire Department.





Typical on/off deluge zone control would include the following however the designer shall verify the system configuration, performance, and sizing; Each Deluge Valve shall be electrically actuated by a push button located in the designated fire command center for the development. NFPA 502 allows for a delivery time of up to 10 minutes; however, this is the delivery time to a hose valve. For this reason, the Authority Having Jurisdiction has requested that the Roadway Dry Manual Deluge system shall be calculated in an approved method to provide water to the most remote zone from the Fire Department Storz connection in a projected time of 5 minutes.

Roadway Alarm Systems shall be robust enough in their design to allow for expansion in the future. All calculations shall be approved by the New Haven Fire Department

Developer shall also be responsible for providing a fully automatic deluge system for any area the New Haven Fire Department, the New Haven Police Department or other Stakeholder deems as a special use area. Examples include but are not limited to areas similar to truck dock turn-around areas, parking areas where the area is directly attached to the roadway and where no rated separation is provided. The water application densities for these systems shall be consistent with the roadway densities. These systems shall be operated and maintained by the developer.

Deluge sprinkler distribution systems shall be securely and adequately supported according to local and national codes and standards and shall be of sufficient strength to withstand the pressure to which they may be subjected including transient water hammer and surge developed during deluge system activation and filling operations.

8.2.2 Standpipe and Hose System

Standpipes for Class I service, as described in the latest editions of NFPA 14 - Standard for the Installation of Standpipe and Hose Systems and NFPA 502 shall be installed in all covered sections of the roadway. Standpipes shall be of the dry type having no permanent water supply connections.

Standpipe lines shall be of a minimum size of 6 inches in diameter.

Identification shall be provided at each surface Storz connection and at each hose valve. Such identification shall be on conspicuous, durable and legible signs affixed to, or immediately adjacent to, ground level Storz connections. In tunnels, identifying signs shall be affixed to tunnel walls at each hose outlet valve or painted directly on the standpipe in white letters next to each hose outlet valve. Exposed tunnel standpipe lines shall be painted.





Dual dry standpipe valves shall be spaced 150 feet apart along the length of the covered roadway. Each covered development parcel shall have a separate standpipe system.

The ends of mains shall have a manual air vent and drain. A drain shall also be supplied at the bottom of each riser and low point.

Standpipes shall be securely and adequately supported according to local and national codes and standards and shall be of sufficient strength to withstand the pressure to which they may be subjected including transient water hammer and surge developed during dry pipe charging operations.

Street level Storz connections shall be provided at each crossing roadway and within 150 feet of an active hydrant. "NO PARKING" signs shall be provided next to these connections. Signing may be required to identify these connections to fire and other emergency personnel.

8.2.3 Standpipe Installation in Areas under Construction

A standpipe system, either temporary or permanent in nature, shall be installed in segments of the covered roadway where air rights platforms are under construction, before the platform has exceeded a length of 250 feet beyond any access point and shall be extended as the platform construction progresses.

Temporary standpipes, which may be used by contractors to furnish water for construction purposes, shall be equipped with hose outlets and valves with 2-1/2-inch hose thread conforming to local Fire Department hose thread, and may have suitable reducers or adapters attached for connection of contractor's hose. Such reducers or adapters shall be readily removable by use of firefighters' hose spanner wrenches.

Permanent standpipes; or temporary standpipes installed in the roadway during construction shall be provided with easily accessible risers to the ground surface level.

Both permanent and temporary standpipes installed during the construction phase shall be securely and adequately supported and shall be of sufficient strength to withstand the pressure to which they may be subjected including transient water hammer and surge developed during dry pipe charging operations.

Temporary standpipes shall remain in service until the permanent standpipe installation is operational.





8.2.4 Portable Fire Extinguishers

Portable fire extinguishers shall be provided in such numbers, sizes and types, and at such locations as determined by the City during the design approval process.

8.2.5 Fire Proofing

All structural systems subject to exposure to a fire occurring within the over-build shall be constructed in a manner conforming to a minimum of a three (3) hour fire rating. The Engineer shall develop sufficient analysis and design to demonstrate design fire load peak heat release and expected duration will not initiate progressive collapse. In addition, the evaluation shall include thermo-mechanical structural response analysis sufficient for identifying structural service factor post fire incident event.

8.3 COMMUNICATIONS

The emergency telecommunications system located within the City of New Haven's right of way shall be maintained at all times. The system shall be expanded within any tunnels created by air rights development with communication points located in well-marked accessible locations within the tunnel area.

Any proposed modifications to the existing system shall be approved by the City of New Haven prior to project initiation.

The following first responder frequencies are required to be available within the new tunnels, either through an active rebroadcast and antenna system within the tunnel area, or via open air through free space demonstrated by an RF study within the new tunnel areas. All these frequencies are "conventional analog radio systems" (both mobile and portable programming):

New Haven Fire Department 1 311	814.5625 MHz	859.5625 MHz
New Haven Fire Department 2 311	809.4875 MHz	854.4875 MHz
New Haven Police Department 1 110.9	465.100 MHz	460.100 MHz
New Haven Police Department 2 110.9	465.450 MHz	460.450 MHz





New Haven Police Department 3 110.9	465.500 MHz	460.500 MHz
New Haven Public Works Dept 110.9	458.750 MHz	453.750 MHz
Medical Dispatch (CMED) 167.9	467.975 MHz	462.975 MHz

8.4 SURVEILLANCE AND TRAFFIC CONTROL

Emergency surveillance, tunnel closure and traffic control systems will be identified through an engineering analysis in accordance with NFPA Section 4.3. and an Emergency Response Plan in accordance with NFPA 502 Section 4.4. The emergency systems owned, maintained and operated by the City of New Haven shall follow National Transportation Communications for Intelligent Transportation System Protocol (NTCIP) standards, equipment cabinet manufacturers standards (NEMA, TEES, ATC), NEC 502, NEC 70, AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, and the MUTCD. Tunnel traffic control systems may need to interface with fire alarm control panel meeting NFPA 72 National Fire Alarm and Signaling Code standards. These systems must also be compatible with the City of New Haven's traffic management center software and meet all applicable design and construction standards.

8.5 TUNNEL FIRE DETECTION AND FIRE ALARMS

Tunnel Fire Detection and Manual Fire Alarm Boxes shall be provided in the tunnel roadway areas.

Manual fire alarm boxes shall be located linearly along the tunnel roadway area at intervals not to exceed 300 feet, and at cross passages and other means of egress from the tunnel. Locations of boxes shall be accessible to the public and tunnel personnel. Alarms shall indicate the location of the fire alarm boxes at the monitoring station.

Linear Heat Detectors (LHD) have been used for many years in U.S. tunnels and have demonstrated that they do not have the sensitivity to provide an early warning of a road tunnel fire, however, do provide alarms for major fire events. Tests performed by tunnel agencies within the U.S. and in Europe have confirmed this conclusion. LHD system performance during actual fires and field tests were not reliable due to normal air velocities in the tunnels caused by large vehicles (piston effect) and mechanical ventilation systems. LHD systems using new type sensors such as fiber optic and continuous thermocouple have been installed in European tunnels. Operational performance data for these type systems during fire emergencies is currently being reviewed by various operating tunnel facilities, especially for





early detection and warning capabilities.

There are essentially four types of LHD systems that may be applied for the tunnel roadway area for automatic detection. There is an analog type, fiber optic type, thermocouple type and digital type.

The analog type has generally not been used in tunnel roadway applications recently as it requires a high alarm temperature requirement, since most fire conditions start as localized events, affecting only a small portion of the overall zone length of the sensor cable to temperature rise. This high alarm temperature requirement usually is above the destruction temperature of the sensor cable, since the calibration for the zone must be over the total length of cable in the zone. Since the alarm temperature set point is over the entire length of the cable in the zone, for a much shorter section of cable in the zone that experiences a fire condition, the temperature at that point must be much higher in proportion to the alarm set point over the entire length of cable to activate the alarm early into the fire event. Generally, the cable is not recoverable after an event and must be replaced and alarm calibration and sensitivity cannot be adjusted without altering the installed cable length. Special tooling is required for the sensor cable splicing and terminations utilizing a heat shrink sleeve or cap, and care must be taking during the process to not to apply too much heat that would damage or destroy the sensor cable, nor too little heat such that proper sealing is not achieved that would then result in faults or false alarms.

The fiber optic type has been used in roadway tunnels recently, and essentially uses the scatter characteristics of light in the glass fiber medium to determine if a fire condition exists. The characteristics typically used are Stokes and Anti Stokes light intensities. Anti-Stokes intensities are temperature dependent while Stokes intensities are temperature independent. Local point temperature along the sensor cable is derived from the ratio of the Anti-Stokes and Stokes light intensities. The controller contains an algorithm that records temperatures along the sensor cable as a continuous profile, and reliably indicates temperature changes within 1 or 2 degrees centigrade per minute for up to 2.5 miles of sensor cable. The sensor cable is typically a stainless-steel tube with two independent quartz type fibers. This type of system can detect early stages of a fire event and its location within the zone. The portion of the cable exposed to a major fire event is not recoverable and that particular section must be replaced with a spliced in portion. Multiple zones may be established off of a common cable instead of the application of different multiple cables for different zones. More precise and different alarm points may be set. The amount of false alarms is dependent upon how finely tuned the set points are to ambient temperature conditions, as well as the type and quantity of alarm set points programmed,

The thermocouple type has been used in roadway tunnels recently and uses a pair of type K thermocouple wires with negative temperature coefficient





insulation between them forming a continuous thermocouple. Essentially, each cable has an infinite number of potential temperatures measuring junctions along its entire length. Each cable will continuously measure and report ambient temperature existing in large areas and detect differential temperatures, or hot spots, when they occur. Available alarm configurations are early warning, pre-alarm and rate of rise alarms. Cables are self-restoring for most events and return to normal configuration after temperature excursions. The amount of false alarms is dependent upon how finely tuned the set points are to ambient temperature conditions.

The digital type has been used in roadway tunnels recently as well as in the past and are the most tried and tested of all the types. The sensor cable is comprised of two metallic conductors, each individually insulated with a heat sensitive polymer. There is usually a twist to the conductors imposing a spring pressure and then wrapped with a protective tape and outer jacket material. When the cable is exposed to the heat of a fire, the insulating polymer melts allowing the two metallic conductors to come in contact and complete an electrical circuit. The sensor cable is a fixed temperature device, not adjustable, with the set point being the melting point of the polymer insulating material of the conductors. Accordingly, there is no calibration required for the sensor cable. There is only one set point for alarm and that is the temperature rating of the sensor cable selected. This sensor cable is the least sensitive of those described and activates primarily for major fire events producing spot temperatures above the temperature rating of the cable, and not for low temperature, smoldering types of fire events. It is also the least prone to false alarms for these same reasons. This type of system can detect a fire event's location within the zone. The portion of the cable exposed to a major fire event is not recoverable and that particular section must be replaced with a spliced in portion. Multiple zones may only be established off of different cables, each as its own zone.

The digital type of linear heat detection is proposed for this roadway tunnel application. This type of linear heat detection is the least prone to false alarms and activates in the event of a major event. It is proposed also due to its scalability and modular approach for expansion as additional developers build out air rights along the right of way. As subsequent sections are built out, new sensor cable zones may be added to existing controllers, or these new sensor cable zones added to new controllers as needed.

Zone layout for the sensor cables shall follow the zone layout for the deluge sprinklers that will be located along the tunnel roadway, such that there shall be a "one to one" layout for coverage for any particular section of the roadway. Sensor cable shall be placed over the centerline of each travel and breakdown lane. Sensor cables shall be routed back to controllers that establish set points and calibration as applicable as well as alarm interface to other systems.

All of these systems should have more than one source of electrical power





and communications to ensure continuous operation. The surveillance and traffic control systems shall be connected to the Operation Control Center via their fiber optics communication line.

Additionally, the visibility detectors, required for normal operation and congested mode SHALL be used for fire detection purposes as well. They shall be used as a second independent fire (smoke) detection method.


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Chapter 9 Lighting Design

9.1 GENERAL

The lighting for this project consists of two tasks; Roadway Lighting and Parking Garage Lighting. Both with different illumination methodologies, but with same objective of providing the appropriate visual environment to ensure the operator of a vehicle can safely move through the facility. For the roadway entering the structure, the entry is considered a Vehicular Tunnel and will be illuminated using the ANSI/IES-RP-RP8-18 (Chapter 14, Tunnels), American National Standard for Tunnel Lighting. Once inside the parking structure, the illumination levels are then defined in ANSI/IES-RP-8-18 (Chapter 17 Parking Lots and Parking Garages. As the structures are developed over the roadway, the roadway lighting will require a review to ensure the approaching motorist has adequate contrast to perceive hazards within the entry of roadway tunnel or garage. Thus, depending on adjacent buildouts, the entrance could serve as a tunnel or the lower level entrance to the parking structure above. In either case, for the roadway and ramps that are considered a tunnel, during daylight hours a driver's adapted state is such that the interior can appear like a "black hole", and hence, obstructions within the entry can effectively become invisible. High levels of artificial lighting are typically required to compensate for these ambient davtime threshold conditions and the driver's adapted state. In order to minimize the costs associated with installing and maintaining these systems, careful analysis is required of the physical features, orientation, construction, and operational requirements for each structure. There are various approaches for providing the required illumination which need to be evaluated, with due consideration for visual performance, driver safety, and both initial capital and life cycle costs. For Emergency Lighting mode use reference National Fire Protection Association NFPA 502, latest edition.

9.2 CODES AND REGULATIONS

Several design recommendations are available for tunnel lighting. These include but not be limited to the latest editions of the following documents:

- ANSI/IESNA RP-8-18, *American National Standard Institute/Illuminating Engineering Society*, Recommended Practice for Tunnel Lighting in Chapter 14, Tunnels.
- ANSI/IESNA, RP-8-18 American National Standard Institute/Illuminating Engineering Society, Recommended Practice for Roadway Lighting in Chapters 10 though Chapter 12.
- CIE 88, International Commission on Illumination, Guide for the Lighting of Road Tunnels
- IESNA, RP-8-18 Roadway sign lighting *Illuminating Engineering*

REVISED BY:



Society, Lighting for Parking Facilities in Chapter 18 Roadway Sign Lighting,

- AASHTO, latest edition American Association of State Highway and Transportation Officials, Informational Guide for Roadway Lighting
- ANSI/NFPA-502, *American National Standard Institute/National Fire Protection Association*, Standard for Road Tunnels, Bridges, and Other Limited Access Highways, latest edition.

9.3 TUNNEL LIGHTING DESIGN

ANSI/IES RP-8-18 divides a complete tunnel lighting design into adaptation zones. The length of each zone and the associated lighting requirements vary with the safe sight stopping distance (SSSD), design speed, the exterior daylight and environmental conditions, and the driver's current adapted state. The required pavement luminance in each zone also depends on the reflectance of the materials used for both the road and tunnel.



Figure 1. Layout of Tunnel Zones

The geometry of these zones and their associated lighting levels are based on the design criteria and reference the dark adaptation rate of the human eye. These zones are the Approach, Threshold, Transitions, Interior, and Exit Zones. There is one additional Zone which is called the Nighttime Zone. This Zone extends from portal to portal and operates during the evening hours.

A graphical representation of the recommended luminance reduction steps for these zones, showing % Luminance versus Time in seconds, is in Figure 2.





Figure 14-12. Recommended luminance reduction for threshold and transition zones. (Adapted from CIE-88 (2004), Figure 6.6.²)



Since human adaptation to higher brightness is all but instantaneous, and adaptation to lower levels is time dependent, standard practice does not require increases in luminance levels at the Exit portal. On the other hand, transitional nighttime roadway lighting is required, for both the Approach and Exit Zones, for a distance of nominally one SSSD.

Most importantly with Air Rights parcels, the location of various lighting zones may be altered thus causing the level of lighting required within the limits of each parcel to change. The lighting system installed under each parcel shall be flexible enough to accommodate all anticipated shifts in zones due to adjacent development.

9.4 TUNNEL ILLUMINATION REQUIREMENTS

9.4.1 Approach and Exit Zones

The Approach Zone is the area of open road immediately prior to the tunnel entry portal. Conversely, the section of roadway immediately following the exit portal is called the Exit Zone. The length of these zones is nominally one Safe Sight Stopping Distance (SSSD).

Most importantly, in the Approach Zone, the phenomenon of preadaptation begins. As the portal increasingly fills more of the field of





view, the driver's eye begins to adapt from the luminance of the wider general view to the significantly lower luminance within the approaching threshold.

For nighttime conditions, RP-8-18 the pavement luminance shall be at least one-third of the pavement luminance level within the tunnel. For example; based on an interior tunnel lighting level of 2.5 cd/m^2 both roadways should be illuminated to a minimum average pavement luminance of 0.83 cd/m^2 . Since these are exterior roadways, it is also recommended they meet the uniformity and glare recommendations of ANSI/IES RP-8-18, latest edition Chapter 10 and Chapter 11.

9.4.2 Threshold Zone

The point, at which the portal structure completely fills the field of view, is called the Adaptation Point and is considered the start of the Threshold Zone. At this stage of the project, assumptions to geometric adjustments may be accounted for in the approach zone, which tends to modestly reduce the number of fixtures in the threshold zone.

The required values for pavement luminance (Lth) in the Threshold Zone(s) are dependent on the design speed, orientation of the tunnel, the ambient daylight conditions, and most importantly, the visual environment immediately surrounding the tunnel portal.

The current standard practice, RP-8-18, provides that the Luminance in the Threshold (Lth) is determined by completing an Equivalent Veiling Luminance evaluation also known as a Lseq evaluation of the portal. This method accounts for the complete visual field surrounding the portal. Using the luminance's within the visual field the Lth is developed based purely on the visual environment. In situations such as in preliminary or conceptual design, the Lth can be calculated using typical surface luminance values found in RP-8-18.

9.4.3 Transition Zone(s)

The Transition Zones immediately follow the Threshold Zone and extend in segments of time. During this time the drivers' eye adaptation continues, while allowing for the roadway luminance requirement to decrease from the bright threshold zone to relatively darker conditions in the interior zone.

- The numbers and lengths of each Transition Zone shall be determined based on the design vehicle speed.
- The value of the lighting levels in the Transition Zone shall be determined based on the Threshold Zone lighting level





and Figure 14-12 from RP-8-18.

• The values of Transition Zones length and lighting level of each Transition Zone shall be determined so that the designer can utilize the tunnel lighting criteria for the tunnel lighting system.

9.4.4 Interior Zone

The value of the lighting levels in the Interior zone shall be determined based on the design vehicle speed and Table 14-8 from RP-8-18. As the last zone within the tunnel, the Interior Zone runs from the end of the Transition Zone all the way to the Exit Portal. The roadway luminance level of the interior zone is based upon the speed and volume of traffic within the tunnel. RP-8-18 indicates the daytime interior level recommendations based on design speed and vehicle traffic flow.

The nighttime luminance level shall be uniform throughout the entire length of the tunnel. A luminance level of 2.5 cd/m^2 is recommended. This level is lower than the daytime interior zone level, thus the circuits that supply power to the interior zone daytime lighting system will either be equipped with dimming equipment that will dim the daytime lighting level to obtain the nighttime lighting level or designed using step dimming. In the threshold and transition zone only those circuits that supply power to the luminaires intended for nighttime operation shall also be similarly equipped to those found in the Interior zone.

The recommended maintained illuminance values for a tunnel approach roadway, per ANSI/IES RP-8-00, Section 14.3.1 shall be no less than 1/3 of the nighttime lighting level in the tunnel.

For the first phase of this project, the transition zone will lead directly into the parking facility; thus, at this point the illumination levels will follow the criteria for a parking garage. However, as the project progresses, the tunnel entry will have a transition leading to the interior zone.

9.5 TUNNEL LIGHTING CONSIDERATIONS

Considerations used in determining the appropriate source and configuration of lighting includes both initial and life cycle lighting cost, ease of construction, maintenance characteristics, photometric performance, traffic volume, and roadway use patterns.

Guidance and Architectural Considerations - The factors that make up these broad categories, which were followed in our evaluation, are as follows:





System Cost:

- Initial Installation Cost of Lighting System
- Controls Cost
- Cost of Spares
- Re-lamping Costs
- Energy Cost Including Demand Charges
- Maintenance Costs over the Life of the System
- Hazardous Waste Costs
- Replacement System Costs at End of Life (Typ. 25 years)

Construction.

- Fixtures' Ability to Withstand the Environment
- Impact Resistance
- Ease of Installation
- Relationship to Wireway and Branch Circuit Distribution

Maintenance.

- Ease of Maintaining System,
- Availability of Spare Parts
- Ease of Cleaning
- Tunnel Cleaning

Photometrics.

- Available Configurations and Wattages
- Beam Type
- System Efficacy (Lumens/Watt)
- System's Ability to Achieve Lighting Design Criteria *Traffic:*
- Design speed
- Tunnel Capacity (AADT)
- Civil Design and Road Geometry
- Physical Design of Tunnel





Optical Guidance:

- Visual Coordination with Civil and Physical Design *Architectural:*
- Surface Materials
- Fixture Locations
- Portal and Landscaping for Luminance Control
- Physical Design of Tunnel

9.5.1 Lighting Sources

LED tunnel luminaires shall be utilized. The IES distribution type and tunnel luminaire wattage shall be determined for daytime and nighttime luminaries for each tunnel zone. The proposed luminaires shall be suitable for tunnel application.

The selection of sources is dependent on the following criteria:

- Efficacy, lumens/watt
- Lamp Lumen Output, wattages available
- Life, hours
- Lumen Maintenance
- Physical Characteristics, size, base type, durability
- Color, stability and consistency
- Cost

9.5.2 Luminaire Maintenance

A tunnel atmosphere is normally dirty, infrequently cleaned, and highly corrosive. The lenses of the photocell control system will be cleaned once a month. The walls and exterior lens of the tunnel luminaires are projected to be cleaned once every six-months to keep LLF above 60%. Cleaning the lenses will aid in controlling the luminaire dirt depreciation factor and light output as well as aid in maintaining fixture integrity. Repairs and maintenance occur at nonpeak hours in a closed travel lane. Workers must labor for prolonged periods, working overhead and exposed to oncoming traffic. The facts outlined above require that not only should maintenance be factored for cost and light depreciation, but the design of the luminaire must be made as maintenance and environmentally friendly as possible.





In order to meet the requirements for luminaire maintenance utilize stainless steel fixture(s) with appropriate gasketing and properly applied finishes.

9.5.3 Light Loss Factor

Many of the above issues are factored into the design calculations in terms of a Light Loss Factor (LLF). The LLF, also known as maintenance factors, are adjustments that are made in order to adjust the lighting calculations to anticipated field conditions. The overall light loss factor is dependent on a series of recoverable and non-recoverable factors which will affect the lighting systems operation from the time the system is first turned on, through the life of the system. The LLF shall be utilized per the City requirements or calculated by the following formula as follows:

LLF = (LAT) x (VF) x (RSDD) x (BO) x (LLD) x (LDD)

Where:

LAT	=	Luminaire Ambient Temperature Factor.
VF	=	Voltage Factor.
RSDD) =	Room Surface Dirt Depreciation Factor.
во	=	Burn Out Factor.
LLD	=	Lamp Lumen Depreciation.
LDD	=	Luminaire Dirt Depreciation Factor.
EF	=	Equipment Factor.

9.5.4 Controls

The ambient light level varies day to day, and throughout the year; inclement weather and cloudy days are significantly darker than clear sunny ones. Proper control of the threshold lighting can take advantage of these lower adaptation requirements by reducing energy consumption. The most effective way to control the lighting within the tunnel is through use of luminance meters located outside the tunnel that views the portal area. This type of meter will give the best indication of driver's adaptation, and therefore more effectively





control the tunnel lighting.

The luminaires within the tunnel should be dimmed in steps, depending on the ambient levels. The lighting control system should have various controlled set points measuring cloud cover, hold-on and hold-off timers, to minimize frequent switching of lamps throughout the course of the day.

The tunnel lighting shall be designed with an automatic illumination level control system operated by ambient light level sensing devices. These controls shall maintain a predetermined ratio of outdoor luminance to threshold luminance under all weather conditions during daytime operating hours. The system shall prohibit response to sudden and short duration (less than 15 minutes) light level changes and shall respond only to steady and long duration (more than 15 minutes) changes. The changes shall be made in five stages as follows:

	Indoor Level (as a percentage)	Sensor Setting – cd/m ²		
Control Level		On Increasing Lt.	Off Decreasing Lt	
1	1	0 - 60	40 - 0	
2	2	60 - 120	100 - 40	
3	7	120 - 350	330 - 100	
4	55	350 - 5000	4800 - 330	
5	100	5000 - UP	UP - 4800	

9.5.5 Emergency Power

For those situations where the power fails, selected luminaires of the tunnel lighting system shall be supplied using an uninterruptible power supply (UPS) listed and labeled as meeting UL-924 requirements.

These luminaires are powered using dedicated branch circuit wiring extended from the UPS. If there is a power failure, these luminaires will remain illuminated and maintain the necessary illumination levels required in NFPA-502-2011. Emergency circuits and fixtures shall meet the NFPA 502 requirement to remain functional for the required time period during the anticipated fire conditions.

All Emergency Power systems, equipment, and design shall utilize





equipment listed for use on Emergency Power and all requirements of NEC 700 Emergency Power.

9.5.6 Luminaire Power Circuiting

Tunnel lighting fixtures shall be energized by a 277-volt, single phase connection to 480/277-volt, three phase, four wire branch circuits radiating from lighting panels located in buildings.

All overcurrent protective devices (OCPDs) shall be resettable circuitbreakers with protection coordination where required by the NEC (for example, NEC 700 Emergency Power) using settable trip units.

9.6 SIGN LIGHTING

All ceiling mounted signs located in tunnels and containing fixed messages shall be retroreflective sheeting meeting the Federal Highway Administration (FHWA) publication FHWA-SA-14-022 for type IV, IX and XI. The developer shall ensure that any mounted signs do not infringe with the minimum vertical clearance for the tunnel.

9.7 PARKING GARAGE LIGHTING

Parking garage lighting focuses on developing an orderly passage for motorists and pedestrians when using the garage facilities. The lighting is based on recommendations for vehicular and pedestrian illuminance on the roadway surface, while providing a factor of safety and security. The garage area of the tunnel will follow the requirements of the IES-RP-8-18 (Chapter 17 Parking Lots and Parking Garages). During the course of this project, a revised version of the document is scheduled to be issued and will replace the existing revision and be used as the illumination guideline. The current lighting requirements for the parking garage lighting is in RP-8-18, Table 17-3.

9.8 PARKING GARAGE LIGHTING CONSIDERATIONS

Similar to the Tunnel Lighting, considerations used in determining the appropriate source and configuration of lighting includes both Initial and life cycle lighting cost, ease of construction, maintenance characteristics, photometric performance, traffic volume and roadway use patterns.

Guidance and Architectural Considerations - The factors that make up these broad categories, which were followed in our evaluation, are as follows:

System Cost

- Initial Installation Cost of Lighting System
- Controls Cost





- Cost of Spares
- Re-lamping Costs
- Energy Cost Including Demand Charges
- Maintenance Costs over the Life of the System
- Hazardous Waste Costs

Construction

- Fixtures' Ability to Withstand the Environment
- Impact Resistance
- Ease of Installation
- Relationship to Wireway and Branch Circuit Distribution

Maintenance

- Ease of Maintaining System,
- Availability of Spare Parts
- Ease of Cleaning
- Facility Cleaning

Photometry

- Available Configurations and Wattages
- Beam Type
- System Efficacy (Lumens/Watt)

Optical Guidance

• Visual Coordination with Civil and Physical Design *Architectural*

Surface Materials

• Fixture Locations

9.8.1 Lighting Sources

Parking Garage lighting shall be LED light sources and system shall comply with all applicable requirements of the International Energy Conservation Code (IECC) with amendments as adopted in the Connecticut State Building Code.





The selection of sources is dependent on the following criteria:

- Efficacy, lumens/watt
- Lamp Lumen Output, wattages available
- Life, hours
- Lumen Maintenance
- Color, stability and consistency
- Cost

9.8.2 Luminaire Maintenance

A garage atmosphere is normally dirty, infrequently cleaned, and to some extent corrosive. Repairs and maintenance occur at non-peak hours, and workers again labor for prolonged periods, working overhead. These factors require that not only should maintenance be factored for cost and light depreciation, but the design of the luminaire must be made as maintenance friendly as possible.

Routine maintenance for burned out lamps and failed ballasts or drivers can be accounted for in readily accessible luminaire components. Tool-less entry, readily removable ballasts/drivers and lamp holders, printed circuit boards, quick release connections, and interchangeable housings are minimum requirements for maintenance. All electrical connections should be made at the maintenance shop, or via quick connect/disconnect plugs in the field. Suspension systems should accommodate the removal of damaged fixtures without interruption of lighting performance in other portions of the system.

In order to meet the requirements for luminaire maintenance we propose the use of appropriate gasketing and properly applied finishes.

9.8.3 Light Loss Factor

Many of the above issues are factored into the design calculations in terms of a Light Loss Factor (LLF). The LLF, also known as maintenance factors, are adjustments that are made in order to adjust the lighting calculations to anticipated field conditions. The overall light loss factor is dependent on a series of recoverable and non-recoverable factors which will affect the lighting systems operation from the time the system is first turned on, through the life of the system. The LLF shall be utilized per the City requirements or calculated by the following formula are as follows:





LLF = (LAT) x (VF) x (RSDD) x (BO) x (LLD) x (LDD)

Where:

LAT	=	Luminaire Ambient Temperature Factor.	
VF	=	Voltage Factor.	
RSDD	=	Room Surface Dirt Depreciation Factor. BO Burn Out Factor.	=
LLD	=	Lamp Lumen Depreciation.	
LDD	=	Luminaire Dirt Depreciation Factor. EF = Equipment Factor.	

9.8.4 Controls

As mentioned previously for the tunnel lighting, the ambient light level varies day to day, and throughout the year; inclement weather and cloudy days are significantly darker than clear sunny ones. The lighting the parking garage obviously is very important in those areas that do not see daylight or are in congested traffic areas. However, for those areas along the edges of the facility, there is often more daylight entering the area than the illumination being delivered by the luminaires. The most effective way to control the lighting is through use of daylight sensors located in those areas affected. The lighting controls shall meet applicable requirements of the International Energy Conservation Code (IECC) with amendments as adopted in the Connecticut State Building Code.

9.8.5 Emergency Power

For those situations where the power fails, selected luminaires shall be supplied using an uninterruptible power supply (UPS). If required by building codes, the lighting backup power source shall meet all requirements of NEC Article 700.

These luminaires are powered using dedicated branch circuit wiring extended from the UPS. If there is a power failure, these luminaires will remain illuminated and maintain he necessary illumination levels required in NFPA-101.

9.8.6 Luminaire Power Circuiting

Garage lighting fixtures shall be energized by a 277-volt, single phase connection to 480/277-volt, three phase, four wire branch circuits radiating from lighting panels.





Overcurrent Protective Devices (OCPDs) shall be circuit breakers. Where coordination of protection is required, the system shall include adjustable trip devices.



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Chapter 10 Maintenance of Operations

10.1 GENERAL

Construction operations shall be planned and conducted so as to cause a minimum interference with traffic flow. The Access to the air-rights garage shall be kept open for the full number of travel lanes normally in operation at all times except as previously approved by the City of New Haven and YNHH Hospital.

Any temporary maintenance and protection of traffic or traffic control inside or on the approaches to the tunnel shall be designed to the requirements in the latest version of NFPA 502 as well as the MUTCD and the City of New Haven.

10.2 PROSECUTION OF WORK AND PROTECTION OF TRAFFIC

The closing of travel lanes carrying Air-Rights traffic will be permitted for construction, subject to the conditions contained herein. Lane closing will be permitted, if in the opinion YNHH service deliveries can be rescheduled per weekly or daily AM coordination meetings.

Two adjacent travel lanes of a minimum width of 22 feet of roadway shall be maintained available for traffic at all times except when the City of New Haven may approve the restriction of traffic as stated in the City of New Haven and/or Connecticut Department of Transportation Limitations of Operations and Prosecution and Progress.

Work, including set-up of traffic control devices and detours, will be allowed as stated in the City of New Haven and/or Connecticut Department of Transportation Limitations of Operations and Prosecution and Progress.

At the end of each working day, all construction equipment and materials shall be removed from the Route 34.

Work shall proceed in such a manner as to minimize delay to traffic and with maximum safety precautions at all times

Workers at the site shall wear suitable safety vests at all times. Workers shall not enter or cross an operating Route 34 lane. Workers who disregard safety regulations will be barred from the job site.

Trucks and construction 'equipment shall be equipped with such devices, flags, lights, and/or colored signs as are in standard use under the safety rules of the City of New Haven and shall be kept in good working order.

All vehicles involved with setting traffic control signs and equipment shall have installed and shall use two 8-inch diameter amber rotating beacons when performing traffic control work.





Operations shall be conducted so as to cause the least possible interference with traffic. Vehicles and equipment traveling in lanes open to traffic shall maintain traffic speed within normal safety limits until entering the area coned or barricaded off as a work area. When entering lanes open to traffic from the work area, vehicles and equipment shall accelerate when possible to normal and safe traffic speed.

Vehicles and equipment will not be permitted to cross the median to reverse direction but will be permitted to reverse direction at intersections in a manner approved by the City Engineer.

During the construction of foundations, extreme care shall be exercised to prevent mud, water, concrete, or any extraneous material from spilling onto the traveled way or passing vehicles or entering the drainage system of CTDOT/City.

The operations of erecting shielding, removing structural steel, lifting and placing concrete or steel beams which from the lowest working platform, or any other construction operations over the Tunnel that may endanger traffic, shall be performed during the early morning hours.

During these operations, the Route 34 traffic shall be detoured through crossovers around the site onto the opposite roadway from the work which shall be made two-directional. This will involve State Police details and the erection and removal of traffic protection devices.

The detour entailing two-directional traffic in one roadway is a concern from the point of safety and will be permitted as allowed by the City of New Haven and/or Connecticut Department of Transportation Limitations of Operations and Prosecution and Progress.

Any work to be performed above the Route 34 while traffic passes underneath will require safety nets and/or shielding of a design approved by the CTDOT/City. Vertical clearances over the City Row shall not be less than 14 feet 3 inches. Nets and shielding shall be in continuous use in the until the appropriate portion of the structure is completed.

The work shall be prosecuted in such a manner that all excavations in the safety walks of the median or along the walls of the City will be backfilled at the end of each day's work. Any excavations authorized to be left open overnight shall be protected with barricades and traffic control devices satisfactory to the City's Engineer.

All areas disturbed by construction shall be restored to their original condition in a manner satisfactory to the City's Engineer.

The City of New Haven shall be reimbursed for all reasonable expenses incurred in performing any work which the City of New Haven deems necessary or advisable to protect persons or property from injury or damage due to the performance of work hereunder and for any and all reasonable expenses incurred by the City of New Haven due to failure of the developer





to comply with all terms and conditions hereof.

10.3 BARRICADES AND WARNING SIGNS

The Contractor will furnish, install, remove, reinstall, and maintain at its expense warning signs, cones, drums, portable flashing arrows, and portable barricades with battery operated flashers as the City's Engineer may direct or approve to meet site conditions, control and direction of traffic and promote safety and convenience. Warning signs, barricades, flashing lights, and other protective devices shall be constructed and erected in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways" - Part VI, prepared by the National Joint Committee on Uniform Control Devices, and approved by the CTDOT/City.

The Contractor shall install, erect, relocate, remove, reinstall, and maintain the signs, cones, and barricades required throughout the period they are needed. Signs, cones, barricades, and flashers that are missing, damaged, or destroyed for any reason whatsoever will be repaired or replaced as soon as possible.

Prior to starting work on any portion of the Project adjacent to or being used by the traveling public, the Contractor shall furnish or have available on the Project the signs, cones, and other devices as required by the attached traffic protection detail sheets.

All signs, cones, and drums shall be reflectorized. Cones shall be an approved type, equipped with a factory made weighted base adapter to resist wind.

10.4 TRAFFIC OFFICERS

The City and/or CTDOT, as it may determine necessary, will furnish uniformed State Police with appropriate supervision to direct and expedite traffic and to safeguard those using the Route 34. The City of New Haven shall be reimbursed directly, at current rates, for detail duty plus the cost of overhead and charges for the use of cruisers.

10.5 CITY OF NEW HAVEN REPRESENTATION

The City of New Haven may assign such assistants and representatives, as it deems necessary at the expense of the Developer and they shall be authorized to give directions with regard to the safety and convenience of the Tunnel motorist, the erection and maintenance of traffic protection devices, barricades and warning signs and related matters.

The right is reserved to suspend construction on any operation on any day at any time when, in the opinion of the City's Engineer, the volume of traffic or the weather is such as to result in inordinate delays in traffic movement.





10.6 SCHEDULE OF OPERATIONS

At least thirty days prior to the time the Contractor intends to start any operations affecting the Tunnel or any of its facilities, and from time to time thereafter as directed by the CTDOT/City, the Contractor shall submit to the City, for its approval, complete shop drawings and work schedule showing the method and sequence of operations. Complete details of any proposed shielding, bracing and shoring which it intends to provide shall also be submitted for approval of the City's Engineer.

In addition to the schedule as required hereinbefore, the Contractor shall submit to the City, not later than 12 noon on every Wednesday, a detailed plan of its operations for the following 2-week period. This plan shall show the kind of work to be done and the traffic lanes which are to be affected for each and every day of the week in which work is to be performed. The City of New Haven may revise the schedule, if necessary, and all work will be performed in strict compliance with the approved schedule. If weather or other conditions beyond the control of the Contractor render the schedule impractical, a revised schedule will be submitted for approval.

10.7 COORDINATION OF WORK

Work on other projects on CTDOT as well as City of New Haven maintenance operations may be in progress during the period of construction of this platform. It is the Contractor's responsibility to coordinate and schedule his operations with those of City of New Haven projects in order to minimize interference to both CTDOT and local traffic. Scheduling will be subject to the review and approval of the City's Engineer who may require revision of the schedule to best suit the proper coordination of the various projects.

10.8 PROSECUTION OF WORK

All structural members shall be adequately connected and secured prior to leaving the site at the end of the workday. Newly erected beams or stringers with diaphragms over roadways, including ramps, shall be adequately secured immediately after erection and before traffic flow resumes.

Any areas of the Tunnel envelope disturbed by construction will be restored according to City of New Haven standards, including tunnel painted finishes, fireproofing, existing conduit reserved for traffic control, and the abovementioned appurtenances.





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Chapter 11 Commissioning

11.1 GENERAL

Commissioning will begin during the conceptual design phase. The developer will hire a qualified third-party commissioning agent that is independent of the design and constructions teams and those firms to fulfill the requirements of this section.

11.2 SUMMARY OF THE COMMISSIONING PROCESS

11.2.1 Definitions

<u>Commissioning</u> - Commissioning is the process to certify to the City of New Haven that systems, equipment, mechanical and electrical controls, and special systems are functioning together in a composite manner as shown on the plans and as specified in the special provisions.

<u>Commissioning Agent</u> - The Commissioning Agent is a designated agency or person hired by the Developer for the commissioning process. The Commissioning Agent is an independent entity, not otherwise associated with the Contractor or design team members. The Commissioning Agent communicates, directs and coordinates the day-to-day commissioning activities, and does not take an oversight role in the construction.

<u>The Commissioning Authority (PB)</u> - is a designated agency or person to oversee the commissioning process and the work of the various commissioning agents for the RTE 34E corridor program filling a QC function for the City of New Haven.

11.2.2 Reference Documents

The following are accepted industry guidelines for the commissioning process. Proposed deviation from this specification shall be in accordance with one or more of these guidelines:

- GSA General Service Administration Commissioning Guidelines
- ACG Associated Commissioning Group Guidelines
- BCA Building Commissioning Association Guidelines



11.2.3 Qualifications

The Commissioning Agent provided by the Contractor shall not be an employee of the Contractor. The Agent shall be independent of the installing personnel or equipment suppliers for this project. The Commissioning Agent must maintain an unbiased approach to problem solving and conflict resolution. In addition, the Commissioning Agent shall:

- Be certified as an independent Commissioning Agent by the AABC Commissioning Group (ACG), BCA or Certified Building Commissioning Professional (CBCP) by Association of Energy Engineers
- Possess knowledge of the systems, including the design, optimization, installation, operations, acceptance testing, training and maintenance.
- Possess experience in management, leadership, system technologies and the construction process.
- Have practical field construction background.
- Demonstrated ability to organize many specific activities into a coherent Commissioning Plan.
- Communication skills, both written and verbal.
- Proficiency in documentation.
- Experience in working with multidisciplinary teams.
- Experience in writing and directing functional performance tests.
- At least 5 years of commissioning experience with the types of building, HVAC, fire protection, and control systems included in this project.

11.2.4 Scheduling

The Commissioning Agent shall:

- Provide the initial schedule of primary commissioning events/milestones at the initial commissioning scoping meeting.
- Work with the Contractor according to established protocols to schedule and maintain the integrated schedule with the commissioning activities.
- Provide a minimum of two weeks' notice to the





Contractor for scheduling commissioning activities.

 Adjust the commissioning schedule as construction progresses and more detailed schedules are available from the Contractor. The Contractor shall integrate all commissioning activities into the master schedule. All parties shall address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

11.2.5 Commissioning Team and Coordination

The members of the Commissioning Team consist of the Commissioning Authority, Commissioning Agent, the Contractor's, Project Manager, appropriate subcontractors (Mechanical, Electrical, Fire-Protection, Security Systems, Controls, Communication Systems), and any other subcontractors or suppliers of equipment. In, City Engineer or appropriate representatives shall be members of the commissioning team. The Authority Having Jurisdiction (AHJ) shall participate in commissioning of fire protection and alarm systems. The Commissioning Agent shall prepare a Commissioning Plan to supplement the team, roles, responsibilities and communication protocols defined in this section.

Commissioning Agent Responsibilities

The Commissioning Agent plans, directs and coordinates the commissioning process and activities; writes the Commissioning Plan and documents performance testing results. All reports and findings are sent directly to Commissioning Authority with carbon copy to the Developer's Representative, and Contractor's representative.

Responsibilities include:

- Plan, organize and lead the commissioning team
- Provide Commissioning Plan
- Convene commissioning team meetings
- Provide Project-specific construction checklists and commissioning process test procedures
- Verify the execution of commissioning process activities using random sampling
- Prepare and maintain the Commissioning Issues Log (Cxlog) and tracking of issues resolution.
- Prepare and maintain completed Construction Commission Checklist Log.





- Provide input to the construction schedule on the commissioning activities and their sequence.
- Witness systems, assemblies, equipment, and component startup.
- Compile test data, inspection reports, and certificates, include them in the systems manual and Commissioning Report

Contractor's Responsibilities

All Contractor's team members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.

Contractor's representatives shall participate in and perform commissioning process activities including, but not limited to, the following:

- Attend commissioning team meetings.
- Integrate, maintain, and coordinate commissioning process activities with construction schedule.
- Review and accept system verification checklists (SVC) checklists provided by the Commissioning Agent.
- Review and accept commissioning process test procedures provided by the Commissioning Agent.
- Statement of Readiness The Contractor shall provide the Commissioning Agent a written statement of readiness, certifying that systems, sub-systems, equipment, and associated controls are ready for testing, manufacturer's checklists are completed, and SVCs are completed.
- Complete commissioning process test procedures.
- Complete seasonal testing and commissioning testing as deemed required by the Commissioning Agent.
- Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
- Cooperate with the Commissioning Agent for resolution of issues recorded in the Commissioning Issues Log (CxLog).
- Ensure cooperation and participation of sub-contractors





as applicable.

- Ensure participation of major equipment manufacturing in appropriate start-up, testing and training activities.
- Prior to start-up, inspect, check and confirm the correct and complete installation of all equipment and systems for which system verification checklists are included in the Commissioning Plan. Document the results of all inspections and checks on the checklists and sign them. If deficient or incomplete work is discovered, ensure corrective action is taken and re-check until the results are satisfactory, and the system is ready for safe start-up.

The Contractor's personnel along with designated representatives may witness activities and verify results, and these activities will be separate from the Commissioning Agent witnessed tests and resulting reports.

City Representative and O&M Contractor Responsibilities

City representatives (including operation and maintenance personnel) and the O&M Contractor responsible for operating the tunnel during Detour Phases shall participate in and perform commissioning process activities including, but not limited to, the following:

- Attend commissioning team meetings.
- Attend testing meetings.
- Participate in training in operation and maintenance of systems, subsystems, and equipment.
- Demonstration of operation of systems, subsystems, and equipment

Meetings

Commissioning Scoping Meeting

Within 60 Calendar Days before the completion of the conceptual phase, the Commissioning Agent shall schedule, plan, and conduct a commissioning scoping meeting with the entire commissioning team in attendance. The scoping meeting shall address the tunnel systems to be commissioned, commissioning requirements, and completion and start-up schedules. Information gathered from this meeting will allow the Commissioning Agent to prepare the Commissioning Plan.

Meeting Minutes

The Commissioning Agent shall distribute meeting minutes and the revised Commissioning Plan to all parties in attendance at the

REVISED BY:





commissioning scoping meeting, and all the commissioning team members.

Commissioning Review Meetings

During the design phase the Commissioning Agent will plan and conduct a commissioning review meeting at each of the follow milestones:

- Schematic design 30% complete
- Design development 60% complete
- Final design 90% complete
- Contract Documents 100% complete

The Commissioning Agent shall distribute meeting agenda to all parties. Prior to each of these meetings the Commissioning Agent (CxA) will review the Owners Project Requirements (OPR) and the compare it to the Basis of Design (BOD) and or drawings that have been progressed. The CxA will prepare a report of the difference and diary these in the CxLog for communications to all team members. These issues will remain on the CxLog until resolved.

Additional Meetings

Other meetings shall be planned and conducted by the Commissioning Agent as construction progresses. The purpose of these meeting is to cover coordination, monitor progress, identify issues and deficiencies, and resolve issues relating to the commissioning with the Contractor, its particular subcontractors and relevant manufacturer representatives.

The Commissioning Agent shall plan and chair these meetings. These meetings shall be held monthly, until the final 6 months of construction, when they will be held once per week. The Commissioning Agent shall distribute meeting minutes to all parties.

11.3 COMMISSIONING PLAN

The Commissioning Agent shall submit a Commissioning Plan to the Commissioning Authority for review and approval 12 months in advance of the first proposed test. The Commissioning Plan shall include the outline of the organization and accountabilities, activities to be performed, sequence, schedule, documentation, verification procedures, and acceptance criteria pertaining to the overall commissioning process.

The Commissioning Plan shall define the percent of each system the Commissioning Agent must witness. Some systems may require 100 percent sampling, but all systems will be sampled at a minimum rate of 20 percent.





System commissioning shall not begin until the completion and acceptance of all utilities at the Tunnel/roadways. The system acceptance period ends when all systems have been operational and meets or exceeds accuracy and availability requirements for 180 days.

The Commissioning Plan shall detail the implementation of the commissioning process. The Commissioning Plan, submitted to the Commissioning Authority for review and approval, shall include the following:

- Scope of Commissioning This section describes the overall commissioning process, and lists all equipment, systems, and interfaces to be commissioned.
- The commissioning team The plan lists all members of the commissioning team, identified by individual name and corporate identity or by functional identity (e.g., general contractor, mechanical contractor, etc.) and describes their roles and responsibilities.
- Reference documents These shall include the drawings and specifications for the project. In addition, published standards or guidelines relevant to commissioning requirements will be referenced.
- Commissioning meetings Describe the purpose and number of commissioning meetings.
- System-specific details For each system to be commissioned, the Commissioning Plan shall include the details listed below. The plan shall also identify the required testing sequence, progressing logically from equipment, to sub-systems, to systems, to interactions between systems.
 - Equipment readiness Describe the system verification checks to be carried out prior to start-up and include specific checklists.
 - Equipment and system start-ups Describe the step-bystep start-up procedure for each system and piece of equipment. This information is contained in the same checklist as the system verification (or pre-start) checks. If the specification requires that the manufacturer's authorized technician perform the start-up, then the plan shall require that a copy of the completed and signed manufacturer start-up form be included with the start-up checklist in the final documentation.
 - Data on specific equipment being installed.





- Functional performance tests (FPTs) Detail the tests needed to demonstrate correct operation under all modes of operation and include the applicable pass/fail criteria. The Commissioning Agent must witness all FPTs to verify results.
- Acceptance List the criteria for completion of the commissioning process. These shall include verification of functional performance for all systems, submission of TAB reports and O&M manuals, as well as other project-specific criteria.
- Training Describe the intended program for City O&M staff orientation, training and demonstration. Training sessions shall be videotaped.
- Documentation requirements List all documentation required for the final commissioning report. The Commissioning Plan itself shall form the basis of this documentation, which shall include:
 - A document reference list
 - Descriptions of each system, including a sequence of operations
 - Completed and signed system verification, start-up and functional performance test checklists documenting, on a system-by-system basis, all checks and tests carried out, and the results.
 - Retests of all unacceptable results
 - Training documentation, including an agenda for each scheduled session, a list of attendees, and videotape requirements.
 - Comprehensive O&M data.
- Schedule Shall consist of a sequence of events, with an elapsed time allowance for each activity. Typical schedule events include:
 - Site inspections
 - Site meetings
 - Commissioning Issues Log (Cxlog) resolution meetings
 - System Verification Checklists (SVCs)
 - System Start-ups
 - Functional Performance Tests (FPTs)



• Operations staff orientation, training and demonstration.

11.3.1 Non-Conformance to Performance Verification Requirements

Should equipment, system components, and associated controls be incorrectly installed or malfunction during any of the Commissioning activities: correct deficiencies, re-verify equipment and components within the nonfunctional system and, include related systems as deemed required by the Commissioning Agent or Engineer, to ensure effective performance.

In addition, nonconformance issues discovered by the Engineer and Commissioning Agent during any separated witnessing or testing shall be recorded in the Commissioning-log, corrected, and may be retested at the request of the Engineer or Commissioning Agent.

Costs for corrective work, additional tests, and additional inspections, to determine acceptability and proper performance of such items to be borne by Contractor

11.3.2 O&M Training

The Commissioning Agent coordinates and schedules O&M training with the Contractor, and the City Engineers. The Contractor notifies subcontractors, suppliers and manufacturer's representatives, and plans the training program according to project specifications. The Commissioning agent is responsible for scheduling the O&M personnel and the O&M Contractor personnel for planned orientation, training and demonstration sessions.

Responsibility for the actual training program is shared by the Commissioning Agent, the Contractor and major equipment suppliers.

The Commissioning Agent is responsible for the videotaping and documentation of O&M training and demonstration sessions. Videotape permits existing O&M staff to review training material, and new staff to receive the same information provided at the original sessions, including questions posed and answers given. Video offers consistency in training and represents a key value-added component of the commissioning process.

The O&M training program shall include:

- Design intent
- System limitations
- Start-up and shut-down procedures
- Modes of control and operation sequences





- Detailed review of the information and organization of the O&M manual
- Complete listing of contractors and manufacturer contact information
- Detailed instructions on the control system
- Recommended procedures for effective operational monitoring including trending and graphics features for SCADA systems
- Routine preventative maintenance procedures as specified by the designer or recommended by the manufacturer
- Provisions for safety shutdowns, emergency conditions, and interfaces with SCADA, and life-safety systems.

11.3.3 Testing

Factory Acceptance Test (FAT)

Factory Acceptance Test (FAT) is performed before delivery of equipment. The Contractor shall submit a detailed list of all tests and general descriptions of each of the tests indicating the way in which these shall be conducted, and the estimated testing time required for each of these tests.

The Contractor shall submit to the Commissioning Agent (CxA) and Engineer for review and approval all detailed test procedures and final schedules for the tests at least 12 weeks prior to the schedule commencement of FAT.

Should a defect be found during the tests, the nature of the defect shall be explained in detail to the CxA and Engineer who shall decide which portion of the test or tests shall be re-run after the fault has been rectified.

When the performance of the equipment is rejected, the Contractor shall submit alternative equipment for Engineer's review and approval.

The Engineer and the Commissioning Agent may, at their option, witness any or all tests. Observations made during the tests and all test results shall be recorded in a document form, certified by Contractor and submitted to the Engineer for review and approval.

Record all data and observations of the tests. The Contractor shall submit formal test certificates and charts for Engineer's review and approval within 14 days after completion of the tests.



Complete FAT reports shall be provided to the Commissioning Agent for their review and approval and to be included as an appendix to the Commissioning Report.

System Verification Checks (SVCs)

SVCs ensure that systems have been installed properly, conform to the specifications and are ready for safe start-up. The responsibility for carrying out these checks, as well as any corrective action, lies with the Contractor. Documentation of these checks depends on project specifications. The Commissioning Agent prepares SVCs as part of the Commissioning Plan.

Contractor shall commence with testing of the complete equipment with all ancillaries when properly installed and connected in its final working arrangement at site. The Contractor shall perform all the necessary tests to prove that equipment has been properly installed and adjusted. In the event of any part of the equipment failing these tests, conduct further tests after rectification of the fault, over at least two successive and separate periods with no further fault occurring.

The Contractor shall provide suitable and approved test equipment, instruments and layout for the purpose of the tests or rectification of faults found during testing.

The Contractor shall have all instruments calibrated before and after tests by an approved laboratory.

The Contractor shall provide all consumable parts, and replacement parts required during the tests.

At least 8 weeks in advance of any particular site testing, the Contractor shall submit to the Engineer details of the test equipment intended for the testing for approval.

The Contractor shall include all tests for statutory requirements and insurances including payment and arrangements for such tests, inspections by authorized bodies, persons or insurers, as may be necessary and the provision of certificates in the prescribed and approved forms necessary to enable systems and equipment to be put into service.

Functional Performance Tests (FPTs)

The Commissioning Agent shall direct, witness and document the results of the FPTs of all systems commissioned. The Contractor operates the systems as directed by the Commissioning Agent so that FPTs, as documented in the Commissioning Plan, can be completed. The applicable sub-contractors shall participate, along with other relevant commissioning team members. The Contractor may have to



override normal control operation or parameters to simulate specific test conditions and set up trend-logs to provide a record of system responses to test actions. FPTs shall progress from individual items of equipment and sub-systems, to complete systems, to interfaces between systems, depending on the scope of the Commissioning Plan. This test progression helps to isolate the cause of problems while confirming correct operation of smaller portions of the installation, before moving on to tests involving larger systems or interfaces between systems.

Testing, Adjusting, and Balancing (TAB)

The Contractor shall perform HVAC testing, adjusting, and balancing (TAB), as shown on the plans and as specified in the commissioning plan in the presence of the Engineer, prior to the start of the Final Systems Integration Test.

Commissioning Agent witnessed tests

The Commissioning Agent shall witness the following procedures:

- Verification that systems and equipment have been cleaned and prepared for startup.
- Verification of systems for proper installation, adjustment, calibration, and readiness to function.
- Adjustment and verification of proper operation of all discrete elements and sub- systems. Each system shall be operated through all modes of system operation including every individual interlock and conditional control logic, all control sequences, both full- and part-load conditions, and simulation of all abnormal conditions for which there is a specified system or controls response.

The Contractor shall be responsible for operating systems and equipment throughout this testing and verification process.

Final System Integration Test

The Final System Integration Test requires the integrated simultaneous operation of all subsystems for a 24-hour period before the tunnel and roadways are opened to public traffic and before the system can enter the 180-day System Acceptance Test (SAT).

System Acceptance Test (SAT)

The System Acceptance Test (SAT) consists of a pre-installation test and a post installation test after a 180 test-day period of operations without a major failure of the Contractor furnished equipment.

The Contractor shall demonstrate that systems consisting of





hardware, software, materials and construction is properly installed, is free from identified problems, exhibits stable and reliable performance, and conforms to the requirements of the commissioning plan and this chapter.

The SAT shall be conducted with the actual traffic conditions when the tunnel and roadways are opened to public traffic.

The Contractor shall ensure that all equipment is maintained in operable condition during the SAT and shall troubleshoot, diagnose, identify, isolate, and resolve all hardware, software, SCADA and firmware problems and inconsistencies. The Contractor shall correct all problems and inconsistencies with Contractor installed equipment.

The Contractor shall correct all system documentation errors and changes discovered and resulting from the SAT and previous testing. System acceptance shall not be complete until corrected documentation is submitted.

Severity of faults and failures depend upon the accuracy and availability of data and control and the potential or actual results on the safety and convenience of the traveling public.

The following conditions shall result in suspension of the SAT:

- Interference with project operations due to vandalism, traffic accident, power failure, or natural disasters.
- Failure to complete the objective of any test scenario due to lack of complete documentation for equipment supplied by the Contractor.
- Intermittent hardware, SCADA, communication, or operation control malfunctions.

After satisfactory remedial action, the SAT shall be resumed and extended one day for each restart.

Any one of the following conditions is considered to be a major failure:

- Failure of any hardware, SCADA, or performance item to meet the operational requirements of the SAT for 72 consecutive hours.
- Failure of 5 percent of all field devices or communication equipment within a 14-day period.
- Failure to correct any problem that has an adverse impact on the safety of the traveling public within 4 hours of notification by the Engineer.





The SAT test clock shall be restarted at zero after a major failure is corrected.

The Commissioning Agent shall notify the Contractor in writing of the start of the System Acceptance Test work period and shall furnish statements regarding days credited to the tunnel systems and equipment commissioning work after the notification.

The time required for SAT work shall be considered as included in the total time limit specified for the contract.

Upon successful completion and acceptance of the SAT, the warranty period shall commence.

Upon successful completion of the SAT, the Commissioning Agent shall provide the Commissioning Authority with a statement of acceptable performance with the complete commissioning records and manuals.

11.3.4 Reports Submittal

The Commissioning Agent shall compile, organize and index the following commissioning data for each system and equipment into labeled, indexed and tabbed, three-ring binder manuals and submit to the Commissioning Authority, to be included with the Operation and Maintenance (O&M) manuals. Three copies of the manuals shall be submitted.

The Commissioning Report shall include a narrative description of systems, equipment, and components for each division of the specifications commissioned.

In addition, the commissioning report shall include, but will not be limited to:

- Executive Summary
- Manufacturer's checklists.
- Cx Issues Log (log of commissioning findings and resolution).
- System Verification Checklists.
- Functional Performance Tests.
- Functional Performance Test summaries
- Site Observation Reports
- Submittal Reviews
- O&M Manuals Reviews organized by systems





- As-Built Drawings Reviews
- O&M Training Documentation
- Start-Up Documentation
- TAB Report Review and Verification
- Commissioning Plan
- Commissioning Progress Reports
- System Acceptance Test Report
- FAT Reports
- List of Acronyms and Abbreviations

11.4 SAMPLE COMMISSIONING SCHEDULE

The Contractor will furnish, install, remove, reinstall, and maintain at its expense warning signs, cones, drums, portable flashing arrows, and portable barricades with battery operated flashers as the RTE 34E Engineer may direct or approve to meet site conditions, control and direction of traffic and promote safety and convenience. Warning signs, barricades, flashing lights, and other protective devices shall be constructed and erected in accordance with the latest edition of the "Manual on Uniform Traffic Control Devices for Streets and Highways" - Part VI, prepared by the National Joint Committee on Uniform Control Devices, and approved by the City Engineer

The appendix contains a sample schedule showing how the construction activities and commissioning activities will be linked in an integrated commissioning schedule.


Date: 3-May-10							SYSTEM START-UP	AND COMMISSION	NING SCHEDULE (P	reliminary)						
		Flush & Clean	Physical Installation	Air/Hydro	System Start-up	Pipe Flushing &	Lock-out/Tag- out Review	Pre-functional checksheets completed -by	Predecessors for Equipment Start-	Equipment	CxA verifies Pre-functional	Predecessors in Cx Functional	Cx Functional Performance Checklists Completed by	Pre-Functional	Cx Functional Performance Checklists Verified By	Start IAQ
Systems	_	Meeting	Complete	Testing	Meeting	Cleaning	Meeting	Subs	up	Start-up	Checklists	Checksheets	Subs	Test Meeting	CxA	OA Flush
	-															
DDC Control system	DDC		7-May-11							8-May-11	7-Jun-11	L	/-Jul-11		7-Aug-11	
Cupply Air Distribution System				-								LOBINCE	1 Aug 11	C Aug 11	10 4	16 Aug 11
All 1.8 All 2	A	15 km 11		25 hup 11	1 14 11	E kul 11	10 10/ 11	1E Jul 11	Electrical	20 101 11	2E Jul 11	L,U.K,J,H,C,B	1-Aug-11	6-Aug-11	10-Aug-11	16-Aug-11
AND-1 & AND-2	D	12-JUI-11	+ +	25-Jun-11	1-JUI-11	2-101-11	10-Jui-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	I-Aug-11	0-Aug-11	9-Aug-11	10-Aug-11
Lab Exhaust System	C		+ +									DE	1-Aug-11	6-Aug-11	9-Aug-11	16-Aug-11
FF-1 2 & 3	D	15-lun-11	20-lun-11	25-lun-11	1-lul-11	5-lul-11	10-Jul-11	15-lul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
ERU	E	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
	-															
Atrium Smoke Exhaust System	F											A. G	1-Aug-11	6-Aug-11	11-Aug-11	16-Aug-11
SMF-1	G	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	10-Aug-11	16-Aug-11
HEPA Exhaust Systems	н											1	1-Aug-11	6-Aug-11	9-Aug-11	16-Aug-11
HEF-1 & 2	I	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
XEL Relief Fans	J							<u>(</u>				к	1-Aug-11	6-Aug-11	9-Aug-11	16-Aug-11
REF-1 ,2,3,4,5 & 6	К	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
Chilled Water System	L											M,N	1-Aug-11	6-Aug-11	9-Aug-11	16-Aug-11
CHWP-1 & 2	м	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
CHXX-1 & 2	N	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
	-															
Hot Water System	0	15 1 - 11	20 1	25 has 11	4.6.1.4.4	E 1.1.11	10 1.11	15 1-1 11	Classical	20 1.1 11	25 1-1 11	P.Q	1-Aug-11	6-Aug-11	9-Aug-11	16-Aug-11
HHWP-1 & 2	P	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jui-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
HHHX-1 & 2	ų.	12-Jun-11	20-Jun-11	25-Jun-11	1-101-11	2-101-11	10-Jui-11	15-Jul-11	Electrical	20-Jui-11	22-Jui-11	DDC	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
Energy Recovery System	R		+ +	-								5010	1-Aug-11	6-Aug-11	9-Aug-11	16-Aug-11
Energy Recovery System	c	15-lup-11	20-lup-11	25-lup-11	1-lul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	3, 0, L, C	1-Aug-11	6-Aug-11	8-Aug-11	16-Aug-11
LIWF-102	-	15-5411-11	20-5011-11	25-5011-11	1-301-11	5-541-11	10-501-11	13-501-11	Liectrical	20-501-11	25-501-11	bbe	1-Aug-11	0-A0g-11	0-Aug-11	10-Aug-11
Lighting Controls	+	15-Jun-11	20-Jun-11	25-Jun-11	1-jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11		1-Aug-11	6-Aug-11	11-Aug-11	16-Aug-11
-0	+	10 101 12								10 10. 11	20 50 11			0,000 22		-01100 11
Refrigeration Systems	+	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	11-Aug-11	16-Aug-11
	1			100100000000												
Domestic Hot Water	1	15-Jun-11	20-Jun-11	25-Jun-11	1-Jul-11	5-Jul-11	10-Jul-11	15-Jul-11	Electrical	20-Jul-11	25-Jul-11	DDC	1-Aug-11	6-Aug-11	11-Aug-11	16-Aug-11
NOTE			When possible	, Meeting Dates will	change to co inside	with Project Meeti	ngs. Dates to be a	djusted as construc	tion progresses.							





11.5 SAMPLE COMMISSIONING FORMS

Following is a sample commissioning forms to show how the rigor and depth of the testing activities.

WJS Job # 2009xxxxx	Root Air Conditioning Unit, ACU-1 Functional Test
Fu	nctional Test
Projec	ct:_ <u>BTMWP - Bidg. J.</u>
FT- PACKAGE	ED AIR CONDITIONING UNIT
Including integral equ X variable s	<u>ACU-1, EF-1</u> uipment: <u>X</u> supply fans, <u>X</u> return fan, speed drive
Related To	ests: Terminal VAV Units
1. Participants Party	Participation
Jorty filling out this form and witnessing	tecting
Party filling out this form and witnessing Date of test	y testing p reports and pre-functional checklists submitted and approved Il interlocking systems are programmed and operable per contract dules with debugging, loop tuning and sensor calibrations
Party filling out this form and witnessing Date of test	p testing p reports and pre-functional checklists submitted and approved



BTMWP - Bidg J WJS Job # 2009xxxxx

Air Conditioning Unit Prefunctional Checklist

Prefunctional Checklist - Packaged Air Co	onditioning	Units ACU-1		6
Check appropriate box if OK. Enter comment or note	number if defic	sient.		
Requested documentation submitted		T T		1
requested documentation submitted	Specified	Shop Dr	Installed	Contr
Manufacturer	Trane	Trano	in taxanicu	Corris.
Model #	CELEEDO	CELEE 20E		3
MOUCH #	Check	SFRFF2UE	mmente	Contr
Vanufacturade out choole	Grieck	00	mments	Conu.
Mariulaculer o cul alecto	1			2
Periormance data (ran curves, con data, etc.)				
nstallauon and startup manual and plan				2
Sequences and control scrategies				6
O&M manuars				2 2
Installation Checks				-
Cabinet and General Installation				
Permanent labels affixed, including for fans				
Casing condition good: no dents, leaks, door gaskets	1			
Stainless steel drain nans	-	-		5
Access doors close tightly - no leaks		1		2 2
Boot between duct and unit tight and in good condition				3
Vibration isolation equipment installed & released from				-
shipping locks Maintenance access acceptable for unit and components		-		3
		-		
Sound attenuation installed		<u></u>		2
Inermal insulation property installed and according to				
specification		-		2
(thermometers pressure ranges flow meters etc.)				-
Clean up of environment completed per contract documents	-	+		2
crear up or equipment competed per contract documents				
Construction filters removed — Filters installed. 30%	-	-		1
Prefiters (MERV 70 and 85% final fitters (MERV 13) and		1		
replacement type and efficiency permanently affixed to housing.				
Valves, Piping and Colls (see full piping checklists)		1		
Pipe fittings complete and pipes properly supported				
Condensate piping witrap and extended to roor drain		1		-
Pipes properly labeled		t		
Pipes properly insulated		T		1
Strainers in place and clean	2			1
Piping system property flushed				
No leaking apparent around fittings		1		
All colls are clean and fins are in good condition				
All SS condensate drain pans clean and slope to drain, per		1	1	č
spec		1		
Valves properly labeled				
Valves Installed in proper direction				1

PC_ACU

8/31/2009

Page 1 of 4



11.6 SYSTEMS TO BE COMMISSIONED

The City of New Haven may assign such assistants and representatives, as it deems necessary at the expense of the Developer and they shall be authorized to give directions with regard to the safety and convenience of the Tunnel motorist, the erection and maintenance of traffic protection devices, barricades and warning signs and related matters.

The right is reserved to suspend construction on any operation on any day at any time when, in the opinion of the Cities Engineer, the volume of traffic or the weather is such as to result in inordinate delays in traffic movement.

11.6.1 General

The Contractor shall perform systems and equipment commissioning in the presence of the Commissioning Agent. The commissioning process shall verify systems and equipment are fully functioning in conformance with the details shown on the plans and the requirements specified in this chapter.

The systems and equipment to be commissioned shall at a minimum include the following for tunnel, and roadways systems:

- Mechanical systems, including:
 - HVAC and ventilation systems
 - CO2 detection and control
 - Utilities Drainage and Stormwater
- Fire protection systems, including:
 - Fixed fire protection system stand-pipe system.
 - Manual fire alarm boxes (pull stations)
 - Fire alarm control panels
 - Fire alarm control panel remote annunciators
 - Fire department hose connections
 - Linear heat detectors
- Electrical systems, including:
 - Lighting systems.
 - Medium voltage switchgear.
 - Electrical metering, monitoring, and control systems.





- Motors.
- Medium voltage automatic transfer switches.
- Medium voltage transformers.
- Low voltage transformers.
- Primary power system cabling.
- Secondary power system cabling.
- Breaker trip sequencing coordination.
- Ground fault systems.
- Service switchboard.
- Circuit breaker panelboards.
- Motor control centers.
- UPS systems and battery capacity test.
- SCADA system
- Special systems, including:
 - Security and access system.
 - Carbon Monoxide (CO) monitoring, calibration and control systems.
 - Tunnel drainage system
- Traffic Operations System (TOS) / Tunnel Traffic Control System (TTCS), including:
 - Variable message signs.
 - Changeable message signs.
 - Extinguishable message signs.
 - Closed circuit television (CCTV) systems.
 - Vehicle detection stations
 - Traffic signals
- Communications systems, including:
 - Telephone systems.
 - Data systems.
 - Fiber optic systems.





- Radio rebroadcast systems.
- Call Box
- Communication link for the Operations control from and with all development parcels associated with the air rights program over the roadway.

After installation and testing of all elements of the tunnel and roadway systems, the systems shall be tested and integrated into a complete system. The testing and integration of all systems shall follow the test plan and procedures (Cx Plan) prepared by the Commissioning Agent and Contractor and approved by the Commissioning Authority.

11.7 COORDINATION WITH OTHER WORK

Work on other projects on the Tunnel as well as City of New Haven maintenance operations may be in progress during the period of construction of this platform. It is the Contractor's responsibility to coordinate and schedule his operations with those of City of New Haven projects in order to minimize interference to both Tunnel and local traffic. Scheduling will be subject to the review and approval of the RT 34E's Engineer who may require revision of the schedule to best suit the proper coordination of the various projects.

11.8 OPERATIONAL CONTROL

The commissioning Agent of this project working for this parcel's developer shall make himself aware and familiar with the previous air right development projects completed and underway.

This commissioning plan shall include the testing of the communication and controls of the scope of work performed under this project with the present Operations control center.

This commissioning plan shall include an integrated acceptance test, all pretests, and the preparation of the forms and schedules required for this test.

All systems included in this commissioning plan that communicate with the Operations Control center will be included in the integrated acceptance test of this section.



Chapter 12 Table of Contents

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12.2.	PLAN REQUIREMENTS	12-2
12.3.	MEANS OF EGRESS/ACCESS	12-2



Chapter 12 Emergency Response Plan

12.1 GENERAL

Emergency response plans shall be developed in accordance with the latest edition of NFPA 502 Chapter 4.4 and approved by the AHJ. The Developer shall assume responsibility for coordinating meetings between all identified stakeholders in the fire life safety engineering analysis.

12.2 PLAN REQUIREMENTS

DRAFT emergency response plans shall be submitted with every design deliverable prepared in accordance with Chapter 4.4 of the latest edition of the NFPA 502. A final draft of the emergency response plan shall be submitted to the AHJ upon completion of the Project.

The emergency response plans shall be developed to work in conjunction/coordination with existing emergency response plans already in place for adjoining tunnel sections. Should modifications be required to the emergency response plan for the adjoining tunnel section the Developer shall be responsible the coordination with all appropriate stakeholders in order to update the emergency response plan.

12.3 MEANS OF EGRESS/ACCESS

The emergency response plan shall include the means of egress requirements in accordance with the latest edition of NFPA 502 Chapter 7 and Chapter 8. Routes used by emergency response units to access the covered roadway shall not be impeded at any time. Safe and well documented egress routes from the covered roadway shall be maintained at all times.

Egress paths shall be incorporated in the design at any air rights development. These paths shall allow egress from the site of an emergency to an unobstructed means of egress. Where roadways are segmented by continuous structures meeting separation requirements for fire and ventilation, egress from one segment (tunnel) to another shall be accommodated via well- marked accessible exit ways. These exit ways shall be located at a maximum of 500 feet on center.

This section needs additional language added to discuss the design of fire doors within traffic areas to allow safe pedestrian use and clearance for conventional swing door operation (e.g. curb or guiderail design in door threshold areas). Sliding doors are an option for confined locations.





LEVEL -1 FOUNDATION PLAN SCALE: 1/16" = 1'-0" NOTE: SEE 5003 FOR PLAN NOTES AND DETAILS

ELKUS MANFREDI
(=ddv=) 25 DBYDOCK AVENUE BOSTON MASSACHUSETTS 02210 (mi) 617.426.1300
101 COLLEGE STREET DEVELOPMENT
WE 101 College Street, LLC Cilent 300 George Street New Haven, CT 00511 200 824 5317
CANA MA RA SALVIA STRUCTURAL INFORMERS Structural Engineer 101 Federal Street, suite 1100 Geston, MA 02110 817 737 0040
MEP Engineer B3 Tremont S, Suite 1040 Boston, MA 02108 781 402 6000
FUSS&O'NEILL Civil Engineer / Landscape 148 Hentlood Read Manchester, CT 08040 880 046 2489
Code Consultant 1661 Worcester Road, Suite 501 Framingham, MA 01701 508-273-8484
PROJECT NUMBER: 15072.000
DATE: DEC 6, 2019 100% SCHEMATIC DESIGN
REVISIONS:
SCALE: 1/16" = 1'-0"
DRWING NAME: LEVEL -1 FOUNDATION PLAN
DRAWING NUMBER:
S100





EXHIBIT X-2

LEGAL DESCRIPTION OF DOWNTOWN CROSSING AREA

A CERTAIN PARCEL OF LAND CONSISTING OF 11.40 ACRES LOCATED IN THE CITY OF NEW HAVEN, STATE OF CONNECTICUT AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE NORTHEAST CORNER OF THE PDD 28 ZONE AND THE CENTER OF NORTH FRONTAGE ROAD RUNNING EAST TO THE CENTER OF THE INTERSECTION WITH SOUTH ORANGE STREET. THENCE RUNNING SOUTHWEST IN THE CENTER OF SOUTH ORANGE STREET TO A POINT IN THE CENTER OF THE INTERSECTION WITH SOUTH FRONTAGE ROAD. ZONE THEN TURNS TO THE NORTHWEST IN THE CENTER OF SOUTH FRO 'TAGE ROAD TO THE EASTERLY PROPERTY LINE OF PDD 28 AND CONTINUES NORTH ALONG TO EASTERLY PROPERTY LINE OF PDD 28. Exhibit X-2 - Legal Description of Downtown Crossing Area

Return to: City of New Haven 165 Church Street New Haven, CT 06510

QUIT-CLAIM DEED

STATUTORY FORM

2012

KNOW YE, that the **State of Connecticut**, acting herein by Shawn T. Wooden, Treasurer of the State of Connecticut, under authority granted by Section 1(a) of the June Special Session of Special Act No. 15-1 of the General Assembly of the State of Connecticut, approved July 6, 2015 pursuant to the provisions of Section 1(c) of the June Special Session of Special Act No. 15-1 of the General Assembly of the State of Connecticut, and with the approval of the State Properties Review Board of the State of Connecticut, for consideration paid One Thousand Dollars (\$1,000.00), the administrative cost of such conveyance, does hereby give, grant, bargain, sell and convey to the **City of New Haven**, a Municipal corporation existing under the laws of the State of Connecticut, and having its territorial limits within the County of New Haven and State of Connecticut, with QUIT-CLAIM COVENANTS,

That certain parcel of land situated in the City of New Haven, County of New Haven and State of Connecticut situated on the southwesterly side of Present Reverend Dr. Martin Luther King Jr. Boulevard (Formerly North Frontage Road), containing 4.5 acres, more or less, and more particularly shown on a map to be filed in the New Haven Town Clerk's Office entitled: TOWN OF NEW HAVEN MAP SHOWING LAND RELEASED TO CITY OF NEW HAVEN BY THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION RICHARD C. LEE HIGHWAY (CT ROUTE 34) SCALE 1" =40' FEBRUARY 2019 MARK D. ROLFE, P.E. CHIEF ENGINEER – BUREAU OF ENGINEERING AND CONSTRUCTION". TOWN NO. 92, PROJECT NO. 92-93, SERIAL NO. 68A, SHEET 1 OF 1, bounded and described as follows:

NORTHEASTERLY by Present Reverend Dr. Martin Luther King Jr. Boulevard (Formerly North Frontage Road), a total distance of 864.71 feet, more or less, by a line designated "RELEASE LINE & FORMER NON-ACCESS HIGHWAY LINE", as shown on said map;

SOUTHEASTERLY by Present Church Street, 220 feet, more or less, by a line designated "RELEASE LINE & EASEMENT LINE", as shown on said map;

SOUTHERLY by Present Church Street at the intersection of Present South Frontage Road, 73 feet, more or less, by a line designated "RELEASE LINE & EASEMENT LINE", as shown on said map;

SOUTHWESTERLY by Present South Frontage Road, a total distance of 766.89 feet, more or less, by a line designated "RELEASE LINE & FORMER NON-ACCESS HIGHWAY LINE", as shown on said map;

NORTHWESTERLY by Present College Street at the intersection of Present South Frontage Road, 33 feet, more or less, by a line designated "RELEASE LINE", as shown on said map;

SOUTHWESTERLY	by said Present College Street at the intersection of Present South Frontage Road, 24 feet, more or less, by a line designated "RELEASE LINE", as shown on said map;
WESTERLY	by said Present College Street at the intersection of Present South Frontage Road, 10 feet, more or less, by a line designated "RELEASE LINE", as shown on said map;
NORTHWESTERLY	by said Present College Street, 152 feet, more or less, by a line designated "RELEASE LINE", as shown on said map;
NORTHERLY	by said Present College Street at the intersection of Present Reverend Dr. Martin Luther King Jr. Boulevard, 10 feet, more or less, by a line designated "RELEASE LINE", as shown on said map;
NORTHEASTERLY	by said Present College Street at the intersection of Present Reverend Dr. Martin Luther King Jr. Boulevard, 12 feet, more or less, by a line designated "RELEASE LINE", as shown on said map;
NORTHWESTERLY	by said Present College Street at the intersection of Present Reverend Dr. Martin Luther King Jr. Boulevard, 32 feet, more or less, by a line designated "RELEASE LINE", as shown on said map.

For the State's source of title to the premises herein conveyed, reference is made to an those certain parcels of land situated in the City of New Haven, County of New Haven and State of Connecticut, as acquired from the following Grantors and as set forth in the below listed instruments, which have been recorded in the New Haven Land Records in the volumes and pages set forth below, to which further reference may be had for more particular descriptions thereof.

Grantor	Instrument	Volume/Page	Recorded Date
Fannie Chain	Certificate of Condemnation	1893/303	05/25/1956
Fannie Chain	Certificate of Condemnation	1927/243	03/08/1957
Ugolina M. Frattini	Certificate of Condemnation	1913/93	10/26/1956
Joseph Alpert, Sam Alpert	Certificate of Condemnation	1911/591	10/24/1956
Lawrence J. Hoffman, Estate of Paul Sugarman	Certificate of Condemnation	1921/501	01/23/1957
Sarong, Incorporated	Certificate of Condemnation	1911/421	10/16/1956
The Russian Progressive Mutual Aid Society, Inc.	Certificate of Condemnation	1929/19	03/20/1957
The Herlin Realty Company	Certificate of Condemnation	1920/99	01/08/1957

Mary Jane Reynolds	Certificate of Condemnation	1929/21	03/20/1957
Louis R. Gans, Joseph Gans	Certificate of Condemnation	1927/245	03/08/1957
Alcibiades G. Heris	Certificate of Condemnation	1918/91	12/18/1956
Frances Mezebish	Certificate of Condemnation	1904/507	08/22/1956
Annie Rosenthal aka Anna Rosenthal	Certificate of Condemnation	1911/491	10/18/1956
Michael Greenberg	Certificate of Condemnation	1906/313	09/04/1956
Irving Caplan and Morris Hurwitz	Certificate of Condemnation	1928/151	03/29/1957
Charles A. Droz and Violet N. Droz	Certificate of Condemnation	1911/483	10/18/1956
Frank Raviola	Certificate of Condemnation	1928/41	03/27/1957
Christie G. Heris	Certificate of Condemnation	1923/269	02/04/1957
Christie G. Heris, a/k/a Christe G. Heris	Certificate of Condemnation	1926/485	03/25/1957
Antoinette Farricelli	Certificate of Condemnation	1927/319	03/12/1957
Samuel D. Aaronson	Certificate of Condemnation	1925/231	02/19/1957
Rose B. Gingold	Certificate of Condemnation	1920/97	01/08/1957
Lena Annunziata, a.k.a. Adelina Annunziata	Certificate of Condemnation	1904/112	08/08/1956
Hill-Commerce Realty Company	Certificate of Condemnation	1926/501	03/25/1957
Isadore Skolnick, Philip A. Skolnick, Benjamin S. Skolnick	Certificate of Condemnation	1929/17	03/20/1957
Mary Mauro	Certificate of Condemnation	1929/23	03/20/1957

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Sol M. Gompertz, Stella L. Dryfus, a.k.a. Estelle L. Dryfus, Florence L. Marqusee, Lillian L. Grannick, a.k.a. Lillie L. Grannick	Certificate of Condemnation	1918/87	12/18/1956
Gerald Franco	Certificate of Condemnation	1918/81	12/18/1956
Elsa G. Links	Certificate of Condemnation	1921/489	01/23/1957
Ruth L. Fisher	Certificate of Condemnation	1928/33	03/27/1957
Domenick Stana, a.k.a. Dominick Stana	Certificate of Condemnation	1925/227	02/19/1957
Frank J. Maisano	Certificate of Condemnation	1922/215	02/01/1957
Bernard P. Kopkind, Esther Kopkind, Sylvia A. Luria, Esther Cotzen, Samuel Schancupp, Harold D. Hartenstein, Helen Hartenstein, Berthe Schancupp, Frances Schancupp, Clarice Morris, Elizabeth Aaronson	Certificate of Condemnation	1929/11	03/20/1957
Hill Street Properties, Inc.	Amended Certificate of Condemnation	1961/187	01/29/1958

Together with any rights, title or interest the State of Connecticut (D.O.T.) has or may have in portions of the former Oak Street, Factory Street, Congress Street, Temple Street and Hill Street, as more particularly shown on said map.

Together with any right, title and interest the State of Connecticut (D.O.T.) has or may have in any pipes, conduits and underground drainage facilities running on, through, over, or under the above-described premises, including without limitation, the pipes and conduits shown on the above-referenced map.

The State of Connecticut, for itself, its successors and assigns waives and relinquishes all rights of enforcement for the former non-access highway line of Present Reverend Dr. Martin Luther King Jr. Boulevard (Formerly North Frontage Road) and Present South Frontage Road, as more particularly shown on said map.

All rights of Ingress and Egress which were specifically denied, and the right excepted to the State of Connecticut to designate access approaches, as stated in a Quit Claim deed from the State of Connecticut to the City of New Haven (City of New Haven land records Volume 2134, Page 345) are hereby released for the parcel of land shown on this map. The release of these rights is strictly limited to the depicted release area.

In accordance with Section 1(b) of the June Special Session of Special Act No. 15-1, the above described premises is conveyed with the special limitation that said premises shall be used for economic development purposes, and in the event that the City of New Haven does not use said parcel for said purposes; does not retain ownership of all of said parcel, except of a sale of said land for economic development purposes; or leases all or any portion of said parcel, except for a lease for economic development purposes, the parcel shall revert to the State of Connecticut. Any funds received by the City of New Haven from a sale or lease of said parcel for economic development purposes shall be transferred to the State Treasurer for deposit in the Special Transportation Fund.

The above-described premises are conveyed subject to such rights and easements as may appear of record, and to any state of facts which an inspection of the premises may show.

The above-described premises are conveyed subject to any and all provisions of any ordinance, municipal regulation, or public or private law.

Signed this day of	, A.D. 20
Witnessed by:	
	State of Connecticut
Witness	
•	By (I.S.)
	Shawn T. Wooden
	Treasurer
Witness	Duly Authorized
STATE OF CONNECTICUT)
) ss: Hartford
COUNTY OF HARTFORD)
Connecticut.	.0, by snawn 1. wooden, measurer of the state of
My Commission Expires	Notary Public
This conveyance is made wi Section 1(c) of the June Special S the State of Connecticut, dated July	th the approval of the undersigned in conformity with ession, of Special Act No. 15-1 of the General Assembly of 6, 2015.
	Edwin S. Greenberg, Chairman (Date)
APPROVED AS TO FORM:	State Properties Review Board
William Tong, Attorney General	State of Connecticut
	Duly Authorized
Joseph Rubin	<u> </u>
Assistant Deputy Attorney General	
Duly Authorized	
Date:	
	5 of 5



	SCHEDULE OF	TITLE	
ILE NO.	FORMER OWNER	INSTRUMENT TYPE	VOL./PG
2-93-134	LENA ANNUNZIATA	CERTIFICATE OF CONDEMNATION	1904/112
2-93-135	HILL-COMMERCE REALTY COMPANY	CERTIFICATE OF CONDEMNATION	1926/501
2-93-137	ISADORE SKOLNICK ET ALS	CERTIFICATE OF CONDEMNATION	1929/17
2-63-159	MARY MAURO	CERTIFICATE OF CONDEMNATION	1929/23
2-93-161	SOL M. GOMPERTZ ET ALS	CERTIFICATE OF CONDEMNATION	1918/87
7-93-162	GERALD FRANCO	CERTIFICATE OF CONDEMNATION	1918/81
2-93-163	ELSA G. LINKS	CERTIFICATE OF CONDEMNATION	1921/489
?-93-164	RUTH L FISHER	CERTIFICATE OF CONDEMNATION	1928/33
2-93-165	DOMENICK STANA	CERTIFICATE OF CONDEMNATION	1925/227
2-93-166	FRANK J. MAISANO	CERTIFICATE OF CONDEMNATION	1922/215
2-93-167	BERNARD P. KOPKIND ET ALS	CERTIFICATE OF CONDEMNATION	1929/11
9-93-183	HILL STREET PROPERTIES, INC.	AMEND. CERT. OF CONDEMNATION	1961/187



EXHIBIT Z

PARKING AGREEMENT

THIS AGREEMENT is made and entered into as of the __ day of ______, 2020, by and among the CITY OF NEW HAVEN, a municipal corporation with an address of 165 Church Street, New Haven, Connecticut (the "City"), THE NEW HAVEN PARKING AUTHORITY (the "Authority"), the City's parking authority established pursuant to 1951 Special laws Act 473 of the General Assembly as amended and a referendum of the electors of the City of New Haven as operator of the Temple Medical Garage and the Temple Street Garage, acting herein by its Chairman, hereunto duly authorized, having an address at 232 George Street, New Haven, Connecticut 06510, and WE 101 COLLEGE STREET LLC, a Delaware Limited Liability Company authorized to do business in Connecticut ("WE 101"), acting herein by its Member/Manager, hereunto duly authorized, having an address at 150 Baker Avenue Extension, Suite 303, Concord, Massachusetts 01742.

WHEREAS, the City is the owner and the Authority is the operator of that certain parking garage facility commonly known as the "Temple Street Garage" and being more particularly described in <u>Schedule of Temple Street Garage</u> attached (the "Temple Street Garage"); and

WHEREAS, the City is also the owner and the Authority is also the operator of that certain parking garage facility commonly known as the "Temple George Garage" also known as the "Temple Medical Garage" and being more particularly described

in <u>Schedule of Temple Medical Garage</u> attached, (the "Temple Medical Garage"); and

WHEREAS, WE 101, the City and the Authority have entered into a Development and Land Disposition Agreement (the "DLDA") for WE 101's development of a commercial, medical, laboratory, and office mixed use facility (the "Mixed Use Facility") to be located on a parcel of land to be known as 101 College Street, New Haven, CT (the "101 College Street Parcel"), being more particularly described in <u>Schedule of 101 College Street Parcel</u> attached; and

WHEREAS, the Authority and WE 101 desire to enter into this Agreement so as to provide, on a long-term basis, for the parking needs of the Mixed Use Facility and the City, as owner of the Temple Street Garage and Temple Medical Garage, is a party to this Agreement solely for the purposes of Section 2 (i), Section 5 and (to the extent applicable) Section 6, and shall in no event be deemed liable or otherwise responsible with respect to any alleged default by the Authority with respect to the obligations of the Authority hereunder.

NOW, THEREFORE, in view of the foregoing and in consideration of the terms hereof, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by the Authority, WE 101 and the City (collectively referred to herein as the "Parties" and individually as a "Party"), do hereby agree as follows:

1. <u>TERM.</u>

(a) The initial term of this Agreement (the "Initial Term") shall be for a period of twenty (20) years, commencing no later than six (6) months after a certificate of occupancy or temporary Certificate of Occupancy (whichever is

earlier) is issued for the Mixed Use Facility, which WE 101 and the Authority anticipate will be in approximately February 2023 (the "Commencement Date"), subject to earlier termination as provided herein. The Parties shall execute a certificate stating the Commencement Date of the Initial Term. The first twenty (20) year period of the Term of this Agreement is sometimes referred to herein as the "Initial Term."

(b) WE 101 shall have three (3) successive options to extend the Term of this Agreement. Each such option shall be for twenty (20) additional years. If WE 101 chooses to exercise the first option to extend the Term, it shall so exercise the first option in writing to the Authority and the City no later than twelve (12) months prior to the expiration of the Initial Term. If WE 101 chooses to exercise the second option to extend the Term, it shall exercise such second option in writing to the Authority and the City no later than twelve (12) months prior to the expiration of the Term as extended by the first extension period. If WE 101 chooses to exercise the third option to extend the term of this Agreement, it shall exercise such third option in writing to the Authority and the City no later than twelve (12) months prior to the expiration of the Term as extended by the second extension period.

(c) WE 101 shall have the right to terminate this Agreement at any time pursuant to the following terms:

(1) If the DLDA terminates, this Agreement shall automatically terminate on the date that the DLDA terminates without the need for any prior notice to the

Authority, and no payment shall be due to the Authority on account of such termination.

(2) If WE 101 gives written notice to the Authority and to the City of the termination of this Agreement under Section 4(c) below, this Agreement shall terminate on the date specified in the notice, except that the Authority shall pay to WE 101 any amounts that have been paid by WE 101 to the Authority for Parking Permits for days subsequent to the date that the Agreement terminates.

(3) If WE 101 gives notice of termination of the Agreement ("Notice of Termination") within the first seven (7) years of the Initial Term, except under the circumstances set forth in subparagraph 1(c)(2),it shall provide the Notice of Termination in writing to the Authority and the City pursuant to the schedule herein below and shall pay to the Authority \$750,000.00 as liquidated damages within 30 days of the termination date (the "Termination Date") specified in the Notice of Termination:

- (a) If the Notice of Termination is provided at a time when WE 101
 is receiving 100 or fewer permits per month in the Temple Medical
 Garage, WE 101 shall provide the Notice of Termination at least
 four (4) months in advance of the Termination Date;
- (b) If the Notice of Termination is provided at a time when WE 101 is receiving 101 or more permits per month in the Temple Medical Garage, WE 101 shall provide the Notice of Termination at least seven (7) months in advance of the Termination Date.

(4) If WE 101 gives the Notice of Termination of the Agreement between the 8th year and 20th year of the Initial Term, except under the circumstances set forth in subparagraph 1(c)(2), it shall provide notice in writing to the Authority and the City no less than 18 months in advance of the Termination Date and shall pay to the Authority as liquidated damages three (3) times the average of the monthly Parking Permit Fees charged by the Authority during the three months prior to the Termination Date. Payment shall be made within 30 days of the Termination Date;

(5) If WE 101 gives the Notice of Termination of the Agreement between the 21st year and 40th year of the Term, except under the circumstances set forth in subparagraph 1(c)(2), it shall provide notice in writing to the Authority and the City no less than 18 months in advance of the Termination Date and shall pay to the Authority as liquidated damages three (3) times the average of the Monthly Parking Permit Fees charged by the Authority to WE 101 during the three months prior to the Termination Date. Payment shall be made within 30 days of the Termination Date;

(6) If WE 101 gives the Notice of Termination of the Agreement between the 41^{st} year and 80^{th} year of the Term, except under the circumstances set forth in subparagraph 1(c)(2), it shall provide notice in writing to the Authority and the City no less than 18 months in advance of the Termination Date, and no liquidated damages shall be due to the Authority on account of such termination.

(7) The Authority and WE 101 agree and acknowledge that the sums payable by WE 101 to the Authority under this provision are liquidated damages and not penalties. The Authority and WE 101 further acknowledge that (i) the

actual amount of loss or damages likely to be incurred is incapable or is difficult to precisely estimate, (ii) the amounts specified above bear a reasonable relationship to and are not plainly or grossly disproportionate to the probable loss likely to be incurred in connection with any termination of this Agreement by WE 101 (iii) the Authority and WE 101 desire to liquidate such amount, and (iv) no further amount shall be owed by WE 101 to the Authority on account of the termination of this Agreement

2. <u>MONTHLY PARKING.</u>

(a) During the Term of this Agreement (which includes the Initial Term and all subsequent extensions of the term of this Agreement, as described above), the Authority shall make available to WE 101 an amount of monthly parking permits (the "Parking Permits") as requested by WE 101 based on the attached Schedule with approximate square footages. In no event shall the Authority make available fewer than 400 Parking Permits, or make available more than 550 Parking Permits under this Agreement, pursuant to the terms of the attached Schedule.

(b) 90 days prior to the Commencement Date, WE 101 shall notify the Authority as to the number of permits that it wishes the Authority to issue on the Commencement Date. During the first seven (7) years of the Initial Term, WE 101 shall have the right to increase the number of Parking Permits to be provided to it upon ninety (90) days' written notice to the Authority up to the maximum allowable 550 Parking Permits per the schedule based on the gross square footage of the Mixed Use Facility. The number of Parking Permits issued by the Authority on the last day of the seventh year of the Initial Term shall be the number of Parking Permits that the Authority shall be required to make available to WE 101 during the balance of the Term, except as hereinafter provided. Commencing on the first day of the 8th year of the Initial Term, WE 101 shall have the right to reduce the number of Parking Permits issued to it during that year and during each subsequent year of the Term, upon written notice to the Authority given ninety (90) days prior to the commencement of the year for which the reduction is requested. Any such reduction shall create the new maximum number of Parking Permits that the Authority is obligated to provide.

The Parking Permits will permit Eligible Users (as hereinafter (c) defined) to park in the Temple Street Garage and/or the Temple Medical Garage. The Parties agree that the first 250 Parking Permits will be issued for Temple Medical Garage. Eligible Users holding Parking Permits for the Temple Medical Garage as directed by Authority personnel shall be permitted to use such Parking Permits for parking in the Temple Street Garage if there are no available spaces in the Temple Medical Garage for them to use. The Authority shall sign / mark deck 3 at the Temple Medical Garage when the first 100 Parking Permits are issued and will sign / mark deck 3a at the Temple Medical Garage when Parking Permits are issued in excess of the first 100 permits. Such signage will indicate the parking availability for tenants of the Mixed Use Facility or specific tenant(s) of the Mixed Use Facility as directed by WE 101. The Authority shall sign / mark 2 (two) additional decks in Temple Medical Garage for permit holders at the Temple Medical Garage, "for monthly permit holders only" or such other language that may be agreeable by both WE 101 and the Authority. The remainder of the Parking Permits issued shall be issued for parking at the Temple Street Garage. The

Parking Permits provided under the Agreement shall be made available to Eligible Users in the Temple Medical Garage or the Temple Street Garage, respectively, on a 24 hour basis every day of the year.

(d) Use of the Parking Permits will be restricted to WE 101, its tenants (other than Yale University), and other occupants of the Mixed Use Facility, and their respective employees, principals, visitors, and invitees (the "Eligible Users"). The Eligible Users shall have access to the Temple Medical Garage or Temple Street Garage, respectively, by using an access system or other such devices as may be available, with parking cards (or what may be applicable in the future) to be supplied by the Authority and distributed by WE 101 or its tenants to the Eligible Users.

(e) The Parties agree that the Authority hereby declares itself not responsible for fire, theft, damage to or loss of any automobile or any article left therein in the Temple Medical Garage or Temple Street Garage. Storage (a stay in excess of 7 days) of vehicles in the Temple Medical Garage or Temple Street Garage is not permitted. **ONLY A LICENSE IS GRANTED HEREBY AND NO BAILMENT IS CREATED.** Notwithstanding the foregoing, if an individual is leaving his or her car in either of the Temple Medical Garage or Temple Street Garage for more than 24 hours and provides notice to the Authority, such action shall not be considered storage and shall be permitted Notice shall be provided by calling, emailing, or faxing the Authority's administrative offices and providing the Authority's staff with the make, year, model, and license plate of the vehicle.

(f) During the Term, WE 101 shall be liable to pay a Monthly Parking Permit fee (the "Monthly Parking Permit Fee") for the Parking Permits, which payment shall be made directly to the Authority. Said Monthly Parking Permit Fee shall be based upon the Authority's adopted public monthly parking rate, plus any applicable sales taxes payable by monthly parkers at the Temple Street Garage and the Temple Medical Garage, as applicable (the "Parking Permit Rate").

(q) The Monthly Parking Permit Fee shall be determined by multiplying the total number of monthly Parking Permits issued to WE 101 by the applicable monthly Parking Permit Rate. In the event that parking is not available to a permit holder in either the Temple Medical Garage or Temple Street Garage, the Authority shall direct such permit holder to another Authority- controlled parking which is located within a 500' radius of any portion of the Temple Medical Garage, Temple Street Garage, or the Mixed Use Facility, provided, however, that the Authority shall not redirect permit holders, except as provided for in Paragraph 4 (c), to a parking facility other than the Temple Street Garage or the Temple Medical Garage more than five (5) occasions during any twelve (12) month period. WE 101 shall provide notice to the Authority within two (2) business days of each occasion and then WE 101 and the Authority shall meet within the next five (5) business days to review and discuss a plan to avoid any additional occasions. In the event that parking is not available in either the Temple Medical Garage or the Temple Street Garage on more than five occasions in a twelve month period, such failure to provide parking shall be considered a default under the Agreement, and, in addition any other remedies that WE 101 may have on account of such default,

the Monthly Parking Permit Fee shall be reduced for each day during a month in which a parking space is not available in the Temple Medical Garage or Temple Street Garage.

The Authority will bill WE 101 the Monthly Parking Permit Fee, (h) monthly in advance for the ensuing month as one (1) group account. Payment to the Authority shall be due on the first day of each month. No charge for the Parking Permits is permitted in excess of the cost of the Parking Permits and an administrative fee not to exceed 15%. In the event WE 101 fails to pay any invoices hereunder due to the Authority within thirty (30) days of the due date of such invoice, and if WE 101 has a good faith dispute as to the sum that it owes to the Authority, it shall provide written notice to the Authority of such dispute within fifteen (15) days of receipt of the Authority's monthly invoice to WE 101, pay the Authority for the portion of the invoice that it does not dispute and escrow the disputed amount with a mutually agreeable third party. Until such dispute is resolved. In the event that WE 101 fails to pay the Authority the undisputed amounts that it owes for a period of 30 days past the due date, WE 101's failure to pay the undisputed portion of the invoice shall immediately be brought to Dispute Resolution Procedure set forth in paragraph 6(m) below, and either Party may provide a Notice of Conflict to the other Party to initiate the Dispute Resolution Procedure. If the issue of nonpayment by WE 101 of the undisputed portion of the Monthly Parking Permit Fee is not resolved as a result of the Dispute Resolution Procedure, the Authority and WE 101 shall submit the failure of WE 101 to pay such undisputed amounts to Mediation pursuant to Section 6(m) of the Agreement.

If at the conclusion of the Mediation, there is no agreement regarding WE 101's failure to pay the undisputed portion of the Monthly Parking Permit Fee and such Monthly Parking Permit Fee remains unpaid, unless otherwise agreed to by the Authority, then, the Authority shall have the right, no sooner than one hundred and twenty (120) days from the due date of the invoice (which includes a ninety (90) day cure period) to (i) suspend the Parking Permits granted hereunder and/or (ii) issue a notice of termination to WE 101 and its Mortgagee that the Agreement will terminate thirty (30) days after the date of the notice of termination if payment of the undisputed amounts is not made before the termination date. If the undisputed fees are not paid within thirty days of the date of the notice of termination, then the Agreement shall, at the Authority's option, terminate the Authority agreeing that such termination is not a termination by WE 101 under Section 1 of this Agreement.

(i) The Authority and the City are aware that Yale University is an intended tenant of the Mixed Use Facility. In the event that Yale University vacates some or all of its leased space in the Mixed Use Facility, upon 180 days' notice to the Authority from WE 101 of such intended vacancy, the Authority and the City will endeavor to assist WE 101 in locating parking for the tenant(s) who will replace Yale University in the Mixed Use Facility.

3. TRANSIENT PARKING.

(a) During the Term, the Authority will make available to WE 101 unreserved transient parking in the Temple Medical Garage and/or the Temple Street Garage on a daily basis during normal operating hours, subject to the limits and current usage and availability of the Temple Medical Garage and/or the Temple Street Garage. Such transient parkers will pay the publicly adopted rate at

the Temple Medical Garage and/or the Temple Street Garage, as appropriate, as the same may change from time to time during the Term.

(b) The Authority will make available to WE 101 and its tenants the Authority's Validation Program.

4. OPERATIONS

(a) The Authority shall cause the Temple Medical Garage and the Temple Street Garage to be operated in accordance with the standards set forth by the Authority as described in Exhibit A, which may be amended from time to time, provided that the Authority gives WE 101 seven (7) days prior notice of its intent to change its standards in any way and allows WE 101 to comment in an advisory capacity. In addition, WE 101 and the Authority shall meet not less than on a quarterly basis to discuss any issues that may arise under the Agreement.

(b) The Authority shall at all times during the Term prominently post signage that provides information about the procedures for the parking and recovery of vehicles during times in which the Authority does not have personnel present at the Temple Medical Garage or Temple Street Garage, as applicable.

- (c) The Authority and WE 101 agree that:
- i) In the event that at any time during the Term, a portion or the entirety of either of the Temple Medical Garage or Temple Street Garage is to be closed for repairs, rebuilding, alterations, renovations, replacement of electrical, mechanical or lighting systems or similar construction activities, or for a public health or safety emergency, then the Authority shall relocate only those Parking Permit holders who cannot be accommodated in their respective garages to either the Temple Medical

Garage or Temple Street Garage during such time. The Authority shall endeavor that, to the extent practical, it will conduct its construction activities, as set forth above herein, in a manner that is the least disruptive to the Parking Permit holders.

ii) In the event that any of the Parking Permit holders cannot be accommodated in either the Temple Medical Garage or the Temple Street Garage pursuant to paragraph 4(c)(i) above, then the Authority shall relocate those Parking Permit holders to other Authority controlled parking which is located within a 500' radius of any portion of the Temple Medical Garage, Temple Street Garage, or the Mixed Used Facility. Once a Parking Permit holder is relocated, the Authority shall adjust the Monthly Parking Permit Fees to the lesser of the adopted public monthly rate of their respective garage or the relocated parking.

(iii) In the event the Authority is unable to relocate the Parking Permit holders pursuant to paragraphs 4(c)(i) and 4(c)(ii), WE 101 shall have the right at its option and upon written notice to the Authority, to temporarily or permanently reduce the number of Parking Permits for Parking Permit holders whom the Authority has not been able to relocate under paragraphs 4(c)(i) and 4(c)(ii).

(iv) In the event such occurrence pursuant to paragraphs 4(c)(ii) above lasts for a period of more than (1) month, then WE 101 shall have the right to either temporarily or permanently reduce those number of Parking

Permits it pays for to reflect such reduction pursuant to such occurrence in paragraphs 4(c)(ii) upon written notice to the Authority.

(v) In addition, in the event such occurrence pursuant to paragraphs 4(c)(ii) and/or 4(c)(iii) lasts for a period of more than one (1) month and includes 25% or more of all the Parking Permits issued pursuant to Sections 2 (a) and 2 (b), WE 101 shall also have the right, if it so chooses, to terminate this Agreement and shall deliver written notice of such termination to the Authority as set forth in Sections 1 and 6.

(d) The Authority shall provide such security for the Temple Medical Garage and Temple Street Garage pursuant to the Authority's Standards as set forth in Exhibit B, which may be amended from time to time, provided that the Authority gives 7 days prior notice to WE 101 of its intent to change its standards in any way and allows WE 101 to comment in an advisory capacity. WE 101 may request that the Authority provide additional security on the condition that WE 101 reimburses the Authority for the reasonable costs of such additional security, which costs shall be approved and paid by WE 101 in advance of the Authority incurring such costs.

5. <u>SUCCESSION; BINDING EFFECT.</u>

(a) This Agreement shall be binding upon, and inure to the benefit of the Authority and WE 101, and their respective successors and assigns and shall be binding on the owners of the Temple Medical Garage and Temple Street Garage, including but not limited to the City, and its successors and assigns.

(b) The City, the Authority and WE 101 agree that, during the Term the Authority shall be obligated to operate the Temple Medical Garage and Temple

Street Garage available to the general public; the City agreeing that the Authority shall be so authorized to do so.

6. <u>MISCELLANEOUS.</u>

(a) Any notice, demand, waiver, approval or consent hereunder shall be in writing and shall be deemed duly served if personally delivered, or delivered by a nationally recognized overnight courier, or if mailed by certified mail, return receipt requested, addressed if to any Party at the address of such Party set forth herein below or to such other address as such Party shall have last designated by written notice to the other Parties. Any notice given by hand delivery shall be deemed to have been given on the same day hand delivered, provided that such hand delivery shall have been confirmed. Any notice given by national overnight carrier or given by certified mail shall be deemed to have been given when mailed. Notices

IF TO THE CITY: CITY OF NEW HAVEN CITY HALL ATTN: ECONOMIC DEVELOPMENT ADMINISTRATOR 165 CHURCH STREET NEW HAVEN, CT 06510 SPECIAL COUNSEL FOR ECONOMIC With a copy to: DEVELOPMENT CORPORATION COUNSEL **165 CHURCH STREET** NEW HAVEN, CT 06510 IF TO THE AUTHORITY: New Haven Parking Authority Attn: Executive Director 232 George Street New Haven, CT 06510

With a copy to:

	Rini & Associates Attn: Joseph L. Rini 51 Elm Street, Suite 420 New Haven, CT 06510
	Cohen and Wolf, P.C. Attn: Clifford A. Merin 1115 Broad Street Bridgeport, CT 06604
IF TO WE 101 :	WE 101 COLLEGE STREET LLC 150 Baker Avenue Extension Suite 303 Concord, Massachusetts 01742 Attn: Carter J. Winstanley Attn: Demian Gage
with copies to:	Carolyn W. Kone Brenner, Saltzman & Wallman LLP 271 Whitney Avenue New Haven, CT 06511
and to:	Geoffrey Howell DLA Piper LLP (US) 33 Arch Street Boston, MA 02110

(b) No waiver by any Party of any default, misrepresentation, or breach of warranty or covenant hereunder, whether intentional or not, shall be deemed to extend to any prior or subsequent default, misrepresentation, or breach of warranty or covenant hereunder or affect in any way any rights arising by virtue of any prior or subsequent such occurrence

(c) During the Term, WE 101 and the Authority shall discuss whether the Authority shall operate the garages located at 100 College Street and 101 College Street, the Authority recognizing that WE 101 is not the owner of the garage at 100 College Street.

(d) The Agreement shall not be interpreted or construed more strictly against one Party or the other merely by virtue of the fact that it was drafted by counsel to any Party; it being hereby acknowledged and agreed that all Parties have both contributed materially and substantially to the negotiations and drafting of the Agreement.

(e) The Agreement shall be governed by and construed in accordance with the laws of the State of Connecticut without giving effect to the principles of conflicts of law.

(f) The captions of the Agreement are for convenience and reference only and in no way define, limit or describe the scope or intent of the Agreement nor in any way affect the Agreement.

(g) No agreement hereafter made shall be effective to change, modify, discharge or effect an abandonment of the Agreement in whole or in part unless such agreement is in writing and signed by the Party against whom enforcement of the change, modification, discharge or abandonment is sought.

(h) The Agreement and the DLDA constitute the entire agreement among the Parties and supersede any prior understandings, agreements, or representations by or among the Parties, written or oral, to the extent they related in any way to the subject matter hereof. In the event that there is a conflict between the Agreement and the DLDA, the terms of the Agreement shall govern.
(i) If any term or provision of the Agreement except as to Term, Parking Permits to be provided, the charges to be paid for such Parking Permits and termination provisions, or the application thereof to any person or circumstances shall, to any extent, be invalid or unenforceable, the remainder of this Agreement, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected thereby, and each term and provision of this Agreement shall be valid and be enforceable to the fullest extent permitted by law.

(j) Each of the Parties shall execute and deliver any and all additional papers, documents, and other assurances, and shall do any and all acts and things reasonably necessary in connection with the performance of their obligations hereunder and to carry out the intent of the parties hereto.

(k) Each Party hereby covenants, warrants and represents: (1) that the individual executing the Agreement on behalf of such Party is duly authorized to execute or attest and deliver the Agreement on behalf of such Party in accordance with the organizational documents of such Party, (2) that the Party has the authority to enter into the Agreement and that the Agreement is fully binding upon such Party, and (3) that the execution, performance and delivery of the Agreement by such Party will not result in any breach of, or constitute a default under or a violation of or impair any of the Party's obligations under any agreement, contract or other instrument to which such Party is a party or by which such Party may be bound or constitute a violation of any applicable law. The Authority represents that the following significant long term agreements, which have at least a year

remaining on the term and account for 50 or more parking permits, exist that relate to the Temple Medical Garage and/or the Temple Street Garage: State of CT Parking Agreement (Gateway); 1977 Temple Street Associates Purchase Agreement; Temple Street Associates II LP Agreement; and 229 George Street LLC Agreement and that WE 101 has been supplied with copies of these agreements. Notwithstanding the foregoing agreements, the Authority warrants and represents that that it has the authority to grant and the ability to provide the Parking Permits (up to 550 Parking Permits) pursuant to the terms of the Agreement, and the execution, delivery and performance of the Agreement by the Authority has been duly authorized by the Board of Commissioners of the Authority at a meeting of said Board duly called and properly held on DATE ____, 2020.

(I) This Agreement may be executed in any number of counterparts with the same effect as if all Parties hereto had signed the same document. All counterparts shall be construed together and shall constitute one Agreement.

(m) The City, WE 101 and the Authority agree that they shall endeavor to resolve any dispute that may arise under the Agreement through a dispute resolution procedure (the "Dispute Resolution Procedure") prior to filing suit in court. Any Party may initiate the Dispute Resolution Procedure by providing a notice of conflict (the "Notice of Conflict") to the Party with which it has a dispute setting forth: (i) the subject of the dispute; (ii) the Party's position and (iii) the relief requested. Within five (5) business days of delivery of the Notice of Conflict, the receiving Party shall respond in writing with a statement of its position. At the request of any Party to the dispute, representatives of each Party involved in the dispute with full

settlement authority shall meet at a mutually acceptable time and place in New Haven, Connecticut within ten (10) days of the Notice of Conflict in order to attempt to negotiate in good faith a resolution to the dispute. If the dispute is not resolved by the parties through the Dispute Resolution Procedure, then if agreed upon by the Parties to the dispute, the dispute may be submitted to mediation under the Commercial Mediation Procedures of the AAA, in effect upon the date that the dispute is submitted to mediation, or under such other rules as the Parties to the dispute may agree upon. Mediation shall be with the AAA, or, if agreed upon, through use of a private mediator chosen by the parties. Mediation shall occur in New Haven, Connecticut or as otherwise agreed upon. The mediator's fees and the filing fees, if any, shall be shared equally among the parties participating in the mediation. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof. If the parties agree to mediation, the conclusion of mediation proceedings shall be a condition precedent to litigation. The parties shall conclude mediation proceedings within sixty (60) days after the designation of the mediator. Prior to the conclusion of the Dispute Resolution Procedure or mediation proceedings, any Party may commence litigation for the sole purpose of tolling the statute of limitations, if necessary. If a Party commences litigation for such purposes, it must request that the Court stay the judicial proceedings until the Dispute Resolution Procedure or the mediation proceedings, as the case may be, are concluded.

(n) Notwithstanding previous provisions in this Agreement, EACH OF THE PARTIES TO THIS AGREEMENT HEREBY AGREES TO WAIVE ITS

RESPECTIVE RIGHTS TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION BASED UPON OR ARISING OUT OF THE AGREEMENT OR ANY OF THE RELATED AGREEMENTS OR ANY DEALINGS BETWEEN THEM **RELATING TO THE SUBJECT MATTER OF THE AGREEMENT.** The scope of this waiver is intended to be all-encompassing of any and all disputes that may be filed in any court and that relate to the subject matter of this transaction, including contract claims, tort claims, breach of duty claims and all other common law and statutory claims. Each Party hereto acknowledges that it has relied on this waiver in entering into the Agreement, and that each will continue to rely on this waiver in their related future dealings. Each Party hereto further warrants and represents that it has reviewed this waiver with its legal counsel and that it knowingly and voluntarily waives its jury trial rights following consultation with legal counsel. THIS WAIVER IS IRREVOCABLE, MEANING THAT IT MAY NOT BE MODIFIED EITHER ORALLY OR IN WRITING, AND THIS WAIVER SHALL APPLY TO ANY SUBSEQUENT AMENDMENTS. RENEWALS. SUPPLEMENTS OR MODIFICATIONS TO THIS AGREEMENT

(o) Insurance: The Authority and WE 101 each agree to maintain the following minimum insurance coverage, during the Term of the Agreement
Worker's compensation insurance in accordance with the laws of the State of Connecticut;

Employer's Liability insurance with limits of \$1,000,000 each accident, \$1,000,000 coverage for each employee for disease and \$1,000,000 policy limits for disease;

Commercial general liability insurance with a limit of \$1,000,000 per occurrence and an annual aggregate of \$2,000,000 and a separate aggregate of \$2,000,000 for products completed operations;

Automobile liability insurance with limits of \$1,000,000 per accident;

Umbrella or excess liability insurance with a minimum limit of \$5,000,000 per occurrence/general aggregate excess of all liability insurance described in the Agreement other than worker's compensation insurance.

All policies shall also include a waiver of subrogation. All such insurance shall be primary and non-contributory with any other insurance and self-insurance. WE 101 and the Authority shall periodically review whether these coverages should be changed, and if they agree that there should be changes, such changes shall be set forth in an amendment to the Agreement.

(p) The word "including" shall mean "including, without limitation", and the use of such word and the word "include" in the Agreement shall be by way of example rather than by limitation. Reference to any agreement, document or instrument means such agreement, document or instrument as amended or otherwise modified from time to time in accordance with the terms thereof, and if applicable hereof. Where the context so requires or permits, the use of the singular form includes the plural, the use of the plural form includes the singular, and the reference to either gender includes either and both genders. When used in this Agreement, words such as "herein", "hereinafter", "hereby", hereof", "hereto", "hereunder" and words of similar import shall refer to the Agreement as a whole

and not to any particular provision of the Agreement, unless the context clearly requires otherwise. The use of the words "or," "either" and "any" shall not be exclusive. The Parties hereto have participated jointly in the negotiation and drafting of this Agreement.

(q) The Agreement and any amendment thereto shall be recorded in the New Haven Land Records.

[Signature Page Follows]

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1. IN WITNESS WHEREOF, the parties have executed this

Agreement as of the date set forth above.

By

Norman Forrester Chairman Duly Authorized to act herein

WE 101 COLLEGE STREET, LLC

By Winstanley Enterprises, LLC

By___

Carter J. Winstanley Its Manager Duly Authorized to act herein

CITY OF NEW HAVEN

By_

Justin Elicker Its Mayor Duly Authorized to act herein (as to Section 2 (i) Section 5 Section 6, as applicable Approved as to Form and Correctness

John R. Ward Special Counsel for Economic Development

)

STATE OF)

COUNTY OF

On this _____ day of _____, 2020, before me, the undersigned officer, personally appeared CARTER J. WINSTANLEY, who acknowledged himself to be the Manager of Winstanley Enterprises, LLC, the member/manager of WE 101 COLLEGE STREET LLC, a Delaware limited liability company, and that as such Manager, being authorized so to do, executed the foregoing instrument for the purposes contained therein, by signing on behalf of Winstanley Enterprises LLC, as his free act and deed as such Manager.

Notary Public Commission expires: Commissioner of the Superior Court

STATE OF CONNECTICUT) COUNTY OF NEW HAVEN)

On this ______ day of ______, 2020, before me, the undersigned officer, personally appeared Norman Forrester, who acknowledged himself to be the Chairman of the New Haven Parking Authority, and that as such Chairman, being authorized so to do, executed the foregoing instrument for the purposes contained therein, by signing on behalf of the New Haven Parking Authority, said act being the free act and deed of the New Haven Parking Authority and her/his free act and deed as such Chairman.

> Notary Public Commission expires: Commissioner of the Superior Court

STATE OF CONNECTICUT) COUNTY OF NEW HAVEN)

On this _____ day of _____, 2020, before me, the undersigned officer, personally appeared Justin Elicker, who acknowledged himself to be the Mayor of the City of New Haven, and that as such Mayor, being authorized so to do, executed the foregoing instrument for the purposes contained

therein, by signing on behalf of the City of New Haven, said act being the free act and deed of the City of New Haven and his free act and deed as such Mayor.

> Notary Public Commission expires: Commissioner of the Superior Court

SCHEDULE OF TEMPLE STREET GARAGE

Temple Street Garage legal description

All that certain pieces and parcels of land in the City of New Haven, County of New Haven, State of Connecticut, occupied by the Temple Street Garage bounded and described as follows:

First Parcel:

Commencing at the southeast corner of Crown Street and Temple Street,

Thence running southerly along the easterly side of Temple Street to the northeast corner of George Street and Temple Street,

Thence running easterly along north side of George Street to a point at North 671626.41 East 951059.89,

Thence North 28 degrees 31 minutes 34 seconds East a distance of 340.03 feet to a point North 671925.16 East 951222.27 in the south side of Crown Street,

Thence running westerly along the south side of Crown Street to the place and point of beginning.

Second Parcel:

Commencing at the southeast corner of George Street and Temple Street,

Thence running southerly along the east side of Temple Street to the northeasterly corner of Temple Street and North Frontage Road, now known as Martin Luther King Boulevard,

Thence running easterly along the north side of North Frontage Road, now known as Martin Luther King Boulevard, to the a point at North 671260.42, East 950860.96,

Thence running North 28 degrees 31 minutes 34 seconds East a distance of 342.53 to a point at North 671561.39 East 91024.55 in the south side of George Street,

Thence running westerly along the south side of George Street to the place and point of beginning.

Together with air rights over George Street at the locations abutting the First Parcel

and the Second Parcel,

Excepting therefrom the land and air rights conveyed by the City of New Haven to the State of Connecticut by deed dated April 12, 2009 and recorded in Volume 8377 Page 225 et seq. of the New Haven Land Records and further excepting therefrom the underground tunnel known as the Chapel Square Mall tunnel.

Subject to the easements granted to the State of Connecticut in said deed.

SCHEDULE OF TEMPLE MEDICAL GARAGE

TEMPLE MEDICAL GARAGE A/K/A TEMPLE GEORGE GARAGE

LEGAL DESCRIPTION

All that certain three dimensional piece or parcel of air space including air improvements, hereditaments and appurtenances forming the Air-Rights Property, which is defined in Subsection 101(b) of a certain Garage Purchase and Operating Agreement entered into by and between Temple Street Associates, a Connecticut Limited Partnership and the City of New Haven, acting by and through the New Haven Parking Authority dated November 4, 1977 and recorded among the Land Records of the Town of New Haven on November 8, 1977 at 12:15 p.m., in Vol. 2672 at Pages 256, et seq., (which Garage Purchase and Operating Agreement is hereinafter referred to as the "GARAGE AGREEMENT") and is described as follows:

A three dimensional piece or parcel of air space with all improvements contained therein located on the over Reuse Parcel A-1-c Temple-George Redevelopment Area between George Street and North Frontage Road, in the City of New Haven, County of New Haven and State of Connecticut, a/k/a Multi-Purpose Structure Site, as the same is defined in Subsection 101(j) of the GARAGE AGREEMENT, which Parcel A-1-c is shown on a map entitled: "Map of Property prepared for Temple Street Associates, New Haven, Connecticut by Cahn Engineers, Inc., Scale 1" = 20' dated 1-25-77",on file in the New Haven Town Clerk's Office, more particularly bounded and described as follows:

Commencing at a point in the Southerly street line of George Street, said point being the Northeasterly corner of land now or formerly of Abner A. Alderman, et al., said point having the coordinates North 171,766.45 and East 550,486.71 on the Connecticut Coordinate System;

Thence running South 60 degrees, 50 minutes, 51 seconds East 145.83 feet along Southerly Street line of George Street;

Thence running South 28 degrees, 24 minutes, 45 seconds West 94.03 feet along land now or formerly of the United Illuminating Company;

Thence running South 36 degrees, 39 minutes, 17 seconds West 17.45 feet along land now or formerly of the United Illuminating Company;

Thence running North 61 degrees, 51 minutes, 51 seconds West 5.44 feet along Reuse Parcel A-1-a;

Thence running South 29 degrees, 09 minutes, 09 seconds West 61.91 feet along Reuse Parcel A-1-a;

Thence running South 60 degrees, 50 minutes, 51 seconds East 37.67 feet along Reuse Parcel A-1-a;

Thence running South 29 degrees, 09 minutes, 09 seconds West 22.26 feet along Reuse Parcel A-1-b;

Thence running South 58 degrees, 16 minutes, 43 seconds West 50.34 feet along Reuse Parcel A-1-b;

Thence running South 29 degrees, 09 minutes, 09 seconds West 75.20 feet along Reuse Parcel A-1-b;

Thence running Westerly on the curve to the right having a radius of 492.00 feet and arc length of 46.66 feet along the Northerly Street line of North Frontage Road;

Thence running North 54 degrees, 24 minutes, 39 seconds West 112.00 feet along the Northerly street line of North Frontage Road;

Thence running North 25 degrees, 10 minutes, 39 seconds East 131.52 feet along land now or formerly of Abner A. Alderman, et al.;

Thence running South 64 degrees, 42 minutes, 51 seconds East 17.00 feet along land now or formerly of Abner A. Alderman, et al.;

Thence running North 28 degrees, 17 minutes, 17 seconds East 166.86 feet along land now or formerly of Abner A. Alderman, et al., to the point of commencement.

The three dimensional piece or parcel of air space being a portion of a Multi-Purpose Structure, defined in Subsection 101(s) of the GARAGE AGREEMENT, the entire building being as shown on drawings entitled City of New Haven, New Haven Parking Authority, Multi-Purpose Building, Temple Street Medical Center by Simeone & Wendler Architects, Incorporated, as revised, being one of the control documents referred to and defined in Subsection 101(k) of the GARAGE AGREEMENT and listed on Exhibit B to the GARAGE AGREEMENT to which drawings by Simeone & Wendler Architects reference is herein made and the same are incorporated herein by reference, original copies of said drawings being on file in the office of New Haven Parking Authority, in the New Haven office of Chicago Title Insurance Company and in office of Temple Street Associates in New Haven and in the law office of Clark, Hall & Peck-White Brothers, said Multi-Purpose Structure located on said Reuse Parcel A-1-c, as shown on a survey prepared by Cahn Engineers, Inc., Licensed Engineers and Surveyors, of Wallingford, Connecticut, and which survey is dated as of October 24, 1977, a copy of which is on file in the Town Clerk's Office of New Haven, Connecticut, and an additional copy, reduced in size and not to scale, is attached to the GARAGE AGREEMENT as Exhibit C and made a part hereof, and which three dimensional piece or parcel of air space is more particularly described as follows:

The Lower Level of said piece or parcel of air space being an irregular generally horizontal plane located approximately at elevation 22.25 to approximate elevation 28.25 feet, U.S. Coast & Geodetic datum, being the top of the floor slab as shown on Drawing A-2 prepared by Simeone & Wendler Architects, Incorporated, of New Haven, Connecticut, and dated May 20, 1977, reduced in size and not to scale, copy of which is attached to the GARAGE AGREEMENT as Exhibit C-2;

The Upper Level of said piece or parcel of air space being the generally horizontal plane being located approximately at elevation 70.30 feet U.S. Coast & Geodetic datum, being the top of the floor slab as shown on revised Drawing A-6 prepared by Simeone & Wendler Architects, Incorporated, dated October 14, 1977, reduced in size and not to scale, copy of which is attached to the GARAGE AGREEMENT as Exhibit C-3;

The outside perimeter of said piece of parcel of air space is the vertical surface generated by the vertical line following the outside perimeter of the outside walls of the Multi-Purpose Structure located at and being between the Lower Level of

said piece or parcel of air space being the top of the floor slab as shown on the above-mentioned Drawing A-2 prepared by Simeone & Wendler Architects, Incorporated, of New Haven, Connecticut and dated May 20, 1977, and the Upper Level of said piece or parcel of air space being the top of the floor slab as shown on revised Drawing A-6 prepared by Simeone & Wendler Architects, Incorporated, dated October 14, 1977, as referred to above.

TOGETHER WITH certain easements and rights of way and subject to certain other easements and rights as more fully set forth in a certain Warranty Deed between the Temple Street Associates, Limited Partnership as Grantor and the City of New Haven acting by and through the New Haven Parking Authority as Grantee dated December 15, 1977 and recorded in Vol. 2679 at Page 216, et seq.

SCHEDULE OF 101 COLLEGE STREET PARCEL

101 COLLEGE STREET

Beginning at a point on the north side of South Frontage Road at the intersection with the Proposed Temple Street Extension;

thence running N 53°44'36" W a distance of 363.59 feet along the north side of South Frontage Road to a point at the intersection with College Street;

thence running on a curve to the right having a delta angle of 83°07'00" a radius of 15.00 feet and an arc length of 21.76 feet to a point;

thence running N 29°21'26" E a distance of 153.50 feet along the east side of College Street to a point at the intersection with Rev. Dr. Martin Luther King Jr. Boulevard;

thence running on a curve to the right having a delta angle of 92°04'55" a radius of 15.00 feet and an arc length of 24.11 feet to a point;

thence running S 54°21'46" E a distance of 416.94 feet along the south side of Rev. Dr. Martin Luther King Jr. Boulevard to a point at the intersection with the Proposed Temple Street Extension;

thence running on a curve to the right having a delta angle of 98°28'34" a radius of 10.00 feet and an arc length of 17.19 feet to a point;

thence running on a curve to the right having a delta angle of 12°43'40" a radius of 808.78 feet and an arc length of 179.66 feet to a point along the west side of the Proposed Temple Street Extension;

thence running on a curve to the right having a delta angle of 69°29'38" a radius of 1.00 feet and an arc length of 1.21 feet to the point and place of beginning;

Proposed Property Area = 76,085 S.F. (1.75 Acres)

SCHEDULE OF PARKING PERMITS TO BE MADE AVAILABLE

Gross	Square	Parking	
Footage		Permits	
	350,000		400
	375,000		427
	400,000		453
	425,000		480
	450,000		506
	475,000		533
	491,501		550
	500,000		550
	525,000		550
	550,000		550

Operations and Maintenance: Fully equipped and skilled in-house maintenance personnel for snow plowing and other maintenance related functions available 24 hours a day/7 days a week.

- Park New Haven has well-trained personnel and a well-equipped maintenance department under the leadership of the Director of Maintenance. This department is responsible for handling all maintenance related matters within the parking facilities.
- The department consists of custodians who handle the general day-today maintenance of the garages. This staff level is supported by specialties including electricians, HVAC handlers, and multiple personnel in position to operate equipment/machinery for snow plowing and removal purposes.
- Snow Removal- Snow plowing/salting and removal from facilities are handled by outside contractors supported by in-house Parking Authority maintenance personnel.
 Coordination with vendors on any snow related matters are conducted on a pro-active basis with provision of maximum available parking spaces as the ultimate goal.

2.11 Parking Procedures

The first of every month through the tenth of every month is a grace period for all monthly parkers due to the fact that billing and/or client payment may not be up to date and the client may not have received his/her hang tag in the mail.

From the eleventh of every month through the last day of every month, any parked vehicle with an outdated hang tag, or without any hang tag, will be issued a warning ticket advising the operator to have his/her current hang tag visible.

There will be no vehicles towed out of a regulation parking stall in any of the NHPA surface lots and/or garages without and until a thorough investigation is completed by the Director of Security. If you feel that there is a vehicle that has not moved or has been in the same parking space/facility for an extended period of time, please contact the Director of Security for follow-up.

2.12 Parking Violation Enforcement

All security officers are responsible for the security and safety of all customers and their property while in our facilities. An additional part of your job is to enforce our parking regulations. Violations include vehicles that are taking up two spaces or not properly parked within a space or vehicles that are parked in a "No Parking Area," just to name a few. Be aware that vehicles are not allowed to park on the yellow lines next to a handicapped space, under any circumstances. This area is for a handicapped person to enter or exit their vehicle with a walker or a wheelchair lift.

Writing a parking ticket should not be a goal. It should be a last resort. The NHPA has warning tickets that can be written in lieu of writing a parking ticket.

When you are confronted by a customer who has been issued a ticket, please make every effort to keep the conversation professional. Maintain your composure and professionalism at all times. Stick to the facts and the specific violation.

If you are filling in for another security officer and are unfamiliar with the garage or post, err on the side of caution and issue a warning ticket. When in doubt, call the Manager On-Duty or the Security Director.

2.16 Pursuit and the Use of Force

Under no circumstances are employees of the NHPA ever authorized to chase an individual as a result of alleged criminal or mischievous activity.

Should the subject(s) flee, it is our policy not to pursue. Running after the subject, shouting at the subject, pursuing in a vehicle, etc... are dangerous and unprofessional practices. The safety of security personnel as well as the general public is better served by permitting the subject(s) to escape. This is an area which requires professional self discipline in order to control liability.

Retaliatory force is not authorized under any circumstances. If and only if, in the line of duty, security is assaulted, security may defend himself/herself and use sufficient and reasonable force necessary to counteract the initial action.

2.17 Use of NHPA Security Vehicle for Patrol

Security patrol vehicles are a major asset. In order to maintain our fleet, our officers must prove themselves to be responsible and honest. These patrol officers must maintain superior performance levels. Officers assigned to vehicular patrol enable us to efficiently manage our lots and garages and assist the customers in a more timely manner.

There are two types of security patrol vehicles:

- 1. Those with Municipal License plates that are allowed to be driven on City Streets, and
- 2. Those without License plates that are not allowed outside the respective garage.

The assigned patrol vehicle and driver will continuously patrol the designated garage(s), respond to calls for service, and report on incidents. Vehicle patrol techniques are not absolutes and require the officer to adapt various techniques to the job being performed.

The main point to remember is that vehicle patrol assignments can and frequently do change. Techniques for patrolling a garage or lot in fair weather will not be the same as in snow or rainy weather. The officer must have the ability to modify patrol procedures as the situations vary.

Vehicular patrols of parking structures require frequent stops to assist in traffic control. Foot patrol techniques are also required in order to satisfy the job specifications. High visibility functions require constant movement. The officer must routinely exit the vehicle to accomplish this.

If a vehicle is not in good operating order and breaks down while in service, effectiveness comes to a halt. The officer who drives the security vehicle is responsible for the daily inspection, maintenance and upkeep of the vehicle.

Security officers who do not possess a valid operator's license will, under no circumstances, be permitted to operate a company patrol vehicle.

2.19 Patrol Procedures

The security vehicle's professional appearance may help in preventing criminal activity. When arriving on the scene of an incident in a patrol vehicle, the security officer needs to be aware of potential hazards and use extreme caution.

A major mistake made by officers on vehicle patrol is to drive with the windows up and the radio on high volume. The officer is unable to accurately hear sounds such as breaking glass or someone requesting assistance. It isn't necessary to have all the windows open, but at least have the driver's side window partly open. This will allow the officer to hear sounds that originate from outside the vehicle.

It is impossible for an officer to make accurate observations or hear outside sounds when traveling at an excessive speed. When patrolling parking areas, speeds in excess of 15 miles per hour prevent the officer from being aware of the surroundings. The speed that allows the officer to do the best job is between 10 and 15 miles per hour.

While patrolling, the officer must drive while making visual observations of any occupied vehicles, pedestrian traffic or any unusual activities. The point is not to automatically drive into any area without advance knowledge. The officer should park close to the area or vehicle being inspected, but not directly in front of it. He/She should look at the exterior for signs of forced entry or any indication that the vehicle is occupied. The officer should then stand to the side of the windows or doors to make interior observations. Using the flashlight, the officer should look into the space with a limited amount of his/her body exposed to anyone who could be inside. The officer should never be in the blind. It only takes a few extra minutes to make advance observations that in the long run will prevent potential hazardous situations.

The ability for our customers to see the security patrol vehicle from a great distance has benefits by virtue of a deterrent effect. With that in mind, officers must keep the overhead strobe lights on at all time while on patrol and in a garage/surface lot.

Many of our security responsibilities stem from a desire to prevent undesirable activity on our customers' person or property. An individual contemplating committing a crime is less likely to do so if the possibility of being detected is great. A visible patrol vehicle with a uniformed officer inside would give the individual cause for a second thought.

Do not become so attached to a patrol vehicle that no other way to patrol a facility is considered or utilized. The ability to be flexible and consider other alternatives to accomplish the job should not be overlooked. The officer should never allow the comfort that a security patrol vehicle provides influence decisions on how a task should be performed.

2.21 Emergency Call Boxes

Certain facilities and garages are equipped with Emergency Call Boxes. These units can be easily identified by the static blue light. When the call box has been activated, an alert will be broadcast over the two-way radio identifying the location and number of the activated call box. When activated, either a second blue light or the static blue light at the call box begins to strobe until reset by security.

3.4 General Post Orders for all Shifts and all Facilities

All Security Officers are required to swipe their own identification cards at the beginning and end of their scheduled shifts. If you do not have your NHPA identification card, you must contact the manager on duty to certify and acknowledge the hours.

All Security Officers are expected to be properly attired and neat in their issued uniforms at all times. Only issued equipment and uniform are to be worn while on duty.

Each officer should patrol the facility/garage/surface lots at least once an hour throughout their assigned shift. All daily activity logs must be completed and turned in at the end of each shift. Each log should contain detailed information relative to the security officer's activity during their shift.

An Incident Report must be completed and turned in to the Manager On-Duty, describing any noteworthy activity that had taken place during your shift (i.e., medical/fire/police response, accident/injury, damage/theft, etc...).

Each assigned shift will be responsible for checking all emergency phones (lights), doors, facility lights, locked gates, illegally parked vehicles, elevators, as well as elevator emergency telephones, to make sure that they are working properly. If any of these items are not working properly, it should be reported to the Manager On-Duty and noted on the daily activity log that is turned in at the end of the shift. Faulty equipment should be reported immediately to the Manager On-Duty.

Eating and/or drinking is not allowed at your post. No lunch period will be taken until the officer has worked a minimum of 4 hours, unless approved by the Manager On-Duty. The Manager On-Duty must also be notified when you take your lunch.

After working a minimum of 4 hours, each employee may take a fifteen (15) minute break twice during the course of their shift. The Manager On-Duty again must be notified.

Under no circumstances shall a security officer leave their assigned facility or abandon their assigned post for any reason.

Aside from the specific post orders detailed below, all security officers are expected to comply with and follow instruction of all supervisory and management personnel.

3.5 Rover – Specific Post Orders

The Rover is required to conduct a daily inspection of the assigned vehicle and complete the Patrol Vehicle Condition Report. The Rover is expected to service the vehicle as required with approval from the Director of Security.

The Rover is required to complete and submit a security activity log for each shift that is worked.

The Rover is expected to patrol with the vehicle and on foot, as a visible deterrent, all surface lots and garages that do not have an assigned security officer, to include:

Granite Square, Union/Water, Broadway Plaza, Whalley/Blake, Dwight/Orchard, State/Grand/Olive, George Street, 432 State Street, State/Audubon, State/Wall, Orchard/Sherman.

The yellow overhead lights must be on while patrolling all surface lots and garages. Yellow overhead lights are not to be used while driving on city streets or highways.

The Rover is required to obey all State motor vehicle laws. Cell phones are not to be used while operating the assigned vehicle.

The Rover is expected to conduct vehicle and/or space counts as directed and logged respectively.

The Rover is required to act as a relief and/or fill-in for other security personnel in other facilities as directed.

At the director of the Director of Security, the Rover will hand deliver documents to the Department of Transportation, Traffic & Parking on a weekly basis.

The Rover is expected to maintain an adequate supply of Parking Violation Ticket Books as well as Written Warning Tags.

The Rover is required to check all signage and general conditions at all surface lots and garages listed above.

The Rover is required to check all emergency and regular lighting devices at all surface lots and garages listed above.

The Rover must perform hang-tag and meter enforcement at all surface lots and garages listed above.

The Rover is expected to inspect all stairways and elevators daily at the garages listed above as well as conduct daily tests of all elevator emergency phones at the garages listed above.

The Rover must conduct monthly checks of all fire extinguishers at all surface lots and garages listed above.

The Rover is required to assist in coin collections as required and scheduled.

The Rover may be required to perform special tasks as instructed by the Director of Security.

3.9 Temple Street Garage – Specific Post Orders

This post is a walking and driving detail. Walking the garage must be integrated with the use of the security patrol vehicle. While using the security patrol vehicle, the strobe and flashing lights must be illuminated when the vehicle is occupied, parked or in motion.

All shifts are required to maintain a visible presence in the Temple Street garage and patrol all levels of the garage to include the basement and valet, keeping aware of general conditions. All shifts are expected to be a visible deterrent in the garage being aware of trespassers, damage to vehicles, damage to NHPA property, and assist customers as needed.

At the start of the shift, conduct and complete a vehicle space count.

At the start and end of each shift, security should patrol the facility looking for vehicular and/or property damage. It is imperative to know and pinpoint when incidents occurred and if they occurred on your respective shift.

All shifts are required to tour the lot and all levels of the garage, once an hour.

All shifts are required to check the garage elevators, once during each shift, to ensure proper working order as well as the elevator emergency telephones.

All shifts are required to walk and inspect the stairs of the garage for suspicious activity, throughout their shift.

All shifts are required to monitor the special parking area on the 2nd level and issue a Warning Ticket or a Parking Violation for identified offenses.

All shifts are required to escort the Cashier(s) to the safe for all money drops.

At the designated times, a vehicular car count must be done. The results are documented on the provided form and attached to the daily activity log.

All shifts are required to check all signage and general conditions at the garage as well as check all emergency and regular lighting devices, noting any deficiencies to the Manager On-Duty.

The security patrol vehicle will only be used by the employee on duty and assigned to the Temple Street Garage. Only trained (licensed) personnel are permitted to operate the vehicle. The vehicle is to be checked at the start of your detail, noting any damage. The vehicle must be kept neat, clean and in safe working order. You are required to report any deficiencies to the Manager OnDuty and note it on the Patrol Vehicle Condition Report. This vehicle is to be used for checking all levels, entrances, exits, doors, cashier booths, lights, call boxes and emergency situations. At the end of your tour, the vehicle should be parked at the designated location. Under no circumstances is the security patrol vehicle to be removed from the Temple Street Garage and driven on New Haven City Streets.

At the designated time, lock specific gates as directed. This includes cashier booths, lane gates and doors.

The 1st shift officer, with the assistance of the Union Station Garage Security Officer, is required to performing scheduled monthly tests of all Call 24 System Units at the garage. Submit completed forms noting variances to the Director of Security.

The garage office is to be used for business purposes only. Do not loiter in this office.

3.10 Temple Medical Garage - Specific Post Orders

All shifts are required to maintain a visible presence in the garage and patrol the garage, keeping aware of general conditions. Both shifts are expected to be a visible deterrent in the garage, being aware of trespassers, damage to vehicles, damage to NHPA property, and assist customers as needed.

At the start of the shift, conduct and complete a vehicle space count.

At the start and end of each shift, security should patrol the facility looking for vehicular and/or property damage. It is imperative to know and pinpoint when incidents occurred and if they occurred on your respective shift.

Both shifts are required to tour all levels of the garage, once an hour.

Both shifts are required to check the garage elevators, once during each shift, to ensure proper working order as well as the elevator emergency telephones.

Both shifts are required to walk and inspect the stairs of the garage for suspicious activity, throughout their shift.

Both shifts are required to monitor parking and issue a Warning Ticket or a Parking Violation for identified offenses.

Both shifts are required to escort the Cashier(s) to the safe for all money drops.

Both shifts are required to check all signage and general conditions at the garage as well as check all emergency and regular lighting devices, noting any deficiencies to the Manager On-Duty.

At the scheduled time, the garage is to be locked down. At this time, all parking levels, elevators and stairwells are to be checked for any customer or vehicular activity. When the Manager On-Duty arrives to cash out the Cashier, security is expected to accompany the Manager On-Duty and the Cashier to confirm the money bags being dropped. The Manager On-Duty is responsible for the final lockdown of the facility.

The garage office is to be used for business purposes only. Do not loiter in this office,

EXHIBIT AA

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is entered into on this _____ day of _____, 20__ and effective as of the _____ day of _____, 20__ (the "Effective Date"), by and between the **CITY OF NEW HAVEN**, a municipal corporation organized and existing under the laws of the State of Connecticut, with a mailing address of 165 Church Street, New Haven, Connecticut 06510 (the "City") and **WE 101 COLLEGE STREET LLC**, a limited liability company organized and existing under the laws of the State of Delaware with a mailing address of 150 Baker Avenue Extension, Suite 303, Concord, Massachusetts (the "Developer").

BACKGROUND

- I. The City is the owner of a parcel of land known as 101 College Street, New Haven, Connecticut (the "Property").
- II. On or about _____, the City, the Developer and the New Haven Parking Authority entered into a Development and Land Disposition Agreement Among the City of New Haven, the New Haven Parking Authority and WE 101 College Street LLC dated as of _____, 2020 for the Development and Disposition of 101 College Street (the "DLDA")
- III. Pursuant to Section 15.1(B) of the DLDA, on _____, the City terminated the DLDA [or Pursuant to Section 15.1 (C) of the DLDA, on _____, the Developer terminated the DLDA].
- IV. Pursuant to Section 15.2 of the DLDA, the Developer and the City are entering into this Memorandum of Understanding (this "New MOU") for the designation of the Developer as the preferred developer for the development of the Property during the term of this New MOU (the "Term").

NOW THEREFORE, in consideration of the foregoing, it is agreed as follows:

1. Preferred Developer Designation

The City hereby designates the Developer as the Preferred Developer for the development of the 101 College Street Parcel during the Term. The City agrees to refrain from negotiating or having dealings with any party other than the Developer or a designated affiliated entity thereof for the acquisition or development of the Property or any part thereof during the Term.

2. Term of MOU

(a) This New MOU shall take effect as of the Effective Date and shall continue in full force and effect for a period of twenty-four months (24)

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months from the Effective Date expiring on_____, 20___ (the "Initial Term"), whereupon this MOU shall automatically terminate and be null and void and of no further force and effect without the need for any notice or other instrument of termination.

- (b) Notwithstanding the provisions of Section 1(a) above, it is agreed and understood that provided the City and the Developer shall have negotiated a mutually acceptable Development and Land Disposition Agreement (the "New DLDA") and associated agreements (collectively the "Definitive Agreements") for the disposition and the development of the Property and submitted the same to the Board of Alders for approval, the Term shall be automatically extended for such further period as may be necessary to obtain Board of Alders approval and thereafter enter into the Definitive Agreements (the "Extended Term") provided that in no event shall the Extended Term exceed a period of one hundred and eighty (180) days.
- (c) Notwithstanding the provisions of Section 1(a) above, this MOU shall automatically terminate upon:
 - (i) a mutual determination that it will not be possible to negotiate mutually acceptable Definitive Agreements or
 - (ii) the Effective Date of the New DLDA and its execution and delivery following approval of the same by the Board of Alders or
 - (iii) rejection of any of the Definitive Agreements by the Board of Alders, or approval of the same upon terms and conditions which are substantively different from those contained in the Definitive Agreements and which are unacceptable to the Developer or

(iv) upon thirty (30) days' written notice by the Developer.

2. Activity.

- (a) During the Initial Term, acting in good faith, the Developer and the City shall seek to negotiate the terms of the Definitive Agreements. The Developer will prepare and deliver to the City a conceptual plan of development for the Property, including all buildings, parking structures and public amenities to be constructed on the Property and the <u>timetable</u> for construction thereof.
- (b) During the Term, the City agrees not to permit any Environmental Conditions, as that term is defined in the DLDA, to be created on the Property which were not found to be present on the Property in the Environmental Phase I/II Report, as that term is defined in the DLDA, or

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if such new Environmental Conditions are present on the Property, to remediate the same.

- (c) During the Term, the City agrees not to voluntarily mortgage or permit any encumbrances, liens, easements or restrictions to be placed on the Property and to remove any encumbrances to title to the Property that are not acceptable to the Developer.
- (d) During the Term, the City further agrees to provide the Developer with access to the Property for the purpose of making investigations, including environmental assessments, performing soil and borings tests and making physical inspections, subject to the City's customary insurance and indemnification clauses.
- 3. <u>Notices</u>. Any notice to be given to the other party shall be given in writing by certified mail or express overnight mail courier, addressed to the party for whom it is intended as follows:

To the City:	Michael Piscitelli Economic Development Administrator City of New Haven 165 Church Street New Haven, CT 06510 MPiscitelli@newhavenct.gov
With a copy to:	John R. Ward, Esq. Special Counsel to Economic Development City of New Haven 165 Church Street New Haven, CT 06510 JWard@newhavenct.gov
To the Developer:	Carter J. Winstanley WE 101 College Street LLC c/o Winstanley Enterprises, LLC 150 Baker Avenue Extension Suite 303 Concord, MA 01742 cwinstanley@winet.com
With a copy to:	Carolyn W. Kone Brenner, Saltzman & Wallman LLP 271 Whitney Avenue

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New Haven, CT 06511 <u>ckone@bswlaw.com</u>

- 4. This New MOU may be assigned by the Developer to an Affiliate as that term is defined in the DLDA.
- 5. This New MOU may only be amended by a written amendment executed by the City and the Developer.
- 6 The Economic Development Administrator of the City is authorized to act on behalf of the City to implement the provisions of this New MOU.

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IN WITNESS WHEREOF, the City and the Developer has entered into this New MOU on the date written above.

Signed in the Presence of:

WE 101 COLLEGE STREET LLC By Winstanley Enterprises LLC

By:__

Carter J. Winstanley Its: Manager

CITY OF NEW HAVEN

By:_

Michael Piscitelli Economic Development Administrator

Approved as to form and correctness

John R. Ward Special Counsel to Economic Development Final

EXHIBIT A

Property