Tighe&Bond

T5037-002
October 20, 2022

Mr. Peter Stith, Principal Planner, Chair
Site Plan Review Technical Advisory Committee
City of Portsmouth Planning Department
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: Site Review, Lot Line Revision & Conditional Use Permit Applications
Proposed Mixed Use Development, Russell & Deer Street, Portsmouth, NH

Dear Peter,

On behalf of Port Harbor Land, LLC (owner/applicant), we are pleased to submit one (1) set of hard copies and one electronic file (.pdf) of the following information to support a request for a Site Review Permit, Lot Line Revision Permit, Conditional Use Permit for Shared Parking on Separate Lots, and a Conditional Use Permit for Increased Building Footprint the above referenced project:

- One (1) full size & one (1) half size copy of the Site Plan Set, last revised October 20, 2022;
- TAC Comment Response Report, dated October 20, 2022;
- Drainage Peer Review Comment Response Letter, dated September 22, 2022
- Traffic Peer Review Comment Response Letter, dated September 22, 2022
- Drainage Analysis, last revised October 20, 2022;
- Operations and Maintenance Manual, dated May 24, 2022;
- Grade Plane Exhibit, last revised October 20, 2022;
- Community Space Exhibit, last revised October 20, 2022;
- Fire Truck Turning Exhibits, last revised October 20, 2022;
- Passenger Vehicle Turning Exhibit, dated September 22, 2022
- Tractor Trailer Turning Exhibit, last revised October 20, 2022;
- Traffic Impact Study, dated May 24, 2022;
- Eversource Will Service Letter, dated May 23, 2022;
- Unitil Will Service Letter, dated April 19, 2022;
- Green Building Statement, dated May 23, 2022;
- Exterior Lighting Compliance Letter, dated August 23, 2022

PROJECT SUMMARY

Existing Conditions

The project is located at 2 Russell Street, Deer Street & 250 Market Street consisting of properties identified as Map 118 Lot 28, Map 119 Lot 1-1A, 1-1C & Lot 4, Map 124 Lot 12, and Map 125 Lot 21 on the City of Portsmouth Tax Maps which are located in the Character District 5 (CD5). The properties identified as Map 118 Lot 28, Map 124 Lot 12, and Map 125 Lot 21 (proposed redevelopment parcels) are the existing parcels proposed to be redeveloped are bound by Deer Street to the south, Maplewood Avenue to the west, the railroad to the north and Russell Street to the east. Map 119 Lot 4 will be developed into a park area as part of the community space for the proposed project, and Map 119 Lot 1-1A & 1-1C will be part of the lot line revision application.

The proposed redevelopment parcels lots currently consist of a large surface parking lot which is mainly used by the Sheraton Hotel. There are some small patches of gravel and grass where the site abuts the railroad property and a ledge outcropping to the north.

Proposed Redevelopment

The proposed project will include the construction of three buildings consisting of office, retail/commercial, and residential uses. Building 1 is a proposed 4-story office building at the corner of Deer Street and Maplewood Avenue, Building 2 is a proposed 5-story mixed-use residential building at the corner of Deer Street and Russell Street with below ground parking, first floor residential lobby, commercial space and parking and 56 upper floor residential units, and Building 3 is a proposed 5-story mixed-use residential building along Russell Street with first floor residential lobby and commercial space and 24 upper floor residential units.

The existing condition of the proposed redevelopment parcels does not provide any stormwater treatment. The proposed development will provide stormwater treatment to runoff from the new buildings and surface pedestrian ways via stormwater filtration treatment units. In addition, underground detention systems have been incorporated into the design to address peak runoff rates from the site. The stormwater management system is described in further detail in the enclosed Drainage Analysis.

The project also consists of significant on-site and off-site improvements including wide sidewalks, roadway improvements, community space, lighting, landscaping, and utilities. The proposed development will provide landscape improvements including an enhanced streetscape and plantings, plaza area at the redesigned intersection of Deer Street and Russell Street, and community space areas. The streetscape design includes a variety of vibrant site elements such as shade trees, public benches, and retail spill out zones. Combined, these site features will create a friendly, safe pedestrian experience and connect users with first floor programs and access to proposed on-site and off-site community space areas. In total the proposed project is providing 22,353 SF of off-site, pedestrian orientated and park space public improvements.

Community Space & Off-Site Improvements

The project is located in the North End Incentive Overlay District. The applicant will be providing 38,596 SF of community spaces. This Community Space is 39.7% of the total lot area which exceeds the 20% of total lot area required to receive the incentive bonus for one additional story (10 ft) above the maximum height requirement. The community space calculation is depicted in the enclosed Community Space Exhibit. Additionally, the project is required to provide 30% community space as part of a conditional use permit application discussed below for Map 118 Lot 28 to allow proposed Building 2 to have a maximum 40,000 SF building footprint. Overall, the project will be providing 31.2% open space on the development lot where only 5% is required by zoning.

LAND-USE PERMIT APPLICATIONS

Local Permitting Timeline

The proposed project will require the following site related approvals from the Planning Board:

- Site Plan Review Permit
- Lot Line Revision Permit
- Conditional Use Permit for Shared Parking on a Separate Lot
- Conditional Use Permit for Increased Building Footprint

To date the applicant has attended the following meetings with the local land-use boards related to the Site Plan:

- December 16, 2021 – Planning Board Conceptual Consultation
- January 11, 2022 – Technical Advisory Committee Work Session
- February 17, 2022 – Planning Board Design Review
- June 7, 2022 – Technical Advisory Committee Meeting
- August 2, 2022 - Technical Advisory Committee Meeting
- September 6, 2022 - Technical Advisory Committee Meeting
- October 4, 2022 - Technical Advisory Committee Meeting

The project received a certificate of approval from the Historic District Commission (HDC) at their meeting on August 10, 2022. In addition to the local land-use permits, the project will also require the following approvals from the New Hampshire Department of Environmental Services (NHDES):

- Alteration of Terrain Permit
- Sewer Connection Permit

Site Plan Review Permit

The project will require a Site Plan Review Permit for the site improvements described above in the project summary. The project has previously been before the Planning Board for Conceptual Consultation and Preliminary Design Review. In addition, the project has previously been before the Technical Advisory Committee (TAC) for a work session and regular meeting.

Lot Line Revision Permit

The proposed redevelopment parcels located at the corner of Russell Street and Deer Street consist of properties identified as Map 118 Lot 28, Map 124 Lot 12, and Map 125 Lot 21. The existing internal lot lines separating these three lots, are proposed to be relocated to better align the parcels for the proposed building footprints.

Additionally, three land transfers are proposed to allow for the realignment of the Russell Street & Deer Street intersection and for the City's future construction of a roundabout at Russell Street and Market Street. Land transfer area 1 is proposed from Map 119, Lot 4 to the City of Portsmouth. Land transfer area 2 is proposed from Map 119, Lot 1-1C to the City of Portsmouth. Lastly land transfer area 3 is proposed from Map 119 Lot 1-1A to the City of Portsmouth.

Conditional Use Permits

Shared Parking on Separate Lots

A Conditional Use Permit for parking on a separate lot as permitted under Section 10.1112.62 of the City of Portsmouth Zoning Ordinance is requested for the project. The project meets the parking requirements by sharing parking between the three (3) proposed redevelopment parcels and the existing Sheraton Hotel and Deer Street condos as shown on the enclosed Site Plans. A total of 334 parking spaces are required to meet the Zoning requirements.

The existing surface parking lot is used by the Sheraton Hotel for their valet and self-park operations. There are also an existing 82 deeded parking spaces for the Deer Street and Sheraton Condos that can be assigned to any space on either the Sheraton Lot or the redevelopment parcels. The table below identifies the required parking for the existing and proposed uses per the City of Portsmouth Ordinance. The project is providing 180 spaces within Building 2 and there are 154 existing spaces on the Sheraton lot, for a total of 334 proposed parking spaces where 334 spaces are required.

City of Portsmouth Downtown Overlay Parking Requirement	
North End Development, Portsmouth, NH	
Proposed Commercial Use Parking Requirements	No requirements 75,000 SF **0 Spaces**
Proposed Residential Use Parking Requirements	1.3 Spaces / Dwelling Unit 80 Dwelling Units **104 Spaces**
Proposed Residential Visitor Parking Requirements	1 Spaces / 5 Dwelling Unit 80 Dwelling Units **16 Spaces**
Sheraton Hotel Parking Requirements	0.75 Spaces / Hotel Room 181 Rooms **136 Spaces**
Sheraton Condo Parking Requirements	Deeded Easement for 24 Spaces 12 Dwelling Units **24 Spaces**
Deer Street Condo Parking Requirements	Deeded Easement for 58 Spaces 3-story mixed use Condos on Deer Street **58 Spaces**
Subtotal Required	**338 Spaces**
DOD Parking	**-4 Spaces**
Total Spaces Required	**334 Spaces**

Per Section 10.1112.62 (2) the shared parking arrangement shall be secured by a covenant acceptable to the City and recorded at the Rockingham County Registry of Deeds. The applicant understands that should the Planning Board grant the shared parking CUP, as a condition of approval the applicant will be required to record the agreement. The applicant will manage the parking for hotel use with a valet parking operator that will operate and manage the parking 24/7/365 to optimize the use of the available parking.

Increased Building Footprint

A Conditional Use Permit to allow a building footprint of up to 40,000 SF as permitted under Section 10.5A43.43 of the City of Portsmouth Zoning Ordinance is being requested for the project. The Planning Board may grant a conditional use permit to allow a building footprint of up to 40,000 SF in the CD5 district, if all of the following criteria are met:

(a) No story above the ground floor parking shall be greater than 30,000 SF in the CD5 district.

The footprint of the building stories above the ground floor are 29,810 SF.

(b) All ground floor parking areas shall be separated from any public or private street by a liner building.

The ground floor parking areas are separated from the public street by a liner building.

(c) At least 50% of the gross floor area of the ground floor shall be dedicated to parking.

The total gross floor area of the ground floor dedicated to parking is 64.2%.

(d) At least 30% of the property shall be assigned and improved as community space.

The proposed lot area for Map 118, Lot 28 and Map 119 Lot 4 is 57,967 SF which requires 17,391 SF of community space to meet the 30% requirement. Map 124, Lot 12 and Map 125, Lot 21 also require 20% community space to be eligible for the North End Overlay Incentives. Proposed community space areas on Map 118, Lot 28 and Map 119 Lot 4 totals 23,446 SF or 40.4%. The total required community space for the project is 25,221 SF with the total proposed community space equaling 38,568 SF or 39.7%. This is shown on the enclosed Community Space Exhibit.

(e) The development shall comply with all applicable standards of the ordinance and the City's land use regulations.

The development complies with all applicable standards of the ordinance and the City's land use regulations.

The enclosed revised plans and supplemental materials have been provided to address comments received from the Technical Advisory Committee (TAC) in correspondence dated October 3, 2022 and at their meeting held on October 4, 2022.

We respectfully request to be placed on the TAC meeting agenda for November 1, 2022. If you have any questions or need any additional information, please contact Neil Hansen by phone at (603) 294-9213 or by email at nahansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Neil A. Hansen, PE
Project Manager

Patrick M. Crimmins, PE
Vice President

Cc: Port Harbor Land, LLC (via e-mail)

NORTH END MIXED USE DEVELOPMENT

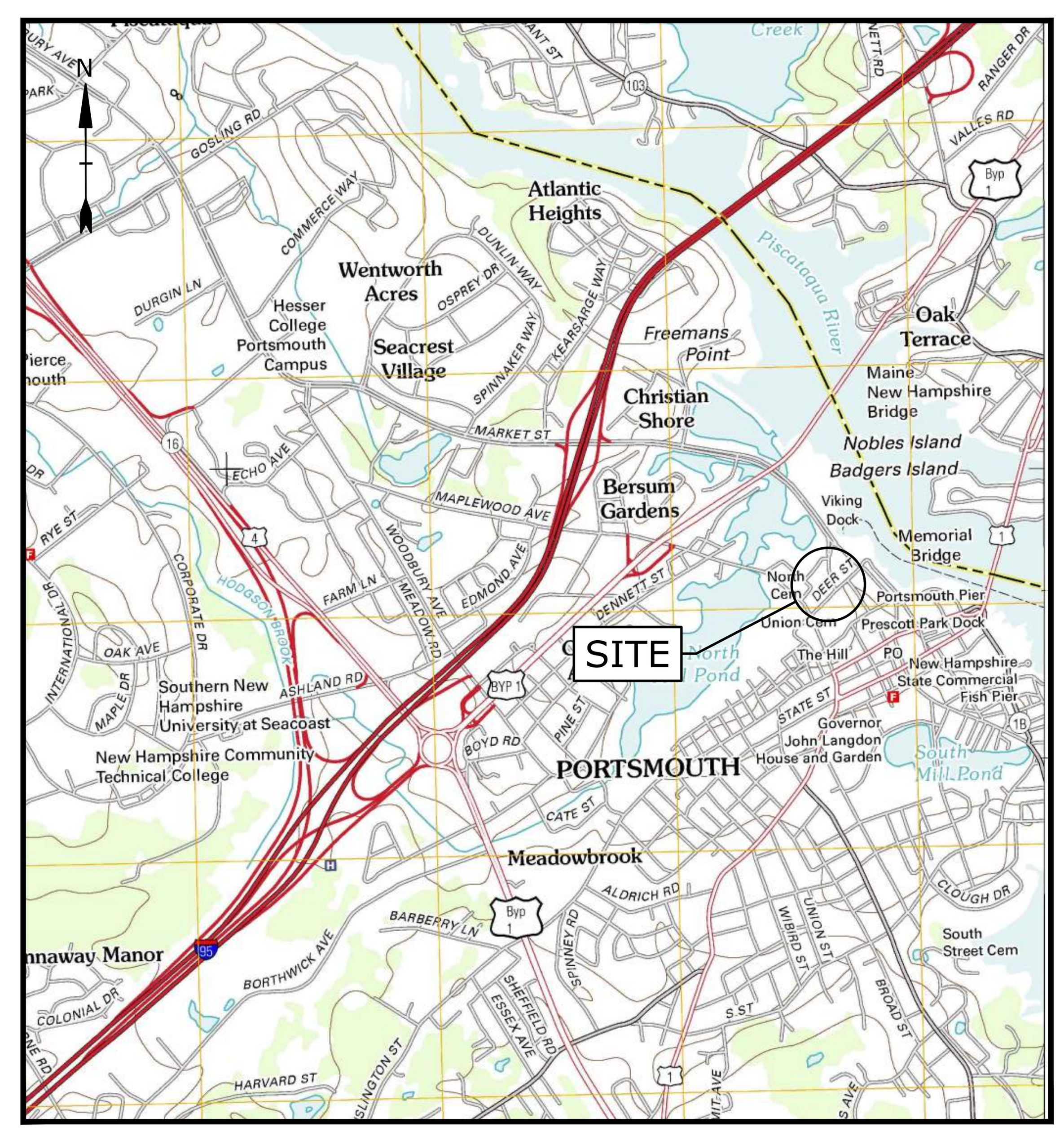
RUSSELL STREET & DEER STREET
PORTSMOUTH, NEW HAMPSHIRE
MAY 24, 2022
LAST REVISED OCTOBER 20, 2022

LIST OF DRAWINGS

SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	10/20/2022
G-100	GENERAL NOTES AND LEGEND	10/20/2022
C-101	EXISTING CONDITIONS & DEMOLITION PLAN	10/20/2022
C-102	OVERALL SITE PLAN	10/20/2022
C-102.1	SITE PLAN	10/20/2022
C-103	GRADING & DRAINAGE PLAN	10/20/2022
C-104	UTILITIES PLAN	10/20/2022
C-200	ACCESS EASEMENT PLAN	10/20/2022
C-201	DRAINAGE EASEMENT PLAN	10/20/2022
C-202	UTILITIES EASEMENT PLAN	10/20/2022
C-203	COMMUNITY SPACE EASEMENT PLAN	10/20/2022
C-204	LOT LINE REVISION PLAN	10/20/2022
C-501	EROSION CONTROL NOTES AND DETAILS SHEET	10/20/2022
C-502	DETAILS SHEET	10/20/2022
C-503	DETAILS SHEET	10/20/2022
C-504	DETAILS SHEET	10/20/2022
C-505	DETAILS SHEET	10/20/2022
C-506	DETAILS SHEET	10/20/2022
C-507	DETAILS SHEET	10/20/2022
C-508	DETAILS SHEET	10/20/2022
C-509	DETAILS SHEET	10/20/2022
C-510	DETAILS SHEET	10/20/2022
L-100	LANDSCAPE MATERIAL PLAN, LEGEND AND NOTES	10/20/2022
L-101	LANDSCAPE SITE PLAN	10/20/2022
L-102	LANDSCAPE DETAILS	10/20/2022
L-103	LANDSCAPE DETAILS	10/20/2022
E-001	LIGHTING COVER SHEET	8/25/2022
E-100	EXTERIOR LIGHTING PLAN AND CALCULATIONS	8/25/2022
E-101	EXTERIOR LIGHTING CUTSHEETS	8/25/2022
E-102	EXTERIOR LIGHTING CUTSHEETS	8/25/2022
E-103	EXTERIOR LIGHTING CUTSHEETS	8/25/2022
E-104	EXTERIOR LIGHTING CUTSHEETS	8/25/2022
A-101	BUILDING 1 AREA PLANS	5/24/2022
A-102	BUILDING 2 AREA PLANS	5/24/2022
A-103	BUILDING 3 AREA PLANS	5/24/2022
A-201	BUILDING 1 ELEVATION	5/24/2022
A-202	BUILDING 1 ELEVATION	5/24/2022
A-203	BUILDING 2 ELEVATION	5/24/2022
A-204	BUILDING 2 ELEVATION	5/24/2022
A-205	BUILDING 2 ELEVATION	5/24/2022
A-206	BUILDING 3 ELEVATION	5/24/2022
A-207	BUILDING 3 ELEVATION	5/24/2022
A-208	GLAZING STUDY	5/24/2022

LIST OF PERMITS

LOCAL	STATUS	DATE
SITE PLAN REVIEW PERMIT	PENDING	
LOT LINE REVISION PERMIT	PENDING	
CONDITIONAL USE PERMIT	PENDING	
STATE		
NHDES - SEWER CONNECTION PERMIT	NOT SUBMITTED	
NHDES - ALTERATION OF TERRAIN PERMIT	NOT SUBMITTED	



LOCATION MAP

SCALE: 1" = 2,000'

PREPARED BY:

Tighe&Bond

177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801
603-433-8818

ARCHITECT:

SGA ARCHITECTURE
200 HIGH STREET, FLOOR 2
BOSTON MA, 02110
857-300-2610

OWNER/APPLICANT:

TAX MAP 118, LOT 28
TAX MAP 119, LOT 1-1A
TAX MAP 119, LOT 1-1C
TAX MAP 119, LOT 4
TAX MAP 124, LOT 12 &
TAX MAP 125, LOT 21

PORT HARBOR LAND, LLC
1000 MARKET STREET, BUILDING ONE
PORTSMOUTH, NEW HAMPSHIRE 03801

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 10/20/22

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER 10/20/22

TAC RESUBMISSION

COMPLETE SET 43 SHEETS

T & B PROJECT NO: T-5037-002

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:44pm By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002_C-COVER.dwg

GENERAL NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
2. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH.
3. THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED LAND SURVEYOR TO DETERMINE ALL LINES AND GRADES.
4. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES. CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES AND COMPLY WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
6. THE CONTRACTOR SHALL OBTAIN AND PAY FOR AND COMPLY WITH ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
7. THE CONTRACTOR SHALL PHASE DEMOLITION AND CONSTRUCTION AS REQUIRED TO PROVIDE CONTINUOUS SERVICE TO EXISTING BUSINESSES AND HOMES THROUGHOUT THE CONSTRUCTION PERIOD. EXISTING BUSINESS AND HOME SERVICES INCLUDE, BUT ARE NOT LIMITED TO ELECTRICAL, COMMUNICATION, FIRE PROTECTION, DOMESTIC WATER AND SEWER SERVICES. TEMPORARY SERVICES, IF REQUIRED, SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL AND UTILITY COMPANY STANDARDS. CONTRACTOR SHALL PROVIDE DETAILED CONSTRUCTION SCHEDULE TO OWNER PRIOR TO ANY DEMOLITION/CONSTRUCTION ACTIVITIES AND SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
8. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES & SPECIFICATIONS.
9. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
10. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
11. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCH BASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
12. SEE EXISTING CONDITIONS PLAN FOR BENCH MARK INFORMATION.
13. APPLICANT SHALL SUBMIT, AS PART OF THE FINAL POST APPROVAL PROCEDURES, RELEVANT PTAP INFORMATION USING THE MOST RECENT ONLINE DATA PORTAL CURRENTLY MANAGED BY THE UNH STORMWATER CENTER. THE PLANNING DEPARTMENT SHALL BE NOTIFIED AND COPIED OF THE PTAP DATA SUBMITTAL.
14. A VIDEO INSPECTION OF THE EXISTING SEWER AND DRAIN LINES ON MAPLEWOOD AVENUE, DEER STREET AND RUSSELL STREET SHALL BE COMPLETED AND PROVIDED TO PORTSMOUTH DPW BOTH BEFORE AND AFTER CONSTRUCTION.
15. CONTRACTOR SHALL INSTALL INTERSECTION VIDEO DETECTION FOR MAPLEWOOD AVENUE AND DEER STREET INTERSECTION. COORDINATE WITH THE CITY OF PORTSMOUTH TRAFFIC DEPARTMENT.

DEMOLITION NOTES:

1. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
2. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES.
3. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
4. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
5. SAW CUT AND REMOVE PAVEMENT ONE (1) FOOT OFF PROPOSED EDGE OF PAVEMENT OR EXISTING CURB LINE IN ALL AREAS WHERE PAVEMENT TO BE REMOVED ABUTS EXISTING PAVEMENT OR CONCRETE TO REMAIN.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.
7. ALL UTILITIES SHALL BE TERMINATED AT THE MAIN LINE PER UTILITY COMPANY AND CITY OF PORTSMOUTH STANDARDS. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES LOCATED WITHIN THE LIMITS OF WORK UNLESS OTHERWISE NOTED.
8. CONTRACTOR SHALL VERIFY ORIGIN OF ALL DRAINS AND UTILITIES PRIOR TO REMOVAL/TERMINATION TO DETERMINE IF DRAINS OR UTILITY IS ACTIVE, AND SERVICES ANY ON OR OFF-SITE STRUCTURE TO REMAIN. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY SUCH UTILITY FOUND AND SHALL MAINTAIN THESE UTILITIES UNTIL PERMANENT SOLUTION IS IN PLACE.
9. PAVEMENT REMOVAL LIMITS ARE SHOWN FOR CONTRACTOR'S CONVENIENCE. ADDITIONAL PAVEMENT REMOVAL MAY BE REQUIRED DEPENDING ON THE CONTRACTOR'S OPERATION. CONTRACTOR TO VERIFY FULL LIMITS OF PAVEMENT REMOVAL PRIOR TO BID.
10. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE PADS, UTILITIES AND PAVEMENT WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT, CURBS, LIGHTING, MANHOLES, CATCH BASINS, UNDER GROUND PIPING, POLES, STAIRS, SIGNS, FENCES, RAMPS, WALLS, BOLLARDS, BUILDING SLABS, FOUNDATION, TREES AND LANDSCAPING.
11. REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
12. CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED BY THE CONTRACTOR, THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO REPLACE DISTURBED MONUMENTS.
13. PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS/CURB INLETS WITHIN CONSTRUCTION LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INLET PROTECTION BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE "HIGH FLOW SILT SACK" BY ACF ENVIRONMENTAL OR EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN EVENT OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED OR SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER.
14. THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
15. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL UTILITIES TO BE REMOVED AND PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
16. THE CONTRACTOR SHALL REMOVE AND SALVAGE EXISTING GRANITE CURB FOR REUSE.

SITE NOTES:

1. PAVEMENT MARKINGS SHALL BE INSTALLED AS SHOWN, INCLUDING PARKING SPACES, STOP BARS, ADA SYMBOLS, PAINTED ISLANDS, FIRE LANES, CROSS WALKS, ARROWS, LEGENDS AND CENTERLINES. ALL MARKINGS EXCEPT CENTERLINE AND MEDIAN ISLANDS TO BE CONSTRUCTED USING WHITE PAVEMENT MARKINGS. ALL THERMOPLASTIC PAVEMENT MARKINGS INCLUDING LEGENDS, ARROWS, CROSSWALKS AND STOP BARS SHALL MEET THE REQUIREMENTS OF AASHTO M249. ALL PAINTED PAVEMENT MARKINGS INCLUDING CENTERLINES, LANE LINES AND PAINTED MEDIANS SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F".
2. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
3. SEE DETAILS FOR PAVEMENT MARKINGS, ADA SYMBOLS, SIGNS AND SIGN POSTS.
4. CENTERLINES SHALL BE FOUR (4) INCH WIDE YELLOW LINES.
5. PAINTED ISLANDS SHALL BE FOUR (4) INCH WIDE DIAGONAL LINES AT 3'-0" O.C. BORDERED BY FOUR (4) INCH WIDE LINES.
6. STOP BARS SHALL BE EIGHTEEN (18) INCHES WIDE, WHITE THERMOPLASTIC AND CONFORM TO CURRENT MUTCD STANDARDS.
7. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAW CUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
8. CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
9. ALL LIGHT POLE BASES NOT PROTECTED BY A RAISED CURB SHALL BE PAINTED YELLOW.
10. COORDINATE ALL WORK ADJACENT TO BUILDING WITH BUILDING CONTRACTOR.
11. SEE ARCHITECTURAL/BUILDING DRAWINGS FOR ALL CONCRETE PADS & SIDEWALKS ADJACENT TO BUILDING.
12. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
13. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
14. THE APPLICANT SHALL HAVE A SITE SURVEY CONDUCTED BY A RADIO COMMUNICATIONS CARRIER APPROVED BY THE CITY'S COMMUNICATIONS DIVISION. THE RADIO COMMUNICATIONS CARRIER MUST BE FAMILIAR AND CONVERSANT WITH THE POLICE AND RADIO CONFIGURATION. IF THE SITE SURVEY INDICATES IT IS NECESSARY TO INSTALL A SIGNAL REPEATER EITHER ON OR NEAR THE PROPOSED PROJECT, THOSE COSTS SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. THE OWNER SHALL COORDINATE WITH THE SUPERVISOR OF RADIO COMMUNICATIONS FOR THE CITY.
15. ALL TREES PLANTED ARE TO BE INSTALLED UNDER THE SUPERVISION OF THE CITY OF PORTSMOUTH DPW USING STANDARD INSTALLATION METHODS.
16. A TEMPORARY SUPPORT OF EXCAVATION (SOE) PLAN SHALL BE PREPARED BY THE APPLICANT'S CONTRACTOR TO CONFIRM ANY TEMPORARY ENCUMBRANCES OF THE CITY'S RIGHT-OF-WAY. IF LICENSES ARE REQUIRED FOR THE SOE, THE APPLICANT WILL BE REQUIRED TO OBTAIN THESE FROM THE CITY PRIOR TO CONSTRUCTION.
17. THE PROPERTY MANAGER WILL BE RESPONSIBLE FOR TIMELY SNOW REMOVAL FROM ALL PRIVATE SIDEWALKS, DRIVEWAYS, AND PARKING AREAS. ALL SNOW REMOVAL WILL BE HAULED OFF-SITE AND LEGALLY DISPOSED OF.
18. THE STREET LIGHTING TYPE TO BE HISTORIC STYLE FIXTURES AND POLE TO MATCH EXISTING LIGHTING ON SOUTH SIDE OF DEER STREET.
19. CONSTRUCTION SEQUENCING OF NORTH COMMUNITY PARK SHALL BE COORDINATED WITH MARKET STREET AND RUSSELL STREET INTERSECTION CONSTRUCTION. NORTH COMMUNITY PARK SHALL NOT BE CONSTRUCTED UNTIL THE INTERSECTION ROUNDABOUT HAS BEEN CONSTRUCTED.
20. THE PROPOSED LOADING ZONE SHALL BE REVIEWED BY THE PARKING & TRAFFIC SAFETY COMMITTEE FOR RECOMMENDATION TO CITY COUNCIL.
21. THE APPLICANTS CONTRACTOR SHALL PREPARE A CONSTRUCTION MANAGEMENT AND MITIGATION PLAN (CMMP) FOR REVIEW AND APPROVAL BY THE CITY'S LEGAL AND PLANNING DEPARTMENTS.

GRADING AND DRAINAGE NOTES:

1. COMPACTION REQUIREMENTS:

BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREAS	90%

* ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM-2922.

2. ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR EQUAL) UNLESS OTHERWISE SPECIFIED.
3. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
4. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMPS AND LOADING DOCK AREAS ADJACENT TO THE BUILDING.
5. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
6. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
7. ALL PROPOSED CATCH BASINS SHALL BE EQUIPPED WITH OIL/GAS SEPARATOR HOODS AND 4' SUMPS.

EROSION CONTROL NOTES:

1. SEE SHEET C-501 FOR GENERAL EROSION CONTROL NOTES AND DETAILS.

UTILITY NOTES:

1. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
   - NATURAL GAS - UNITIL
   - WATER/SEWER - CITY OF PORTSMOUTH
   - ELECTRIC - EVERSOURCE
   - COMMUNICATIONS - COMCAST/CONSOLIDATED COMMUNICATIONS/FIRST LIGHT
2. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, CEMENT LINED DUCTILE IRON PIPE.
3. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF PORTSMOUTH WATER DEPARTMENT.
4. ALL SEWER PIPE SHALL BE PVC SDR 35 UNLESS OTHERWISE STATED.
5. CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ABUTTING PROPERTIES THROUGHOUT CONSTRUCTION.
6. CONNECTION TO EXISTING WATER MAIN SHALL BE CONSTRUCTED TO CITY OF PORTSMOUTH STANDARDS.
7. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE DEPARTMENT OF PUBLIC WORKS STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
8. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
9. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE APPLICABLE UTILITY COMPANIES.
10. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
11. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
12. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES.
13. A 10-FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18-INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
14. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN
15. HYDRANTS, GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF PORTSMOUTH.
16. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF PORTSMOUTH.
17. ALL SEWER PIPE WITH LESS THAN 6' OF COVER IN PAVED AREAS OR LESS THAT 4' OF COVER IN UNPAVED AREAS SHALL BE INSULATED.
18. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
19. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PROVIDED BY THE PROJECT ELECTRICAL ENGINEER.
20. CONTRACTOR SHALL CONSTRUCT ALL UTILITIES AND DRAINS TO WITHIN 10' OF THE FOUNDATION WALLS AND CONNECT THESE TO SERVICE STUBS FROM THE BUILDING.
21. FINAL LOCATIONS OF ALL UTILITY LINES SHALL BE APPROVED BY THE CITY OF PORTSMOUTH DPW PRIOR TO CONSTRUCTION.
22. CONTRACTOR SHALL PERFORM TEST PITS TO VERIFY THE LOCATION OF EXISTING UTILITIES PRIOR TO CONSTRUCTION AND SHALL NOTIFY ENGINEER IF LOCATIONS DIFFER FROM PLAN.
23. CONTRACTOR SHALL COMPLETE PRE AND POST BLAST SURVEY AND MONITORING OF THE EXISTING SEWER LINE ALONG DEER STREET.

LANDSCAPE NOTES:

1. SEE SHEET L-100 FOR LANDSCAPE NOTES.

EXISTING CONDITIONS PLAN NOTES:

1. EXISTING CONDITIONS ARE BASED ON A FIELD SURVEY PERFORMED BY MSC CIVIL ENGINEERS & LAND SURVEYORS, INC., SEE REFERENCE PLAN #1.

REFERENCE PLANS:

1. "EXISTING FEATURES PLAN MAP 118 LOT 28, MAP 119 LOT 4, MAP 124 LOT 12 AND MAP 125 LOT 21" PREPARED BY MSC CIVIL ENGINEERS AND LAND SURVYORS, INC., DATED JANUARY 16, 2015.

ABBREVIATIONS

TBR	TO BE REMOVED
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
30'R	CURB RADIUS
SSWL	SINGLE SOLID WHITE LINE
DSYL	DOUBLE SOLID YELLOW LINE
VGC	VERTICAL GRANITE CURB
SGC	SLOPED GRANITE CURB
FGC	FLUSH GRANITE CURB
TC	TOP OF CURB
BC	BOTTOM OF CURB
TW	TOP OF WALL
BW	BOTTOM OF WALL
TS	TOP OF STEP
BS	BOTTOM OF STEP
HDPE	HIGH-DENSITY POLYETHYLENE
FF	FINISH FLOOR
VIF	VERIFY IN FIELD

LEGEND

	PROPOSED SAWCUT
	LIMIT OF WORK
	PROPOSED SILT SOCK
	APPROXIMATE LIMIT OF PAVEMENT TO BE REMOVED
	PROPOSED CONSTRUCTION EXIT
	PROPERTY LINE
	PROPOSED PROPERTY LINE
	PROPOSED EDGE OF PAVEMENT
	PROPOSED CURB
	PROPOSED BUILDING
	PROPOSED PAVEMENT SECTION
	PROPOSED MILL AND OVERLAY SECTION
	PROPOSED CONCRETE SIDEWALK
	PROPOSED BRICK SIDEWALK
	PROPOSED BOLLARD
20	PROPOSED MAJOR CONTOUR LINE
22	PROPOSED MINOR CONTOUR LINE
	PROPOSED DRAIN LINE (TYP)
	INLET PROTECTION SILT SACK
	PROPOSED CATCHBASIN
	PROPOSED DRAIN MANHOLE
	PROPOSED YARD DRAIN
D	EXISTING STORM DRAIN
S	EXISTING SANITARY SEWER
S	EXISTING SANITARY SEWER TO BE REMOVED
T T T	EXISTING UNDERGROUND TELECOMMUNICATION
W	EXISTING WATER
G	EXISTING GAS
E	EXISTING UNDERGROUND ELECTRIC
OHW	EXISTING OVERHEAD UTILITY
PS	PROPOSED SANITARY SEWER
PW	PROPOSED WATER
G	PROPOSED GAS
	PROPOSED UNDERGROUND ELECTRIC
COM	PROPOSED UNDERGROUND TELECOMMUNICATION
	EXISTING CATCHBASIN
	EXISTING DRAIN MANHOLE
	EXISTING SEWER MANHOLE
WV	EXISTING WATER VALVE
	EXISTING HYDRANT
	EXISTING ELECTRIC MANHOLE
	EXISTING TELEPHONE MANHOLE
	PROPOSED SEWER MANHOLE
WV	PROPOSED WATER VALVE
	PROPOSED HYDRANT
GV	PROPOSED GAS VALVE
E	PROPOSED ELECTRIC MANHOLE
	PROPOSED LIGHT POLE BASE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
10/20/22

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED
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10/20/22

North End Mixed Use Development

Two International Group

Russell Street &
Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

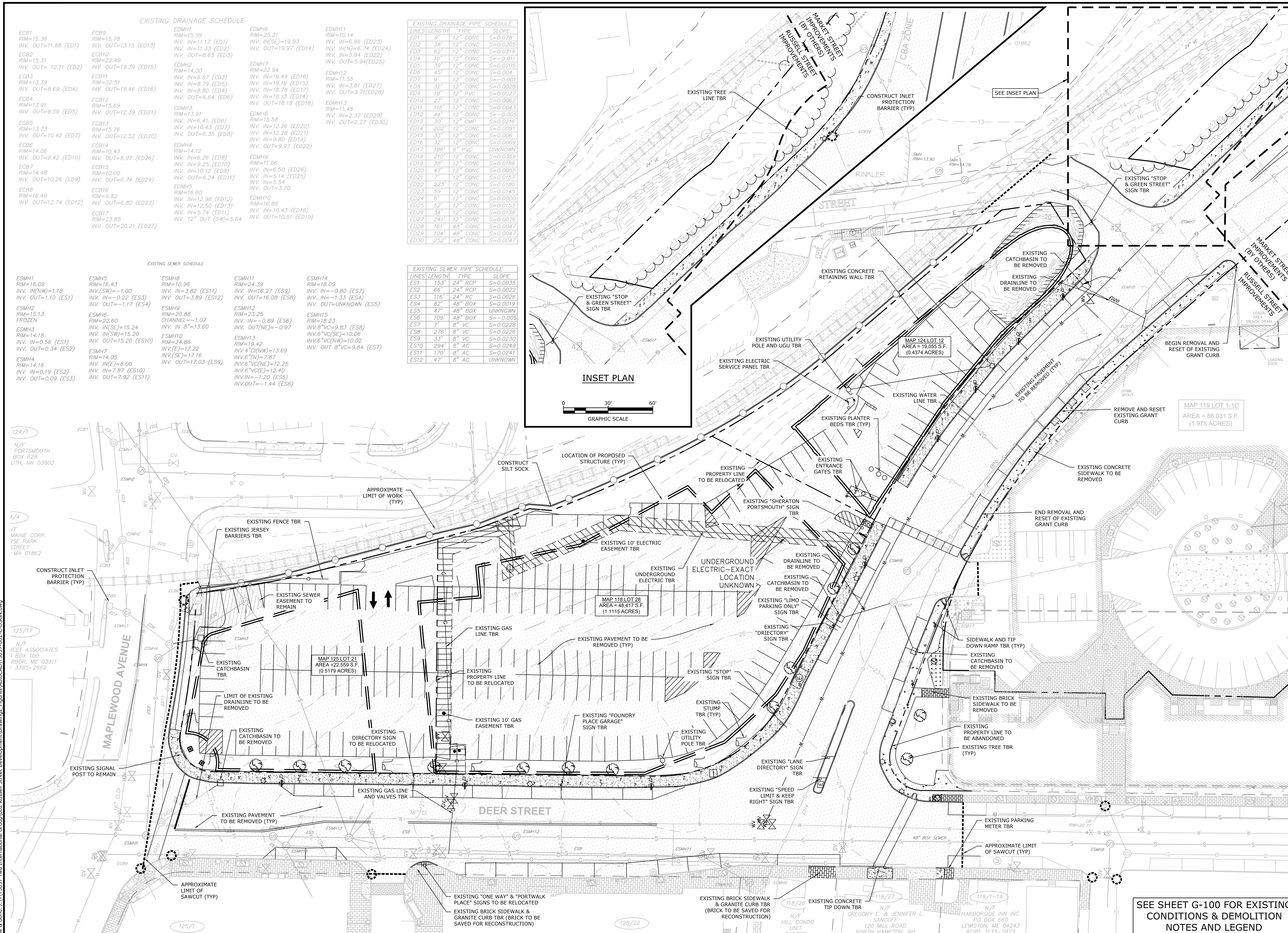
PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DSGN.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

GENERAL NOTES
AND LEGEND

SCALE: AS SHOWN

G-100

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:45pm By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DSGN.dwg



EXISTING DRAINAGE SCHEDULE

ECB1
RIM=15.36
INV. OUT=11.88 (ED1)

ECB2
RIM=15.31
INV. OUT= 12.11 (ED2)

ECB3
RIM=13.39
INV. OUT=8.69 (ED4)

ECB4
RIM=13.91
INV. OUT=9.59 (ED5)

ECB5
RIM=13.73
INV. OUT=10.42 (ED7)

ECB6
RIM=14.06
INV. OUT=9.42 (ED10)

ECB7
RIM=14.48
INV. OUT=10.26 (ED9)

ECB8
RIM=16.49
INV. OUT=12.74 (ED12)

ECB9
RIM=15.78
INV. OUT=13.15 (ED13)

ECB10
RIM=22.49
INV. OUT=19.39 (ED15)

ECB11
RIM=22.51
INV. OUT=19.46 (ED16)

ECB12
RIM=15.69
INV. OUT=12.39 (ED21)

ECB13
RIM=15.76
INV. OUT=12.52 (ED20)

ECB14
RIM=10.43
INV. OUT=6.97 (ED26)

ECB15
RIM=10.00
INV. OUT=6.74 (ED24)

ECB16
RIM=9.82
INV. OUT=6.80 (ED23)

ECB17
RIM=23.85
INV. OUT=20.21 (ED27)

EDMH1
RIM=15.59
INV. IN=11.17 (ED1)
INV. IN=11.33 (ED2)
INV. OUT=8.65 (ED3)

EDMH2
RIM=14.00
INV. IN=6.67 (ED3)
INV. IN=8.79 (ED5)
INV. IN=8.80 (ED4)
INV. OUT=6.64 (ED6)

EDMH3
RIM=13.91
INV. IN=6.41 (ED6)
INV. IN=10.43 (ED7)
INV. OUT=6.35 (ED8)

EDMH4
RIM=14.12
INV. IN=6.26 (ED8)
INV. IN=9.25 (ED10)
INV. IN=10.12 (ED9)
INV. OUT=6.24 (ED11)

EDMH5
RIM=16.60
INV. IN=12.98 (ED12)
INV. IN=12.50 (ED13)
INV. IN=5.74 (ED11)
INV. 12" OUT (SW)=5.64

EDMH6
RIM=25.21
INV. IN(SE)=19.93
INV. OUT=19.97 (ED14)

EDMH7
RIM=22.94
INV. IN=19.49 (ED16)
INV. IN=19.19 (ED15)
INV. IN=18.78 (ED17)
INV. IN=18.13 (ED14)
INV. OUT=18.18 (ED18)

EDMH8
RIM=15.58
INV. IN=12.26 (ED20)
INV. IN=12.28 (ED21)
INV. IN=9.80 (ED19)
INV. OUT=9.97 (ED22)

EDMH9
RIM=11.06
INV. IN=6.50 (ED26)
INV. IN=5.14 (ED25)
INV. IN=5.54
INV. OUT=3.70

EDMH10
RIM=16.89
INV. IN=10.43 (ED18)
INV. OUT=10.51 (ED19)

EDMH11
RIM=10.14
INV. IN=6.96 (ED23)
INV. IN(N)=6.74 (ED24)
INV. IN=5.94 (ED22)
INV. OUT=5.94(ED25)

EDMH12
RIM=11.55
INV. IN=3.81 (ED27)
INV. OUT=3.71(ED28)

EDMH13
RIM=11.45
INV. IN=2.37 (ED29)
INV. OUT=2.27 (ED30)

EXISTING DRAINAGE PIPE SCHEDULE			
LINES	LENGTH	TYPE	SLOPE
ED1	9'	12" CONC	S=0.078
ED2	38'	12" CONC	S=0.0205
ED3	62'	12" CONC	S=0.0319
ED4	10'	12" CONC	S=-0.011
ED5	39'	12" CONC	S=0.0205
ED6	45'	12" CONC	S=0.004
ED7	9'	12" CONC	S=-0.001
ED8	32'	12" CONC	S=0.0028
ED9	18'	12" PVC	S=0.0077
ED10	27'	12" CONC	S=0.0062
ED11	116'	12" CONC	S=0.0043
ED12	44'	12" CONC	S=-0.005
ED13	30'	12" CMP	S=0.0216
ED14	202'	12" CONC	S=0.0091
ED15	33'	12" CONC	S=0.006
ED16	32'	12" CONC	S=0.0009
ED17	186'	6" PVC	UNKNOWN
ED18	210'	12" CONC	S=0.0369
ED19	38'	12" CONC	S=0.0186
ED20	47'	12" CONC	S=0.0055
ED21	7'	12" CONC	S=0.0157
ED22	223'	12" CONC	S=0.0180
ED23	59'	12" CONC	S=0.0145
ED24	6'	12" CONC	S=0.0000
ED25	52'	12" CONC	S=0.0153
ED26	34'	12" CONC	S=0.0138
ED27	241'	12" CONC	S=0.0076
ED28	161'	48" CONC	S=0.0047
ED29	104'	48" CONC	S=0.0047
ED30	252'	48" CONC	S=0.0047

EXISTING SEWER SCHEDULE

ESMH1
RIM=16.09
INV. IN(NW)=1.18
INV. OUT=1.10 (ES1)

ESMH2
RIM=15.13
FROZEN

ESMH3
RIM=14.18
INV. IN=0.56 (ES1)
INV. OUT=0.34 (ES2)

ESMH4
RIM=14.16
INV. IN=0.19 (ES2)
INV. OUT=0.09 (ES3)

ESMH5
RIM=16.43
INV.(SW)=-1.00
INV. IN=-0.22 (ES3)
INV. OUT=-1.17 (ES4)

ESMH6
RIM=22.60
INV. IN(SE)=15.24
INV. IN(SW)=15.20
INV. OUT=15.20 (ES10)

ESMH7
RIM=14.05
INV. IN(E)=8.00
INV. IN=7.87 (ES10)
INV. OUT=7.92 (ES11)

ESMH8
RIM=10.96
INV. IN=3.82 (ES11)
INV. OUT=3.89 (ES12)

ESMH9
RIM=20.88
CHANNEL=-1.07
INV. IN 8"=13.60

ESMH10
RIM=24.86
INV.(E)=17.22
INV.(SE)=17.16
INV. OUT=17.03 (ES9)

ESMH11
RIM=24.39
INV. IN=16.27 (ES9)
INV. OUT=16.08 (ES8)

ESMH12
RIM=23.25
INV. IN=-0.89 (ES6)
INV. OUT(NE)=-0.97

ESMH13
RIM=19.42
INV.4"CI(NW)=13.69
INV.6"(N)=7.87
INV.6"VC(NE)=12.25
INV.6"VC(E)=12.40
INV.IN=-1.20 (ES5)
INV.OUT=-1.44 (ES6)

ESMH14
RIM=18.09
INV. IN=-0.80 (ES7)
INV. IN=-1.33 (ES4)
INV. OUT=UNKNOWN (ES5)

ESMH15
RIM=18.23
INV.8"VC=9.83 (ES8)
INV.6"VC(SE)=10.06
INV.6"VC(NW)=10.02
INV. OUT 8"VC=9.84 (ES7)

EXISTING SEWER PIPE SCHEDULE			
LINES	LENGTH	TYPE	SLOPE
ES1	153'	24" RCP	S=0.0035
ES2	66'	24" RCP	S=0.0022
ES3	116'	24" RC	S=0.0026
ES4	82'	48" BOX	S=0.0019
ES5	47'	48" BOX	UNKNOWN
ES6	109'	48" BOX	S=-0.005
ES7	7'	8" VC	S=0.0228
ES8	276'	8" VC	S=0.0226
ES9	33'	8" VC	S=0.0230
ES10	294'	8" AC	S=0.0249
ES11	170'	8" AC	S=0.0241
ES12	47'	8" AC	UNKNOWN

SEE SHEET G-100 FOR EXISTING CONDITIONS & DEMOLITION NOTES AND LEGEND

Tighe&Bond

PATRICK CRIMMINS No. 12378 STATE OF NEW HAMPSHIRE LICENSED PROFESSIONAL ENGINEER
10/20/22

NEIL A. HANSEN No. 15227 STATE OF NEW HAMPSHIRE LICENSED PROFESSIONAL ENGINEER
10/20/22

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DSGN.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

EXISTING CONDITIONS & DEMOLITION PLAN

SCALE: AS SHOWN

C-101

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:45pm By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DSGN.dwg

SITE DATA:

LOCATION: TAX MAP 118 LOT 28
TAX MAP 119 LOT 1-1A
TAX MAP 119 LOT 1-1C
TAX MAP 119 LOT 4
TAX MAP 124 LOT 12
TAX MAP 125 LOT 21

OWNER: PORT HARBOR LAND LLC
1000 MARKET ST
BUILDING ONE
PORTSMOUTH, NH 03801

ZONING DISTRICT: CHARACTER DISTRICT 5 (CD5)
DOWNTOWN OVERLAY DISTRICT
NORTH END INCENTIVE OVERLAY DISTRICT
HISTORIC DISTRICT

PROPOSED USE: MIXED USE, RESIDENTIAL, RETAIL

DEVELOPMENT STANDARDS

BUILDING PLACEMENT (PRINCIPAL BUILDING):	REQUIRED	PROPOSED MAP 125 LOT 21	MAP 118 LOT 28	MAP 124 LOT 12
MAXIMUM PRINCIPAL FRONT YARD:	5 FT	6 FT(1)	9 FT(1)	10 FT(1)
SIDE YARD:	NR			
MINIMUM REAR YARD:	5 FT	20 FT	22 FT	20 FT
FRONT LOT LINE LENGTH:	NR			
MINIMUM FRONT LOT LINE BUILDOUT:	80%	81%	100%	84%

BUILDING AND LOT OCCUPATION:	REQUIRED	PROPOSED MAP 125 LOT 21	MAP 118 LOT 28	MAP 124 LOT 12
MAXIMUM BUILDING BLOCK LENGTH:	225 FT	107 FT	104 FT	225 FT
MAXIMUM FACADE MODULATION LENGTH:	100 FT	<100 FT	<100 FT	<100 FT
MAXIMUM ENTRANCE SPACING:	50 FT	<50 FT	<50 FT	<50 FT
MAXIMUM BUILDING COVERAGE:	95%	65%	74%	58%
MAXIMUM BUILDING FOOTPRINT:	40,000 SF(2)	11,935 SF	39,255 SF	11,210 SF
MINIMUM LOT AREA:	NR			
MINIMUM OPEN SPACE:	5%	35%	26%	42%
MAXIMUM GROUND FLOOR GFA PER USE:	15,000 SF	7,975 SF	10,419 SF	8,067 SF

BUILDING FORM (PRINCIPAL BUILDING):	REQUIRED	PROPOSED MAP 125 LOT 21	MAP 118 LOT 28	MAP 124 LOT 12
BUILDING HEIGHT:	2-4 STORIES	4 STORIES	5 STORIES(3)	5 STORIES(3)
	60 FT	57 FT	60 FT	60 FT
MAXIMUM FINISHED FLOOR SURFACE OF GROUND FLOOR ABOVE SIDEWALK GRADE:	36 IN	0 IN	0 IN	0 IN
MINIMUM GROUND STORY HEIGHT:	12 FT	16.5 FT	14.0 FT	13.0 FT
MINIMUM SECOND STORY HEIGHT:	10 FT	13 FT	10.5 FT	10.5 FT
FACADE GLAZING:				
SHOP FRONT	70% MIN.	75%	73%	71%
ALLOWED ROOF TYPES FLAT, GABLE, HIP, GAMBREL, MANSARD		FLAT	FLAT	FLAT

OFF-STREET PARKING REQUIREMENTS

PARKING SPACES REQUIRED:		
COMMERCIAL:		
NO REQUIREMENT IN DOD		0 SPACES
DWELLING UNITS:		
OVER 750 SF, 1.3 SPACES PER UNIT	80 UNITS	104 SPACES
VISITOR SPACES:		
1 SPACE PER 5 DWELLING UNITS	80 UNITS	16 SPACES
EXISTING HOTEL:		
0.75 SPACES PER GUEST ROOM	181 ROOMS	136 SPACES
EXISTING DEEDED CONDO SPACES:		
SHERATON CONDOS		24 SPACES
DEER STREET CONDOS		58 SPACES
DOWNTOWN OVERLAY DISTRICT		-4 SPACES
TOTAL MINIMUM PARKING SPACES REQUIRED =		334 SPACES

TOTAL PARKING SPACES PROVIDED	
EXISTING SHERATON HOTEL PARKING	154 SPACES
ON SITE SURFACE PARKING	180 SPACES
TOTAL SPACES PROVIDED	334 SPACES

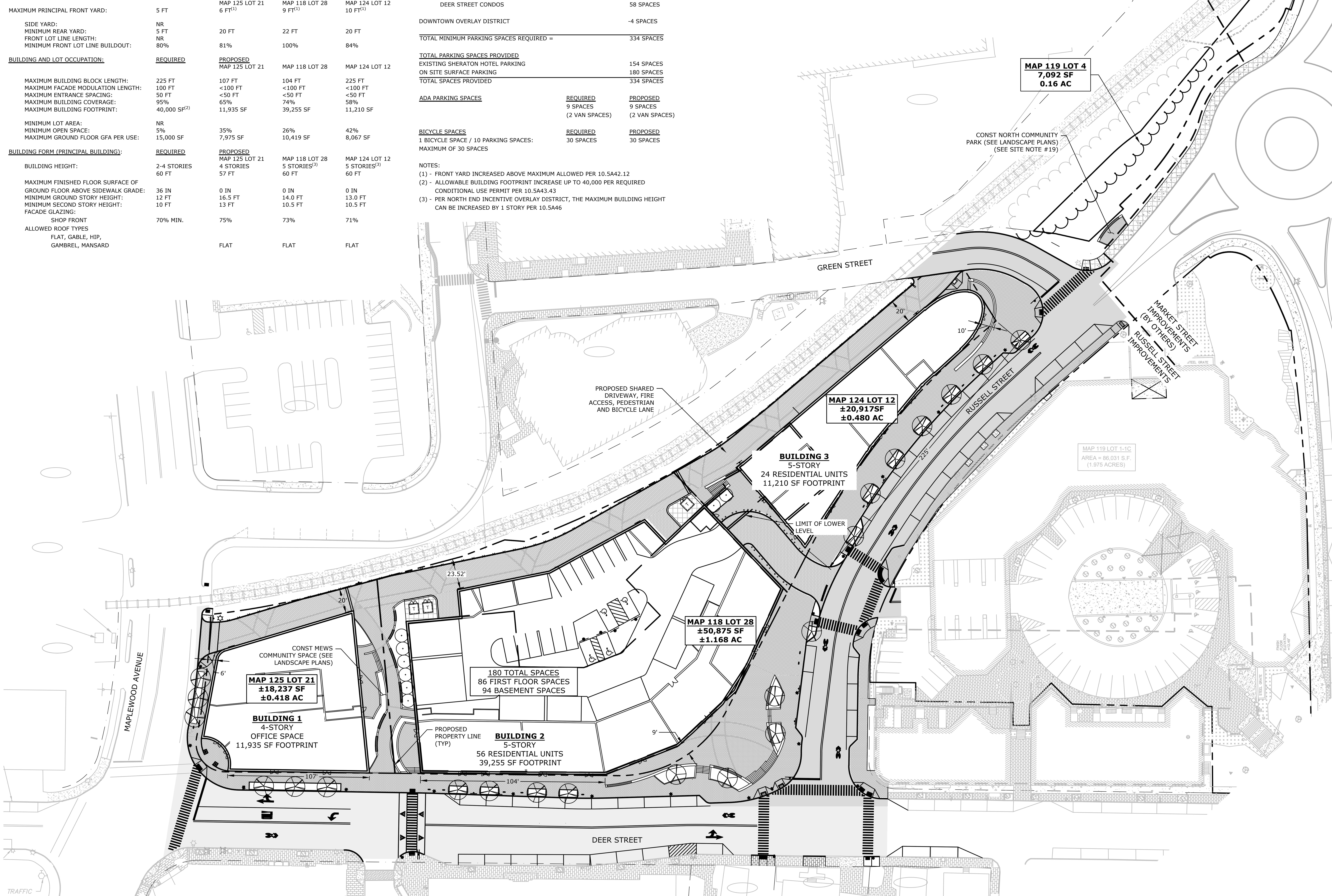
ADA PARKING SPACES	REQUIRED	PROPOSED
	9 SPACES (2 VAN SPACES)	9 SPACES (2 VAN SPACES)

BICYCLE SPACES	REQUIRED	PROPOSED
1 BICYCLE SPACE / 10 PARKING SPACES: MAXIMUM OF 30 SPACES	30 SPACES	30 SPACES

NOTES:
(1) - FRONT YARD INCREASED ABOVE MAXIMUM ALLOWED PER 10.5A42.12
(2) - ALLOWABLE BUILDING FOOTPRINT INCREASE UP TO 40,000 PER REQUIRED CONDITIONAL USE PERMIT PER 10.5A43.43
(3) - PER NORTH END INCENTIVE OVERLAY DISTRICT, THE MAXIMUM BUILDING HEIGHT CAN BE INCREASED BY 1 STORY PER 10.5A46

COMMUNITY SPACE:

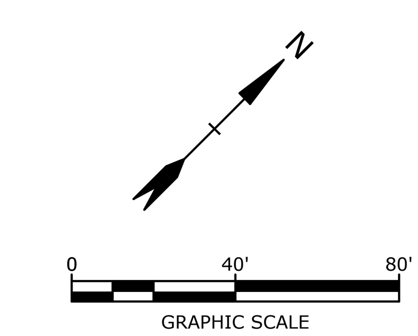
	REQUIRED	PROPOSED
MAP 125 LOT 21		
DEVELOPMENT LOT AREA: 18,237 SF	3,647 SF, 20%	6,122 SF, 33.6%
MAP 118 LOT 28		
DEVELOPMENT LOT AREA: 50,875 SF	15,263 SF, 30%	
OFFSITE COMMUNITY SPACE AREA (MAP 119 LOT 4): 7,092 SF	2,128 SF, 30%	
MAP 118 LOT 28 TOTAL	17,391 SF, 30%	23,420 SF, 40.4%
MAP 124 LOT 12		
DEVELOPMENT LOT AREA: 20,917 SF	4,183 SF, 20%	9,002 SF, 43.0%
TOTALS	25,221 SF	38,596 SF, 39.7%



SITE RECORDING NOTES:
1. THIS SITE PLAN SHALL BE RECORDED IN THE ROCKINGHAM COUNTY REGISTRY OF DEEDS.
2. ALL IMPROVEMENTS SHOWN ON THIS SITE PLAN SHALL BE CONSTRUCTED AND MAINTAINED IN ACCORDANCE WITH THE PLAN BY THE PROPERTY OWNER AND ALL FUTURE PROPERTY OWNERS. NO CHANGES SHALL BE MADE TO THIS SITE PLAN WITHOUT THE EXPRESS APPROVAL OF THE PORTSMOUTH PLANNING DIRECTOR.
3. THIS IS NOT A BOUNDARY SURVEY AND SHALL NOT BE USED AS SUCH.

SEE SHEET G-100 FOR SITE NOTES AND LEGEND

Tighe&Bond



North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DSGN.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

OVERALL SITE PLAN

SCALE: AS SHOWN

C-102

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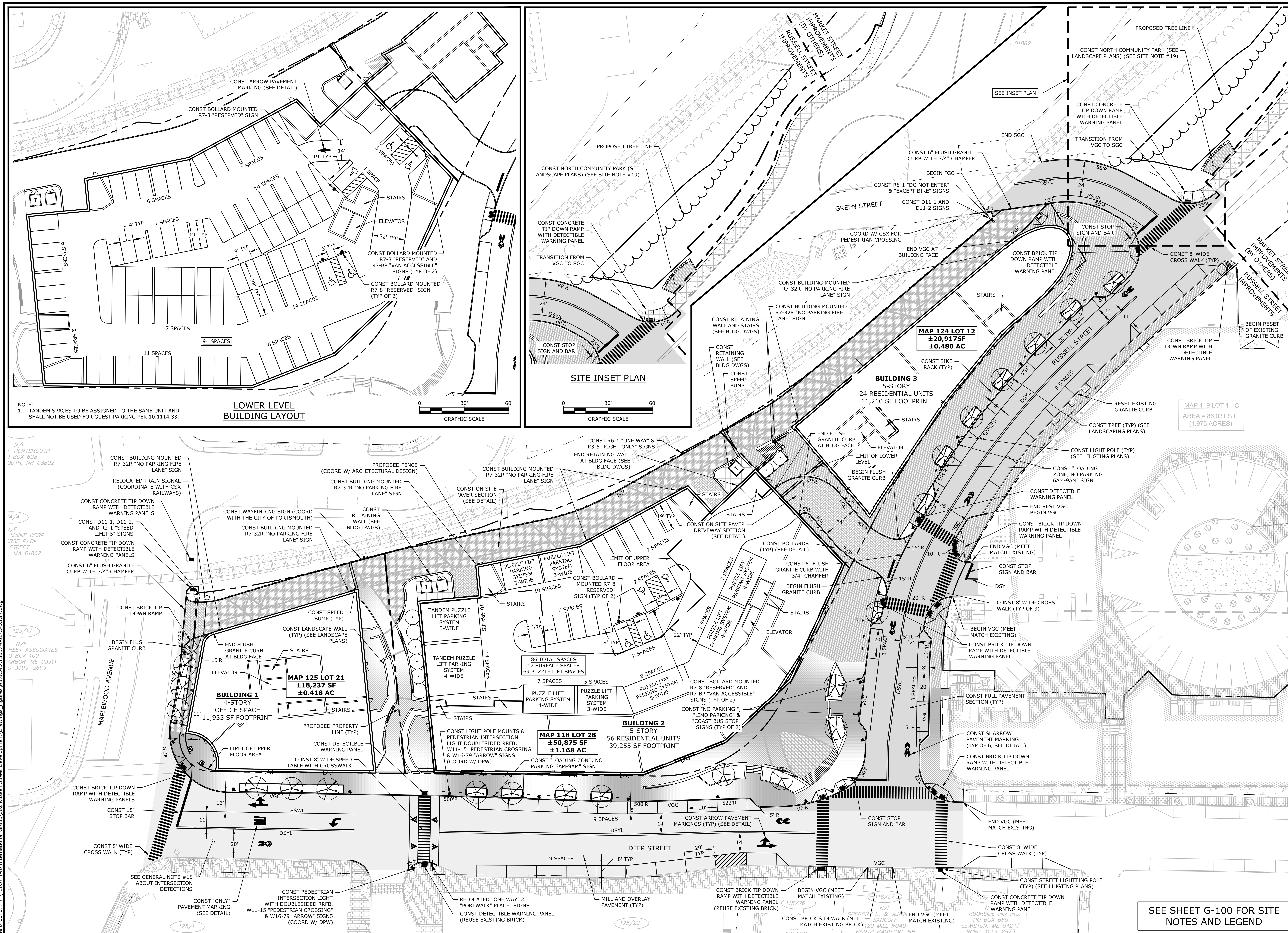

Tighe&Bond

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

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CHECKED:	NAH
APPROVED:	PMC

SITE PLAN

SCALE: AS SHOWN

C-102.1

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EXISTING DRAINAGE SCHEDULE

ECB1
RIM=15.36
INV. OUT=11.88 (ED1)

ECB2
RIM=15.31
INV. OUT= 12.11 (ED2)

ECB3
RIM=13.39
INV. OUT=8.69 (ED4)

ECB4
RIM=13.91
INV. OUT=9.59 (ED5)

ECB5
RIM=13.73
INV. OUT=10.42 (ED7)

ECB6
RIM=14.06
INV. OUT=9.42 (ED10)

ECB7
RIM=14.48
INV. OUT=10.26 (ED9)

ECB8
RIM=16.49
INV. OUT=12.74 (ED12)

ECB9
RIM=15.78
INV. OUT=13.15 (ED13)

ECB10
RIM=22.49
INV. OUT=19.39 (ED15)

ECB11
RIM=22.51
INV. OUT=19.46 (ED16)

ECB12
RIM=15.69
INV. OUT=12.39 (ED21)

ECB13
RIM=15.76
INV. OUT=12.52 (ED20)

ECB14
RIM=10.43
INV. OUT=6.97 (ED26)

ECB15
RIM=10.00
INV. OUT=6.74 (ED24)

ECB16
RIM=9.82
INV. OUT=6.80 (ED23)

ECB17
RIM=23.85
INV. OUT=20.21 (ED27)

EDMH1
RIM=15.59
INV. IN=11.17 (ED1)
INV. IN=11.33 (ED2)
INV. OUT=8.65 (ED3)

EDMH2
RIM=14.00
INV. IN=6.67 (ED3)
INV. IN=8.79 (ED5)
INV. IN=8.80 (ED4)
INV. OUT=6.64 (ED6)

EDMH3
RIM=13.91
INV. IN=6.41 (ED6)
INV. IN=10.43 (ED7)
INV. OUT=6.35 (ED8)

EDMH4
RIM=14.12
INV. IN=6.26 (ED8)
INV. IN=9.25 (ED10)
INV. IN=10.12 (ED9)
INV. OUT=6.24 (ED11)

EDMH5
RIM=16.60
INV. IN=12.98 (ED12)
INV. IN=12.50 (ED13)
INV. IN=5.74 (ED11)
INV. 12" OUT (SW)=5.64

EDMH6
RIM=25.21
INV. IN(SE)=19.93
INV. OUT=19.97 (ED14)

EDMH7
RIM=22.94
INV. IN=19.49 (ED16)
INV. IN=19.19 (ED15)
INV. IN=18.78 (ED17)
INV. IN=18.13 (ED14)
INV. OUT=18.18 (ED18)

EDMH8
RIM=15.58
INV. IN=12.26 (ED20)
INV. IN=12.28 (ED21)
INV. IN=9.80 (ED19)
INV. OUT=9.97 (ED22)

EDMH9
RIM=11.06
INV. IN=6.50 (ED26)
INV. IN=5.14 (ED25)
INV. IN=5.54
INV. OUT=3.70

EDMH10
RIM=16.89
INV. IN=10.43 (ED18)
INV. OUT=10.51 (ED19)

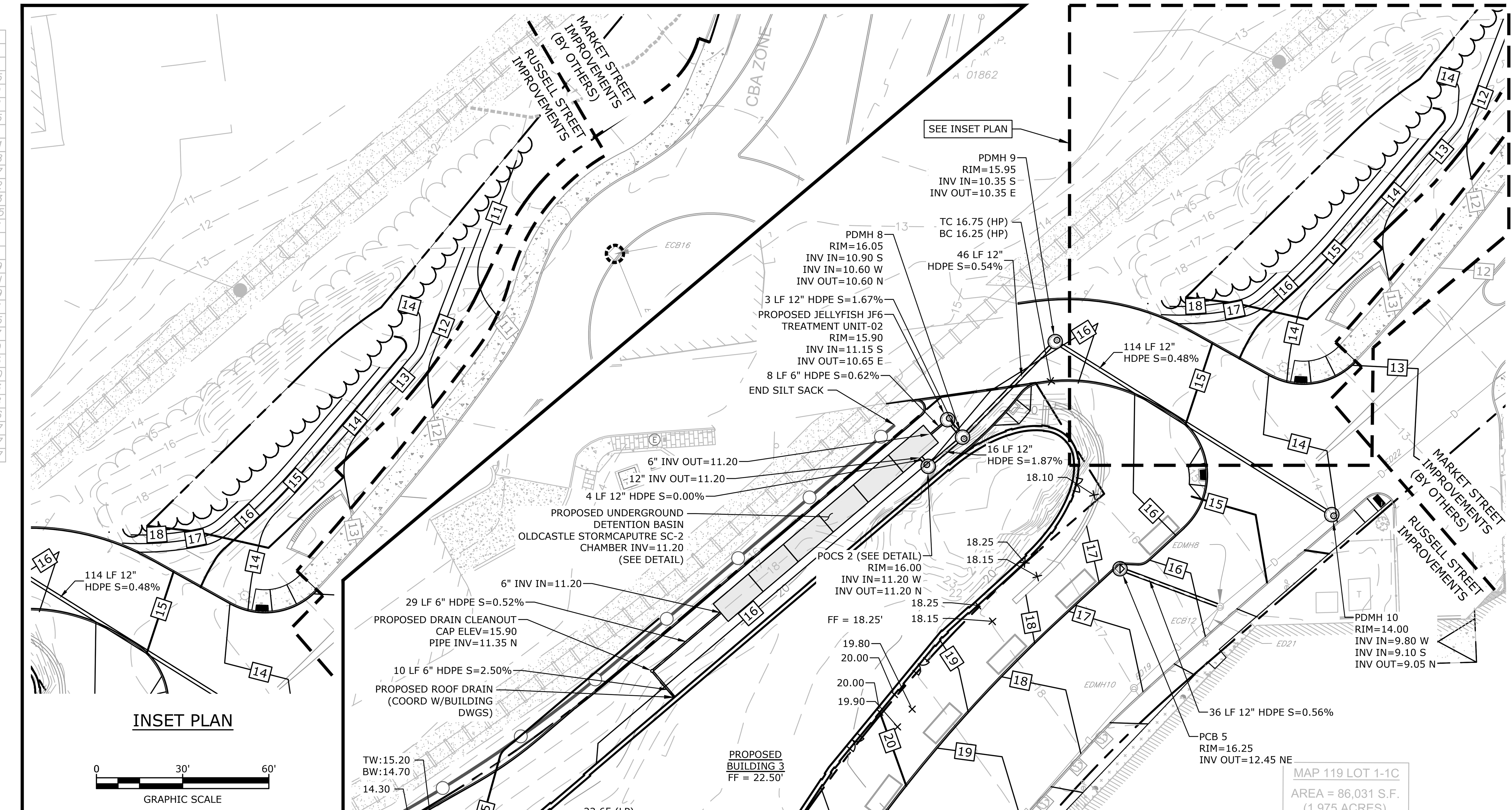
EDMH11
RIM=10.14
INV. IN=6.96 (ED23)
INV. IN(N)=6.74 (ED24)
INV. IN=5.94 (ED22)
INV. OUT=5.94(ED25)

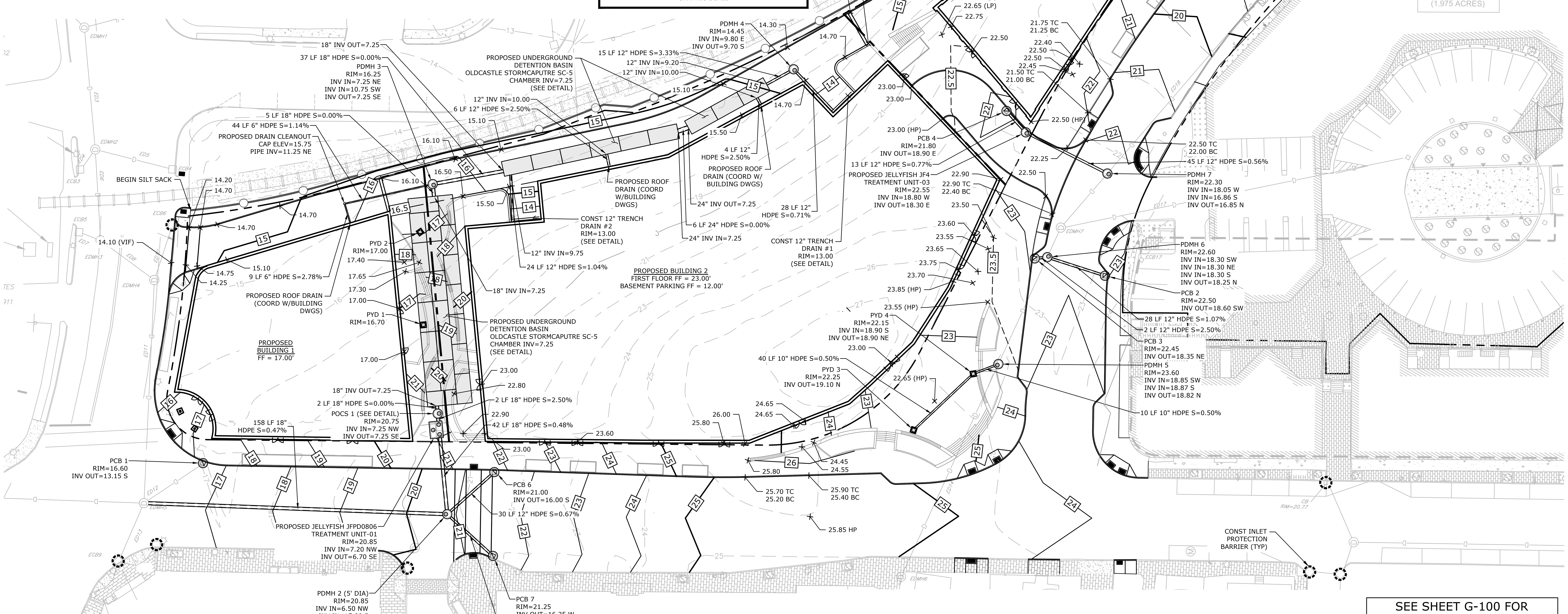
EDMH12
RIM=11.55
INV. IN=3.81 (ED27)
INV. OUT=3.71(ED28)

EDMH13
RIM=11.45
INV. IN=2.37 (ED29)
INV. OUT=2.27 (ED30)

EXISTING DRAINAGE PIPE SCHEDULE

LINES	LENGTH	TYPE	SLOPE
ED1	9'	12" CONC	S=0.078
ED2	38'	12" CONC	S=0.0205
ED3	62'	12" CONC	S=0.0319
ED4	10'	12" CONC	S=-0.011
ED5	39'	12" CONC	S=0.0205
ED6	45'	12" CONC	S=0.004
ED7	9'	12" CONC	S=-0.001
ED8	32'	12" CONC	S=0.0028
ED9	18'	12" PVC	S=0.0077
ED10	27'	12" CONC	S=0.0062
ED11	116'	12" CONC	S=0.0043
ED12	44'	12" CONC	S=-0.005
ED13	30'	12" CMP	S=0.0216
ED14	202'	12" CONC	S=0.0091
ED15	33'	12" CONC	S=0.006
ED16	32'	12" CONC	S=0.0009
ED17	186'	6" PVC	UNKNOWN
ED18	210'	12" CONC	S=0.0369
ED19	38'	12" CONC	S=0.0186
ED20	47'	12" CONC	S=0.0055
ED21	7'	12" CONC	S=0.0157
ED22	223'	12" CONC	S=0.0180
ED23	59'	12" CONC	S=0.0145
ED24	6'	12" CONC	S=0.0000
ED25	52'	12" CONC	S=0.0153
ED26	34'	12" CONC	S=0.0138
ED27	241'	12" CONC	S=0.0076
ED28	161'	48" CONC	S=0.0047
ED29	104'	48" CONC	S=0.0047
ED30	252'	48" CONC	S=0.0047





SEE SHEET G-100 FOR GRADING & DRAINAGE NOTES AND LEGEND

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED PROFESSIONAL ENGINEER
10/20/22

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED PROFESSIONAL ENGINEER
10/20/22

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CHECKED:	NAH
APPROVED:	PMC

GRADING & DRAINAGE PLAN

SCALE: AS SHOWN

C-103

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:46pm By: CML
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EXISTING DRAINAGE SCHEDULE

ECB1
RIM=15.36
INV. OUT=11.88 (ED1)

ECB2
RIM=15.31
INV. OUT= 12.11 (ED2)

ECB3
RIM=13.39
INV. OUT=8.69 (ED4)

ECB4
RIM=13.91
INV. OUT=9.59 (ED5)

ECB5
RIM=13.73
INV. OUT=10.42 (ED7)

ECB6
RIM=14.06
INV. OUT=9.42 (ED10)

ECB7
RIM=14.48
INV. OUT=10.26 (ED9)

ECB8
RIM=16.49
INV. OUT=12.74 (ED12)

ECB9
RIM=15.78
INV. OUT=13.15 (ED13)

ECB10
RIM=22.49
INV. OUT=19.39 (ED15)

ECB11
RIM=22.51
INV. OUT=19.46 (ED16)

ECB12
RIM=15.69
INV. OUT=12.39 (ED21)

ECB13
RIM=15.76
INV. OUT=12.52 (ED20)

ECB14
RIM=10.43
INV. OUT=6.97 (ED26)

ECB15
RIM=10.00
INV. OUT=6.74 (ED24)

ECB16
RIM=9.82
INV. OUT=6.80 (ED23)

ECB17
RIM=23.85
INV. OUT=20.21 (ED27)

EDMH1
RIM=15.59
INV. IN=11.17 (ED1)
INV. IN=11.33 (ED2)
INV. OUT=8.65 (ED3)

EDMH2
RIM=14.00
INV. IN=6.67 (ED3)
INV. IN=8.79 (ED5)
INV. IN=8.80 (ED4)
INV. OUT=6.64 (ED6)

EDMH3
RIM=13.91
INV. IN=6.41 (ED6)
INV. IN=10.43 (ED7)
INV. OUT=6.35 (ED8)

EDMH4
RIM=14.12
INV. IN=6.26 (ED8)
INV. IN=9.25 (ED10)
INV. IN=10.12 (ED9)
INV. OUT=6.24 (ED11)

EDMH5
RIM=16.60
INV. IN=12.98 (ED12)
INV. IN=12.50 (ED13)
INV. IN=5.74 (ED11)
INV. 12" OUT (SW)=5.64

EDMH6
RIM=25.21
INV. IN(SE)=19.93
INV. OUT=19.97 (ED14)

EDMH7
RIM=22.94
INV. IN=19.49 (ED16)
INV. IN=19.19 (ED15)
INV. IN=18.78 (ED17)
INV. IN=18.13 (ED14)
INV. OUT=18.18 (ED18)

EDMH8
RIM=15.58
INV. IN=12.26 (ED20)
INV. IN=12.28 (ED21)
INV. IN=9.80 (ED19)
INV. OUT=9.97 (ED22)

EDMH9
RIM=11.06
INV. IN=6.50 (ED26)
INV. IN=5.14 (ED25)
INV. IN=5.54
INV. OUT=3.70

EDMH10
RIM=16.89
INV. IN=10.43 (ED18)
INV. OUT=10.51 (ED19)

EDMH11
RIM=10.14
INV. IN=6.96 (ED23)
INV. IN(N)=6.74 (ED24)
INV. IN=5.94 (ED22)
INV. OUT=5.94(ED25)

EDMH12
RIM=11.55
INV. IN=3.81 (ED27)
INV. OUT=3.71(ED28)

EDMH13
RIM=11.45
INV. IN=2.37 (ED29)
INV. OUT=2.27 (ED30)

EXISTING DRAINAGE PIPE SCHEDULE			
LINES	LENGTH	TYPE	SLOPE
ED1	9'	12" CONC	S=0.078
ED2	38'	12" CONC	S=0.0205
ED3	62'	12" CONC	S=0.0319
ED4	10'	12" CONC	S=-0.011
ED5	39'	12" CONC	S=0.0205
ED6	45'	12" CONC	S=0.004
ED7	9'	12" CONC	S=-0.001
ED8	32'	12" CONC	S=0.0028
ED9	18'	12" PVC	S=0.0077
ED10	27'	12" CONC	S=0.0062
ED11	116'	12" CONC	S=0.0043
ED12	44'	12" CONC	S=-0.005
ED13	30'	12" CMP	S=0.0216
ED14	202'	12" CONC	S=0.0091
ED15	33'	12" CONC	S=0.006
ED16	32'	12" CONC	S=0.0009
ED17	186'	6" PVC	UNKNOWN
ED18	210'	12" CONC	S=0.0369
ED19	38'	12" CONC	S=0.0186
ED20	47'	12" CONC	S=0.0055
ED21	7'	12" CONC	S=0.0157
ED22	223'	12" CONC	S=0.0180
ED23	59'	12" CONC	S=0.0145
ED24	6'	12" CONC	S=0.0000
ED25	52'	12" CONC	S=0.0153
ED26	34'	12" CONC	S=0.0138
ED27	241'	12" CONC	S=0.0076
ED28	161'	48" CONC	S=0.0047
ED29	104'	48" CONC	S=0.0047
ED30	252'	48" CONC	S=0.0047

EXISTING SEWER SCHEDULE

ESMH1
RIM=16.09
INV. IN(NW)=1.18
INV. OUT=1.10 (ES1)

ESMH2
RIM=15.13
FROZEN

ESMH3
RIM=14.18
INV. IN=0.56 (ES1)
INV. OUT=0.34 (ES2)

ESMH4
RIM=14.16
INV. IN=0.19 (ES2)
INV. OUT=0.09 (ES3)

ESMH5
RIM=16.43
INV.(SW)=-1.00
INV. IN=-0.22 (ES3)
INV. OUT=-1.17 (ES4)

ESMH6
RIM=22.60
INV. IN(SE)=15.24
INV. IN(SW)=15.20
INV. OUT=15.20 (ES10)

ESMH7
RIM=14.05
INV. IN(E)=8.00
INV. IN=7.87 (ES10)
INV. OUT=7.92 (ES11)

ESMH8
RIM=10.96
INV. IN=3.82 (ES11)
INV. OUT=3.89 (ES12)

ESMH9
RIM=20.88
CHANNEL=-1.07
INV. IN 8"=13.60

ESMH10
RIM=24.86
INV.(E)=17.22
INV.(SE)=17.16
INV. OUT=17.03 (ES9)

ESMH11
RIM=24.39
INV. IN=16.27 (ES9)
INV. OUT=16.08 (ES8)

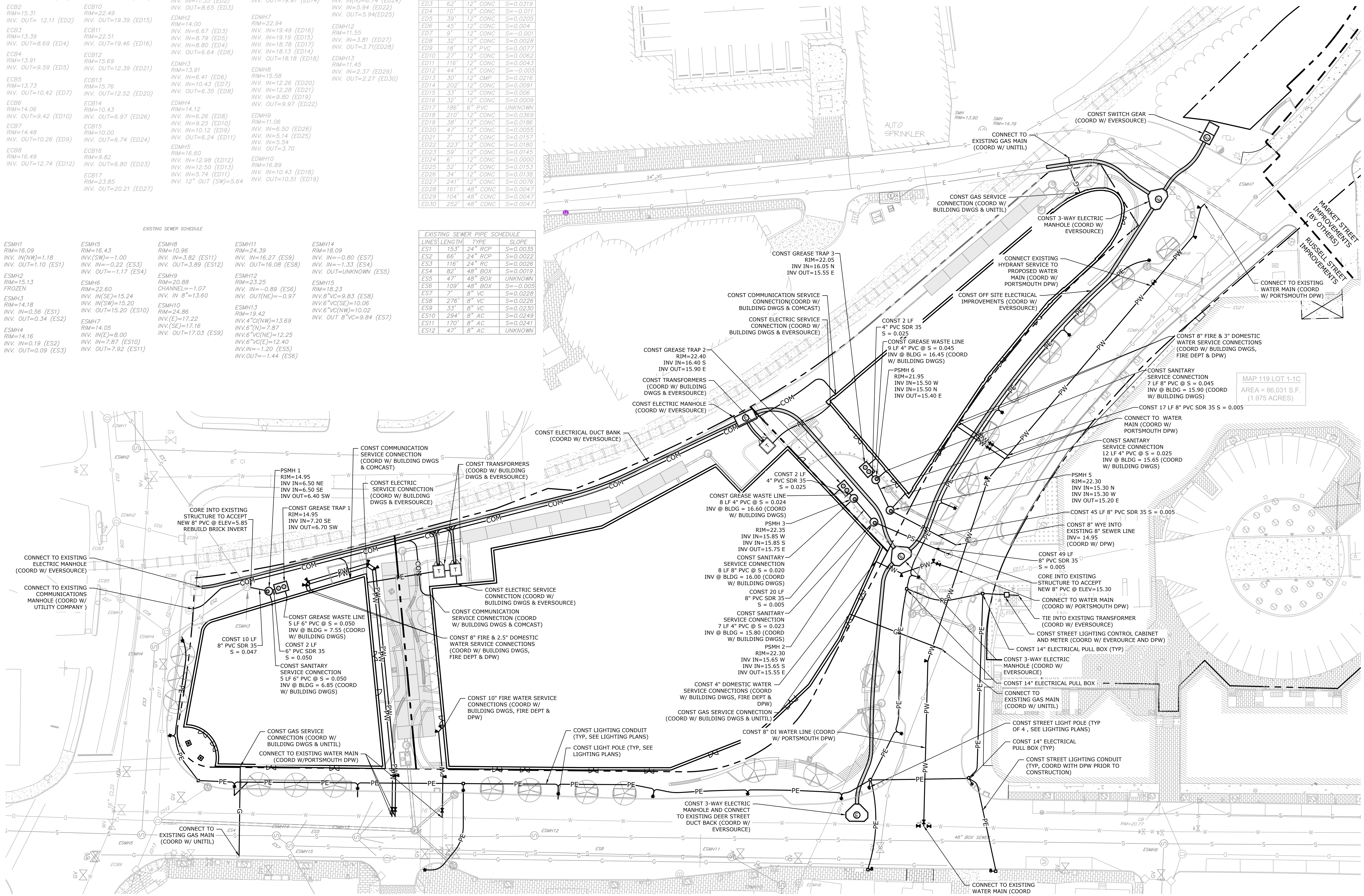
ESMH12
RIM=23.25
INV. IN=-0.89 (ES6)
INV. OUT(NE)=-0.97

ESMH13
RIM=19.42
INV.4"CI(NW)=13.69
INV.6"(N)=7.87
INV.6"VC(NE)=12.25
INV.6"VC(E)=12.40
INV.IN=-1.20 (ES5)
INV.OUT=-1.44 (ES6)

ESMH14
RIM=18.09
INV. IN=-0.80 (ES7)
INV. IN=-1.33 (ES4)
INV. OUT=UNKNOWN (ES5)

ESMH15
RIM=18.23
INV.8"VC=9.83 (ES8)
INV.6"VC(SE)=10.06
INV.6"VC(NW)=10.02
INV. OUT 8"VC=9.84 (ES7)

EXISTING SEWER PIPE SCHEDULE			
LINES	LENGTH	TYPE	SLOPE
ES1	153'	24" RCP	S=0.0035
ES2	66'	24" RCP	S=0.0022
ES3	116'	24" RC	S=0.0026
ES4	82'	48" BOX	S=0.0019
ES5	47'	48" BOX	UNKNOWN
ES6	109'	48" BOX	S=-0.005
ES7	7'	8" VC	S=0.0228
ES8	276'	8" VC	S=0.0226
ES9	33'	8" VC	S=0.0230
ES10	294'	8" AC	S=0.0249
ES11	170'	8" AC	S=0.0241
ES12	47'	8" AC	UNKNOWN



SEE SHEET G-100 FOR UTILITIES NOTES AND LEGEND

Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
10/20/22

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
10/20/22

North End Mixed Use Development

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PROJECT NO:	T5037-002
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FILE:	T5037-002-C-DSGN.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

UTILITIES PLAN

SCALE: AS SHOWN

C-104

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:46pm By: CML
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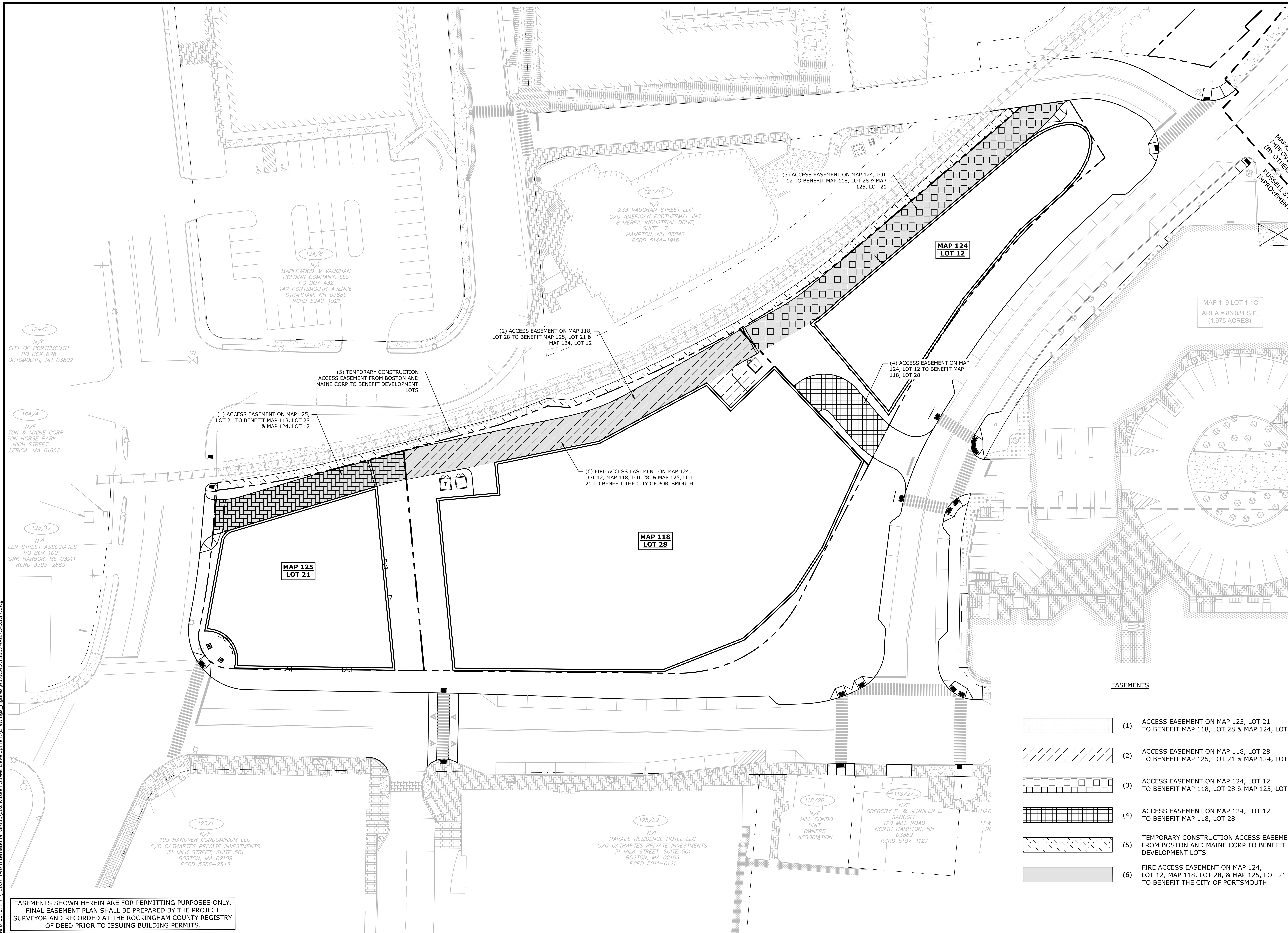

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Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
10/20/22

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED
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10/20/22

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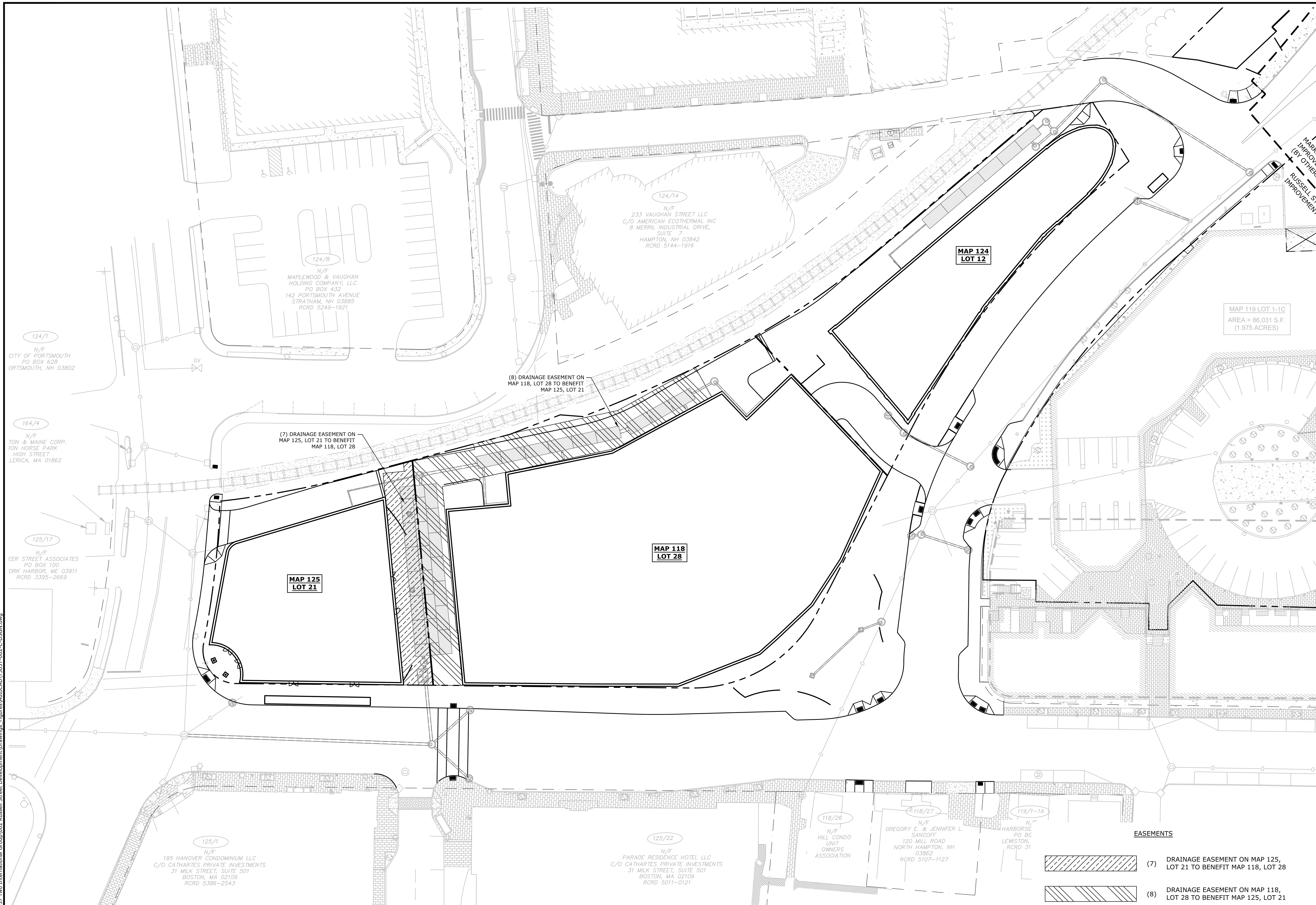
APPROVED:	PMC

ACCESS EASEMENT PLAN

SCALE: AS SHOWN

C-200



EASEMENTS SHOWN HEREIN ARE FOR PERMITTING PURPOSES ONLY. FINAL EASEMENT PLAN SHALL BE PREPARED BY THE PROJECT SURVEYOR AND RECORDED AT THE ROCKINGHAM COUNTY REGISTRY OF DEED PRIOR TO ISSUING BUILDING PERMITS.

EASEMENTS

(7) DRAINAGE EASEMENT ON MAP 125, LOT 21 TO BENEFIT MAP 118, LOT 28

(8) DRAINAGE EASEMENT ON MAP 118, LOT 28 TO BENEFIT MAP 125, LOT 21

Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 10/20/22

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER 10/20/22

0 30' 60'
GRAPHIC SCALE

North End Mixed Use Development

Two International Group

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Portsmouth, NH

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DRAINAGE EASEMENT PLAN

SCALE: AS SHOWN

C-201

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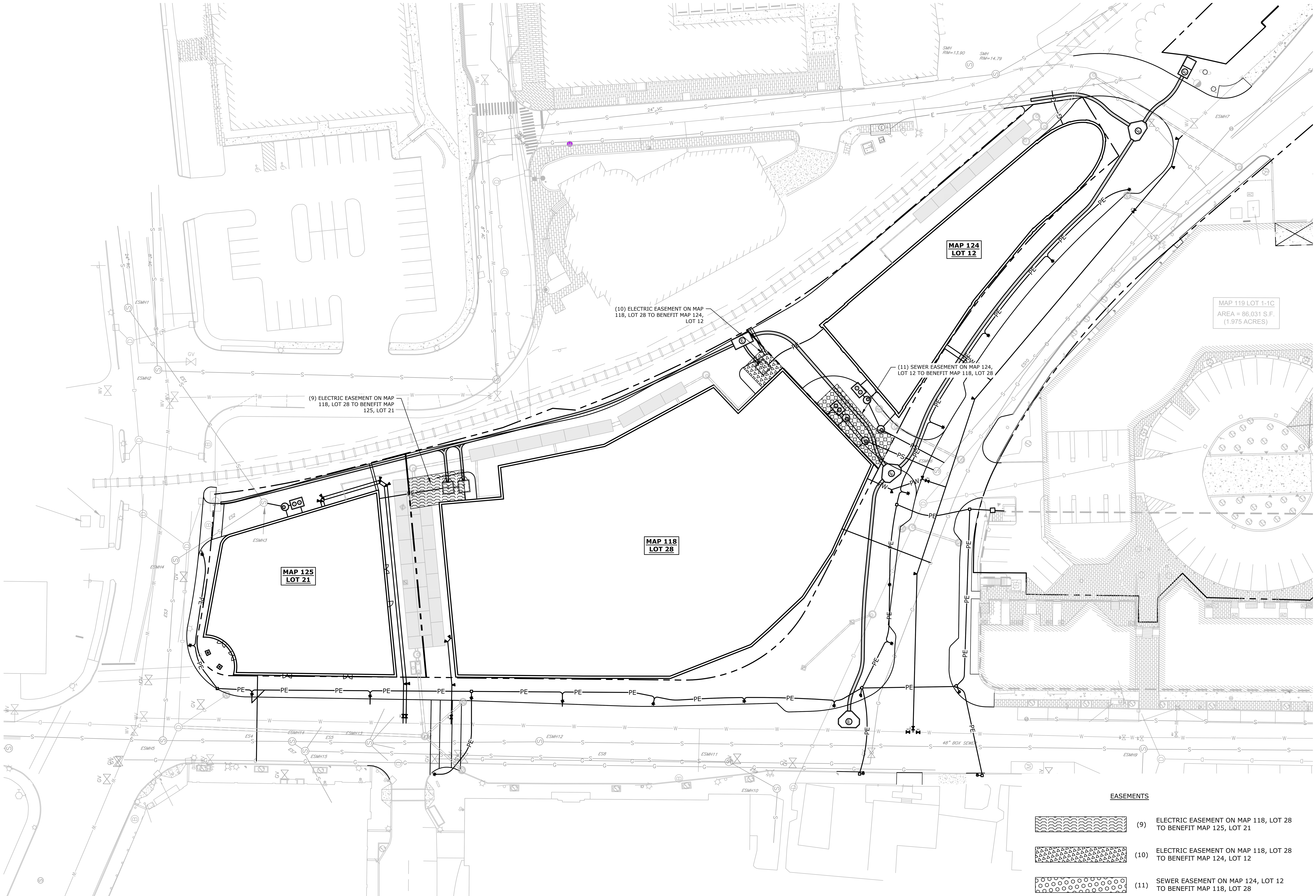
Tighe & Bond:J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DSGN.dwg



EASEMENTS

(9) ELECTRIC EASEMENT ON MAP 118, LOT 28 TO BENEFIT MAP 125, LOT 21

(10) ELECTRIC EASEMENT ON MAP 118, LOT 28 TO BENEFIT MAP 124, LOT 12

(11) SEWER EASEMENT ON MAP 124, LOT 12 TO BENEFIT MAP 118, LOT 28

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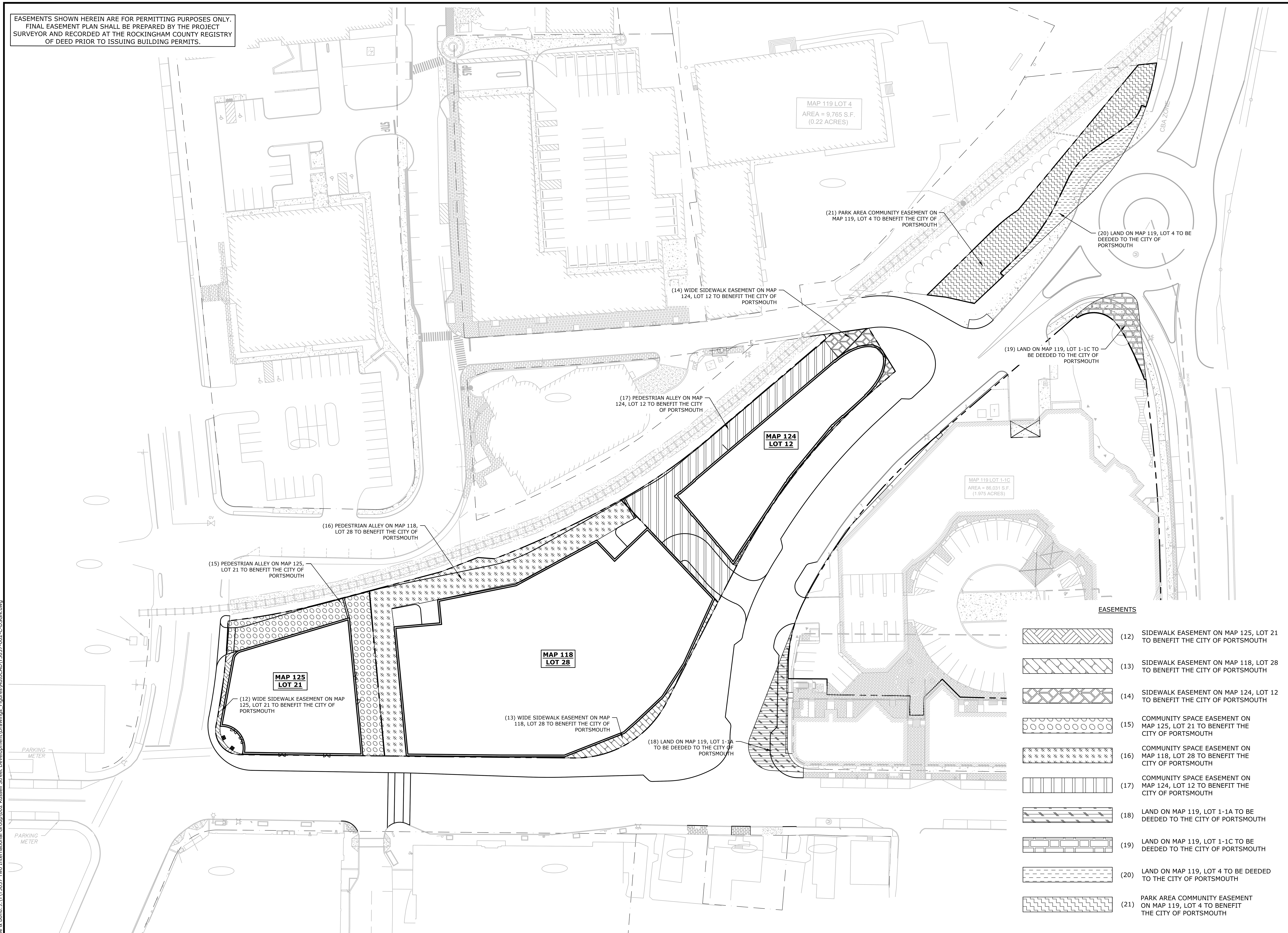
PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DSGN.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

UTILITIES
EASEMENT PLAN

SCALE: AS SHOWN

C-202



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Plotted On:Oct 20, 2022-2:47pm By: CML
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Tighe&Bond

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER 10/20/22

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER 10/20/22

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

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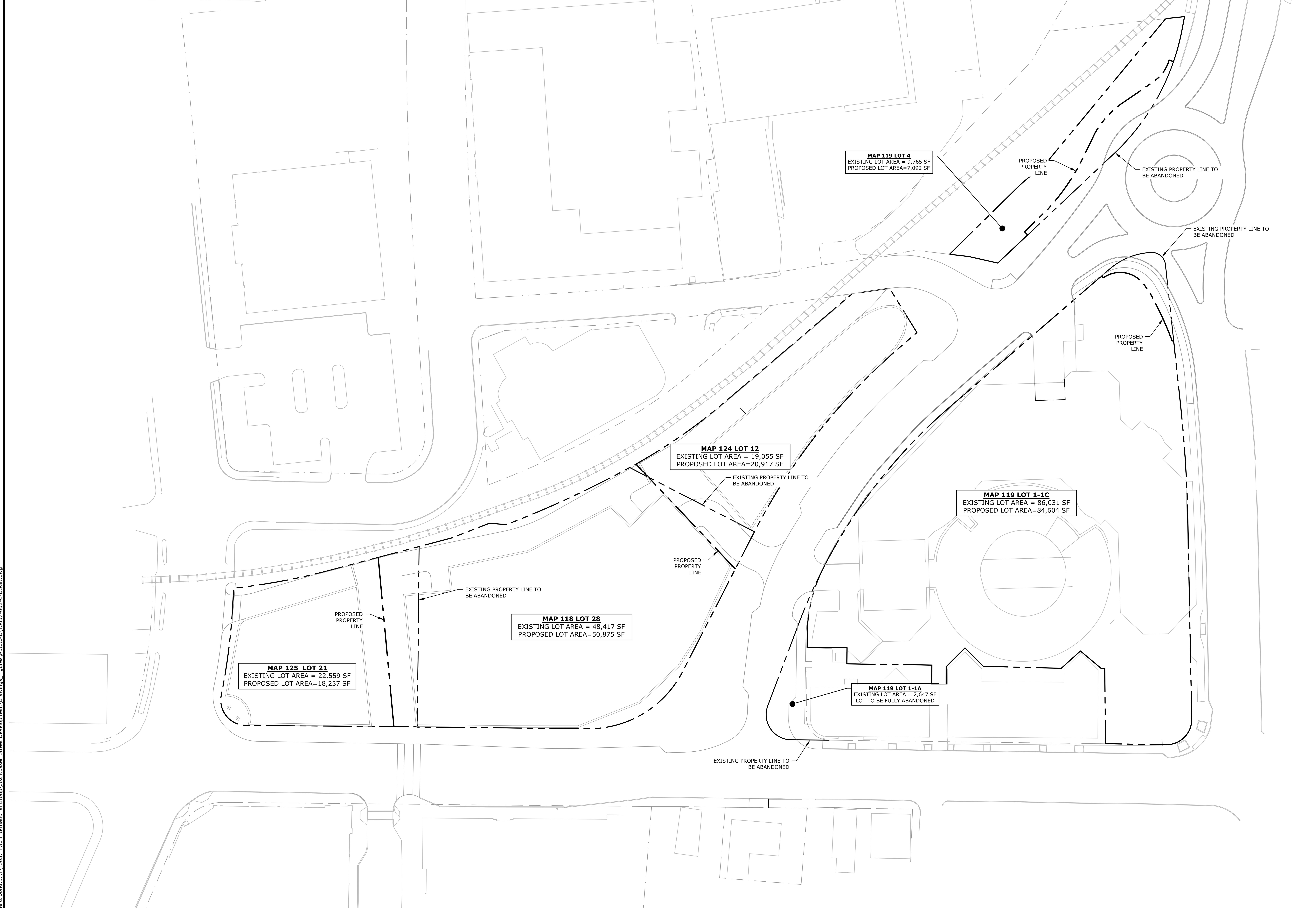
COMMUNITY SPACE EASEMENT PLAN

SCALE: AS SHOWN

C-203

LOT LINE REVISIONS SHOWN HEREIN ARE FOR PERMITTING PURPOSES ONLY. FINAL LOT LINE REVISION PLAN SHALL BE PREPARED BY THE PROJECT SURVEYOR AND RECORDED AT THE ROCKINGHAM COUNTY REGISTRY OF DEED PRIOR TO ISSUING BUILDING PERMITS.



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LOT LINE
REVISION PLAN

SCALE: AS SHOWN

C-204

GENERAL PROJECT INFORMATION
PROJECT APPLICANT: PORT HARBOR LAND, LLC
1000 MARKET STREET, BUILDING ONE
PORTSMOUTH, NH 03801
PROJECT NAME: PROPOSED MIXED USE DEVELOPMENT
PROJECT MAP / LOT: MAP 118 / LOT 28
MAP 119 / LOT 1-1A
MAP 119 / LOT 1-1C
MAP 119 / LOT 4
MAP 124 / LOT 12
MAP 125 / LOT 21
PROJECT ADDRESS: RUSSELL STREET & DEER STREET
PORTSMOUTH, NH 03801
PROJECT LATITUDE: 43°-04'-43" N
PROJECT LONGITUDE: 70°-45'-41" W

PROJECT DESCRIPTION
THE PROJECT CONSISTS OF THE CONSTRUCTION OF AN OFFICE BUILDING AND TWO MIXED USE RESIDENTIAL BUILDINGS WITH ASSOCIATED SITE IMPROVEMENTS.

DISTURBED AREA
THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 2.1 ACRES.

SOIL CHARACTERISTICS
BASED ON THE USCS WEB SOIL SURVEY THE SOILS ON SITE CONSIST OF URBAN LAND WHICH IS EXCESSIVELY DRAINED SOILS WITH A HYDROLOGIC SOIL GROUP RATING OF A.

NAME OF RECEIVING WATERS
THE STORMWATER RUNOFF FROM THE SITE WILL BE DISCHARGED VIA A CLOSED DRAINAGE SYSTEM TO THE CITY OF PORTSMOUTH'S CLOSED DRAINAGE SYSTEM WHICH ULTIMATELY FLOWS TO NORTH MILL POND THEN TO THE PISCATAQUA RIVER OR DIRECTLY TO THE PISQUATAQUA RIVER.

CONSTRUCTION SEQUENCE OF MAJOR ACTIVITIES:
1. CUT AND CLEAR TREES.
2. CONSTRUCT TEMPORARY AND PERMANENT SEDIMENT, EROSION AND DETENTION CONTROL FACILITIES. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATIONS THAT WILL INFLUENCE STORMWATER RUNOFF SUCH AS:
   - NEW CONSTRUCTION
   - CONTROL OF DUST
   - CONSTRUCTION DURING LATE WINTER AND EARLY SPRING
3. ALL PERMANENT DITCHES, SWALES, DETENTION, RETENTION AND SEDIMENTATION BASINS TO BE STABILIZED USING THE VEGETATIVE AND NON-STRUCTURAL BMPS PRIOR TO DIRECTING RUNOFF TO THEM.
4. CLEAR AND DISPOSE OF DEBRIS.
5. CONSTRUCT TEMPORARY CULVERTS AND DIVERSION CHANNELS AS REQUIRED.
6. GRADE AND GRAVEL ROADWAYS AND PARKING AREAS - ALL ROADS AND PARKING AREA SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
7. BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
8. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, PERIMETER EROSION CONTROL MEASURES, SEDIMENT TRAPS, ETC., MULCH AND SEED AS REQUIRED.
9. SEDIMENT TRAPS AND/OR BASINS SHALL BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.
10. FINISH PAVING ALL ROADWAYS AND PARKING LOTS.
11. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
12. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
13. REMOVE TRAPPED SEDIMENTS FROM COLLECTOR DEVICES AS APPROPRIATE AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES.

SPECIAL CONSTRUCTION NOTES:
1. THE CONSTRUCTION SEQUENCE MUST LIMIT THE DURATION AND AREA OF DISTURBANCE.
2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

EROSION CONTROL NOTES:
1. ALL EROSION CONTROL MEASURES AND PRACTICES SHALL CONFORM TO THE "NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3: EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION" PREPARED BY THE NHDES.
2. PRIOR TO ANY WORK OR SOIL DISTURBANCE, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EROSION CONTROL MEASURES AS REQUIRED IN THE PROJECT MANUAL.
3. CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL BARRIERS, INCLUDING HAY BALES, SILT FENCES, MULCH BERMS, SILT SACKS AND SILT SOCKS AS SHOWN IN THESE DRAWINGS AS THE FIRST ORDER OF WORK.
4. SILT SACK INLET PROTECTION SHALL BE INSTALLED IN ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AND BE MAINTAINED FOR THE DURATION OF THE PROJECT.
5. PERIMETER CONTROLS INCLUDING SILT FENCES, MULCH BERM, SILT SOCK, AND/OR HAY BALE BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT UNTIL NON-PAVED AREAS HAVE BEEN STABILIZED.
6. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
7. ALL DISTURBED AREAS NOT OTHERWISE BEING TREATED SHALL RECEIVE 6" LOAM, SEED AND FERTILIZER.
8. INSPECT ALL INLET PROTECTION AND PERIMETER CONTROLS WEEKLY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
9. CONSTRUCT EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1.

STABILIZATION:
1. AN AREA SHALL BE CONSIDERED STABLE WHEN ONE OF THE FOLLOWING HAS OCCURRED:
   A. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
   B. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
   C. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED;
   D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.;
   E. IN AREAS TO BE PAVED, "STABLE" MEANS THAT BASE COURSE GRAVELS MEETING THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2 HAVE BEEN INSTALLED.
2. WINTER STABILIZATION PRACTICES:
   A. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS;
   B. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS;
   C. AFTER OCTOBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT;
3. STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES, AND DISTURBED AREAS, WHERE CONSTRUCTION ACTIVITY SHALL NOT OCCUR FOR MORE THAN TWENTY-ONE (21) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. STABILIZATION MEASURES TO BE USED INCLUDE:
   A. TEMPORARY SEEDING;
   B. MULCHING.
4. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
5. WHEN CONSTRUCTION ACTIVITY PERMANENTLY OR TEMPORARILY CEASES WITHIN 100 FEET OF NEARBY SURFACE WATERS OR DELINEATED WETLANDS, THE AREA SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OR PRIOR TO A RAIN EVENT. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN THESE AREAS, SILT FENCES, MULCH BERMS, HAY BALE BARRIERS AND ANY EARTH/DIKES SHALL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.
6. DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH SILT FENCES, MULCH BERMS, HAY BALE BARRIERS, OR SILT SOCKS. ALL STORM DRAIN BASIN INLETS SHALL BE PROVIDED WITH FLARED END SECTIONS AND TRASH RACKS. THE SITE SHALL BE STABILIZED FOR THE WINTER BY OCTOBER 15.

DUST CONTROL:
1. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD.
2. DUST CONTROL METHODS SHALL INCLUDE, BUT BE NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING.
3. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ABUTTING AREAS.

STOCKPILES:
1. LOCATE STOCKPILES A MINIMUM OF 50 FEET AWAY FROM CATCH BASINS, SWALES, AND CULVERTS.
2. ALL STOCKPILES SHOULD BE SURROUNDED WITH TEMPORARY EROSION CONTROL MEASURES PRIOR TO THE ONSET OF PRECIPITATION.
3. PERIMETER BARRIERS SHOULD BE MAINTAINED AT ALL TIMES, AND ADJUSTED AS NEEDED TO ACCOMMODATE THE DELIVERY AND REMOVAL OF MATERIALS FROM THE STOCKPILE. THE INTEGRITY OF THE BARRIER SHOULD BE INSPECTED AT THE END OF EACH WORKING DAY.
4. PROTECT ALL STOCKPILES FROM STORMWATER RUN-OFF USING TEMPORARY EROSION CONTROL MEASURES SUCH AS BERMS, SILT SOCK, OR OTHER APPROVED PRACTICE TO PREVENT MIGRATION OF MATERIAL BEYOND THE IMMEDIATE CONFINES OF THE STOCKPILES.

OFF SITE VEHICLE TRACKING:
1. THE CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE(S) PRIOR TO ANY EXCAVATION ACTIVITIES.

VEGETATION:
1. TEMPORARY GRASS COVER:
   A. SEEDBED PREPARATION:
      a. APPLY FERTILIZER AT THE RATE OF 600 POUNDS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF THREE (3) TONS PER ACRE;
   B. SEEDING:
      a. UTILIZE ANNUAL RYE GRASS AT A RATE OF 40 LBS/ACRE;
      b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF TWO (2) INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED;
      c. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). HYDROSEEDINGS, WHICH INCLUDE MULCH, MAY BE LEFT ON SOIL SURFACE. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING;
   C. MAINTENANCE:
      a. TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED. AT A MINIMUM, 95% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER BARRIERS, CHECK DAMS, ETC.).
2. VEGETATIVE PRACTICE:
   A. FOR PERMANENT MEASURES AND PLANTINGS:
      a. LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF THREE (3) TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 6.5;
      b. FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 800 POUNDS PER ACRE OF 10-20-20 FERTILIZER;
      c. SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4-1/2 POUNDS AND 5-1/2 POUNDS PER INCH OF WIDTH;
      d. SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH;
      e. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AS INDICATED ABOVE;
      f. THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED;
      g. THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED;
      h. A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE APPLIED AT THE INDICATED RATE:

SEED MIX	APPLICATION RATE
CREEPING RED FESCUE	20 LBS/ACRE
TALL FESCUE	20 LBS/ACRE
REDTOP	2 LBS/ACRE

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE (1) PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. SEEDING SHALL BE DONE NO LATER THAN SEPTEMBER 15. IN NO CASE SHALL SEEDING TAKE PLACE OVER SNOW.
3. DORMANT SEEDING (SEPTEMBER 15 TO FIRST SNOWFALL):
   A. FOLLOW PERMANENT MEASURES SLOPE, LIME, FERTILIZER AND GRADING REQUIREMENTS. APPLY SEED MIXTURE AT TWICE THE INDICATED RATE. APPLY MULCH AS INDICATED FOR PERMANENT MEASURES.

CONCRETE WASHOUT AREA:
1. THE FOLLOWING ARE THE ONLY NON-STORMWATER DISCHARGES ALLOWED. ALL OTHER NON-STORMWATER DISCHARGES ARE PROHIBITED ON SITE:
   A. THE CONCRETE DELIVERY TRUCKS SHALL, WHENEVER POSSIBLE, USE WASHOUT FACILITIES AT THEIR OWN PLANT OR DISPATCH FACILITY;
   B. IF IT IS NECESSARY, SITE CONTRACTOR SHALL DESIGNATE SPECIFIC WASHOUT AREAS AND DESIGN FACILITIES TO HANDLE ANTICIPATED WASHOUT WATER;
   C. CONTRACTOR SHALL LOCATE WASHOUT AREAS AT LEAST 150 FEET AWAY FROM STORM DRAINS, SWALES AND SURFACE WATERS OR DELINEATED WETLANDS;
   D. INSPECT WASHOUT FACILITIES DAILY TO DETECT LEAKS OR TEARS AND TO IDENTIFY WHEN MATERIALS NEED TO BE REMOVED.

ALLOWABLE NON-STORMWATER DISCHARGES:
1. FIRE-FIGHTING ACTIVITIES;
2. FIRE HYDRANT FLUSHING;
3. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED;
4. WATER USED TO CONTROL DUST;
5. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHING;
6. ROUTINE EXTERNAL BUILDING WASH DOWN WHERE DETERGENTS ARE NOT USED;
7. PAVEMENT WASH WATERS WHERE DETERGENTS ARE NOT USED;
8. UNCONTAMINATED AIR CONDITIONING/COMPRESSOR CONDENSATION;
9. UNCONTAMINATED GROUND WATER OR SPRING WATER;
10. FOUNDATION OR FOOTING DRAINS WHICH ARE UNCONTAMINATED;
11. UNCONTAMINATED EXCAVATION DEWATERING;
12. LANDSCAPE IRRIGATION.

WASTE DISPOSAL:
1. WASTE MATERIAL:
   A. ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN A DUMPSTER;
   B. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ON SITE;
   C. ALL PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
2. HAZARDOUS WASTE:
   A. ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER;
   B. SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
3. SANITARY WASTE:
   A. ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

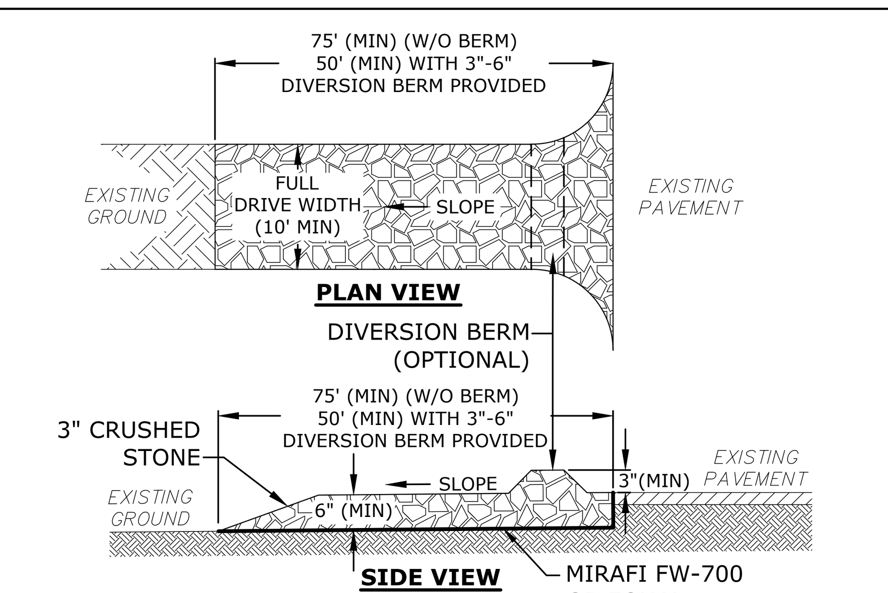
SPILL PREVENTION:
1. CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
2. THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
   A. GOOD HOUSEKEEPING - THE FOLLOWING GOOD HOUSEKEEPING PRACTICE SHALL BE FOLLOWED ON SITE DURING CONSTRUCTION:
      a. ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB SHALL BE STORED ON SITE;
      b. ALL REGULATED MATERIALS STORED ON SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE, ON AN IMPERVIOUS SURFACE;
      c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED;
      d. THE SITE SUPERINTENDENT SHALL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS;
      e. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER;
      f. WHENEVER POSSIBLE ALL OF A PRODUCT SHALL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
      g. THE TRAINING OF ON-SITE EMPLOYEES AND THE ON-SITE POSTING OF RELEASE RESPONSE INFORMATION DESCRIBING WHAT TO DO IN THE EVENT OF A SPILL OF REGULATED SUBSTANCES.
   B. HAZARDOUS PRODUCTS - THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
      a. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE;
      b. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHALL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION;
      c. SURPLUS PRODUCT THAT MUST BE DISPOSED OF SHALL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.
   C. PRODUCT SPECIFIC PRACTICES - THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ON SITE:
      a. PETROLEUM PRODUCTS:
      i. ALL ON SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE;
      ii. PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
      iii. SECURE FUEL STORAGE AREAS AGAINST UNAUTHORIZED ENTRY;
      iv. INSPECT FUEL STORAGE AREAS WEEKLY;
      v. WHEREVER POSSIBLE, KEEP REGULATED CONTAINERS THAT ARE STORED OUTSIDE MORE THAN 50 FEET FROM SURFACE WATER AND STORM DRAINS, 75 FEET FROM PRIVATE WELLS, AND 400 FEET FROM PUBLIC WELLS;
      vi. COVER REGULATED CONTAINERS IN OUTSIDE STORAGE AREAS;
      vii. SECONDARY CONTAINMENT IS REQUIRED FOR CONTAINERS CONTAINING REGULATED SUBSTANCES STORED OUTSIDE, EXCEPT FOR ON PREMISE USE HEATING FUEL TANKS, OR ABOVEGROUND OR UNDERGROUND STORAGE TANKS OTHERWISE REGULATED.
      viii. THE FUEL HANDLING REQUIREMENTS SHALL INCLUDE:
         (1) EXCEPT WHEN IN USE, KEEP CONTAINERS CONTAINING REGULATED SUBSTANCES CLOSED AND SEALED;
         (2) PLACE DRIP PANS UNDER SPIGOTS, VALVES, AND PUMPS;
         (3) HAVE SPILL CONTROL AND CONTAINMENT EQUIPMENT READILY AVAILABLE IN ALL WORK AREAS;
         (4) USE FUNNELS AND DRIP PANS WHEN TRANSFERRING REGULATED SUBSTANCES;
         (5) PERFORM TRANSFERS OF REGULATED SUBSTANCES OVER AN IMPERVIOUS SURFACE.
      ix. FUELING AND MAINTENANCE OF EXCAVATION, EARTHMOVING AND OTHER CONSTRUCTION RELATED EQUIPMENT SHALL COMPLY WITH THE REGULATIONS OF THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES THESE REQUIREMENTS ARE SUMMARIZED IN WD-DWGB-22-6 BEST MANAGEMENT PRACTICES FOR FUELING AND MAINTENANCE OF EXCAVATION AND EARTHMOVING EQUIPMENT, OR ITS SUCCESSOR DOCUMENT.
      HTTPS://WWW.DES.NH.GOV/ORGANIZATION/COMMISSIONER/PIP/FACTSHEETS/DWGB/DOCUMENTS/DWGB-22-6.PDF
      b. FERTILIZERS:
      i. FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS;
      ii. ONCE APPLIED FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER;
      iii. STORAGE SHALL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
      c. PAINTS:
      i. ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE;
      ii. EXCESS PAINT SHALL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM;
      iii. EXCESS PAINT SHALL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
   D. SPILL CONTROL PRACTICES - IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION, THE FOLLOWING PRACTICES SHALL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
      a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES;
      b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS SHALL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE;
      c. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY;
      d. THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE;
      e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE LOCAL, STATE OR FEDERAL AGENCIES AS REQUIRED;
      f. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
   E. VEHICLE FUELING AND MAINTENANCE PRACTICE:
      a. CONTRACTOR SHALL MAKE AN EFFORT TO PERFORM EQUIPMENT/VEHICLE FUELING AND MAINTENANCE AT AN OFF-SITE FACILITY;
      b. CONTRACTOR SHALL PROVIDE AN ON-SITE FUELING AND MAINTENANCE AREA THAT IS CLEAN AND DRY;
      c. IF POSSIBLE THE CONTRACTOR SHALL KEEP AREA COVERED;
      d. CONTRACTOR SHALL KEEP A SPILL KIT AT THE FUELING AND MAINTENANCE AREA;
      e. CONTRACTOR SHALL REGULARLY INSPECT VEHICLES FOR LEAKS AND DAMAGE;
      f. CONTRACTOR SHALL USE DRIP PANS, DRIP CLOTHS, OR ABSORBENT PADS WHEN REPLACING SPENT FLUID.

EROSION CONTROL OBSERVATIONS AND MAINTENANCE PRACTICES
1. THIS PROJECT EXCEEDS ONE (1) ACRE OF DISTURBANCE AND THUS REQUIRES A SWPPP. THE SWPPP SHALL BE PREPARED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE FAMILIAR WITH THE SWPPP AND KEEP AN UPDATED COPY OF THE SWPPP ONSITE AT ALL TIMES.
2. THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:
   A. OBSERVATIONS OF THE PROJECT FOR COMPLIANCE WITH THE SWPPP SHALL BE MADE BY THE CONTRACTOR AT LEAST ONCE A WEEK OR WITHIN 24 HOURS OF A STORM 0.25 INCHES OR GREATER;
   B. AN OBSERVATION REPORT SHALL BE MADE AFTER EACH OBSERVATION AND DISTRIBUTED TO THE ENGINEER, THE OWNER, AND THE CONTRACTOR;
   C. A REPRESENTATIVE OF THE SITE CONTRACTOR, SHALL BE RESPONSIBLE FOR MAINTENANCE AND REPAIR ACTIVITIES;
   D. IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS OF REPORT.

BLASTING NOTES:
1. CONTRACTOR SHALL CONTACT THE NHDES PRIOR TO COMMENCING ANY BLASTING ACTIVITIES
2. FOR ANY PROJECT FOR WHICH BLASTING OF BEDROCK IS ANTICIPATED, THE APPLICANT SHALL SUBMIT:
   A. A BLASTING PLAN THAT IDENTIFIES:
      a. WHERE THE BLASTING ACTIVITIES ARE ANTICIPATED TO OCCUR;
      b. THE ESTIMATED QUANTITY OF BLAST ROCK IN CUBIC YARDS; AND
      c. SITE-SPECIFIC BLASTING BEST MANAGEMENT PRACTICES.
3. IF MORE THAN 5000 CUBIC YARDS OF BLAST ROCK WILL BE GENERATED AND THERE ARE ONE OR MORE PUBLIC DRINKING WATER WELLS WITHIN 2000 FEET OF THE BLASTING ACTIVITIES, A PLAN TO MONITOR GROUNDWATER TO DETECT ANY CONTAMINATION IN SUFFICIENT TIME TO PROTECT THE WATER SUPPLY WELLS SHALL BE PROVIDED TO THE NHDES. THE GROUNDWATER MONITORING PLAN SHALL INCLUDE:
   A. MONITORING FOR NITRATE AND NITRITE EITHER IN THE DRINKING WATER SUPPLY WELLS OR IN OTHER WELLS THAT ARE REPRESENTATIVE OF THE DRINKING WATER SUPPLY WELLS IN THE AREA:
      a. THE GROUNDWATER SAMPLING PROGRAM MUST BE IMPLEMENTED ONCE APPROVED BY THE NHDES.
   B. THE FOLLOWING BEST MANAGEMENT PROCEDURES FOR BLASTING SHALL BE COMPLIED WITH:
      a. LOADING PRACTICES - THE FOLLOWING BLASTHOLE LOADING PRACTICES TO MINIMIZE ENVIRONMENTAL EFFECTS SHALL BE FOLLOWED:
   - DRILLING LOGS SHALL BE MAINTAINED BY THE DRILLER AND COMMUNICATED DIRECTLY TO THE BLASTER. THE LOGS SHALL INDICATE DEPTHS AND LENGTHS OF VOIDS, CAVITIES, AND FAULT ZONES OR OTHER WEAK ZONES ENCOUNTERED AS WELL AS GROUNDWATER CONDITIONS;
   - EXPLOSIVE PRODUCTS SHALL BE MANAGED ON-SITE SO THAT THEY ARE EITHER USED IN THE BOREHOLE, RETURNED TO THE DELIVERY VEHICLE, OR PLACED IN SECURE CONTAINERS FOR OFF-SITE DISPOSAL;
   - SPILLAGE AROUND THE BOREHOLE SHALL EITHER BE PLACED IN THE BOREHOLE OR CLEANED UP AND RETURNED TO AN APPROPRIATE VEHICLE FOR HANDLING OR PLACEMENT IN SECURED CONTAINERS FOR OFF-SITE DISPOSAL;
   - LOADED EXPLOSIVES SHALL BE DETONATED AS SOON AS POSSIBLE AND SHALL NOT BE LEFT IN THE BLASTHOLES OVERNIGHT, UNLESS WEATHER OR OTHER SAFETY CONCERNS REASONABLY DICTATE THAT DETONATION SHOULD BE POSTPONED;
   - LOADING EQUIPMENT SHALL BE CLEANED IN AN AREA WHERE WASTEWATER CAN BE PROPERLY CONTAINED AND HANDLED IN A MANNER THAT PREVENTS RELEASE OF CONTAMINANTS TO THE ENVIRONMENT;
   - EXPLOSIVES SHALL BE LOADED TO MAINTAIN GOOD CONTINUITY IN THE COLUMN LOAD TO PROMOTE COMPLETE DETONATION. INDUSTRY ACCEPTED LOADING PRACTICES FOR PRIMING, STEMMING, DECKING AND COLUMN RISE NEED TO BE ATTENDED TO.
      b. EXPLOSIVE SELECTION - THE FOLLOWING BMPS SHALL BE FOLLOWED TO REDUCE THE POTENTIAL FOR GROUNDWATER CONTAMINATION WHEN EXPLOSIVES ARE USED:
   - EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT ARE APPROPRIATE FOR SITE CONDITIONS AND SAFE BLAST EXECUTION;
   - EXPLOSIVE PRODUCTS SHALL BE SELECTED THAT HAVE THE APPROPRIATE WATER RESISTANCE FOR THE SITE CONDITIONS PRESENT TO MINIMIZE THE POTENTIAL FOR HAZARDOUS EFFECT OF THE PRODUCT UPON GROUNDWATER
   - PREVENTION OF MISFIRES. APPROPRIATE PRACTICES SHALL BE DEVELOPED AND IMPLEMENTED TO PREVENT MISFIRES.
   - MUCK PILES MANAGEMENT - MUCK PILES (THE BLASTED PIECES OF ROCK) AND ROCK PILES SHALL BE MANAGED IN A MANNER TO REDUCE THE POTENTIAL FOR CONTAMINATION BY IMPLEMENTING THE FOLLOWING MEASURES:
   - REMOVE THE MUCK PILE FROM THE BLAST AREA AS SOON AS REASONABLY POSSIBLE;
   - MANAGE THE INTERACTION OF BLASTED ROCK PILES AND STORMWATER TO PREVENT CONTAMINATION OF WATER SUPPLY WELLS OR SURFACE WATER.
   C. SPILL PREVENTION AND SPILL MITIGATION MEASURES SHALL BE IMPLEMENTED TO PREVENT THE RELEASE OF FUEL AND OTHER RELATED SUBSTANCES TO THE ENVIRONMENT DURING BLASTING OPERATIONS. THE MEASURES TO PREVENT SUCH RELEASES SHALL BE DETAILED IN THE GROUNDWATER MONITORING REPORT AND COMPLY WITH THE MEASURES AND BEST MANAGEMENT PRACTICES LISTED ON THIS SHEET.

STATE OF NEW HAMPSHIRE PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
10/20/22

STATE OF NEW HAMPSHIRE NEIL A. HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
10/20/22



NOTE:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT FROM THE SITE. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO RUNOFF DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS

STABILIZED CONSTRUCTION EXIT
NO SCALE

Tighe&Bond

North End Mixed Use Development

Two International Group

Russell Street &
Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

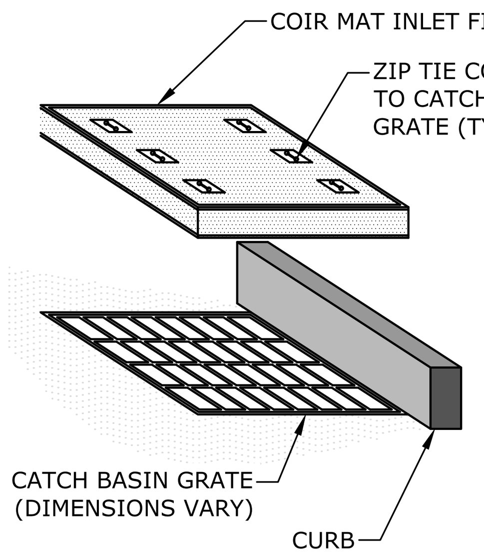
PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DTLS.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

EROSION CONTROL NOTES AND DETAILS SHEET

SCALE: AS SHOWN

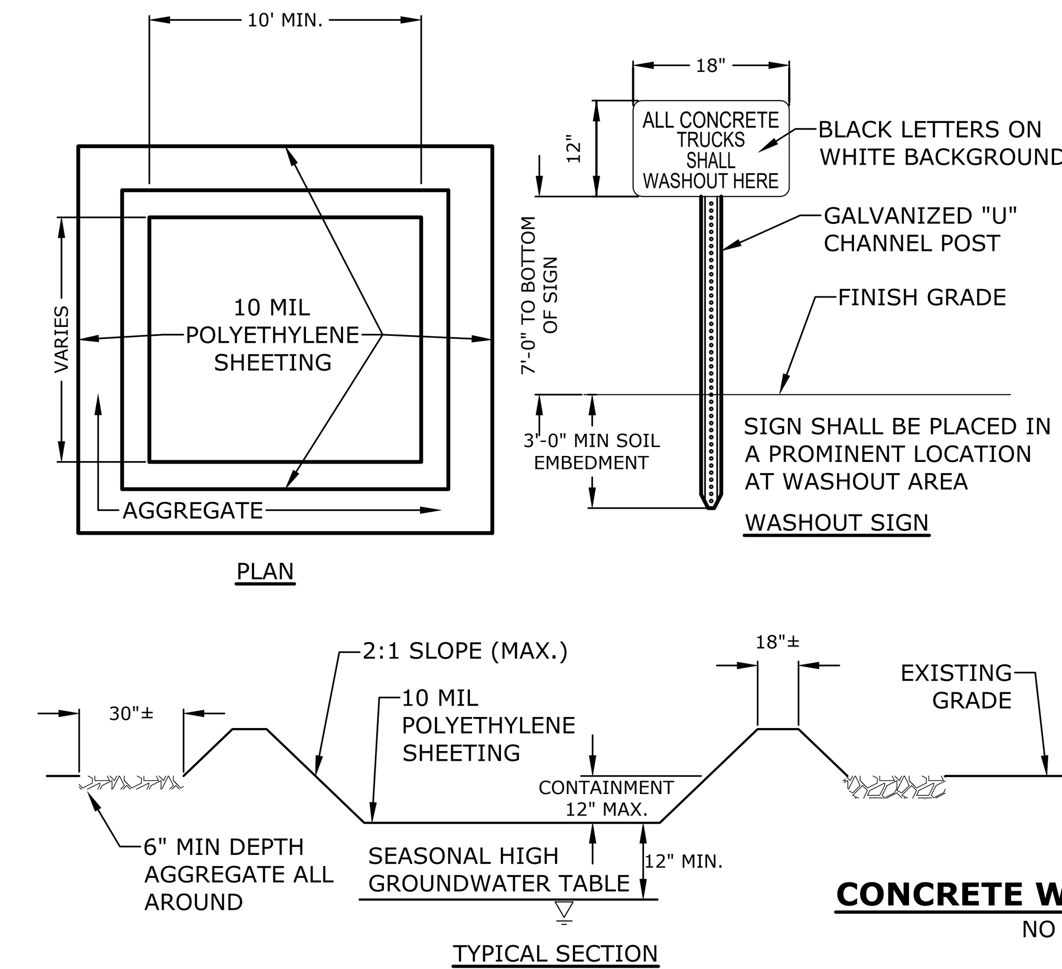
C-501

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:47pm By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DTLS.dwg



NOTES:
1. COIR MAT INLET FILTER SHALL BE STORM WATER INLET FILTER BY BLOCKSOM & CO. OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN INLET PROTECTION IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

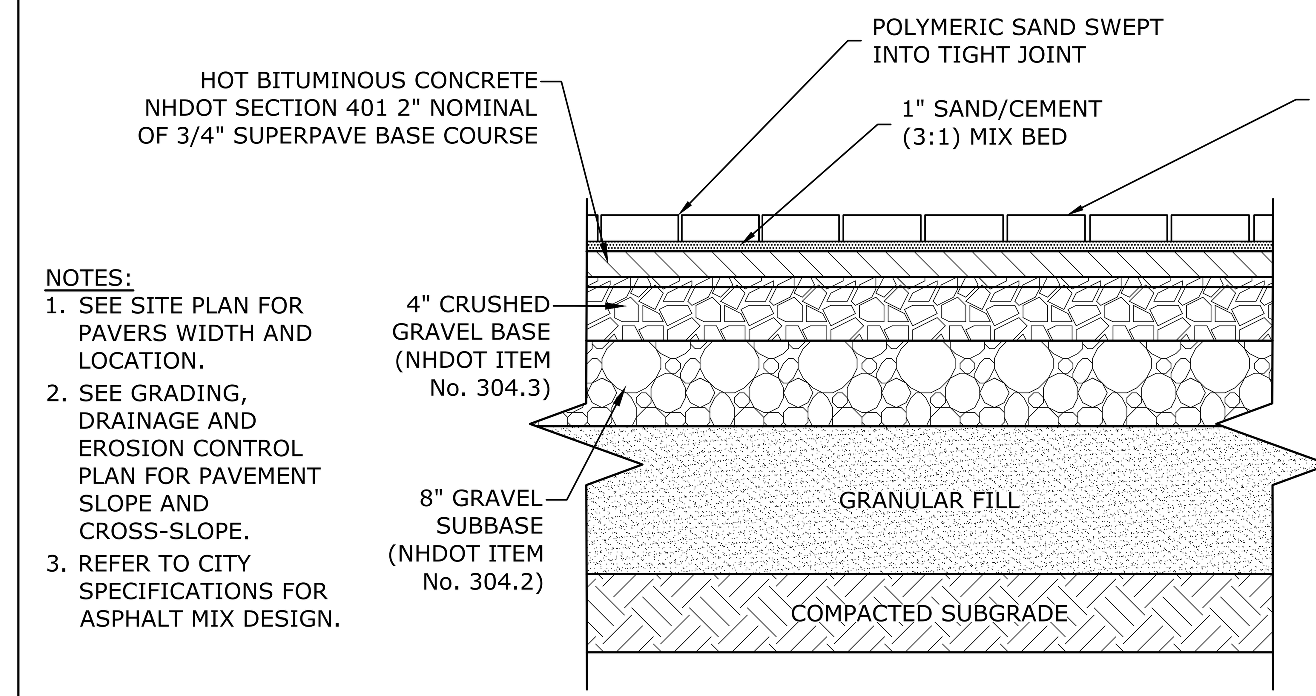
INLET PROTECTION
NO SCALE



NOTES:
1. CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
2. CONTAINMENT DEVICES MUST BE OF SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED.
3. WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE WASHOUT IS 75% FULL.
4. WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
5. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
6. AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.

CONCRETE WASHOUT AREA
NO SCALE

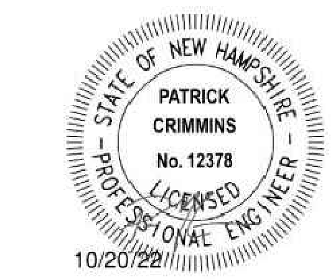
NOTES:
1. SEE SITE PLAN FOR PAVERS WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. REFER TO CITY SPECIFICATIONS FOR ASPHALT MIX DESIGN.

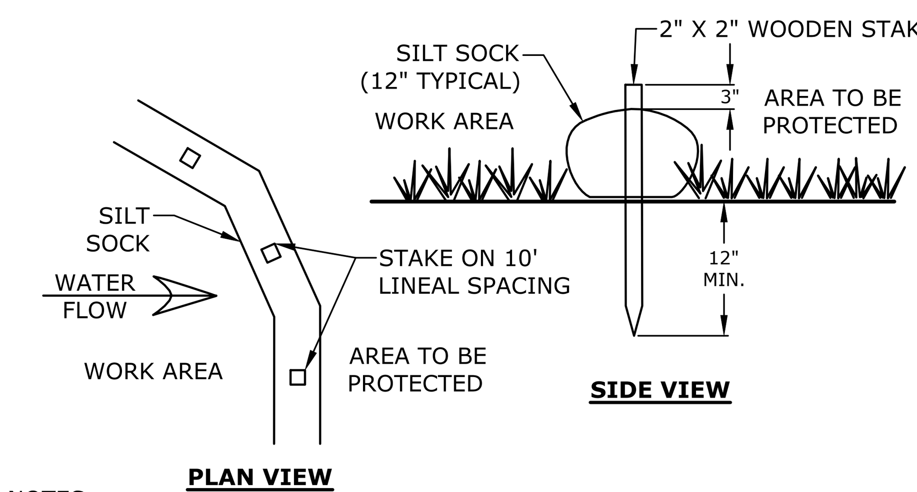


NHDOT ITEM No. 304.2 (GRAVEL)	
SIEVE SIZE	% PASSING
6"	100
#4	25-70
#200	0-12

NHDOT ITEM No. 304.3 (CRUSHED GRAVEL)	
SIEVE SIZE	% PASSING
3"	100
2"	95-100
1"	55-85
#4	27-52
#200	0-12

ON-SITE PAVERS SECTION
NO SCALE



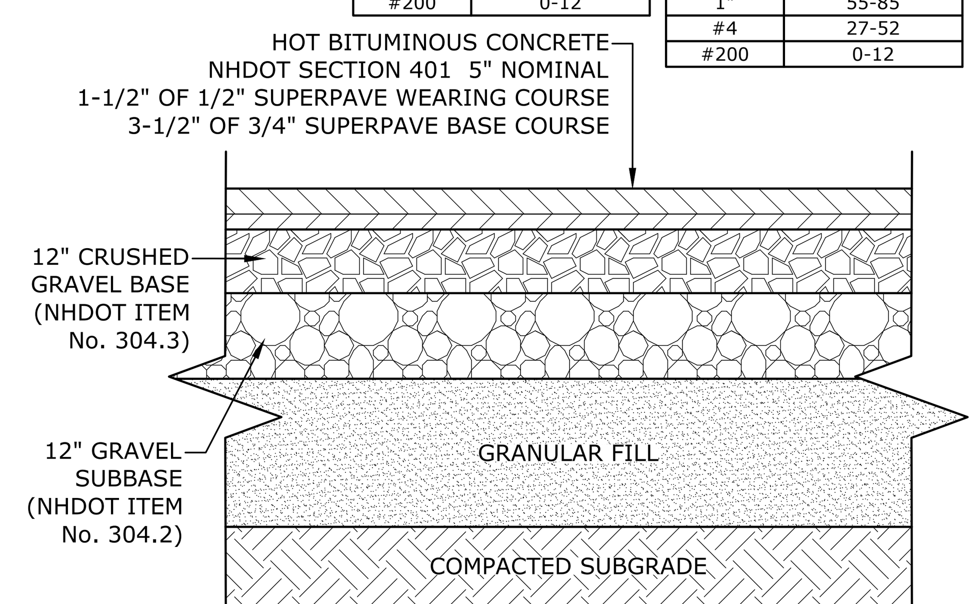


NOTES:
1. SILT SOCK SHALL BE SILT SOXX BY FILTREXX OR APPROVED EQUAL.
2. INSTALL SILT SOCK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

SILT SOCK
NO SCALE

NHDOT ITEM No. 304.2 (GRAVEL)	
SIEVE SIZE	% PASSING
6"	100
#4	25-70
#200	0-12

NHDOT ITEM No. 304.3 (CRUSHED GRAVEL)	
SIEVE SIZE	% PASSING
3"	100
2"	95-100
1"	55-85
#4	27-52
#200	0-12

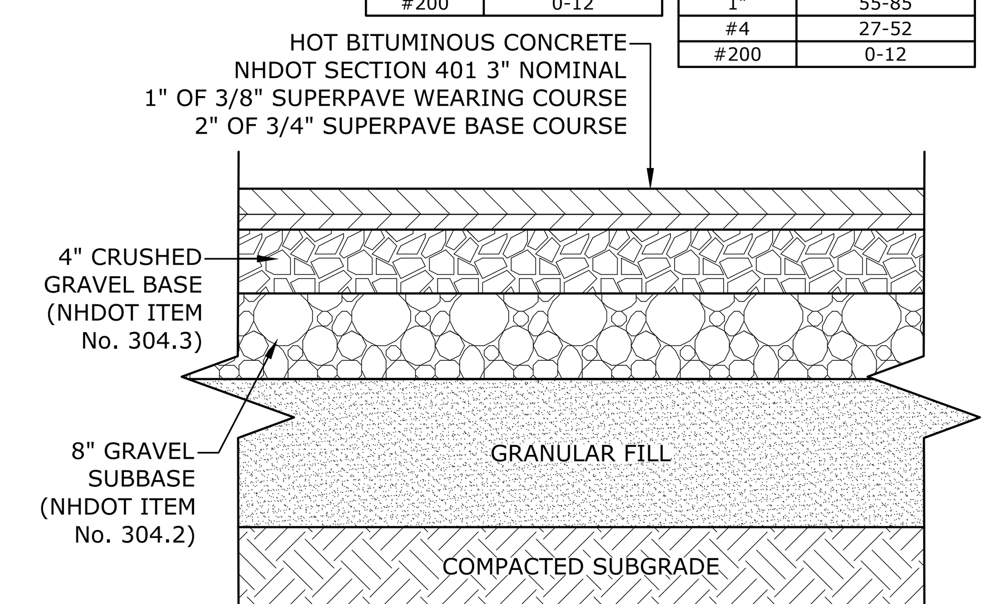


NOTES:
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. A TACK COAT SHALL BE PLACED ON TOP OF BINDER COURSE PAVEMENT PRIOR TO PLACING WEARING COURSE.
4. REFER TO CITY SPECIFICATIONS FOR ASPHALT MIX DESIGN.

CITY RIGHT-OF-WAY PAVEMENT SECTION
NO SCALE

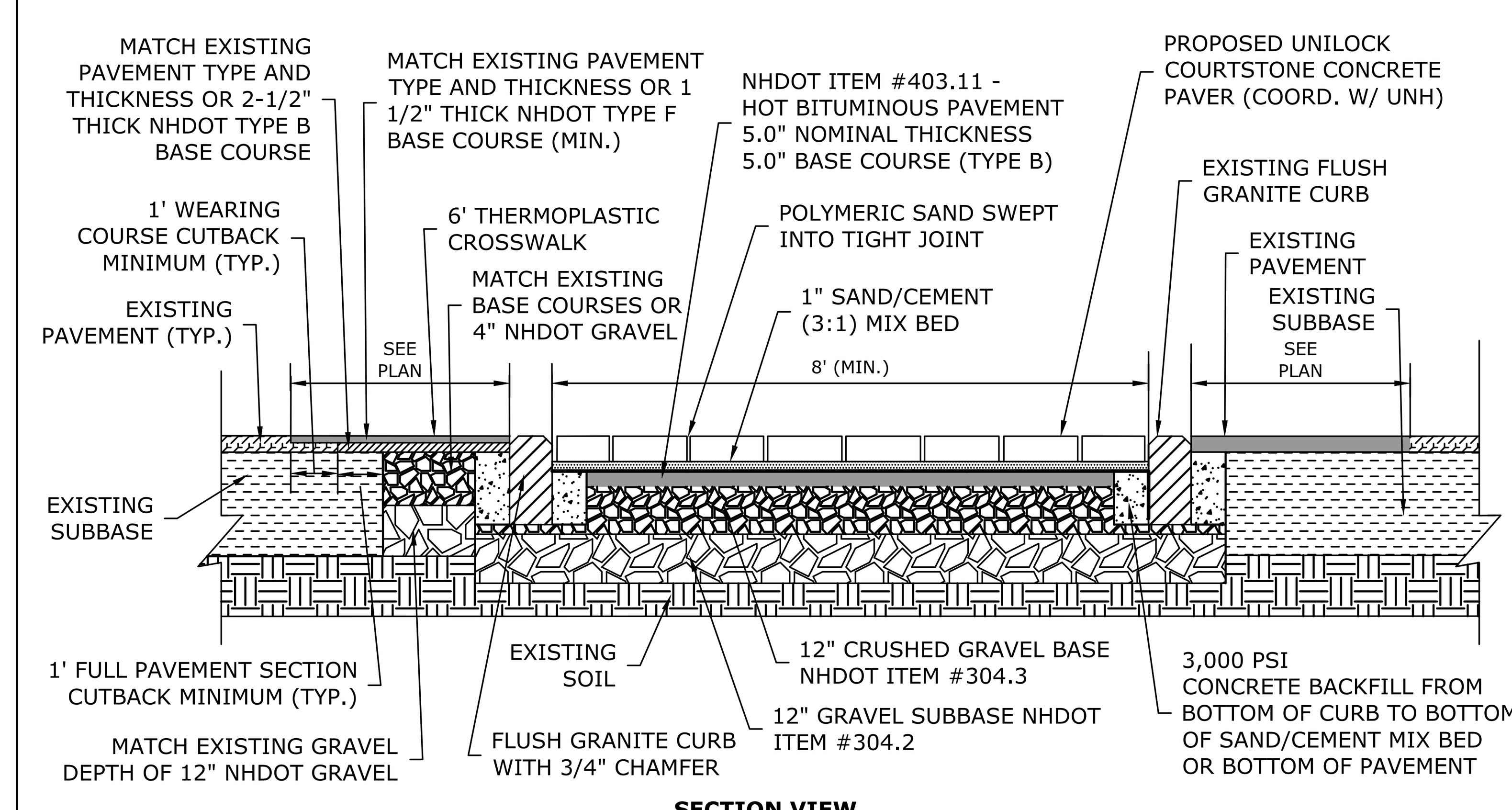
NHDOT ITEM No. 304.2 (GRAVEL)	
SIEVE SIZE	% PASSING
6"	100
#4	25-70
#200	0-12

NHDOT ITEM No. 304.3 (CRUSHED GRAVEL)	
SIEVE SIZE	% PASSING
3"	100
2"	95-100
1"	55-85
#4	27-52
#200	0-12



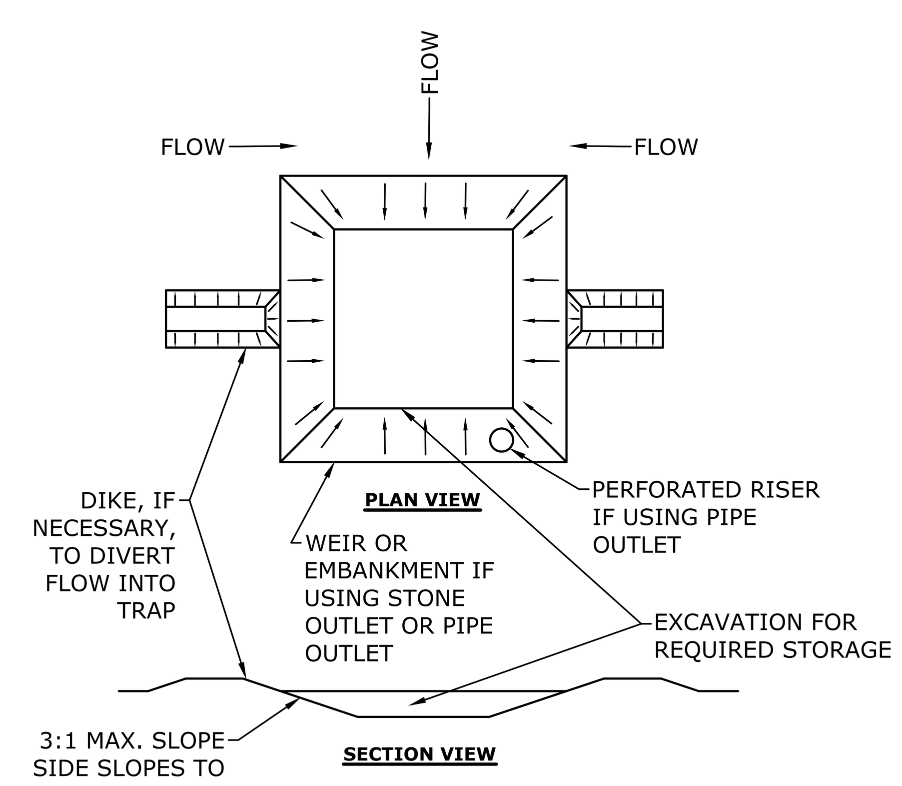
NOTES:
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. A TACK COAT SHALL BE PLACED ON TOP OF BINDER COURSE PAVEMENT PRIOR TO PLACING WEARING COURSE.
4. REFER TO CITY SPECIFICATIONS FOR ASPHALT MIX DESIGN.

ON-SITE PAVEMENT SECTION
NO SCALE



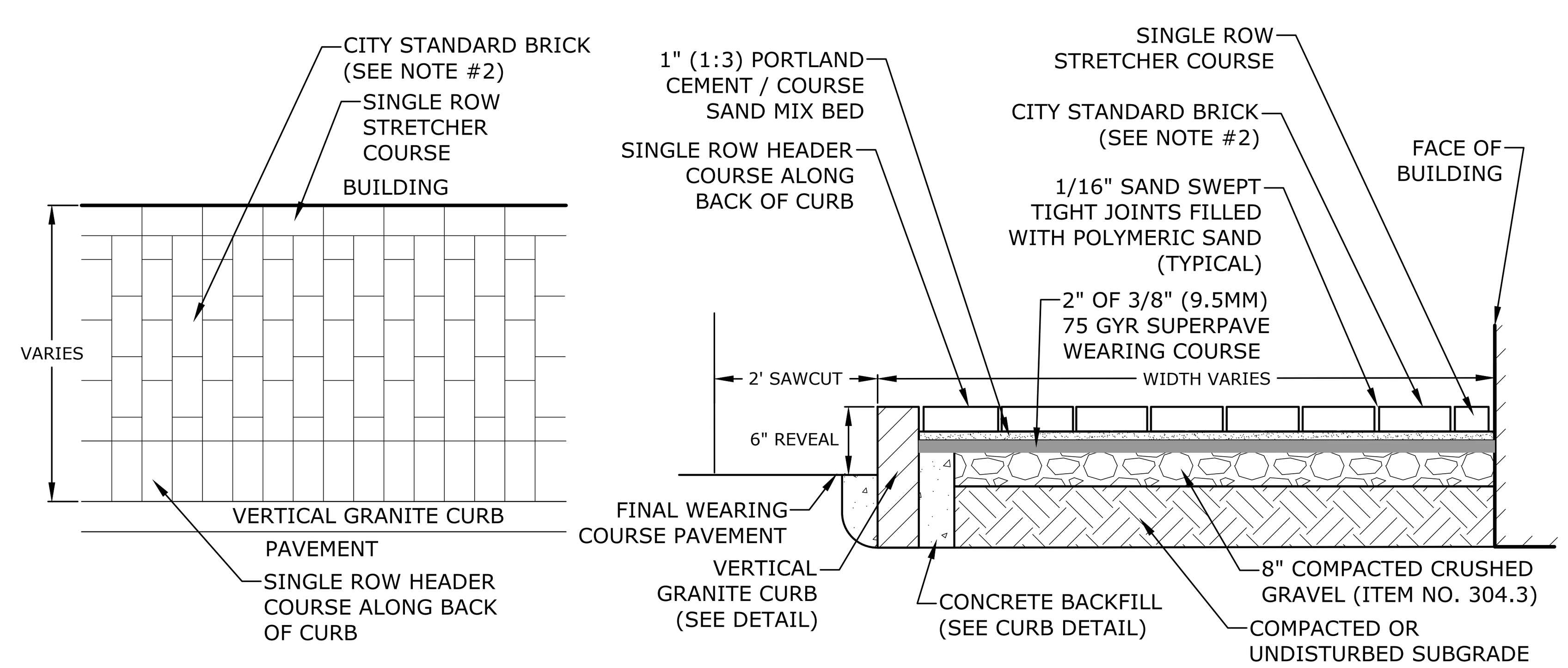
NOTES:
1. FINAL COLOR AND PATTERN OF **UNILOCK COURTSTONE** CONCRETE PAVERS TO BE COORDINATED WITH DPW. CONTRACTOR SHALL PROVIDE SAMPLES TO THE GROUP PRIOR TO ORDERING MATERIALS.
2. BEDDING MATERIAL SHALL BE A SAND/CEMENT MIX THAT IS 3 PARTS SAND AND 1 PART CEMENT. SAND SHALL CONFORM WITH ASTM C33 AND CEMENT SHALL BE PORTLAND CEMENT TYPE I/TYPE II.

DEER STREET PAVER CROSSWALK
NO SCALE



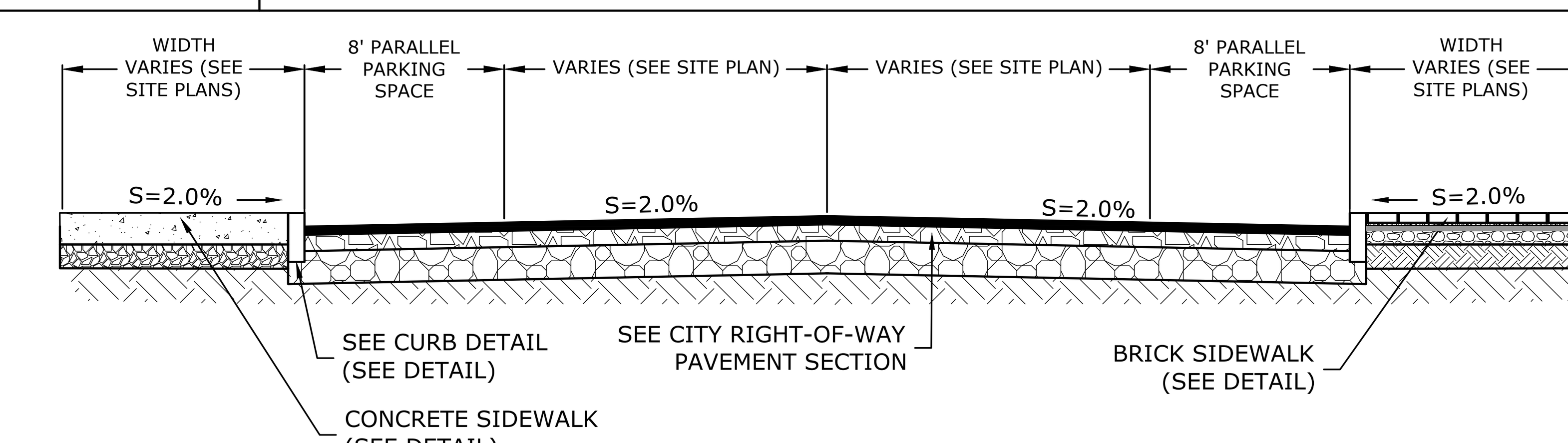
NOTES:
1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING AREA TO A SINGLE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. TRAP OUTLET SHALL BE MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP.
5. TRAP SHALL DISCHARGE TO A STABILIZED AREA.
6. TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.
8. SEDIMENT TRAPS MUST BE USED AS NEEDED TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.

SEDIMENT TRAP
NO SCALE

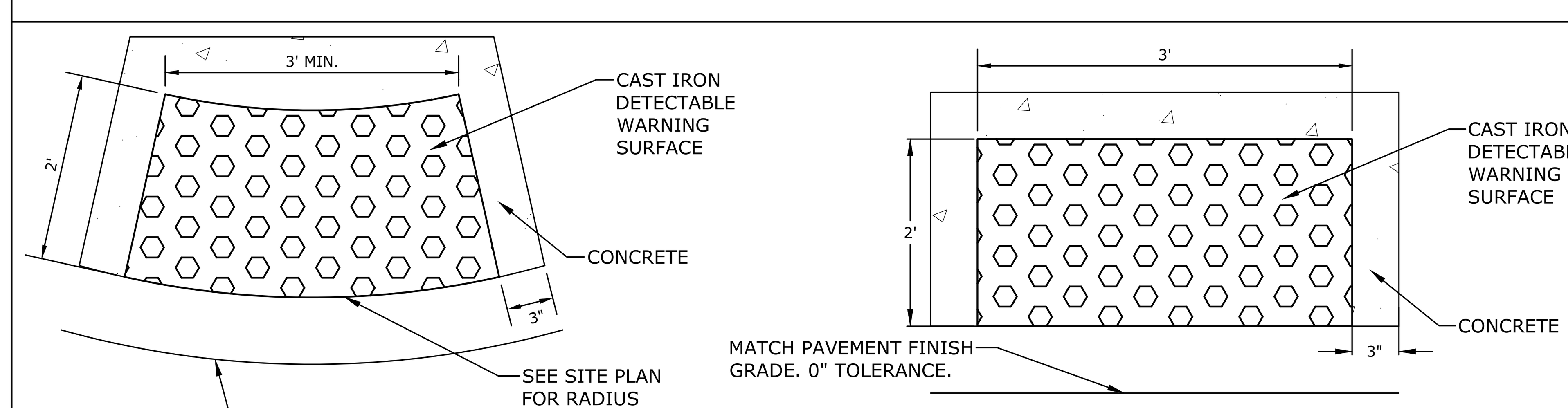


NOTES:
1. BRICK SIDEWALK SHALL BE INSTALLED AS DETAILED AND PER CITY OF PORTSMOUTH REQUIREMENTS/SPECIFICATIONS AND SHALL INCLUDE A CONTINUOUS APPROVED PAVER EDGE RESTRAINT SYSTEM AT ALL LOCATIONS NOT ADJACENT TO CURB OR BUILDINGS.
2. CITY STANDARD BRICK SHALL BE TRADITIONAL EDGE, PATHWAY, FULL RANGE 2.25"X4"X8" PAVER, BY PINE HALL BRICK, INC. BRICK MATERIAL SAMPLES SHALL BE PROVIDED TO DPW PRIOR TO INSTALLATION FOR REVIEW AND APPROVAL.
3. BEDDING MATERIAL SHALL BE A PORTLAND CEMENT / COURSE SAND MIX THAT IS 1 PART PORTLAND CEMENT AND 3 PARTS COURSE SAND. SAND SHALL CONFORM WITH ASTM C-33 AND CEMENT SHALL BE PORTLAND CEMENT TYPE I/TYPE II.

BRICK SIDEWALK
NO SCALE



TYPICAL RUSSELL STREET ROADWAY CROSS SECTION
NO SCALE



NOTES:
1. DETECTABLE WARNING SURFACE SHALL BE 2' X 3' CAST IRON PANEL SET IN CONCRETE.
2. DETECTABLE WARNING SURFACE SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

CAST IRON DETECTABLE WARNING SURFACE
NO SCALE

Tighe&Bond

North End Mixed Use Development

Two International Group

Russell Street & Deer Street Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

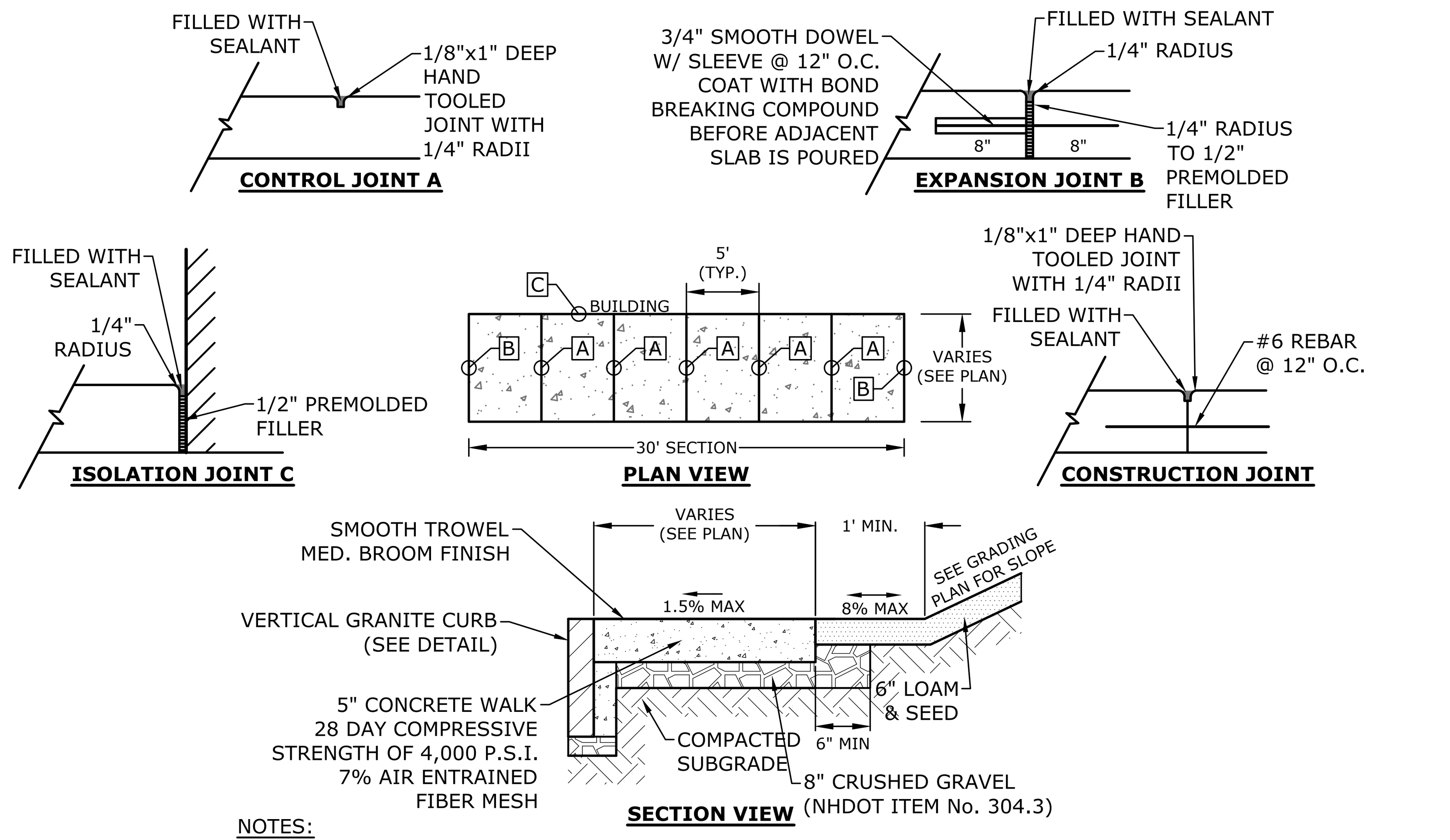
PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DTLS.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

DETAILS SHEET

SCALE: AS SHOWN

C-502

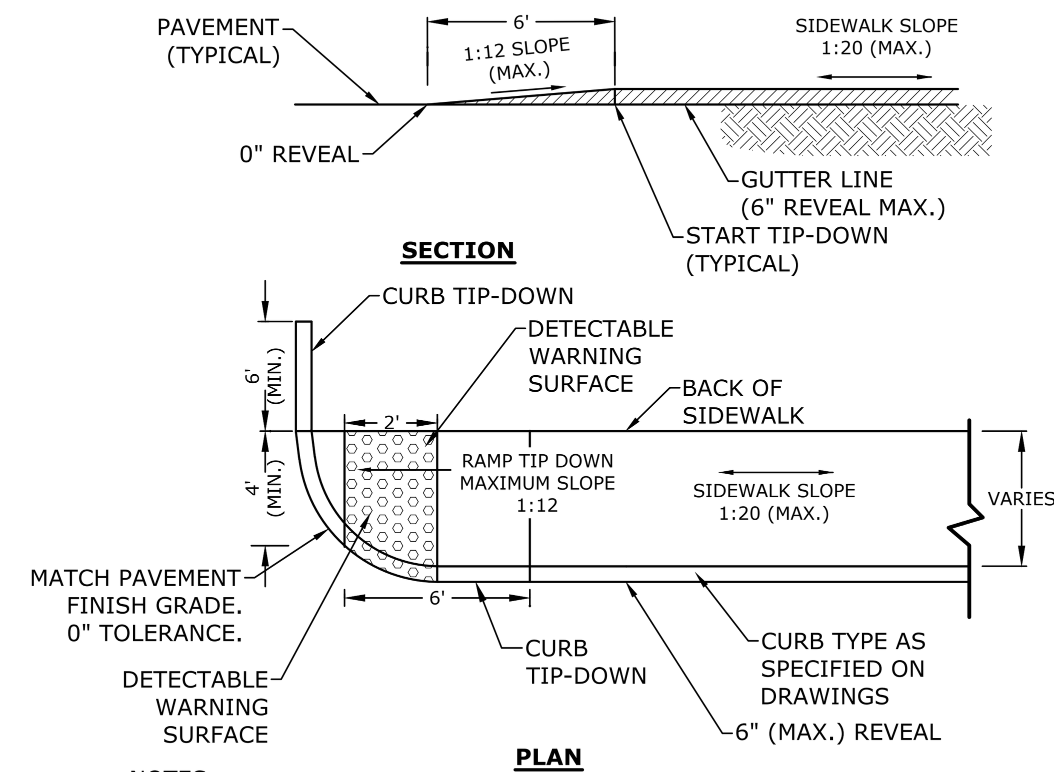
Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:47pm By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DTLS.dwg



NOTES:
1. SEE SITE PLAN FOR SIDEWALK WIDTH AND LOCATIONS.
2. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR WALK AND SIDE SLOPE GRADES.
3. ISOLATION JOINTS ADJACENT TO BUILDING SHALL BE COORDINATED WITH BUILDING DRAWINGS.

CONCRETE SIDEWALK WITH GRANITE CURB

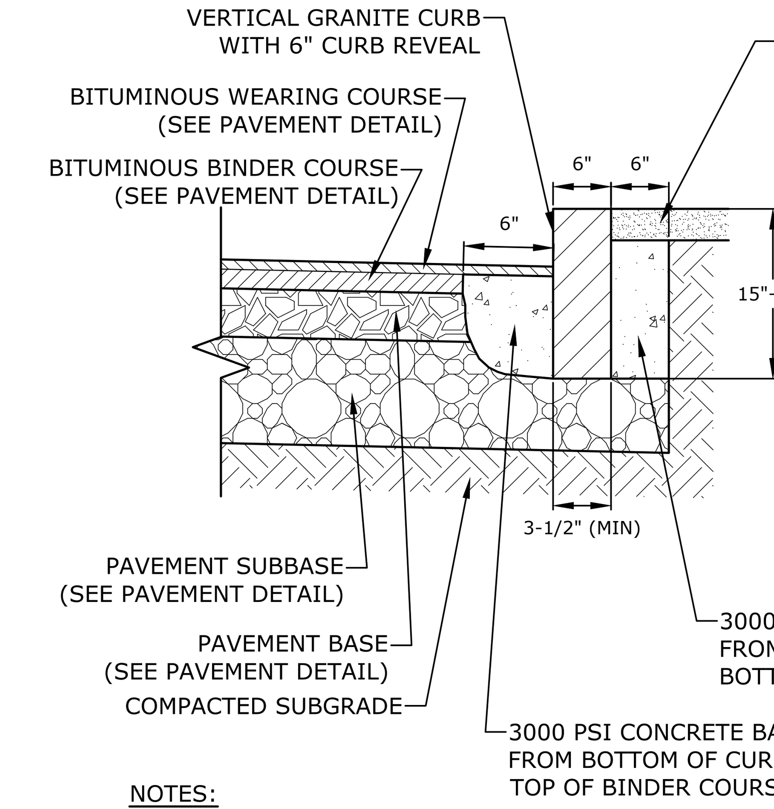
NO SCALE



NOTES:
1. RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
2. PROVIDE 8" COMPACTED CRUSHED GRAVEL BASE BENEATH RAMPS.
3. DETECTABLE WARNING STRIP SHALL BE ADA SOLUTIONS, INC. CAST IN PLACE RAMP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

CONCRETE SIDEWALK TIP-DOWN RAMP WITH DETECTABLE WARNING PANEL

NO SCALE



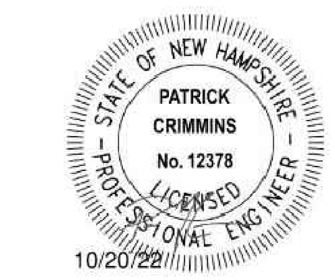
CURB RADIUS TABLE	
RADIUS	MAX. LENGTH
<20'	USE CURVED CURB
21'	3'
22'-28'	4'
29'-35'	5'
36'-42'	6'
43'-49'	7'
50'-56'	8'
57'-60'	9'
>60'	10'

NOTES:
1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
6. ALL RADII 20 FEET AND SMALLER SHALL BE CONSTRUCTED USING CURVED SECTIONS.
7. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

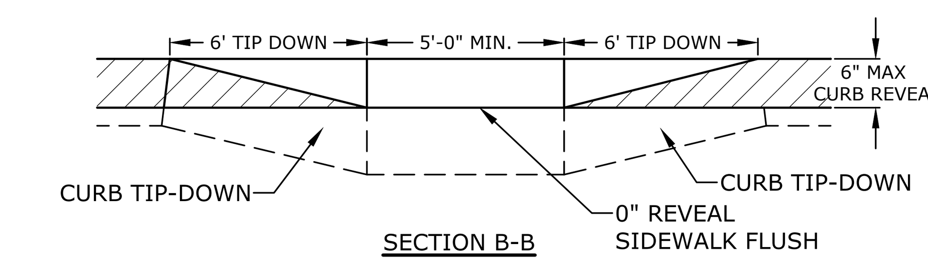
VERTICAL GRANITE CURB

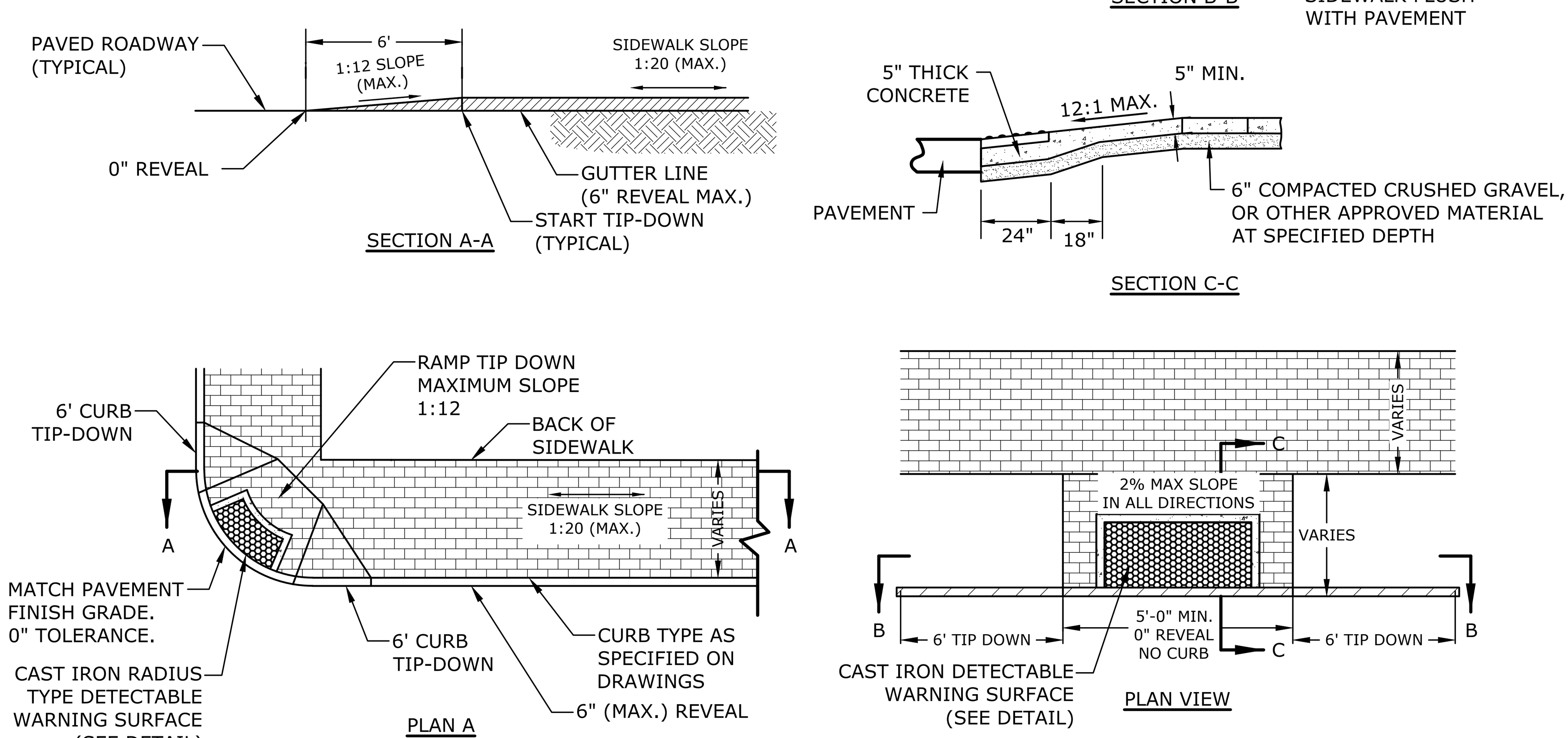
NO SCALE

Tighe&Bond



NHDOT ITEM No. 304.3 (CRUSHED GRAVEL)	
SIEVE SIZE	% PASSING
3"	100
2"	95-100
1"	55-85
#4	27-52
#200	0-12

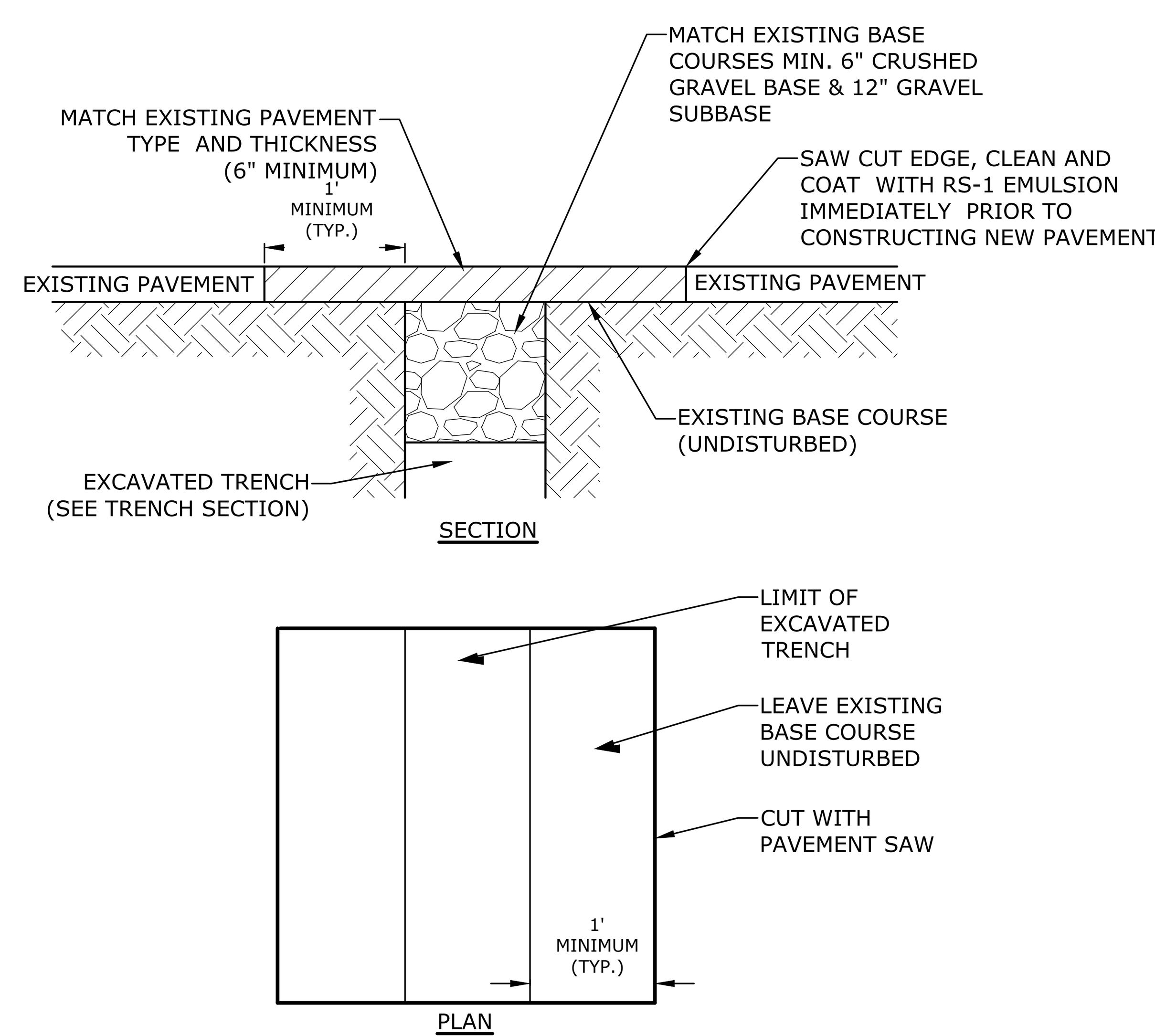




NOTES:
1. RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE AMERICANS WITH DISABILITIES ACT AND LOCAL AND STATE REQUIREMENTS.
2. A 6" COMPACTED CRUSHED GRAVEL BASE (NHDOT ITEM No. 304.3) SHALL BE PROVIDED BENEATH RAMPS.
3. DETECTABLE WARNING PANEL SHALL BE CAST IRON SET IN CONCRETE (SEE DETAIL.)
4. PROVIDE DETECTABLE WARNING SURFACES ANYTIME THAT A CURB RAMP, BLENDED TRANSITION, OR LANDING CONNECTS TO A STREET.
5. LOCATE THE DETECTABLE WARNING SURFACES AT THE BACK OF THE CURB ALONG THE EDGE OF THE LANDING.
6. THE MAXIMUM RUNNING SLOPE OF ANY SIDEWALK CURB RAMP IS 12:1, THE MAXIMUM CROSS SLOPE IS 2%. THE SLOPE OF THE LANDING SHALL NOT EXCEED 2% IN ANY DIRECTION.
7. TRANSITIONS SHALL BE FLUSH AND FREE OF ABRUPT CHANGES. ROADWAY SHOULDER SLOPES ADJOINING SIDEWALK CURB RAMPS SHALL BE A MAXIMUM OF 5% (FULL WIDTH) FOR A DISTANCE OF 2 FT. FROM THE ROADWAY CURBLINE.
8. THE BOTTOM OF THE SIDEWALK CURB RAMP OR LANDING, EXCLUSIVE OF THE FLARED SIDES, SHALL BE WHOLLY CONTAINED WITHIN THE CROSSWALK MARKINGS.
9. DETECTABLE WARNING PANELS SHALL BE A MINIMUM OF 2 FEET IN DEPTH. THE ROWS OF TRUNCATED DOMES SHALL BE ALIGNED PERPENDICULAR TO THE GRADE BREAK BETWEEN THE RAMP, BLENDED TRANSITION, OR LANDING AND THE STREET.
10. THE TEXTURE OF THE DETECTABLE WARNING FEATURE MUST CONTRAST VISUALLY WITH THE SURROUNDING SURFACES (EITHER LIGHT-ON-DARK OR DARK-ON-LIGHT).

CONCRETE WHEELCHAIR ACCESSIBLE RAMP

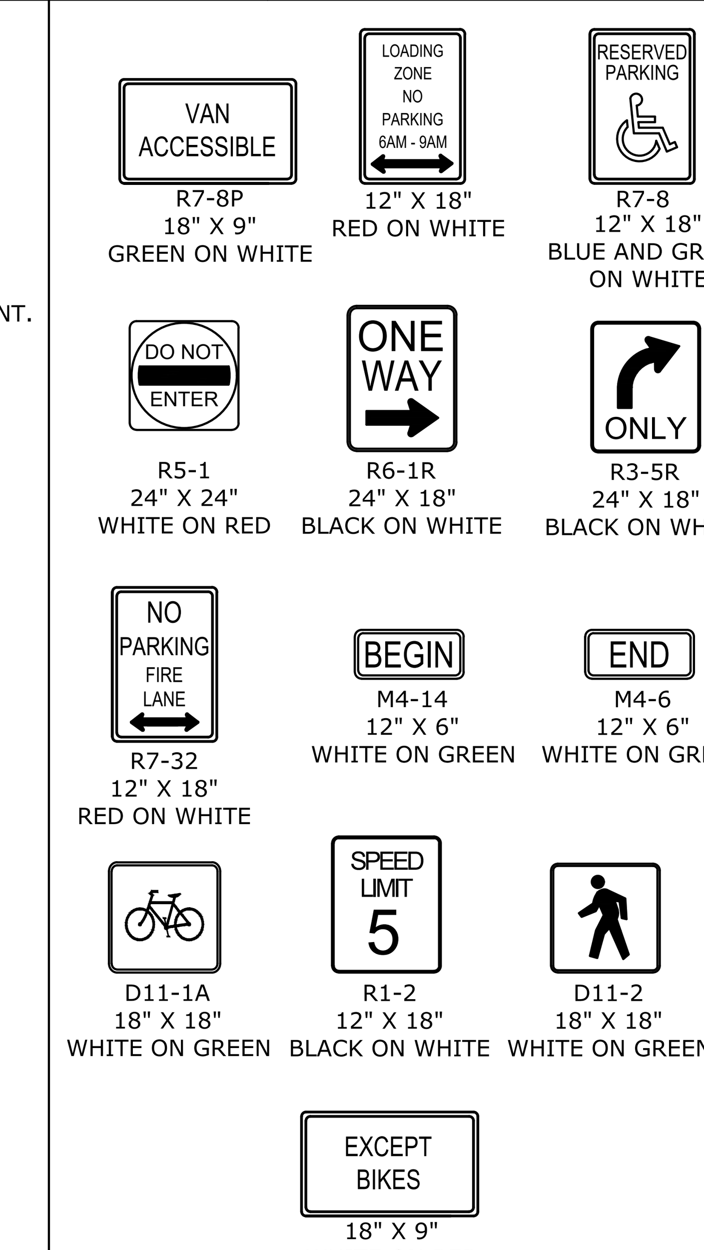
NO SCALE

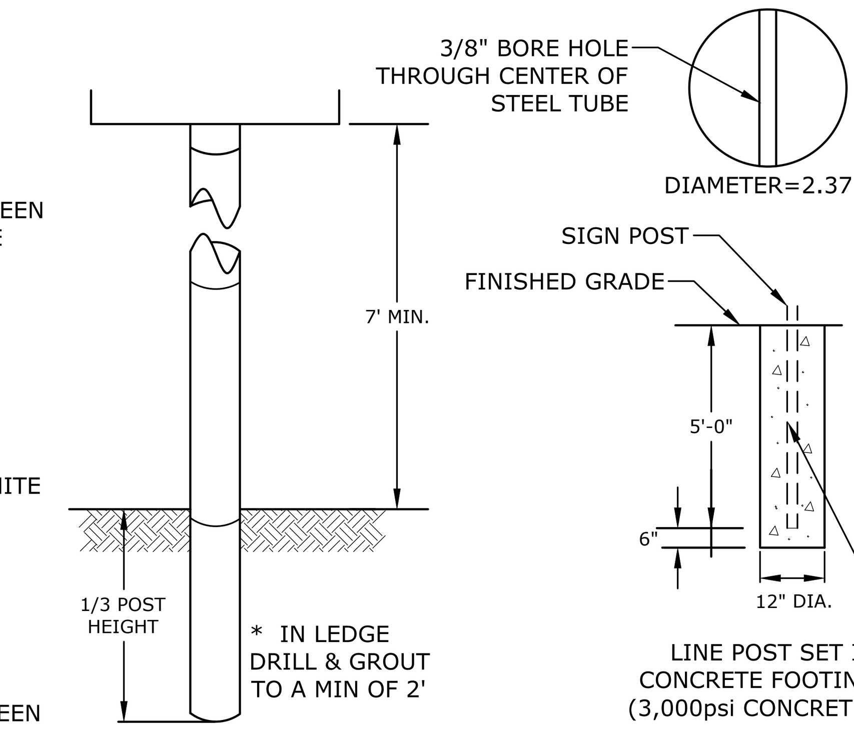


NOTE:
1. COORDINATE AND OBTAIN APPROVAL FOR ALL TRENCHING AND PATCHING WITHIN CITY RIGHT OF WAY WITH CITY OF PORTSMOUTH DPW PRIOR TO COMMENCING WORK.

ROADWAY TRENCH PATCH

NO SCALE

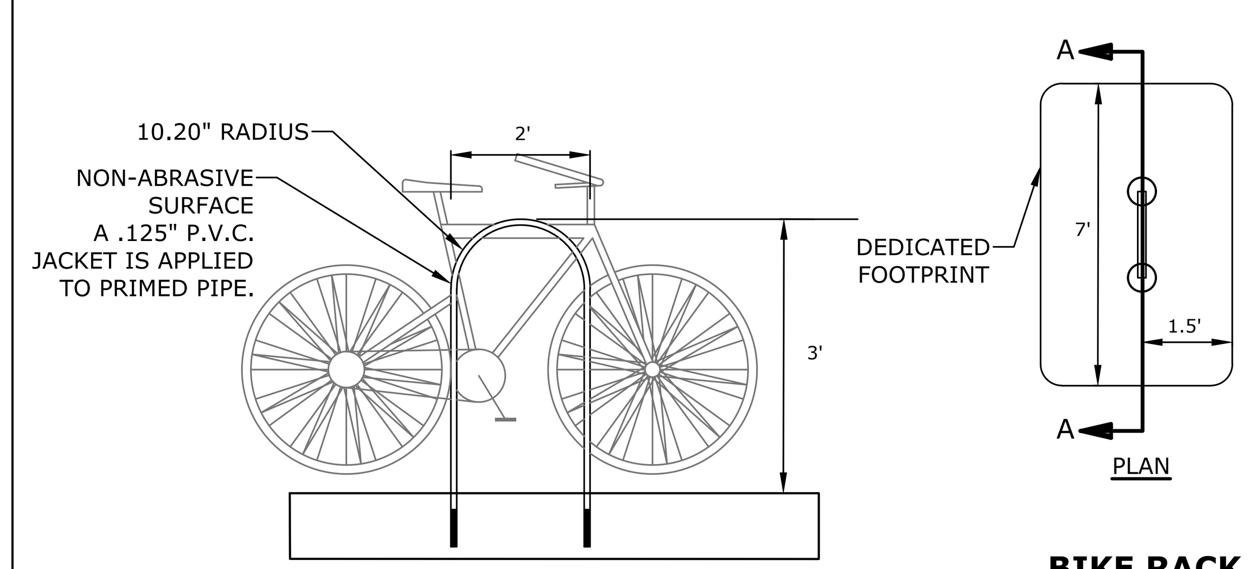




NOTES:
ALL SIGNS TO BE INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
POST: SCHEDULE 40 GALVANIZED STEEL PIPE (OUTSIDE DIA. = 2.375").
FINISH: POST TO BE POWDER COATED GLOSS BLACK
LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER (AS REQUIRED)
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070-1080)

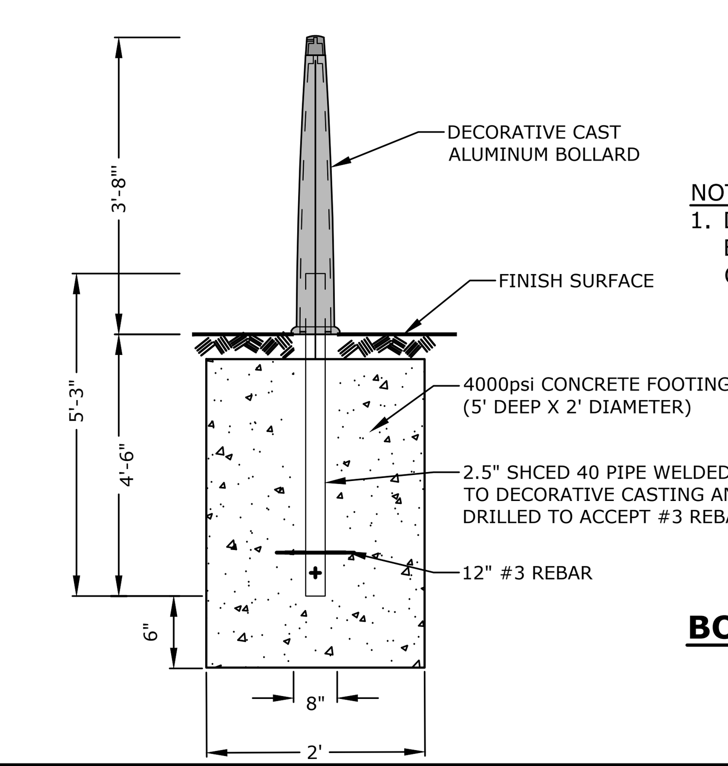
SIGN LEGEND & SIGN POST

NO SCALE



BIKE RACK

NO SCALE



NOTES:
1. DECORATIVE CAST BOLLARD TO BE DG4 BY URBAN ACCESSORIES OR APPROVED EQUAL

BOLLARD DETAIL

NO SCALE

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
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A	7/21/2022	TAC Resubmission

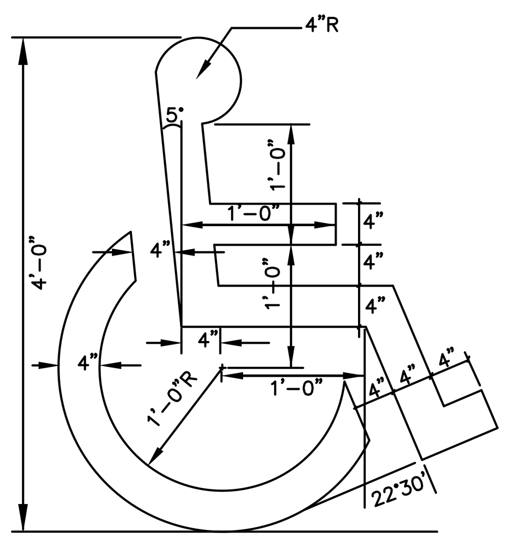
PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DTLS.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

DETAILS SHEET

SCALE: AS SHOWN

C-503

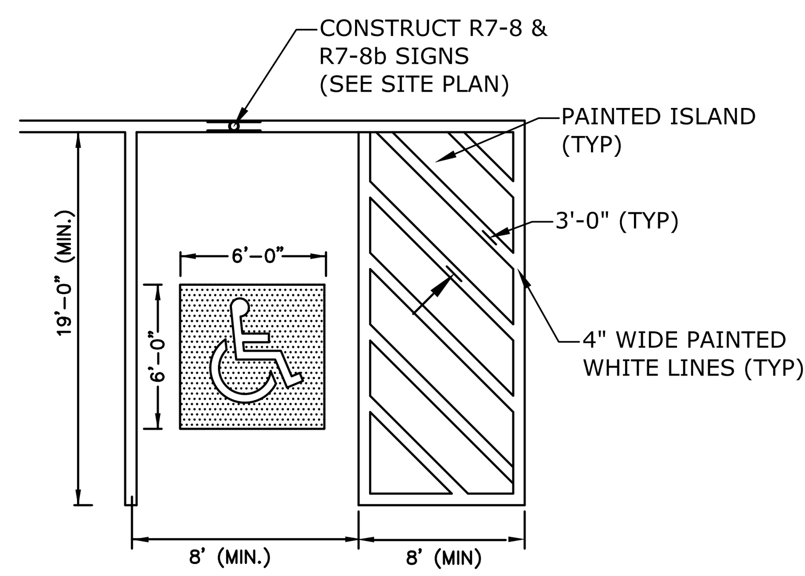
Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:47pm By: CML
Tighe & Bond:J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DTLS.dwg



NOTES:
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ACCESSIBLE SPACES USING WHITE THERMOPLASTIC, REFLECTORIZED PAVEMENT PARKING MATERAL MEETING THE REQUIREMENTS OF ASTM D 4505.
2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST ADA, STATE AND LOCAL REQUIREMENTS.

ACCESSIBLE SYMBOL

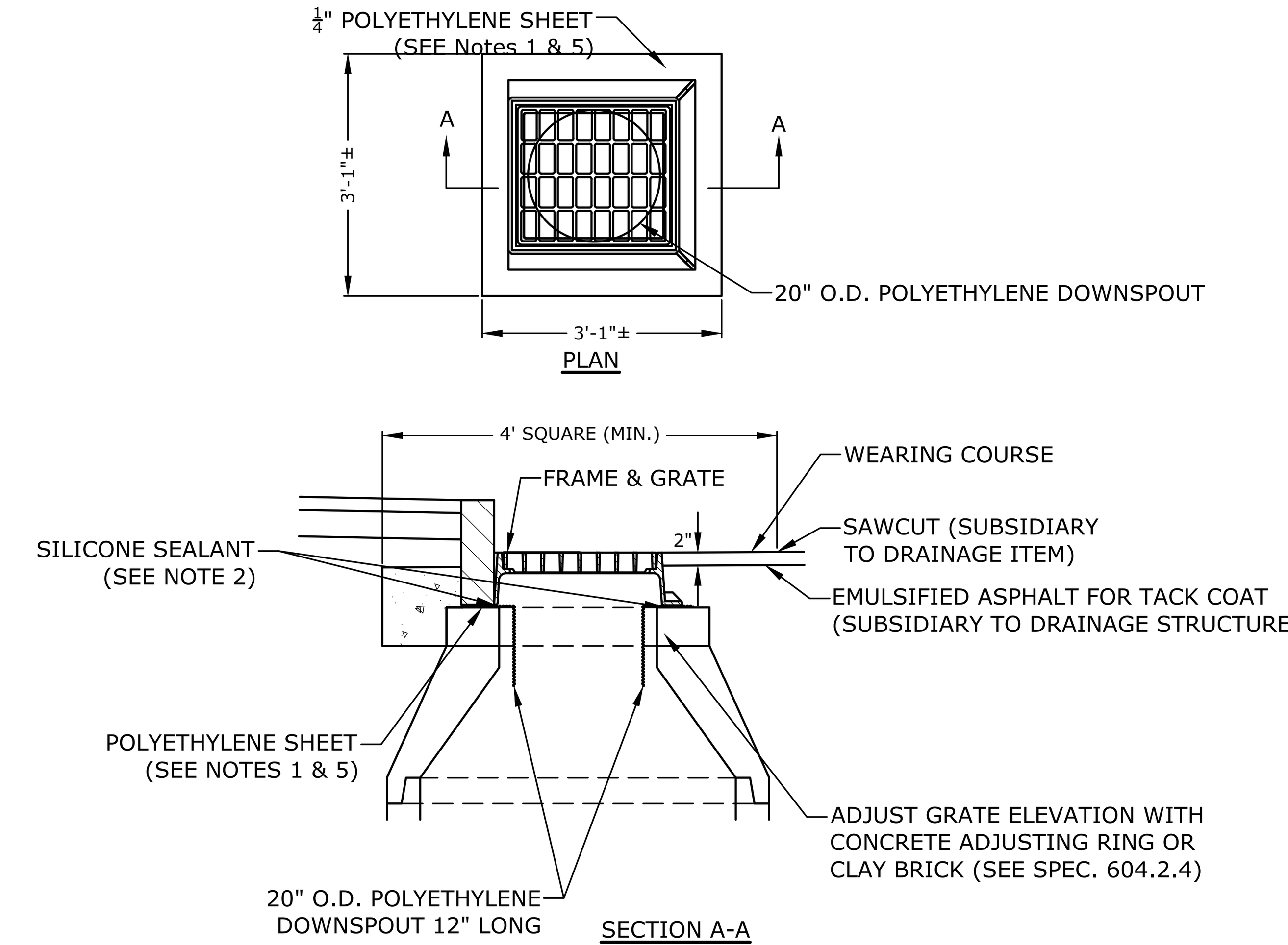
NO SCALE



NOTES:
1. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
2. SYMBOLS & PARKING STALLS SHALL CONFORM TO THE REQUIREMENTS OF THE AMERICAN W/DISABILITIES ACT.

ACCESSIBLE PARKING STALL

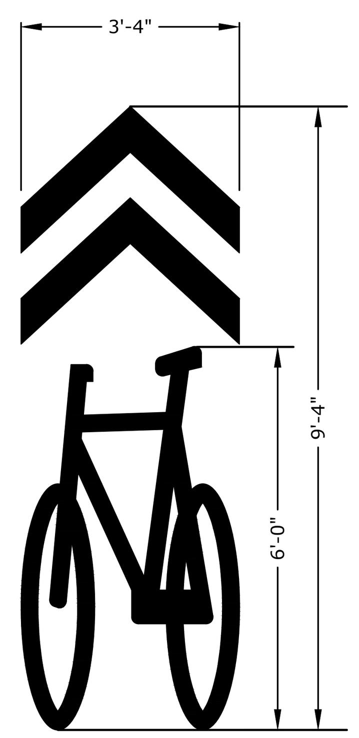
NO SCALE



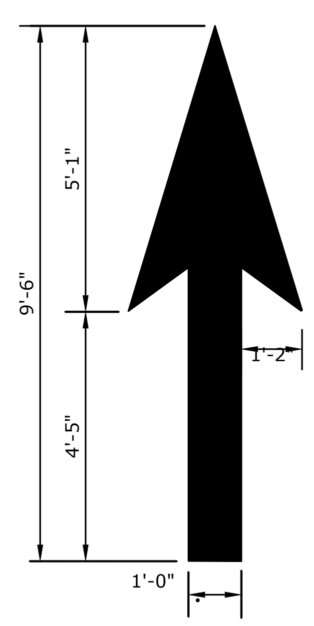
NOTES:
1. POLYETHYLENE LINER (ITEM 604.0007) SHALL BE FABRICATED AT THE SHOP. DOWNSPOUT SHALL BE EXTRUSION FILLET WELDED TO THE POLYETHYLENE SHEET.
2. PLACE A CONTINUOUS BEAD OF AN APPROVED SILICONE SEALANT (SUBSIDIARY TO ITEM 604.0007) BETWEEN FRAME AND POLYETHYLENE SHEET.
3. PLACE CLASS AA CONCRETE TO 2" BELOW THE TOP OF THE GRATE ELEVATION (SUBSIDIARY TO DRAINAGE STRUCTURE).
4. USE ON DRAINAGE STRUCTURES 4' MIN. DIAMETER ONLY.
5. TRIM POLYETHYLENE SHEET A MAXIMUM OF 4" OUTSIDE THE FLANGE ON THE FRAME FOR THE CATCH BASIN BEFORE PLACING CONCRETE (EXCEPT AS SHOWN WHEN USED WITH 3-FLANGE FRAME AND CURB).
6. THE CENTER OF THE GRATE & FRAME MAY BE SHIFTED A MAXIMUM OF 6" FROM THE CENTER OF THE DOWNSPOUT IN ANY DIRECTION.
7. PLACED ONLY IN DRAINAGE STRUCTURES IN PAVEMENT.
8. SEE NHDOT DR-04, "DI-DB, UNDERDRAIN FLUSHING BASIN AND POLYETHYLENE LINER DETAILS", FOR ADDITIONAL INFORMATION.
9. CATCHBASINS WITHIN CITY RIGHT OF WAY SHALL HAVE A POLYETHYLENE LINER

POLYETHYLENE LINER

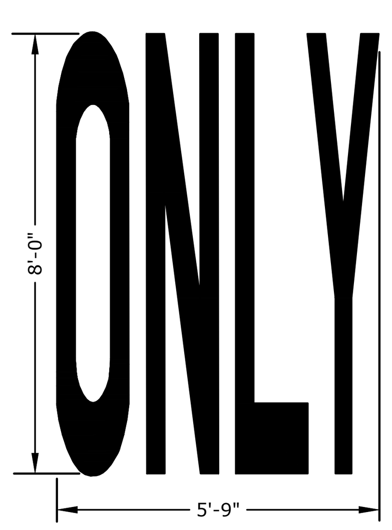
NO SCALE



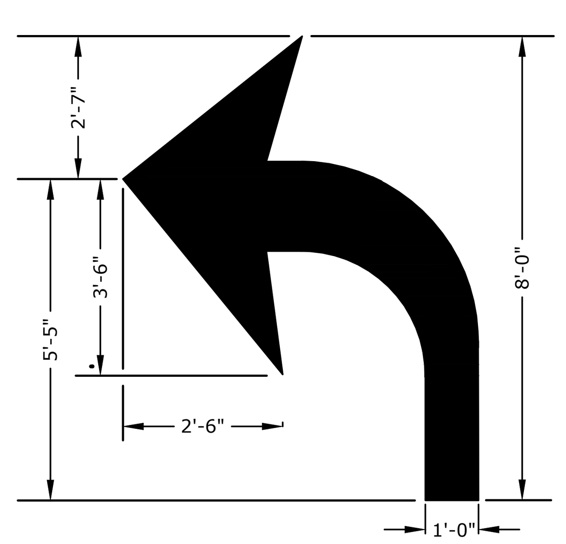
SHARROW



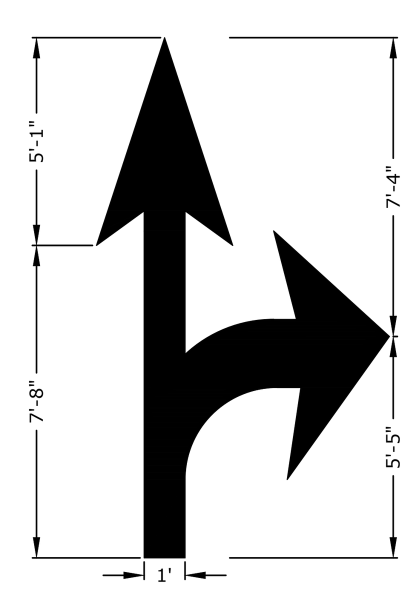
STRAIGHT ARROW



ONLY



TURN ARROW

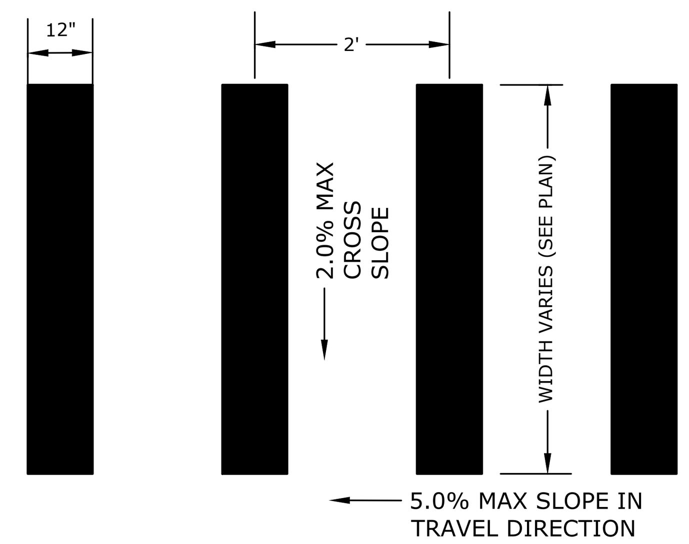


COMBINATION ARROW

NOTES:
1. ALL WORDS AND SYMBOLS SHALL BE RETROREFLECTIVE WHITE AND SHALL CONFORM TO THE LATEST VERSION OF THE MUTCD.
2. MULTI-WORD MESSAGES SHALL READ "UP"; THAT IS, THE FIRST WORD SHALL BE NEAREST THE APPROACHING DRIVER.
3. THE WORD "ONLY" SHALL NOT BE USED WITH THROUGH OR COMBINATION ARROWS, AND SHALL NOT BE USED ADJACENT TO A BROKEN LANE LINE. A WORD/SYMBOL SHALL PRECEED THE WORD "ONLY".
4. COMBINATION ARROWS MAY BE COMPRISED OF 2 SINGLE ARROWS (e.g. TURN AND THROUGH ARROWS). HOWEVER, THE SHAFTS OF THE ARROWS SHALL COINCIDE AS SHOWN.
5. PREFORMED WORDS AND SYMBOLS SHALL BE PRE-CUT BY THE MANUFACTURER.
6. WRONG-WAY ARROWS SHALL NOT BE SUBSTITUTED FOR THROUGH ARROWS.
7. ALL STOP BARS, WORDS, SYMBOLS AND ARROW SHALL BE THERMOPLASTIC.

PAVEMENT MARKINGS

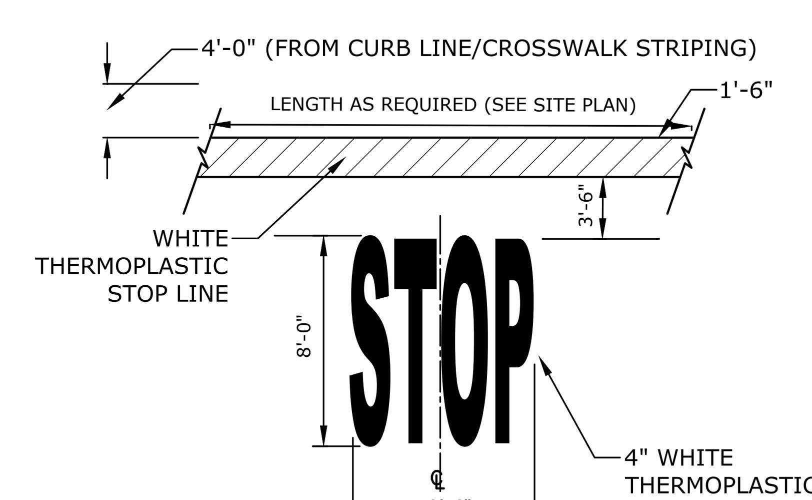
NO SCALE



NOTE:
1. STRIPING SHALL BE CONSTRUCTED USING WHITE THERMO PLASTIC, REFLECTERIZED PAVEMENT MARKING MATERIAL MEETING THE REQUIREMENTS OF ASTM D 4505

CROSSWALK STRIPING

NO SCALE

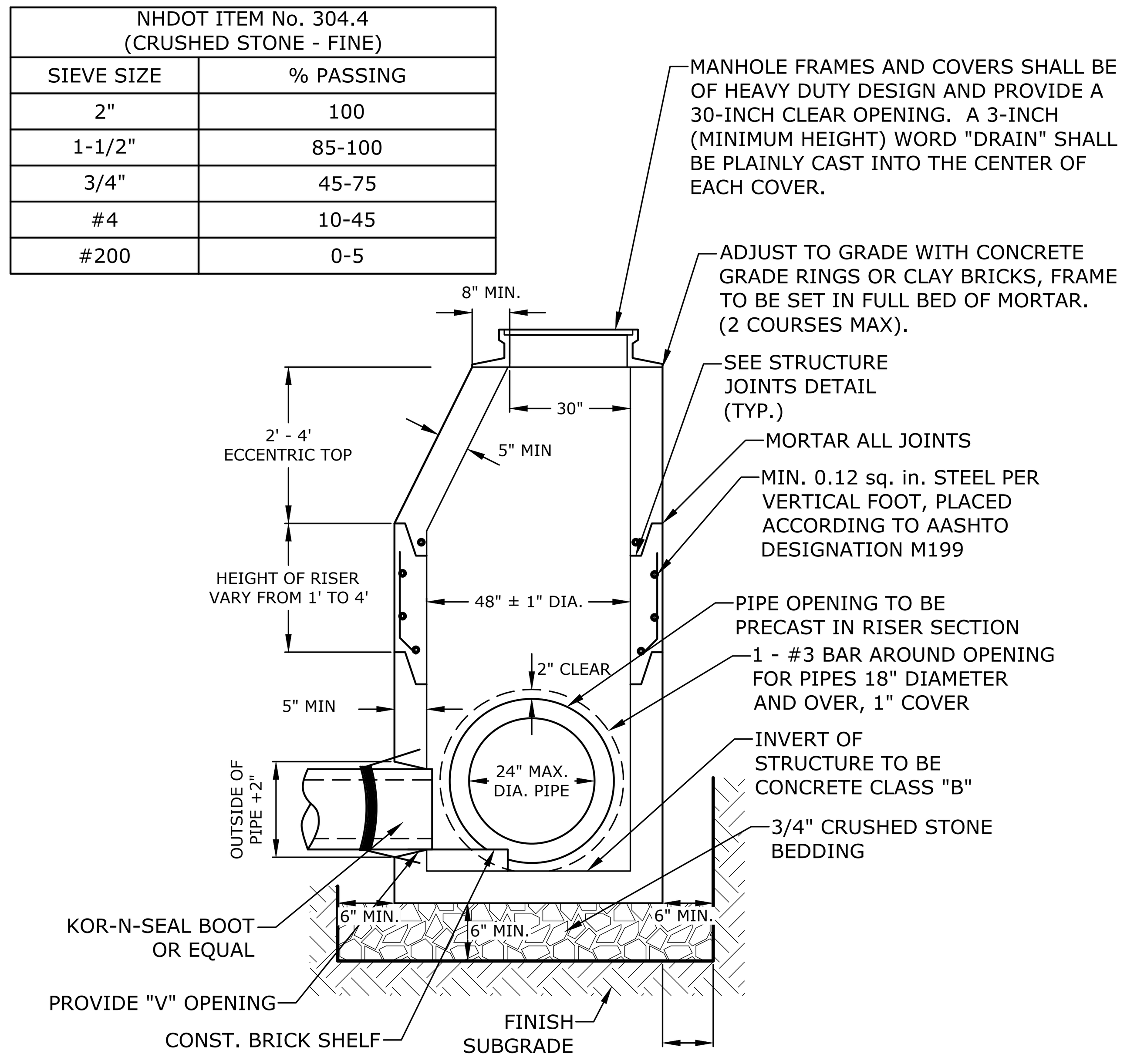


NOTES:
1. PAVEMENT MARKINGS TO BE INSTALLED IN LOCATIONS AS SHOWN ON SITE PLAN.
2. STRIPING SHALL BE CONSTRUCTED USING WHITE THERMO PLASTIC, REFLECTERIZED PAVEMENT MARKING MATERIAL MEETING THE REQUIREMENTS OF ASTM D 4505

STOP BAR AND LEGEND

NO SCALE

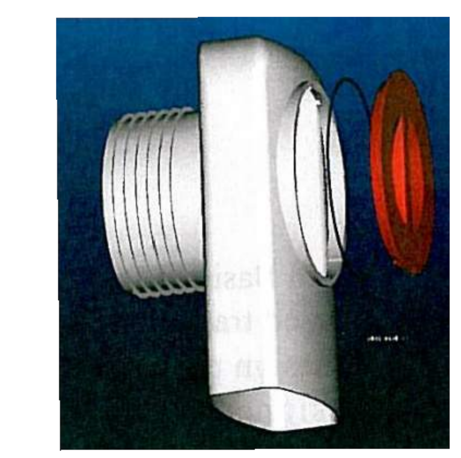
NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
SIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5



NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE AND THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. CONSTRUCT CRUSHED STONE BEDDING AND BACKFILL UNDER (6" MINIMUM THICKNESS)
6. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
7. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
8. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
9. PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
10. ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES, NO MORE THAN 75% OF A HORIZNTAL CROSS SECTION SHALL BE HOLES, AND THERE SHALL BE NO HOLES CLOSER THAN 3" TO JOINTS.

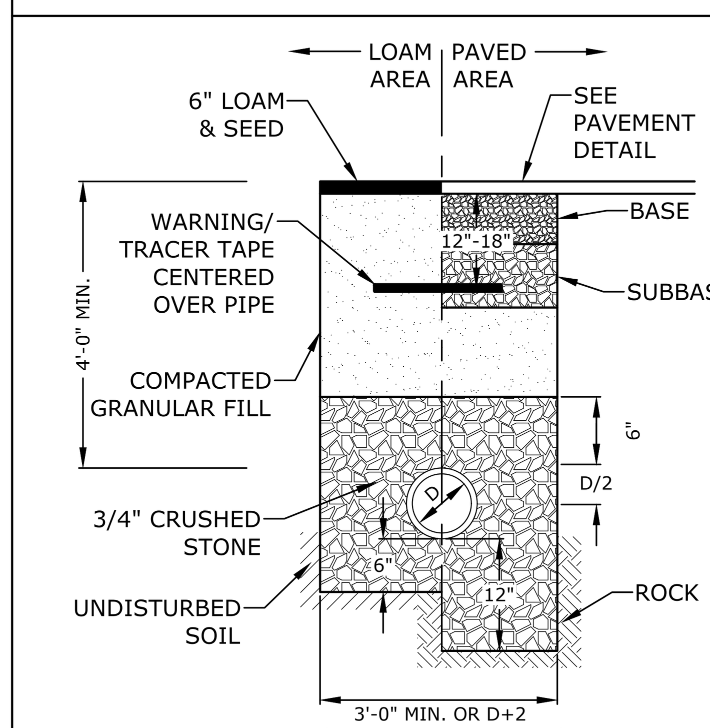
4' DIAMETER DRAIN MANHOLE

NO SCALE



NOTES:
1. ALL CATCH BASIN OUTLETS TO HAVE "ELIMINATOR" OIL AND FLOATING DEBRIS TRAP MANUFACTURED BY KLEANSTREAM (NO EQUAL)
2. INSTALL DEBRIS TRAP TIGHT TO INSIDE OF STRUCTURE.
3. 1/4" HOLE SHALL BE DRILLED IN TOP OF DEBRIS TRAP

"ELIMINATOR" OIL FLOATING DEBRIS TRAP

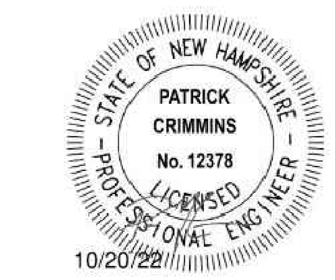


NOTES:
1. CRUSHED STONE BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 6" ABOVE TOP OF PIPE.
2. ALL UTILITIES SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.

STORM DRAIN TRENCH

NO SCALE

Tighe&Bond



North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
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PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DTLS.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

DETAILS SHEET

SCALE: AS SHOWN

C-504

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:47pm By: CML
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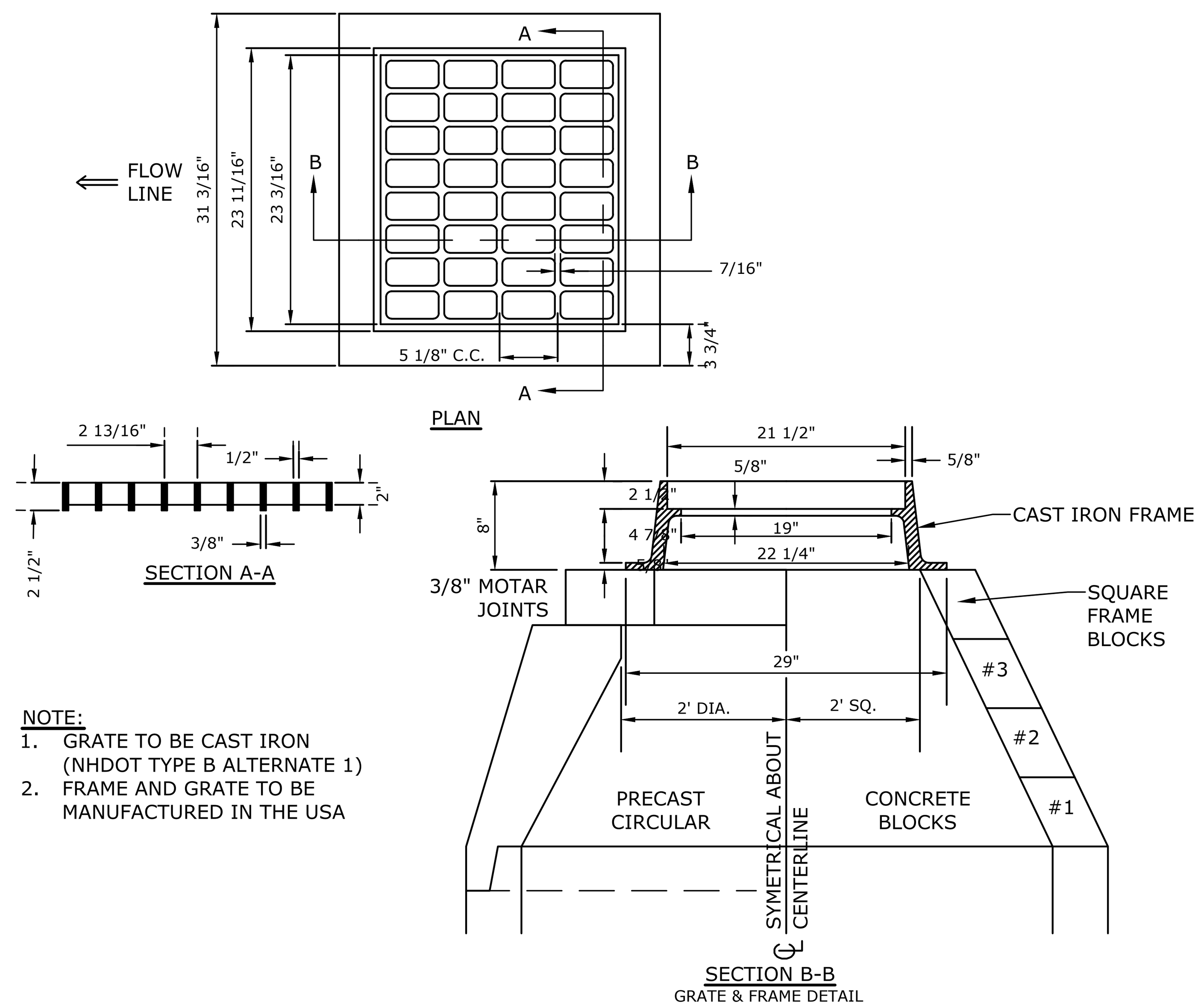
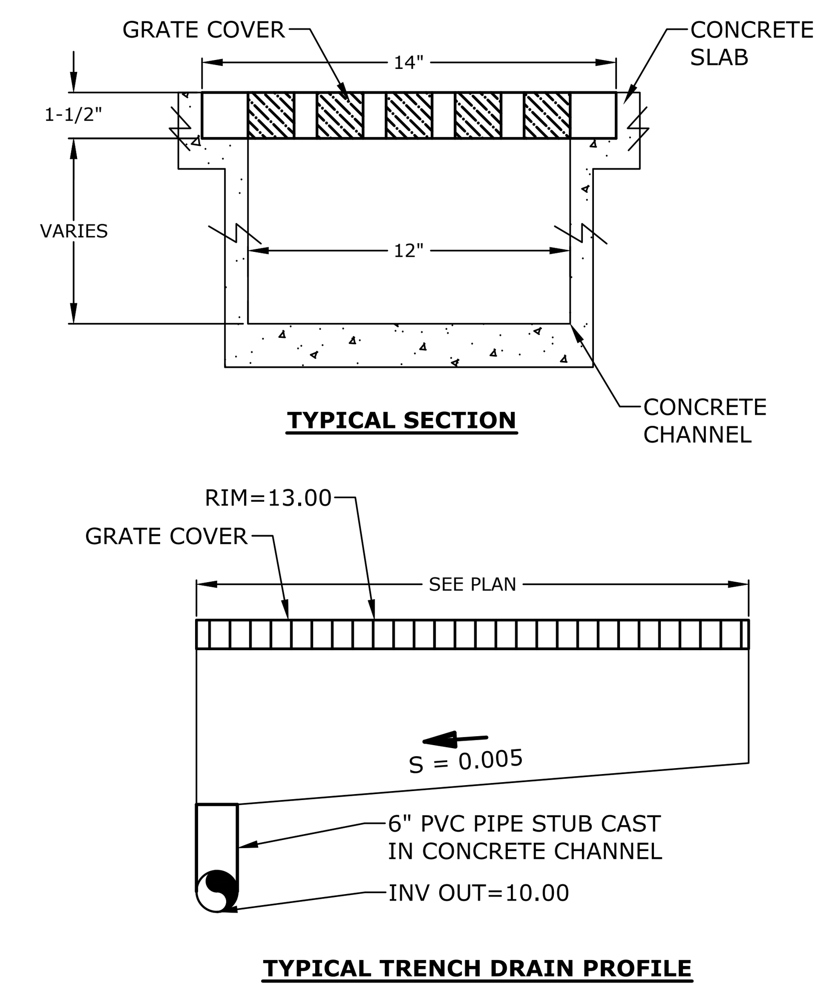


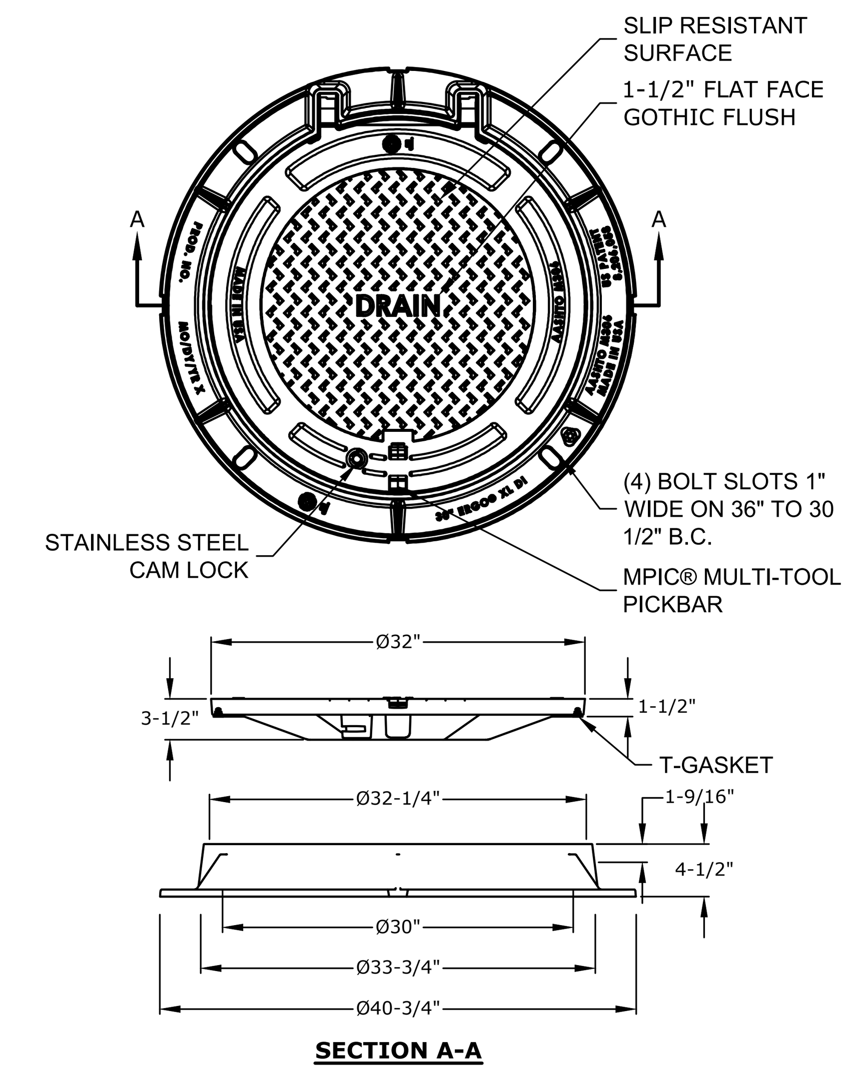
NOTE:
1. GRATE TO BE CAST IRON (NHDOT TYPE B ALTERNATE 1)
2. FRAME AND GRATE TO BE MANUFACTURED IN THE USA

CATCH BASIN FRAME & GRATE
NO SCALE



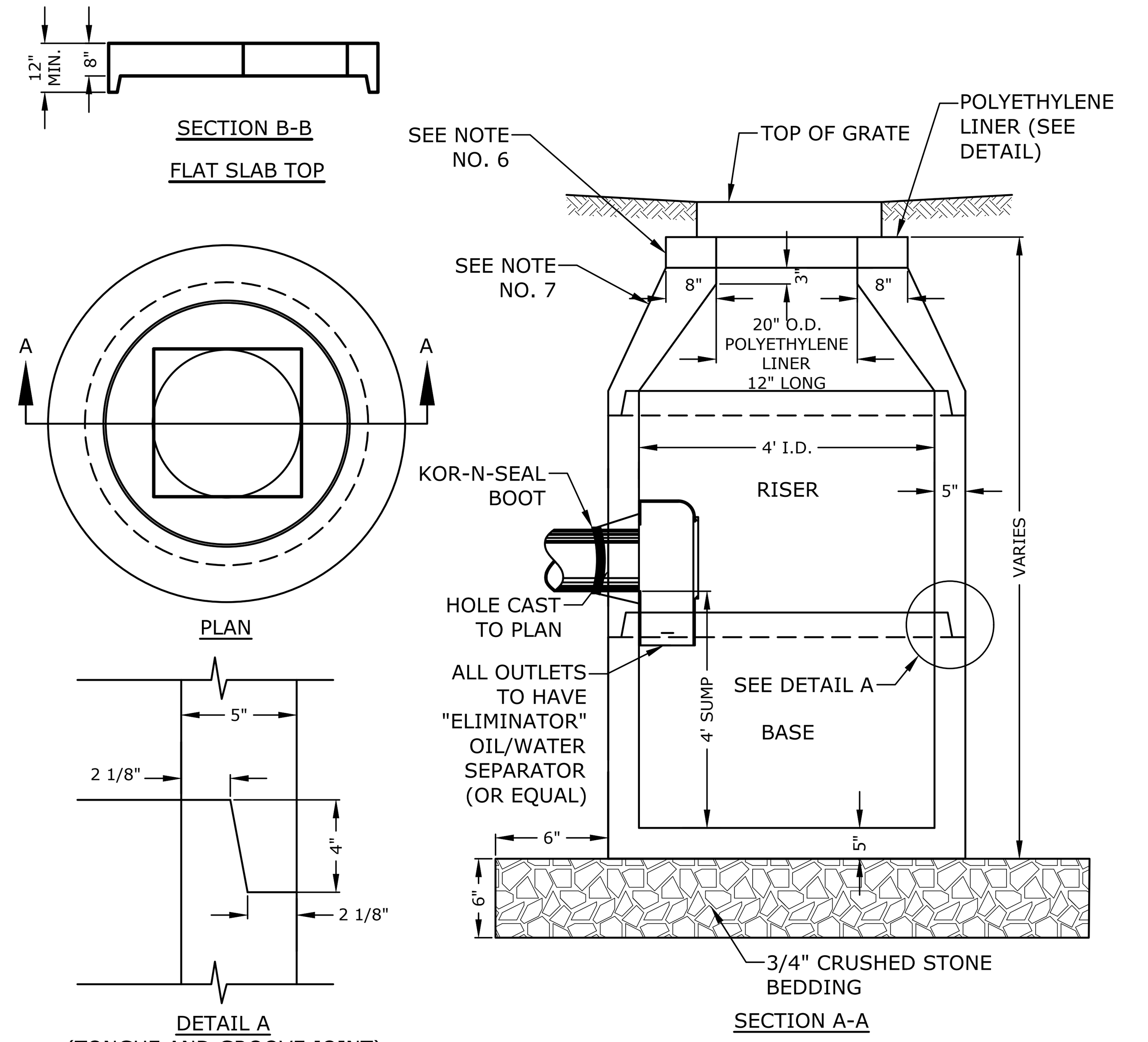
NOTES:
1. TRENCH DRAIN FRAME AND GRATE SHALL BE MULTIDRAIN ECONODRAIN SERIES #12 OR EQUAL.

TRENCH DRAIN
NO SCALE



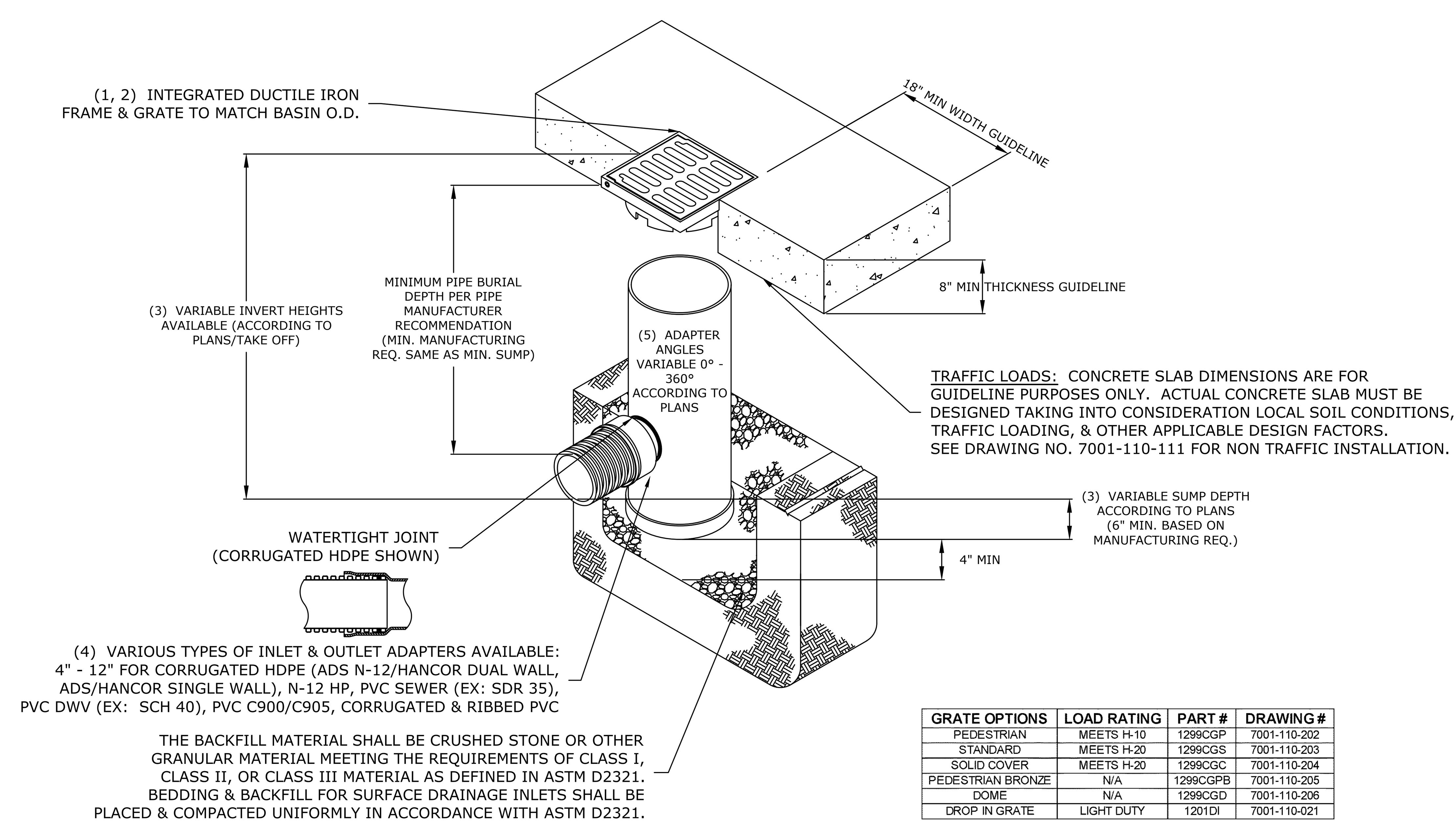
NOTES:
1. MANHOLE FRAME AND COVER SHALL BE 32" HINGED ERGO XL BY EJ CO.
2. ALL DIMENSIONS ARE NOMINAL.
3. FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
   A. THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
   B. THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES REMAIN THE SAME TO ALLOW CONTINUED USE OF EXISTING GRATES/COVERS AS THE EXISTING FRAMES ALLOW, WITHOUT SHIMS OR OTHER MODIFICATIONS OR ACCOMMODATIONS.
   C. ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
4. LABEL TYPE OF MANHOLE WITH 3" HIGH LETTERS IN HE CENTER OF THE COVER.

DRAIN MANHOLE FRAME & COVER
NO SCALE



NOTES:
1. ALL SECTIONS SHALL BE CONCRETE CLASS AA(4000 psi).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ.IN. PER LINEAR FT. IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
3. THE TONGUE AND GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT.
4. RISERS OF 1', 2', 3' & 4' CAN BE USED TO REACH DESIRED DEPTH.
5. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
6. FITTING FRAME TO GRADE MAY BE DONE WITH PREFABRICATED ADJUSTMENT RINGS OR CLAY BRICKS (2 COURSES MAX.).
7. CONE SECTIONS MAY BE EITHER CONCENTRIC OR ECCENTRIC, OR FLAT SLAB TOPS MAY BE USED WHERE PIPE WOULD OTHERWISE ENTER INTO THE CONE SECTION OF THE STRUCTURE AND WHERE PERMITTED.
8. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
9. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
10. PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
11. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
12. "ELIMINATOR" OIL/WATER SEPARATOR SHALL BE INSTALLED TIGHT TO INSIDE OF CATCHBASIN.

4' DIAMETER CATCHBASIN
NO SCALE

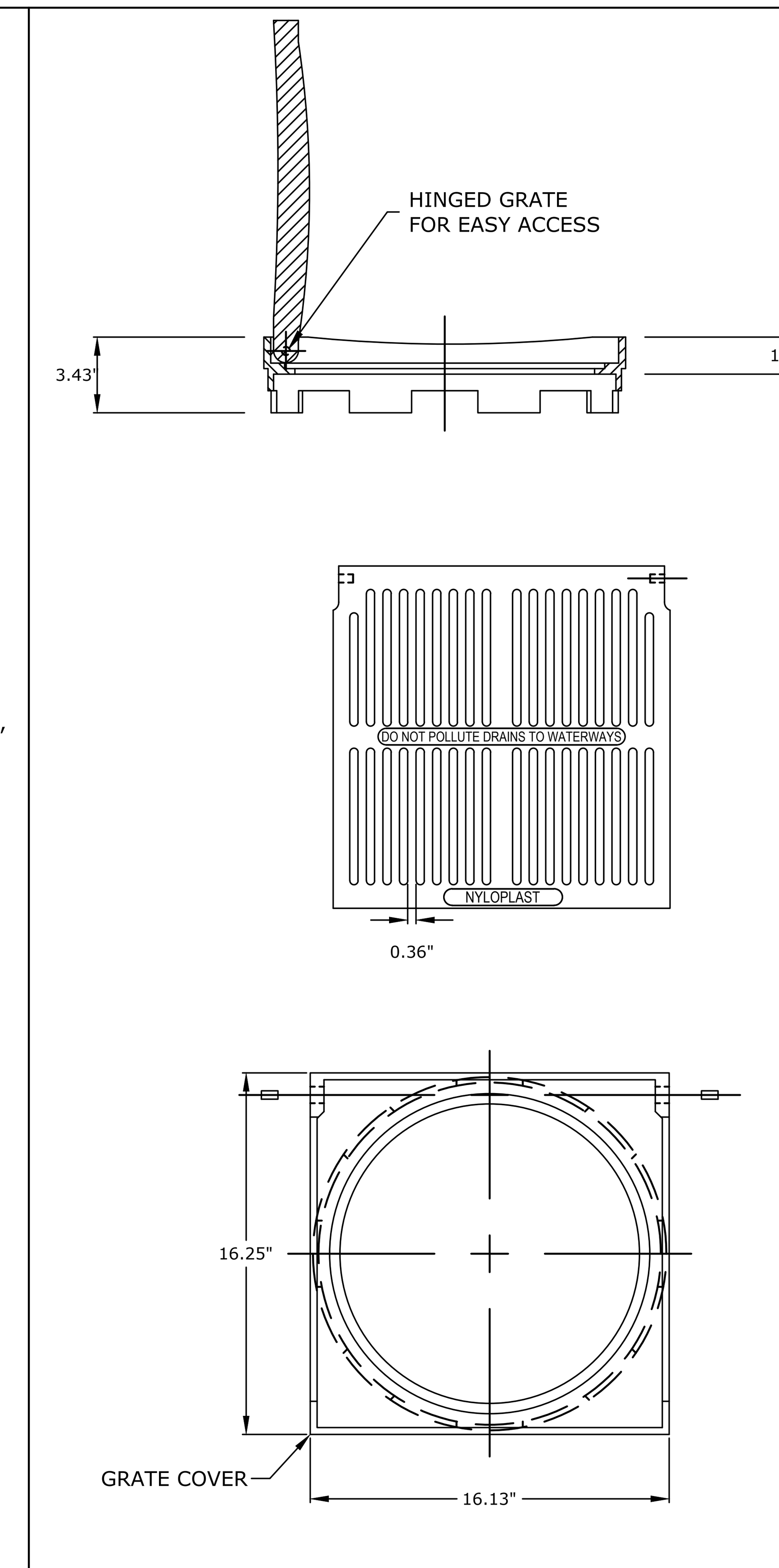


GRATE OPTIONS	LOAD RATING	PART #	DRAWING #
PEDESTRIAN	MEETS H-10	1299CGP	7001-110-202
STANDARD	MEETS H-20	1299CGS	7001-110-203
SOLID COVER	MEETS H-20	1299CGC	7001-110-204
PEDESTRIAN BRONZE	N/A	1299CGPB	7001-110-205
DOME	N/A	1299CGD	7001-110-206
DROP IN GRATE	LIGHT DUTY	1201DI	7001-110-021

TYPICAL SECTION

NOTES:
1 - GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05, WITH THE EXCEPTION OF THE BRONZE GRATE.
2 - FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065
4 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER.
5 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.

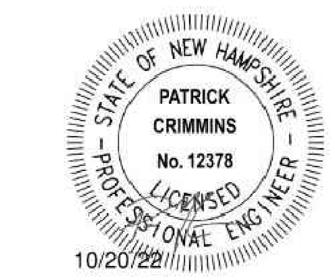
YARD DRAIN
NO SCALE



NOTES:
1. NYLOPLAST MODEL 1299CGPBL OR EQUAL.

YARD DRAIN FRAME AND GRATE
NO SCALE

Tighe&Bond



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APPROVED:	PMC

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SCALE: AS SHOWN

C-505

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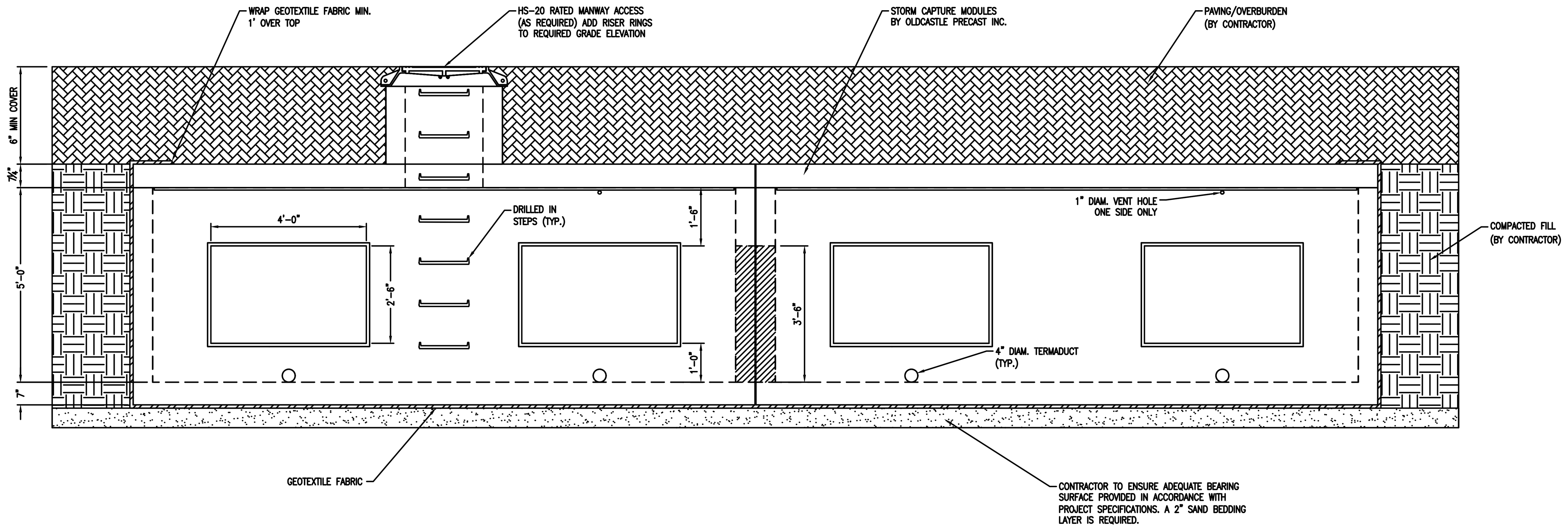
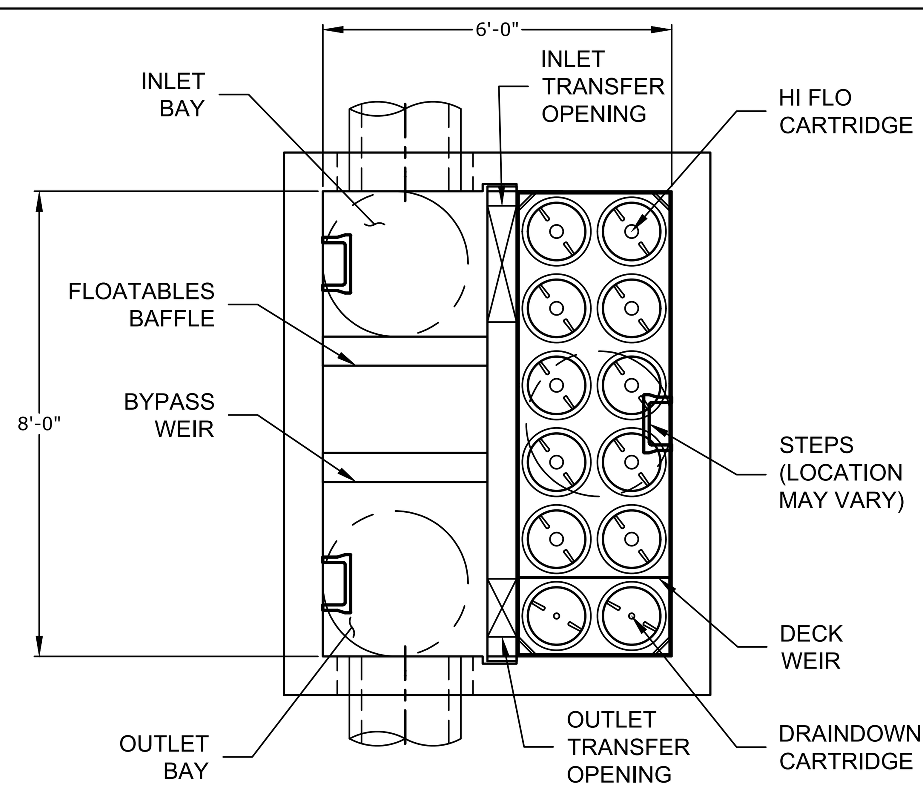


TYPICAL SECTION

NOTES:
1. UNDERGROUND DETENTION SYSTEM TO BE OLDCASTLE STORMCAPTURE SC-5 DESIGNED FOR H-20 LOADING. CONTRACTOR TO SUBMIT BASIN SPECIFICATIONS AND FINAL MANUFACTURES DESIGN TO ENGINEER FOR APPROVAL.
2. MANUFACTURER TO SUBMIT PLANS STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE.
3. THE DESIGN ENGINEER SHALL PROVIDE SUFFICIENT INSPECTION TO CERTIFY THAT THE SYSTEM HAS BEEN INSTALLED PER THE APPROVED DESIGN PLAN.

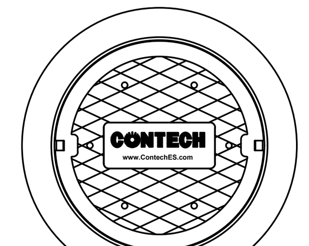
OLDCASTLE SC-5 DETAIL

NO SCALE

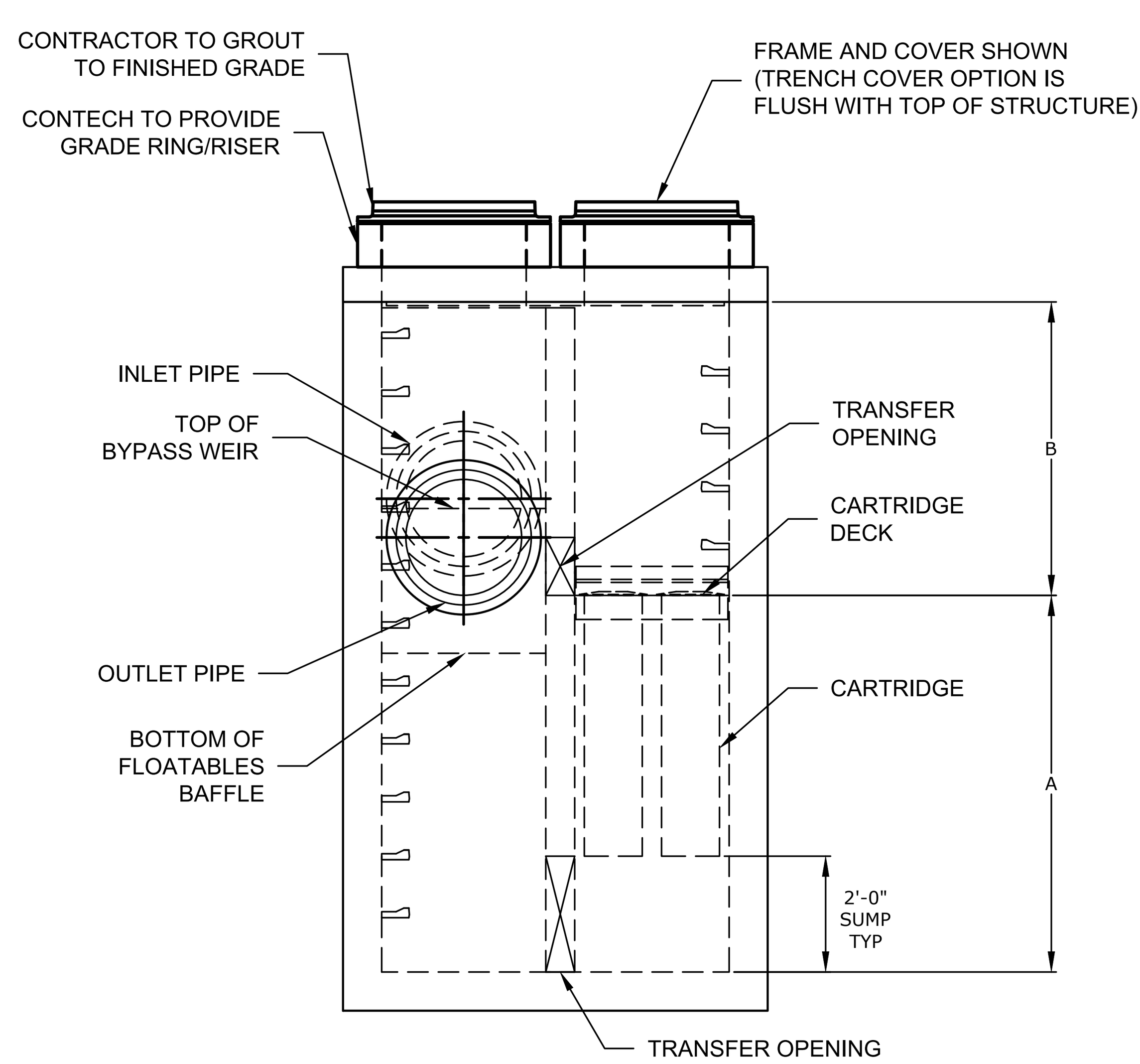


PLAN VIEW
(TOP SLAB NOT SHOWN FOR CLARITY)

JELLYFISH JFPD0806 - DESIGN NOTES				
JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD				
CARTRIDGE SELECTION				
CARTRIDGE LENGTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"	5'-4"	4'-3"	3'-3"
FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089	0.133 / 0.067	0.089 / 0.045	0.049 / 0.025
MAX. TREATMENT (CFS)	1.96	1.47	0.98	0.54
DECK TO INSIDE TOP (MIN) (B)	5.00	4.00	4.00	4.00



SITE SPECIFIC DATA REQUIREMENTS	
STRUCTURE ID	JF-1
MODEL SIZE	JFPD0808
WATER QUALITY FLOW RATE (cfs)	0.59
PEAK FLOW RATE (cfs)	1.45
RETURN PERIOD OF PEAK FLOW (yrs)	25
# OF CARTRIDGES REQUIRED (HF / DD)	3/1
CARTRIDGE SIZE	54"



ELEVATION VIEW

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

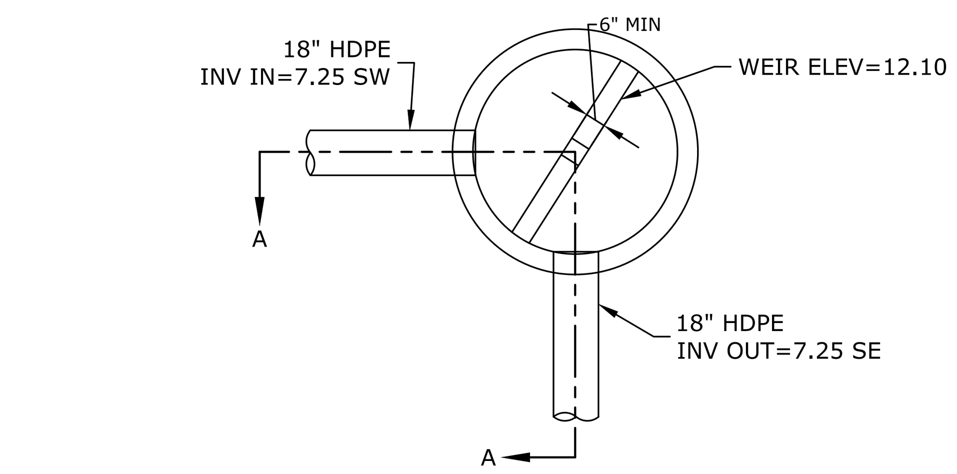
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.

Jellyfish Filter
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING: U.S. PATENT NO. 8,287,726; 8,221,618 & US 8,123,935; OTHER INTERNATIONAL PATENTS PENDING

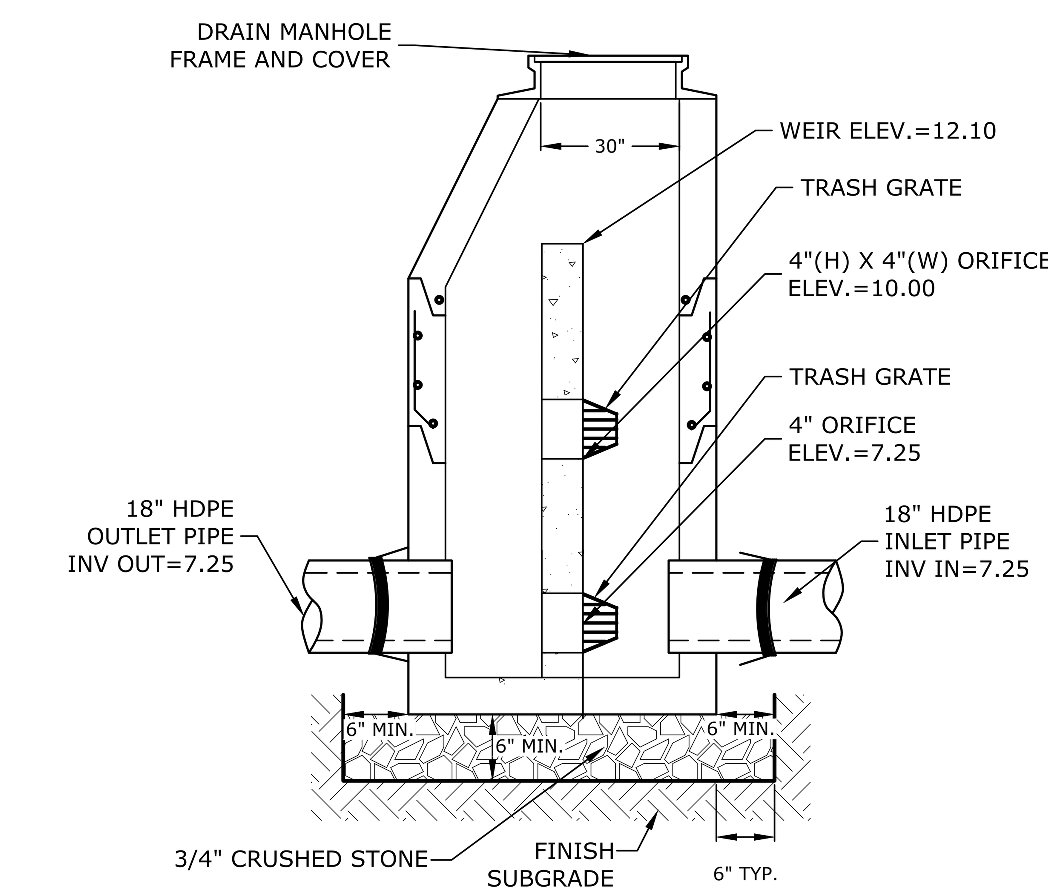
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH JELLYFISH STORMWATER FILTER (JFPD0806)

NO SCALE



PLAN VIEW

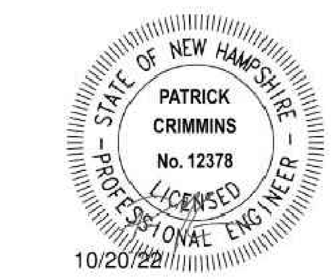


NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRD WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

POS-01

NO SCALE

Tighe&Bond



North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DTLS.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

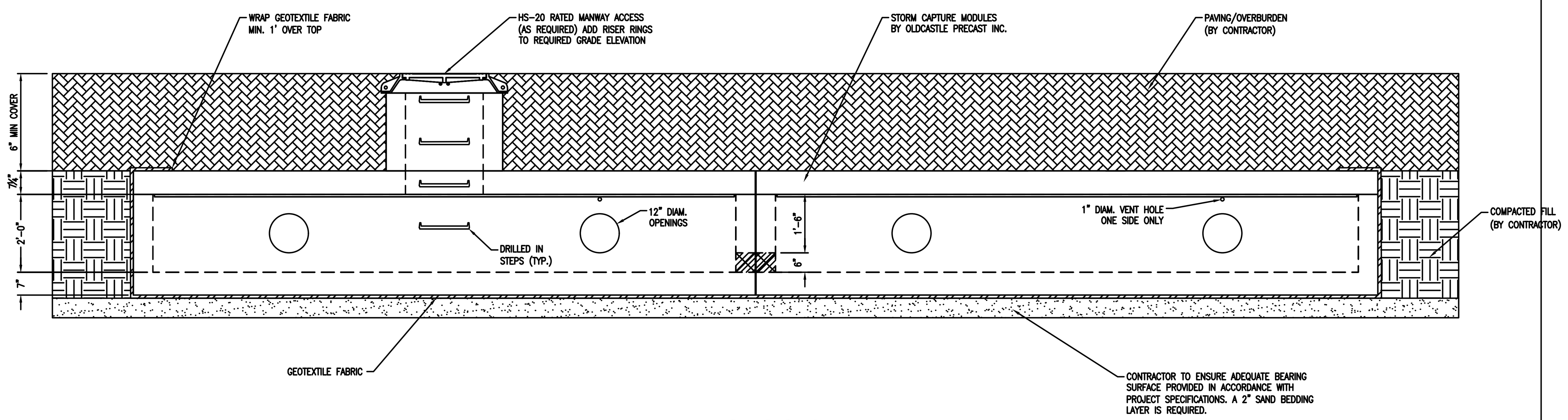
DETAILS SHEET

SCALE: AS SHOWN

C-506

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:48pm By: CML
Tighe & Bond:J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DTLS.dwg

Tighe&Bond

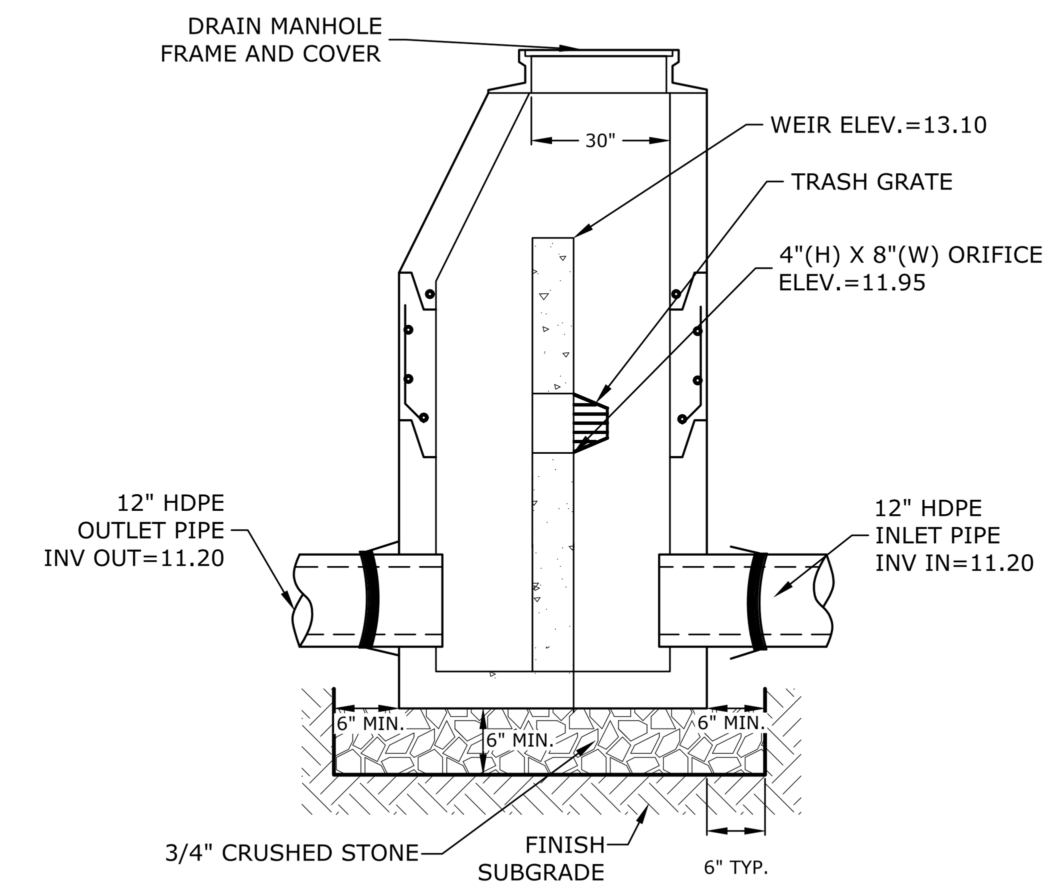


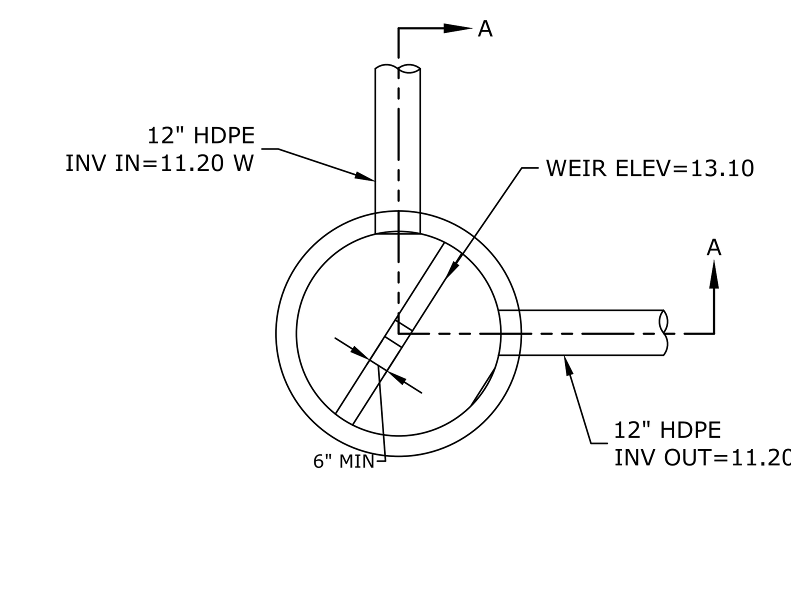
TYPICAL SECTION

NOTES:
1. UNDERGROUND DETENTION SYSTEM TO BE OLDCASTLE STORMCAPTURE SC-2 DESIGNED FOR H-20 LOADING. CONTRACTOR TO SUBMIT BASIN SPECIFICATIONS AND FINAL MANUFACTURES DESIGN TO ENGINEER FOR APPROVAL.
2. MANUFACTURER TO SUBMIT PLANS STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NEW HAMPSHIRE.
3. THE DESIGN ENGINEER SHALL PROVIDE SUFFICIENT INSPECTION TO CERTIFY THAT THE SYSTEM HAS BEEN INSTALLED PER THE APPROVED DESIGN PLAN.

OLDCASTLE SC-2 DETAIL

NO SCALE



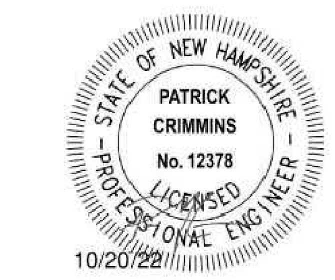


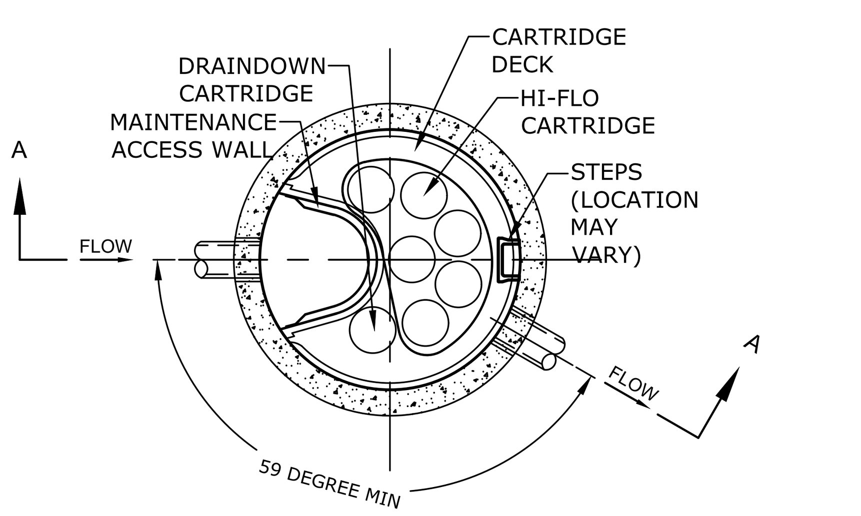
PLAN VIEW

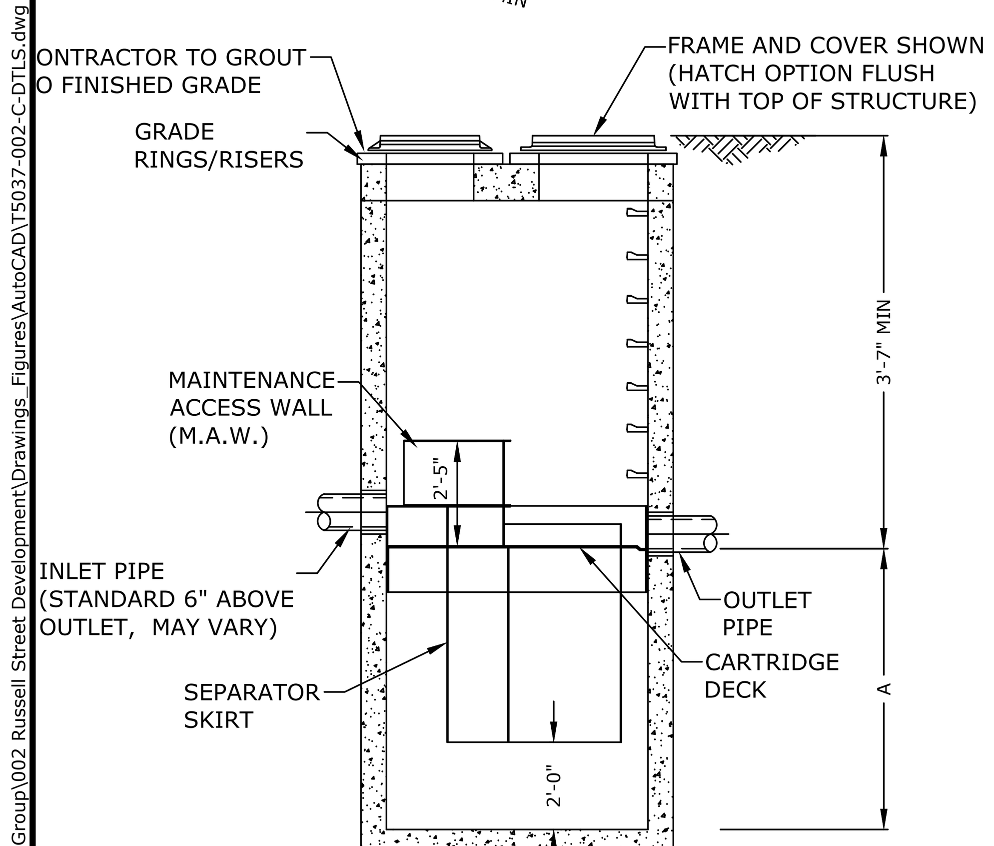
NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRD WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

POS-02

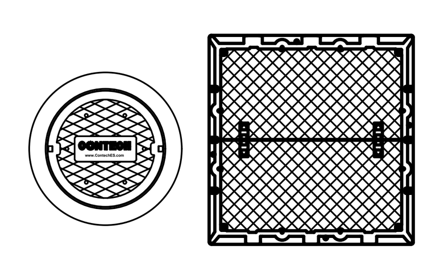
NO SCALE







JELLYFISH DESIGN NOTES				
JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN. Ø72" MANHOLE JELLYFISH PEAK TREATMENT CAPACITY IS 1.16 CFS. IF THE SITE CONDITIONS EXCEED 1.16 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.				
CARTRIDGE SELECTION				
CARTRIDGE DEPTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-5"	5'-3"	4'-2"	3'-2"
FLOW RATE HIGH-FLO / DRAINDOWN (cfs) (per cart)	0.18 / 0.09	0.13 / 0.065	0.09 / 0.045	0.05 / 0.025
MAX. CARTS HIGH-FLO / DRAINDOWN	6 / 1			



SITE SPECIFIC DATA REQUIREMENTS	
STRUCTURE ID	2
WATER QUALITY FLOW RATE (cfs)	0.64
PEAK FLOW RATE (cfs)	0.94
RETURN PERIOD OF PEAK FLOW (yrs)	25
# OF CARTRIDGES REQUIRED (HF / DD)	4/1
CARTRIDGE SIZE	54"

GENERAL NOTES:
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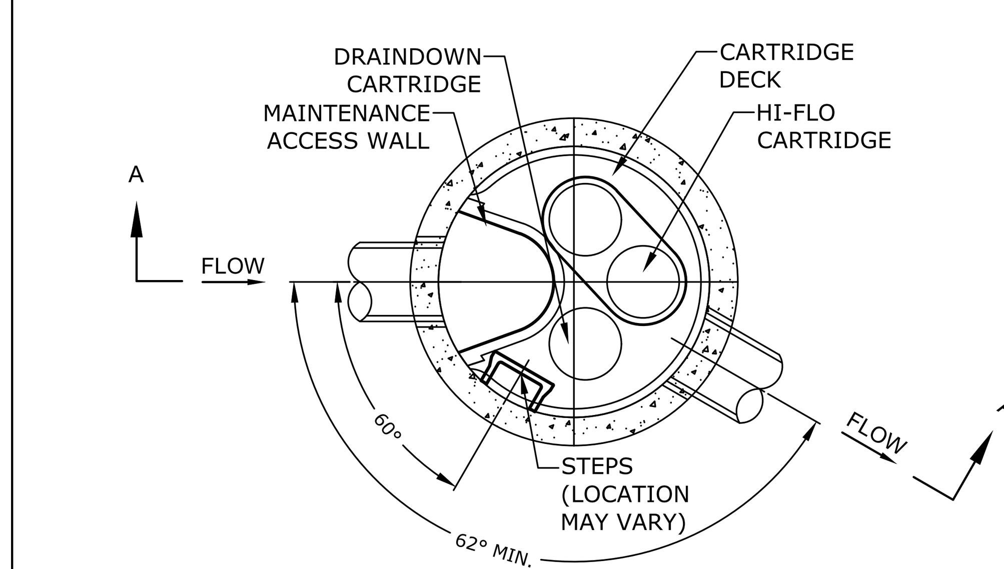
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.

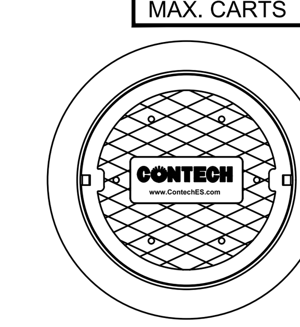
CONTECH JELLYFISH STORMWATER FILTER (JF6)

NO SCALE

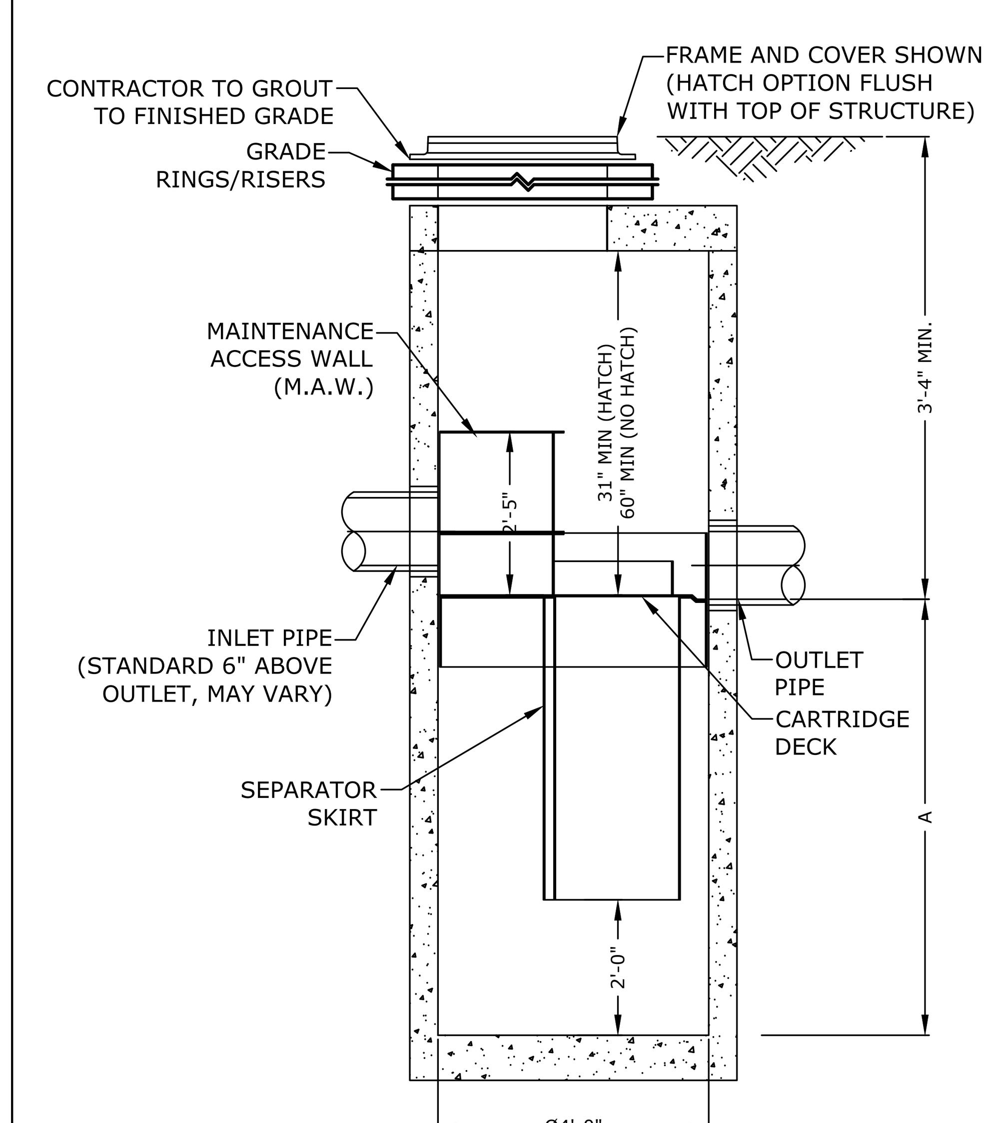


PLAN VIEW

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN. Ø48" MANHOLE JELLYFISH PEAK TREATMENT CAPACITY IS 0.45 CFS. IF THE SITE CONDITIONS EXCEED 0.45 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.	
CARTRIDGE SELECTION	
CARTRIDGE DEPTH	54"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-5"
FLOW RATE HIGH-FLO / DRAINDOWN (cfs) (per cart)	0.18 / 0.09
MAX. CARTS HIGH-FLO / DRAINDOWN	2 / 1



SITE SPECIFIC DATA REQUIREMENTS	
STRUCTURE ID	3
WATER QUALITY FLOW RATE (cfs)	0.05
# OF CARTRIDGES REQUIRED (HF / DD)	(1/1)
CARTRIDGE SIZE	54"



SECTION A-A

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
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3. JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
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D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.

CONTECH JELLYFISH (JF4)

NO SCALE

North End Mixed Use Development

Two International Group

Russell Street &
Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

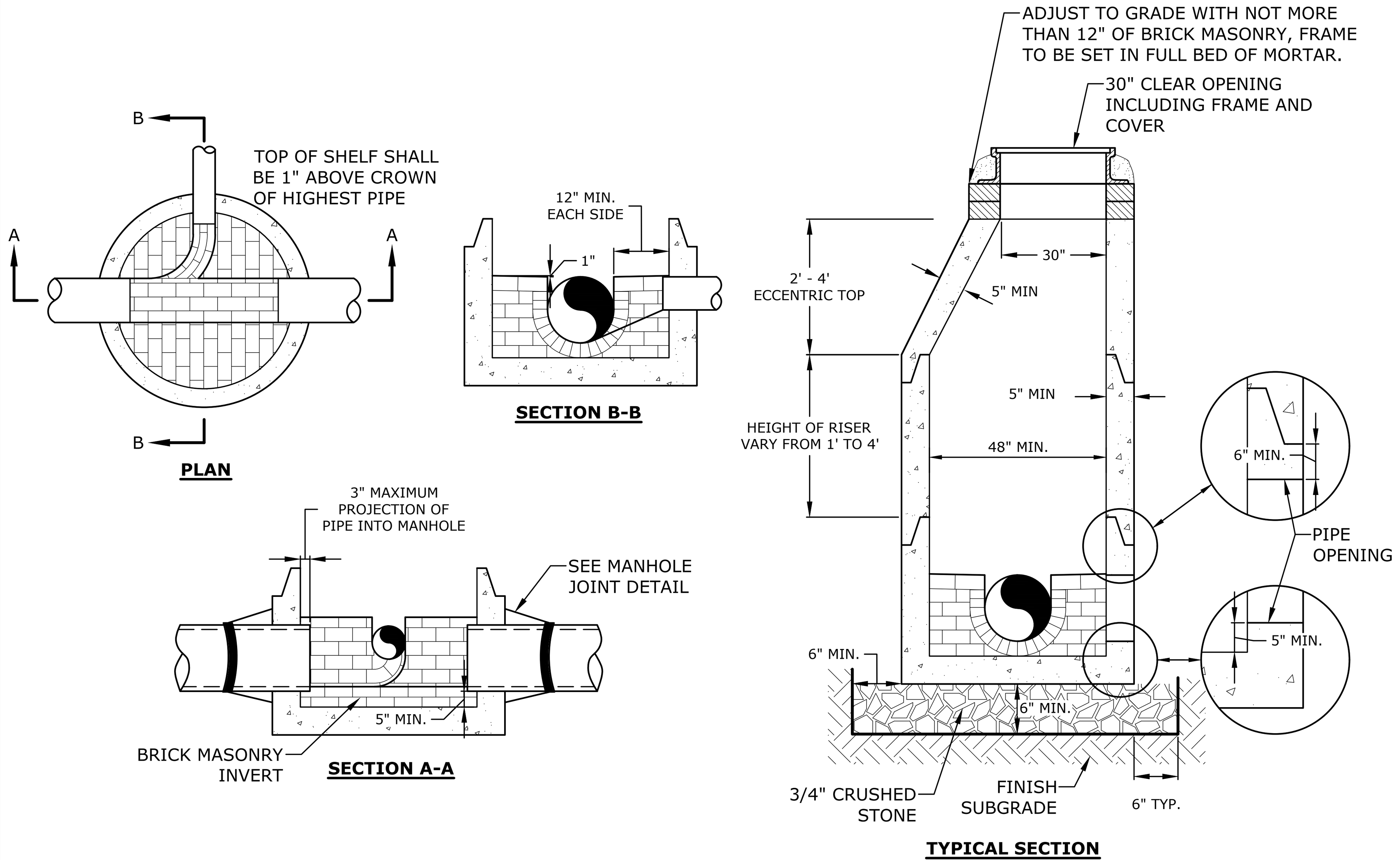
PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DTLS.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

DETAILS SHEET

SCALE: AS SHOWN

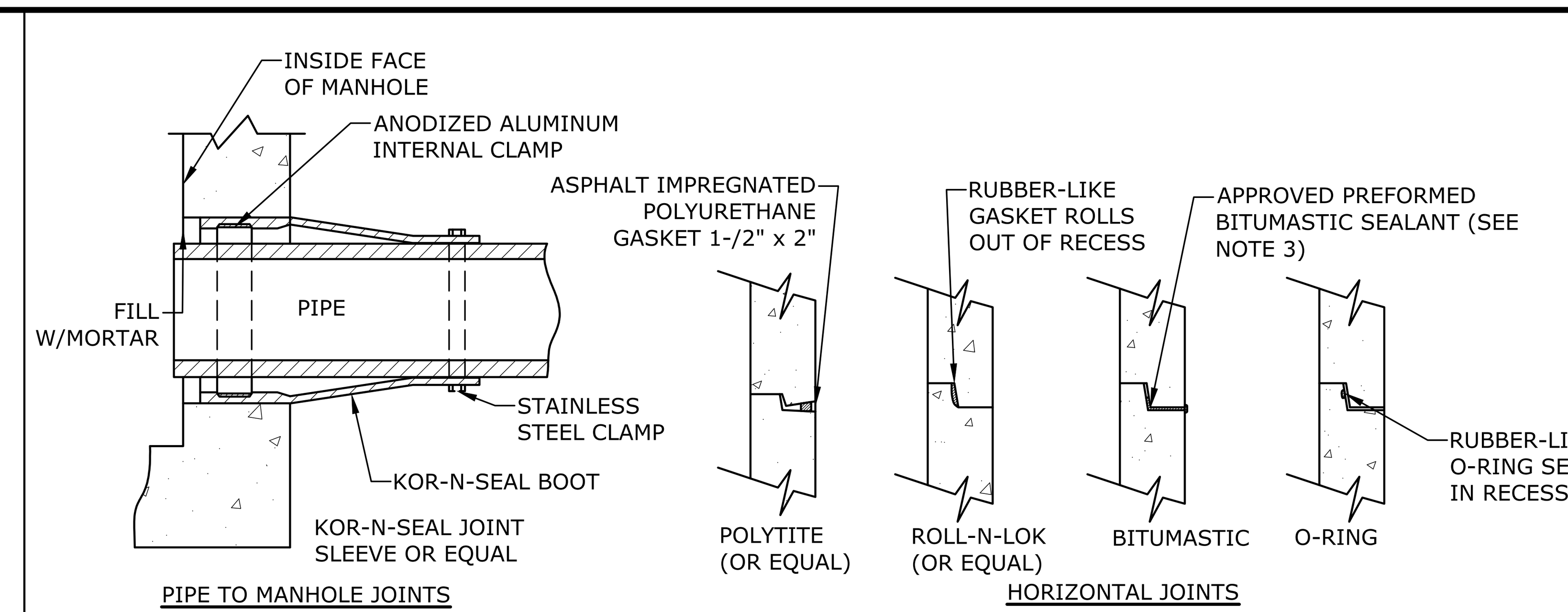
C-507

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:48pm By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DTLS.dwg



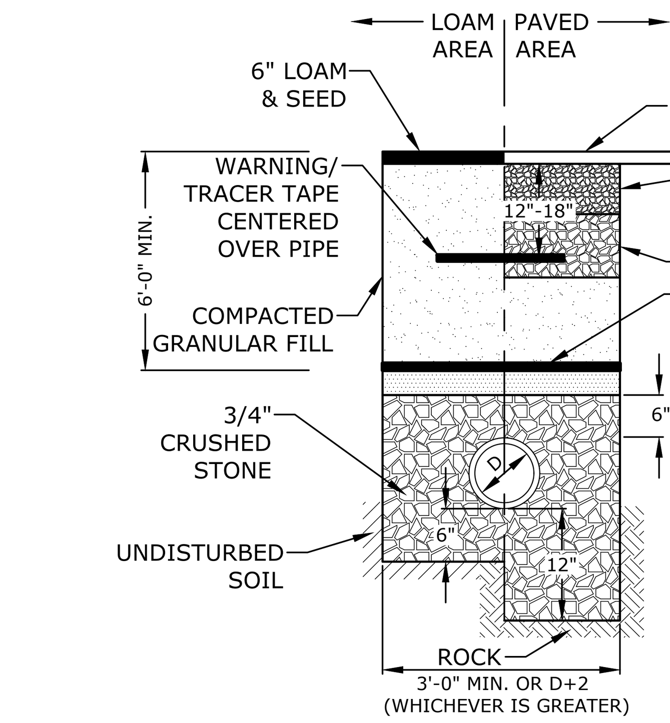
NOTES:
1. INVERT AND SHELF TO BE PLACED AFTER EACH LEAKAGE TEST.
2. CARE SHALL BE TAKEN TO INSURE THAT THE BRICK INVERT IS A SMOOTH CONTINUATION OF THE SEWER INVERT.
3. INVERT BRICKS SHALL BE LAID ON EDGE.
4. TWO (2) COATS OF BITUMINOUS WATERPROOF COATING SHALL BE APPLIED TO ENTIRE EXTERIOR OF MANHOLE.
5. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS WITHIN CITY RIGHT OF WAY SHALL BE CITY STANDARD HINGE COVERS MANUFACTURED BY EJ. FRAMES AND COVERS WILL BE PURCHASED FROM THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS. ALL OTHER MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30-INCH CLEAR OPENING. A 3-INCH (MINIMUM HEIGHT) WORD "SEWER" SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.
6. HORIZONTAL JOINTS SHALL BE SEALED FOR WATER TIGHTNESS USING A DOUBLE ROW OF ELASTOMERIC OR MASTIC-LIKE SEALANT.
7. BARREL AND CONE SECTIONS SHALL BE PRECAST REINFORCED CONCRETE DESIGNED FOR H20 LOADING, AND CONFORMING TO ASTM C478-06.

SEWER MANHOLE
NO SCALE



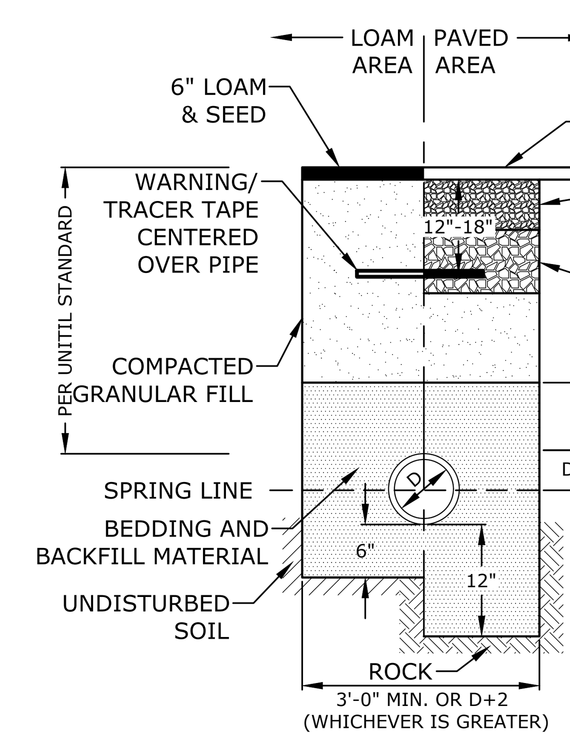
NOTES:
1. HORIZONTAL JOINTS BETWEEN THE SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE PER CITY OF PORTSMOUTH DPW STANDARD AND SHALL BE SEALED FOR WATERTIGHTNESS USING A DOUBLE ROW ELASTOMERIC OR MASTIC-LIKE GASKET.
2. PIPE TO MANHOLE JOINTS SHALL BE PER CITY OF PORTSMOUTH STANDARD.
3. FOR BITUMASTIC TYPE JOINTS THE AMOUNT OF SEALANT SHALL BE SUFFICIENT TO FILL AT LEAST 75% OF THE JOINT CAVITY.
4. ALL GASKETS, SEALANTS, MORTAR, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.

MANHOLE JOINTS
NO SCALE



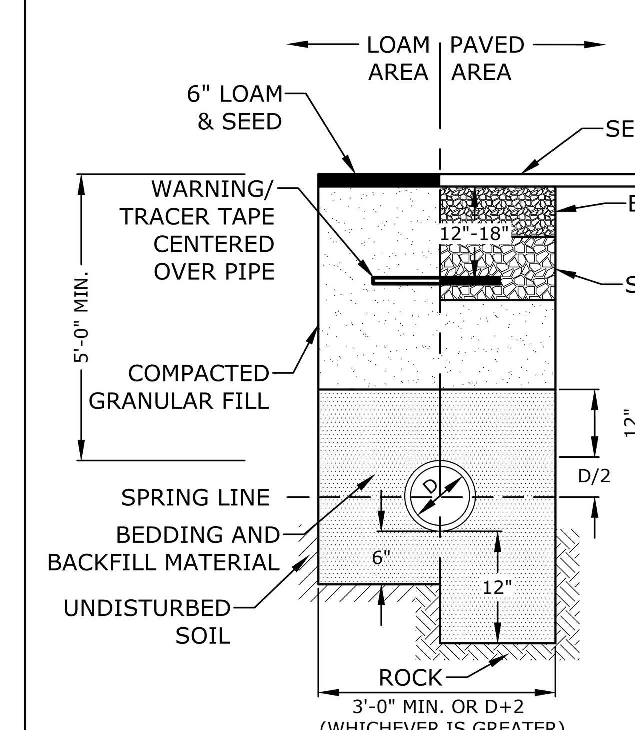
NOTES:
1. CRUSHED STONE BEDDING FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK. CRUSHED STONE SHALL ALSO COMPLETELY ENCASE THE PIPE AND COVER THE PIPE TO A GRADE 6" OVER THE TOP OF THE PIPE FOR THE ENTIRE WIDTH OF THE TRENCH.
2. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

SEWER SERVICE TRENCH
NO SCALE



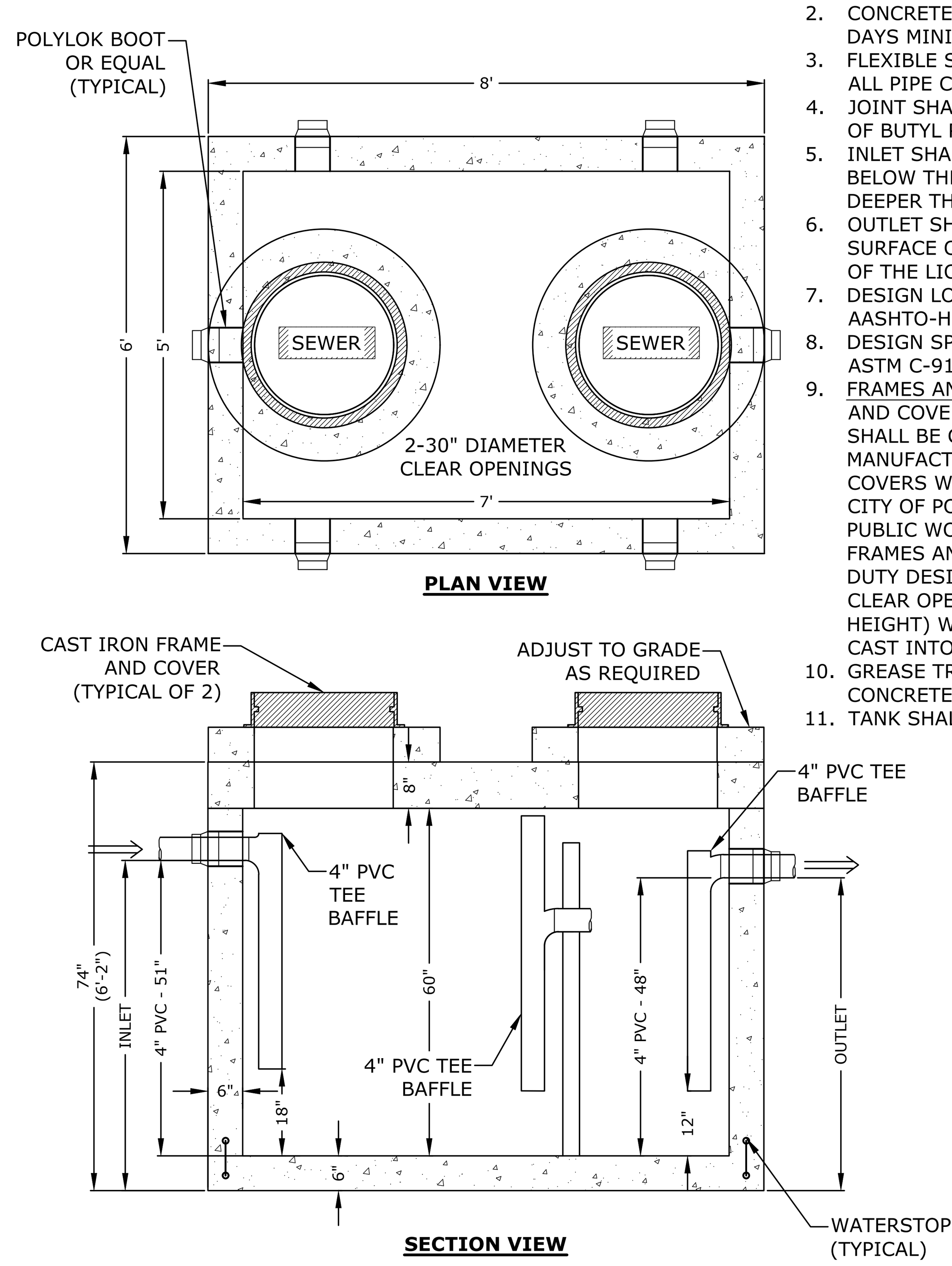
NOTE:
1. SAND BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 12" ABOVE TOP OF PIPE.
2. GAS SHALL BE INSTALLED PER UNITIL STANDARDS. COORDINATE ALL INSTALLATIONS WITH UNITIL AND THE CITY OF PORTSMOUTH.

GAS TRENCH
NO SCALE



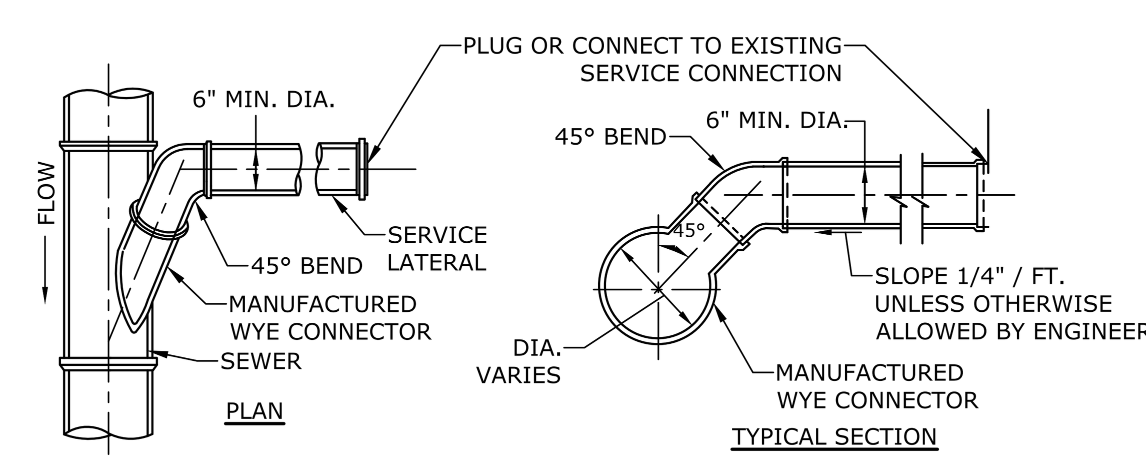
NOTES:
1. SAND BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 12" ABOVE TOP OF PIPE.
2. WATER MAIN SHALL BE INSTALLED PER CITY OF PORTSMOUTH STANDARDS. COORDINATE ALL INSTALLATIONS WITH THE CITY OF PORTSMOUTH.

WATER TRENCH
NO SCALE

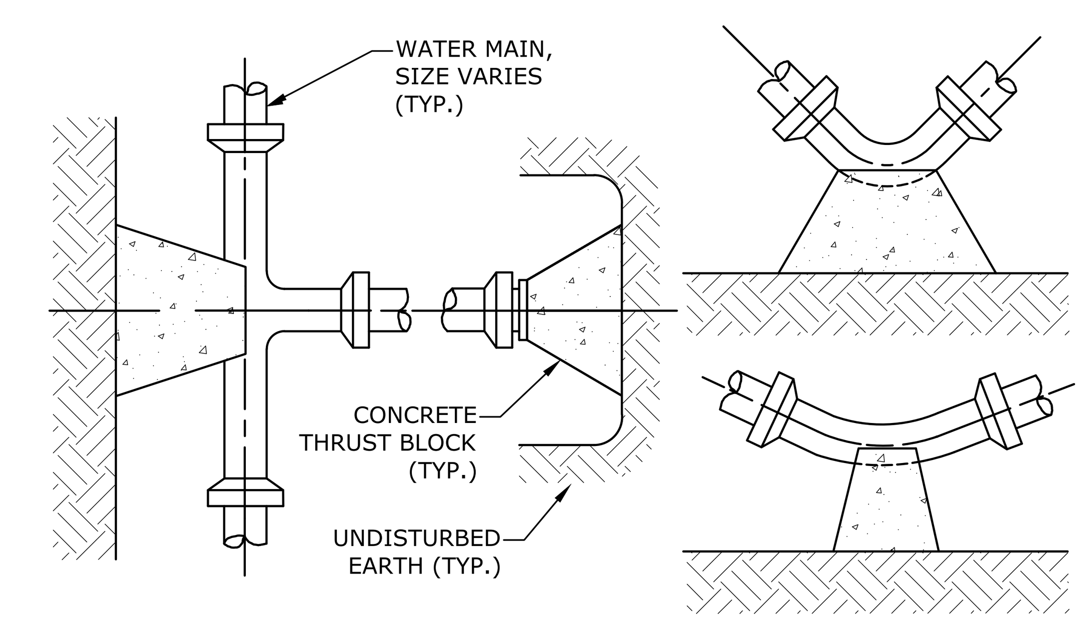


NOTES:
1. STEEL REINFORCEMENT SHALL CONFORM TO LATEST ASTM SPECIFICATIONS: ASTM-A615 GRADE 60 REBAR.
2. CONCRETE SHALL BE F_C=5,000 PSI @ 28 DAYS MINIMUM.
3. FLEXIBLE SLEEVES SHALL BE PROVIDED ON ALL PIPE CONNECTIONS.
4. JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
5. INLET SHALL PENETRATE AT LEAST 9" BELOW THE LIQUID LEVEL, BUT NOT DEEPER THAN THE OUTLET BAFFLE.
6. OUTLET SHALL EXTEND BELOW THE SURFACE OF THE LIQUID EQUAL TO 40% OF THE LIQUID DEPTH (19").
7. DESIGN LOADING SHALL BE: AASHTO-HS20-44, ASTM C-890-06.
8. DESIGN SPECIFIED AS: ASTM C-1227-08, ASTM C-913-08.
9. FRAMES AND COVERS: MANHOLE FRAMES AND COVERS WITHIN CITY RIGHT OF WAY SHALL BE CITY STANDARD HINGE COVERS MANUFACTURED BY EJ. FRAMES AND COVERS WILL BE PURCHASED FROM THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS. ALL OTHER MANHOLE FRAMES AND COVERS SHALL BE OF HEAVY DUTY DESIGN AND PROVIDE A 30-INCH CLEAR OPENING. A 3-INCH (MINIMUM HEIGHT) WORD "SEWER" SHALL BE PLAINLY CAST INTO THE CENTER OF EACH COVER.
10. GREASE TRAP SHALL BE PHOENIX PRECAST CONCRETE P/N: C-6420 OR EQUAL.
11. TANK SHALL BE PUMPED AS NEEDED.

1,000 GALLON GREASE TRAP
NO SCALE



STANDARD SERVICE LATERAL CONNECTION
NO SCALE



TEST PRESSURE = 200psi	SQUARE FEET OF CONCRETE THRUST BLOCKING BEARING ON UNDISTURBED MATERIAL				
REACTION TYPE	PIPE SIZE				
	4"	6"	8"	10"	12"
A 90°	0.89	2.19	3.82	11.14	17.24
B 180°	0.65	1.55	2.78	8.38	12.00
C 45°	0.48	1.19	2.12	6.02	9.32
D 22-1/2°	0.25	0.60	1.06	3.08	4.74
E 11-1/4°	0.13	0.30	0.54	1.54	2.38

NOTES:
1. POUR THRUST BLOCKS AGAINST UNDISTURBED MATERIAL, WHERE TRENCH WALL HAS BEEN DISTURBED, EXCAVATE LOOSE MATERIAL AND EXTEND THRUST BLOCK TO UNDISTURBED MATERIAL. NO JOINTS SHALL BE COVERED WITH CONCRETE.
2. ON BENDS AND TEES, EXTEND THRUST BLOCKS FULL LENGTH OF FITTING.
3. PLACE BOARD IN FRONT OF ALL PLUGS BEFORE POURING THRUST BLOCKS.
4. WHERE M.J. PIPE IS USED, M.J. PLUG WITH RETAINER GLAND MAY BE SUBSTITUTED FOR END BLOCKINGS.
5. INSTALLATION AND STANDARD DIMENSIONAL REQUIREMENTS SHALL BE WITH CITY OF PORTSMOUTH WATER DEPARTMENT STANDARDS.

THRUST BLOCKING DETAIL
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED PROFESSIONAL ENGINEER
10/20/22

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED PROFESSIONAL ENGINEER
10/20/22

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-C-DTLS.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

DETAILS SHEET

SCALE: AS SHOWN

C-508

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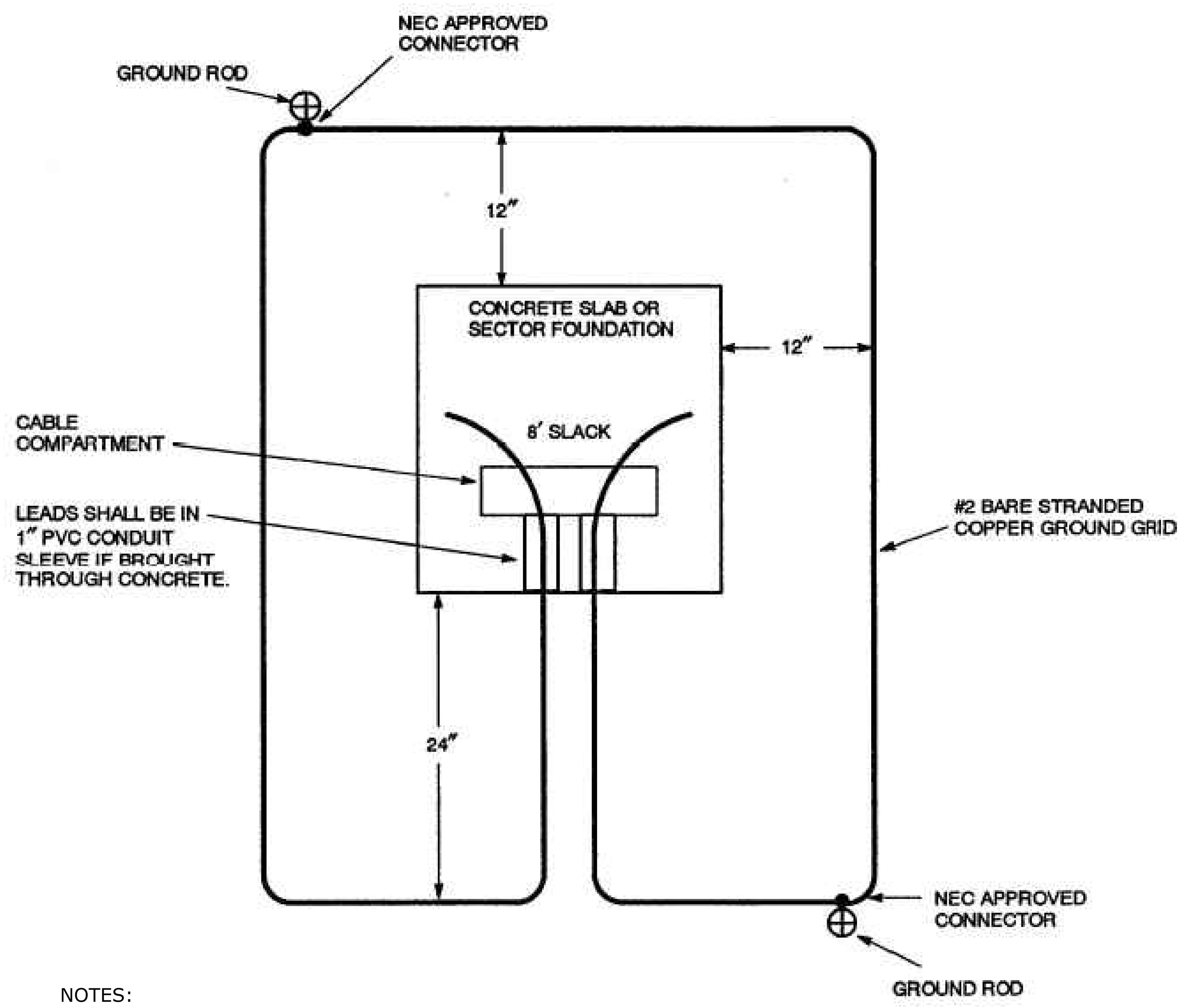
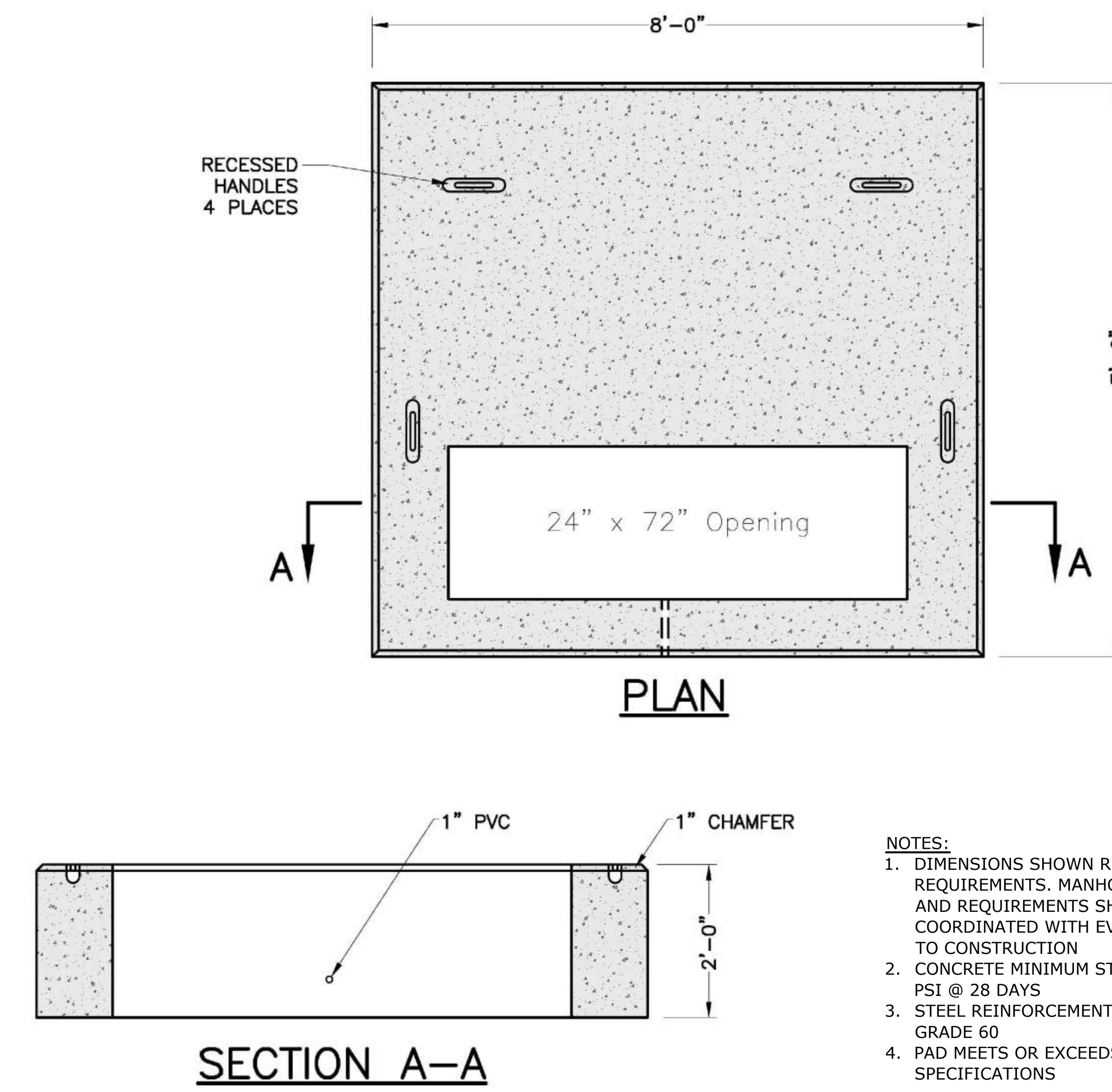
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DTLS.dwg



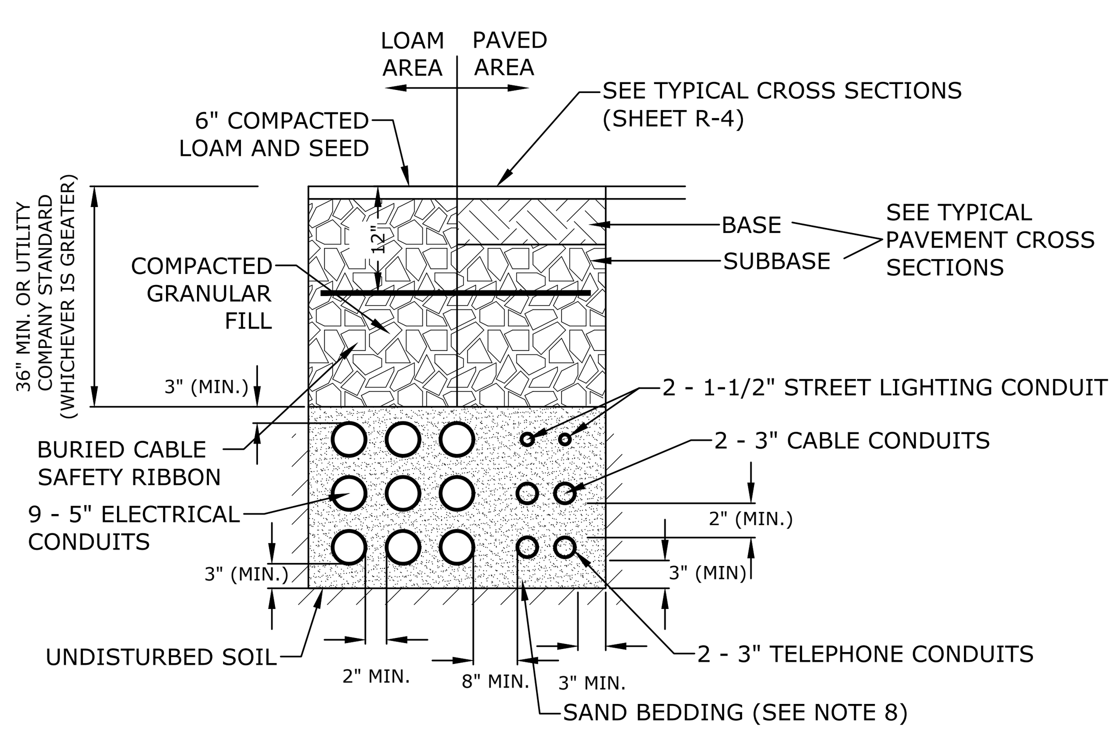
NOTES:
THE GROUND GRID SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR AND IS TO BE BURIED AT LEAST 12 INCHES BELOW GRADE. EIGHT FEET OF EXTRA WIRE FOR EACH GROUND GRID LEG SHALL BE LEFT EXPOSED IN THE CABLE COMPARTMENT TO ALLOW FOR THE CONNECTION TO THE TRANSFORMER. THE TWO 8-FOOT GROUND RODS MAY BE EITHER GALVANIZED STEEL OR COPPERWELD AND THEY SHALL BE CONNECTED TO THE GRID WITH NEC APPROVED CONNECTORS.

PAD-MOUNTED EQUIPMENT GROUNDING GRID DETAIL
NO SCALE



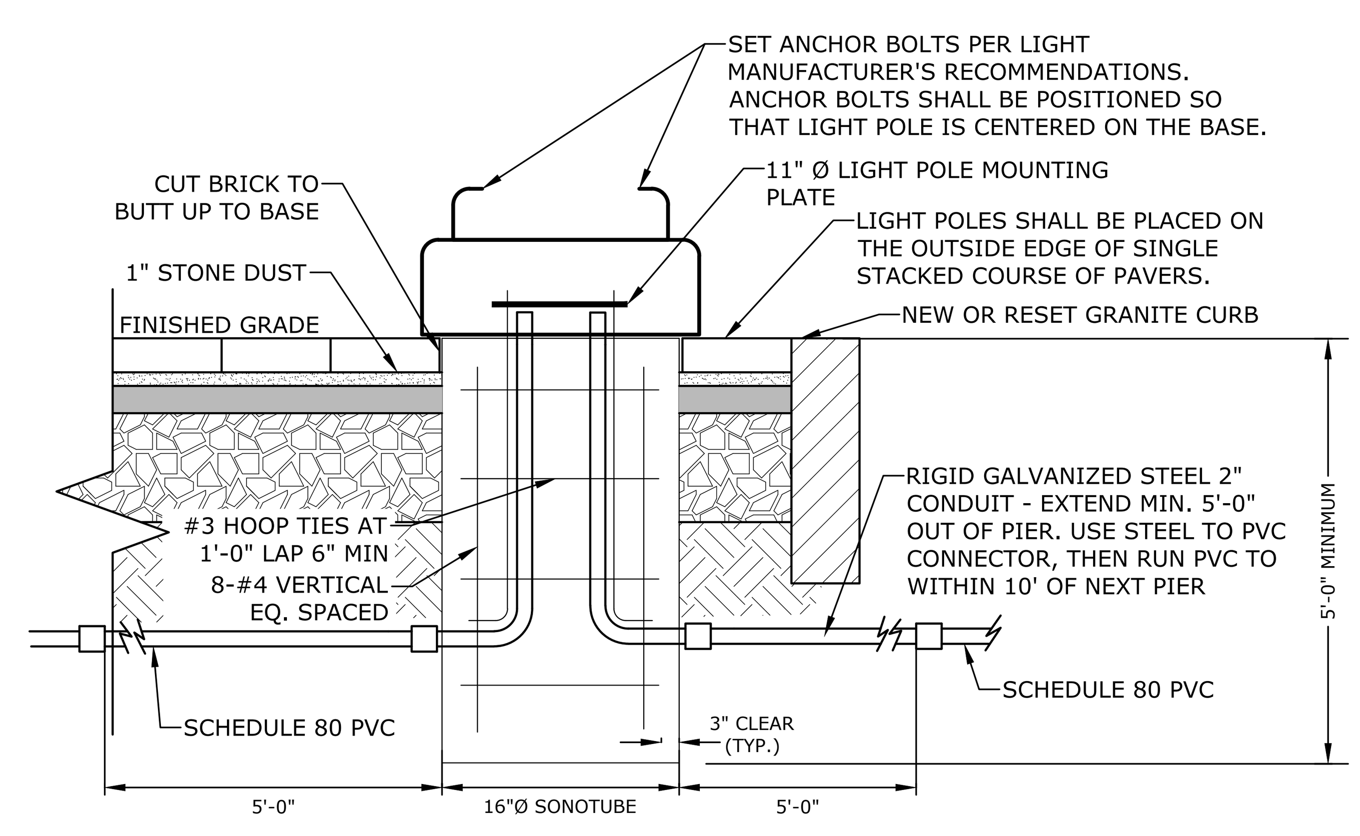
NOTES:
1. DIMENSIONS SHOWN REPRESENT TYPICAL REQUIREMENTS. MANHOLE LOCATIONS AND REQUIREMENTS SHALL BE COORDINATED WITH EVERSOURCE PRIOR TO CONSTRUCTION
2. CONCRETE MINIMUM STRENGTH - 4,000 PSI @ 28 DAYS
3. STEEL REINFORCEMENT - ASTM A615, GRADE 60
4. PAD MEETS OR EXCEEDS EVERSOURCE SPECIFICATIONS

3-PHASE TRANSFORMER PAD
NO SCALE



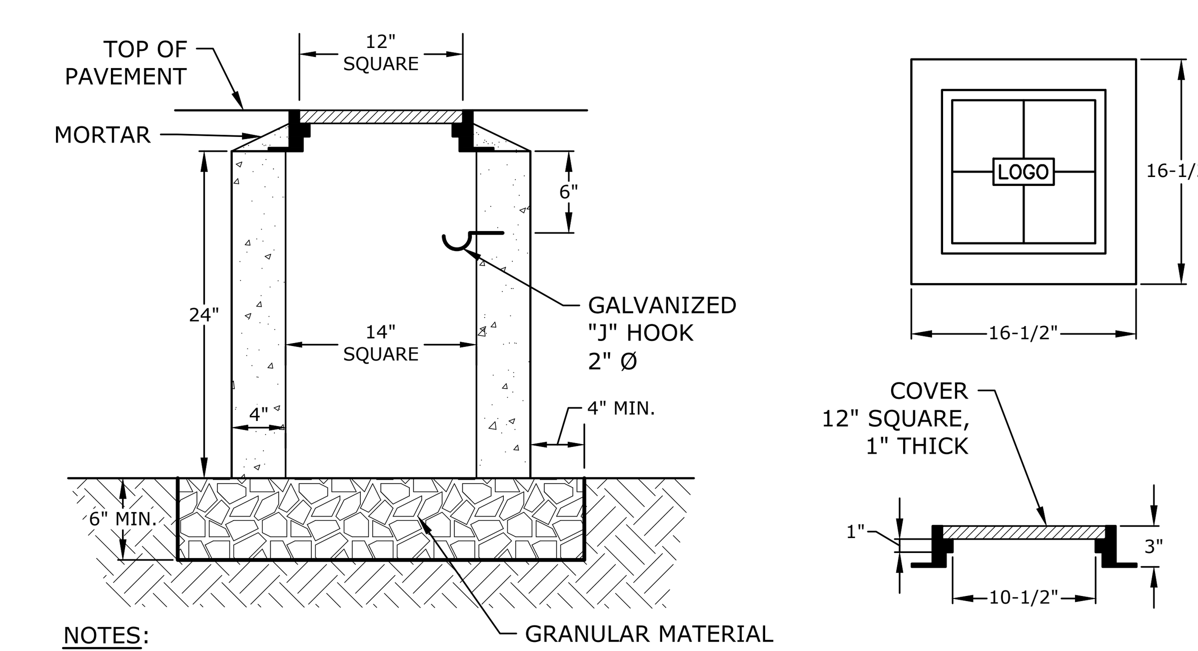
NOTES:
1. NUMBER, MATERIAL, AND SIZE OF UTILITY CONDUITS TO BE DETERMINED BY LOCAL UTILITY OR AS SHOWN ON ELECTRICAL DRAWINGS. CONTRACTOR TO PROVIDE ONE SPARE CONDUIT FOR EACH UTILITY TO BUILDING.
2. DIMENSIONS SHOWN REPRESENT OWNERS MINIMUM REQUIREMENTS. ACTUAL DIMENSIONS MAY BE GREATER BASED ON UTILITY COMPANY STANDARDS, BUT SHALL NOT BE LESS THAN THOSE SHOWN.
3. NO CONDUIT RUN SHALL EXCEED 360 DEGREES IN TOTAL BENDS.
4. A SUITABLE PULLING STRING, CAPABLE OF 200 POUNDS OF PULL, MUST BE INSTALLED IN THE CONDUIT BEFORE UTILITY COMPANY IS NOTIFIED TO INSTALL CABLE. THE STRING SHOULD BE BLOWN INTO THE CONDUIT AFTER THE RUN IS ASSEMBLED TO AVOID BONDING THE STRING TO THE CONDUIT.
5. UTILITY COMPANY MUST BE GIVEN THE OPPORTUNITY TO INSPECT THE CONDUIT PRIOR TO BACKFILL. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPAIRS SHOULD THE UTILITY COMPANY BE UNABLE TO INSTALL ITS CABLE IN A SUITABLE MANNER.
6. ALL CONDUIT INSTALLATIONS MUST CONFORM TO THE CURRENT EDITION OF THE NATIONAL ELECTRIC SAFETY CODE, STATE AND LOCAL CODES AND ORDINANCES, AND, WHERE APPLICABLE, THE NATIONAL ELECTRIC CODE.
7. ALL 90° SWEEPS WILL BE MADE USING RIGID GALVANIZED STEEL. SWEEPS WITH A 36 TO 48 INCH RADIUS.
8. SAND BEDDING TO BE REPLACED WITH CONCRETE ENCASEMENT WHERE COVER IS LESS THAN 3 FEET, WHEN LOCATED BELOW PAVEMENT, OR WHERE SHOWN ON THE UTILITIES PLAN.

ELECTRICAL AND COMMUNICATION CONDUIT
NO SCALE



NOTES:
1. REFER TO ELECTRICAL PLANS FOR WIRING DETAILS.
2. CONCRETE: 4000 PSI, AIR ENTRAINED STEEL: 60 KSI
3. LIGHT POLE FOUNDATIONS SHALL BE PLACED PRIOR TO INSTALLATION OF BRICK PAVERS.
4. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL, TO INCLUDE PERFORMANCE SPECIFICATIONS, CALCULATIONS AND NH LICENSED STRUCTURAL ENGINEER'S STAMP FOR LIGHT POLE FOUNDATION.
5. STANDARD BASE SHALL BE CONSTRUCTED UNLESS THERE IS CONFLICT WITH THE EXISTING DUCT BANK. SPREAD FOOTING BASE SHALL BE USED IN LIEU OF STANDARD BASE IN LOCATIONS WHERE TOP OF DUCT BANK ELEVATION WILL CONFLICT WITH STANDARD POLE BASE DEPTH. CONTRACTOR SHALL VERIFY LOCATIONS WHERE SPREAD FOOTINGS ARE REQUIRED PRIOR TO CONSTRUCTION. SEE NOTE#4 FOR SUBMITTAL REQUIREMENTS.

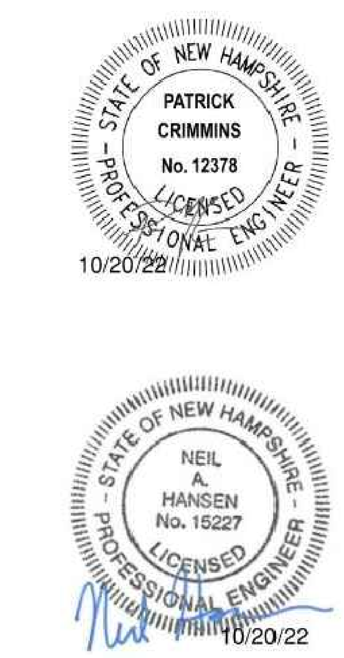
HISTORIC LIGHT FIXTURE BASE
NO SCALE



NOTES:
1. 14" X 14" CONCRETE PULL BOX, NHDOT ITEM 614.511

CONCRETE PULL BOX
NO SCALE

Tighe&Bond



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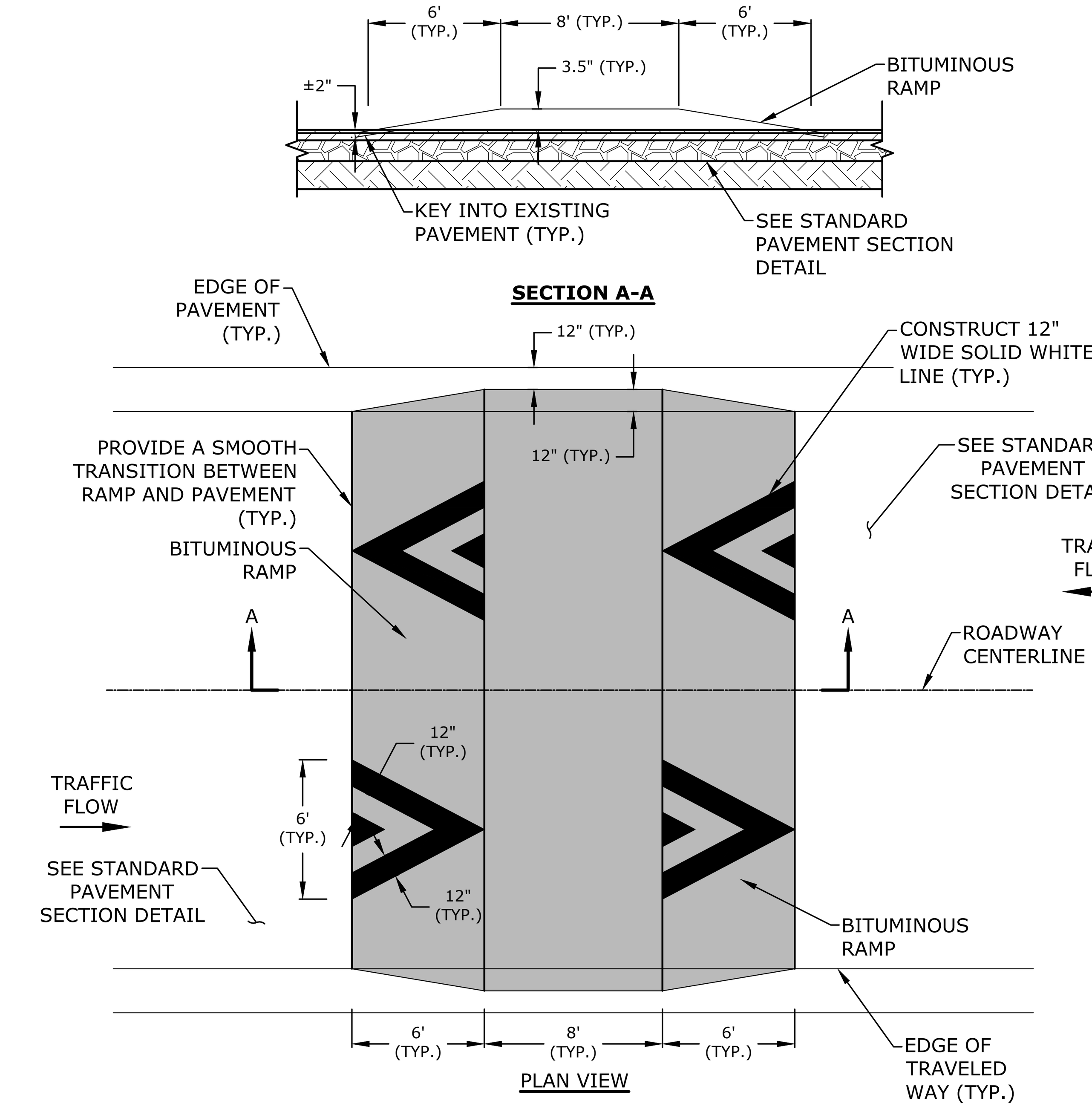
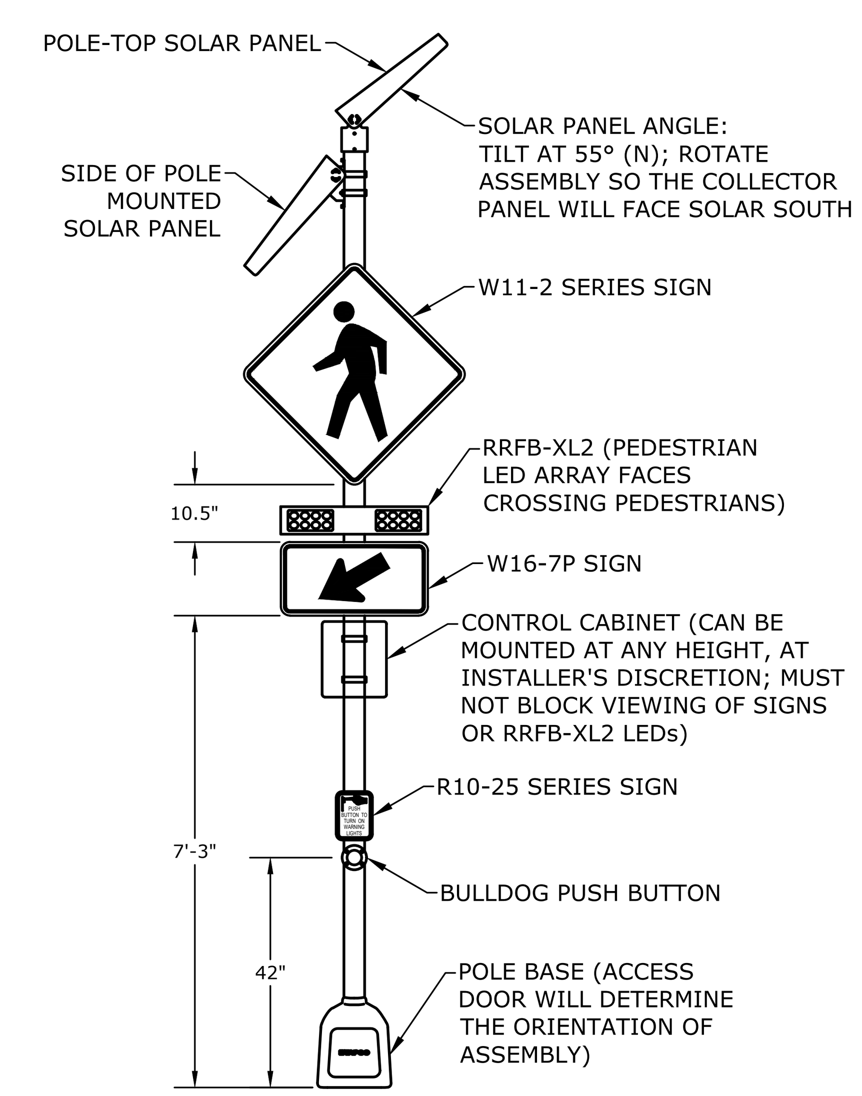


NOTE:
1. ALL PAINT SHALL BE FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY THE MANUFACTURER.

SPEED TABLE CROSS SECTION
NO SCALE



RAPID RECTANGULAR FLASHING BEACON (RRFB)
NO SCALE

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
10/20/22

STATE OF NEW HAMPSHIRE
NEIL A. HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
10/20/22

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PLANT SCHEDULE

Symbol	Quantity	Botanical Name	Common Name	Size	Spacing	Notes
TREES						
AC BO	7	*Acer rubrum 'Bowhall'*	Bowhall Maple	4-5" Cal.		Single-stem, matched
CA CA	6	*Carpinus caroliniana*	American Hornbean	4-5" Cal.		Single-stem, matched
CO SP	2	*Cornus 'Rutgan' Stellar Pink*	Stellat Pink Dogwood	3-4" Cal.		B&B; matched
GI BI	4	*Ginkgo biloba 'Magyar'*	Magyar Ginkgo	5-6" Cal.		B&B; matched
LI WO	5	*Liquidambar styraciflua 'Worplesdon'*	Worplesdon Sweetgum	4-5" Cal.		B&B; matched
QU RP	6	*Quercus x warei 'Long' Regal Prince*	Regal Prince Oak	4-5" Cal.		B&B; matched
SHRUBS						
Co Pe		*Comptonia peregrina*	Sweet Fern	#3 Container	36" O.C.	
Co Ra		*Cornus sericea 'Cardinal'*	Cardinal Red Twig Dogwood	#5 Container	36" O.C.	
De Gr		*Deutzia gracilis 'Nikko'*	Nikko Deutzia	#3 Container	30" O.C.	
Fo Ga		*Fothergilla gardenii 'Mount Airy'*	Mount Airy Fothergilla	#5 Container	36" O.C.	
Hy Qu		*Hydrangea quercifolia 'Pee Wee'*	Oakleaf Hydrangea	#5 Container	48" O.C	
Li Be		*Lindera Benzoin*	Spice Bush	#5 Container	36" O.C.	
Ix Gl		*Ilex glabra 'Shamrock'*	Shamrock Inkberry	#5 Container	36" O.C.	
Il Ji		*Ilex verticillata 'Jim Dandy'*	Jim Dandy Winterberry	#5 Container	48" O.C	
Il Ve		*Ilex verticillata 'Red Sprite'*	Red Sprite Winterberry	#5 Container	48" O.C	
My Pe		*Myrica pensylvanica*	Northern Bayberry	#5 Container	48" O.C.	
Rh Gl		*Rhus aromatica 'Gro-Low'*	Fro-Low Fragrant Sumac	#3 Container	30" O.C.	
Rh Mh		*Rhododendron x 'Marie Hoffman'*	Mare Hoffman Azalea	#5 Container	48" O.C.	
Sp To		*Spiraea tomentosa*	Steeplebush	#3 Container	30" O.C.	
PERENNIALS						
am hu		*Amsonia x 'Blue Ice'*	Blue Star Flower	#2 Container	18" O.C.	
as ob		*Aster oblongifolius 'Raydon's Favorite'*	Raydon's Favorite Aster	#2 Container	24" O.C.	
ba bi		*Baptisia australis*	Blue False Indigo	#3 Container	30" O.C.	
ga od		*Galium odoratum*	Sweet Woodruff	#2 Container	12" O.C.	
ge ro		*Geranium x 'Rozanne'*	Rozanna Cranesbill	#2 Container	18" O.C.	
he vi		*Heuchera villosa 'Autumn Bride'*	Autumn Bride Coral Bells	#2 Container	18" O.C.	
he hr		*Hemerocallis 'Happy Returns'*	Happy Returns Daylily	#2 Container	24" O.C.	
li sp		*Liriope spicata*	Lilyturf	4" Container	10" O.C.	
os ci		*Osmundastrum cinnamomeum*	Cinnamon Fern	#2 Container	30" O.C.	
po od		*Polygonatum odoratum var. pluriflorum 'Variegatum*	Variegated Solomon's Seal	#2 Container	15" O.C.	
ti co		*Tiarella cordifolia*	Foamflower	#2 Container	15" O.C.	
va an		*Vaccinium angustifolium*	Lowbush Blueberry	#2 Container	15" O.C.	
ORNAMENTAL GRASSES						
bo cu		*Bouteloua curtipendula*	Side Oats Grama	#2 Container	30" O.C.	
ca pe		*Carex pennsylvania*	Pennsylvania Sedge	#2 Container	30" O.C.	
ca ac		*Calamagrostis acutiflora 'Karl Foerster'*	Feather Reed Grass	#3 Container	30" O.C.	
de ce		*Deschampsia cespitosa 'Pixie Fountain'*	Tufted Hair Grass	#2 Container	30" O.C.	
mi si		*Miscanthus sinensis 'Adagio'*	Dwarf Silver Grass	#2 Container	30" O.C.	
pe al		*Pennisetum alopecuroides 'Hamelin'*	Hameln Dwarf Fountain Grass	#2 Container	24" O.C.	
SEED MIXES						
Buffer Seed Mix		*Ernst Seed Fescue Mix composed of 45% Creeping Red Fescue/ 27.5% Hard Fescue 'Minimus' / 27.5% Hard Fescue 'Beacon'*				

PLANTING NOTES

1. LANDSCAPE ARCHITECT TO APPROVE PLANT MATERIAL PRIOR TO DELIVERY TO SITE.

2. PLANT MATERIAL SHALL CONFORM TO "THE AMERICAN STANDARD FOR NURSERY STOCK", PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.

3. NO SUBSTITUTIONS OF PLANT SPECIES WITHOUT LANDSCAPE ARCHITECT'S WRITTEN APPROVAL.

4. SUBSTITUTIONS OF PLANT SPECIES SHALL BE A PLANT OF EQUIVALENT OVERALL FORM, HEIGHT AND BRANCHING HABIT, FLOWER, LEAF AND FRUIT, COLOR AND TIME OF BLOOM, AS APPROVED BY LANDSCAPE ARCHITECT.

5. LOCATE AND VERIFY UTILITY LINE LOCATIONS PRIOR TO STAKING AND REPORT CONFLICTS TO LANDSCAPE ARCHITECT.

6. PLANTING DEMOLITION DEBRIS, GARBAGE, LUMPS OF CONCRETE, STEEL AND OTHER MATERIALS DELETERIOUS TO PLANT'S HEALTH AS DETERMINED BY LANDSCAPE ARCHITECT SHALL BE REMOVED FROM ALL PLANTING AREAS.

7. NO PLANTING TO BE INSTALLED BEFORE ACCEPTANCE OF ROUGH GRADING.

8. ALL PROPOSED TREE LOCATIONS SHALL BE STAKED OR LAID OUT IN THEIR APPROXIMATE LOCATION BY THE CONTRACTOR. REFER TO LAYOUT AND PLANTING SHEETS FOR LAYOUT INFORMATION. THE CONTRACTOR SHALL ADJUST THE LOCATIONS AS REQUESTED BY THE LANDSCAPE ARCHITECT TO ACCOUNT FOR SUBSURFACE UTILITIES AND OTHER FIELD CONDITIONS. FINAL LOCATIONS OF ALL PLANTS MUST BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO PLANTING.

9. INSTALL PLANTS WITH ROOT FLARES FLUSH WITH FINISHED GRADE. IMMEDIATELY REPLANT PLANTS THAT SETTLE OUT OF PLUMB OR BELOW FINISHED GRADE.

10. PLANT UNDER FULL TIME SUPERVISION OF CERTIFIED ARBORIST, NURSERYMAN, OR LICENSED LANDSCAPE ARCHITECT. PROVIDE WRITTEN VERIFICATION OF CERTIFICATION AND/OR LICENSE FOR LANDSCAPE ARCHITECT'S APPROVAL.

11. WATER PLANTS THOROUGHLY AFTER INSTALLATION, A MINIMUM OF TWICE WITHIN THE FIRST 24 HOURS.

12. REPAIR DAMAGE DUE TO OPERATIONS INSIDE AND OUTSIDE OF LIMIT OF WORK

13. SOAK ALL PERENNIALS FOR 24 HOURS PRIOR TO INSTALLATION

14. BUFFER SEED MIX AREA TO BE WATERED AND MONITORED DURING ESTABLISHMENT TO ENSURE SEED COVERAGE AND ESTABLISHMENT IS UNIFORM AND HEALTHY AND UNTIL ACCEPTANCE.

15. MOWING OF THE BUFFER SEED MIX AREA FOLLOWING ESTABLISHED AND ACCEPTANCE SHALL OCCUR TWICE A YEAR - IN SPRING PRIOR TO NEW GROWTH AND THE AUTUMN AFTER DORMANCY. MOWING IS NOT TO OCCUR IN THE HEAT OF SUMMER. MOWING ENCOURAGES ESTABLISHMENT VIA ROOT SYSTEM GROWTH AND MITIGATES GROWTH OF WEEDS, UNDESIRABLE AND INVASIVE SPECIES.

16. MOWING HEIGHT TO BE NOT LESS THAN 3".

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LANDSCAPE MATERIAL PLAN, LEGEND AND NOTES

SCALE: AS SHOWN

L-100

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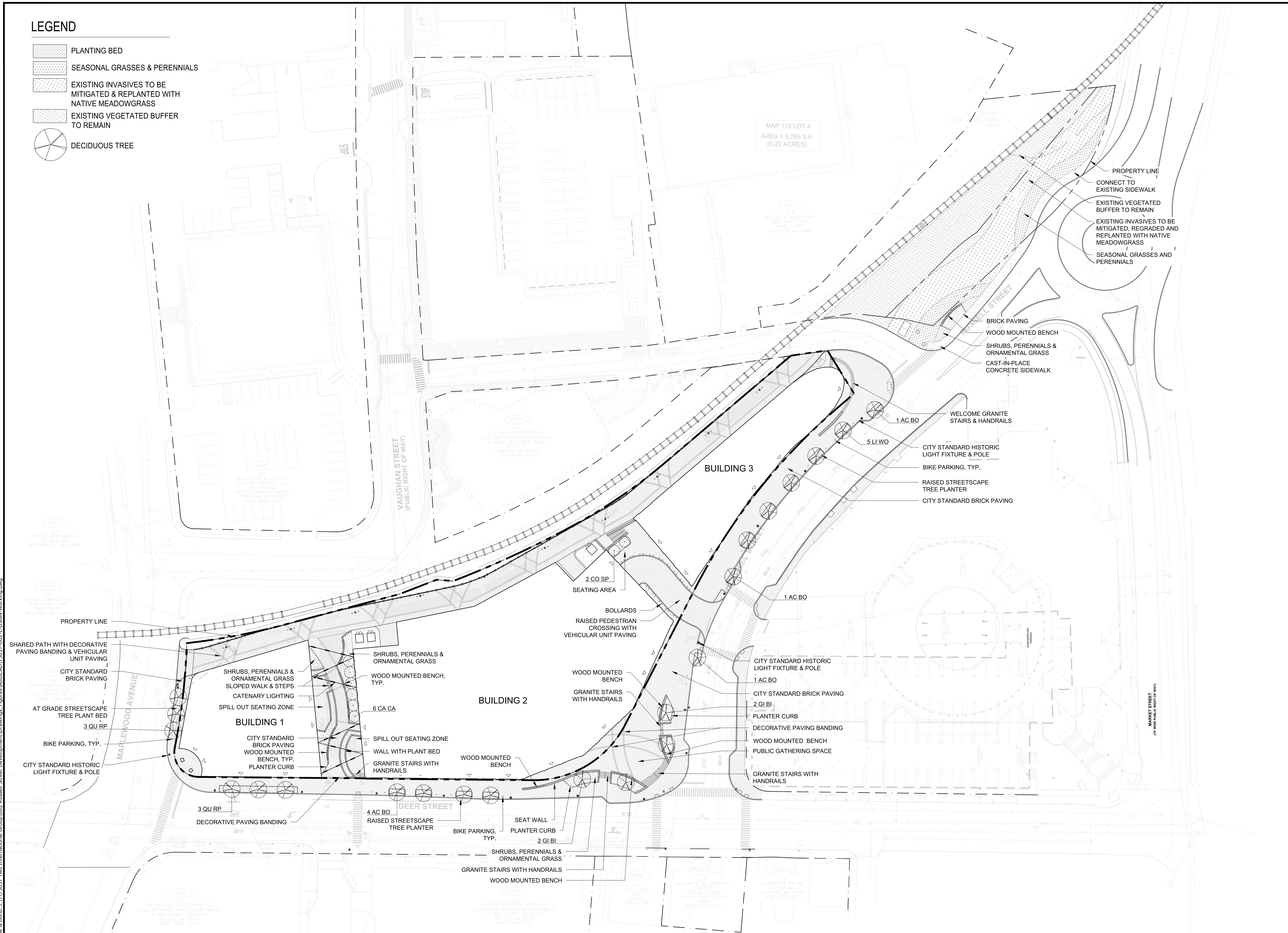

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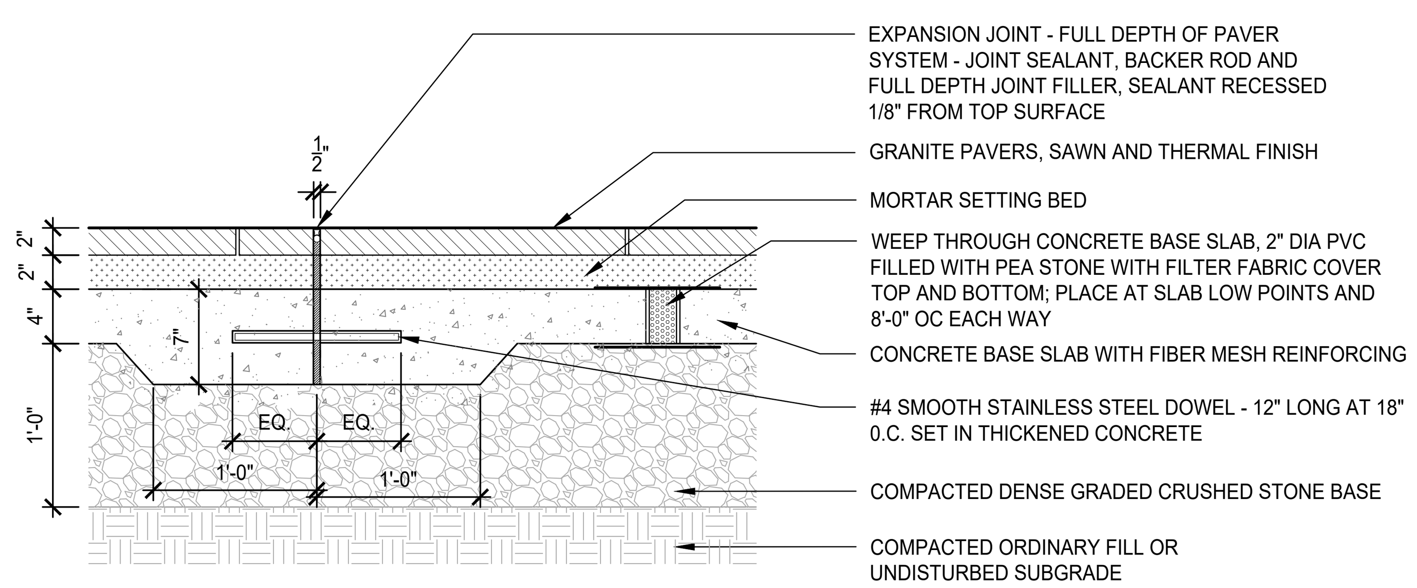
LANDSCAPE SITE PLAN

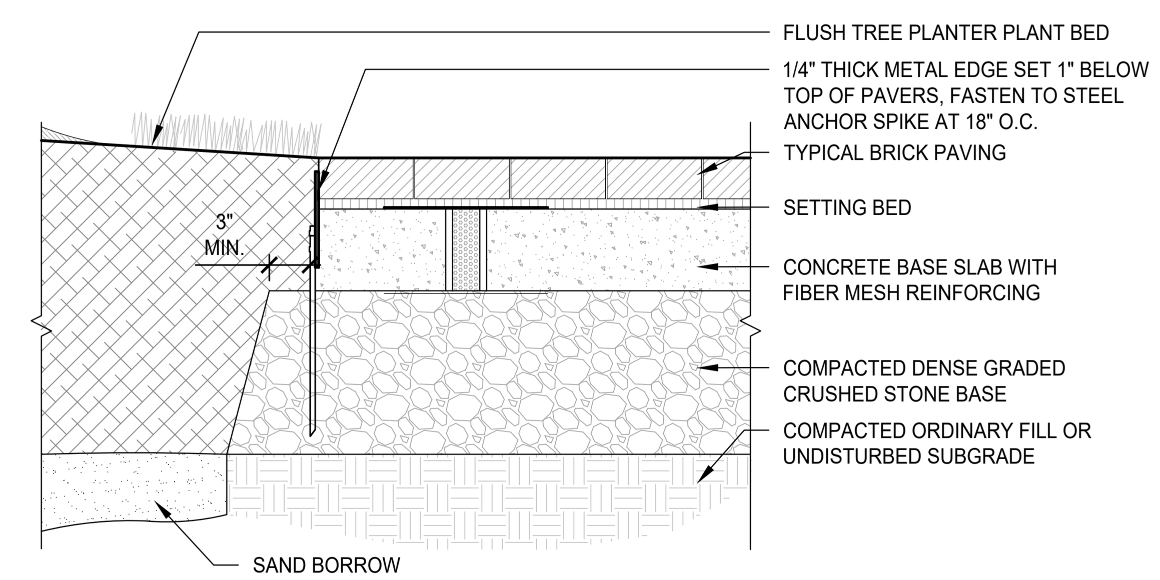
SCALE: AS SHOWN

L-101

NOTE:
1. ALIGN EXPANSION JOINT WITH PAVER JOINT.
2. PROVIDE EXPANSION JOINTS AT 20' ON CENTER OR AS SHOWN ON DRAWINGS.
3. PROVIDE CAULKED CONSTRUCTION JOINT WHERE PAVING ABUTS VERTICAL SURFACE.
4.THE JOINTS BETWEEN GRANITE PAVER PIECES TO BE 1/4" MORTAR JOINTS.

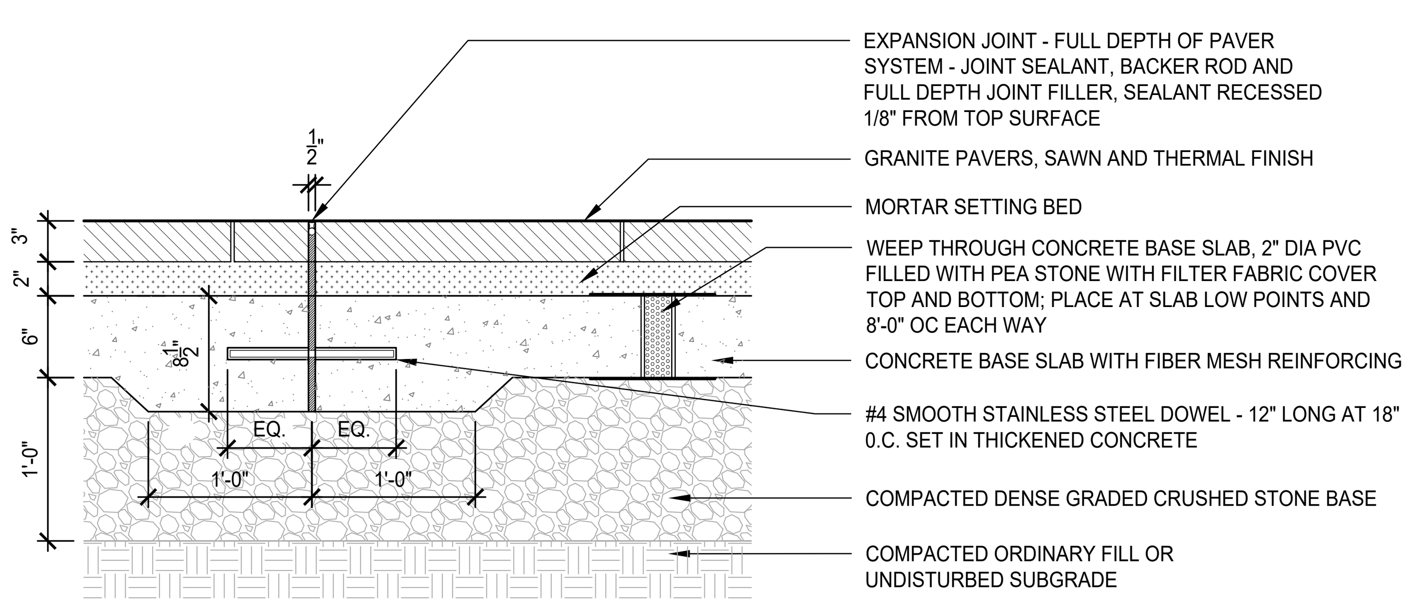


1 GRANITE PAVERS ON CONCRETE BASE - PEDESTRIAN
SCALE: 1"=1'-0"

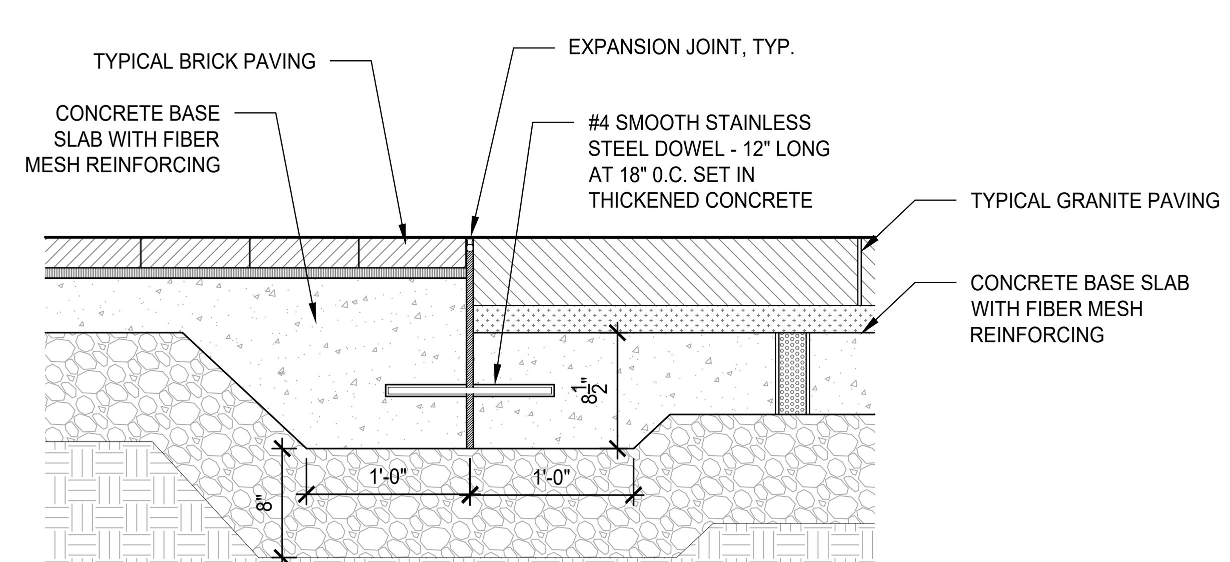


4 METAL EDGE AT BRICK PAVING ABUTTING PLANTING BED
SCALE: 1" = 1'-0"

NOTE:
1. ALIGN EXPANSION JOINT WITH PAVER JOINT.
2. PROVIDE EXPANSION JOINTS AT 20' ON CENTER OR AS SHOWN ON DRAWINGS.
3. PROVIDE CAULKED CONSTRUCTION JOINT WHERE PAVING ABUTS VERTICAL SURFACE.
4. THE JOINTS BETWEEN GRANITE PAVER PIECES TO BE 1/4"MORTAR JOINTS.



2 GRANITE PAVERS ON CONCRETE BASE - VEHICULAR
SCALE: 1"=1'-0"



3 GRANITE TO BRICK PAVING TRANSITION
SCALE: 1"=1'-0'

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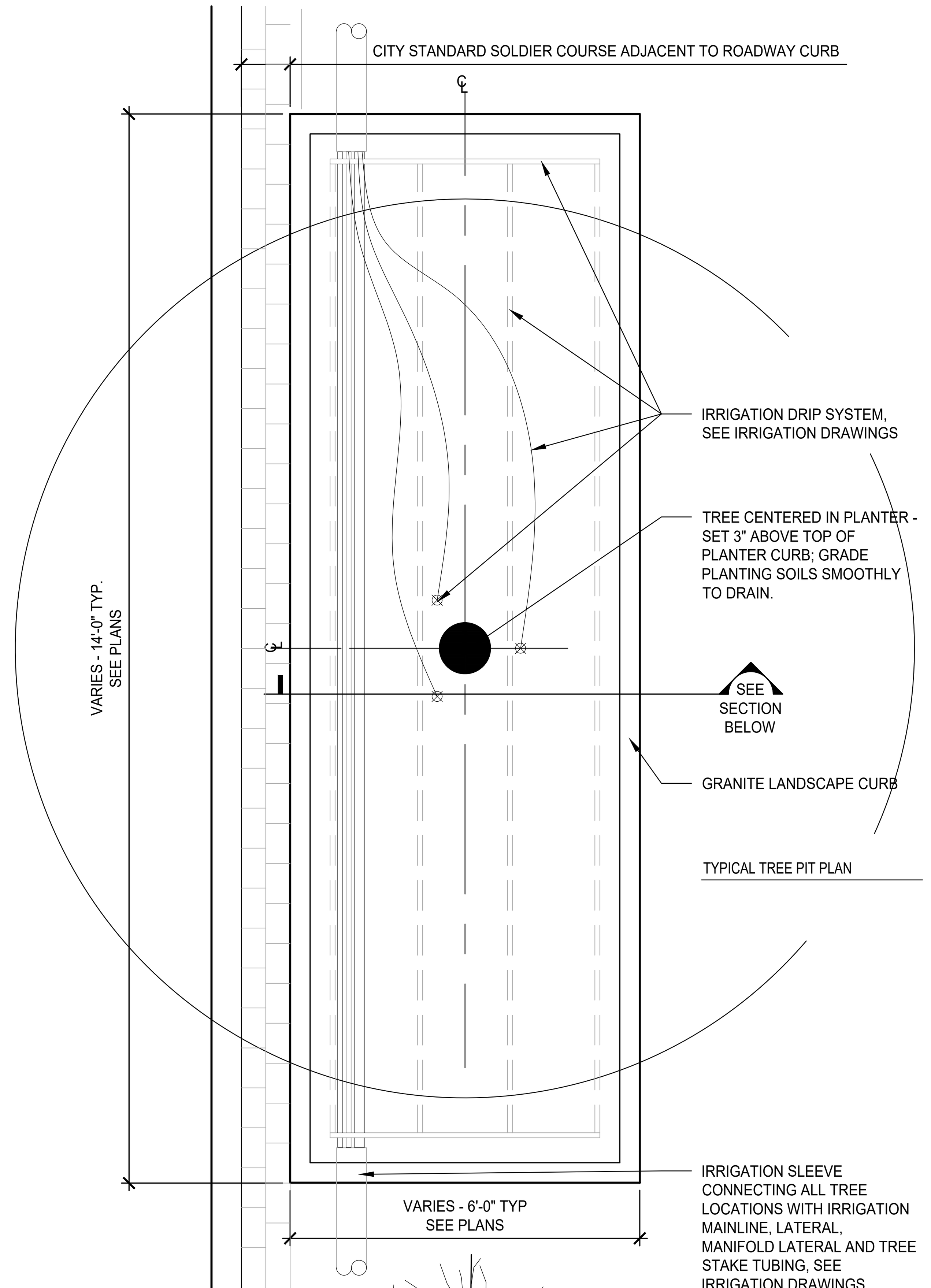
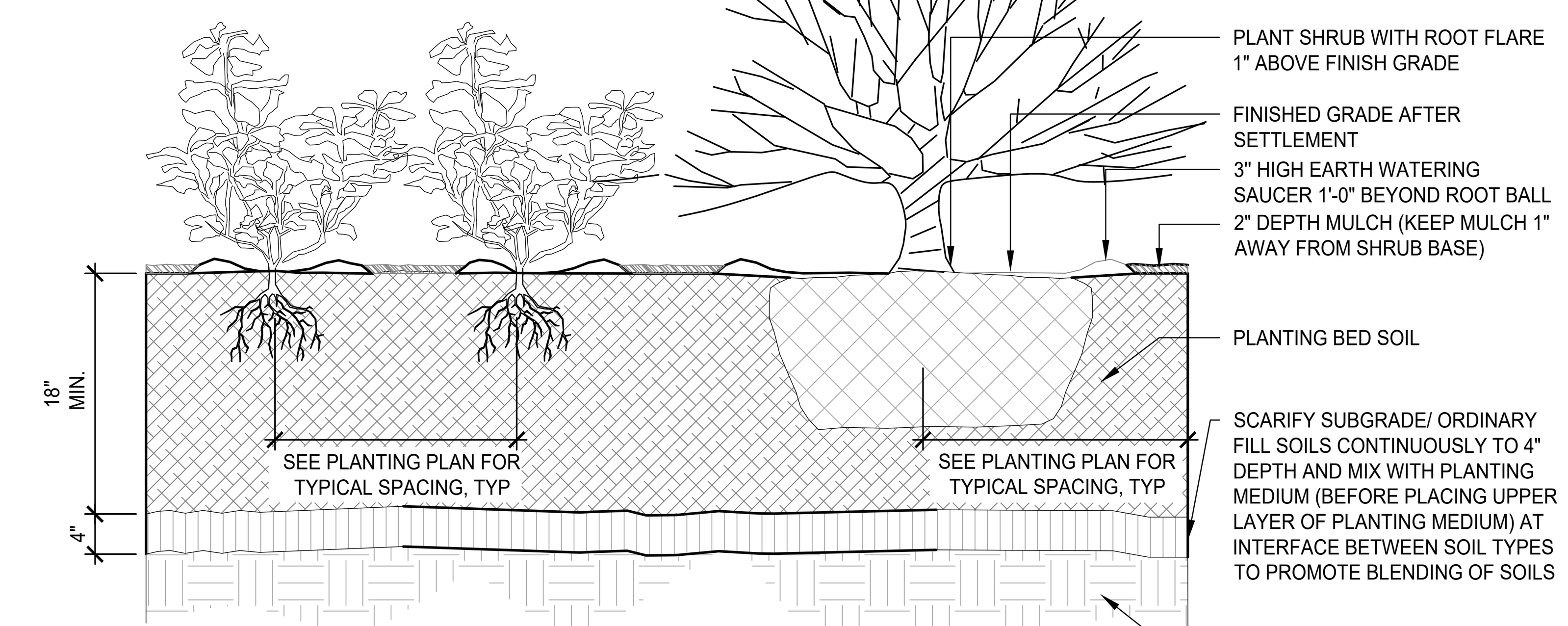
CITY OF PORTSMOUTH TREE PLANTING REQUIREMENTS

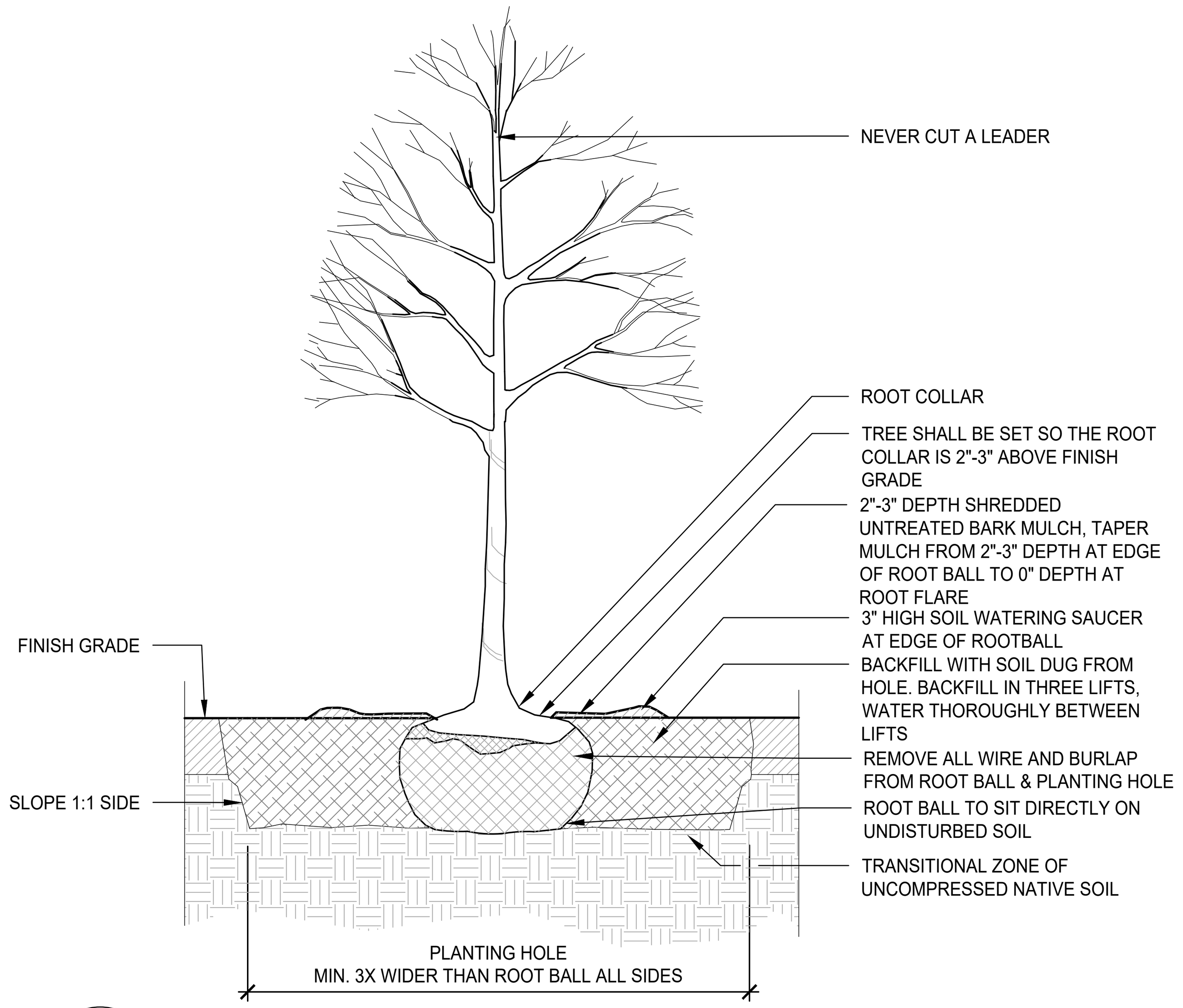
THE BASE OF THE CITY OF PORTSMOUTH TREE PLANTING REQUIREMENTS IS THE ANSI A300 PART 6 STANDARD PRACTICES FOR PLANTING AND TRANSPLANTING. ANSI A300 PART 6 LAYS OUT TERMS AND BASIC STANDARDS AS SET FORTH BY INDUSTRY BUT IT IS NOT THE 'END ALL' FOR THE CITY OF PORTSMOUTH. THE FOLLOWING ARE THE CITY OF PORTSMOUTH, NH TREE PLANTING REQUIREMENTS THAT IN ADDITION TO OR THAT GO BEYOND THE ANSI A300 PART 6.

1. ALL PLANTING HOLES SHALL BE DUG BY HAND- NO MACHINES. THE ONLY EXCEPTIONS ARE NEW CONSTRUCTION WHERE NEW PLANTING PITS, PLANTING BEDS WITH GRANITE CURBING, AND PLANTING SITES WITH SILVA CELLS ARE BEING CREATED. IF A MACHINES USED TO DIG ANY OF THESE SITUATIONS AND PLANTING DEPTH NEEDS TO BE RAISED THE MATERIAL IN THE BOTTOM OF THE PLANTING HOLE MUST BE FIRMED WITH MACHINE TO PREVENT SINKING OF THE ROOT BALL.
2. ALL WIRE AND BURLAP SHALL BE REMOVED FROM THE ROOT BALL AND PLANTING HOLE.
3. THE ROOT BALL OF THE TREE SHALL BE WORKED SO THAT THE ROOT COLLAR OF THE TREE IS VISIBLE AND NO GIRDLING ROOTS ARE PRESENT.
4. THE ROOT COLLAR OF THE TREE SHALL BE 2"-3" ABOVE GRADE OF PLANTING HOLE FOR FINISHED DEPTH.
5. ALL PLANTINGS SHALL BE BACKFILLED WITH SOIL FROM THE SITE AND AMENDED NO MORE THAN 20% WITH ORGANIC COMPOST. THE ONLY EXCEPTIONS ARE NEW CONSTRUCTION WHERE ENGINEERED SOIL IS BEING USED IN CONJUNCTION WITH SILVA CELLS AND WHERE NEW PLANTING BEDS ARE BEING CREATED.
6. ALL PLANTINGS SHALL BE BACKFILLED IN THREE LIFTS AND ALL LIFTS SHALL BE WATERED SO THE PLANTING WILL BE SET AND FREE OF AIR POCKETS- NO EXCEPTIONS.
7. AN EARTH BERM SHALL BE PLACED AROUND THE PERIMETER OF THE PLANTING HOLE EXCEPT WHERE CURBED PLANTING BEDS OR PITS ARE BEING USED.
8. 2"-3" OF MULCH SHALL BE PLACED OVER THE PLANTING AREA.
9. AT THE TIME THE PLANTING IS COMPLETE THE PLANTING SHALL RECEIVE ADDITIONAL WATER TO ENSURE COMPLETE HYDRATION OF THE ROOTS, BACKFILL MATERIAL AND MULCH LAYER.



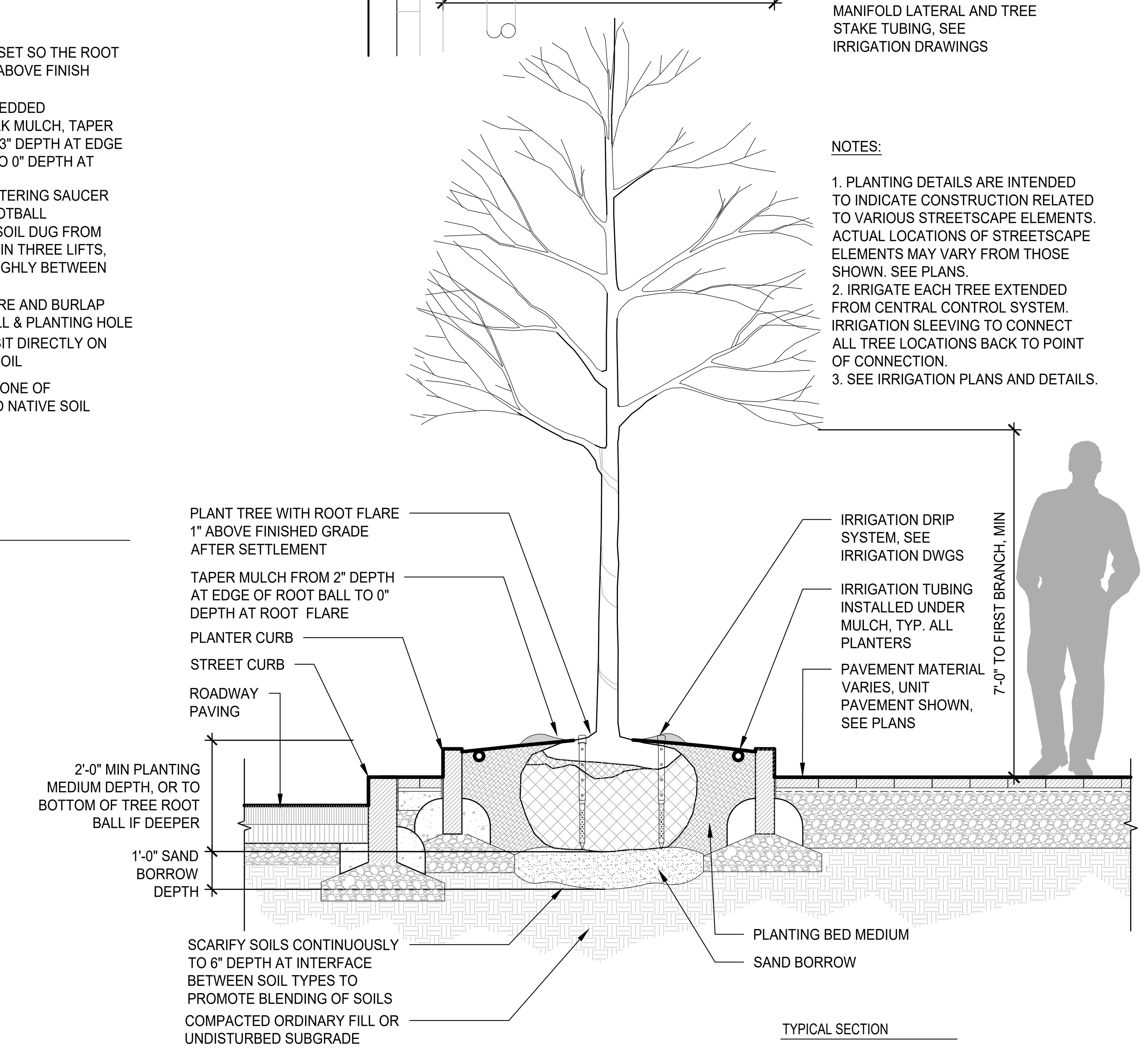


1 SHRUB, PERENNIAL AND ANNUAL PLANTING
SCALE: 3/4"=1'-0"



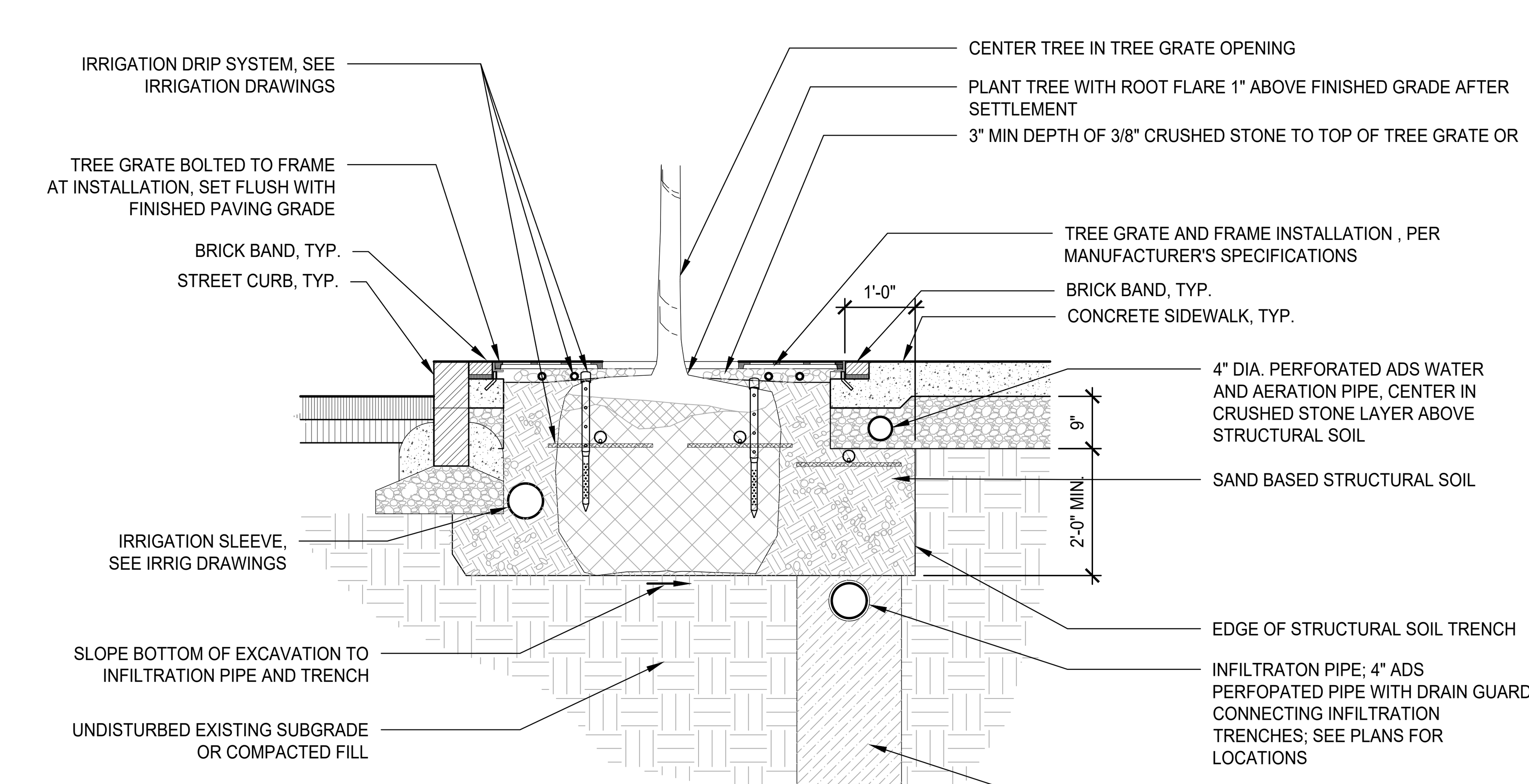
2 TREE PLANTING DETAIL
SCALE: 3/8"=1'-0"

NOTES:
1. PLANTING DETAILS ARE INTENDED TO INDICATE CONSTRUCTION RELATED TO VARIOUS STREETSCAPE ELEMENTS. ACTUAL LOCATIONS OF STREETSCAPE ELEMENTS MAY VARY FROM THOSE SHOWN. SEE PLANS.
2. IRRIGATE EACH TREE EXTENDED FROM CENTRAL CONTROL SYSTEM. IRRIGATION SLEEVING TO CONNECT ALL TREE LOCATIONS BACK TO POINT OF CONNECTION.
3. SEE IRRIGATION PLANS AND DETAILS.



3 TREE PLANTING IN RAISED LANDSCAPE CURB PLANTER
SCALE: 1/2" = 1'-0"

PLAN: WATER AND AERATION SYSTEM IN STREETSCAPE LAYOUT



CROSS SECTION

NOTES:
1. PLANTING DETAILS ARE INTENDED TO INDICATE CONSTRUCTION RELATED TO VARIOUS STREETSCAPE ELEMENTS. ACTUAL LOCATIONS OF STREETSCAPE ELEMENTS MAY VARY FROM THOSE SHOWN. SEE PLANS.
2. FINISHED GRADE OF TREE GRATES AND FRAMES SHALL BE FLUSH WITH SURROUNDING PAVEMENT.
3. PROVIDE AUTOMATIC IRRIGATION SYSTEM TO IRRIGATE EACH TREE EXTENDED FROM CENTRAL CONTROLS SYSTEM. IRRIGATION SLEEVING TO CONNECT ALL TREE LOCATIONS BACK TO POINT OF CONNECTION.
4. LIMB BRANCHES TO PROVIDE CLEAR PEDESTRIAN ZONE TO 7'-0" ABOVE FINISH GRADE.
5. SCARIFY ALL SOIL MARGINS TO DEPTH OF 6".
6. SEE IRRIGATION PLANS AND DETAILS.

4 TREE PLANTING IN TREE GRATE OVER SAND-BASED STRUCTURAL SOIL
SCALE: 1/2"=1'-0"

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-2:50pm By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-L-DSGN-Working.dwg

Tighe&Bond

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-L-DSGN-WORKING.DWG
DRAWN BY:	OS
CHECKED:	RU
APPROVED:	RU

LANDSCAPE DETAILS

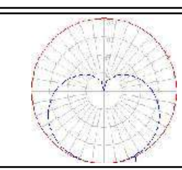
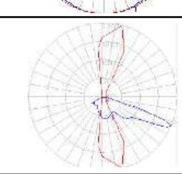
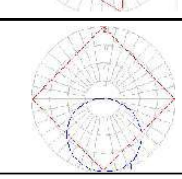
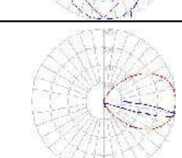
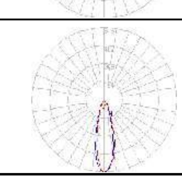
SCALE: AS SHOWN

L-103

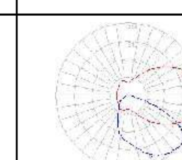
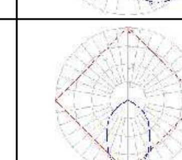
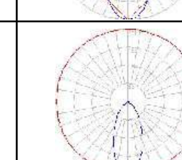
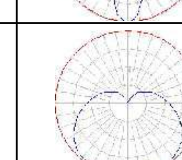
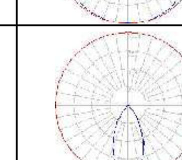
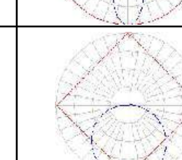
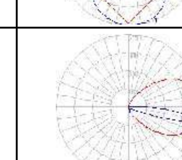
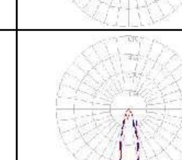
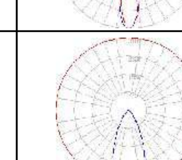
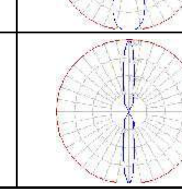
DRAWING INDEX

SHEET NUMBER	DRAWING NUMBER	SHEET TITLE	ISSUE DATE: TAC SUBMISSION 07.15.22	ISSUE DATE: TAC SUBMISSION #3 08.25.22
1	L-001	LIGHTING COVER SHEET, FIXTURE SCHEDULE, AND DRAWING INDEX	●	●
2	L-100	EXTERIOR LIGHTING PLAN AND CALCULATIONS	●	●
3	L-101	EXTERIOR LIGHTING CUTSHEETS NO. 1	●	●
4	L-102	EXTERIOR LIGHTING CUTSHEETS NO. 2	●	●
5	L-103	EXTERIOR LIGHTING CUTSHEETS NO. 3	●	●
6	L-104	EXTERIOR LIGHTING CUTSHEETS NO. 4		●

LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE DESIGNATION	SYMBOL	FIXTURE DESCRIPTION	FIXTURE DISTRIBUTION	LOCATION	QUANTITY	LAMPS: QNTY. PER FIXTURE	LAMPS: TYPE	LAMPS: WATTS		DRIVER/ BALLAST: VOLTS	DRIVER/ BALLAST: DIM TYPE	MAX TOTAL SYSTEM WATTS	SPECIFIED BY	MANUFACTURER/CATALOG NUMBER
P1		PORTSMOUTH STANDARD HISTORIC LED STREET POLES		STREET LIGHTING	19	2	EACH	12.2 W	2200	120V	NON DIM	25 W	LBX STUDIOS	POLE: NEW STAMP LIGHTING "RS-TUR" #RS-TUR-177 #PSHNC-16-10.17-2.88/3.50-CB LAMP: PHILIPS SIGNIFY #12.2A19/LED/927/FR/P/E26/ND/T20 6/1FB
P2		PORTSMOUTH STANDARD COBRA HEAD LED STREET POLES		CROSSWALK	3	1	EA	180 W	17700	120 - 277V	0-10V DIM	180 W	LBX STUDIOS	LEOTEK GREENCOBRA LED STREET LIGHT GC1 F-Series #GC1-80F-MV-WW-2-GY-700-HSS
X6		FLEXIBLE LED FIXTURE		CORNER COMMUNITY SPACE - BENCH	78	1	LF	1.5W	47	120 - 277V	0-10V	1.5W/LF	LBX STUDIOS	Q-TRAN 'ANYBEND-SW' ANBD-SW-XX-WET-30-SO-ENC/TL
X7	–	LED STEP LIGHT		CORNER COMMUNITY SPACE - STAIRS	9	1	EACH	7W	275	120 - 277V	0-10V	7W	LBX STUDIOS	BEGA '24 063' 24 063 - K3
X8	∝◁	LED TREE UPLIGHTS		CORNER COMMUNITY SPACE - PLANTERS	18	1	EACH	3W	156	120V	MLV	3W	LBX STUDIOS	BK LIGHTING 'MINI-MICRO LED' S-MM-LED-E71-MLF-12-11
TOTAL LIGHTING LUMENS (OUTSIDE THE PROPERTY LINE)								56,059						

LIGHTING FIXTURE SCHEDULE

FIXTURE TYPE DESIGNATION	SYMBOL	FIXTURE DESCRIPTION	FIXTURE DISTRIBUTION	LOCATION	QUANTITY	LAMPS: QNTY. PER FIXTURE	LAMPS: TYPE	LAMPS: WATTS	LAMPS: LUMENS	DRIVER/ BALLAST: VOLTS	DRIVER/ BALLAST: DIM TYPE	MAX TOTAL SYSTEM WATTS	SPECIFIED BY	MANUFACTURER/CATALOG NUMBER
X1		LED CYLINDER SCONCE WITH FORWARD THROW DISTRIBUTION.		BUILDING FACADE	98	1	EACH	30 W	448	120 - 277V	0-10V	30 W	LBX STUDIOS	WE-EF 131-0232
X2		LINEAR LED FIXTURE RECESSED IN CANOPY		ENTRY CANOPIES	134	1	LF	4.9 W/ FT	85	120 - 277V	0-10V	4.9 W/ FT	LBX STUDIOS	Q-TRAN 'VERS-LOUVER' VERS-07-SW-1.5-30-DMP-DF-S/P-BWBW-X
X3		SURFACE MOUNTED LINEAR LED GRAZER		GARAGE SCREEN WALL	153	1	LF	18.5 W/FT	150	120 - 277V	DMX	18.5 W/FT	LBX STUDIOS	COLOR KINETICS 'GRAZE COMPACT POWERCORE' 423-000020-01 MOD 150 LUMENS/FT
X4		3' DIAMETER VERTICAL LED CATENARY RING		COMMUNITY SPACE	16	1	EACH	18 W	250	24 VDC	0-10V	18 W	LBX STUDIOS	LUMINII 'PLEXINEON CATENARY' PX-36-VR-1X30-SO-F-CAT-GC PS010V-96-24-LIN MOD 250 LUMENS
X5	∝◁	BUILDING MOUNTED FLOOD LIGHT		GENERAL EXTERIOR	8	1	EACH	26 W	652	120 - 277V	0-10V	26 W	LBX STUDIOS	BEGA '77 607' 77 607-K3-70 050
X6		FLEXIBLE LED FIXTURE		BENCH	37	1	LF	1.5W	47	120 - 277V	0-10V	1.5W/LF	LBX STUDIOS	Q-TRAN 'ANYBEND-SW' ANBD-SW-XX-WET-30-SO-ENC/TL
X7	–	LED STEP LIGHT		STAIRS	14	1	EACH	7W	275	120 - 277V	0-10V	7W	LBX STUDIOS	BEGA '24 063' 24 063 - K3
X8	∝◁	LED TREE UPLIGHTS		PLANTERS	4	1	EACH	3W	156	120V	MLV	3W	LBX STUDIOS	BK LIGHTING 'MINI-MICRO LED' S-MM-LED-E71-MLF-12-11
X9	○	CATENARY MOUNTED LED DOWNLIGHT		COMMUNITY SPACE	6	1	EACH	9W	900	120V	0-10V	9W	LBX STUDIOS	WE-EF 'DAS120 LED' DAS120 LED - MOD 900 LUMENS
X10		LED SCONCE		BUILDING FACADE	98	2	EACH	3W	146	120V	0-10V	6W	LBX STUDIOS	BEGA 66 655 66 655-K3-MOD. DIRECT/INDIRECT, 146 LUMENS
TOTAL LIGHTING LUMENS (WITHIN PROPERTY LINE)							113,381							
SITE AREA							2.07 ACRES							
TOTAL LUMEN/NET ACRE							54,773							
ZONING ORDINANCE MAXIMUM MEAN LUMENS PER NET ACRE ALLOWANCE							55,000							

CONTROL TYPE LEGEND

ND:	NON - DIM
0-10V:	0-10V
MLV:	MAGNETIC TRANSFORMER

SGA

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857.300.2610 | SGA-ARCH.COM

PROJECT TEAM:

CLIENT
TWO INTERNATIONAL GROUP

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PORTSMOUTH, NH 03801
(603) 436-8686

ARCHITECT OF RECORD
MARKET SQUARE ARCHITECTS

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PORTSMOUTH, NH 03801
(603) 501-0202

CIVIL ENGINEER
TIGHE & BOND

177 Corporate Drive
PORTSMOUTH, NH 03801
(603) 433-8818

LANDSCAPE DESIGN
HALVORSON

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BOSTON, MA 02111
(617) 536-0380

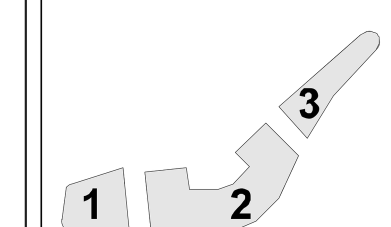
STRUCTURE DESIGN
DESIMONE CONSULTING ENGINEERS
31 MILK STREET
BOSTON, MA 02109
(617) 936-4492

MEP ENGINEER
JB&B

125 HIGH STREET, SUITE 220
BOSTON, MA 02110
(212) 530-9300

LIGHTING DESIGN
LIGHTBOX STUDIOS

80 PINE STREET
NEW YORK, NY 10005
(646) 810-2600



SEAL / SIGNATURE

PROJECT:

Russell Street Mixed Development

2 Russell Street, Portsmouth NH

Two International Group

REVISIONS:

No.	Date	Description

SUBMISSIONS:

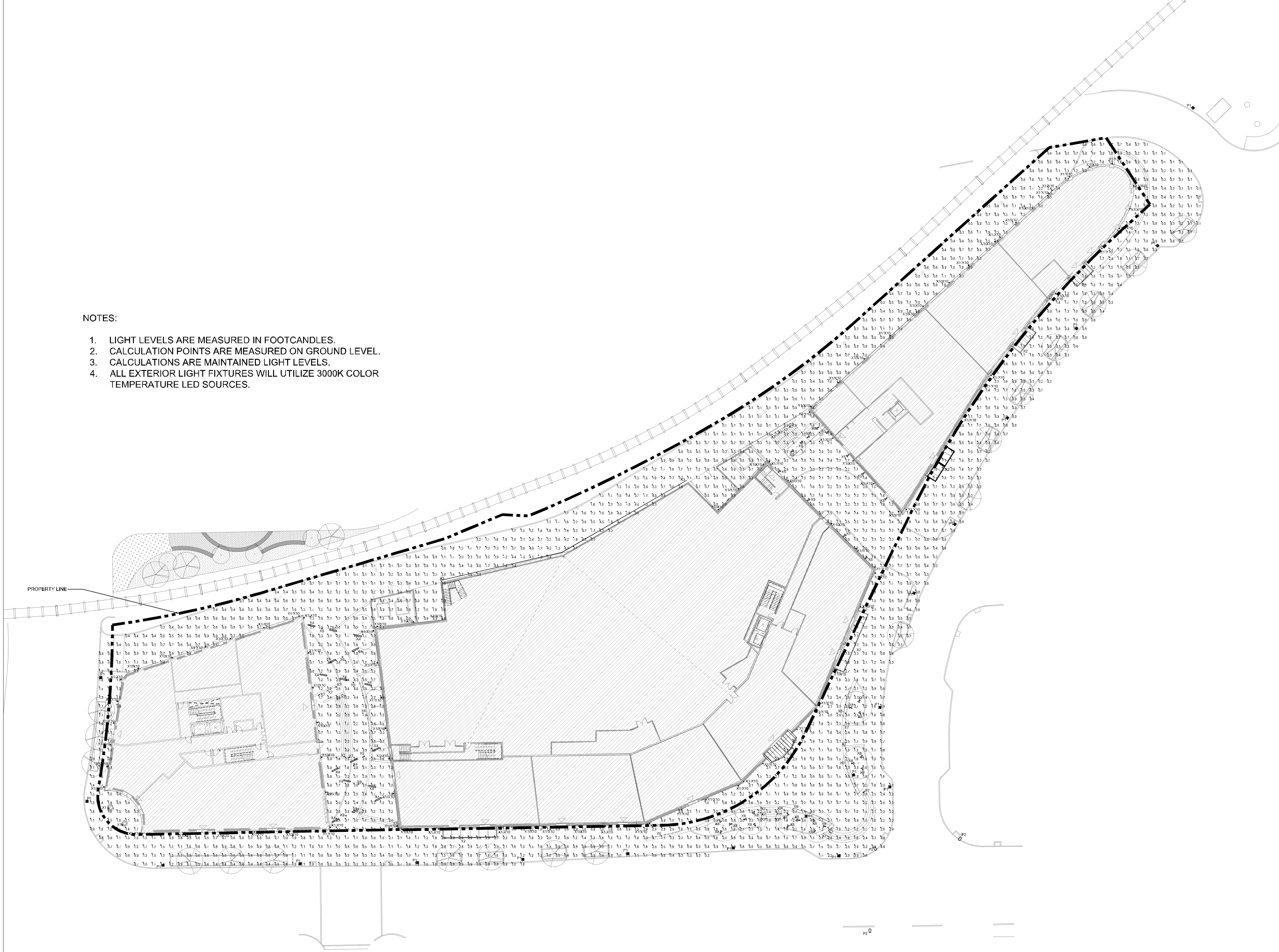
Date	Issued For:
07/15/2022	TAC SUBMISSION
08/25/2022	TAC SUBMISSION #3

SCALE	**NONE**
DATE ISSUED	**07/15/22**
PROJECT NO	**27009.N.001**
DRAWN BY	**JR**
CHECKED BY	**MM**

SHEET TITLE:

LIGHTING COVER SHEET, FIXTURE SCHEDULE, AND DRAWING INDEX

E-001



NOTES:

1. LIGHT LEVELS ARE MEASURED IN FOOTCANDLES.
2. CALCULATION POINTS ARE MEASURED ON GROUND LEVEL.
3. CALCULATIONS ARE MAINTAINED LIGHT LEVELS.
4. ALL EXTERIOR LIGHT FIXTURES WILL UTILIZE 3000K COLOR TEMPERATURE LED SOURCES.

SGA

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PROJECT TEAM:

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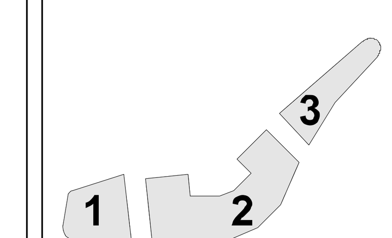


SEAL / SIGNATURE

PROJECT:

Russell Street Mixed Development

2 Russell Street, Portsmouth NH

Two International Group

REVISIONS:

No.	Date	Description

SUBMISSIONS:

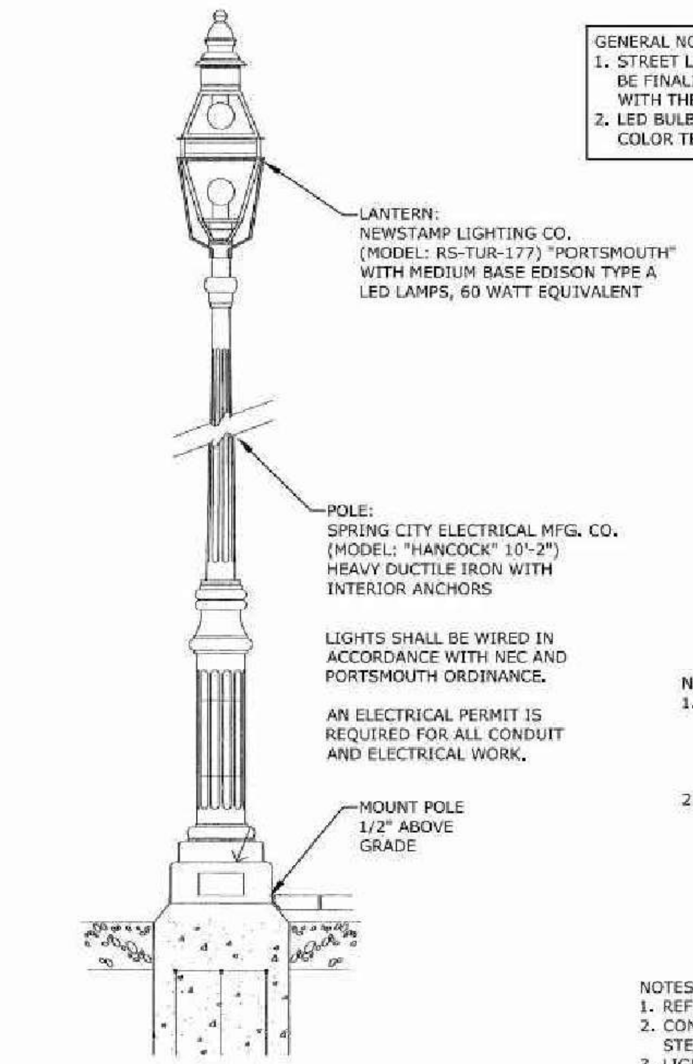
Date	Issued For:
07/15/2022	TAC SUBMISSION
08/25/2022	TAC SUBMISSION #3

SCALE	**1" = 20'-0"**
DATE ISSUED	**07/15/22**
PROJECT NO	**27009.N.001**
DRAWN BY	**JR**
CHECKED BY	**MM**

SHEET TITLE:

EXTERIOR LIGHTING PLAN AND CALCULATIONS

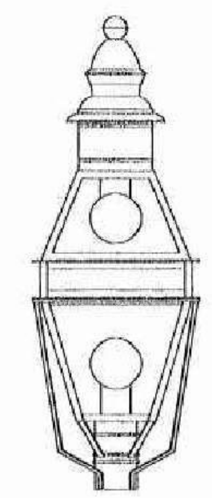
E-100



GENERAL NOTES:
1. STREET LIGHTING TYPE TO BE USED SHALL BE FINALIZED THROUGH CONSULTATION WITH THE PLANNING DEPARTMENT.
2. LED BULBS FOR FIXTURES SHALL BE 3000K COLOR TEMP.

NOTES:
1. LIGHTING CONDUIT SHALL BE 2" PVC IN SAND AND 3'-0" BELOW FINISHED GRADE.
2. CITY OF PORTSMOUTH SHALL BE PROVIDED WITH THEIR OWN METER BOX AND KEY.
3. POWER SHALL BE PROVIDED PER CITY OF PORTSMOUTH REQUIREMENT.
4. POLE SHALL BE MADE FROM DUCTILE IRON.

POLE DETAIL
NO SCALE



NOTES:
1. LIGHT FIXTURE SHALL BE CITY OF PORTSMOUTH STANDARD BY NEWSTAMP LIGHTING COMPANY. FIXTURE SHALL INCLUDE DARK SKY FRIENDLY SHIELD AND SYLVANIA LED LIGHT BULB.
2. LIGHT FIXTURE TO BE USED FOR CITY STREET HISTORIC POLE.

FIXTURE DETAIL
NO SCALE

NOTES:
1. REFER TO ELECTRICAL PLANS FOR WIRING DETAILS.
2. CONCRETE FOUNDATION: 4000 PSI, AIR ENTRAINED STEEL: 60 KSI
3. LIGHT POLE FOUNDATIONS SHALL BE PLACED PRIOR TO INSTALLATION OF BRICK PAVER AND STONE DUST.
4. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL, TO INCLUDE PERFORMANCE SPECIFICATIONS, CALCULATIONS AND ENGINEER'S STAMP FOR LIGHT POLE FOUNDATION.

LIGHT FIXTURE AND POLE
NO SCALE

FIXTURE TYPE 'P1'
STREET LIGHT ON 10FT POLE

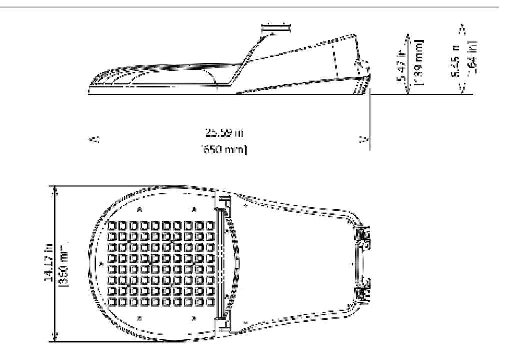
LEOTEK LITE-ON GROUP

Project
Type
Catalog No.

GreenCobra™ LED Street Light
GC1 F-Series Specification Data Sheet

Luminaire Data

Weight 21 lbs [9.5 kg]
EPA 0.67 ft²



Ordering Information
Sample Catalog No. GC1-60F-MV-NW-2-GY-FDC350

Product	No. & Type of LEDs	Voltage	Color Temperature	Distribution	Finish[1]	Drive Current[2]	Options
GC1	20F 30F 40F 60F 80F	MV 120-277V HV 347-480V	WW 3000K NW 4000K CW 5000K	2 Type 2 3 Type 3	GY Gray DB Dark Bronze BK Black	350 350mA 530 530mA 700 700mA 1A[3] 1A	HSS[4] House Side Shield (Factory Installed) FDC[5] Fixed Drive Current FFA[6] Full Field Adjustability LPCR Less Photocontrol Receptacle PCR7 ANSI 7-wire Photocontrol Receptacle PCR7-CR[7] Control Ready 7-wire Photocontrol Receptacle SC PCR Shorting Cap WL Utility Wattage Labe

Notes:
1 Gray, Black and Dark Bronze standard, consult factory for other finishes.
2 Specified drive current code is the factory set maximum drive current. Field adjustable current selector enables standard dimming to lower wattage drive currents only. Consult factory if wattage limits require a special drive current.
3 1A drive current only available with 40F. Specify 1A maximum at time of order.
4 Flush mounted house side shield factory installed. Shield cuts light off at 1/2 mounting height behind luminaire.
5 Non-field adjustable, fixed drive current. Specify required drive current. Not available with PCR7-CR option.
6 The FFA option enables full field adjustability from the specified drive current code to all drive currents available. This option is not DLC qualified.
7 Control-ready wired at factory for wireless node dimming. Supplied at maximum drive current. If lower drive current is required, consult factory.
8 Flush mounted house side shield. Shield cuts light off at 1/2 mounting height behind luminaire. Specify Model and Color.
9 Specify Color (GY, DB, BK)
10 Specify MV (120-277V) or HV (347V-480V)

Accessories*	
HSSGC1[8]	House Side Shield
SPB[9]	Square Pole Horizontal Arm Bracket
RPB[9]	Round Pole Horizontal Arm Bracket
PTB[9]	Pole Top Tenon Horizontal Arm Bracket
PTB2[9]	Pole Top Tenon Horizontal Arm Bracket (2@180°)
WB[9]	Wall Horizontal Arm Bracket
BSK	Bird Deterrent Solder Kit
LLPC[10]	Long-Life Twist Lock Photocontrol
SC	Twist Lock Shorting Cap

*Accessories are ordered separately and not to be included in the catalog number

U.S.A. cULus LISTED DLC ida

FIXTURE TYPE 'P2'
STREET LIGHT ON 20FT POLE

LEOTEK LITE-ON GROUP

GreenCobra™ LED Street Light
GC1 F-Series Specification Data Sheet

Luminaire Specifications

Housing
Die cast aluminum housing with universal four-bolt slip fitter mounts to 1-1/4" to 2" (1-5/8" to 2-3/8" O.D.) diameter mast arm. Aluminum housing provides passive heat-sinking of the LEDs and has upper surfaces that shed precipitation. Mounting provisions meet 3G vibration per ANSI C136.31-2010 Normal Application, Bridge & Overpass. Mounting has leveling adjustment from + 10° to -5° in 2.5° steps and integral bubble level standard. Electrical components are accessed without tools and are mounted on removable power door with stainless steel latches. Standard rubber wildlife guard conforms to mast arm with no gaps.

Light Emitting Diodes
Hi flux/Hi power white LEDs produce a minimum of 90% of initial intensity at 100,000 hours of life based on IES LM-21. LEDs are tested in accordance with IES LM-80 testing procedures. LEDs have correlated color temperature of 3000K (WW), 4000K (NW), or 5000K (CW) and 70 CRI minimum. LEDs are 100% mercury and lead free.

Field Adjustability
LED drive current can be changed in the field to adjust light output for local conditions (not available with PCR7-CR option). The specified drive current code will be the factory set maximum drive current and field adjustments can only be made to available lower wattage drive currents. Select the FFA option if full field adjustability to all available drive currents (700mA max or 1A max) is desired. The FFA option is not DLC qualified.

Quality Control
Every luminaire is performance tested before and after a 2-hour burn-in period. Assembled in the USA.

Optical Systems
Micro-lens optical systems produce IESNA Type 2 or Type 3 distributions and are fully sealed to maintain an IP66 rating. Luminaire produces 0% total lumens above 90° (BUG Rating, U=0). Optional house side shield cuts light off at 1/2 mounting height behind luminaire.

Electrical
Rated life of electrical components is 100,000 hours. Uses isolated power supply that is 1-10V dimmable. Power supply is wired with quick disconnect terminals. Power supply features a minimum power factor of .90 and <20% Total Harmonic Distortion (THD). EMC meets or exceeds FCC CFR Part 15. Terminal block accommodates 6 to 14 gauge wire and is aligned for straight wire entry. Surge protection complies with IEEE/ANSI C62.41 Category C High, 20kV/10kA.

Controls
3-Wire photocontrol receptacle is standard. ANSI C136.41 7-wire (PCR7) photocontrol receptacles are available. All photocontrol receptacles have tool-less rotatable bases. Wireless control module is provided by others.

Finish
Housing receives a fade and abrasion resistant polyester powder coat finish. Finish tested to withstand 3000 hours in salt spray exposure per ASTM B117. Finish tested 500 hours in UV exposure per ASTM G154 and meets ASTM D523 gloss retention.

Listings/Ratings/Labels
Luminaires are UL listed for use in wet locations in the United States and Canada. DesignLights Consortium™ qualified 120-277V 4000K product. Refer to DLC web site for specific DLC listed models. International Dark Sky Association listed. Luminaire is qualified to operate at ambient temperatures of -40°C to 40°C.

Photometry
Luminaires photometrics are tested by certified independent testing laboratories in accordance with IES LM-79 testing procedures. IES files for all CCTs are available at leotek.com.

Warranty
10-year limited warranty is standard on luminaire and components.

LEOTEK LITE-ON GROUP

GreenCobra™ LED Street Light
GC1 F-Series Specification Data Sheet

Performance Data
All data nominal. IES files for all CCTs are available at leotek.com.

No. of LEDs & Type	Drive Current (mA)	System Wattage (W)	Delivered Lumens (Lm)[1]	Efficacy (Lm/W)	Type 2 BUG Rating	Type 3 BUG Rating
20F	350	25	2700	108	B1 U0 G1	B1 U0 G1
	530	35	3650	104	B1 U0 G1	B1 U0 G1
	700	47	4800	102	B1 U0 G1	B1 U0 G1
30F	350	35	3800	109	B1 U0 G1	B1 U0 G1
	530	53	5400	102	B1 U0 G1	B2 U0 G1
	700	70	7000	100	B2 U0 G2	B2 U0 G2
40F	350	45	5050	112	B1 U0 G1	B2 U0 G1
	530	70	7200	103	B2 U0 G2	B2 U0 G2
	700	92	9300	101	B2 U0 G2	B2 U0 G2
40F (1A Maximum)	530	70	7200	103	B2 U0 G2	B2 U0 G2
	700	92	9300	101	B2 U0 G2	B2 U0 G2
	1000	132	12300	93	B3 U0 G3	B3 U0 G3
60F	350	70	7600	109	B2 U0 G2	B2 U0 G2
	530	101	10400	103	B2 U0 G2	B2 U0 G2
	700	133	13400	101	B3 U0 G3	B3 U0 G3
80F	350	85	9500	112	B2 U0 G2	B2 U0 G2
	530	133	14200	107	B3 U0 G3	B3 U0 G3
	700	180	17700	98	B3 U0 G3	B3 U0 G3

Notes:
1 All data nominal lumens for 4000K (NW) and 5000K (CW). For 3000K (WW) apply a LLF of 0.93. Normal tolerance ± 10% due to factors including distribution type, LED bin variance, and ambient temperatures.

SLS410 LED
131-0232 (previous product code: 620-6216 for reference only!)
1/3

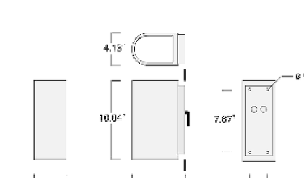
we-ef

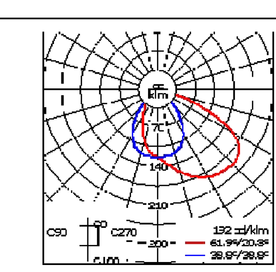
Description
Surface-mounted wall luminaire. IP66. Class I. IK07. Marine-grade, die-cast aluminum alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. Safety glass lens. Two cable entries. CAD-optimized optics for superior illumination and glare control. Integral driver. OLC® One LED Concept. Factory-installed LED circuit board. 0-10V Dimming comes standard with luminaire. Suitable for Up, Down, or Up/Down light distribution. Supplied with wall plate to fit over 4" recessed junction box. Specify product with 7 Digit product code – Finish Color. Accessories, such as mounting, optical, and electrical, must be specified separately. Example: XXX-XXXX-9004 (Black) + XXX-XXXX (Accessory 1)

Beam Type	asymmetric, 'forward throw' [A60]
Light Source	LED-3/13W / 1400 mA - 3000 K
CRI	80
Gear Type	electronic gear
Nominal Luminous Flux (lm)	
LED Lumens	498.7 lm
LEDs	3
Total Lumens	1496 lm
Tj	85 °C
Delivered Lumens Flux (lm)	
LED Lumens	149.4 lm
Total Lumens	448.1 lm
Ta	25 °C
Rated Input Power	16 W

SLS410 LED
131-0232 (previous product code: 620-6216 for reference only!)
2/3

we-ef





Material Specification

Body:	Marine-grade, die-cast aluminium alloy
Weight (lbs):	7.70
Lens:	Safety glass lens
Colours:	RAL9004 Black RAL9007 Grey Metallic RAL9016 White RAL8019 Dark Bronze
Quick Ship	Quickship features a one week ship time for Steplights and two week ship time for the rest of our Core products. All applicable information must be included for orders to be processed and colours must be in one of our 4 standard finishes. A maximum order quantity of 30 pieces applies.
Gasket:	Silicone rubber gasket
Fasteners:	PCS hardware
Ingress protection:	IP66
Impact protection:	IK07
Corrosion protection:	5CE
Listings:	UL listed. Suitable for wet locations.

Electrical Specification

Power supply:	Integral [ECG] electronic 0-10 V dimmable driver in 120-277 universal voltage.
Driver / Ballast:	Integral LC electronic converter
Cable:	Two cable entries

Lifetime
Ta=25°/40° L90B10 > 90000h

BUG Rating:
B0 U0 G0

SLS410 LED
131-0232 (previous product code: 620-6216 for reference only!)
3/3

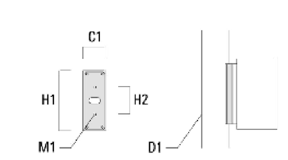
we-ef

Mounting Accessories

Column fitter
Mounting plate for installing SLS400 series on columns.

CF-410/420

	C1	D1	H1	H2	M1	Weight (lbs)
131-9140	3.27	5.51	8.66	3.94	0.24	1.32 lbs



FIXTURE TYPE 'X1'
BUILDING MOUNTED LIGHT FIXTURE

SGA

54 W 21st Street, Suite 1201
NEW YORK, NY 10010
857.300.2610 | SGA-ARCH.COM

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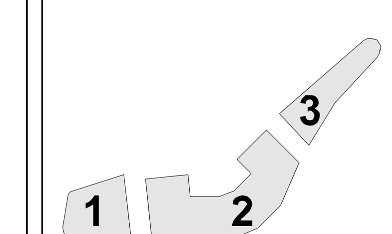


SEAL / SIGNATURE

PROJECT:

Russell Street Mixed Development

2 Russell Street, Portsmouth NH

Two International Group

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/15/2022	TAC SUBMISSION
08/25/2022	TAC SUBMISSION #3

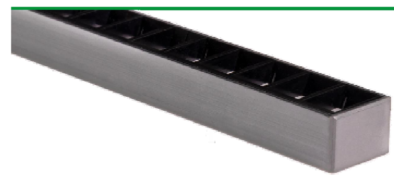
SCALE	**NONE**
DATE ISSUED	**07/15/22**
PROJECT NO	**27009.N.001**
DRAWN BY	**JR**
CHECKED BY	**MM**

SHEET TITLE:

EXTERIOR LIGHTING CUTSHEETS NO. 1

E-101

VERS-LOUVER (07) Linear Fixtures - Surface



The VERS Louver is designed to eliminate glare, rendering more precise light distribution. A custom-sized black VERS louver fits snugly above a low-profile clear or diffused lens to mitigate diode imaging and glare issues. Metal endcaps combined with the flush louver and extruded aluminum VERS housing provide a sleek compact fixture.

Part Number Builder

Static White

Product	WFT	CCT	Pairs	Lens	Input/Output	Connector/Wire In	Connector/Wire Out	Wire Color	Wire Type	Mounting	Finish	Length (in)
VERS-07-SW												

Static White High Efficacy

• 5 year warranty
• Field modifications void warranty
• Data subject to change, all data has +/- 5% tolerance
• Compatible for use with Q-Tran power supplies
• Suitable for installation in the storage area of a clothes closet when using wattage of 4.0W/ft or less

VERS-LOUVER (07) Linear Fixtures - Surface

Technical Information

Static White · Static White High Efficacy · Dynamic White High Efficacy · Dynamic White · Static Color · Warm Dim · RGBW · RGB · RGBW High Efficacy · Temperature Ratings

VERS-LOUVER (07) Linear Fixtures - Surface

Lens · Beam Angle · Finish · Connector/Wire – In/Out · Input/Output · Dimensions · Mounting · End Caps · Light Engine Spacing Detail

FIXTURE TYPE 'X2'
ENTRY CANOPY FIXTURE

Graze Compact Powercore

Date
Type
Firm Name
Project

IntelliHue, 100 to 277 VAC, Low Power, 30° x 60°, 305 mm (1 ft)

Exterior compact linear grazing luminaire with intelligent white and color light

Graze Compact is a high-performance, exterior linear luminaire designed to highlight architectural features like molding details, archways and windows up to two stories high. Graze Compact IntelliHue utilizes Color Kinetics IntelliHue technology to produce millions of saturated colors, pastels, and high-quality white light, in the same precisely controllable luminaire. Multiple luminaire lengths and beam angles support a large range of façade or surface illumination applications. The brand new low-profile housing, connectorized cabling, a universal power input range, and direct line voltage make Graze Compact luminaires easy to install and operate.

• Tailor light output to specific applications—Available in two standard lengths (1 ft and 4 ft), and four standard 10° x 60°, 30° x 60°, 60° x 60°, and 100° x 100° beam angles
• Ultra compact form factor—Graze Compact's ultra-low profile is half the size of Graze, allowing it to fit discretely into almost any layout, from simple to elaborate.
• Integrates patented Powercore technology that controls power output to luminaires directly from line voltage – rapidly, efficiently, and accurately. The Color Kinetics Data Enabler Pro merges line voltage with control data and delivers them to luminaires over a single standard cable, dramatically simplifying installation and lowering total system cost.
• Graze Compact provides years of reliable use under rugged conditions.

COLORKINETICS

Specifications

Output · Electrical · Control · Lumen Maintenance · Physical · Temperature Ranges · Vibration Resistance · Corrosion Resistance · Thermal Protection enabled · Luminaire Run Lengths · Certification and Safety

FIXTURE TYPE 'X3'
SCREEN WALL GRAZER

iLight Plexineon Catenary Mount — Static White CQ, 1X, 2X | Colors

Features

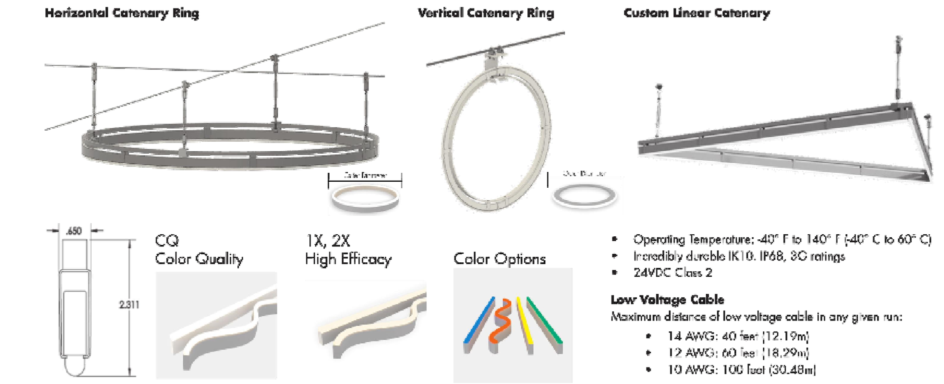
• Neon look providing a crisp, clean line of light.
• Catenary cable mount designed to be suspended outdoors, but also can be used indoors to reduce suspension points
• Available in standard Plexineon vertical or horizontal rings, and linear runs. Custom designs may also be available.
• Package includes luminaire, aluminum support structure, and necessary hardware.
• Luminaires have rugged solid plastic sidewalls that are standard in metallic gray.
• Matte black, matte white or matte gray sidewalls are also available with some colors
• Incredibly durable, featuring IP68, IK10, & 3G ratings
• Standard ring sizes are available up to 24 feet in diameter for horizontal rings and 6 feet in diameter for vertical rings.
• Operating temperature -40°F to 140°F (-40°C to 60°C)
• Low voltage 24VDC, Class 2
• Warranty: 5 years indoors, 3 years outdoors

Common Applications

Patios | Outdoor Dining Areas | Roof Top Bars | Courtyards | Airports | Statement Pieces

iLight Plexineon Catenary Mount — Static White CQ, 1X, 2X | Colors

Horizontal Catenary Ring · Vertical Catenary Ring · Custom Linear Catenary



Technical Information

Ordering Code

FIXTURE TYPE 'X4'
COMMUNITY SPACE CATENARY FIXTURE

---

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JB&B

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1 2 3

SEAL / SIGNATURE

PROJECT:

Russell Street Mixed Development

2 Russell Street, Portsmouth NH

Two International Group

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/15/2022	TAC SUBMISSION
08/25/2022	TAC SUBMISSION #3

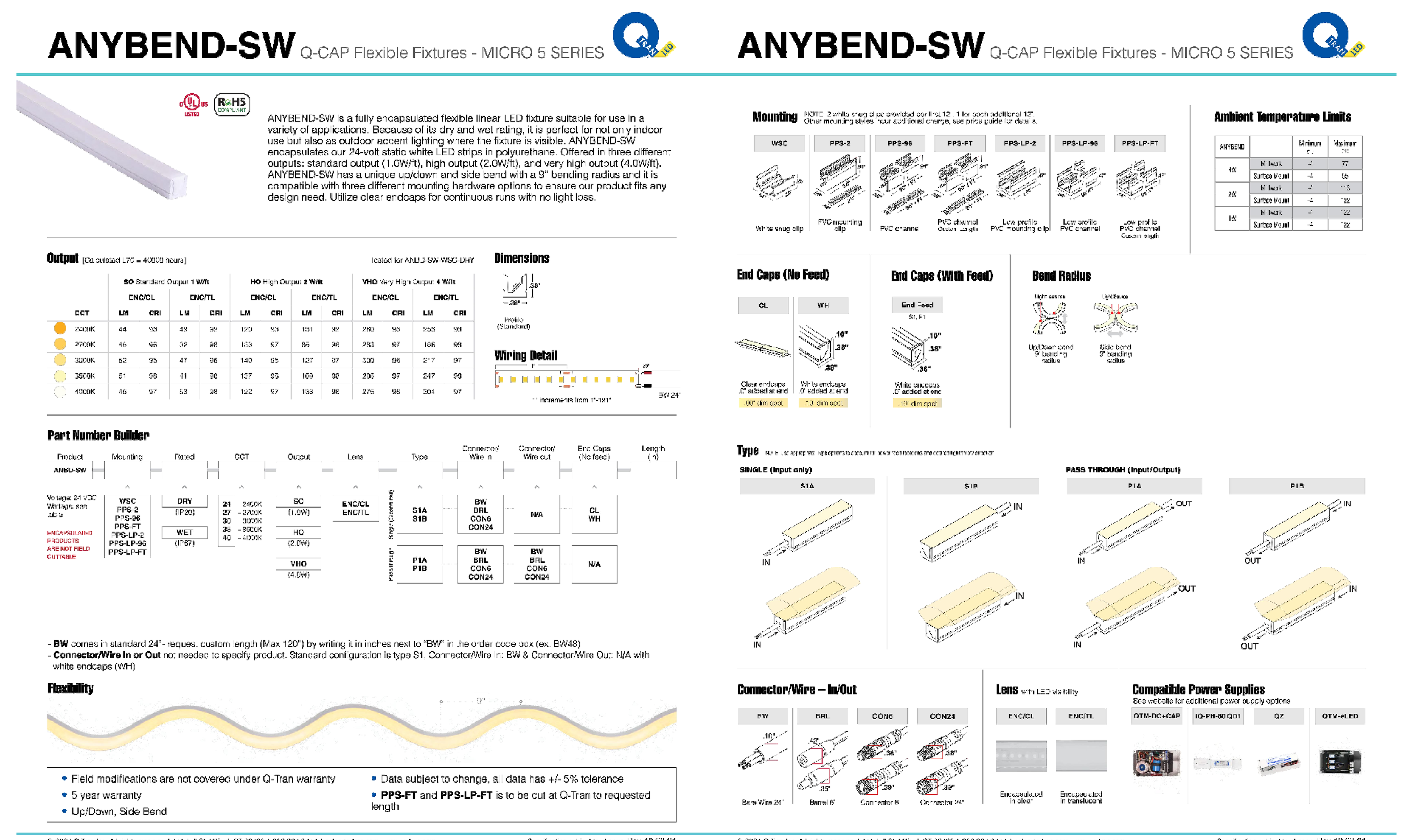
SCALE NONE
DATE ISSUED 07/15/22
PROJECT NO 27009.N.001
DRAWN BY JR
CHECKED BY MM

SHEET TITLE:

EXTERIOR LIGHTING CUTSHEETS NO. 2

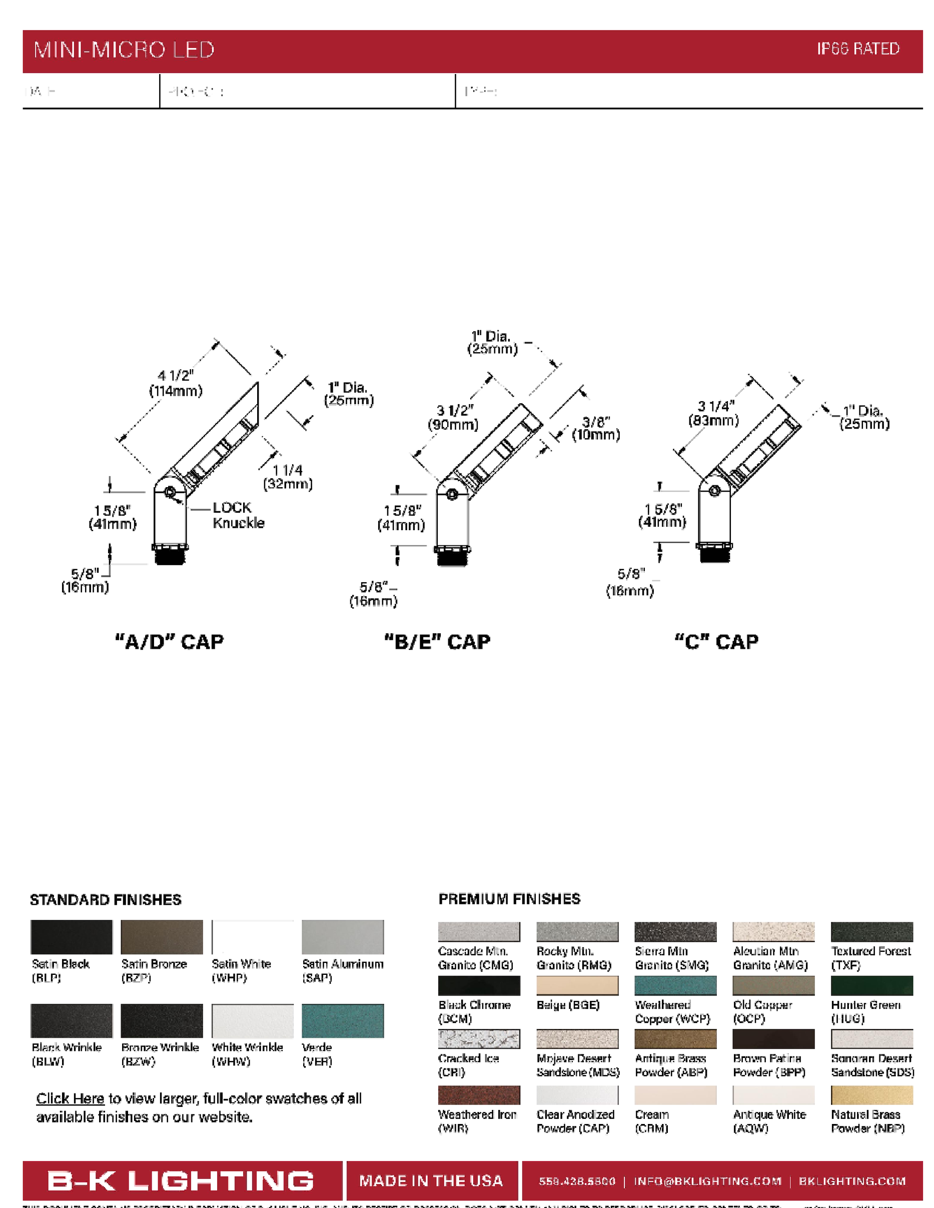
E-102

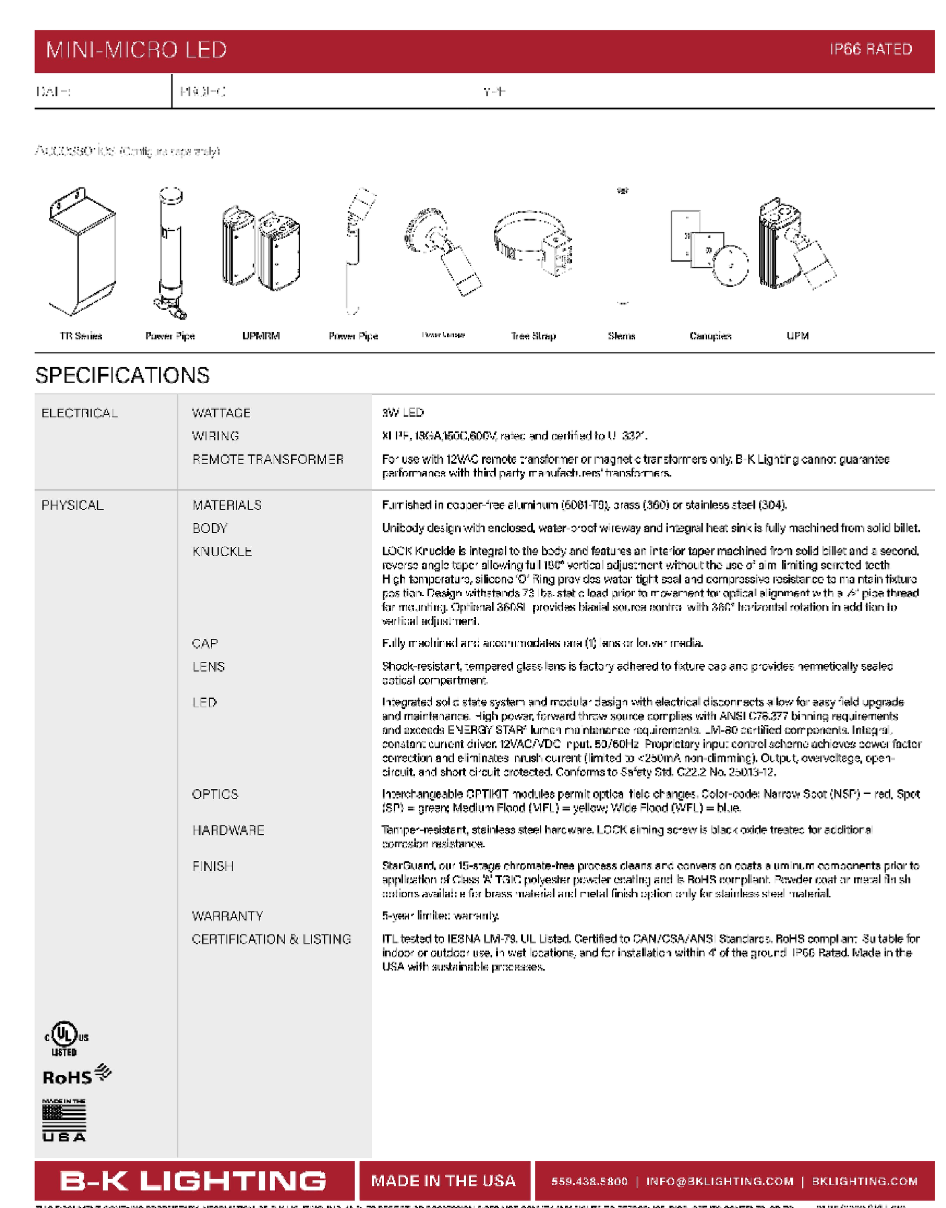
FIXTURE TYPE 'X5'
BUILDING FLOODLIGHT

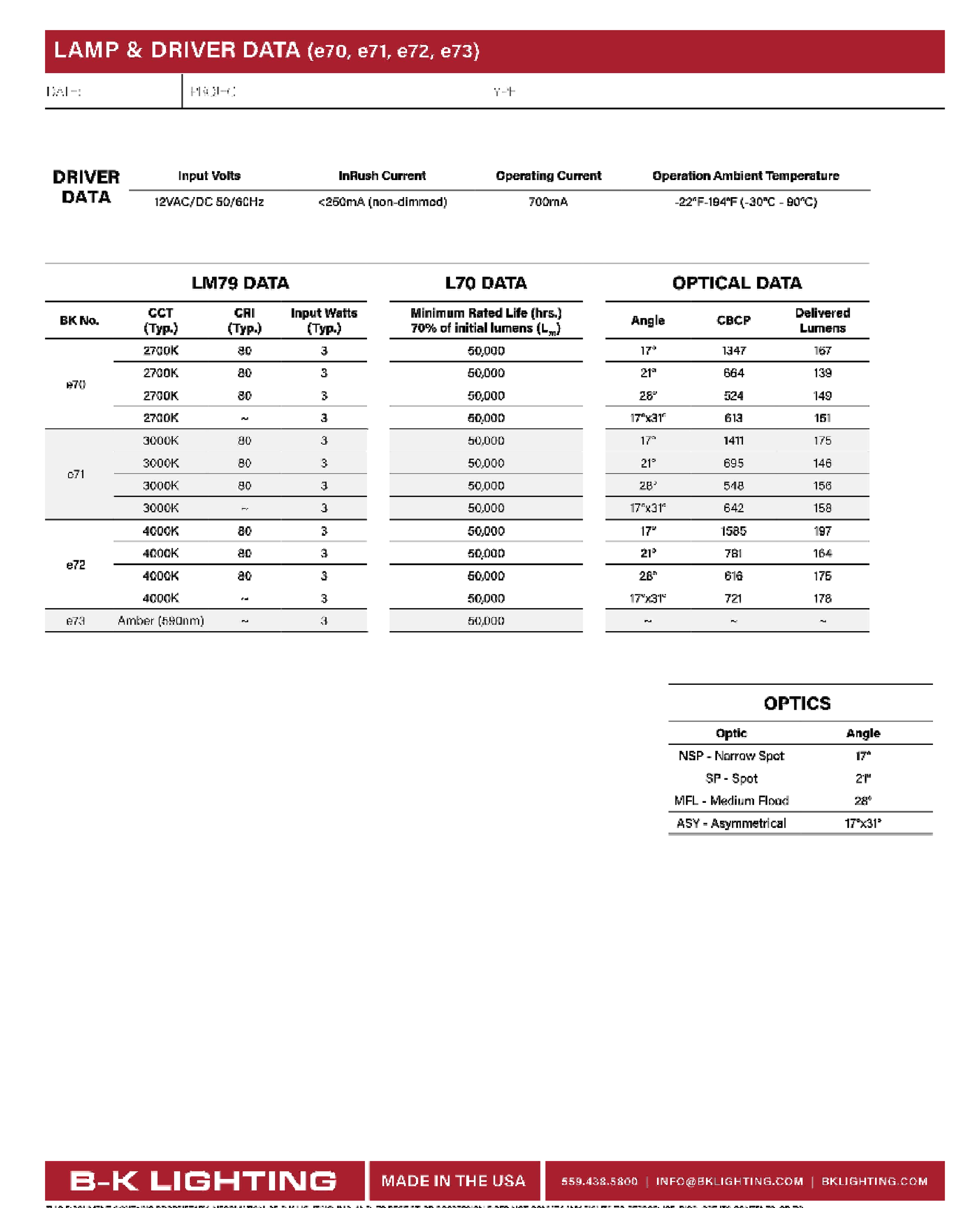


FIXTURE TYPE 'X6'
BENCH LIGHT

FIXTURE TYPE 'X7'
STEP LIGHT







FIXTURE TYPE 'X8'
TREE UPLIGHT

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PROJECT TEAM:

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LIGHTING DESIGN
LIGHTBOX STUDIOS
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(646) 810-2600

1 2 3

SEAL / SIGNATURE

PROJECT:
Russell Street Mixed Development

2 Russell Street, Portsmouth NH

Two International Group

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
07/15/2022	TAC SUBMISSION
08/25/2022	TAC SUBMISSION #3

SCALE	NONE
DATE ISSUED	07/15/22
PROJECT NO	27009.N.001
DRAWN BY	JR
CHECKED BY	MM

SHEET TITLE:
EXTERIOR LIGHTING CUTSHEETS NO. 3

E-103

DAS120 LED
134-2183

1/4

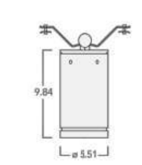
Description
IP66, Class I. IK07. Marine-grade, die-cast aluminum alloy. 5CE superior corrosion protection including PCS hardware. Silicone CCG® Controlled Compression Gasket. Safety glass lens. One cable entry, second cable entry for through wiring with cable connector optional. Integral driver, thermally separated. CAD-optimized optics for superior illumination and glare control. OLC® One LED Concept. Factory installed LED circuit board. 0-10V Dimming comes standard with luminaire. The luminaire is factory-sealed and does not need to be opened during installation. Optional 2200 K version available, to be specified at time of ordering. Includes cable connector, for cable 0.08-0.47 inch. +/- 10° adjustable to compensate for sloping catenary systems. Specify product with 7 Digit product code – Finish Color. Accessories, such as mounting, optical, and electrical, must be specified separately. Example: XXX-XXXX – 9004 (Black) + XXX-XXXX (Accessory 1)

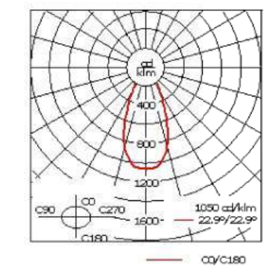
Beam Type	symmetric, wide beam [W]
Light Source	LED-12/24W / 700 mA - 3000 K
CRI	80
Gear Type	electronic gear
Nominal Luminous Flux (lm)	
LED Lumens	245.9 lm
LEDs	12
Total Lumens	2951 lm
Tj	85 °C
Delivered Lumens Flux (lm)	
LED Lumens	180.8 lm
Total Lumens	2169.9 lm
Ta	25 °C
Rated Input Power	28 W

WE-EF LIGHTING USA LLC
Spec Support Hotline: +1 724 278 3855 | 410-D Keystone Drive | Warrendale PA 15086 U.S.A. | Tel +1 724 742 0030 | info.usa@we-ef.com | www.we-ef.com | 24-08-2022 23:45
Technical modifications and errors excepted

DAS120 LED
134-2183

2/4





Material Specification

Body:	Marine-grade, die-cast aluminum alloy
Weight (lbs):	8.60
Lens:	Safety glass lens
Colours:	RAL9004 Black RAL9007 Grey Metallic RAL9016 White RAL8019 Dark Bronze
Gasket:	Silicone CCG® Controlled Compression Gasket
Fasteners:	PCS Polymer Coated Stainless Steel Hardware
Ingress protection:	IP66
Impact protection:	IK07
Corrosion protection:	5CE
Mounting:	Includes cable connector, for cable 2-12 mm. +/- 10° adjustable
Listings:	Contact WE-EF USA for ETL/UL certification status.
Windage (EPA):	0.0376 m²

Electrical Specification

Power factor:	> 0.9
Driver / Ballast:	Standard. DALI on request
Cable:	One cable entry, optional T-QPD connector for through wiring available on request

Lifetime
Ta=25°/40° L90B10 > 90000h

WE-EF LIGHTING USA LLC
Spec Support Hotline: +1 724 278 3855 | 410-D Keystone Drive | Warrendale PA 15086 U.S.A. | Tel +1 724 742 0030 | info.usa@we-ef.com | www.we-ef.com | 24-08-2022 23:45
Technical modifications and errors excepted

DAS120 LED
134-2183

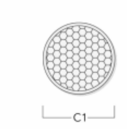
3/4

Optical Accessories

Honeycomb louvre
Honeycomb louvre, matt black Teflon® coated. For luminaires equipped with [B] [M] light distribution. A maximum of one internal optical accessory.

IW-DAC120-LED

	C1
134-2002	4.05



Linear spread lens
Broadens light distribution in one plane only. Ideally suitable for [M] [EE] [EES]. Does not fit in combination with [B] lens. Internal component, factory installed.

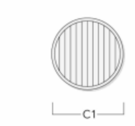
WE-EF LIGHTING USA LLC
Spec Support Hotline: +1 724 278 3855 | 410-D Keystone Drive | Warrendale PA 15086 U.S.A. | Tel +1 724 742 0030 | info.usa@we-ef.com | www.we-ef.com | 24-08-2022 23:45
Technical modifications and errors excepted

DAS120 LED
134-2183

4/4

IO-180-DAC120-LED

	C1
134-2000	4.05



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Spec Support Hotline: +1 724 278 3855 | 410-D Keystone Drive | Warrendale PA 15086 U.S.A. | Tel +1 724 742 0030 | info.usa@we-ef.com | www.we-ef.com | 24-08-2022 23:45
Technical modifications and errors excepted

FIXTURE TYPE 'X9'
CATENARY DOWNLIGHT

Wall luminiare - single-sided light output

BEGA

Application
Wall luminaires with single-sided light output designed to provide up or down lighting effects for interior and exterior locations.

Materials
Luminaire housing and faceplate constructed of die-cast marine grade, copper free (≤0.3% copper content) A360.0 aluminum alloy
Clear safety glass
Reflector made of pure anodized aluminum
High temperature silicone gasket
Mechanically captive stainless steel fasteners

NRTL listed to North American Standards, suitable for wet locations
Protection class IP65
Weight: 4.4 lbs

Electrical

Operating voltage	120-277V AC
Minimum start temperature	-30°C
LED module wattage	7.9W
System wattage	10.5W
Controllability	0-10V dimmable
Color rendering index	Ra> 80
Luminaire lumens	652 lumens (3000K)
LED service life (L70)	60,000 hours

LED color temperature
☐ 4000K - Product number + **K4 (*EXPRESS*)**
☐ 3500K - Product number + **K35**
☐ 3000K - Product number + **K3 (*EXPRESS*)**
☐ 2700K - Product number + **K27**
☐ Amber - Product number + **AMB**

Wildlife friendly amber LED - Optional
Luminaire is optionally available with a narrow bandwidth, amber LED source (585-600nm) approved by the FWC. This light output is suggested for use within close proximity to sea turtle nesting and hatching habitats. Electrical and control information may vary from standard luminaire.

LED module wattage	9.0W (Amber)
System wattage	11.6W (Amber)
Luminaire lumens	220 lumens (Amber)

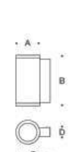
BEGA can supply you with suitable LED replacement modules for up to 20 years after the purchase of LED luminaires - see website for details

Finish
All BEGA standard finishes are matte, textured polyester powder coat with minimum 3 mil thickness.

Available colors ☐ Black (BLK) ☐ White (WHT) ☐ RAL:
☐ Bronze (BRZ) ☐ Silver (SLV) ☐ CUS:

Type:
BEGA Product:
Project:
Modified:

Available Accessories
☐ **79547** Suface mounted wiring box
See individual accessory spec sheet for details.



Wall luminaire · single-sided output

	LED	β	A	B	C	D	Required wiring box
66655	7.9W	19.5°	4 3/8	9	6 3/8	1 5/8	**19537**

β = Beam angle

BEGA 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 info@bega-us.com
Due to the dynamic nature of lighting products and the associated technologies, luminaire data on this sheet is subject to change at the discretion of BEGA North America. For the most current technical data, please refer to bega-us.com

Updated 03/19/19

FIXTURE TYPE 'X10'
UPPER SCONCE

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MEP ENGINEER
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125 HIGH STREET, SUITE 220
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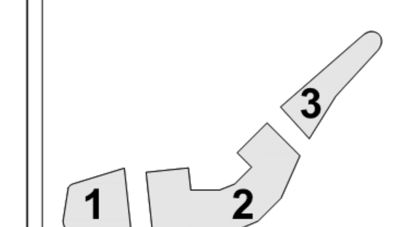
NEW YORK, NY 10005
(646) 810-2600



SEAL / SIGNATURE

06/10/22

PROJECT:

Russell Street Mixed Development

2 Russell Street, Portsmouth NH

Two International Group

REVISIONS:

No.	Date	Description

SUBMISSIONS:

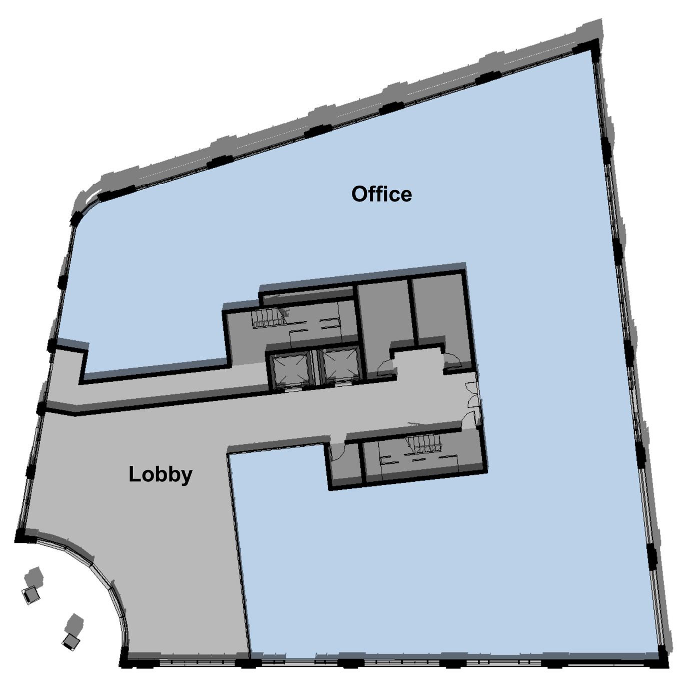
Date	Issued For:
08/25/2022	TAC SUBMISSION #3

SCALE	NONE
DATE ISSUED	07/15/22
PROJECT NO	27009.N.001
DRAWN BY	JR
CHECKED BY	MM

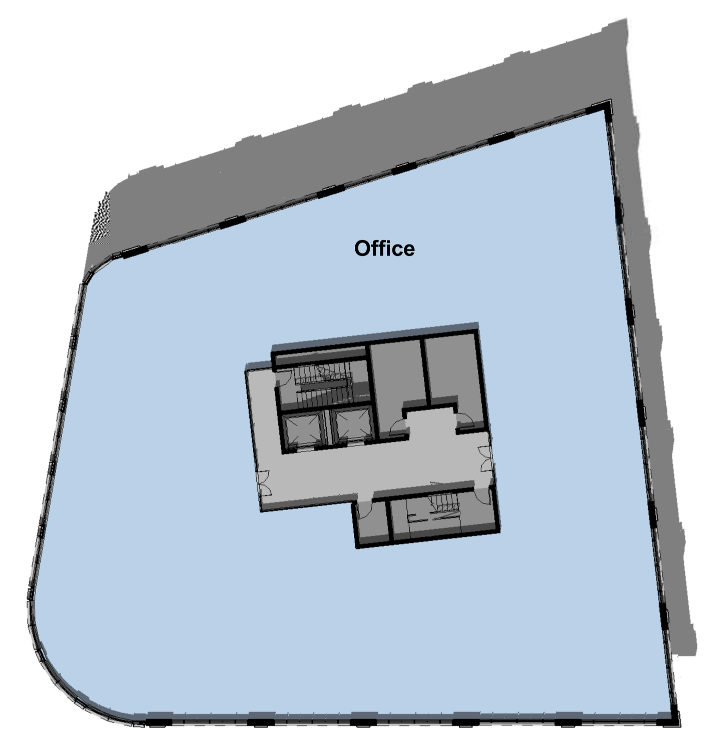
SHEET TITLE:

EXTERIOR LIGHTING CUTSHEETS NO. 4

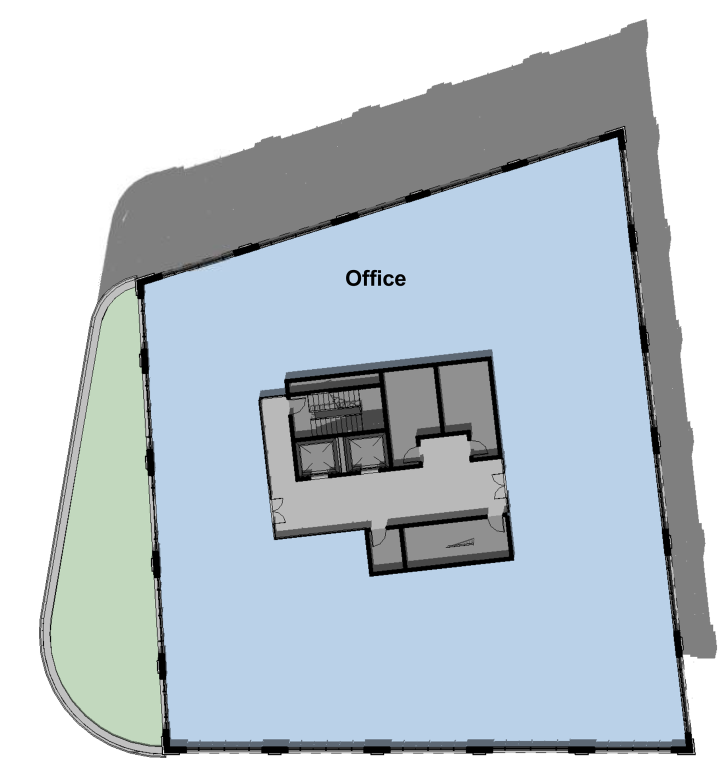
E-104



1 B1 - LEVEL 1
1/32" = 1'-0"



2 B1 - LEVEL 3
1/32" = 1'-0"



3 B1 - LEVEL 4
1/32" = 1'-0"

GROSS AREA CALCULATIONS

B1 - LEVEL 1	
Back of House	1,061 SF
Lobby	2,574 SF
Office	7,974 SF
	11,609 SF
B1 - LEVEL 2	
Back of House	956 SF
Lobby	663 SF
Office	10,312 SF
	11,932 SF
B1 - LEVEL 3	
Back of House	956 SF
Lobby	663 SF
Office	10,313 SF
	11,932 SF
B1 - LEVEL 4	
Back of House	956 SF
Lobby	663 SF
Office	8,851 SF
	10,471 SF
GRAND TOTAL	45,944 SF

AREA LEGEND

- OFFICE
- CONDO
- RETAIL
- PARKING
- LOBBY
- OUTDOOR SPACE
- BACK OF HOUSE

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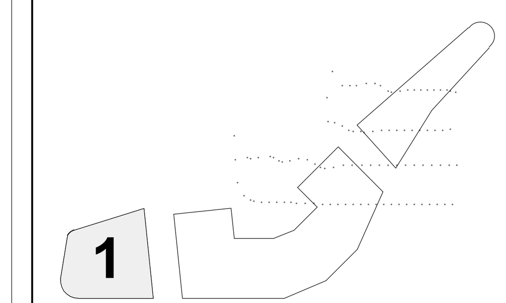
PROJECT TEAM:



SEAL / SIGNATURE

PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

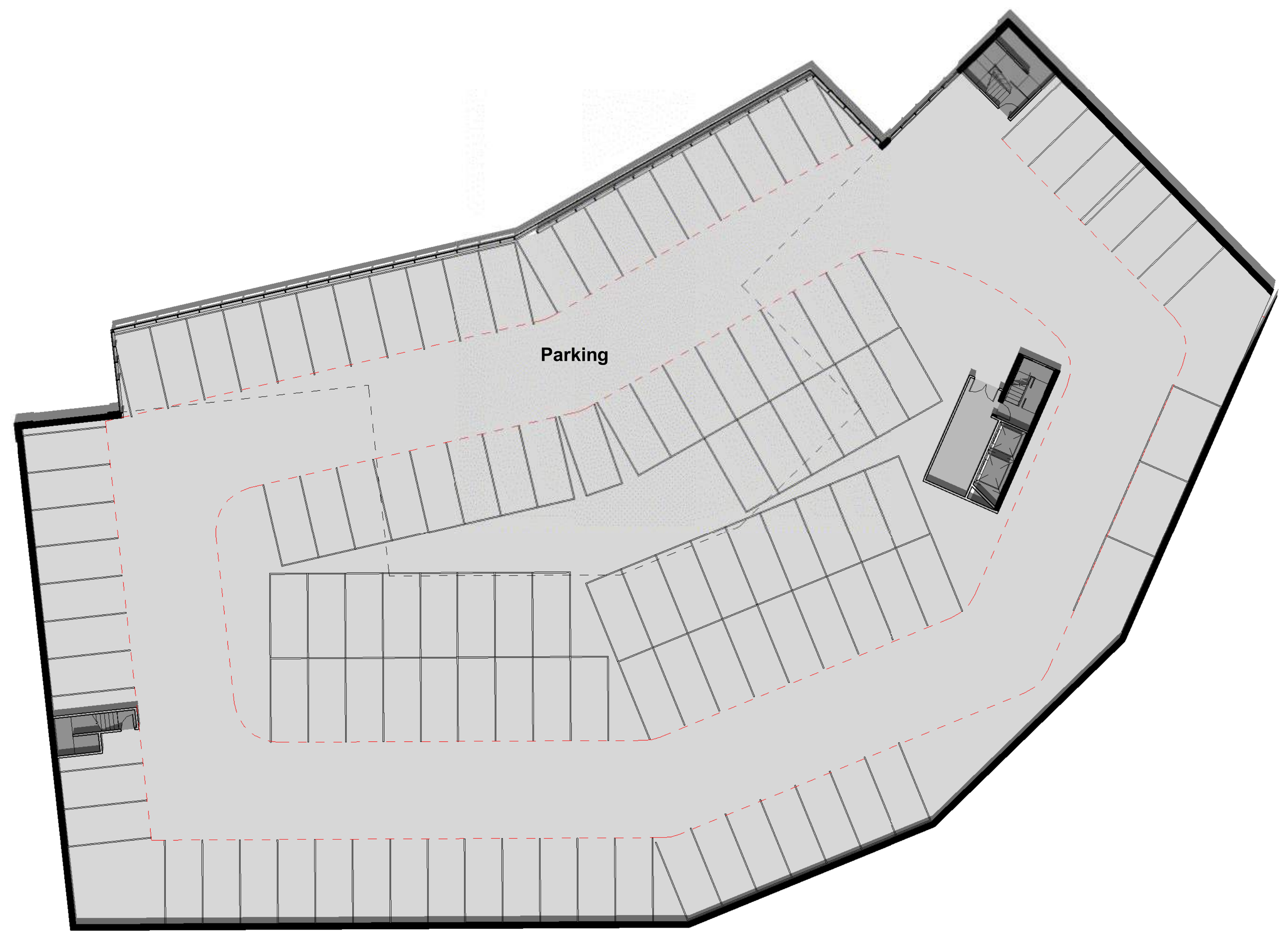
SCALE	**As indicated**
DATE ISSUED	**05/23/22**
PROJECT NO	**4979.00**
DRAWN BY	**Author**
CHECKED BY	**Checker**

SHEET TITLE:

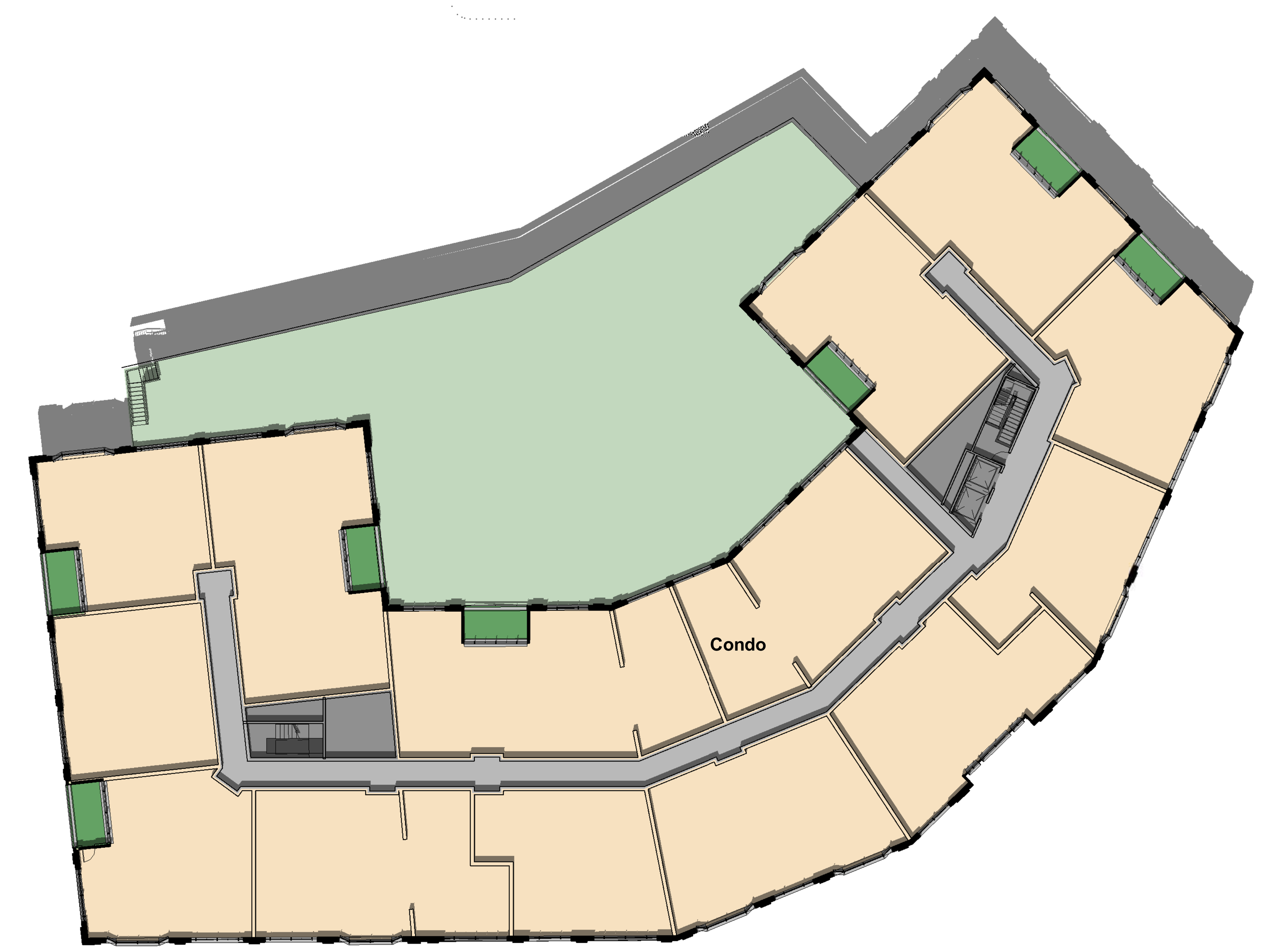
BUILDING 1 AREA PLANS

A - 101

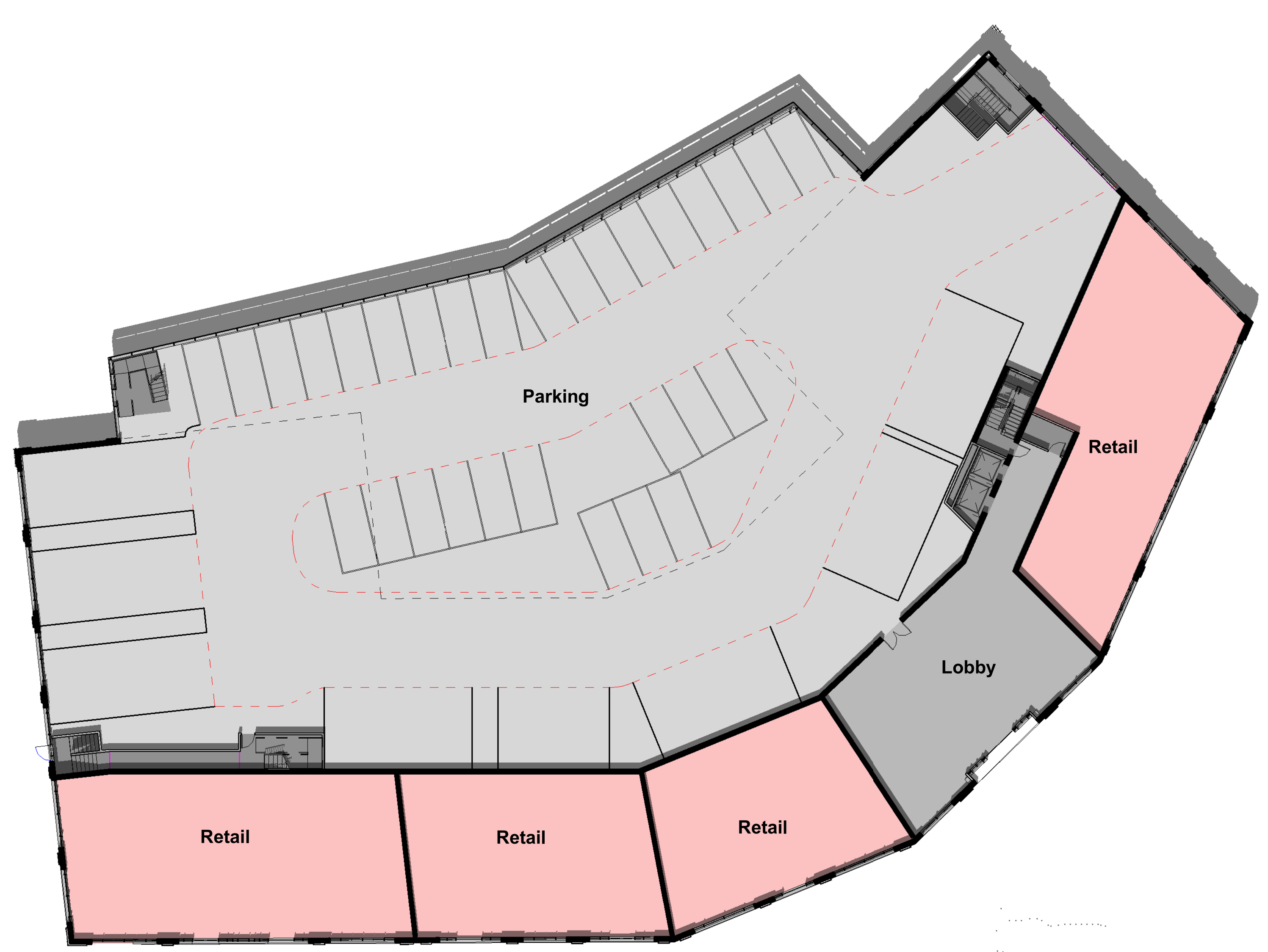
5/23/2022 9:25:21 PM



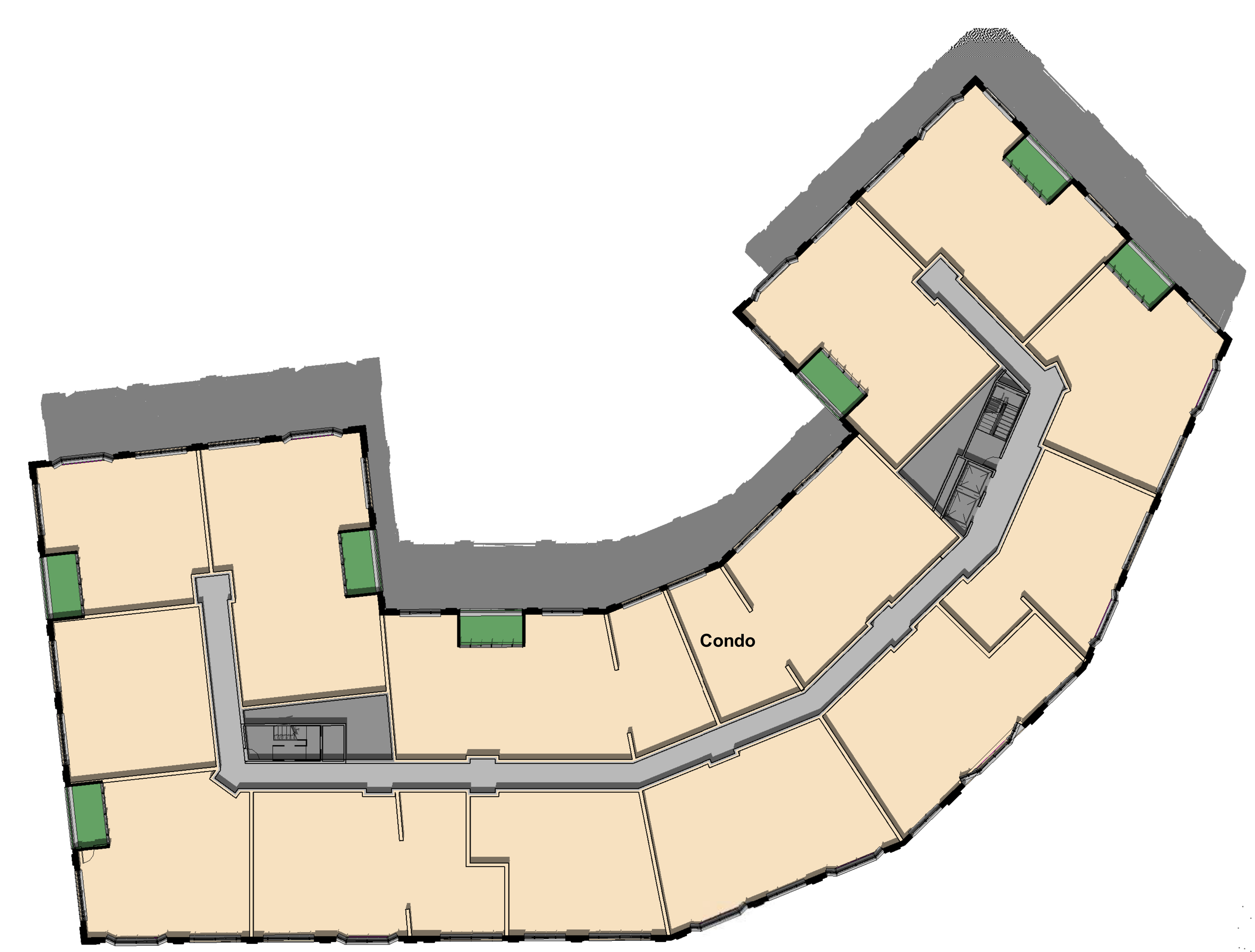
1 B2 - LEVEL 0
1/32" = 1'-0"



3 B2 - LEVEL 2
1/32" = 1'-0"



2 B2 - LEVEL 1
1/32" = 1'-0"



4 B2 - LEVEL 3-5
1/32" = 1'-0"

GROSS AREA CALCULATIONS

B2 - LEVEL 0	
Back of House	625 SF
Lobby	253 SF
Parking	38,270 SF
	39,148 SF
B2 - LEVEL 1	
Back of House	1,263 SF
Lobby	2,441 SF
Parking	25,590 SF
Retail	10,440 SF
	39,735 SF
B2 - LEVEL 2	
Back of House	1,082 SF
Balcony	944 SF
Condo	25,109 SF
Lobby	2,619 SF
	29,754 SF
B2 - LEVEL 3	
Back of House	1,082 SF
Balcony	944 SF
Condo	25,395 SF
Lobby	2,391 SF
	29,810 SF
B2 - LEVEL 4	
Back of House	1,082 SF
Balcony	944 SF
Condo	25,395 SF
Lobby	2,391 SF
	29,810 SF
B2 - LEVEL 5	
Back of House	1,082 SF
Balcony	944 SF
Condo	25,395 SF
Lobby	2,391 SF
	29,810 SF
GRAND TOTAL	198,068 SF

AREA LEGEND

- OFFICE
- CONDO
- RETAIL
- PARKING
- LOBBY
- OUTDOOR SPACE
- BACK OF HOUSE

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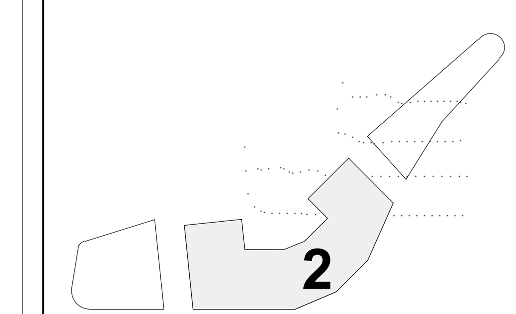
PROJECT TEAM:



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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

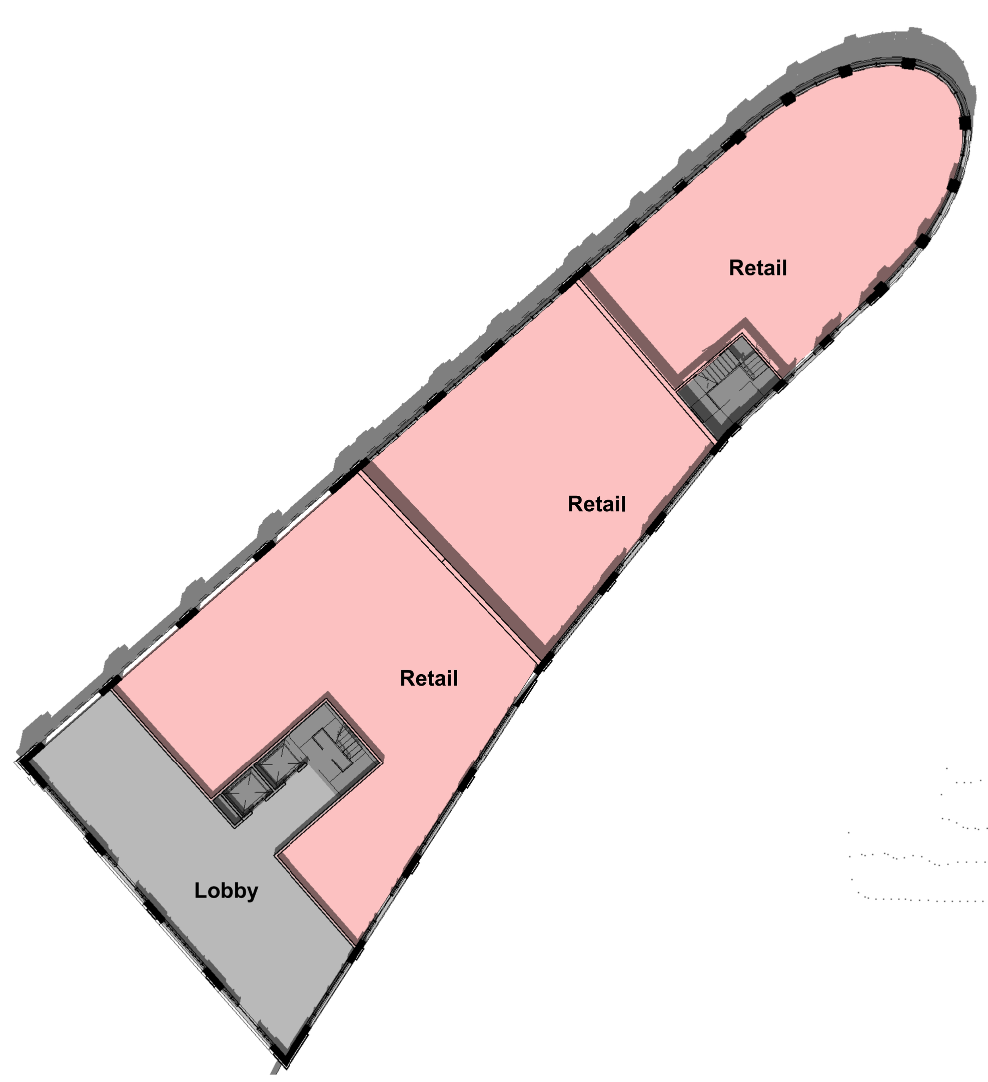
SCALE	As indicated
DATE ISSUED	05/23/22
PROJECT NO	4979.00
DRAWN BY	Author
CHECKED BY	Checker

SHEET TITLE:

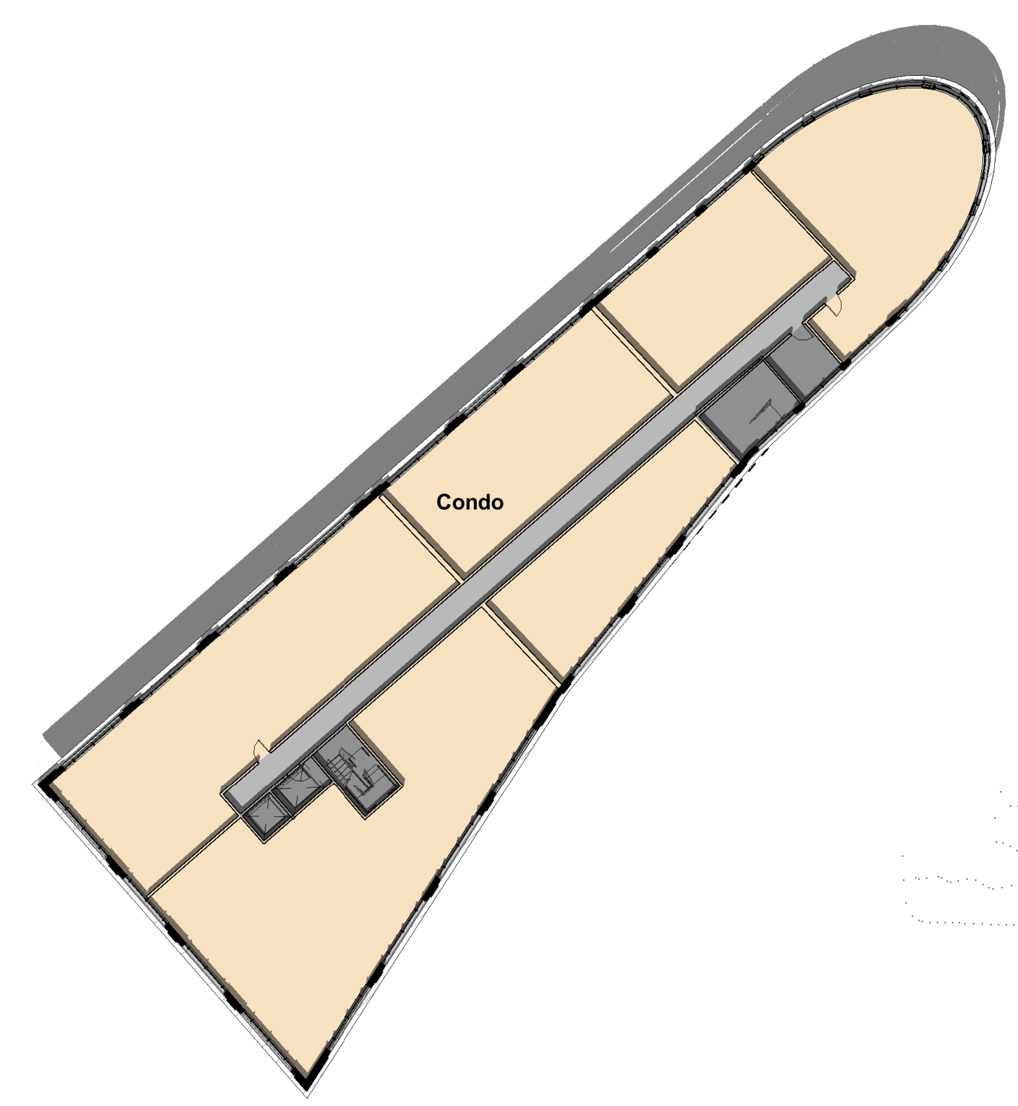
BUILDING 2 AREA PLANS

A - 102

5/23/2022 9:26:05 PM



1 B3 - LEVEL 1
1/32" = 1'-0"



2 B3 - LEVEL 2-5
1/32" = 1'-0"

GROSS AREA CALCULATIONS

B3 - LEVEL 1	
Back of House	514 SF
Lobby	1,861 SF
Retail	8,829 SF
	11,203 SF
B3 - LEVEL 2	
Back of House	624 SF
Condo	9,675 SF
Lobby	904 SF
	11,203 SF
B3 - LEVEL 3	
Back of House	624 SF
Condo	9,675 SF
Lobby	904 SF
	11,203 SF
B3 - LEVEL 4	
Back of House	624 SF
Condo	9,675 SF
Lobby	904 SF
	11,203 SF
B3 - LEVEL 5	
Back of House	624 SF
Condo	9,675 SF
Lobby	904 SF
	11,203 SF
GRAND TOTAL	56,017 SF

AREA LEGEND

- OFFICE
- CONDO
- RETAIL
- PARKING
- LOBBY
- OUTDOOR SPACE
- BACK OF HOUSE

5/23/2022 9:26:16 PM

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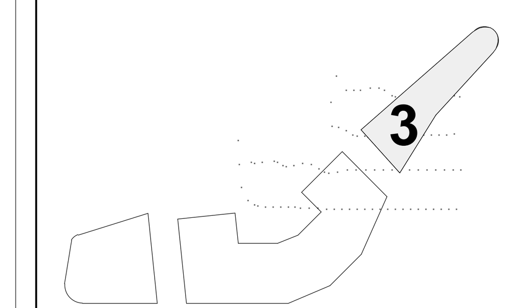

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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	**As indicated**
DATE ISSUED	**05/23/22**
PROJECT NO	**4979.00**
DRAWN BY	**Author**
CHECKED BY	**Checker**

SHEET TITLE:

BUILDING 3 AREA PLANS

A - 103

1 B1 - East Elevation
3/32" = 1'-0"

2 B1- South Elevation
3/32" = 1'-0"

MATERIAL LEGEND

	BRICK
	LIMESTONE
	GRANITE
	METAL

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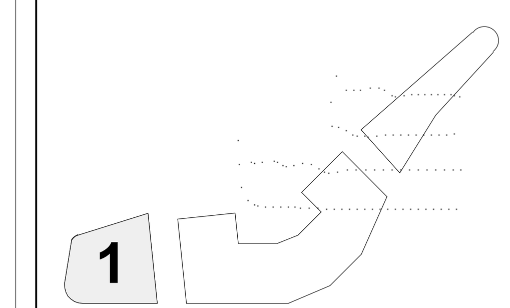

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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	As indicated
DATE ISSUED	05/23/22
PROJECT NO	4979.00
DRAWN BY	Author
CHECKED BY	Checker

SHEET TITLE:

BUILDING 1 ELEVATION

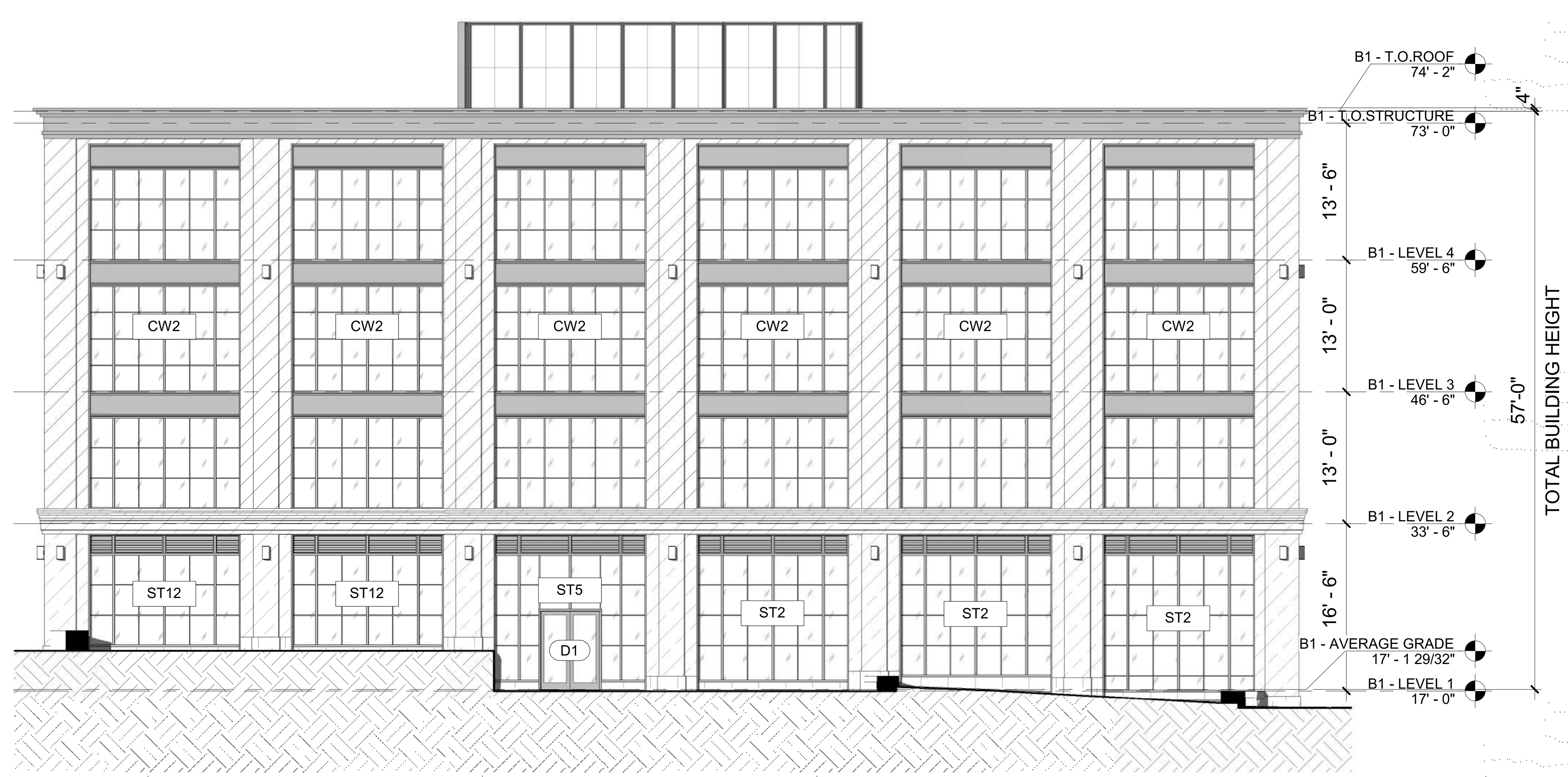
A - 201

5/23/2022 9:26:35 PM

MATERIAL LEGEND

- BRICK
- LIMESTONE
- GRANITE
- METAL

1 B1-West Elevation
3/32" = 1'-0"



2 B1- North Elevation
3/32" = 1'-0"

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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	**As indicated**
DATE ISSUED	**05/23/22**
PROJECT NO	**4979.00**
DRAWN BY	**Author**
CHECKED BY	**Checker**

SHEET TITLE:

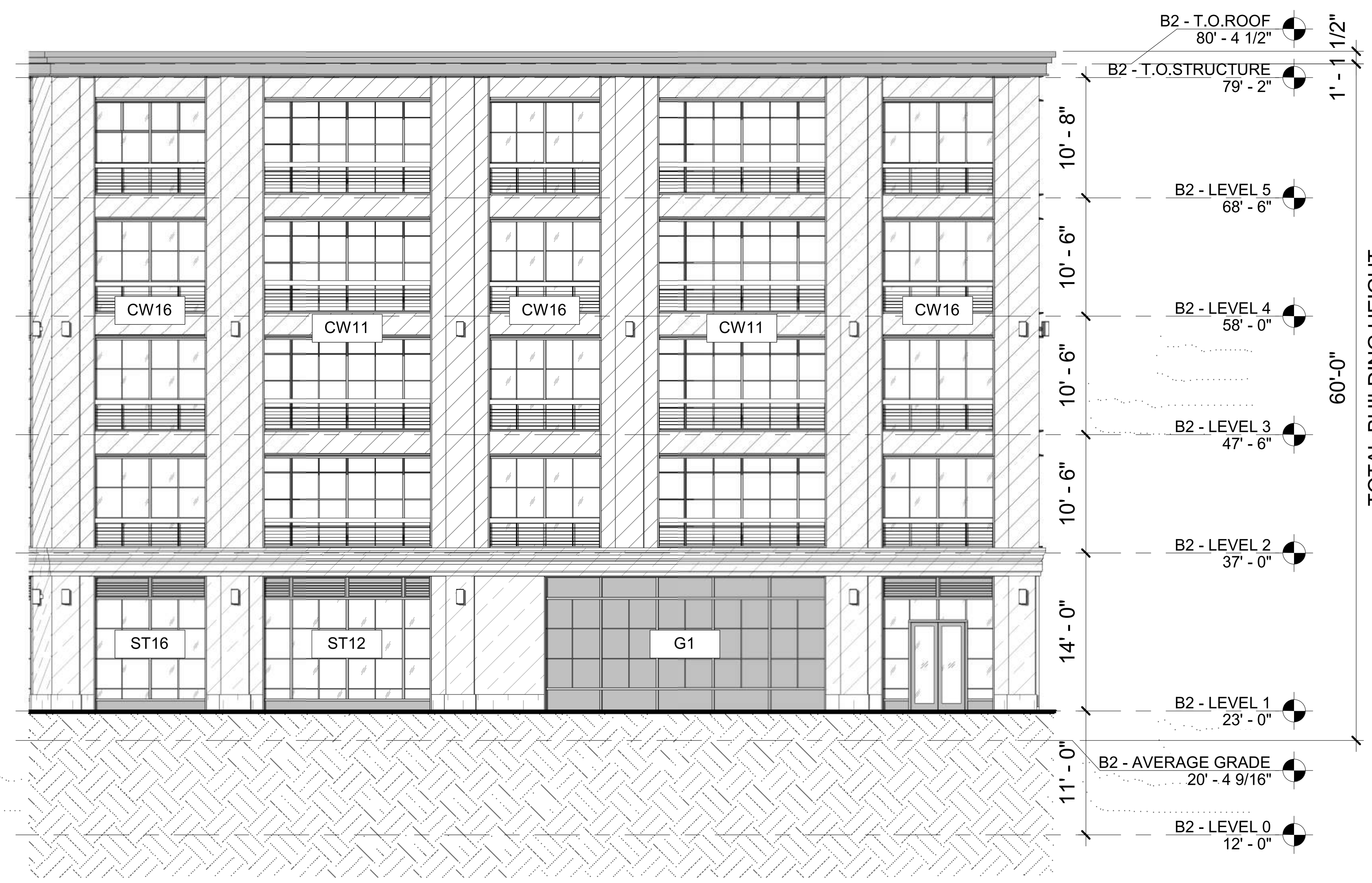
BUILDING 1 ELEVATION

A - 202

5/23/2022 9:26:56 PM

MATERIAL LEGEND

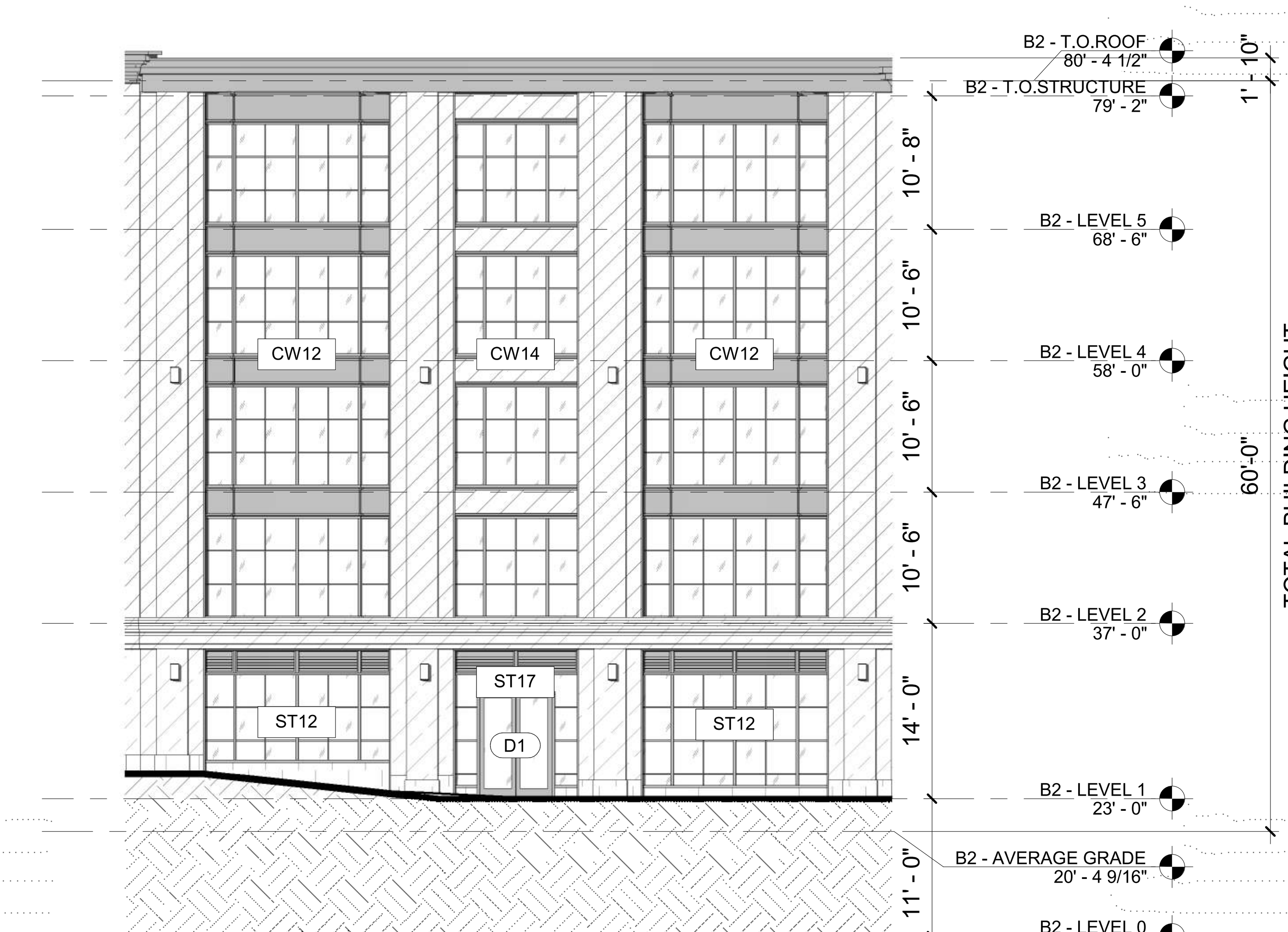
- BRICK
- LIMESTONE
- GRANITE
- METAL



1 B2 - North Elevation
3/32" = 1'-0"

2 B2 - East Elevation 1
3/32" = 1'-0"

3 B2 - East Elevation 2
3/32" = 1'-0"



4 B2 - South-East Elevation 1
3/32" = 1'-0"

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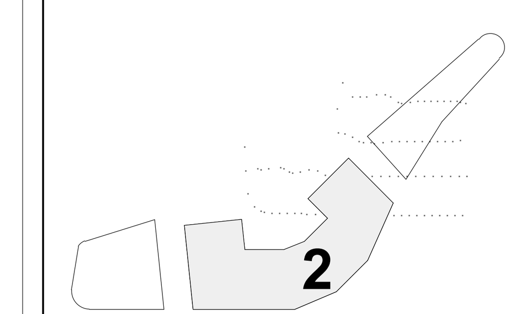

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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	As indicated
DATE ISSUED	05/23/22
PROJECT NO	4979.00
DRAWN BY	Author
CHECKED BY	Checker

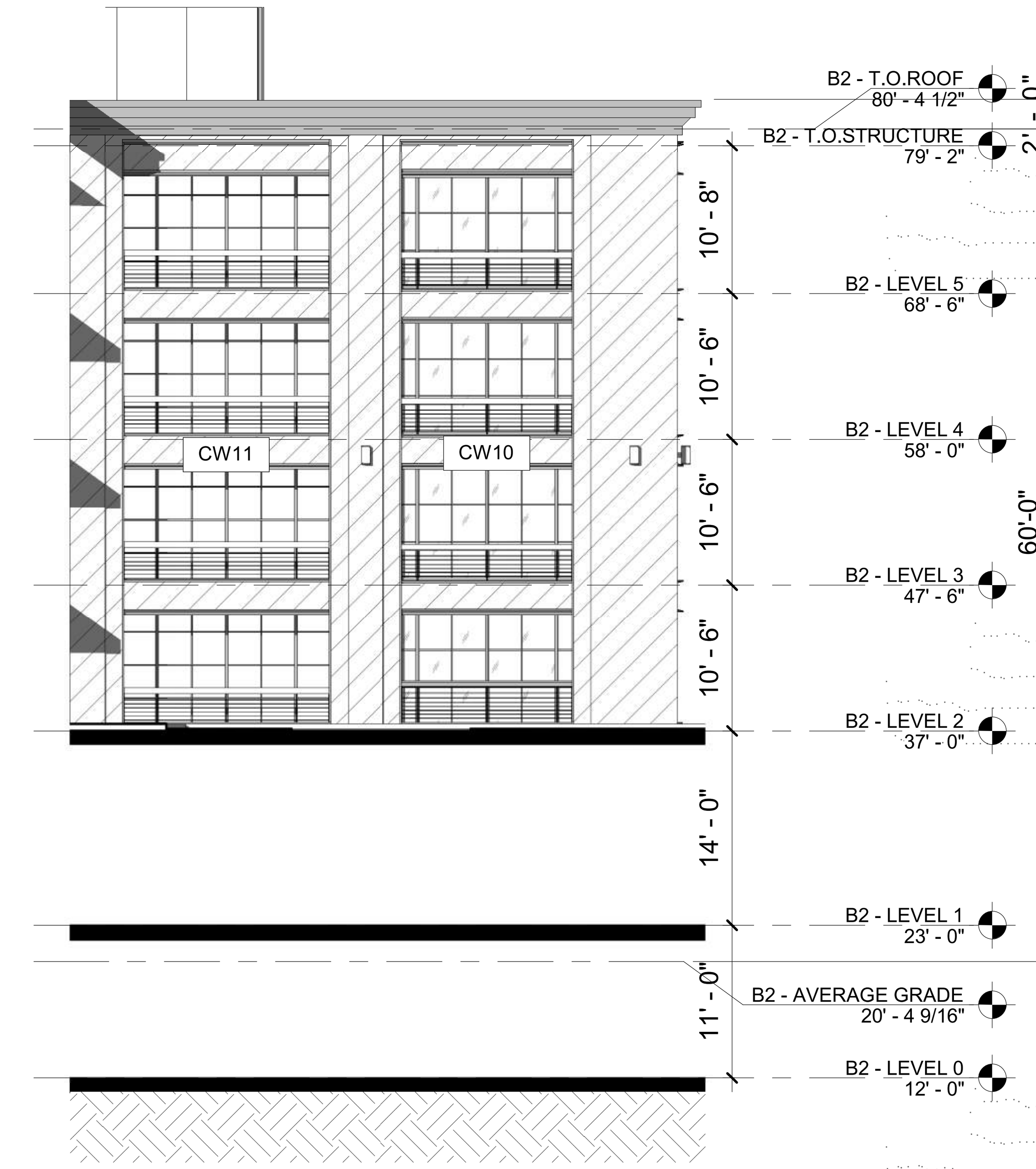
SHEET TITLE:

BUILDING 2 ELEVATION

A - 203

5/23/2022 9:27:29 PM

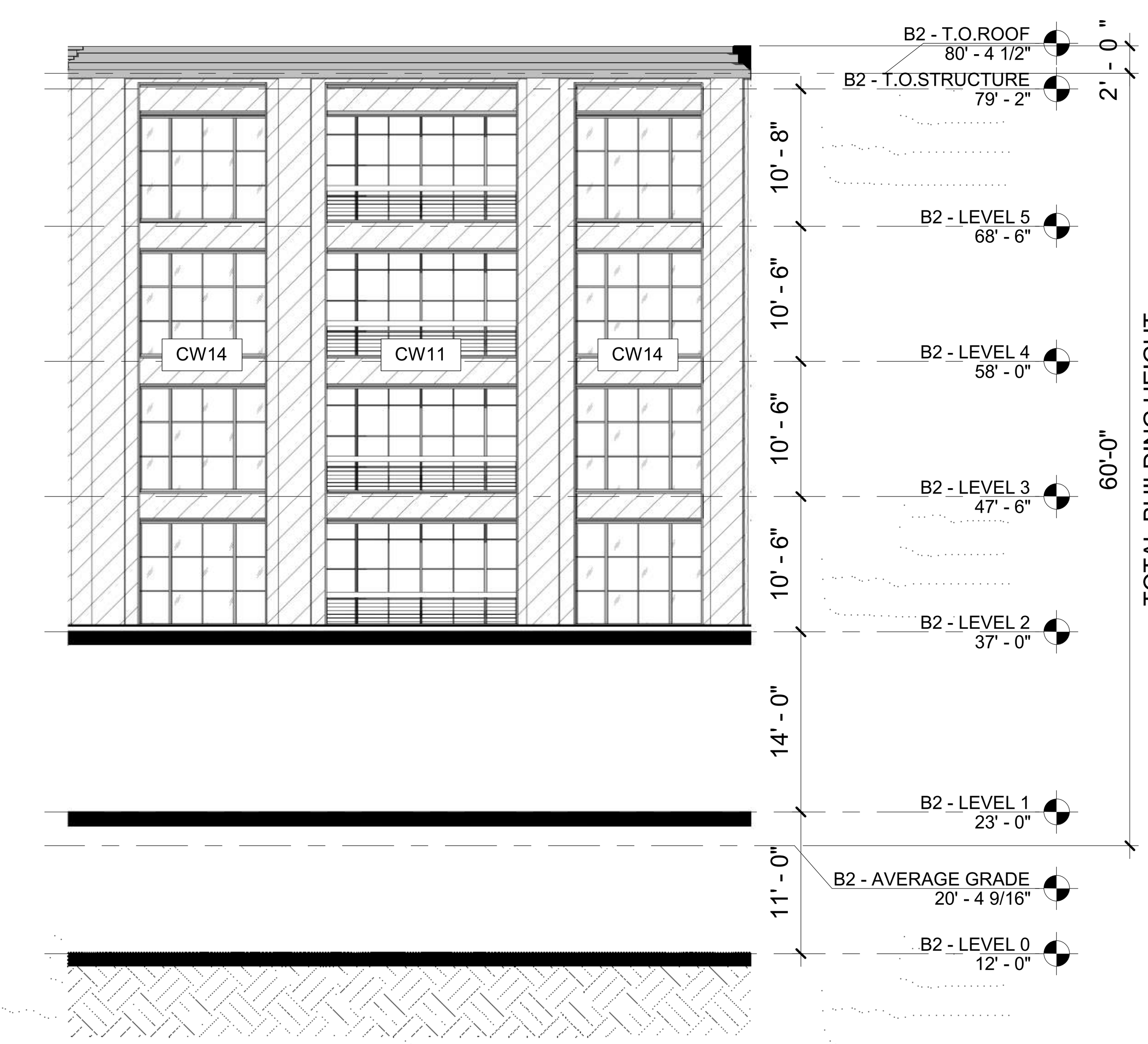
1 B2 - South-East Elevation 2
3/32" = 1'-0"



3 B2 - North Elevation 2
3/32" = 1'-0"

MATERIAL LEGEND	
	BRICK
	LIMESTONE
	GRANITE
	METAL

2 B2- South Elevation
3/32" = 1'-0"



4 B2 - South-West Elevation 2
3/32" = 1'-0"

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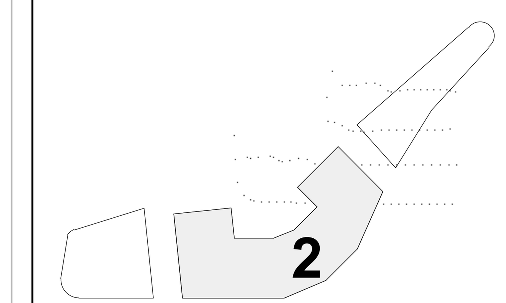
PROJECT TEAM:



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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	As indicated
DATE ISSUED	05/23/22
PROJECT NO	4979.00
DRAWN BY	Author
CHECKED BY	Checker

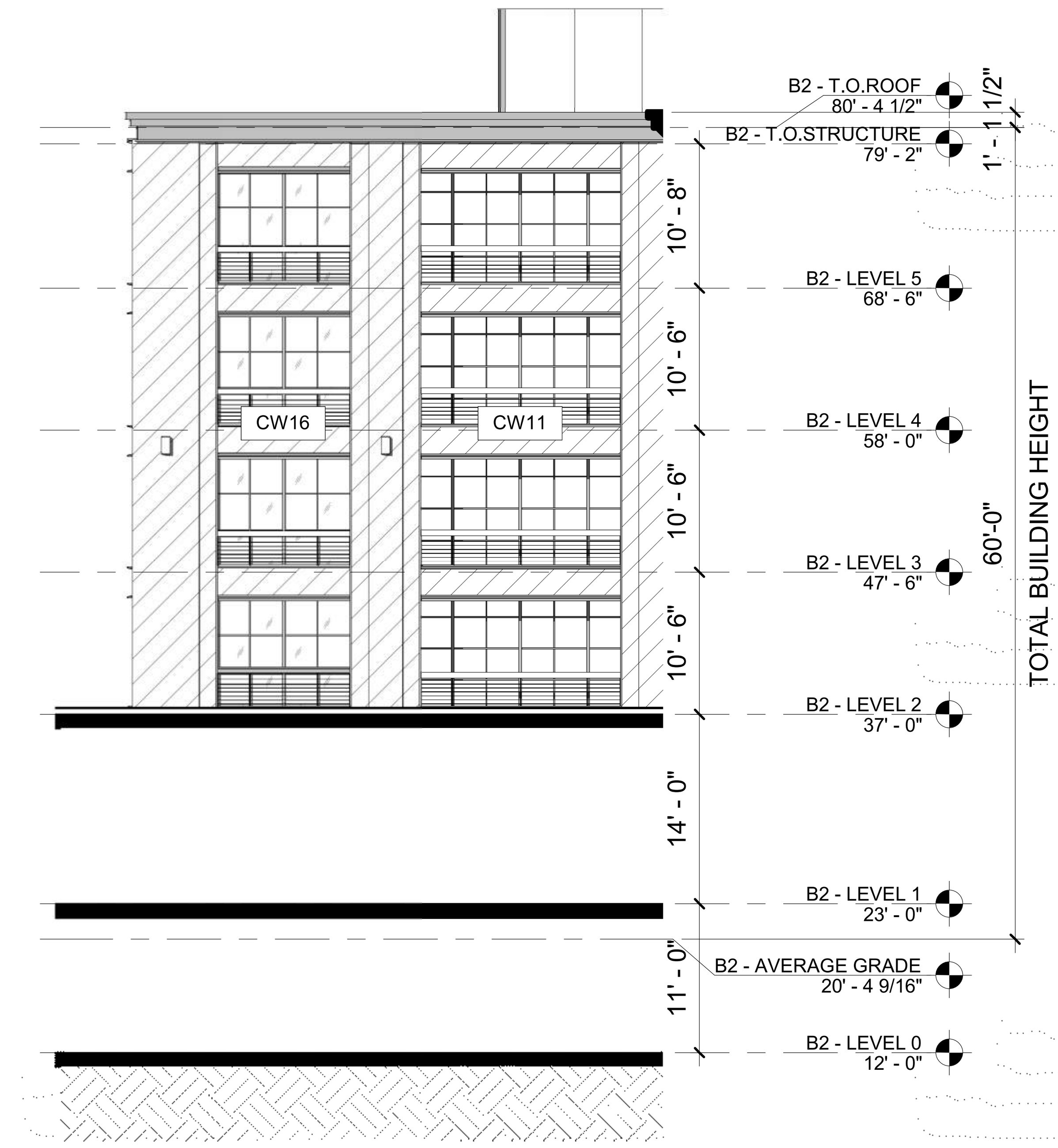
SHEET TITLE:

BUILDING 2 ELEVATION

A - 204

5/23/2022 9:27:52 PM

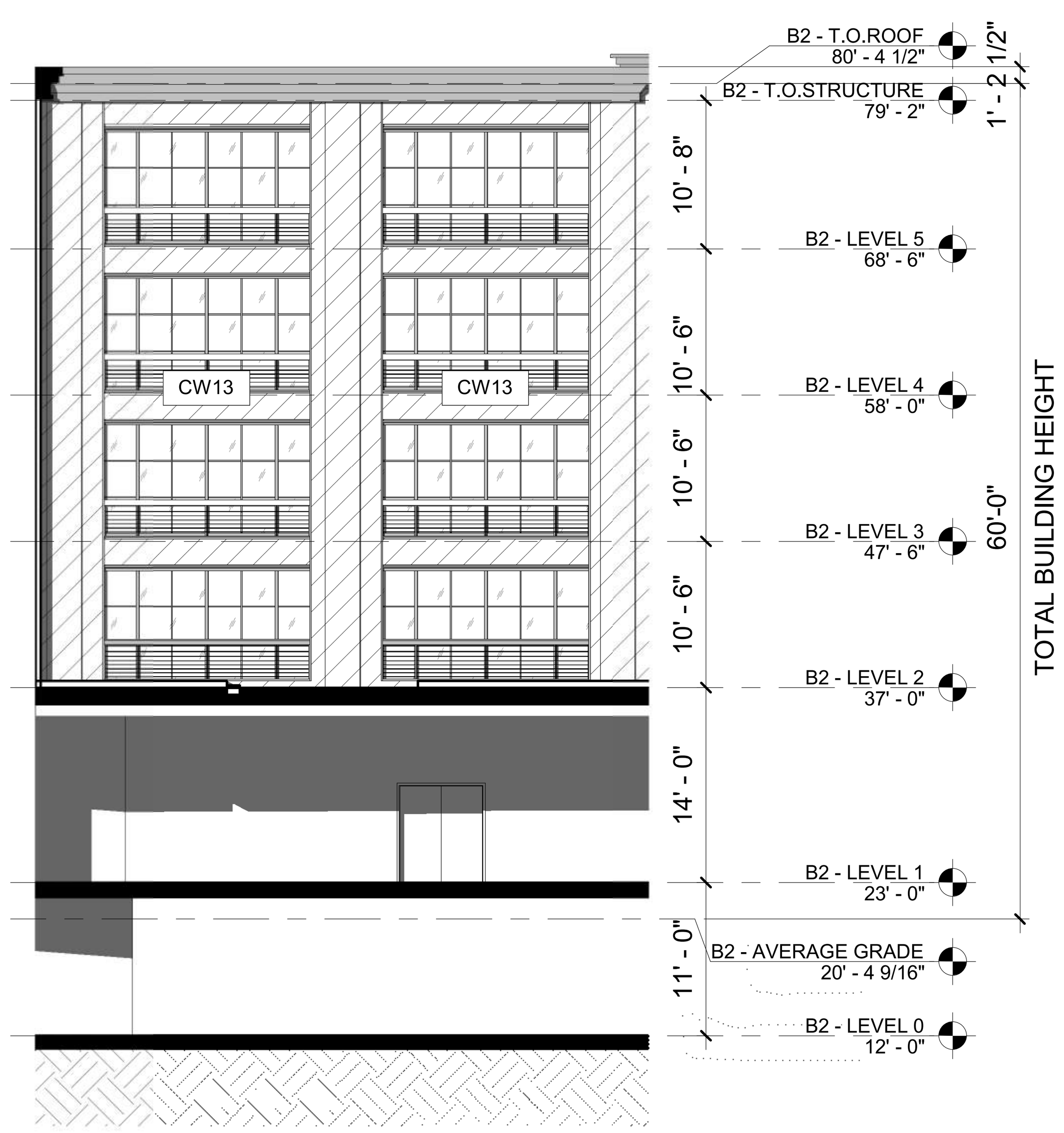
1 B2 - West Elevation 1
3/32" = 1'-0"



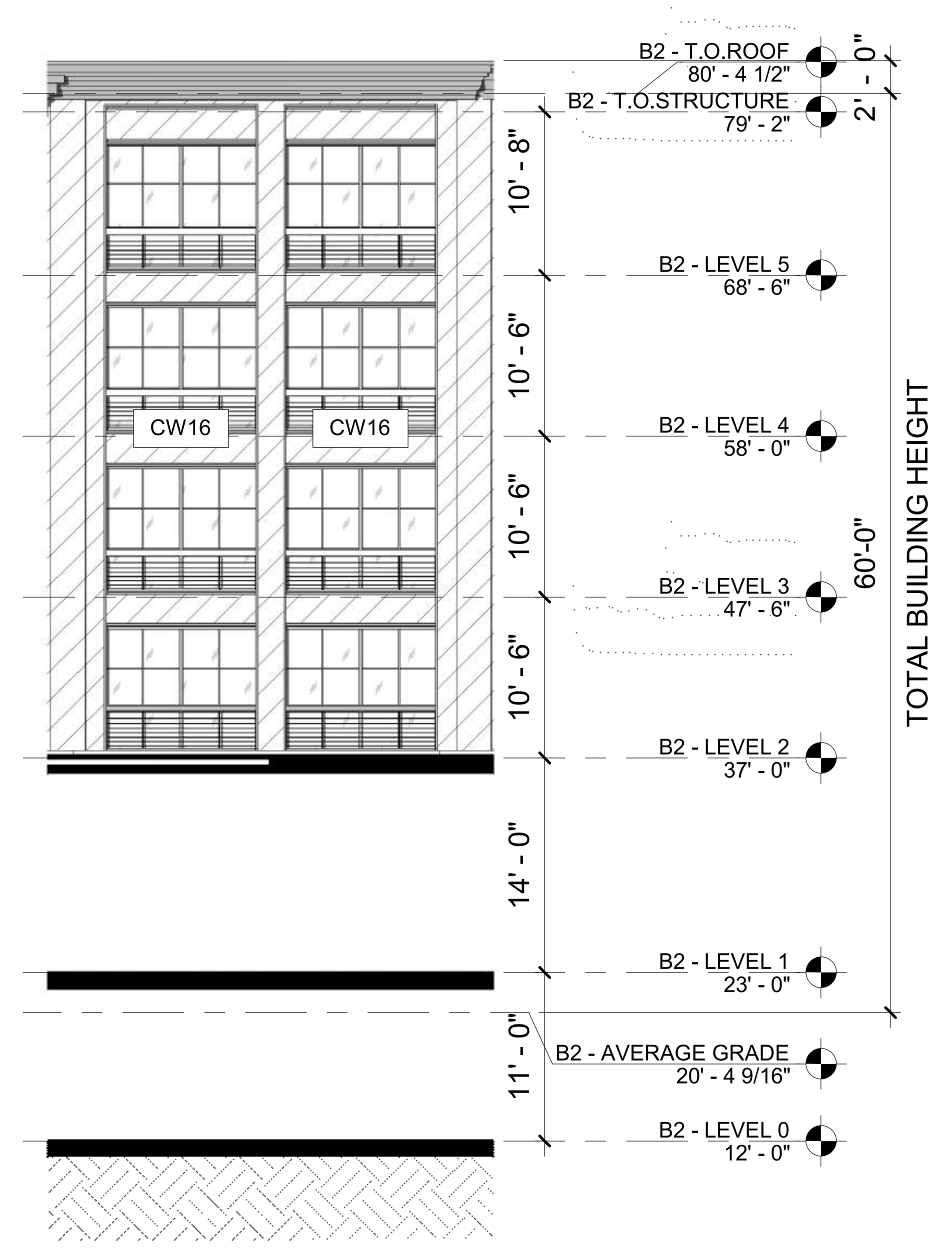
2 B2 - South Elevation 2
3/32" = 1'-0"

MATERIAL LEGEND

	BRICK
	LIMESTONE
	GRANITE
	METAL



3 B2 - West Elevation 2
3/32" = 1'-0"



4 B2 - South West Elevation 1
3/32" = 1'-0"

5 B2 - North-West Elevation
3/32" = 1'-0"

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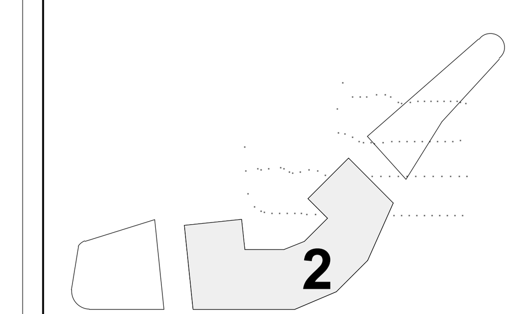

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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	As indicated
DATE ISSUED	05/23/22
PROJECT NO	4979.00
DRAWN BY	Author
CHECKED BY	Checker

SHEET TITLE:

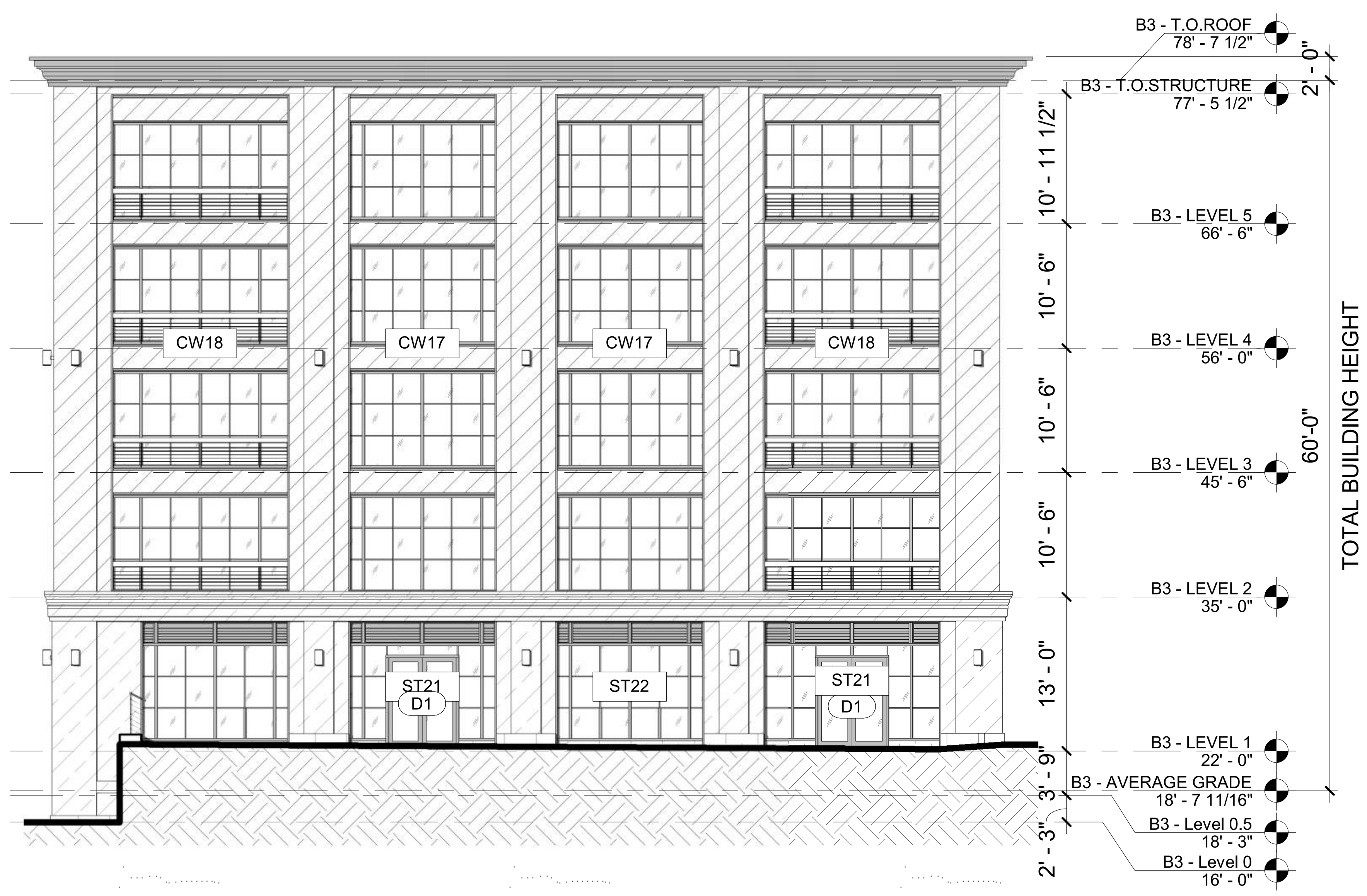
BUILDING 2 ELEVATION

A - 205

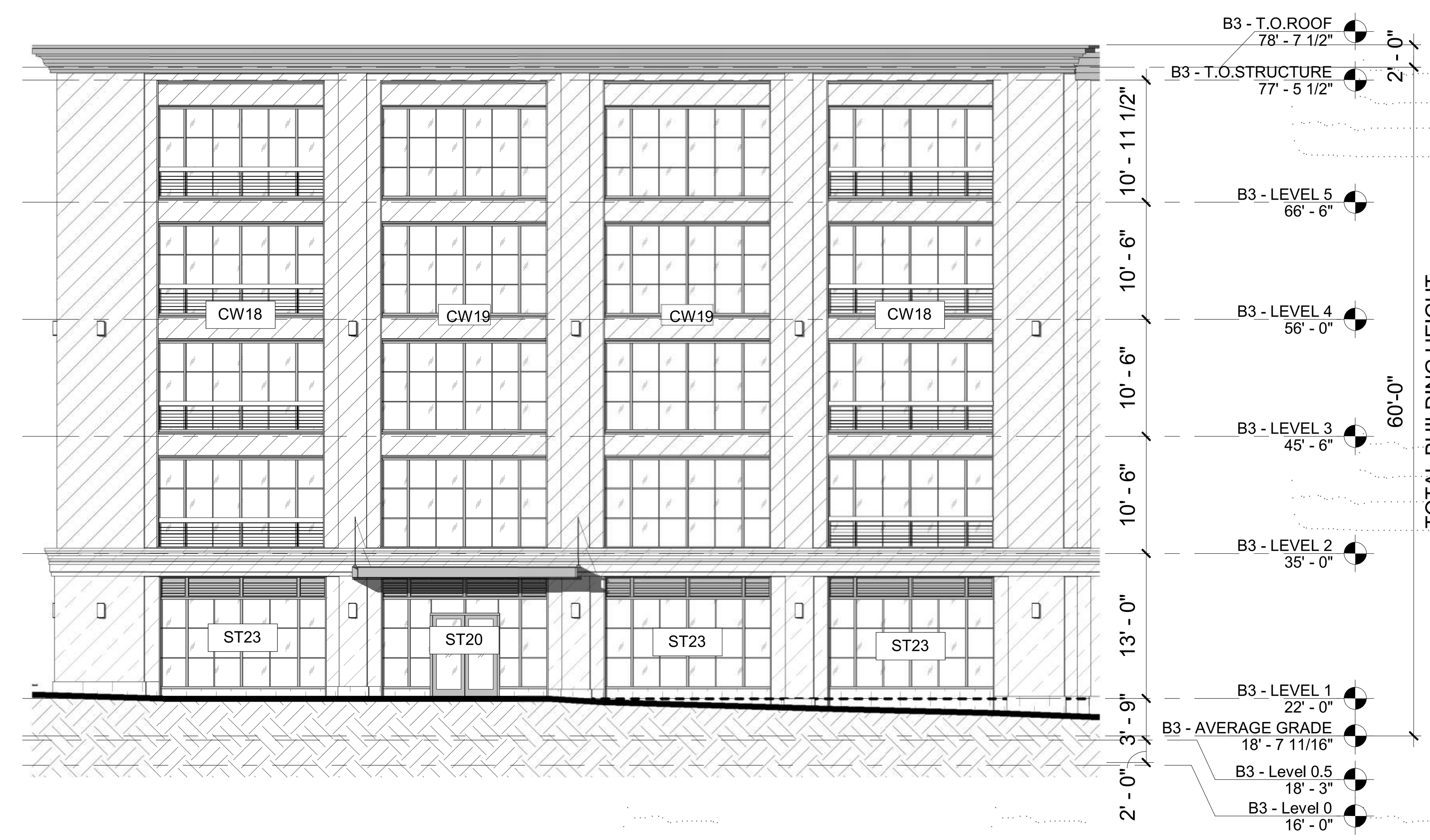
5/23/2022 9:28:17 PM

MATERIAL LEGEND

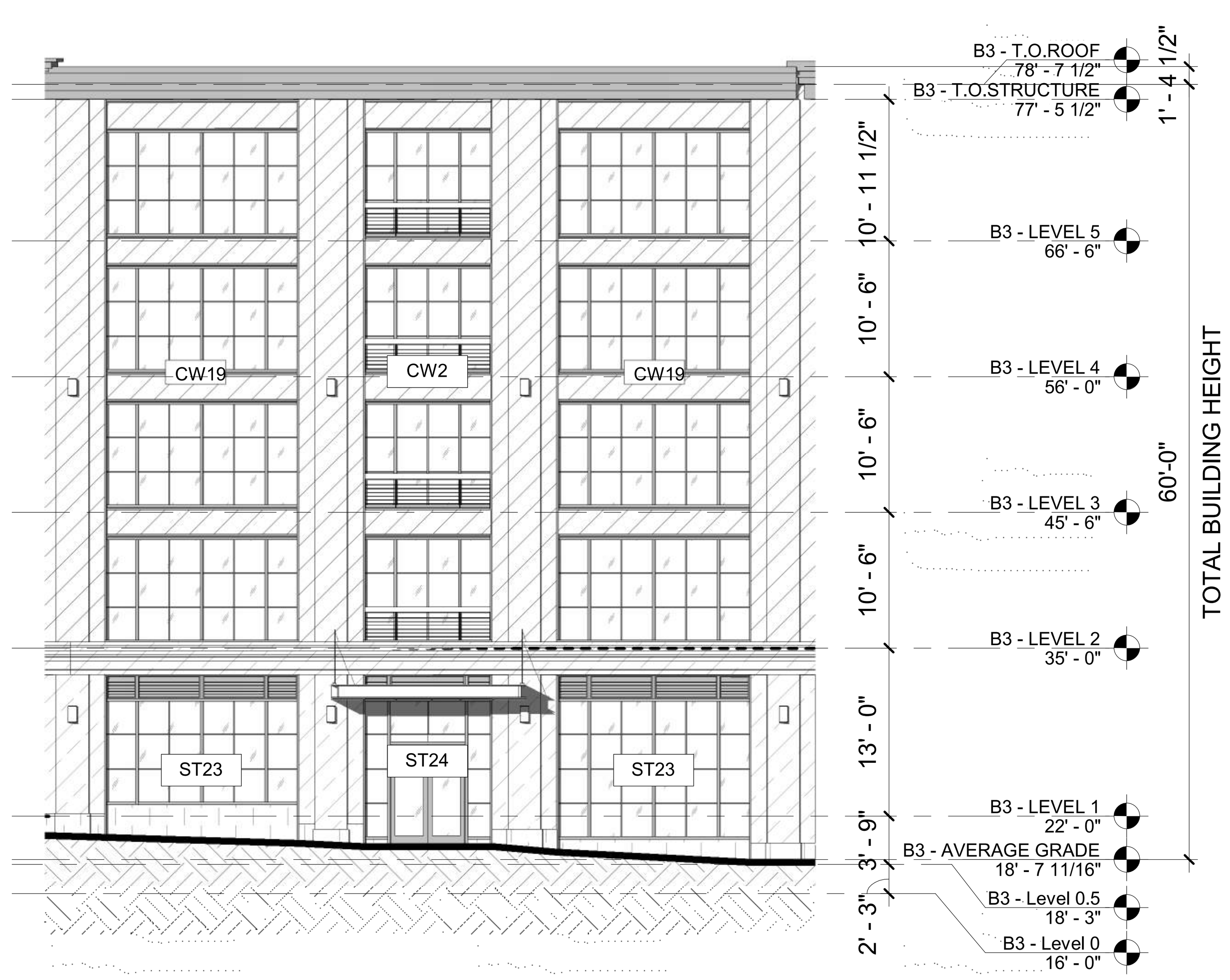
BRICK	
LIMESTONE	
GRANITE	
METAL	



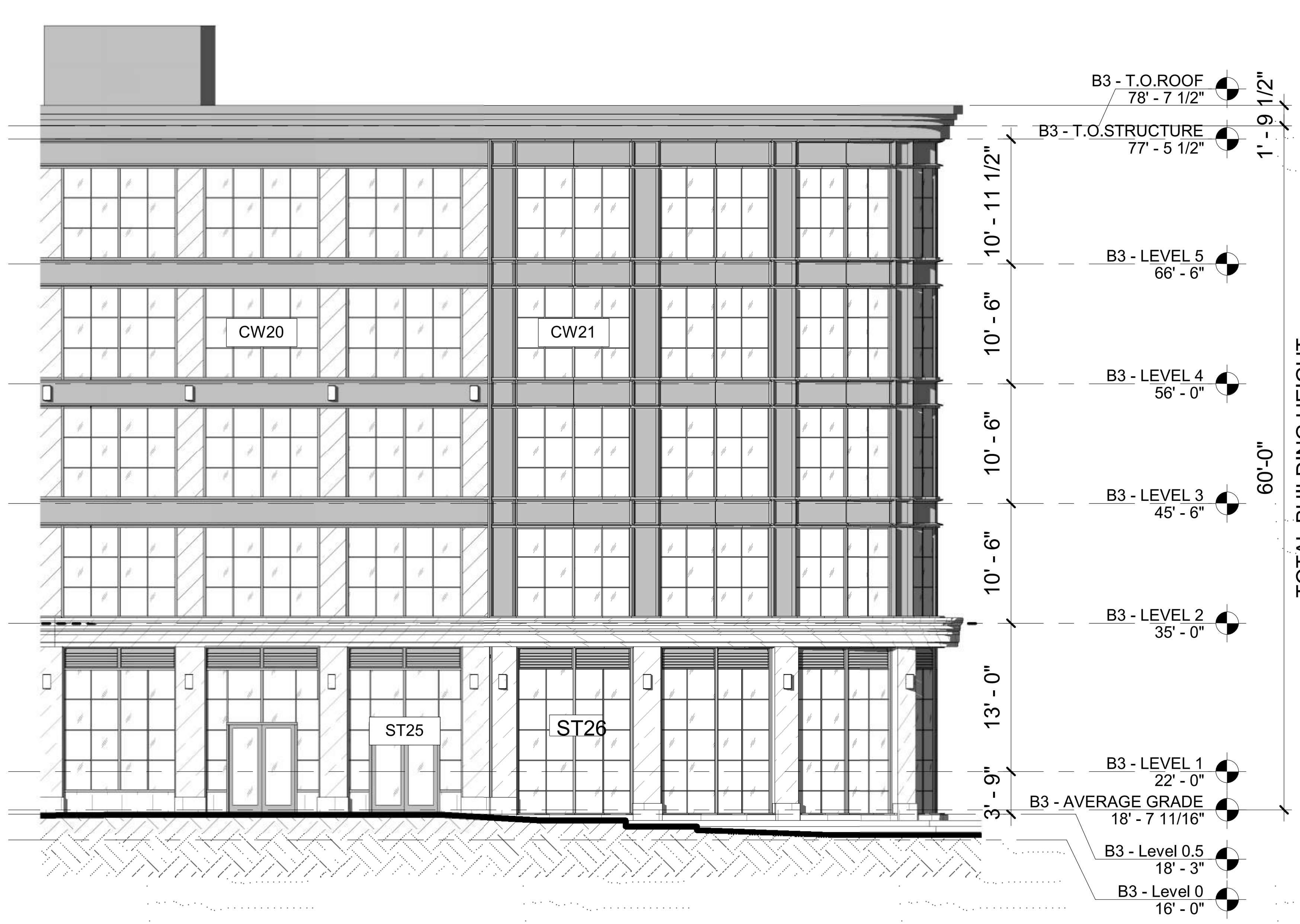
1 B3 - South Elevation
3/32" = 1'-0"



2 B3 -East Elevation 1
3/32" = 1'-0"



3 B3- East Elevation 2
3/32" = 1'-0"



4 B3- East Elevation 3
3/32" = 1'-0"

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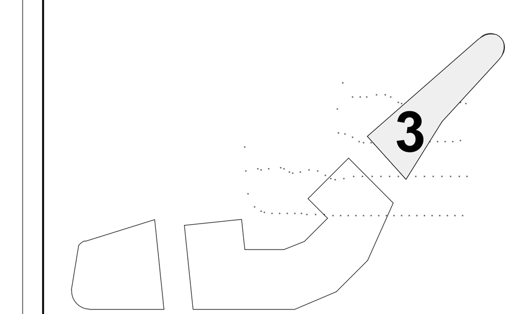

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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	As indicated
DATE ISSUED	05/23/22
PROJECT NO	4979.00
DRAWN BY	Author
CHECKED BY	Checker

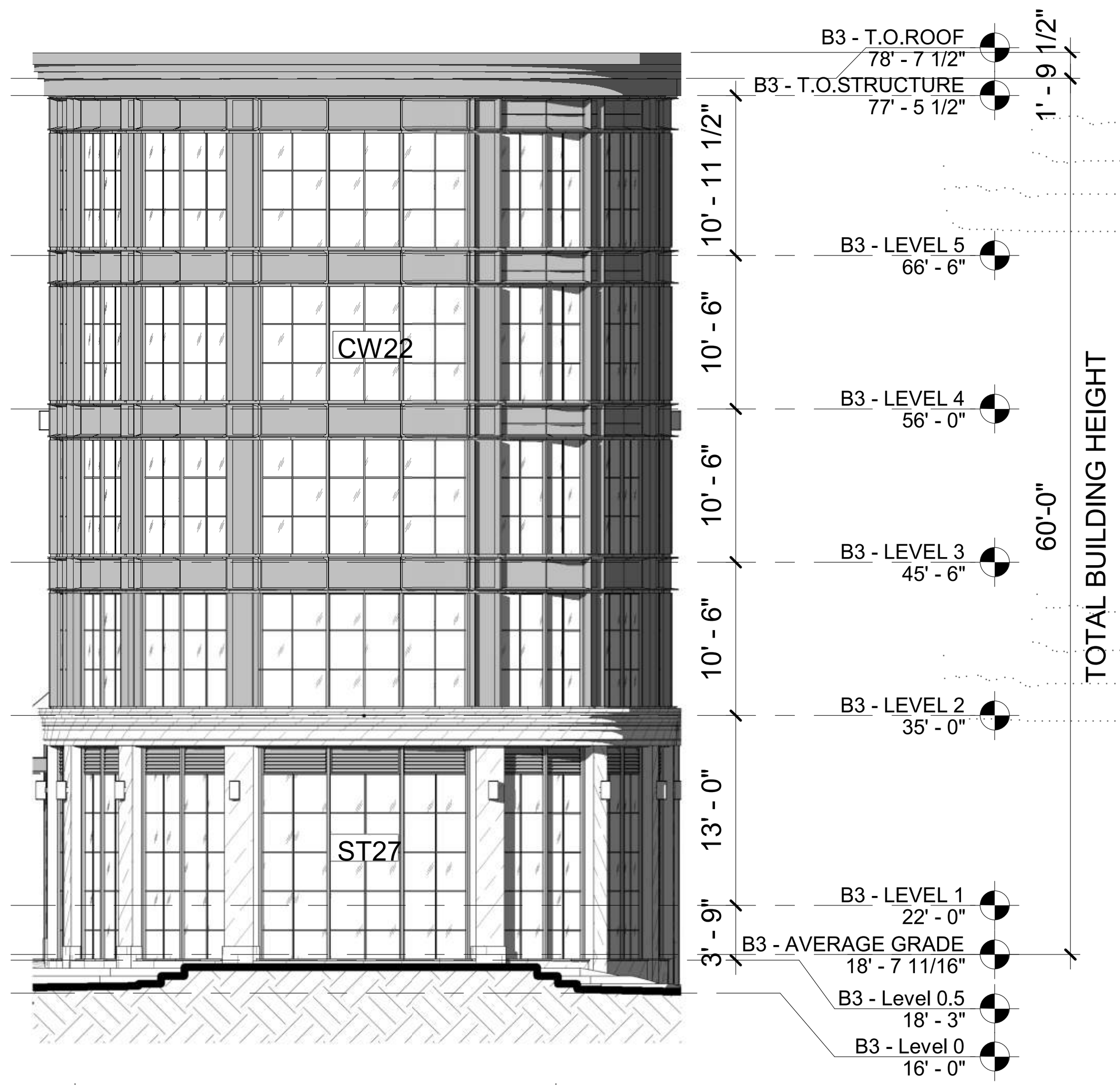
SHEET TITLE:

BUILDING 3 ELEVATION

A - 206

5/23/2022 9:28:39 PM

MATERIAL LEGEND	
	BRICK
	LIMESTONE
	GRANITE
	METAL



1 B3 - North Elevation
3/32" = 1'-0"

2 B3 -West Elevation
3/32" = 1'-0"

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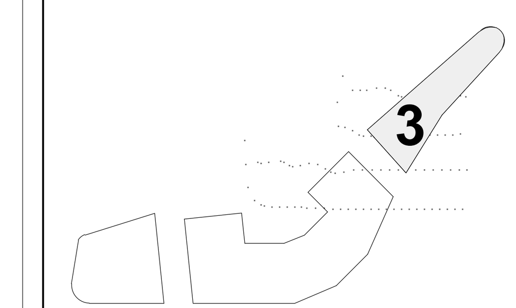

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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	As indicated
DATE ISSUED	05/23/22
PROJECT NO	4979.00
DRAWN BY	Author
CHECKED BY	Checker

SHEET TITLE:

BUILDING 3 ELEVATION

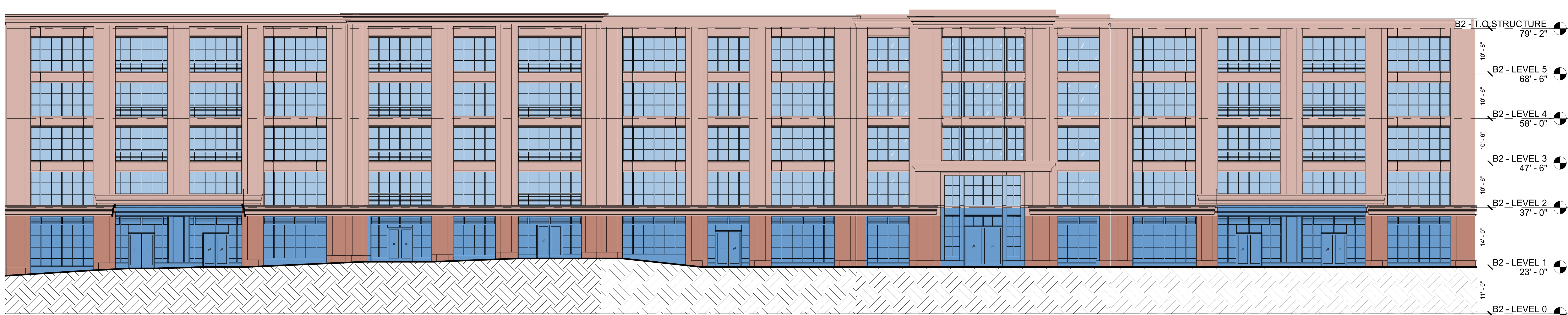
A - 207

5/23/2022 9:29:06 PM

1 B1 Unfolded Elevation Deer Street And Maplewood Avenue
1/16" = 1'-0"

Facade Glazing

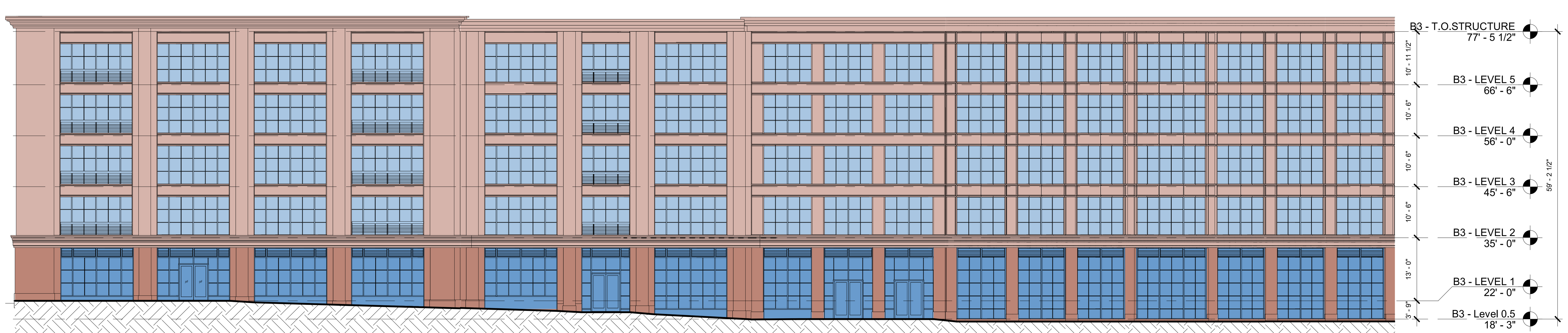
Facade	Glazing	Percentage
8884.76 SF	4059.69 SF	45.69%
Shopfront Facade		
Facade	Glazing	Percentage
3228.43 SF	2411.33 SF	74.69%



2 B2 Unfolded Elevation Russel Street and Deer Street
1/16" = 1'-0"

Facade Glazing

Facade	Glazing	Percentage
16269.4 SF	7016.41 SF	43.13%
Shopfront Facade		
Facade	Glazing	Percentage
4171.77 SF	3041.62 SF	72.91%



3 B3 Unfolded Elevation Russel Street And Green Street
1/16" = 1'-0"

Facade Glazing

Facade	Glazing	Percentage
13590.1 SF	6313.03 SF	46.45%
Shopfront Facade		
Facade	Glazing	Percentage
3892.94 SF	2769.66 SF	71.15%

5/23/2022 9:29:20 PM

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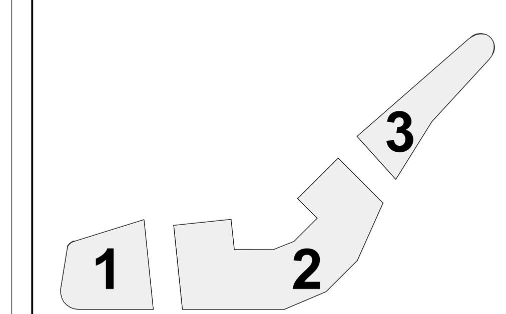
PROJECT TEAM:



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PROJECT:

Russell Street Mixed Use Scheme

Russell Street, Portsmouth NH

REVISIONS:

No.	Date	Description

SUBMISSIONS:

Date	Issued For:
05/23/22	TAC Work Session

SCALE	**As indicated**
DATE ISSUED	**05/23/22**
PROJECT NO	**4979.00**
DRAWN BY	**Author**
CHECKED BY	**Checker**

SHEET TITLE:

GLAZING STUDY

A - 208

Russell Street - City of Portsmouth TAC COMMENT RESPONSE Date: October 20, 2022

City of Portsmouth TAC, October 4, 2022:			
	TAC Comment	**Applicant Response**	**Sheet**
TAC Comments from 10/3 Correspondence:			
1	Open curb cut to 15’ (radius) for alley turning onto Maplewood.	Radius from Maplewood into rear driveway has been increased to 15'	C-102.1
2	Decorative paving pattern should be flipped to indicate pedestrian travel along side of buildings.	Decorative paving pattern has been flipped to indicate pedestrian travel along side of buildings.	C-102.1
3	Increase traffic calming behind buildings.	Two speedbumps have been added to the rear driveway. They have been place just prior to the locations where pedestrians would be entering from between the buildings.	C-102.1
4	Please use tree grates on Maplewood instead of planters.	Tree grates have been called out on Maplewood Avenue.	L-101
5	Raise area between crosswalks at Deer Street and Portwalk Place. Use pavers and granite between crosswalks. Add advance warning signage and RRFB flashing beacon.	Based on site walk held on 10/13 with DPW and Planning, a single raised, painted crosswalk with RRFB's has been added to the site plans. Intersection street lights have been located on either side of the crosswalk to provide visibility within the crosswalk.	C-102.1
6	Parking spot closest to crossing at Portwalk Place will need to be removed due to close proximity to crossing. Must maintain at least 20 feet clearance from crosswalk.	Parking spot closest to crossing at Portwalk Place has been removed.	C-102.1
7	Is Limo parking spot on Russell desired for use by project?	Limo parking is an existing condition that we a retaining in the proposed condition. This space is used by the Sheraton hotel and it is the desire of the applicant to keep the space.	
8	Turning templates still needed for turns from Maplewood onto Deer, and Deer onto Russell.	Turning templates for turns from Maplewood onto Deer, and Deer onto Russell have been provided for tractor trailers and the Portsmouth fire truck.	
9	Traffic calming measures such as speed bumps or tables should be put in walkway/driveway along back of buildings.	See Comment response 3	
10	Corner of building one is in City sewer easement. Realign sewer main into Maplewood under the train tracks or move building footprint. The applicant is responsible for these changes. The City timeframe for the project is uncertain at this time.	The applicant has agreed to remove the corner of building 1 that is located within the sewer easement, and having this as a stipulation prior to Planning Board approval.	
11	The corner radius at the Maplewood entrance to the rear driveway should be enlarged to provide easier access for the fire truck.	See Comment response 1	
12	A fence and buffer should be provided along the railroad tracks.	A fence has been called out along the railroad tracks. Fence type to be coordinated with the HDC.	

Prior to Construction:			
13	Applicant must coordinate with CSX to relocate train signage.	Acknowledged	

T-5037-002
September 22, 2022

Ms. Beverly M. Zendt, Planning Director
City of Portsmouth Planning Department
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: **Review of North End Mixed-Use Development Stormwater and Drainage**
Developer: Port Harbor Land LLC
Design Engineer: Tighe & Bond
CMA #1134.4

Dear Beverly:

On behalf of Port Harbor Land, LLC (applicant), we are pleased to submit this letter in response to peer review comments on the above referenced project received from CMA Engineers, Inc. (CMA) in a letter dated September 1, 2022.

Please find **in bold** below specific responses to the two (2) remaining comments received from CMA stated in the September 1st letter.

1. *The plan includes no infiltration of groundwater recharge features. This redevelopment presents the opportunity to potentially improve upon the existing condition. The applicant should demonstrate why on-site infiltration is not achievable.*

   As stated in response to Site Plan Review Regulation, Comment #2 and General Comments, Comment #1 1n our response to the initial comments letter dated July 21, 2022, the proposed site is comprised of urban land with shallow bedrock. The bedrock on site is exposed on the northern end of the site ~9 feet above the surrounding area. Towards the middle of the site in the location of proposed building 2 bedrock is at elevation ±19 feet, which is ~4-6 feet below grade. Additionally, given the tight urban environment there is not an area on site that is a sufficient distance from the building foundation or other subsurface utilities suitable for infiltration. Due to these site constrictions, infiltration is not feasible. Peak flows have been mitigated for the development site through the use of underground detention chambers, and treatment standards of the City and NHDES are being met through the use of stormwater filtration units.

2. *The applicant should confirm the downstream existing stormwater drainage system has adequate capacity (functions well under existing conditions).*

   As stated in response to General Comments, Comment #2 1n our response to the initial comments letter dated July 21, 2022, per discussions with the City of Portsmouth DPW it is our understanding that the existing stormwater drainage system functions well in the existing conditions for both Russell Street and Maplewood Avenue. It is also our understanding that the City is currently in the design process to upgrade the drainage system and outfall to the Maplewood Avenue drainage system. The existing condition of the site was looked at closely to ensure that the pre-development condition was modelled accurately so that the proposed

development would not have an adverse impact to the City's closed drainage system. The proposed project results in reduced peak flow to the existing closed drainage systems therefore the proposed project would not have an adverse impact on the city's drainage system.

If you have any questions or need any additional information, please contact Neil Hansen by phone at (603) 294-9213 or by email at nahansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Neil A. Hansen, PE
Project Manager

Patrick M. Crimmins, PE
Vice President

Enclosures

Copy: Port Harbor Land, LLC (via email)

29-5037-002
September 22, 2022

Peter Stith, AICP
Principal Planner
City of Portsmouth Planning Department
City Hall, 3rd Floor
1 Junkins Avenue
Portsmouth, NH 03801

Re: **Response to Traffic Peer Review Comments**
Proposed Mixed Use Development, Russell Street, Portsmouth, NH

Dear Mr. Stith:

Tighe & Bond has prepared this letter in response to peer review comments on the subject project received from TEC, Inc. (TEC) in a letter dated August 29, 2022. For ease of review, remaining TEC comments are repeated herein in *italics*, followed by our response for each. Comment responses are provided herein for comments on the Traffic Impact Study (TIS); responses to site plan comments will be provided under separate cover.

Comment 9: *TEC Follow-up Comment: Noted. A signage and wayfinding plan was included within the latest site plan revision (7/21/2022). Pavement markings should also be considered along Maplewood Avenue and along the rear driveway.*

Response: Site Plan Sheet C-102.1 details proposed signage for the site's rear access drive area, for both vehicles and pedestrians/bikes. A band of different color pavers has been added to the rear drive to designate separate areas for vehicular and pedestrian/bike traffic.

Comment 11: *TEC Follow-up Comment: The Applicant should remove the following language from their proposed improvements, "Bi-directional bicycle lanes on Russell Street from Deer Street to Green Street" from Site Access section (Page 4-1) of the TIA. In addition, the Applicant should consider painting shared-lane marking (Sharrow) on Russell Street and Deer Street to alert drivers about presence of bicyclists.*

The rear driveway is envisioned to operate as an alley with shared and undefined use for all modes of transportation. TEC recommends providing striping or different color pavers to designate separate areas for vehicular traffic and those that may walk or bike.

Response: As noted in our prior response, bike lanes have been removed from the site plan. Sharrows have been added to the plans on Russell and Deer Street.

A band of different color pavers has been added to the rear drive to designate separate areas for vehicular and pedestrian/bike traffic.

Comment 12: *TEC Follow-up Comment: TEC recommends that the Applicant collect updated 2022 turning movements counts during weekday morning (7:00 AM to 9:00 AM), weekday evening (4:00 PM to 6:00 PM), and Saturday* *midday (11:00 AM to 1: 1:00 PM) peak periods at the intersection of Market Street at Russell Street in order to assist the City to estimate a fair-share contribution based on a projected net traffic volume increase under a 2022 baseline condition.*

Response: The applicant does not feel additional counts are necessary. The City of Portsmouth collects traffic counts along Market Street at Nobles Island. When comparing historic data provided by the City, volumes from February 2020 to February 2022 reduced by 5.8%.

To assist the City in estimating a fair share contribution, we have prepared the enclosed "Market Street at Russell Street Traffic Volume Calculation". This was prepared to show the impact the development will have on the Market and Russell Street intersection in the 2035 Build Condition when adjusting the baseline condition to align with the historic Market Street traffic volumes provided by the City. As shown in the enclosed, there will be a 4.8% increase in traffic during the weekday morning peak and 3.7% increase in traffic during under the 2035 Build Condition.

Comment 13: *TEC Follow-up Comment: The Planning Board should consider a condition of approval to require the Applicant to a) submit an architectural plan depicting the location of on-site secure bicycle parking prior to issuance of a Building Permit and b) submit an annual report to document the TDM program activities for at least the first five years following initial site occupancy.*

Response: a) Adequate bike racks are shown on the site plan to meet the required number of bike storage spaces per the City's Zoning Ordinance. Additional bike storage areas are planned within the Building 2 parking area, although the exact area has not yet been determined.

b) The applicant agreed in the previous response to a TDM program that would include a welcome package outlining various alternative transportation options will be provided to residents and posted in a central location in each building lobby. We understand that the prior approval on this site had significant TDM reporting requirements as a condition of approval, however the proposed uses of that project were significantly more traffic and pedestrian intense than the current proposal. The prior approval included a major supermarket, conference center, and large public parking garage, where the current proposal has no public parking and office and residential uses. An enhanced TDM plan and reporting requirements would not provide any benefit to the City given the proposed traffic impact of the development.

Comment 16: TEC notes that COAST bus stops (Routes 13 and 43) are provided on either side of Russell Street in the vicinity of the Sheraton Hotel / Parking Lot Driveway. No provision for maintaining these bus stops is shown on the site plan. The Applicant should provide information regarding any discussions with COAST for removal of these stops.

TEC Follow-up Comment: This should be confirmed to ensure the location and number of on-street parking stalls along Russell Street.

Response: The proposed plan is to maintain the existing bus stops as they exist today. The existing bus stop on the inbound side of Russell Street is adjacent to the limo parking zone. This condition is maintained in the proposed condition with the reinstallation of the limo park zone and the COAST bus stop signage. The bus will be able to utilize the limo loading area as they do in the existing condition. On the outbound side of Russell Street, the existing bus stop signage is mounted to a light pole adjacent to the Sheraton driveway, with no dedicated loading area. The proposed plan includes the reinstallation of the COAST bus signage in the same location. Both inbound and outbound bus stop locations are being maintained in the proposed condition to operate as they do in the existing condition.

Comment 20: *TEC Follow-up Comment: The Applicant should provide a written description of how they will manage the puzzle lift and other tandem stalls according to the proposed unit mix.*

Response: The puzzle lifts will be dedicated for use by the hotel valet. Unit owner parking will be in the basement level parking lot and tandem spaces will be assigned to specific units as required by the City's Zoning Ordinance.

Comment 22: *Many pedestrians currently travel between Vaughan Street, the current surface parking lot and Portwalk Place in an uncontrolled fashion. The project will introduce a centrally located and landscaped gathering space between the buildings that nicely aligns with Portwalk Place. The project will likely increase the pedestrian trips in this area. Although TEC generally agree with the proposed layout, we recommend the following design enhancements:*

- *Construct a raised crosswalk/intersection with flush granite curbing on both sides of each crosswalk with a moderate vertical transition to enhance motor vehicle awareness of pedestrian activities;*
- *Provide underground conduit and pull boxes in appropriate locations to provide flexibility for the future Rectangular Rapid Flashing Beacon (RRFB), if warranted;*
- *A "DO NOT BLOCK INTERSECTION" sign (MUTCD designation, R10-7) on the Deer Street southbound approach before the crosswalks;*
- *To be compatible with MUTCD standards, the parking stall on the east side of the subject crosswalk may need to be removed or shifted to provide the minimum requirement of 20-feet spacing and install "No Parking Between Signs" adjacent to the proposed crossing on both sides; and*
- *Install fixed and/or removable ornamental bollards in areas where the sidewalk may be flush with the sidewalk area. TEC recommends that the striped crosswalks on each edge of the intersection be the focused locations for pedestrian crossings and where the ADA detectable warning devices should be located as they will line up with the existing sidewalks along Portwalk Place.*

Response: The applicant does not agree with revising this intersection to be a raised condition. The proposed design mirrors the existing crosswalk at the intersection of Hanover Street and Portwalk Place as previously requested by staff during this Site Review Process. Adding a raised crosswalk in this location will require additional drainage structures and which will conflict with existing utilities in this area. In addition, the slope down from a proposed table to the existing crosswalk on Portwalk Place will be too steep and it will also require work on private property that the applicant does not control.

If safety is a concern, the applicant takes no issue with revising the design back to a single striped crosswalk from east side of the Portwalk Place as we originally proposed prior to City Staff's request to mirror the Portwalk Place and Hanover Street intersection crosswalk. This would bring the crosswalk further from Maplewood and provide more time for drivers to see the crosswalk once they turn the corner.

Comment 23: *The Applicant should provide additional design details for the proposed train signal relocation on the east side of Maplewood Avenue. The City should require submission of a detailed off-site improvement plan for this area depicting the location of all existing and relocated equipment, signs, and pavement markings necessary to satisfy MUTCD requirements and guidance. This will require coordination with the railroad owner for the crossing requirements and because certain elements of work are proposed on their property and not within the existing City right-of-way. This design of the crossing upgrade should also consider accessibility requirements and a pedestrian gate to control pedestrian movements.*

Response: The applicant acknowledges that coordination with the railroad will be required prior to construction for the relocation of the signals and for the pedestrian crossing requested by the City on Green Street.

Comment 24: *TEC recommend that the Applicant provide an offset between the railroad property line and the proposed driveways and other site features because it does not provide a reasonable level of buffer for motor vehicle traffic and the potential for snowbanks. Furthermore, the Applicant should consider the installation of fencing along its westerly property boundary with the railroad to deter uncontrolled pedestrian movements across the rail corridor between the project site and Vaughan Street. This may require realignment and adjustment to the rear (westerly) driveway and coordination with railroad owner.*

Response: Adding a buffer along the railroad is not feasible due to the requirements of the fire department for a 20' wide access lane along the rear of the buildings. Fencing was considered along the railroad to deter pedestrian crossings, however it was not pursued at the direction of the Historic District Commission. Pedestrian wayfinding signage is proposed for the end of the Mews community space to direct pedestrians to the legal crossings.

Comment 25: *The Applicant should clarify where the visitor parking spaces are located and how they are going to be managed. Given the complexity of the parking operations within the first floor parking area, including its puzzle vehicle lift system, it may not be desirable for visitors or the general public to access the upper parking area from Russell Street unless controlled by a gate system or staff. The introduction of a gate would also control undesirable parking lot circulation for those unfamiliar with the property. The Applicant should provide details for the vehicle wayfinding, parking signs, and parking controls, including a plan to depict the specific location of any visitor stalls.*

Response: Visitor parking will be located in the non-puzzle lift spaces on the first floor parking area. Residents of the buildings will be responsible for providing access to the parking area for their visitors. There will be no public parking on site. A gate is not preferred by the applicant as it will act as a visual deterrent to pedestrians passing through the site.

Comment 26: *The Applicant should coordinate with railroad owner for any permanent easements associated with the construction of the proposed sidewalk and railroad crossing along Green Street near the site's exit-only driveway. The proposed improvements appear to be located outside the City's right-of-way. This area is not currently compliant with accessibility guidelines.*

Response: The applicant acknowledges that coordination with the railroad will be required prior to construction.

Please contact us if you have any questions or comments on the responses above.

Sincerely,

TIGHE & BOND, INC.

Neil Hansen, PE
Project Manager

Enclosures: Market Street at Russell Street Traffic Volume Calculation

Copy: Two International Group, LLC

J:\T\T5037 Two International Group\002 Russell Street Development\Report_Evaluation\Traffic Impact Study\Peer Review Comment Response 2\2022-09-22 Traffic Peer Review Response.docx

Market Street at Russell Street Traffic Volume Calculation

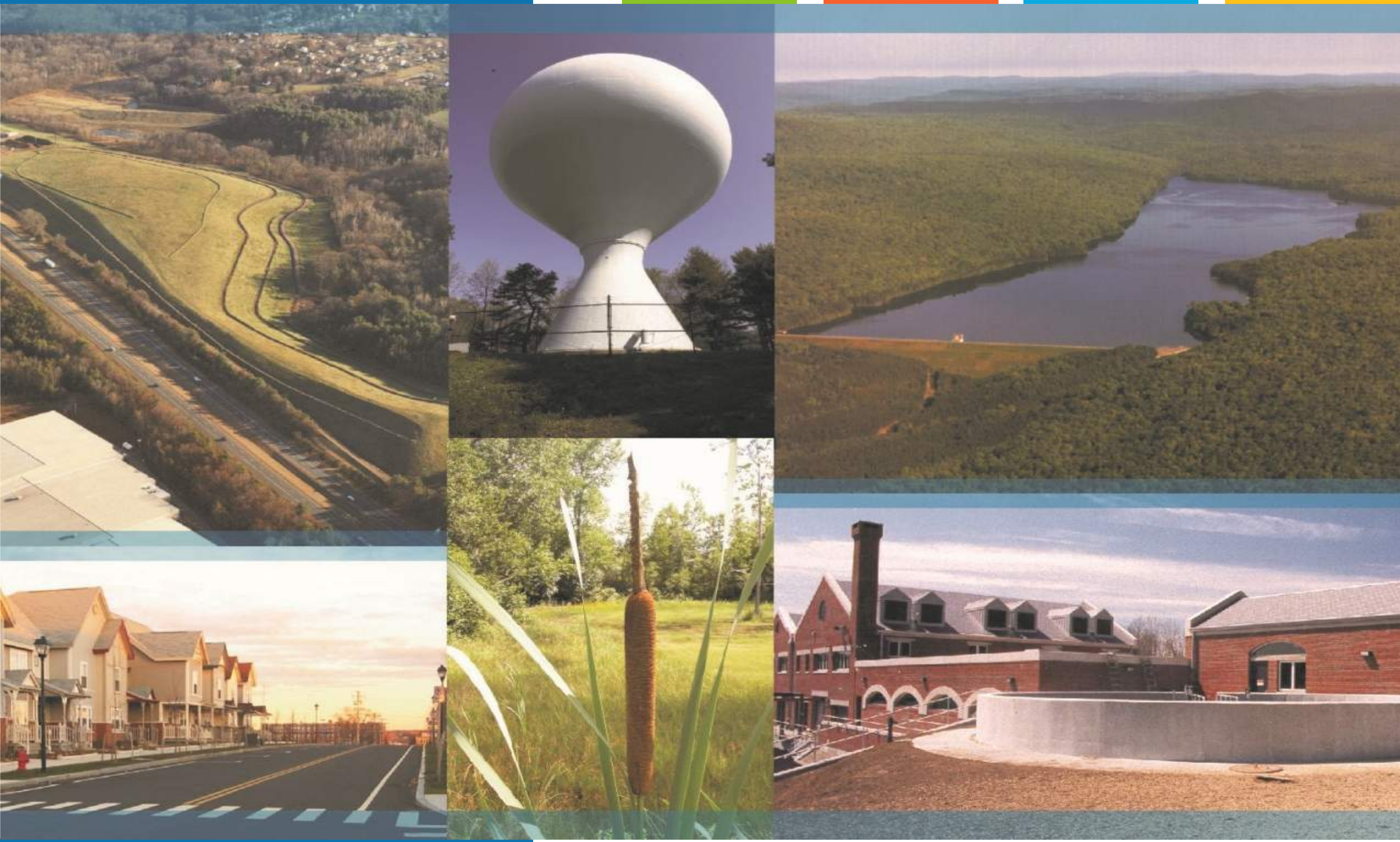
Entering Intersection Traffic Volumes based on 2035 Future Condition Traffic Volumes

Weekday Morning Peak Hour						Weekday Afternoon Peak Hour				
2035 No Build	2035 Build	% Increase				2035 No Build	2035 Build	% Increase		
142	167				EBL	422	483			
7	7				EBR	8	8			
0	0				NBL	0	0			
173	173				NBT	541	541			
311	334				SBR	523	536			
306	306				SBT	396	396			
939	987	**5.1%**	increase of	48		1890	1964	**3.9%**	increase of	74

Traffic Volume Calculation based on Market St City Volumes Comparison

2020	10,780	Tues to Thurs Average Volume (Week of Feb 23) at Nobles Island
2022	10,187	Tues to Thurs Average Volume (Week of Feb 20) at Nobles Island
% Change	5.8%	

Increased No Build based on 5.5% avg daily volume increase					Increased No Build based on 5.5% avg daily volume increase				
993	1041	**4.8%**	increase of	48	2000	2074	**3.7%**	increase of	74



North End Mixed Use Development
Russell & Deer Street
Portsmouth, NH

Drainage Analysis

Port Harbor Land, LLC

May 24, 2022

Last Revised October 20, 2022

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
10/20/22

Tighe&Bond

100% Recyclable

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A Web Soil Survey Report

B Extreme Precipitation Tables

Section 1
Project Description

The project is located at 2 Russell Street, Deer Street & 250 Market Street consisting of properties identified as Map 118 Lot 28, Map 119 Lot 1-1C & Lot 4, Map 124 Lot 12, and Map 125 Lot 21 on the City of Portsmouth Tax Maps. The properties identified as Map 118 Lot 28, Map 124 Lot 12, and Map 125 Lot 21 (proposed redevelopment parcels) are the existing parcels proposed to be redeveloped are bound by Deer Street to the south, Maplewood Avenue to the west, the railroad to the north and Russell Street to the east.

The proposed project will include the construction of three buildings consisting of office, retail/commercial, and residential uses. Building 1 is a proposed 4-story office building at the corner of Deer Street and Maplewood Avenue, Building 2 is a proposed 5-story mixed-use residential building at the corner of Deer Street and Russell Street with below ground parking, first floor residential lobby, commercial space and parking and 56 upper floor residential units, and Building 3 is a proposed 5-story mixed-use residential building along Russell Street with first floor residential lobby and commercial space and 24 upper floor residential units.

1.1 On-Site Soil Description

The proposed redevelopment parcels lots currently consist of a large surface parking lot which is mainly used by the Sheraton Hotel. There are some small patches of gravel and grass where the site abuts the railroad property and a ledge outcropping to the north.

A web soil survey was completed for the project and can be found in Appendix A of this report. Based on the soil survey, the runoff analyzed within these studies has been modeled using Hydrologic Soil Group D and Hydrologic Soil Group A soils.

1.2 Pre- and Post-Development Comparison

The pre-development and post-development watershed areas have been analyzed at three (3) point of analysis. While the points of analysis have remained unchanged, the contributing sub-catchment areas varied between pre-development and post-development conditions. These adjustments were made to reflect the differences in drainage patterns between the existing and proposed conditions. The overall area analyzed as part of this drainage analysis was held constant. PA-1 assesses flows that discharge to a closed drainage system on Maplewood Avenue, which flows to the North Mill Pond and ultimately to the Piscataqua River. PA-2 evaluates the flow the discharges surface water toward the existing railroad tracks to the west of the project. PA-3 assesses flows that discharge to a separate closed drainage system along Russell Street that ultimately discharges to the Piscataqua River.

The peak discharge rates at these points of analysis were determined by analyzing Type III, 24-hour storm events. The rainfall data for these storm events were obtained from the data published by the Northeast Regional Climate Center at Cornell University which can be found in Appendix B.

Additionally, the site is located within a Coastal and Great Bay Community, therefore an added factor of safety of 15% was included as required by Env-Wq 1503.08(l).

1.3 Calculation Methods

The design storms analyzed in this study are the 2-year, 10-year, 25-year and 50-year 24-hour duration storm events. The stormwater modeling system, HydroCAD 10.0 was utilized to predict the peak runoff rates from these storm events. The peak discharge rates were determined by analyzing Type III 24-hour storm events. The rainfall data for these storm events were obtained from the data published by the Northeast Regional Climate Center at Cornell University, with an additional 15% added factor of safety as required by Env-Wq 1503.08(l).

The time of concentration was computed using the TR-55 Method, which provides a means of determining the time for an entire watershed to contribute runoff to a specific location via sheet flows, shallow concentrated flow, and channel flow. Runoff curve numbers were calculated by estimating the coverage areas and then summing the curve number for the coverage area as a percent of the entire watershed.

References:

1. HydroCAD Stormwater Modeling System, by HydroCAD Software Solutions LLC, Chocorua, New Hampshire.
2. New Hampshire Stormwater Management Manual, Volume 2, Post-Construction Best Management Practices Selection and Design, December 2008.
3. "Extreme Precipitation in New York & New England." Extreme Precipitation in New York & New England by Northeast Regional Climate Center (NRCC), 26 June 2012.

Section 2
Pre-Development Conditions

To analyze the pre-development condition, the site has been divided into three (3) distinct points of analysis (PA-1, PA-2, & PA-3). These points of analysis and watersheds are depicted on the plan entitled "Pre-Development Watershed Plan", Sheet C-801.

The point of analysis and its contributing watershed areas are described below:

Point of Analysis (PA-1)

Pre-development Watershed 1.0 (PRE 1.0) is comprised of mostly impervious surfaces from portions of the existing paved parking area, Deer Street, and concrete sidewalks, with pockets of grass. Runoff from this watershed area sheets via overland flow to either Deer Street or Maplewood Avenue and carried along the gutter line at the edge of the road to various catch basins connecting to a closed drainage system. This closed drainage system along Maplewood Avenue discharging to North Mill Pond and ultimately the Piscataqua River.

Point of Analysis (PA-2)

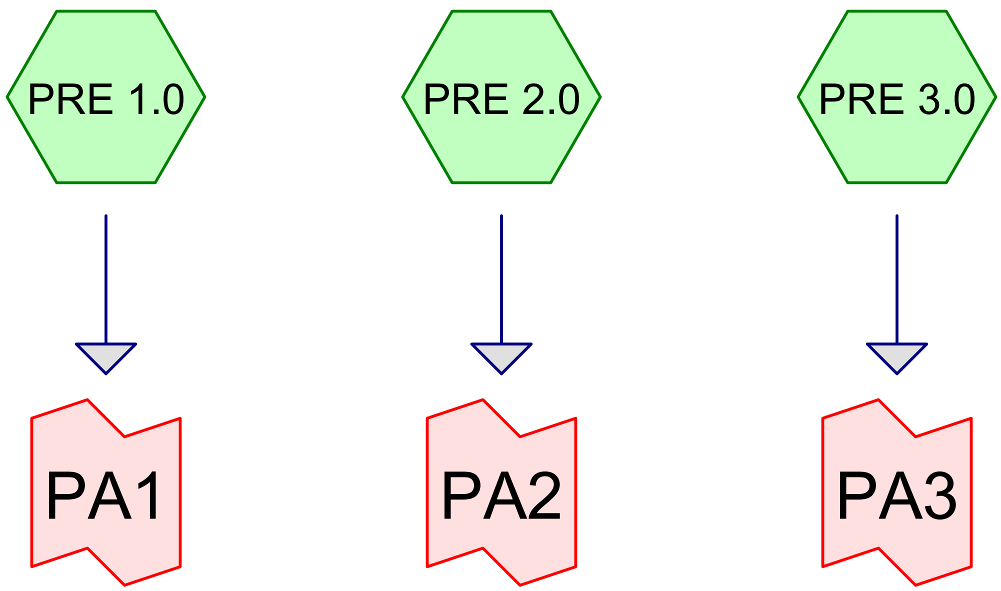
Pre-development Watershed 2.0 (PRE 2.0) is comprised of mainly impervious surfaces from the existing paved parking area with pockets of grass and gravel. Runoff from this watershed area sheets via overland flow to a gravel swale along the railroad tracks. Runoff directed toward the railroad tracks travels where it infiltrates.

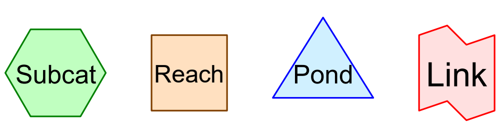
Point of Analysis (PA-3)

Pre-development Watershed 3.0 (PRE 3.0) is comprised of mostly impervious surfaces including the existing Russell Street, paved parking, and concrete sidewalks. Additionally, there are some small portions of Ledge and grassed landscaped areas. Runoff from this watershed area travels via overland flow to a closed drainage system along Russell Street discharge to the Piscataqua River.

2.1 Pre-Development Calculations

2.2 Pre-Development Watershed Plan





Routing Diagram for T-5037-002 PRE
Prepared by Tighe & Bond, Printed 7/20/2022
HydroCAD® 10.00-20 s/n 03436 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
12,636	39	>75% Grass cover, Good, HSG A (PRE 2.0, PRE 3.0)
10,382	80	>75% Grass cover, Good, HSG D (PRE 1.0, PRE 2.0, PRE 3.0)
2,104	96	Gravel surface, HSG A (PRE 2.0)
5,270	96	Gravel surface, HSG D (PRE 2.0)
3,120	98	Ledge, HSG A (PRE 2.0, PRE 3.0)
62,458	98	Unconnected pavement, HSG A (PRE 2.0, PRE 3.0)
63,417	98	Unconnected pavement, HSG D (PRE 1.0, PRE 2.0, PRE 3.0)
6,029	30	Woods, Good, HSG A (PRE 3.0)
165,416	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
86,347	HSG A	PRE 2.0, PRE 3.0
0	HSG B	
0	HSG C	
79,069	HSG D	PRE 1.0, PRE 2.0, PRE 3.0
0	Other	
165,416		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PRE 1.0: Runoff Area=14,937 sf 79.04% Impervious Runoff Depth>3.01"
Flow Length=290' Tc=5.0 min CN=94 Runoff=1.16 cfs 3,746 cf

Subcatchment PRE 2.0: Runoff Area=78,192 sf 76.16% Impervious Runoff Depth>2.91"
Flow Length=444' Tc=5.0 min CN=93 Runoff=5.91 cfs 18,945 cf

Subcatchment PRE 3.0: Runoff Area=72,287 sf 79.73% Impervious Runoff Depth>2.26"
Flow Length=470' Tc=5.0 min CN=86 Runoff=4.38 cfs 13,596 cf

Link PA1: Inflow=1.16 cfs 3,746 cf
Primary=1.16 cfs 3,746 cf

Link PA2: Inflow=5.91 cfs 18,945 cf
Primary=5.91 cfs 18,945 cf

Link PA3: Inflow=4.38 cfs 13,596 cf
Primary=4.38 cfs 13,596 cf

Total Runoff Area = 165,416 sf Runoff Volume = 36,287 cf Average Runoff Depth = 2.63"
22.02% Pervious = 36,421 sf 77.98% Impervious = 128,995 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PRE 1.0: Runoff Area=14,937 sf 79.04% Impervious Runoff Depth>4.89"
Flow Length=290' Tc=5.0 min CN=94 Runoff=1.83 cfs 6,085 cf

Subcatchment PRE 2.0: Runoff Area=78,192 sf 76.16% Impervious Runoff Depth>4.78"
Flow Length=444' Tc=5.0 min CN=93 Runoff=9.44 cfs 31,119 cf

Subcatchment PRE 3.0: Runoff Area=72,287 sf 79.73% Impervious Runoff Depth>4.02"
Flow Length=470' Tc=5.0 min CN=86 Runoff=7.71 cfs 24,208 cf

Link PA1: Inflow=1.83 cfs 6,085 cf
Primary=1.83 cfs 6,085 cf

Link PA2: Inflow=9.44 cfs 31,119 cf
Primary=9.44 cfs 31,119 cf

Link PA3: Inflow=7.71 cfs 24,208 cf
Primary=7.71 cfs 24,208 cf

Total Runoff Area = 165,416 sf Runoff Volume = 61,412 cf Average Runoff Depth = 4.46"
22.02% Pervious = 36,421 sf 77.98% Impervious = 128,995 sf

Summary for Subcatchment PRE 1.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.83 cfs @ 12.07 hrs, Volume= 6,085 cf, Depth> 4.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

Area (sf)	CN	Description
3,131	80	>75% Grass cover, Good, HSG D
11,806	98	Unconnected pavement, HSG D
14,937	94	Weighted Average
3,131		20.96% Pervious Area
11,806		79.04% Impervious Area
11,806		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0750	2.50		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.2	47	0.0310	3.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.7	143	0.0053	3.30	2.59	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Concrete pipe, bends & connections
1.6	290	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment PRE 2.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 9.44 cfs @ 12.07 hrs, Volume= 31,119 cf, Depth> 4.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

	Area (sf)	CN	Description
*	1,504	98	Ledge, HSG A
	4,951	39	>75% Grass cover, Good, HSG A
	2,104	96	Gravel surface, HSG A
	12,416	98	Unconnected pavement, HSG A
	6,315	80	>75% Grass cover, Good, HSG D
	5,270	96	Gravel surface, HSG D
	45,632	98	Unconnected pavement, HSG D
	78,192	93	Weighted Average
	18,640		23.84% Pervious Area
	59,552		76.16% Impervious Area
	58,048		97.47% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	100	0.0750	2.50		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
2.5	344	0.0129	2.31		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.2	444	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment PRE 3.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 7.71 cfs @ 12.07 hrs, Volume= 24,208 cf, Depth> 4.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

	Area (sf)	CN	Description
*	1,616	98	Ledge, HSG A
	7,685	39	>75% Grass cover, Good, HSG A
	6,029	30	Woods, Good, HSG A
	50,042	98	Unconnected pavement, HSG A
	936	80	>75% Grass cover, Good, HSG D
	5,979	98	Unconnected pavement, HSG D
	72,287	86	Weighted Average
	14,650		20.27% Pervious Area
	57,637		79.73% Impervious Area
	56,021		97.20% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	25	0.0140	0.97		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.1	15	0.1670	2.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
1.1	140	0.0110	2.13		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.6	290	0.0300	7.86	6.17	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
2.2	470	Total, Increased to minimum Tc = 5.0 min			

Summary for Link PA1:

Inflow Area = 14,937 sf, 79.04% Impervious, Inflow Depth > 4.89" for 10-Yr event
Inflow = 1.83 cfs @ 12.07 hrs, Volume= 6,085 cf
Primary = 1.83 cfs @ 12.07 hrs, Volume= 6,085 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA2:

Inflow Area =	78,192 sf,	76.16% Impervious,	Inflow Depth > 4.78"	for 10-Yr event	
Inflow =	9.44 cfs @	12.07 hrs,	Volume=	31,119 cf	
Primary =	9.44 cfs @	12.07 hrs,	Volume=	31,119 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA3:

Inflow Area =	72,287 sf,	79.73% Impervious,	Inflow Depth > 4.02"	for 10-Yr event	
Inflow =	7.71 cfs @	12.07 hrs,	Volume=	24,208 cf	
Primary =	7.71 cfs @	12.07 hrs,	Volume=	24,208 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PRE 1.0: Runoff Area=14,937 sf 79.04% Impervious Runoff Depth>6.36"
Flow Length=290' Tc=5.0 min CN=94 Runoff=2.34 cfs 7,922 cf

Subcatchment PRE 2.0: Runoff Area=78,192 sf 76.16% Impervious Runoff Depth>6.25"
Flow Length=444' Tc=5.0 min CN=93 Runoff=12.16 cfs 40,708 cf

Subcatchment PRE 3.0: Runoff Area=72,287 sf 79.73% Impervious Runoff Depth>5.44"
Flow Length=470' Tc=5.0 min CN=86 Runoff=10.30 cfs 32,768 cf

Link PA1: Inflow=2.34 cfs 7,922 cf
Primary=2.34 cfs 7,922 cf

Link PA2: Inflow=12.16 cfs 40,708 cf
Primary=12.16 cfs 40,708 cf

Link PA3: Inflow=10.30 cfs 32,768 cf
Primary=10.30 cfs 32,768 cf

Total Runoff Area = 165,416 sf Runoff Volume = 81,398 cf Average Runoff Depth = 5.90"
22.02% Pervious = 36,421 sf 77.98% Impervious = 128,995 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment PRE 1.0: Runoff Area=14,937 sf 79.04% Impervious Runoff Depth>7.76"
Flow Length=290' Tc=5.0 min CN=94 Runoff=2.83 cfs 9,654 cf

Subcatchment PRE 2.0: Runoff Area=78,192 sf 76.16% Impervious Runoff Depth>7.64"
Flow Length=444' Tc=5.0 min CN=93 Runoff=14.70 cfs 49,752 cf

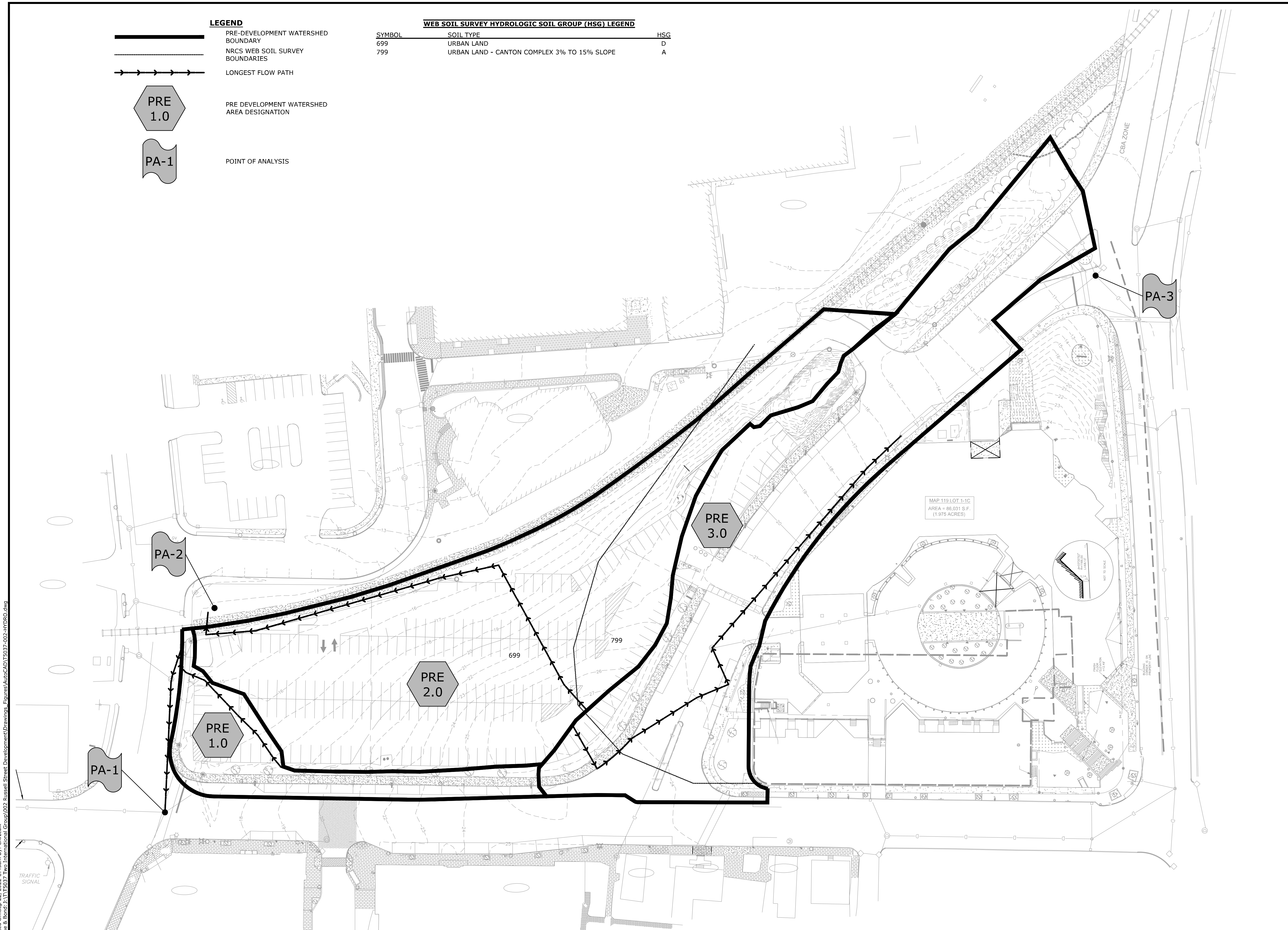
Subcatchment PRE 3.0: Runoff Area=72,287 sf 79.73% Impervious Runoff Depth>6.79"
Flow Length=470' Tc=5.0 min CN=86 Runoff=12.71 cfs 40,925 cf

Link PA1: Inflow=2.83 cfs 9,654 cf
Primary=2.83 cfs 9,654 cf

Link PA2: Inflow=14.70 cfs 49,752 cf
Primary=14.70 cfs 49,752 cf

Link PA3: Inflow=12.71 cfs 40,925 cf
Primary=12.71 cfs 40,925 cf

Total Runoff Area = 165,416 sf Runoff Volume = 100,331 cf Average Runoff Depth = 7.28"
22.02% Pervious = 36,421 sf 77.98% Impervious = 128,995 sf



Tighe&Bond

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E		
D		
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-HYDRO.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

PRE-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-801

Section 3
Post-Development Conditions

The post-development condition was analyzed by dividing the watersheds into six (6) watershed areas. Stormwater runoff from these sub-catchment areas flow via subsurface drainage systems prior to discharging to the city's closed drainage system. Like the pre-development condition, flows from these sub-catchment areas are modeled at three point of analysis (PA-1, PA-2 & PA-3).

Two underground detention systems are included on the development site for the purpose of mitigating peak flowrates. Additionally, three Jellyfish Filter units are proposed for treatment purposes. The two treatment units located post detention, are designed that flows greater than the 2-year storm event bypass these units. The standalone treatment unit is designed to pass the larger storm events.

These points of analysis and their sub-catchment areas are depicted on the plan entitled "Post-Development Watershed Plan," Sheet C-802. The point of analysis and it's contributing watershed areas are described below:

Point of Analysis (PA-1)

Post-development Watershed 1.0 (POST 1.0) is comprised mostly of brick sidewalks and seating areas along Deer Street and Maplewood Avenue. Runoff from this sub-catchment travels via overland flow to the existing closed drainage system on Maplewood Avenue.

Post-development Watershed 1.1 (Post 1.1) is comprised of the majority of the development lot. This watershed contains proposed buildings 1 and 2 as well as portions of the mews community space. Runoff from this watershed is captured by various yard drains and roof leaders connecting to a proposed underground detention system (Pond 1.1). The detention system discharges to the treatment unit, a Contech Jellyfish Stormwater Filter (Pond PJFF 1). Flows exiting the Jellyfish Filter discharge to the closed drainage system along Maplewood Avenue (PA-1).

Point of Analysis (PA-2)

Post-development Watershed 2.0 (POST 2.0) is comprised mostly of the brick fire, pedestrian, and bicycle access drive. Additionally, this watershed has portions of gravel adjacent to the railroad tracks. Like the pre-development conditions, runoff from this watershed travels parallel to the railroad tracks prior to infiltrating into the ground.

Point of Analysis (PA-3)

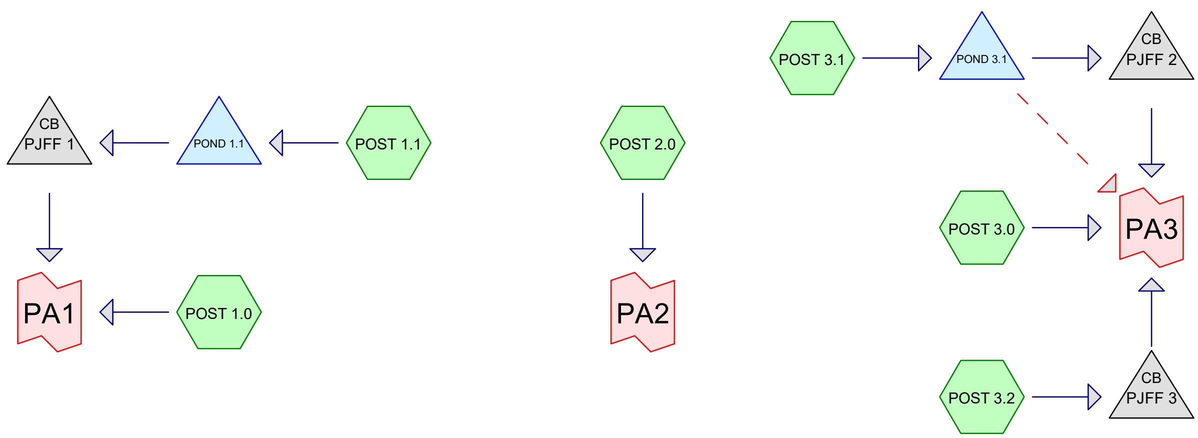
Post-development Watershed 3.0 (POST 3.0) is comprised of mostly impervious surfaces including the proposed realigned Russell Street and sidewalks adjacent to the proposed building. Additionally, there are some small portions of grassed landscaped areas along the street. Runoff from this watershed area travels via overland flow to a closed drainage system along Russell Street discharge to the Piscataqua River.

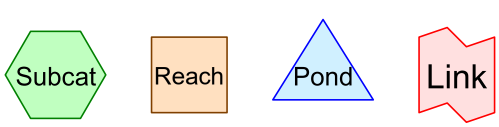
Post-development Watershed 3.1 (POST 3.1) is comprised of the proposed building 3 and the shared access driveway between buildings 2 and 3. Runoff from this watershed is captured by a catch basin and roof leader connecting to a proposed underground detention system (Pond 3.1). The detention system discharges to the treatment unit, a Contech Jellyfish Stormwater Filter (Pond PJFF 2). Flows exiting the Jellyfish Filter discharge to the closed drainage system along Russell Street (PA-3).

Post-development Watershed 3.2 (POST 3.2) is comprised of the shared access driveway between buildings 2 and 3. Runoff from this watershed is captured by a catch basin which discharges to the treatment unit, a Contech Jellyfish Stormwater Filter (Pond PJFF 3). Flows exiting the Jellyfish Filter discharge to the closed drainage system along Russell Street (PA-3).

3.1 Post-Development Calculations

3.2 Post-Development Watershed Plan





Routing Diagram for T-5037-002 POST
Prepared by Tighe & Bond, Printed 9/28/2022
HydroCAD® 10.00-20 s/n 03436 © 2017 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
11,117	39	>75% Grass cover, Good, HSG A (POST 2.0, POST 3.0, POST 3.2)
2,460	80	>75% Grass cover, Good, HSG D (POST 1.0, POST 1.1, POST 3.0)
1,125	96	Gravel surface, HSG A (POST 2.0)
6,672	96	Gravel surface, HSG D (POST 2.0)
51,328	98	Paved parking, HSG A (POST 2.0, POST 3.0, POST 3.2)
26,589	98	Paved parking, HSG D (POST 1.0, POST 1.1, POST 2.0, POST 3.0, POST 3.2)
20,986	98	Roofs, HSG A (POST 1.1, POST 3.1)
43,348	98	Unconnected roofs, HSG D (POST 1.1)
1,791	30	Woods, Good, HSG A (POST 3.0)
165,416	**93**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
86,347	HSG A	POST 1.1, POST 2.0, POST 3.0, POST 3.1, POST 3.2
0	HSG B	
0	HSG C	
79,069	HSG D	POST 1.0, POST 1.1, POST 2.0, POST 3.0, POST 3.2
0	Other	
165,416		**TOTAL AREA**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: Runoff Area=8,504 sf 88.63% Impervious Runoff Depth>3.22"
Flow Length=336' Tc=5.0 min CN=96 Runoff=0.68 cfs 2,283 cf

Subcatchment POST 1.1: Runoff Area=56,100 sf 98.25% Impervious Runoff Depth>3.44"
Flow Length=158' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=4.64 cfs 16,102 cf

Subcatchment POST 2.0: Runoff Area=25,065 sf 68.10% Impervious Runoff Depth>3.33"
Flow Length=420' Slope=0.0193 '/' Tc=5.0 min CN=97 Runoff=2.05 cfs 6,959 cf

Subcatchment POST 3.0: Runoff Area=60,974 sf 78.54% Impervious Runoff Depth>2.17"
Flow Length=726' Tc=5.0 min CN=85 Runoff=3.56 cfs 11,039 cf

Subcatchment POST 3.1: Runoff Area=11,899 sf 100.00% Impervious Runoff Depth>3.44"
Flow Length=139' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=0.99 cfs 3,415 cf

Subcatchment POST 3.2: Runoff Area=2,874 sf 95.34% Impervious Runoff Depth>3.11"
Flow Length=82' Slope=0.0170 '/' Tc=5.0 min CN=95 Runoff=0.23 cfs 746 cf

Pond PJFF 1: Peak Elev=7.09' Inflow=0.59 cfs 15,602 cf
18.0" Round Culvert n=0.013 L=38.0' S=0.0053 '/' Outflow=0.59 cfs 15,602 cf

Pond PJFF 2: Peak Elev=11.12' Inflow=0.64 cfs 3,373 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0167 '/' Outflow=0.64 cfs 3,373 cf

Pond PJFF 3: Peak Elev=18.57' Inflow=0.23 cfs 746 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0056 '/' Outflow=0.23 cfs 746 cf

Pond POND 1.1: Peak Elev=9.39' Storage=6,990 cf Inflow=4.64 cfs 16,102 cf
Outflow=0.59 cfs 15,602 cf

Pond POND 3.1: Peak Elev=12.00' Storage=503 cf Inflow=0.99 cfs 3,415 cf
Primary=0.64 cfs 3,373 cf Secondary=0.00 cfs 0 cf Outflow=0.64 cfs 3,373 cf

Link PA1: Inflow=1.15 cfs 17,885 cf
Primary=1.15 cfs 17,885 cf

Link PA2: Inflow=2.05 cfs 6,959 cf
Primary=2.05 cfs 6,959 cf

Link PA3: Inflow=4.33 cfs 15,158 cf
Primary=4.33 cfs 15,158 cf

Total Runoff Area = 165,416 sf Runoff Volume = 40,544 cf Average Runoff Depth = 2.94"
14.00% Pervious = 23,165 sf 86.00% Impervious = 142,251 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: Runoff Area=8,504 sf 88.63% Impervious Runoff Depth>5.12"
Flow Length=336' Tc=5.0 min CN=96 Runoff=1.06 cfs 3,626 cf

Subcatchment POST 1.1: Runoff Area=56,100 sf 98.25% Impervious Runoff Depth>5.35"
Flow Length=158' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=7.10 cfs 25,011 cf

Subcatchment POST 2.0: Runoff Area=25,065 sf 68.10% Impervious Runoff Depth>5.23"
Flow Length=420' Slope=0.0193 '/' Tc=5.0 min CN=97 Runoff=3.15 cfs 10,930 cf

Subcatchment POST 3.0: Runoff Area=60,974 sf 78.54% Impervious Runoff Depth>3.91"
Flow Length=726' Tc=5.0 min CN=85 Runoff=6.37 cfs 19,892 cf

Subcatchment POST 3.1: Runoff Area=11,899 sf 100.00% Impervious Runoff Depth>5.35"
Flow Length=139' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=1.51 cfs 5,305 cf

Subcatchment POST 3.2: Runoff Area=2,874 sf 95.34% Impervious Runoff Depth>5.00"
Flow Length=82' Slope=0.0170 '/' Tc=5.0 min CN=95 Runoff=0.36 cfs 1,198 cf

Pond PJFF 1: Peak Elev=7.24' Inflow=1.08 cfs 24,318 cf
18.0" Round Culvert n=0.013 L=38.0' S=0.0053 '/' Outflow=1.08 cfs 24,318 cf

Pond PJFF 2: Peak Elev=11.21' Inflow=0.85 cfs 5,074 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0167 '/' Outflow=0.85 cfs 5,074 cf

Pond PJFF 3: Peak Elev=18.64' Inflow=0.36 cfs 1,198 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0056 '/' Outflow=0.36 cfs 1,198 cf

Pond POND 1.1: Peak Elev=10.57' Storage=10,845 cf Inflow=7.10 cfs 25,011 cf
Outflow=1.08 cfs 24,318 cf

Pond POND 3.1: Peak Elev=12.27' Storage=675 cf Inflow=1.51 cfs 5,305 cf
Primary=0.85 cfs 5,074 cf Secondary=0.30 cfs 179 cf Outflow=1.15 cfs 5,253 cf

Link PA1: Inflow=1.65 cfs 27,944 cf
Primary=1.65 cfs 27,944 cf

Link PA2: Inflow=3.15 cfs 10,930 cf
Primary=3.15 cfs 10,930 cf

Link PA3: Inflow=7.64 cfs 26,342 cf
Primary=7.64 cfs 26,342 cf

Total Runoff Area = 165,416 sf Runoff Volume = 65,961 cf Average Runoff Depth = 4.79"
14.00% Pervious = 23,165 sf 86.00% Impervious = 142,251 sf

Summary for Subcatchment POST 1.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.06 cfs @ 12.07 hrs, Volume= 3,626 cf, Depth> 5.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

Area (sf)	CN	Description
0	98	Paved parking, HSG A
967	80	>75% Grass cover, Good, HSG D
7,537	98	Paved parking, HSG D
8,504	96	Weighted Average
967		11.37% Pervious Area
7,537		88.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	100	0.0038	0.76		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	206	0.0310	3.57		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	30	0.0053	3.30	2.59	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
3.4	336	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST 1.1:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 7.10 cfs @ 12.07 hrs, Volume= 25,011 cf, Depth> 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

	Area (sf)	CN	Description
	9,087	98	Roofs, HSG A
	0	39	>75% Grass cover, Good, HSG A
*	0	96	Gravel surface, HSG A
	0	98	Paved parking, HSG A
	43,348	98	Unconnected roofs, HSG D
	980	80	>75% Grass cover, Good, HSG D
*	0	96	Gravel surface, HSG D
	2,685	98	Paved parking, HSG D
	56,100	98	Weighted Average
	980		1.75% Pervious Area
	55,120		98.25% Impervious Area
	43,348		78.64% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	100	0.0050	0.85		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.8	58	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.8	158	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST 2.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.15 cfs @ 12.07 hrs, Volume= 10,930 cf, Depth> 5.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

	Area (sf)	CN	Description
	0	98	Roofs, HSG A
	199	39	>75% Grass cover, Good, HSG A
*	1,125	96	Gravel surface, HSG A
	5,809	98	Paved parking, HSG A
	0	98	Unconnected roofs, HSG D
	0	80	>75% Grass cover, Good, HSG D
*	6,672	96	Gravel surface, HSG D
	11,260	98	Paved parking, HSG D
	25,065	97	Weighted Average
	7,996		31.90% Pervious Area
	17,069		68.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	100	0.0193	1.45		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.9	320	0.0193	2.82		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.0	420	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST 3.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 6.37 cfs @ 12.07 hrs, Volume= 19,892 cf, Depth> 3.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

	Area (sf)	CN	Description
	1,791	30	Woods, Good, HSG A
	10,784	39	>75% Grass cover, Good, HSG A
*	0	96	Gravel surface, HSG A
	42,807	98	Paved parking, HSG A
	0	98	Unconnected roofs, HSG D
	513	80	>75% Grass cover, Good, HSG D
*	0	96	Gravel surface, HSG D
	5,079	98	Paved parking, HSG D
	60,974	85	Weighted Average
	13,088		21.46% Pervious Area
	47,886		78.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.8	89	0.0398	1.90		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.2	637	0.0387	8.92	7.01	**Pipe Channel,** 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013
2.0	726	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST 3.1:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.51 cfs @ 12.07 hrs, Volume= 5,305 cf, Depth> 5.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

	Area (sf)	CN	Description
	11,899	98	Roofs, HSG A
	0	39	>75% Grass cover, Good, HSG A
*	0	96	Gravel surface, HSG A
	0	98	Paved parking, HSG A
	0	98	Unconnected roofs, HSG D
	0	98	Paved parking, HSG D
*	0	96	Gravel surface, HSG D
	11,899	98	Weighted Average
	11,899		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.0	100	0.0050	0.85		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
0.6	39	0.0050	1.14		**Shallow Concentrated Flow,** Unpaved Kv= 16.1 fps
2.6	139	Total, Increased to minimum Tc = 5.0 min			

Summary for Subcatchment POST 3.2:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 1,198 cf, Depth> 5.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Yr Rainfall=5.59"

	Area (sf)	CN	Description
	0	98	Roofs, HSG A
	134	39	>75% Grass cover, Good, HSG A
*	0	96	Gravel surface, HSG A
	2,712	98	Paved parking, HSG A
	0	98	Unconnected roofs, HSG D
	28	98	Paved parking, HSG D
*	0	96	Gravel surface, HSG D
	2,874	95	Weighted Average
	134		4.66% Pervious Area
	2,740		95.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	82	0.0170	1.33		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 3.68"
1.0	82	Total, Increased to minimum Tc = 5.0 min			

Summary for Pond PJFF 1:

Inflow Area = 56,100 sf, 98.25% Impervious, Inflow Depth > 5.20" for 10-Yr event
Inflow = 1.08 cfs @ 12.55 hrs, Volume= 24,318 cf
Outflow = 1.08 cfs @ 12.55 hrs, Volume= 24,318 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.08 cfs @ 12.55 hrs, Volume= 24,318 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 7.24' @ 12.55 hrs
Flood Elev= 22.95'

Device	Routing	Invert	Outlet Devices
#1	Primary	6.70'	**18.0" Round Culvert** L= 38.0' Ke= 0.500 Inlet / Outlet Invert= 6.70' / 6.50' S= 0.0053 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=1.08 cfs @ 12.55 hrs HW=7.24' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 1.08 cfs @ 2.79 fps)

Summary for Pond PJFF 2:

Inflow Area = 11,899 sf,100.00% Impervious, Inflow Depth > 5.12" for 10-Yr event
Inflow = 0.85 cfs @ 12.14 hrs, Volume= 5,074 cf
Outflow = 0.85 cfs @ 12.14 hrs, Volume= 5,074 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.14 hrs, Volume= 5,074 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 11.21' @ 12.14 hrs
Flood Elev= 15.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	10.65'	**12.0" Round Culvert** L= 3.0' Ke= 0.500 Inlet / Outlet Invert= 10.65' / 10.60' S= 0.0167 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 12.14 hrs HW=11.20' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.85 cfs @ 2.74 fps)

Summary for Pond PJFF 3:

Inflow Area = 2,874 sf, 95.34% Impervious, Inflow Depth > 5.00" for 10-Yr event
Inflow = 0.36 cfs @ 12.07 hrs, Volume= 1,198 cf
Outflow = 0.36 cfs @ 12.07 hrs, Volume= 1,198 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.36 cfs @ 12.07 hrs, Volume= 1,198 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 18.64' @ 12.07 hrs
Flood Elev= 22.55'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.30'	**12.0" Round Culvert** L= 45.0' Ke= 0.500 Inlet / Outlet Invert= 18.30' / 18.05' S= 0.0056 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.07 hrs HW=18.63' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.34 cfs @ 2.22 fps)

Summary for Pond POND 1.1:

Inflow Area = 56,100 sf, 98.25% Impervious, Inflow Depth > 5.35" for 10-Yr event
Inflow = 7.10 cfs @ 12.07 hrs, Volume= 25,011 cf
Outflow = 1.08 cfs @ 12.55 hrs, Volume= 24,318 cf, Atten= 85%, Lag= 28.9 min
Primary = 1.08 cfs @ 12.55 hrs, Volume= 24,318 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 10.57' @ 12.55 hrs Surf.Area= 3,840 sf Storage= 10,845 cf
Flood Elev= 12.25' Surf.Area= 3,840 sf Storage= 16,330 cf

Plug-Flow detention time= 162.0 min calculated for 24,318 cf (97% of inflow)
Center-of-Mass det. time= 144.6 min (889.6 - 745.0)

Volume	Invert	Avail.Storage	Storage Description
#1E	6.25'	0 cf	**24.00'W x 128.00'L x 6.58'H Field E** 20,224 cf Overall - 17,152 cf Embedded = 3,072 cf x 0.0% Voids
#2E	7.25'	13,130 cf	**Oldcastle Storm Capture SC1 5'** x 24 Inside #1 Inside= 84.0"W x 60.0"H => 34.69 sf x 16.00'L = 555.0 cf Outside= 96.0"W x 67.0"H => 44.67 sf x 16.00'L = 714.7 cf 3 Rows adjusted for 190.0 cf perimeter wall
#3F	6.25'	0 cf	**8.00'W x 96.00'L x 6.58'H Field F** 5,056 cf Overall - 4,288 cf Embedded = 768 cf x 0.0% Voids
#4F	7.25'	3,200 cf	**Oldcastle Storm Capture SC1 5'** x 6 Inside #3 Inside= 84.0"W x 60.0"H => 34.69 sf x 16.00'L = 555.0 cf Outside= 96.0"W x 67.0"H => 44.67 sf x 16.00'L = 714.7 cf 1 Rows adjusted for 130.0 cf perimeter wall
		16,330 cf	Total Available Storage

Storage Group E created with Chamber Wizard
Storage Group F created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	7.25'	**18.0" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 7.25' / 7.20' S= 0.0250 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	7.25'	**4.0" Vert. Orifice/Grate** C= 0.600
#3	Device 1	10.00'	**4.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#4	Primary	12.10'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.00 Width (feet) 4.00 4.00

Primary OutFlow Max=1.08 cfs @ 12.55 hrs HW=10.57' TW=7.24' (Dynamic Tailwater)
1=Culvert (Passes 1.08 cfs of 13.64 cfs potential flow)
2=Orifice/Grate (Orifice Controls 0.75 cfs @ 8.55 fps)
3=Orifice/Grate (Orifice Controls 0.34 cfs @ 3.04 fps)
4=Custom Weir/Orifice (Controls 0.00 cfs)

Summary for Pond POND 3.1:

Inflow Area = 11,899 sf,100.00% Impervious, Inflow Depth > 5.35" for 10-Yr event
Inflow = 1.51 cfs @ 12.07 hrs, Volume= 5,305 cf
Outflow = 1.15 cfs @ 12.14 hrs, Volume= 5,253 cf, Atten= 24%, Lag= 4.4 min
Primary = 0.85 cfs @ 12.14 hrs, Volume= 5,074 cf
Secondary = 0.30 cfs @ 12.14 hrs, Volume= 179 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 12.27' @ 12.14 hrs Surf.Area= 768 sf Storage= 675 cf
Flood Elev= 13.20' Surf.Area= 768 sf Storage= 1,260 cf

Plug-Flow detention time= 24.5 min calculated for 5,242 cf (99% of inflow)
Center-of-Mass det. time= 18.1 min (763.1 - 745.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	10.20'	0 cf	**8.00'W x 96.00'L x 3.58'H Field A** 2,752 cf Overall - 1,984 cf Embedded = 768 cf x 0.0% Voids
#2A	11.20'	1,260 cf	**Oldcastle Storm Capture SC1 2'** x 6 Inside #1 Inside= 84.0"W x 24.0"H => 13.13 sf x 16.00'L = 210.0 cf Outside= 96.0"W x 31.0"H => 20.67 sf x 16.00'L = 330.7 cf
		1,260 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	11.20'	**6.0" Round Culvert** L= 8.0' Ke= 0.500 Inlet / Outlet Invert= 11.20' / 11.15' S= 0.0062 '/' Cc= 0.900 n= 0.013, Flow Area= 0.20 sf
#2	Secondary	11.20'	**12.0" Round Culvert** L= 16.0' Ke= 0.500 Inlet / Outlet Invert= 11.20' / 10.90' S= 0.0187 '/' Cc= 0.900 n= 0.013, Flow Area= 0.79 sf
#3	Device 2	12.00'	**8.0" W x 4.0" H Vert. Orifice/Grate** C= 0.600
#4	Device 2	13.10'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 1.50 Width (feet) 4.00 4.00

Primary OutFlow Max=0.85 cfs @ 12.14 hrs HW=12.27' TW=11.20' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.85 cfs @ 4.31 fps)

Secondary OutFlow Max=0.29 cfs @ 12.14 hrs HW=12.27' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.29 cfs of 2.85 cfs potential flow)
 ├─**3=Orifice/Grate** (Orifice Controls 0.29 cfs @ 1.66 fps)
 └─**4=Custom Weir/Orifice** (Controls 0.00 cfs)

Summary for Link PA1:

Inflow Area = 64,604 sf, 96.99% Impervious, Inflow Depth > 5.19" for 10-Yr event
Inflow = 1.65 cfs @ 12.08 hrs, Volume= 27,944 cf
Primary = 1.65 cfs @ 12.08 hrs, Volume= 27,944 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA2:

Inflow Area = 25,065 sf, 68.10% Impervious, Inflow Depth > 5.23" for 10-Yr event
Inflow = 3.15 cfs @ 12.07 hrs, Volume= 10,930 cf
Primary = 3.15 cfs @ 12.07 hrs, Volume= 10,930 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA3:

Inflow Area =	75,747 sf,	82.54% Impervious,	Inflow Depth > 4.17"	for 10-Yr event
Inflow =	7.64 cfs @	12.08 hrs, Volume=	26,342 cf	
Primary =	7.64 cfs @	12.08 hrs, Volume=	26,342 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: Runoff Area=8,504 sf 88.63% Impervious Runoff Depth>6.60"
Flow Length=336' Tc=5.0 min CN=96 Runoff=1.35 cfs 4,677 cf

Subcatchment POST 1.1: Runoff Area=56,100 sf 98.25% Impervious Runoff Depth>6.84"
Flow Length=158' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=9.00 cfs 31,966 cf

Subcatchment POST 2.0: Runoff Area=25,065 sf 68.10% Impervious Runoff Depth>6.72"
Flow Length=420' Slope=0.0193 '/' Tc=5.0 min CN=97 Runoff=4.01 cfs 14,034 cf

Subcatchment POST 3.0: Runoff Area=60,974 sf 78.54% Impervious Runoff Depth>5.33"
Flow Length=726' Tc=5.0 min CN=85 Runoff=8.55 cfs 27,063 cf

Subcatchment POST 3.1: Runoff Area=11,899 sf 100.00% Impervious Runoff Depth>6.84"
Flow Length=139' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=1.91 cfs 6,780 cf

Subcatchment POST 3.2: Runoff Area=2,874 sf 95.34% Impervious Runoff Depth>6.48"
Flow Length=82' Slope=0.0170 '/' Tc=5.0 min CN=95 Runoff=0.45 cfs 1,552 cf

Pond PJFF 1: Peak Elev=7.34' Inflow=1.45 cfs 31,062 cf
18.0" Round Culvert n=0.013 L=38.0' S=0.0053 '/' Outflow=1.45 cfs 31,062 cf

Pond PJFF 2: Peak Elev=11.24' Inflow=0.94 cfs 6,283 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0167 '/' Outflow=0.94 cfs 6,283 cf

Pond PJFF 3: Peak Elev=18.69' Inflow=0.45 cfs 1,552 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0056 '/' Outflow=0.45 cfs 1,552 cf

Pond POND 1.1: Peak Elev=11.45' Storage=13,716 cf Inflow=9.00 cfs 31,966 cf
Outflow=1.45 cfs 31,062 cf

Pond POND 3.1: Peak Elev=12.45' Storage=785 cf Inflow=1.91 cfs 6,780 cf
Primary=0.94 cfs 6,283 cf Secondary=0.56 cfs 439 cf Outflow=1.50 cfs 6,722 cf

Link PA1: Inflow=2.21 cfs 35,740 cf
Primary=2.21 cfs 35,740 cf

Link PA2: Inflow=4.01 cfs 14,034 cf
Primary=4.01 cfs 14,034 cf

Link PA3: Inflow=10.27 cfs 35,337 cf
Primary=10.27 cfs 35,337 cf

Total Runoff Area = 165,416 sf Runoff Volume = 86,073 cf Average Runoff Depth = 6.24"
14.00% Pervious = 23,165 sf 86.00% Impervious = 142,251 sf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment POST 1.0: Runoff Area=8,504 sf 88.63% Impervious Runoff Depth>8.00"
Flow Length=336' Tc=5.0 min CN=96 Runoff=1.63 cfs 5,666 cf

Subcatchment POST 1.1: Runoff Area=56,100 sf 98.25% Impervious Runoff Depth>8.24"
Flow Length=158' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=10.80 cfs 38,504 cf

Subcatchment POST 2.0: Runoff Area=25,065 sf 68.10% Impervious Runoff Depth>8.12"
Flow Length=420' Slope=0.0193 '/' Tc=5.0 min CN=97 Runoff=4.81 cfs 16,952 cf

Subcatchment POST 3.0: Runoff Area=60,974 sf 78.54% Impervious Runoff Depth>6.67"
Flow Length=726' Tc=5.0 min CN=85 Runoff=10.59 cfs 33,909 cf

Subcatchment POST 3.1: Runoff Area=11,899 sf 100.00% Impervious Runoff Depth>8.24"
Flow Length=139' Slope=0.0050 '/' Tc=5.0 min CN=98 Runoff=2.29 cfs 8,167 cf

Subcatchment POST 3.2: Runoff Area=2,874 sf 95.34% Impervious Runoff Depth>7.88"
Flow Length=82' Slope=0.0170 '/' Tc=5.0 min CN=95 Runoff=0.55 cfs 1,886 cf

Pond PJFF 1: Peak Elev=7.54' Inflow=2.39 cfs 37,320 cf
18.0" Round Culvert n=0.013 L=38.0' S=0.0053 '/' Outflow=2.39 cfs 37,320 cf

Pond PJFF 2: Peak Elev=11.27' Inflow=1.03 cfs 7,383 cf
12.0" Round Culvert n=0.013 L=3.0' S=0.0167 '/' Outflow=1.03 cfs 7,383 cf

Pond PJFF 3: Peak Elev=18.73' Inflow=0.55 cfs 1,886 cf
12.0" Round Culvert n=0.013 L=45.0' S=0.0056 '/' Outflow=0.55 cfs 1,886 cf

Pond POND 1.1: Peak Elev=12.24' Storage=16,307 cf Inflow=10.80 cfs 38,504 cf
Outflow=2.39 cfs 37,320 cf

Pond POND 3.1: Peak Elev=12.63' Storage=902 cf Inflow=2.29 cfs 8,167 cf
Primary=1.03 cfs 7,383 cf Secondary=0.73 cfs 721 cf Outflow=1.75 cfs 8,103 cf

Link PA1: Inflow=2.83 cfs 42,987 cf
Primary=2.83 cfs 42,987 cf

Link PA2: Inflow=4.81 cfs 16,952 cf
Primary=4.81 cfs 16,952 cf

Link PA3: Inflow=12.63 cfs 43,899 cf
Primary=12.63 cfs 43,899 cf

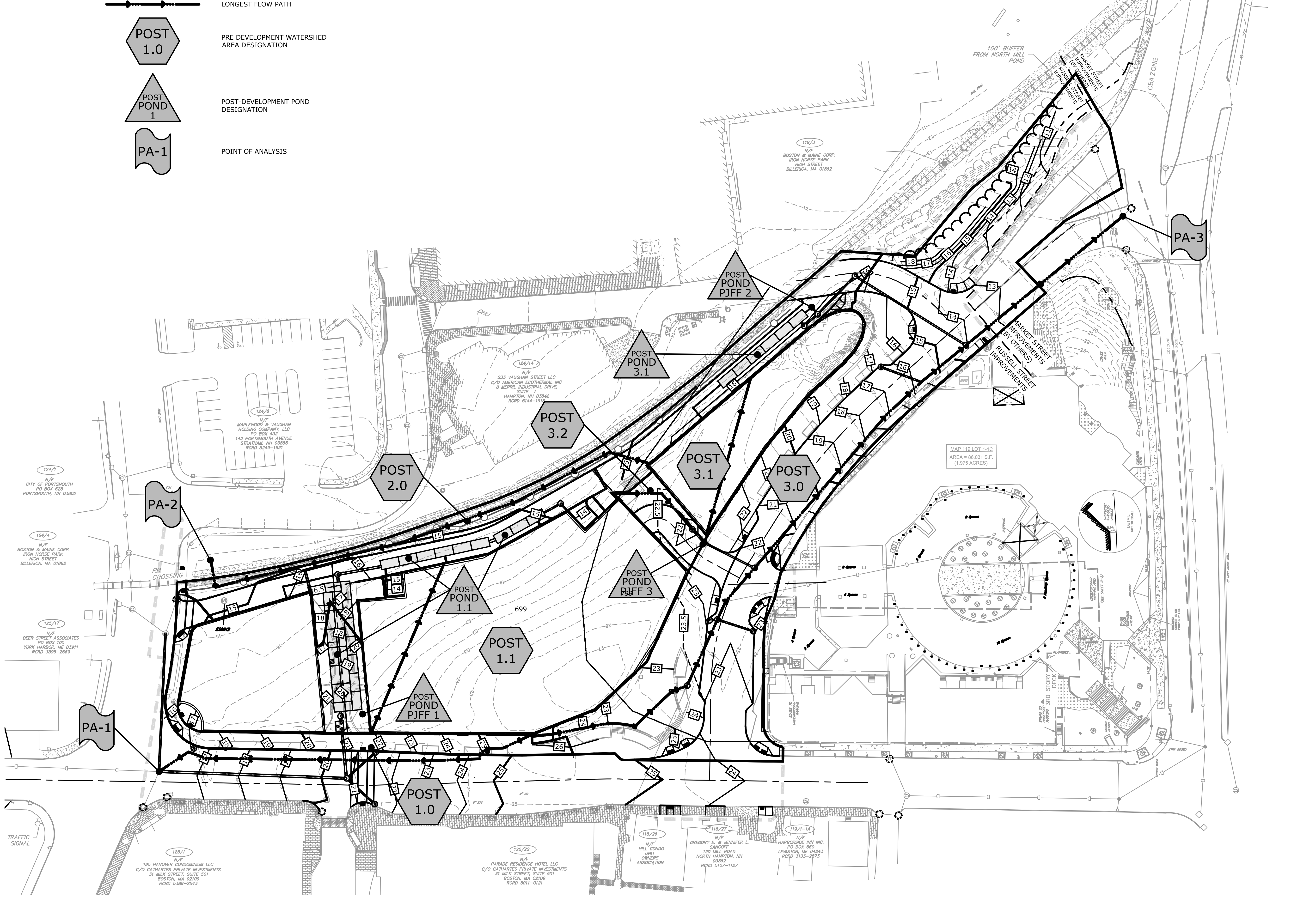
Total Runoff Area = 165,416 sf Runoff Volume = 105,085 cf Average Runoff Depth = 7.62"
14.00% Pervious = 23,165 sf 86.00% Impervious = 142,251 sf

LEGEND

(heavy solid line)	POST-DEVELOPMENT WATERSHED BOUNDARY
(dashed line)	NRCS WEB SOIL SURVEY BOUNDARIES
(line with arrows)	LONGEST FLOW PATH
POST 1.0	PRE DEVELOPMENT WATERSHED AREA DESIGNATION
POST POND 1	POST-DEVELOPMENT POND DESIGNATION
PA-1	POINT OF ANALYSIS

WEB SOIL SURVEY HYDROLOGIC SOIL GROUP (HSG) LEGEND

SYMBOL	SOIL TYPE	HSG
699	URBAN LAND	D
799	URBAN LAND - CANTON COMPLEX 3% TO 15% SLOPE	A



Tighe&Bond

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E	10/20/2022	TAC Resubmission
D	9/28/2022	Intersection Realignment
C	9/22/2022	TAC Resubmission
B	8/25/2022	TAC Resubmission
A	7/21/2022	TAC Resubmission

PROJECT NO:	T5037-002
DATE:	May 24, 2022
FILE:	T5037-002-HYDRO.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

POST-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-802

Last Saved: 10/20/2022
Plotted On:Oct 20, 2022-9:34am By: CML
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-HYDRO.dwg

Section 4
Peak Rate Comparison

The following table summarizes and compares the pre- and post-development peak runoff rates from the 2-year, 10-year, 25-year and 50-year storm events at the point of analysis.

Table 4.1
Comparison of Pre- and Post-Development Flows (CFS)

	2-Year Storm	10-Year Storm	25-Year Storm	50-Year Storm
Pre-Development Watershed				
PA-1	1.16	1.83	2.34	2.83
PA-2	5.91	9.44	12.16	14.70
PA-3	4.38	7.71	10.30	12.71
Post-Development Watershed				
PA-1	1.15	1.65	2.21	2.83
PA-2	2.05	3.15	4.01	4.81
PA-3	4.33	7.64	10.27	12.63

The Peak Runoff Control Requirements of Env-Wq 1507.06 are required to be met for all points of analysis. As shown in Table 1.2 the Post-development flows are decreased from the Pre-development flows for all points of analysis.

Section 5
Mitigation Description

The stormwater management system has been designed to provide stormwater treatment as required by the City of Portsmouth Site Review Regulations and NHDES AoT Regulations (Env-Wq 1500).

5.1 Pre-Treatment Methods for Protecting Water Quality

Pre-treatment for the stormwater filtration systems consist of deep sump catch basins.

5.2 Treatment Methods for Protecting Water Quality.

The existing 90,030 SF lot is comprised of 72,833 SF (80.90%) of impervious area. Per the City of Portsmouth's Site Plan regulations, Section 7.6.2.2, the proposed project qualifies as a redevelopment project being that greater than 40% of the developable land is existing impervious surface. The proposed development lot contains 88,455 SF of impervious surface and is proposed to treat 69,757 SF of this impervious surface. The project is required to treat at least 30% of the existing impervious surface and 100% of the additional impervious surfaces. The proposed stormwater management system treats 100% (15,622 SF) of the additional impervious surface and 74% (54,135 SF) of the existing impervious surface.

The runoff from the proposed impervious areas will be treated by two Contech Jellyfish stormwater filtration systems. The Jellyfish systems are sized to treat their respective Water Quality Flows of their sub-catchment areas. The first system is outfitted with an internal bypass that diverts peak flows away from treatment. The second system is designed to direct the WQF to the treatment unit and discharge the higher flows to a bypass outlet control unit. The BMP worksheet for these treatment practices has been included in Section 6 of this report.

The proposed stormwater management system is required to removal 80% of the annual Total Suspended Soils (TSS) loads and 50% of the annual Total Nitrogen (TN) loads per the City of Portsmouth's Site Plan regulations, Section 7.6.2.1.a.i. As shown in table 5.1 the pollutant removal efficiencies for the proposed treatment systems exceeds the City of Portsmouth's removal requirements.

Table 5.1 – Pollutant Removal Efficiencies

BMP	Total Suspended Solids	Total Nitrogen	Total Phosphorus
Jellyfish Filter w/Pretreatment[1]	91%	53%	61%

1. Pollutant removal calculations for Jellyfish Filter with deep sump catchbasin pretreatment are shown in Table 5.2.
2. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix B.

Table 5.2 – Pollutant Removal Calculations				
Contech Jellyfish Filter				
BMP	TSS Removal Rate	Starting TSS Load	TSS Removed	Remaining TSS Load
Deep Sump Catchbasin w/Hood[1]	0.15	1.00	0.15	0.85
Jellyfish Filter[2]	0.89	0.85	0.76	0.09
	Total Suspended Solids Removed:			**91%**
	TN Removal Rate	Starting TN Load	TN Removed	Remaining TN Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Jellyfish Filter[2]	0.51	0.95	0.48	0.47
	Total Nitrogen Removed:			**53%**
	TP Removal Rate	Starting TP Load	TP Removed	Remaining TP Load
Deep Sump Catchbasin w/Hood[1]	0.05	1.00	0.05	0.95
Jellyfish Filter[2]	0.59	0.95	0.56	0.39
	Total Phosphorus Removed:			**61%**

1. Pollutant removal efficiencies from NH Stormwater Manual Volume 2, Appendix E.
2. Pollutant removal efficiencies from Contech Engineered Solutions, Jellyfish Filter Stormwater Treatment performance testing results.

Section 6
BMP Worksheet

General Calculations - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

1.29	ac	A = Area draining to the practice
1.27	ac	A_I = Impervious area draining to the practice
0.98	decimal	I = percent impervious area draining to the practice, in decimal form
0.94	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
1.21	ac-in	WQV= 1" x Rv x A
4,383	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = amount of rainfall. For WQF in NH, P = 1".
0.94	inches	Q = water quality depth. Q = WQV/A
99	unitless	CN = unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P]$^{0.5}$)
0.1	inches	S = potential maximum retention. S = (1000/CN) - 10
0.011	inches	Ia = initial abstraction. Ia = 0.2S
5.0	minutes	T_c = Time of Concentration
640.0	cfs/mi^2/in	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
1.208	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac

Designer's Notes: JELLYFISH FILTER 1
Pretreatment: Offline Deep Sump Catch Basins and Roof Runoff
Treatment: (1) Contech Jellyfish Model JFPD0806-3-1- design capacity of 0.62 cfs
Treatment structures located post-detention therefore the treatment unit is sized to treat the 2-year post detention flow rate of 0.59 cfs.

General Calculations - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.27	ac	A = Area draining to the practice
0.27	ac	A_I = Impervious area draining to the practice
1.00	decimal	I = percent impervious area draining to the practice, in decimal form
0.95	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.26	ac-in	WQV= 1" x Rv x A
931	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")

Water Quality Flow (WQF)

1	inches	P = amount of rainfall. For WQF in NH, P = 1".
0.95	inches	Q = water quality depth. Q = WQV/A
100	unitless	CN = unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P] $^{0.5}$)
0.0	inches	S = potential maximum retention. S = (1000/CN) - 10
0.009	inches	Ia = initial abstraction. Ia = 0.2S
5.0	minutes	T_c = Time of Concentration
640.0	cfs/mi^2/in	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
0.257	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac

Designer's Notes: JELLYFISH FILTER 2

Pretreatment: Roof Runoff

Treatment: (1) Contech Jellyfish Model JF6-4-1- design capacity of 0.80 cfs

Treatment structures located post-detention therefore the treatment unit is sized to treat the 2-year post detention flow rate of 0.65 cfs.

General Calculations - WQV and WQF
(optional worksheet)

This worksheet may be useful when designing a BMP that does not fit into one of the specific worksheets already provided (i.e. for a technology which is not a stormwater wetland, infiltration practice, etc.)

Water Quality Volume (WQV)

0.07	ac	A = Area draining to the practice
0.06	ac	A_I = Impervious area draining to the practice
0.86	decimal	I = percent impervious area draining to the practice, in decimal form
0.82	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)
0.06	ac-in	WQV= 1” x Rv x A
209	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12”)

Water Quality Flow (WQF)

1	inches	P = amount of rainfall. For WQF in NH, P = 1".
0.82	inches	Q = water quality depth. Q = WQV/A
98	unitless	CN = unit peak discharge curve number. CN =1000/(10+5P+10Q–10*[Q^2 + 1.25*Q*P]$^{0.5}$)
0.2	inches	S = potential maximum retention. S = (1000/CN) - 10
0.034	inches	Ia = initial abstraction. Ia = 0.2S
5.0	minutes	T_c = Time of Concentration
640.0	cfs/mi^2/in	qu is the unit peak discharge. Obtain this value from TR-55 exhibits 4-II and 4-III
0.058	cfs	WQF = q_u x WQV. Conversion: to convert "cfs/mi^2/in * ac-in" to "cfs" multiply by 1mi^2/640ac

Designer's Notes: JELLYFISH FILTER 3

Pretreatment: Offline Deep Sump Catch Basin

Treatment: (1) Contech Jellyfish Model JF4-1-1 design capacity of 0.27 cfs

Section 7
Contech Sizing Memos

CONTECH ENGINEERED SOLUTIONS

CONTECH Stormwater Solutions Inc. Engineer:	DRA
Date Prepared:	**8/11/2022**

Site Information

Project Name	**North End Mixed Use Development**
Project State	**NH**
Project City	**Portsmouth**
Site Designation	**JF 1**

Total Drainage Area, Ad	**1.29**	ac
Post Development Impervious Area, Ai	**1.27**	ac
Pervious Area, Ap	**0.02**	ac
% Impervious	**98%**	
Runoff Coefficient, Rc	**0.94**	
Upstream pretreatment credit	**50%**	

Mass Loading Calculations

Mean Annual Rainfall, P	**50**	in
Agency Required % Removal	**80%**	
Percent Runoff Capture	**90%**	
Mean Annual Runoff, Vt	**197,245**	ft3
Event Mean Concentration of Pollutant, EMC	**70**	mg/l
Annual Mass Load, M total	**862**	lbs

Filter System

Filtration Brand	**Jelly Fish**	
Cartridge Length	**54**	in

Jelly Fish Sizing

Mass removed by pretreatment system	**431**	lbs
Mass load to filters after pretreatment	**431**	lbs
Mass to be Captured by System	**345**	lbs
Water Quality Flow	**0.59**	cfs

Method to Use **FLOW BASED**

Summary			
Flow	Required Size	**JFPD0806-3-1**	54
	Treatment Flow Rate provided:	0.62	cfs

CONTECH Stormwater Solutions Inc. Engineer:	DRA
Date Prepared:	**8/11/2022**

Site Information

Project Name	**North End Mixed Use Development**
Project State	**NH**
Project City	**Portsmouth**
Site Designation	**JF 2**

Total Drainage Area, Ad	**0.34**	ac
Post Development Impervious Area, Ai	**0.34**	ac
Pervious Area, Ap	**0.00**	ac
% Impervious	**100%**	
Runoff Coefficient, Rc	**0.95**	

Mass Loading Calculations

Mean Annual Rainfall, P	**50**	in
Agency Required % Removal	**80%**	
Percent Runoff Capture	**90%**	
Mean Annual Runoff, Vt	**52,762**	ft3
Event Mean Concentration of Pollutant, EMC	**75**	mg/l
Annual Mass Load, M total	**247**	lbs

Filter System

Filtration Brand	**Jelly Fish**	
Cartridge Length	**54**	in

Jelly Fish Sizing

Mass to be Captured by System	**198**	lbs
Water Quality Flow	**0.65**	cfs

Method to Use **FLOW BASED**

Summary			
Flow	Required Size	**JF6-4-1**	54
	Treatment Flow Rate provided:	0.80 cfs	

CONTECH ENGINEERED SOLUTIONS

CONTECH Stormwater Solutions Inc. Engineer:	DRA
Date Prepared:	**8/11/2022**

Site Information

Project Name	**North End Mixed Use Development**
Project State	**NH**
Project City	**Portsmouth**
Site Designation	**JF 3**

Total Drainage Area, Ad	**0.07**	ac
Post Development Impervious Area, Ai	**0.06**	ac
Pervious Area, Ap	**0.01**	ac
% Impervious	**86%**	
Runoff Coefficient, Rc	**0.82**	
Upstream pretreatment credit	**50%**	

Mass Loading Calculations

Mean Annual Rainfall, P	**50**	in
Agency Required % Removal	**80%**	
Percent Runoff Capture	**90%**	
Mean Annual Runoff, Vt	**9,393**	ft3
Event Mean Concentration of Pollutant, EMC	**70**	mg/l
Annual Mass Load, M total	**41**	lbs

Filter System

Filtration Brand	**Jelly Fish**	
Cartridge Length	**54**	in

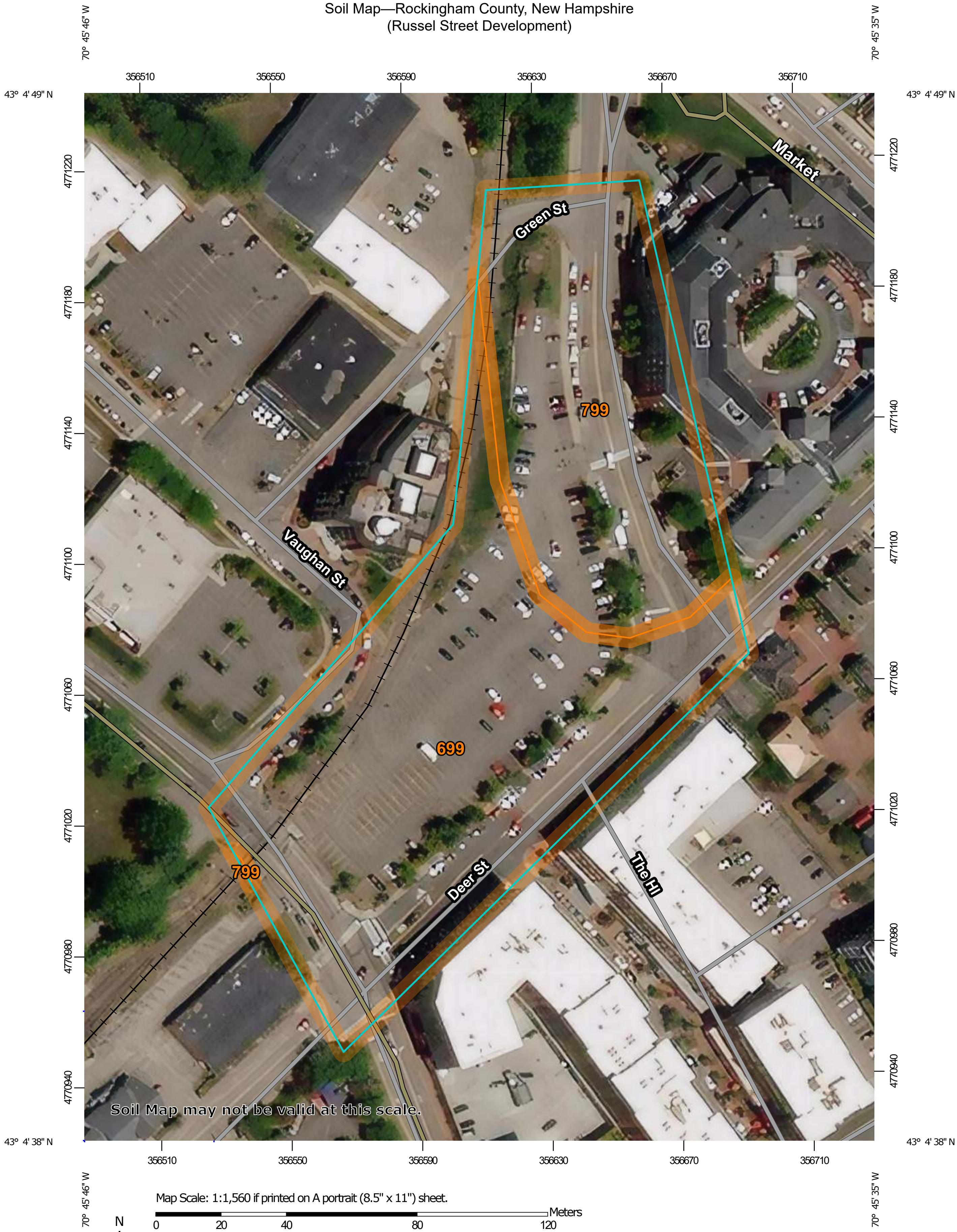
Jelly Fish Sizing

Mass removed by pretreatment system	**21**	lbs
Mass load to filters after pretreatment	**21**	lbs
Mass to be Captured by System	**16**	lbs
Water Quality Flow	**0.05**	cfs

Method to Use **FLOW BASED**

Summary			
Flow	Required Size	**JF4-1-1**	54
	Treatment Flow Rate provided:	0.27	cfs

Soil Map—Rockingham County, New Hampshire
(Russel Street Development)



Map Scale: 1:1,560 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 20, 40, 80, 120

Feet: 0, 50, 100, 200, 300

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Rockingham County, New Hampshire
Survey Area Data: Version 24, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
699	Urban land	3.2	62.5%
799	Urban land-Canton complex, 3 to 15 percent slopes	1.9	37.5%
Totals for Area of Interest		**5.2**	**100.0%**

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	70.761 degrees West
Latitude	43.079 degrees North
Elevation	0 feet
Date/Time	Thu, 10 Mar 2022 09:15:04 -0500

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.65	2.92	**1yr**	2.35	2.81	3.22	3.94	4.54	**1yr**
2yr	0.32	0.50	0.62	0.81	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.48	3.20	3.57	**2yr**	2.84	3.43	3.93	4.67	5.32	**2yr**
5yr	0.37	0.58	0.73	0.97	1.25	1.61	**5yr**	1.08	1.47	1.89	2.43	3.14	4.06	4.57	**5yr**	3.59	4.40	5.03	5.93	6.69	**5yr**
10yr	0.41	0.65	0.82	1.11	1.45	1.89	**10yr**	1.25	1.72	2.23	2.89	3.74	4.86	5.52	**10yr**	4.30	5.31	6.07	7.09	7.96	**10yr**
25yr	0.48	0.76	0.97	1.33	1.77	2.33	**25yr**	1.53	2.14	2.77	3.62	4.73	6.16	7.09	**25yr**	5.45	6.81	7.78	9.00	10.03	**25yr**
50yr	0.53	0.86	1.10	1.53	2.07	2.75	**50yr**	1.78	2.52	3.28	4.31	5.65	7.37	8.57	**50yr**	6.53	8.24	9.40	10.79	11.95	**50yr**
100yr	0.59	0.96	1.24	1.76	2.41	3.25	**100yr**	2.08	2.97	3.90	5.15	6.75	8.83	10.36	**100yr**	7.82	9.96	11.35	12.93	14.24	**100yr**
200yr	0.67	1.10	1.42	2.04	2.82	3.82	**200yr**	2.43	3.51	4.60	6.11	8.06	10.58	12.52	**200yr**	9.37	12.04	13.71	15.50	16.98	**200yr**
500yr	0.80	1.31	1.71	2.48	3.47	4.75	**500yr**	2.99	4.37	5.75	7.68	10.19	13.45	16.11	**500yr**	11.90	15.49	17.61	19.72	21.44	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.88	**1yr**	0.63	0.86	0.92	1.33	1.68	2.23	2.48	**1yr**	1.97	2.39	2.86	3.18	3.88	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.34	3.05	3.45	**2yr**	2.70	3.31	3.82	4.54	5.07	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.12	2.73	3.78	4.18	**5yr**	3.34	4.02	4.71	5.52	6.23	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.56	1.80	2.39	3.06	4.36	4.85	**10yr**	3.86	4.66	5.42	6.39	7.17	**10yr**
25yr	0.44	0.67	0.83	1.18	1.56	1.90	**25yr**	1.34	1.86	2.10	2.76	3.54	4.70	5.87	**25yr**	4.16	5.64	6.62	7.76	8.65	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.17	**50yr**	1.52	2.12	2.34	3.07	3.93	5.31	6.77	**50yr**	4.70	6.51	7.68	9.00	9.98	**50yr**
100yr	0.53	0.81	1.01	1.46	2.00	2.47	**100yr**	1.73	2.41	2.62	3.42	4.35	5.96	7.81	**100yr**	5.28	7.51	8.92	10.45	11.52	**100yr**
200yr	0.59	0.89	1.12	1.63	2.27	2.81	**200yr**	1.96	2.75	2.93	3.79	4.79	6.68	9.01	**200yr**	5.91	8.66	10.34	12.15	13.31	**200yr**
500yr	0.68	1.02	1.31	1.90	2.70	3.36	**500yr**	2.33	3.28	3.41	4.32	5.46	7.76	10.87	**500yr**	6.87	10.45	12.58	14.86	16.11	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.54	0.72	0.89	1.08	**1yr**	0.77	1.06	1.26	1.74	2.21	2.98	3.16	**1yr**	2.64	3.04	3.58	4.37	5.04	**1yr**
2yr	0.34	0.52	0.64	0.86	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.52	3.42	3.70	**2yr**	3.03	3.56	4.08	4.83	5.62	**2yr**
5yr	0.40	0.62	0.76	1.05	1.34	1.62	**5yr**	1.15	1.58	1.88	2.53	3.25	4.33	4.96	**5yr**	3.84	4.77	5.37	6.37	7.15	**5yr**
10yr	0.47	0.72	0.89	1.24	1.61	1.97	**10yr**	1.39	1.93	2.28	3.11	3.95	5.33	6.20	**10yr**	4.72	5.96	6.82	7.83	8.74	**10yr**
25yr	0.57	0.87	1.09	1.55	2.04	2.57	**25yr**	1.76	2.51	2.95	4.07	5.15	7.77	8.34	**25yr**	6.88	8.02	9.15	10.33	11.40	**25yr**
50yr	0.67	1.02	1.27	1.82	2.46	3.12	**50yr**	2.12	3.05	3.59	5.00	6.32	9.73	10.46	**50yr**	8.62	10.06	11.45	12.71	13.95	**50yr**
100yr	0.79	1.19	1.49	2.15	2.95	3.80	**100yr**	2.55	3.72	4.37	6.15	7.76	12.18	13.11	**100yr**	10.78	12.61	14.32	15.68	17.08	**100yr**
200yr	0.92	1.39	1.76	2.54	3.55	4.64	**200yr**	3.06	4.54	5.33	7.58	9.53	15.29	16.45	**200yr**	13.53	15.82	17.94	19.34	20.91	**200yr**
500yr	1.14	1.70	2.19	3.18	4.52	6.02	**500yr**	3.90	5.89	6.92	10.01	12.54	20.67	22.22	**500yr**	18.29	21.37	24.18	25.50	27.33	**500yr**

Coastal and Great Bay Region Precipitation Increase		
	24-hr Storm Event (in.)	24-hr Storm Event + 15% (in.)
1 Year	2.65	3.05
2 Year	3.20	3.68
10 Year	4.86	5.59
25 Year	6.16	7.08
50 Year	7.37	8.48

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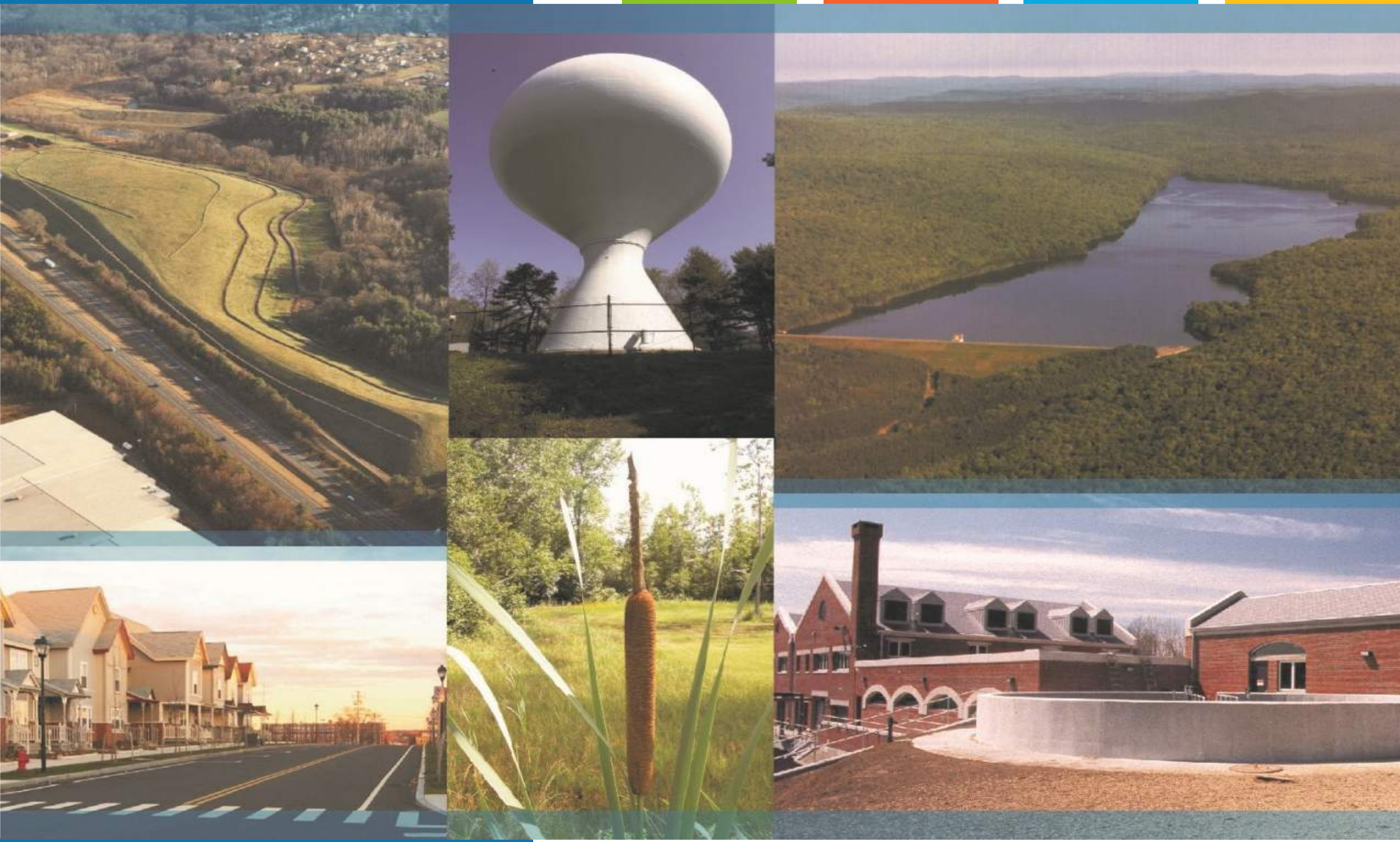

North End Mixed Use Development
Russell Street & Deer Street
Portsmouth, NH

Long-Term Operation & Maintenance Plan

Two International Group

May 24, 2022

Tighe&Bond

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Section 1 Long-Term Operation & Maintenance Plan

1.1 Contact/Responsible Party 1-1
1.2 Maintenance Items 1-1
1.3 Overall Site Operation & Maintenance Schedule 1-2
1.3.1 Disposal Requirements 1-2
1.4 Underground Detention System Maintenance Requirements 1-3
1.5 Contech Jellyfish Filter System Maintenance Requirements 1-3
1.6 Snow & Ice Management for Standard Asphalt and Walkways 1-4

Section 2 Invasive Species

Section 3 Annual Updates and Log Requirements

Section 1
Long-Term Operation & Maintenance Plan

It is the intent of this Operation and Maintenance Plan to identify the areas of this site that need special attention and consideration, as well as implementing a plan to assure routine maintenance. By identifying the areas of concern as well as implementing a frequent and routine maintenance schedule the site will maintain a high-quality stormwater runoff.

1.1 Contact/Responsible Party

Port Harbor Land, LLC
1000 Market Street, 3rd Floor
Portsmouth, NH 03801

(Note: The contact information for the Contact/Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

1.2 Maintenance Items

Maintenance of the following items shall be recorded:

- Litter/Debris Removal
- Landscaping
- Catchbasin Cleaning
- Pavement Sweeping
- Underground Detention System
- Contech Jellyfish Filtration System

The following maintenance items and schedule represent the minimum action required. Periodic site inspections shall be conducted, and all measures must be maintained in effective operating condition. The following items shall be observed during site inspection and maintenance:

- Inspect vegetated areas, particularly slopes and embankments for areas of erosion. Replant and restore as necessary
- Inspect catch basins for sediment buildup
- Inspect site for trash and debris

1.3 Overall Site Operation & Maintenance Schedule

Maintenance Item	Frequency of Maintenance
Litter/Debris Removal	Weekly
Pavement Sweeping - Sweep impervious areas to remove sand and litter.	Annually
Landscaping - Landscaped islands to be maintained and mulched.	Maintained as required and mulched each Spring
Catch Basin (CB) Cleaning - CB to be cleaned of solids and oils.	Annually
Contech Jelly Fish Units	In accordance with Manufacturer's Recommendations (See section 1.5)
Underground Detention Basin - Visual observation of sediment levels within system	Bi-Annually (See Section 1.4)

1.3.1 Disposal Requirements

Disposal of debris, trash, sediment and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

1.4 Underground Detention System Maintenance Requirements

Underground Detention System Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Monitor inlet and outlet structures for sediment accumulation	Two (2) times annually	- Trash, debris and sediment to be removed - Any required maintenance shall be addressed
Deep Sump Catchbasins	Two (2) times annually	- Removal of sediment as warranted by inspection - No less than once annually
Monitor detention system for sediment accumulation	Two (2) times annually	- Trash, debris and sediment to be removed - Any required maintenance shall be addressed

1.5 Contech Jellyfish Filter System Maintenance Requirements

Contech Jellyfish Filter System Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Inspect vault for sediment build up, static water, plugged media and bypass condition	Quarterly during the first year of operation, Minimum of annually in subsequent years	- See section 4 & 5 of Jellyfish Filter Owner's Manual
Replace Cartridges	As required by inspection, 1–5 years.	- See section 6 & 7 of Jellyfish Filter Owner's Manual

Jellyfish® Filter
Owner's Manual

Jellyfish® Filter

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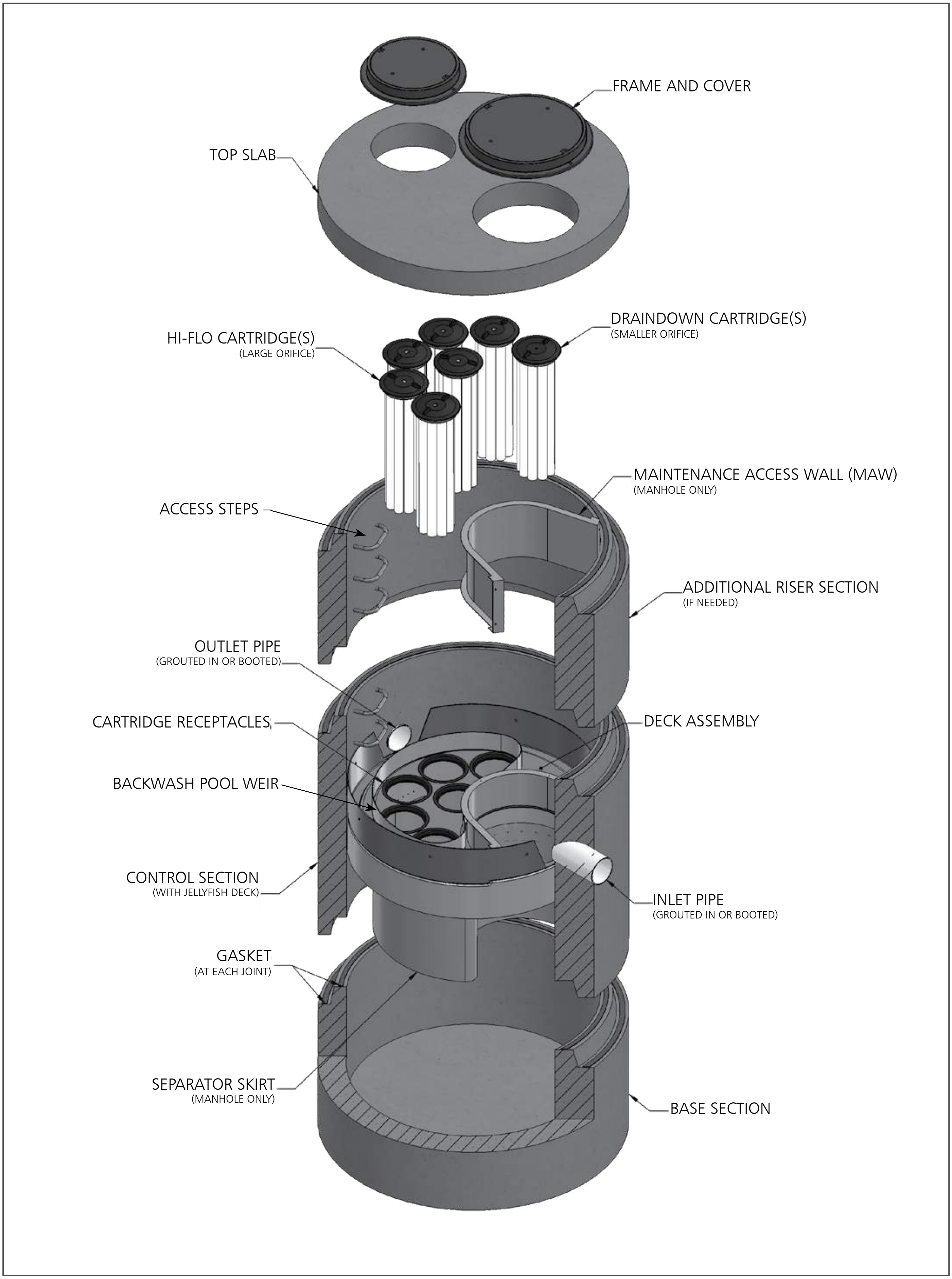
Jellyfish Filter Inspection and Maintenance Log 12

THANK YOU FOR PURCHASING THE JELLYFISH® FILTER!

Contech Engineered Solutions would like to thank you for selecting the Jellyfish Filter to meet your project's stormwater treatment needs. With proper inspection and maintenance, the Jellyfish Filter is designed to deliver ongoing, high levels of stormwater pollutant removal.

If you have any questions, please feel free to call us or e-mail us:

Contech Engineered Solutions
9025 Centre Pointe Drive, Suite 400 | West Chester, OH 45069
513-645-7000 | 800-338-1122
www.ContechES.com
info@conteches.com


FRAME AND COVER
TOP SLAB
DRAINDOWN CARTRIDGE(S)
(SMALLER ORIFICE)
HI-FLO CARTRIDGE(S)
(LARGE ORIFICE)
MAINTENANCE ACCESS WALL (MAW)
(MANHOLE ONLY)
ACCESS STEPS
ADDITIONAL RISER SECTION
(IF NEEDED)
OUTLET PIPE
(GROUTED IN OR BOOTED)
CARTRIDGE RECEPTACLES
DECK ASSEMBLY
BACKWASH POOL WEIR
CONTROL SECTION
(WITH JELLYFISH DECK)
INLET PIPE
(GROUTED IN OR BOOTED)
GASKET
(AT EACH JOINT)
SEPARATOR SKIRT
(MANHOLE ONLY)
BASE SECTION

WARNINGS / CAUTION

1. FALL PROTECTION may be required.
2. WATCH YOUR STEP if standing on the Jellyfish Filter Deck at any time; Great care and safety must be taken while walking or maneuvering on the Jellyfish Filter Deck. Attentive care must be taken while standing on the Jellyfish Filter Deck at all times to prevent stepping onto a lid, into or through a cartridge hole or slipping on the deck.
3. The Jellyfish Filter Deck can be SLIPPERY WHEN WET.
4. If the Top Slab, Covers or Hatches have not yet been installed, or are removed for any reason, great care must be taken to NOT DROP ANYTHING ONTO THE JELLYFISH FILTER DECK. The Jellyfish Filter Deck and Cartridge Receptacle Rings can be damaged under high impact loads. This type of activity voids all warranties. All damaged items to be replaced at owner's expense.
5. Maximum deck load 2 persons, total weight 450 lbs.

Safety Notice

Jobsite safety is a topic and practice addressed comprehensively by others. The inclusions here are intended to be reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s) and Contractor(s). OSHA and Canadian OSH, and Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.

Confined Space Entry

Secure all equipment and perform all training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to proceed safely at all times.

Personal Safety Equipment

Contractor is responsible to provide and wear appropriate personal protection equipment as needed including, but not limited to safety boots, hard hat, reflective vest, protective eyewear, gloves and fall protection equipment as necessary. Make sure all equipment is staffed with trained and/or certified personnel, and all equipment is checked for proper operation and safety features prior to use.

- Fall protection equipment
- Eye protection
- Safety boots
- Ear protection
- Gloves
- Ventilation and respiratory protection
- Hard hat
- Maintenance and protection of traffic plan

Chapter 1

1.0 – Owner Specific Jellyfish Filter Product Information

Below you will find a reference page that can be filled out according to your Jellyfish Filter specification to help you easily inspect, maintain and order parts for your system.

Owner Name:	
Phone Number:	
Site Address:	
Site GPS Coordinates/unit location:	
Unit Location Description:	
Jellyfish Filter Model No.:	
Contech Project & Sequence Number	
No. of Hi-Flo Cartridges	
No. of Cartridges:	
Length of Draindown Cartridges:	
No. of Blank Cartridge Lids:	
Bypass Configuration (Online/Offline):	

Notes:

Chapter 2

2.0 – Jellyfish Filter System Operations and Functions

The Jellyfish Filter is an engineered stormwater quality treatment technology that removes a high level and wide variety of stormwater pollutants. Each Jellyfish Filter cartridge consists of eleven membrane - encased filter elements ("filtration tentacles") attached to a cartridge head plate. The filtration tentacles provide a large filtration surface area, resulting in high flow and high pollutant removal capacity.

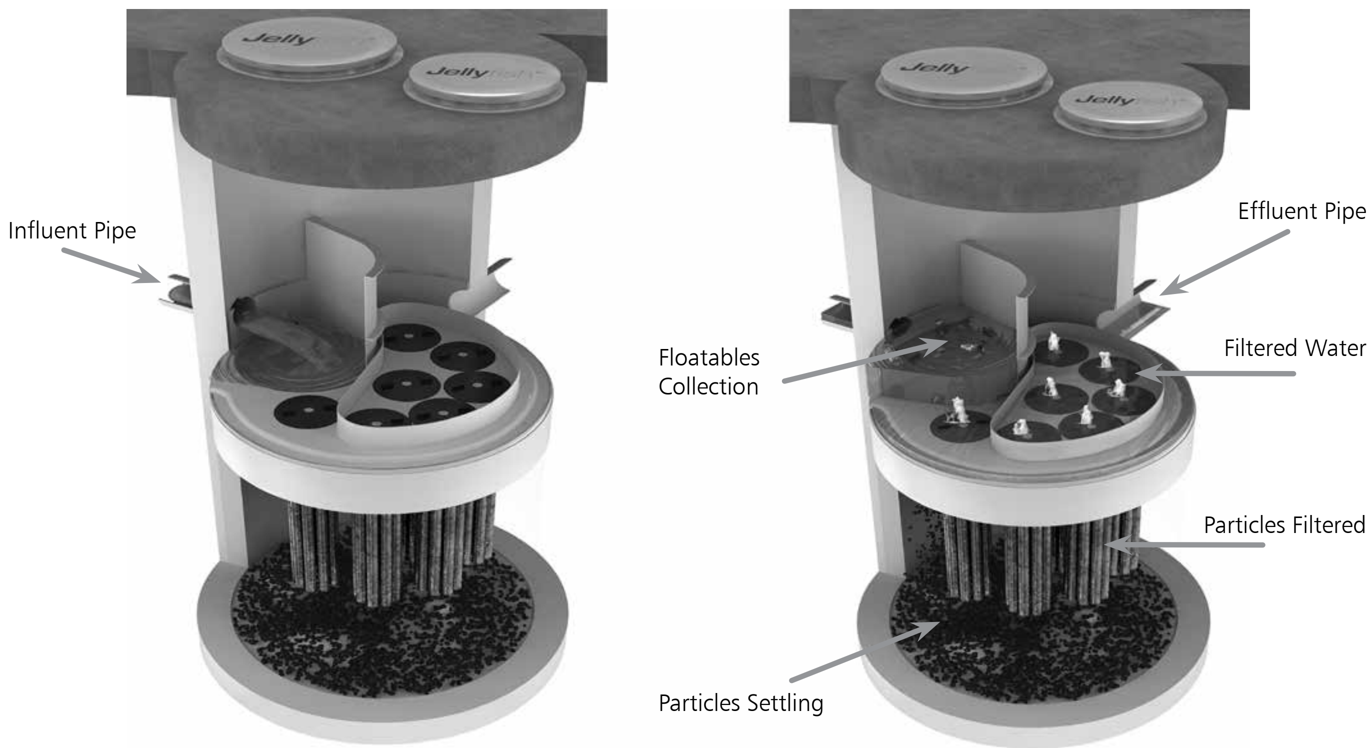
The Jellyfish Filter functions are depicted in Figure 1 below.

FIGURE 1

Jellyfish Filter Treatment Functions

Membrane Filtration

Section View with Maintenance Access Wall (MAW) Cutaway



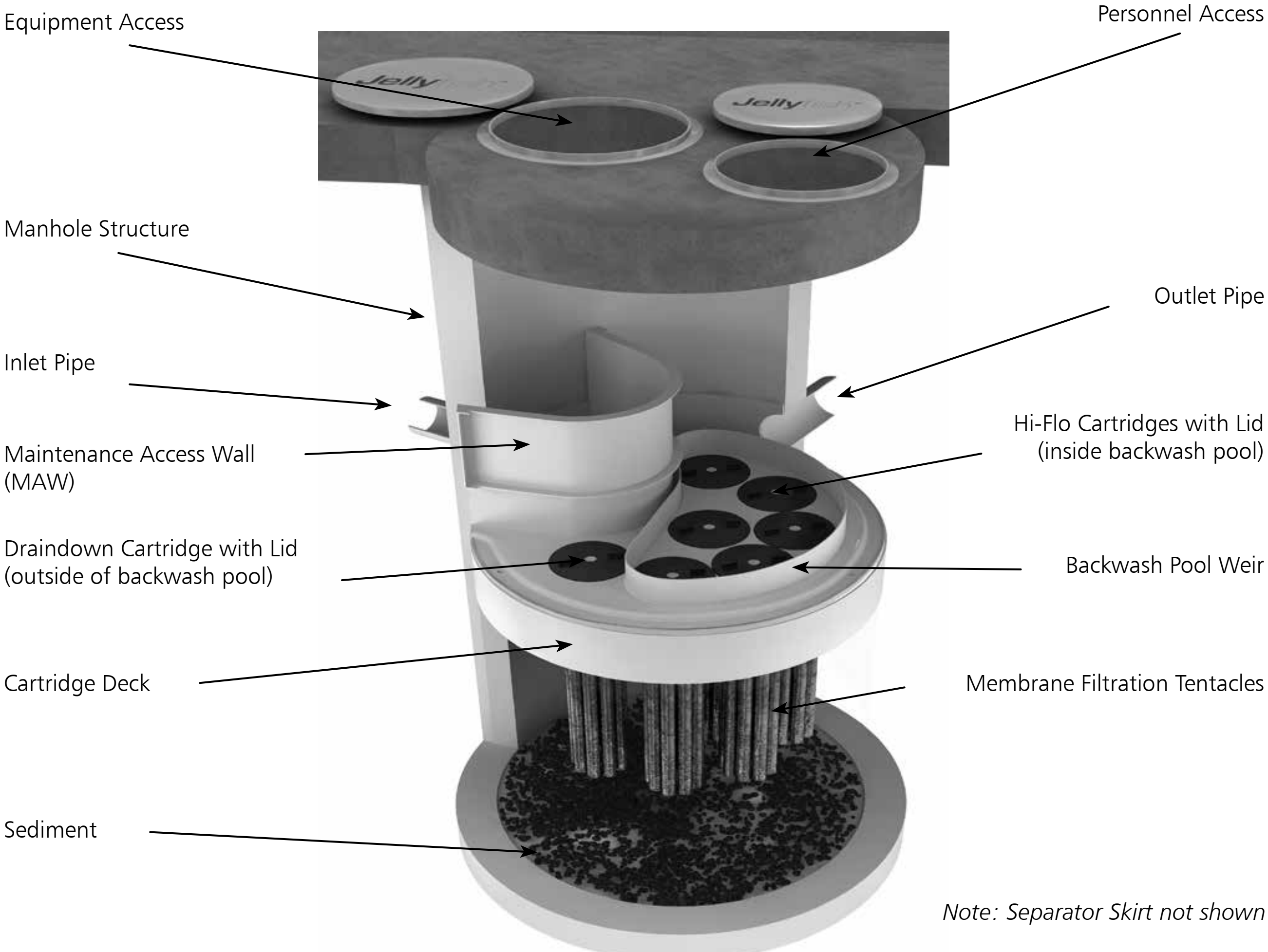
Jellyfish Filter cartridges are backwashed after each peak storm event, which removes accumulated sediment from the membranes. This backwash process extends the service life of the cartridges and increases the time between maintenance events.

For additional details on the operation and pollutant capabilities of the Jellyfish Filter please refer to additional details on our website at www.ContechES.com.

2.1 – Components and Cartridges

The Jellyfish Filter and components are depicted in Figure 2 below.

FIGURE 2 **Jellyfish Filter Components**



Tentacles are available in various lengths as depicted in Table 1 below.

Table 1 – Cartridge Lengths / Weights and Cartridge Lid Orifice Diameters

Cartridge Lengths	Dry Weight	Hi-Flo Orifice Diameter	Draindown Orifice Diameter
15 inches (381 mm)	10 lbs (4.5 kg)	35 mm	20 mm
27 inches (686 mm)	14.5 lbs (6.6 kg)	45 mm	25 mm
40 inches (1,016 mm)	19.5 lbs (8.9 kg)	55 mm	30 mm
54 inches (1,372 mm)	25 lbs (11.4 kg)	70 mm	35 mm

2.2 – Jellyfish Membrane Filtration Cartridge Assembly

The Jellyfish Filter utilizes multiple membrane filtration cartridges. Each cartridge consists of removable cylindrical filtration "tentacles" attached to a cartridge head plate. Each filtration tentacle has a threaded pipe nipple and o-ring. To attach, insert the top pipe nipples with the o-ring through the head plate holes and secure with locking nuts. Hex nuts to be hand tightened and checked with a wrench as shown below.

2.3 – Jellyfish Membrane Filtration Cartridge Installation

- Cartridge installation will be performed by trained individuals and coordinated with the installing site Contractor. Flow diversion devices are required to be in place until the site is stabilized (final paving and landscaping in place). Failure to address this step completely will reduce the time between required maintenance.
- Descend to the cartridge deck (see Safety Notice and page 3).
- Refer to Contech's submittal drawings to determine proper quantity and placement of Hi-Flo, Draindown and Blank cartridges with appropriate lids. Lower the Jellyfish membrane filtration cartridges into the cartridge receptacles within the cartridge deck. It is possible that not all cartridge receptacles will be filled with a filter cartridge. In that case, a blank headplate and blank cartridge lid (no orifice) would be installed.

Cartridge Assembly

Do not force the tentacles down into the cartridge receptacle, as this may damage the membranes. Apply downward pressure on the cartridge head plate to seat the lubricated rim gasket (thick circular gasket surrounding the circumference of the head plate) into the cartridge receptacle. (See Figure 3 for details on approved lubricants for use with rim gasket.)

- Examine the cartridge lids to differentiate lids with a small orifice, a large orifice, and no orifice.
  - Lids with a <u>small orifice</u> are to be inserted into the <u>Draindown cartridge receptacles</u>, outside of the backwash pool weir.
  - Lids with a <u>large orifice</u> are to be inserted into the <u>Hi-Flo cartridge receptacles</u> within the backwash pool weir.
  - Lids with <u>no orifice</u> (blank cartridge lids) and a <u>blank headplate</u> are to be inserted into unoccupied cartridge receptacles.
- To install a cartridge lid, align both cartridge lid male threads with the cartridge receptacle female threads before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation.

3.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

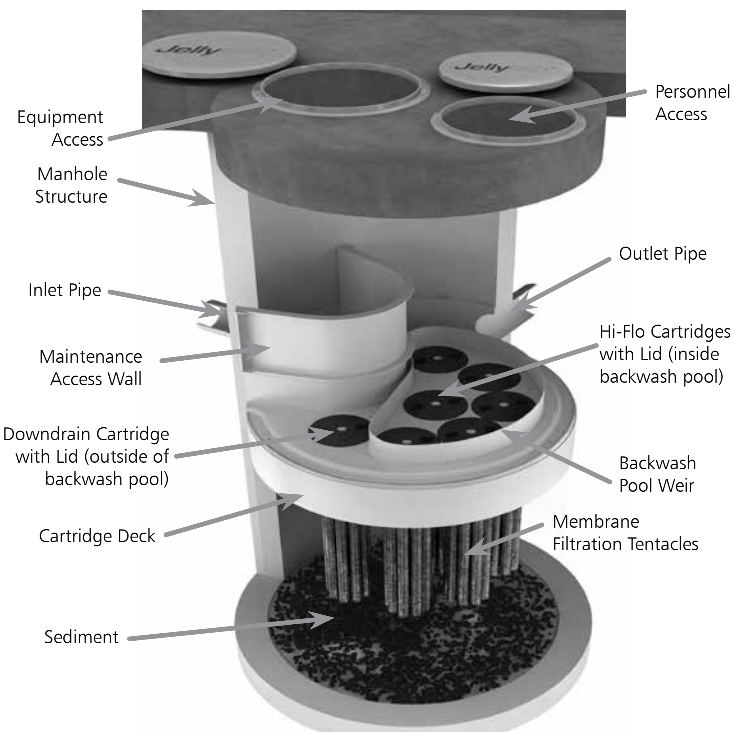
- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed

4.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent*.



Note: Separator Skirt not shown

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

5.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

5.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.

Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment (≥1/16") accumulated on the deck surface should be removed.

5.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

6.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

7.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage*.
3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

7.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. *Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs*.
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

7.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.
2. Position tentacles in a container (or over the MAW), with the

Cartridge Removal & Lifting Device

threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.

3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. *Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane*.

4. Collected rinse water is typically removed by vacuum hose.

5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

7.3 Sediment and Flotables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.
3. Pressure wash cartridge deck and receptacles to remove all

Rinsing Cartridge with Contech Rinse Tool

sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.

4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.
6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some

Vacuuming Sump Through MAW

vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

7.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. *Caution: Do not force the cartridge downward; damage may occur.*
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

7.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

7.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

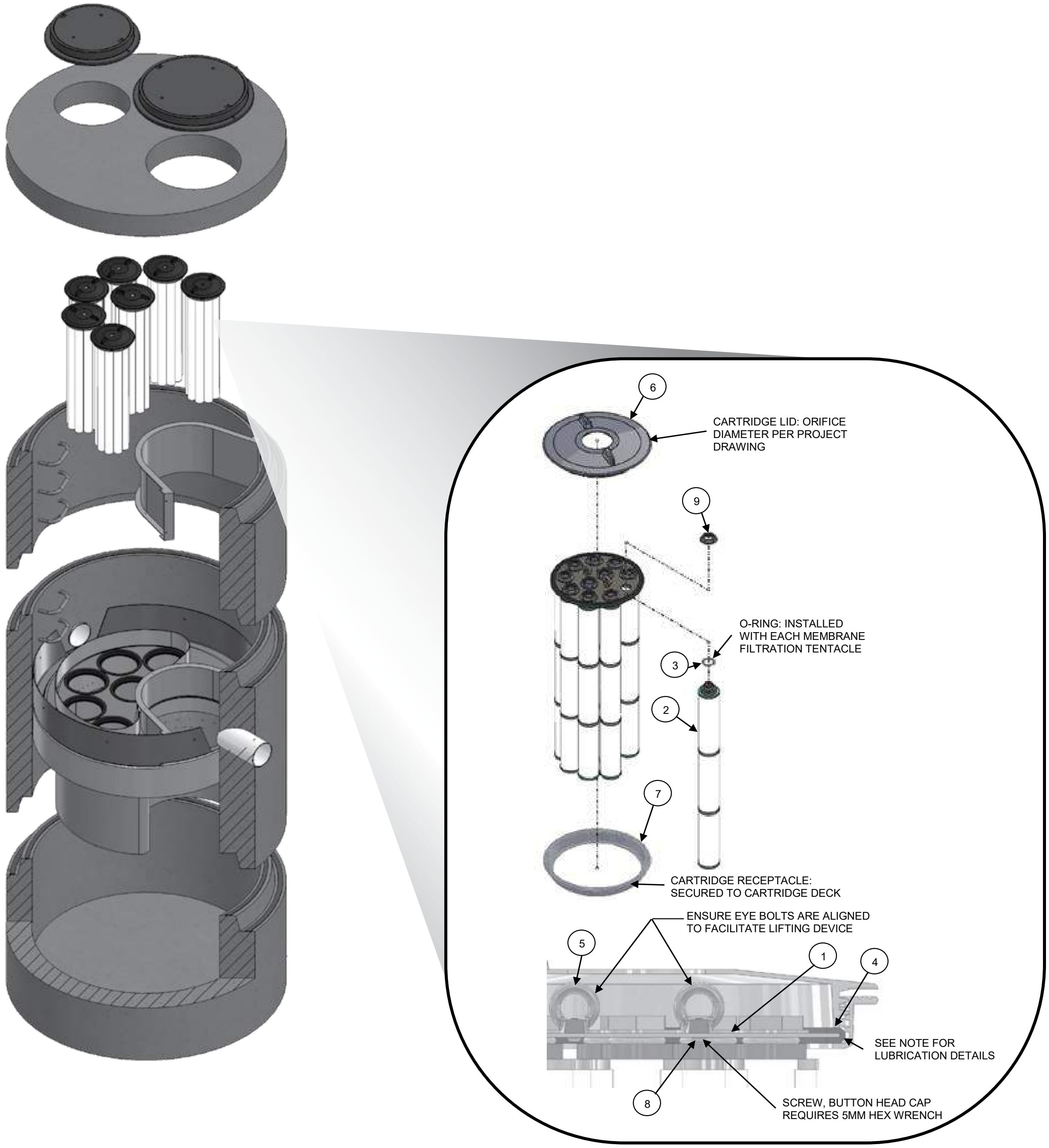


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:
Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:
Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner: ____ Jellyfish Model No.:______________________________

Location: ______________________________________ GPS Coordinates: _______________________________

Land Use: Commercial:______ Industrial: ______ Service Station:______

Road/Highway:____ Airport: ________ Residential: _________ Parking Lot:______

Date/Time:					
Inspector:					
Maintenance Contractor:					
Visible Oil Present: (Y/N)					
Oil Quantity Removed					
Floatable Debris Present: (Y/N)					
Floatable Debris removed: (Y/N)					
Water Depth in Backwash Pool					
Cartridges externally rinsed/re-commissioned: (Y/N)					
New tentacles put on Cartridges: (Y/N)					
Sediment Depth Measured: (Y/N)					
Sediment Depth (inches or mm):					
Sediment Removed: (Y/N)					
Cartridge Lids intact: (Y/N)					
Observed Damage:					
Comments:					

1.6 Snow & Ice Management for Standard Asphalt and Walkways

There are no snow storage areas on site. The property manager will be responsible for timely snow removal from all private sidewalks, driveways, and parking areas. All snow removal will be hauled off-site and legally disposed of. Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt and sand shall be used to the minimum extent practical (refer to the attached for de-icing application rate guideline from the New Hampshire Stormwater Management Manual, Volume 2,).

Deicing Application Rate Guidelines

24' of pavement (typcial two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Pounds per two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

** A blend of 6 - 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

Anti-icing Route Data Form				
Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

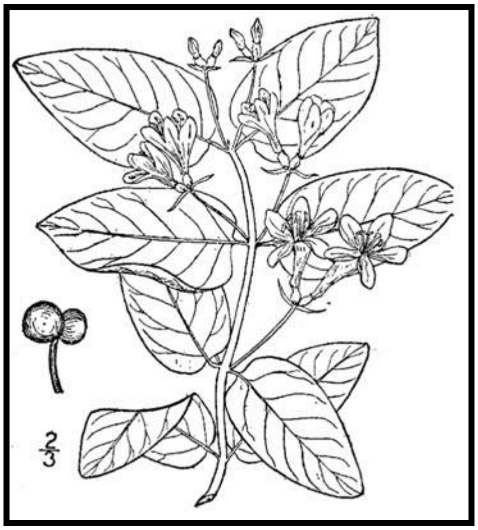
Section 2
Invasive Species

With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem is classified as an invasive species. Refer to the following fact sheet prepared by the University of New Hampshire Cooperative Extension entitled Methods for Disposing Non-Native Invasive Plants for recommended methods to dispose of invasive plant species.

Methods for Disposing Non-Native Invasive Plants

UNIVERSITY of NEW HAMPSHIRE
COOPERATIVE EXTENSION

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions.* Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

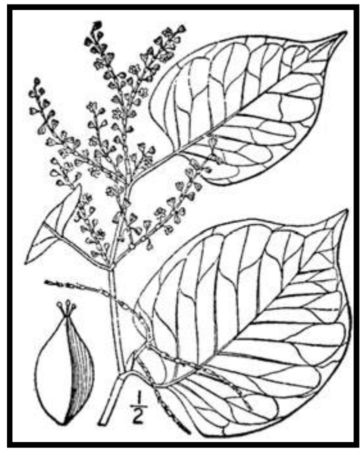
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

Woody Plants	Method of Reproducing	Methods of Disposal
Norway maple *(Acer platanoides)* European barberry *(Berberis vulgaris)* Japanese barberry *(Berberis thunbergii)* autumn olive *(Elaeagnus umbellata)* burning bush *(Euonymus alatus)* Morrow's honeysuckle *(Lonicera morrowii)* Tatarian honeysuckle *(Lonicera tatarica)* showy bush honeysuckle *(Lonicera x bella)* common buckthorn *(Rhamnus cathartica)* glossy buckthorn *(Frangula alnus)*	**Fruit and Seeds**	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Use as firewood. ▪ Make a brush pile. ▪ Chip. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip once all fruit has dropped from branches. ▪ Leave resulting chips on site and monitor.
oriental bittersweet *(Celastrus orbiculatus)* multiflora rose *(Rosa multiflora)*	**Fruits, Seeds, Plant Fragments**	**Prior to fruit/seed ripening** Seedlings and small plants ▪ Pull or cut and leave on site with roots exposed. No special care needed. Larger plants ▪ Make a brush pile. ▪ Burn.
		After fruit/seed is ripe Don't remove from site. ▪ Burn. ▪ Make a covered brush pile. ▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame’s rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">**Fruits and Seeds**</td><td>**Prior to flowering**
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>**During and following flowering**
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(*Phragmites australis*)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>**Fruits, Seeds, Plant Fragments**
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn’t materially influence disposal activities.</td><td>**Small infestation**
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010

Managing Invasive Plants
Methods of Control

by Christopher Mattrick

They're out there. The problem of invasive plants is as close as your own backyard.

Maybe a favorite dogwood tree is struggling in the clutches of an Oriental bittersweet vine. Clawlike canes of multiflora rose are scratching at the side of your house. That handsome burning bush you planted few years ago has become a whole clump in practically no time … but what happened to the azalea that used to grow right next to it?

If you think controlling or managing invasive plants on your property is a daunting task, you're not alone. Though this topic is getting lots of attention from federal, state, and local government agencies, as well as the media, the basic question for most homeowners is simply, "How do I get rid of the invasive plants in my own landscape?" Fortunately, the best place to begin to tackle this complex issue is in our own backyards and on local conservation lands. We hope the information provided here will help you take back your yard. We won't kid you—there's some work involved, but the payoff in beauty, wildlife habitat, and peace of mind makes it all worthwhile.

PLAN OF ATTACK

Three broad categories cover most invasive plant control: mechanical, chemical, and biological. Mechanical control means physically removing plants from the environment through cutting or pulling. Chemical control uses herbicides to kill plants and inhibit regrowth. Techniques and chemicals used will vary depending on the species. Biological controls use plant diseases or insect predators, typically from the targeted species' home range. Several techniques may be effective in controlling a single species, but there is usually one preferred method—the one that is most resource efficient with minimal impact on non-target species and the environment.

Spraying chemicals to control invasive plants.

MECHANICAL CONTROL METHODS

Mechanical treatments are usually the first ones to look at when evaluating an invasive plant removal project. These procedures do not require special licensing or introduce chemicals into the environment. They do require permits in some situations, such as wetland zones. [See sidebar on page 23.] Mechanical removal is highly labor intensive and creates a significant amount of site disturbance, which can lead to rapid reinvasion if not handled properly.

Pulling and digging

Many herbaceous plants and some woody species (up to about one inch in diameter), if present in limited quantities, can be pulled out or dug up. It's important to remove as much of the root system as possible; even a small portion can restart the infestation. Pull plants by hand or use a digging fork, as shovels can shear off portions of the root system, allowing for regrowth. To remove larger woody stems (up to about three inches in diameter), use a Weed Wrench™, Root Jack, or Root Talon. These tools, available from several manufacturers, are designed to remove the aboveground portion of the plant as well as the entire root system. It's easiest to undertake this type of control in the spring or early summer when soils are moist and plants come out more easily.

Using tools to remove woody stems.

Volunteers hand pulling invasive plants.

Suffocation

Try suffocating small seedlings and herbaceous plants. Place double or triple layers of thick UV-stabilized plastic sheeting, either clear or black (personally I like clear), over the infestation and secure the plastic with stakes or weights. Make sure the plastic extends at least five feet past the edge of infestation on all sides. Leave the plastic in place for at least two years. This technique will kill everything beneath the plastic—invasive and non-invasive plants alike. Once the plastic is removed, sow a cover crop such as annual rye to prevent new invasions.

Cutting or mowing

This technique is best suited for locations you can visit and treat often. To be effective, you will need to mow or cut infested areas three or four times a year for up to five years. The goal is to interrupt the plant's ability to photosynthesize by removing as much leafy material as possible. Cut the plants at ground level and remove all resulting debris from the site. With this treatment, the infestation may actually appear to get worse at first, so you will need to be as persistent as the invasive plants themselves. Each time you cut the plants back, the root system gets slightly larger, but must also rely on its energy reserves to push up new growth. Eventually, you will exhaust these reserves and the plants will die. This may take many years, so you have to remain committed to this process once you start; otherwise the treatment can backfire, making the problem worse.

CHEMICAL CONTROL METHODS

Herbicides are among the most effective and resource-efficient tools to treat invasive species. Most of the commonly known invasive plants can be treated using only two herbicides—glyphosate (the active ingredient in Roundup™ and Rodeo™) and triclopyr (the active ingredient in Brush-B-Gone™ and Garlon™). Glyphosate is non-selective, meaning it kills everything it contacts. Triclopyr is selective and does not injure monocots (grasses, orchids, lilies, etc.). Please read labels and follow directions precisely for both environmental and personal safety. These are relatively benign herbicides, but improperly used they can still cause both short- and long-term health and environmental problems. Special aquatic formulations are required when working in wetland zones. You are required to have a state-issued pesticide applicator license when applying these chemicals on land you do not own. To learn more about the pesticide regulations in your state, visit or call your state's pesticide control division, usually part of the state's Department of Agriculture. In wetland areas, additional permits are usually required by the Wetlands Protection Act. [See sidebar on page 23.]

Foliar applications

When problems are on a small scale, this type of treatment is usually applied with a backpack sprayer or even a small handheld spray bottle. It is an excellent way to treat large monocultures of herbaceous plants, or to spot-treat individual plants that are difficult to remove mechanically, such as goutweed, swallowwort, or purple loosestrife. It is also an effective treatment for some woody species, such as Japanese barberry, multiflora rose, Japanese honeysuckle, and Oriental bittersweet that grow in dense masses or large numbers over many acres. The herbicide mixture should contain no more than five percent of the active ingredient, but it is important to follow the instructions on the product label. This treatment is most effective when the plants are actively growing, ideally when they are flowering or beginning to form fruit. It has been shown that plants are often more susceptible to this type of treatment if the existing stems are cut off and the regrowth is treated. This is especially true for Japanese knotweed. The target plants should be thoroughly wetted with the herbicide on a day when there is no rain in the forecast for the next 24 to 48 hours.

Cut stem treatments

There are several different types of cut stem treatments, but here we will review only the one most commonly used. All treatments of this type require a higher concentration of the active ingredient than is used in foliar applications. A 25 to 35 percent solution of the active ingredient should be used for cut stem treatments, but read and follow all label instructions. In most cases, the appropriate herbicide is glyphosate, except for Oriental bittersweet, on which triclopyr should be used. This treatment can be used on all woody stems, as well as phragmites and Japanese knotweed.

For woody stems, treatments are most effective when applied in the late summer and autumn—between late August and November. Stems should be cut close to the ground, but not so close that you will lose track of them. Apply herbicide directly to the cut surface as soon as possible after cutting. Delaying the application will reduce the effectiveness of the treatment. The herbicide can be applied with a sponge, paintbrush, or spray bottle.

Cut stem treatment tools.

For phragmites and Japanese knotweed, treatment is the same, but the timing and equipment are different. Plants should be treated anytime from mid-July through September, but the hottest, most humid days of the summer are best for this method. Cut the stems halfway between two leaf nodes at a comfortable height. Inject (or squirt) herbicide into the exposed hollow stem. All stems in an infestation should be treated. A wash bottle is the most effective application tool, but you can also use an eyedropper, spray bottle, or one of the recently developed high-tech injection systems.

It is helpful to mix a dye in with the herbicide solution. The dye will stain the treated surface and mark the areas that have been treated, preventing unnecessary reapplication. You can buy a specially formulated herbicide dye, or use food coloring or laundry dye.

There is not enough space in this article to describe all the possible ways to control invasive plants. You can find other treatments, along with more details on the above-described methods, and species-specific recommendations on The Nature Conservancy Web site (tncweeds.ucdavis.edu). An upcoming posting on the Invasive Plant Atlas of New England (www.ipane.org) and the New England Wild Flower Society (www.newfs.org) Web sites will also provide further details.


Hollow stem injection tools.

Biological controls—still on the horizon

Biological controls are moving into the forefront of control methodology, but currently the only widely available and applied biocontrol relates to purple loosestrife. More information on purple loosestrife and other biological control projects can be found at www.invasiveplants.net.

DISPOSAL OF INVASIVE PLANTS

Proper disposal of removed invasive plant material is critical to the control process. Leftover plant material can cause new infestations or reinfest the existing project area. There are many appropriate ways to dispose of invasive plant debris. I've listed them here in order of preference.

1. **Burn it**—Make a brush pile and burn the material following local safety regulations and restrictions, or haul it to your town's landfill and place it in their burn pile.

2. **Pile it**—Make a pile of the woody debris. This technique will provide shelter for wildlife as well.

3. **Compost it**—Place all your herbaceous invasive plant debris in a pile and process as compost. Watch the pile closely for resprouts and remove as necessary. Do not use the resulting compost in your garden. The pile is for invasive plants only.


Injecting herbicide into the hollow stem of phragmites.

4. **Dry it/cook it**—Place woody debris out on your driveway or any asphalt surface and let it dry out for a month. Place herbaceous material in a doubled-up black trash bag and let it cook in the sun for one month. At the end of the month, the material should be non-viable and you can dump it or dispose of it with the trash. The method assumes there is no viable seed mixed in with the removed material.

Care should be taken in the disposal of all invasive plants, but several species need extra attention. These are the ones that have the ability to sprout vigorously from plant fragments and should ideally be burned or dried prior to disposal: Oriental bittersweet, multiflora rose, Japanese honeysuckle, phragmites, and Japanese knotweed.

Christopher Mattrick is the former Senior Conservation Programs Manager for New England Wild Flower Society, where he managed conservation volunteer and invasive and rare plant management programs. Today, Chris and his family work and play in the White Mountains of New Hampshire, where he is the Forest Botanist and Invasive Species Coordinator for the White Mountain National Forest.

Controlling Invasive Plants in Wetlands

Special concerns; special precautions

Control of invasive plants in or around wetlands or bodies of water requires a unique set of considerations. Removal projects in wetland zones can be legal and effective if handled appropriately. In many cases, herbicides may be the least disruptive tools with which to remove invasive plants. You will need a state-issued pesticide license to apply herbicide on someone else's property, but all projects in wetland or aquatic systems fall under the jurisdiction of the Wetlands Protection Act and therefore require a permit. ***Yes, even hand-pulling that colony of glossy buckthorn plants from your own swampland requires a permit.*** Getting a permit for legal removal is fairly painless if you plan your project carefully.

1. Investigate and understand the required permits and learn how to obtain them. The entity charged with the enforcement of the Wetlands Protection Act varies from state to state. For more information in your state, contact:

ME: Department of Environmental Protection
www.state.me.us/dep/blwq/docstand/nrpapage.htm

NH: Department of Environmental Services
www.des.state.nh.us/wetlands/

VT: Department of Environmental Conservation
www.anr.state.vt.us/dec/waterq/permits/htm/pm_cud.htm

MA: Consult your local town conservation commission

RI: Department of Environmental Management
www.dem.ri.gov/programs/benviron/water/permits/fresh/index.htm

CT: Consult your local town Inland Wetland and Conservation Commission

2. Consult an individual or organization with experience in this area. Firsthand experience in conducting projects in wetland zones and navigating the permitting process is priceless. Most states have wetland scientist societies whose members are experienced in working in wetlands and navigating the regulations affecting them. A simple Web search will reveal the contact point for these societies. Additionally, most environmental consulting firms and some nonprofit organizations have skills in this area.

3. Develop a well-written and thorough project plan. You are more likely to be successful in obtaining a permit for your project if you submit a project plan along with your permit application. The plan should include the reasons for the project, your objectives in completing the project, how you plan to reach those objectives, and how you will monitor the outcome.

4. Ensure that the herbicides you plan to use are approved for aquatic use. Experts consider most herbicides harmful to water quality or aquatic organisms, but rate some formulations as safe for aquatic use. Do the research and select an approved herbicide, and then closely follow the instructions on the label.

5. If you are unsure—research, study, and most of all, ask for help. Follow the rules. The damage caused to aquatic systems by the use of an inappropriate herbicide or the misapplication of an appropriate herbicide not only damages the environment, but also may reduce public support for safe, well-planned projects.

Section 3
Annual Updates and Log Requirements

The Owner and/or Contact/Responsible Party shall review this Operation and Maintenance Plan once per year for its effectiveness and adjust the plan and deed as necessary.

A log of all preventative and corrective measures for the stormwater system shall be kept on-site and be made available upon request by any public entity with administrative, health environmental or safety authority over the site including NHDES.

Copies of the Stormwater Maintenance report shall be submitted to the City of Portsmouth on an annual basis.

Stormwater Management Report						
North End Mixed Use Development		**Russell Street – Map 118 Lot 28, Map 119 Lot 4, Map 124 Lot 12, Map 125 Lot 21**				
BMP Description	**Date of Inspection**	**Inspector**	**BMP Installed and Operating Properly?**	**Cleaning / Corrective Action Needed**	**Date of Cleaning / Repair**	**Performed By**
Deep Sump CB's			❑Yes ❑No			
Underground Detention			❑Yes ❑No			
Jellyfish Filter 1			❑Yes ❑No			

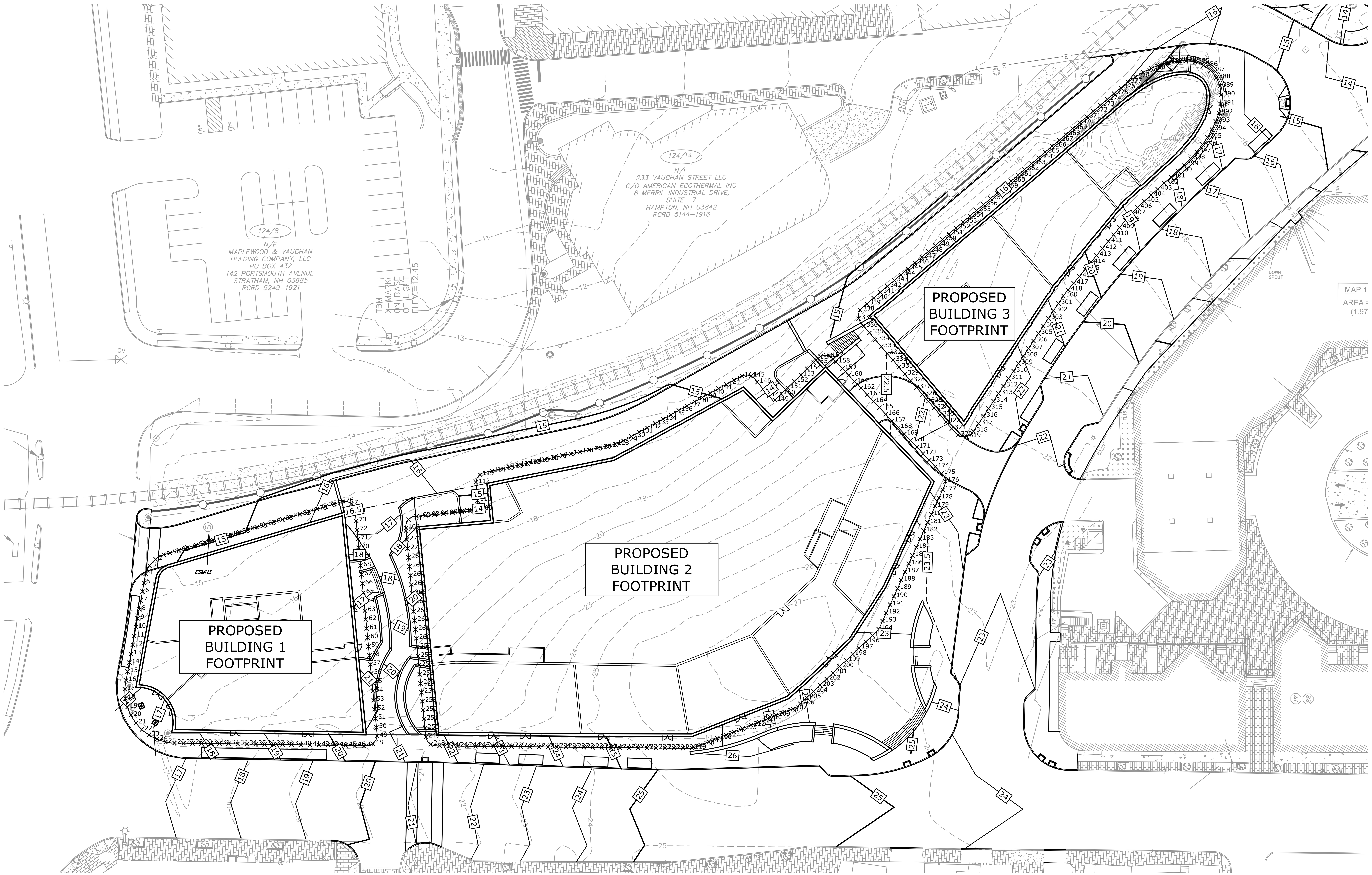
BUILDING 1 ELEVATION AND HEIGHT				
GRADE PLANE ELEVATION	BUILDING ELEVATION		BUILDING HEIGHT	
	ALLOWED	PROPOSED	ALLOWED	PROPOSED
17.18'	77.18'	74.16'	60.00'	56.98'

BUILDING 2 ELEVATION AND HEIGHT				
GRADE PLANE ELEVATION	BUILDING ELEVATION		BUILDING HEIGHT	
	ALLOWED	PROPOSED	ALLOWED	PROPOSED
20.38'	80.36'	80.38'	60.00'	60.00'

BUILDING 3 ELEVATION AND HEIGHT				
GRADE PLANE ELEVATION	BUILDING ELEVATION		BUILDING HEIGHT	
	ALLOWED	PROPOSED	ALLOWED	PROPOSED
18.71'	78.71'	78.64'	60.00'	59.93'

NORTH END MIXED USE DEVELOPMENT
RUSSELL STREET & DEER STREET
PORTSMOUTH, NEW HAMPSHIRE

GRADE PLANE EXHIBIT



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GRAPHIC SCALE

Tighe&Bond

OCTOBER 20, 2022
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NORTH END MIXED USE DEVELOPMENT
RUSSELL STREET & DEER STREET
PORTSMOUTH, NEW HAMPSHIRE

COMMUNITY SPACE EXHIBIT

PROPOSED COMMUNITY SPACE:

	REQUIRED	PROVIDED
WIDE SIDEWALK COMMUNITY SPACE		7,140 SF
PEDESTRIAN ALLEY COMMUNITY SPACE		21,691 SF
PARK AREA COMMUNITY SPACE		9,765 SF
TOTAL COMMUNITY SPACE AREA	25,221 SF	38,596 SF

CITY RIGHT OF WAY IMPROVEMENTS
(NOT INCLUDED IN COMMUNITY SPACE CALCULATION):

PUBLIC REALM IMPROVEMENT WITHIN CITY R.O.W.	22,353 SF

LEGEND

PROPERTY LINE

PROPOSED BUILDING FOOTPRINT

COMMUNITY SPACE:

	REQUIRED	PROPOSED
MAP 125 LOT 21		
DEVELOPMENT LOT AREA: 18,237 SF	3,647 SF, 20%	6,122 SF, 33.6%
MAP 118 LOT 28		
DEVELOPMENT LOT AREA: 50,875 SF	15,263 SF, 30%	
OFFSITE COMMUNITY SPACE AREA (MAP 119 LOT 4): 7,092 SF	2,128 SF, 30%	
MAP 118 LOT 28 TOTAL	17,391 SF, 30%	23,420 SF, 40.4%
MAP 124 LOT 12		
DEVELOPMENT LOT AREA: 20,917 SF	4,183 SF, 20%	9,002 SF, 43.0%
TOTALS	25,221 SF	38,596 SF, 39.7%

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October 20, 2022
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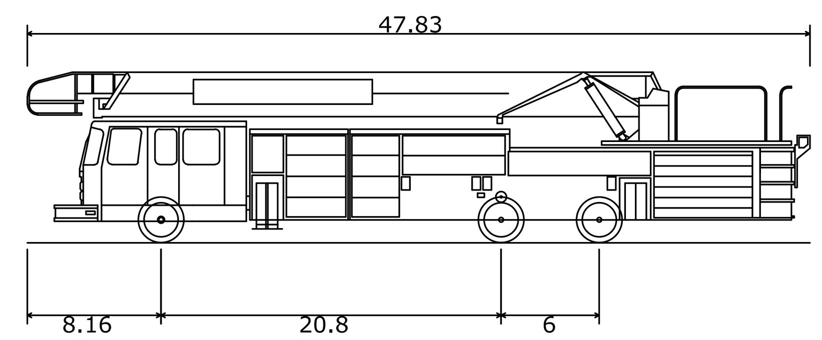
NORTH END MIXED USE DEVELOPMENT
RUSSELL STREET & DEER STREET
PORTSMOUTH, NEW HAMPSHIRE

FIRE TRUCK TURNING EXHIBIT

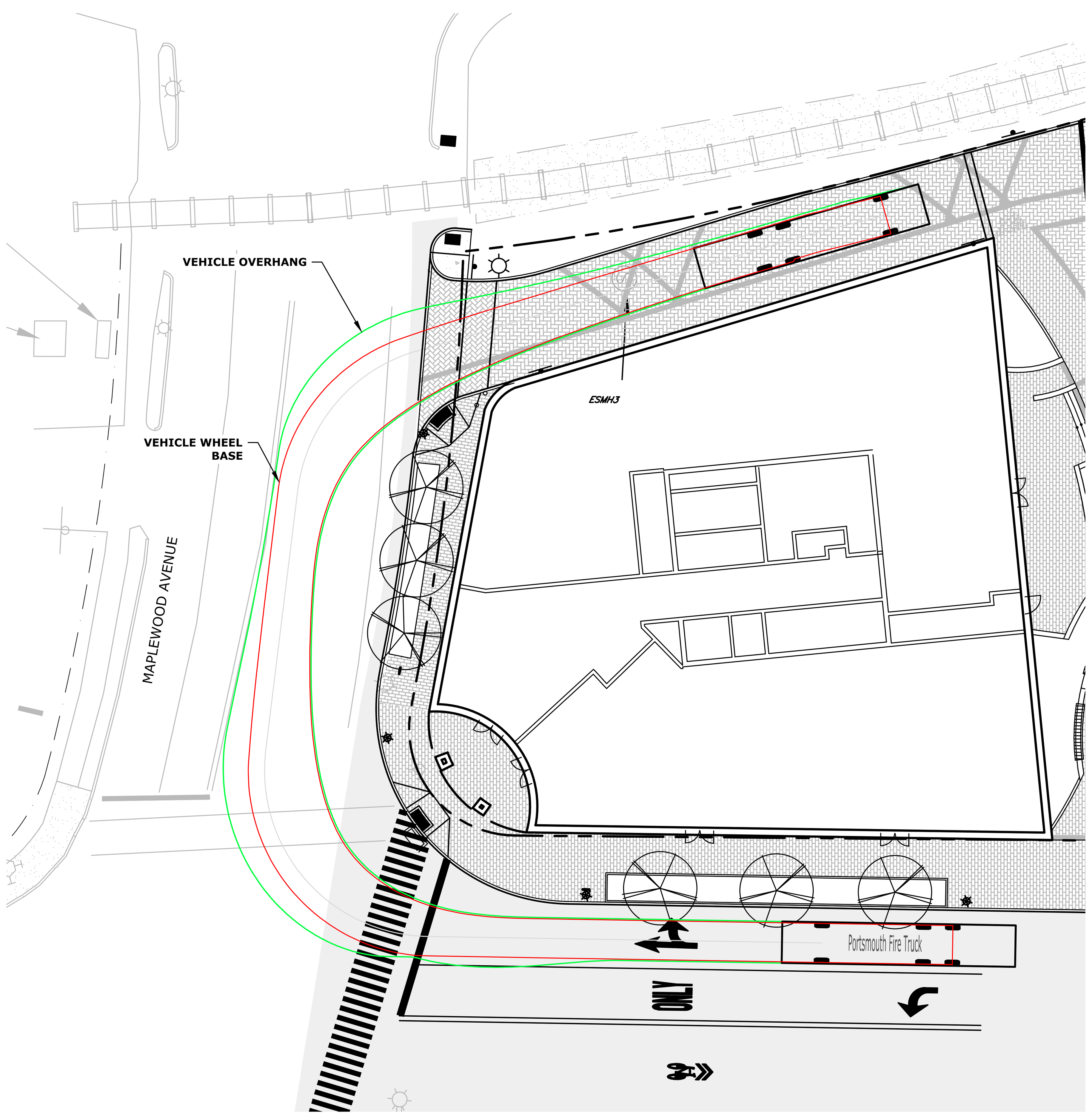


Portsmouth Fire Truck	
Overall Length	47.830ft
Overall Width	8.500ft
Overall Body Height	10.432ft
Min Body Ground Clearance	0.862ft
Track Width	8.000ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	38.00°

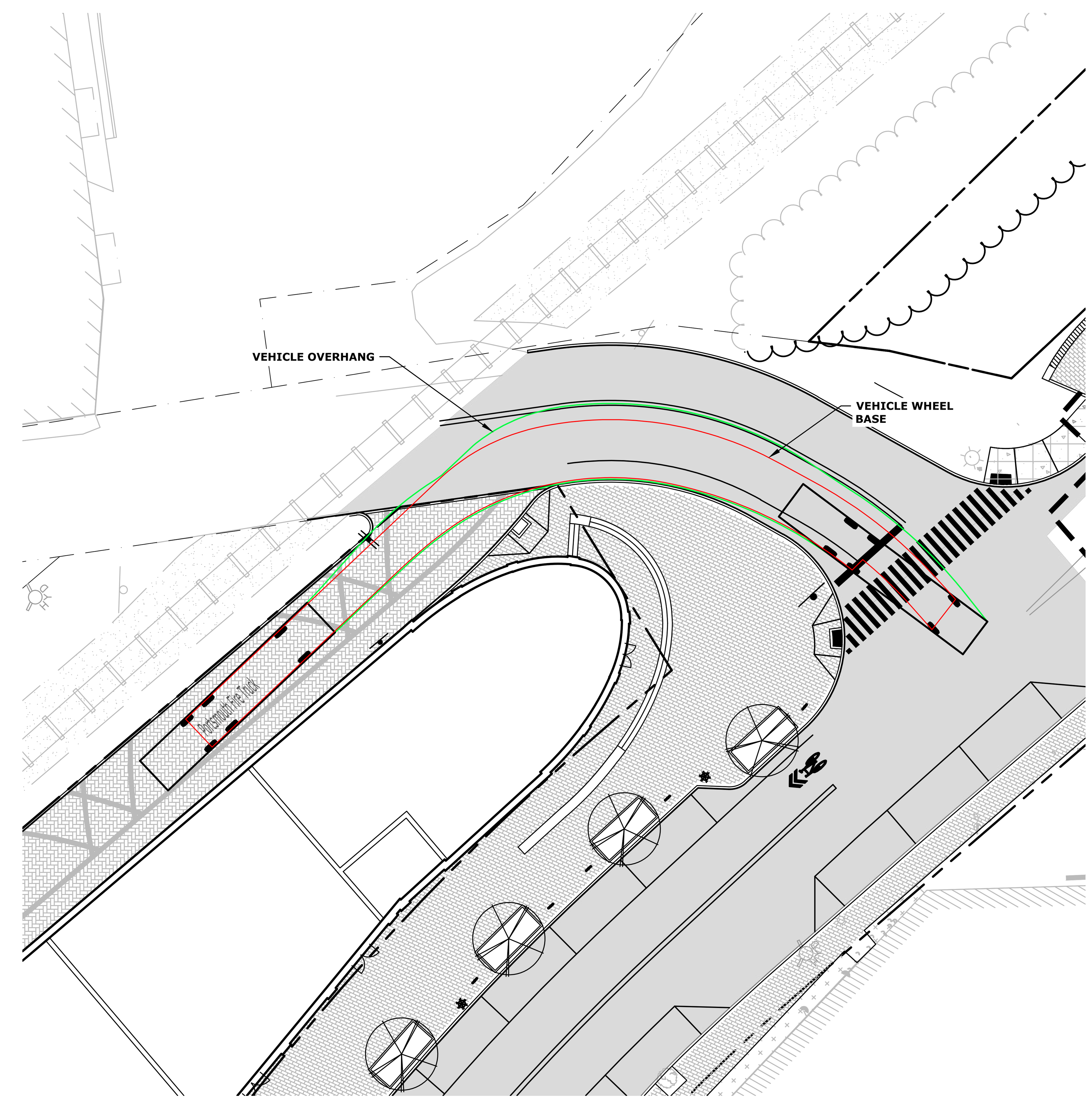
LEGEND

VEHICLE WHEEL BASE

VEHICLE OVERHANG



MAPLEWOOD AVENUE ENTRANCE



GREEN STREET EXIT

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GRAPHIC SCALE

Tighe&Bond

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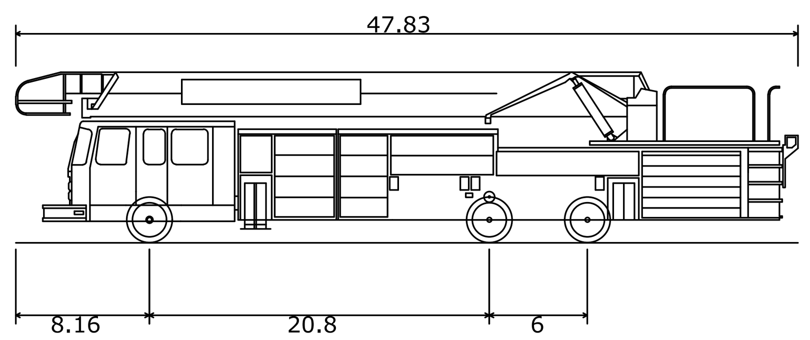
NORTH END MIXED USE DEVELOPMENT
RUSSELL STREET & DEER STREET
PORTSMOUTH, NEW HAMPSHIRE

FIRE TRUCK TURNING EXHIBIT



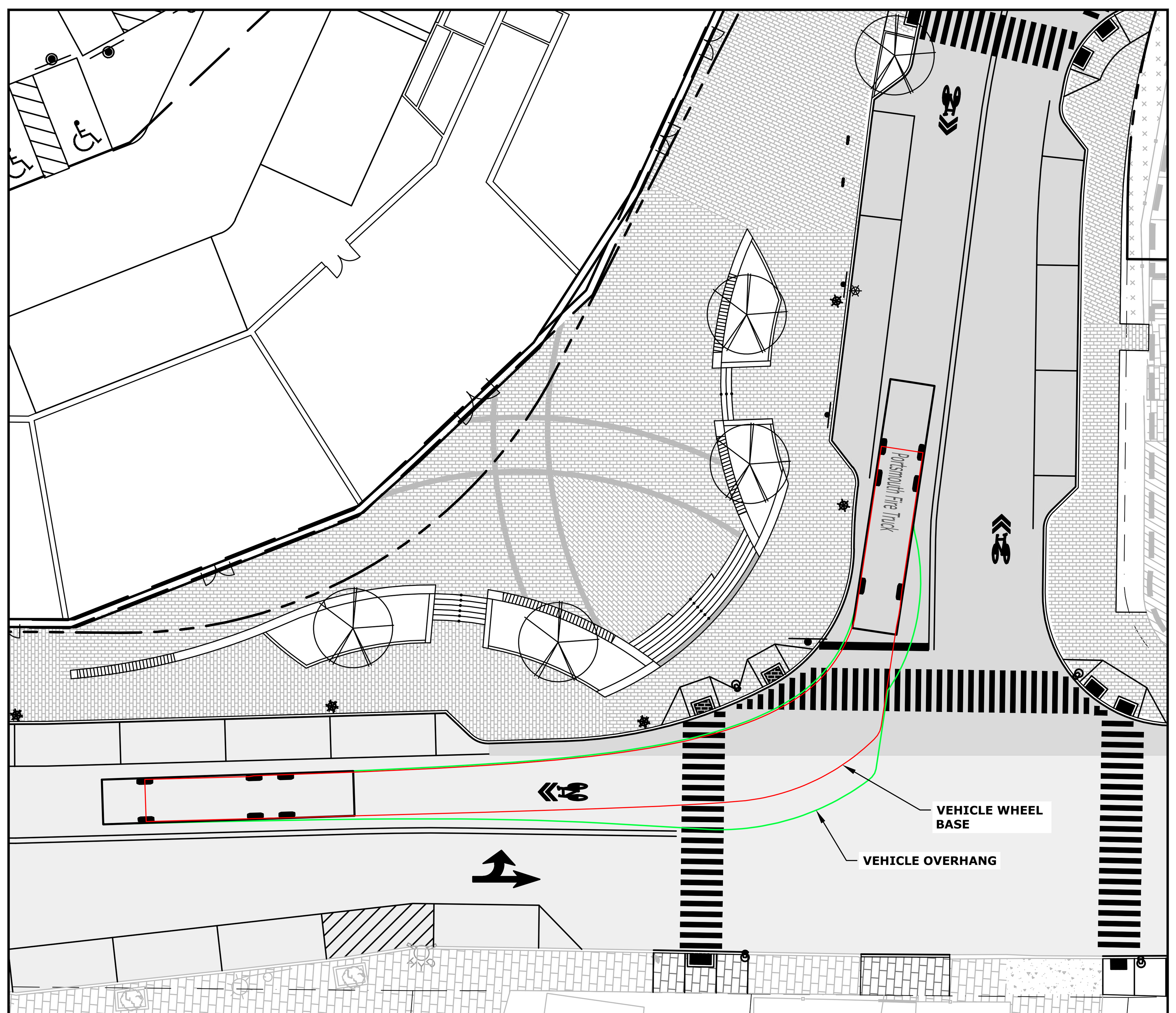
Portsmouth Fire Truck

Overall Length	47.830ft
Overall Width	8.500ft
Overall Body Height	10.432ft
Min Body Ground Clearance	0.862ft
Track Width	8.000ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	38.00°

LEGEND

VEHICLE WHEEL BASE

VEHICLE OVERHANG



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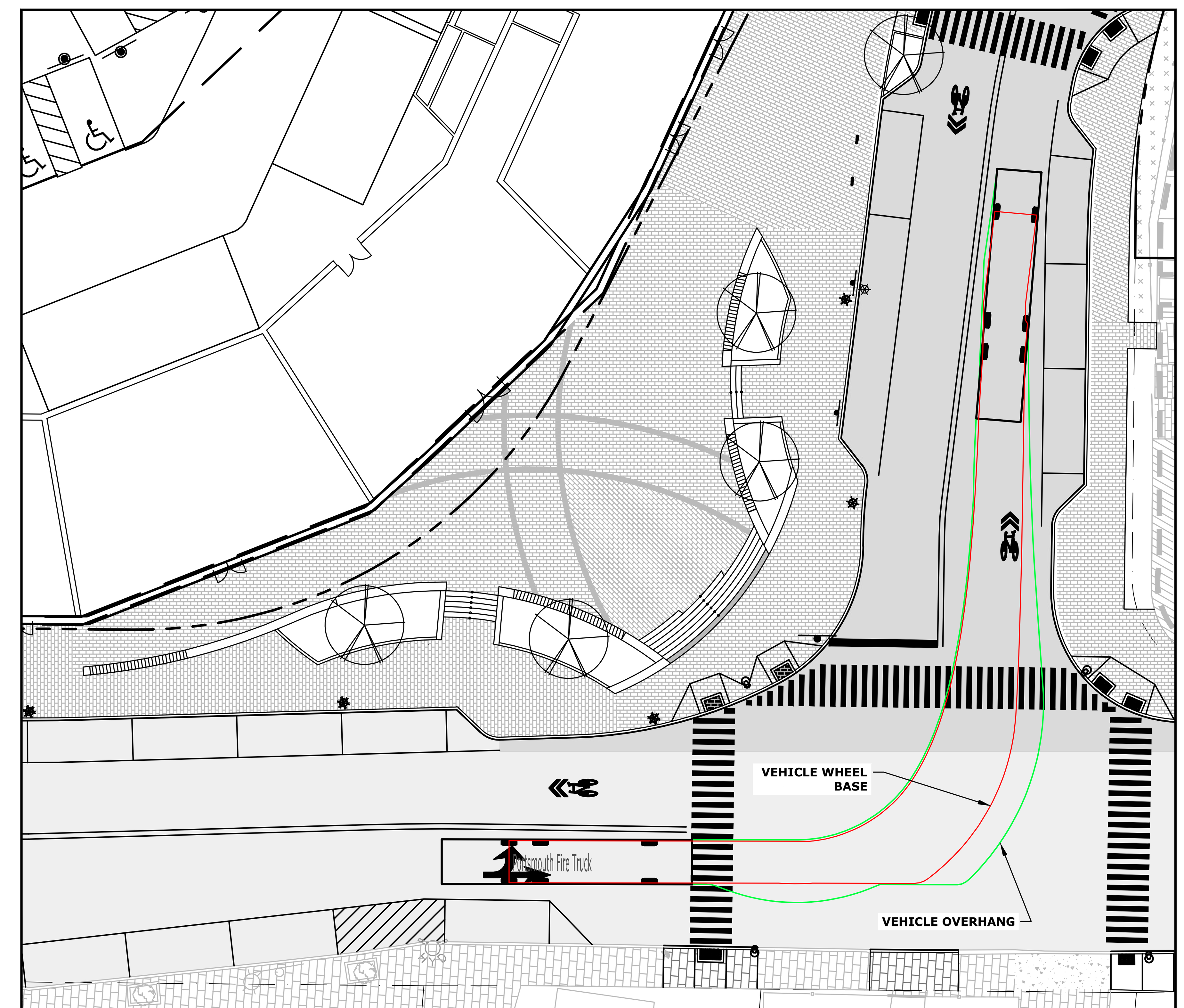

DEER ST ONTO MAPLEWOOD AVE

N

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GRAPHIC SCALE

Tighe&Bond

October 20, 2022
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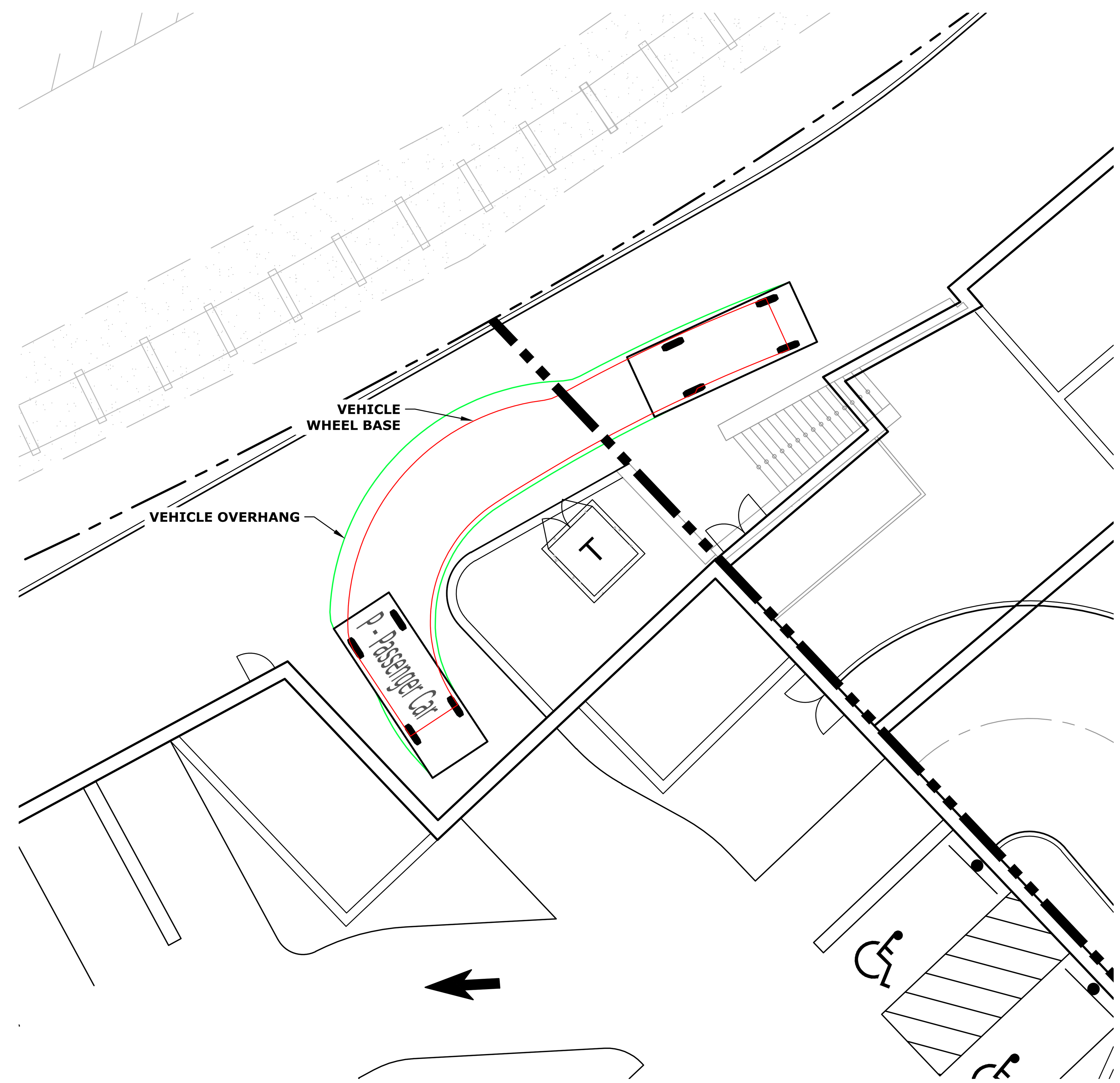
NORTH END MIXED USE DEVELOPMENT
RUSSELL STREET & DEER STREET
PORTSMOUTH, NEW HAMPSHIRE

PASSENGER VEHICLE TURNING EXHIBIT

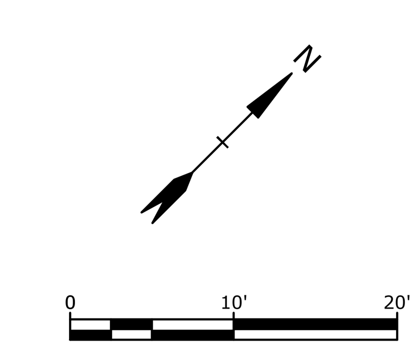
LEGEND

(red line)	VEHICLE WHEEL BASE
(green line)	VEHICLE OVERHANG

VEHICLE ENTRANCE



VEHICLE EXIT



Tighe&Bond

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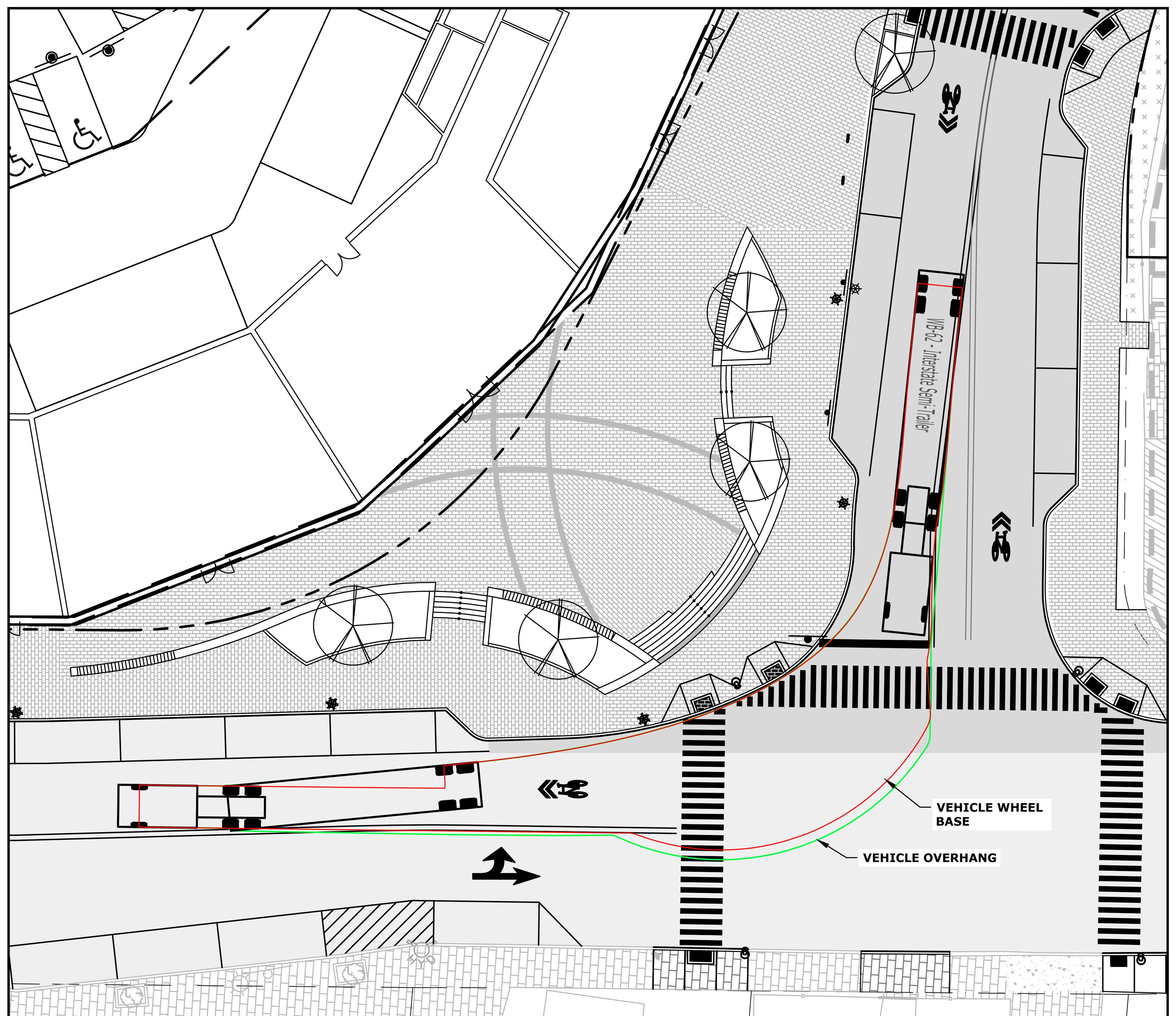
NORTH END MIXED USE DEVELOPMENT
RUSSELL STREET & DEER STREET
PORTSMOUTH, NEW HAMPSHIRE

TRACTOR TRAILER TURNING EXHIBIT

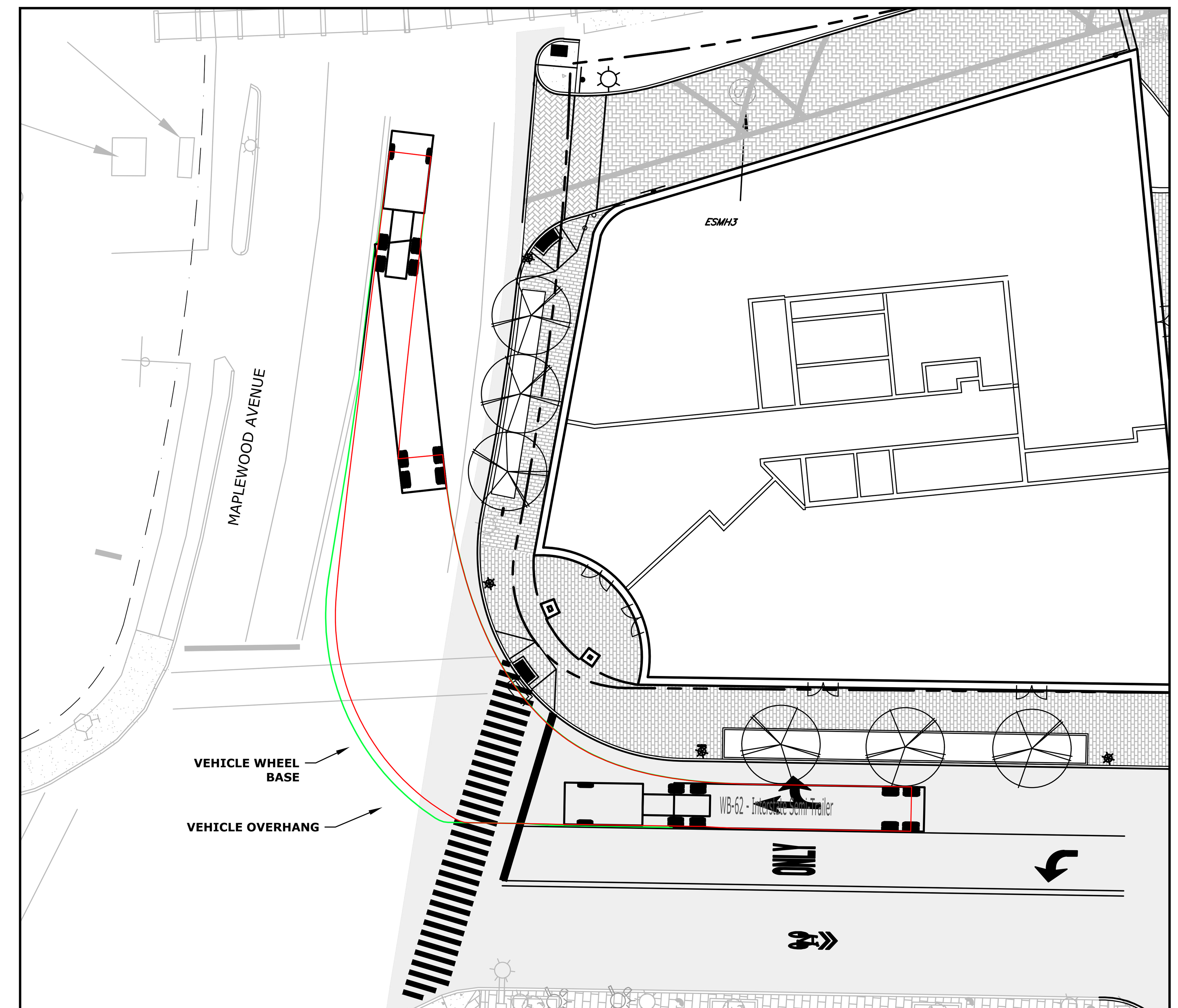
LEGEND

VEHICLE WHEEL BASE

VEHICLE OVERHANG



RUSSELL ST ONTO DEER ST



DEER ST ONTO MAPLEWOOD AVE

N

0 20' 40'
GRAPHIC SCALE

Tighe&Bond

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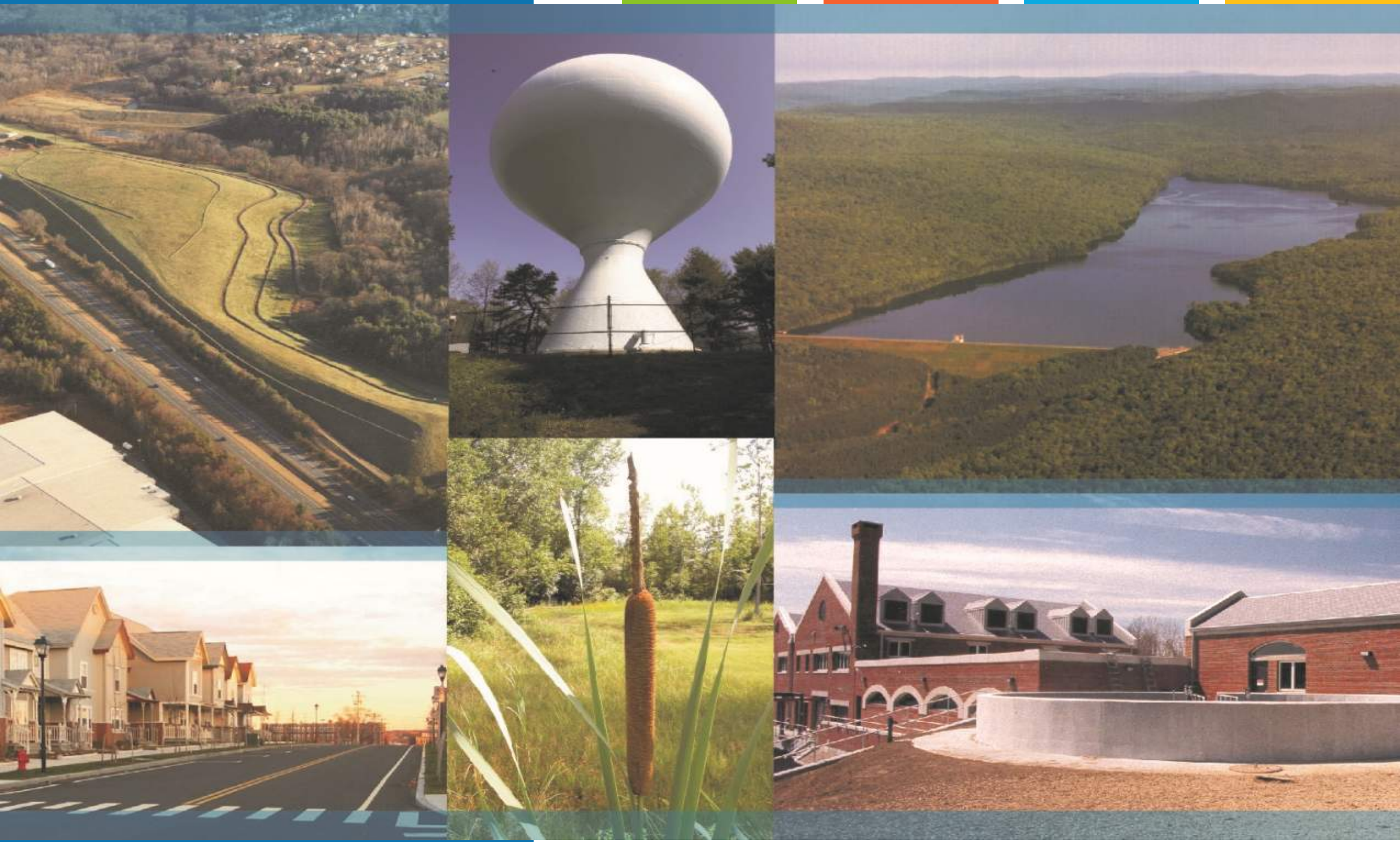

Russell Street Mixed Use Development
Portsmouth, New Hampshire

TRAFFIC IMPACT STUDY

Two International Group

May 24, 2022

Tighe&Bond

100% Recyclable

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Section 2 Existing Conditions

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Section 6 Conclusions and Recommendations

Section 7 Additional Tables

Section 8 Figures

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A. Traffic Volume Data
B. NHDOT Seasonal Adjustment Factors
C. Traffic Volume Adjustment Calculations
D. Capacity Analysis Methodology
E. Capacity Analyses Worksheets
F. Site Development Plans
G. Other Development Traffic Volumes
H. Internal Capture Calculation

Section 1
Introduction & Summary

Tighe & Bond has prepared this *Traffic Impact Study* to summarize the potential changes in the traffic operations resulting from the proposed Russell Street Mixed Use Development which will include 80 residential units, 46,000 square feet (SF) of office space, and 18,500 SF of retail space, (the Project) located at Russell Street and Deer Street in Portsmouth, New Hampshire (the Site).

The Site is bounded by Russell Street to the northeast, Deer Street to the southeast, Maplewood Avenue to the southwest, and the Pan Am Railroad to the northwest. The Site is currently functioning as the Sheraton Portsmouth Harborside public parking lot. Vehicular access to the Site will be provided via a new driveway located just south of the existing parking lot driveway on Russell Street directly across from the existing Sheraton Hotel driveway. The Project includes approximately 189 parking spaces between the upper and lower parking levels beneath the building.

The trip generation analysis indicates that the Project can be expected to generate approximately 136 new vehicular trips during the weekday morning peak hour (91 entering trips, 45 exiting trips), and 177 new vehicular trips during the weekday afternoon peak hour (70 entering trips, 107 exiting trips).

A traffic operations analysis was conducted for the study intersections during the weekday morning and weekday afternoon peak hours. The analysis was conducted for the following four scenarios:

- 2025 No-Build Scenario – Future Projected Traffic Volumes without Site Generated Traffic
- 2025 Build Scenario – Future Projected Traffic Volumes with Site Generated Traffic
- 2035 No-Build Scenario – Future Projected Traffic Volumes without Site Generated Traffic (10-year Horizon)
- 2035 Build Scenario – Future Projected Traffic Volumes with Site Generated Traffic (10-year Horizon)

The Study builds off the previous Maplewood Avenue Traffic Evaluation conducted in 2019 and Raynes Avenue Traffic Impact Study conducted in 2021. Previously collected traffic volume data was utilized where possible. Additional traffic volume information was collected in February 2022 for study intersections where no previous and or recent data was available. The February 2022 traffic counts were validated by comparing 2022 traffic volumes to historical traffic volumes as further detailed in Section 2.3. The traffic counts were projected to and analyzed for the expected 2025 opening year and 10-year Horizon year of 2035 per NHDOT guidelines.

The remainder of the report summarizes the traffic evaluation which includes a description of the study area, traffic volumes during the weekday morning and weekday afternoon peak hours, trip generation estimates for the Project, estimated trip distribution patterns for the new site generated trips, traffic volume projections for the analysis scenarios, traffic operations analysis for the study area intersections, and a summary of the study findings and recommendations.

Based on the analyses conducted, it is the professional opinion of Tighe & Bond that the additional traffic expected to be generated by the Russell Street Mixed Use Development is not expected to have a significant impact to traffic operations on the surrounding roadway network.

Section 2
Existing Conditions

The following section includes a description of existing study area roadway geometry, intersection geometry, intersection traffic control, and data collection efforts within the study area. Figure 1 shows the location of the Site in relation to the surrounding roadway network and study area.

2.1 Roadway Descriptions

Russell Street is a two-lane roadway (one lane in each direction) that runs northeast-southwest between Deer Street and Market Street. On-street parallel parking and sidewalks are provided on both sides of Russell Street in the vicinity of the Project. The roadway has a posted speed limit of 25 miles per hour (mph) near the Site.

The other study area roadways (Maplewood Avenue, Deer Street, Russell Street, Green, Street, and Market Street) within the study area have similar urban characteristics: two-lane roadways, on-street parallel parking, sidewalks, and low speed limits (25 mph or less). Land uses near the Site are a mix of commercial businesses, restaurants, hotels and residential.

2.2 Study Area Intersections

Seven existing intersections were included for analysis in the study area. The study area was previously approved by the City of Portsmouth.

Maplewood Avenue at Deer Street

Deer Street intersects Maplewood Avenue from the east and west to form a four-way signalized intersection. Maplewood Avenue southbound approach consists of left turn only lane and a right/through shared lane. Maplewood Avenue northbound approach consists of an exclusive left turn lane, exclusive through lane and an exclusive right turn lane. Deer Street eastbound approach consists of a single lane. Deer Street westbound approach consists of an exclusive left turn lane and a right/through shared lane. The intersection is equipped with an exclusive actuated pedestrian phase. Each leg of the intersection has painted crosswalks.

Maplewood Avenue at Hanover Street

Hanover Street intersects Maplewood Avenue from the east and west to form a four-way signalized intersection. Maplewood Avenue southbound approach consists of left turn only lane and a right/through shared lane. Maplewood Avenue northbound approach consists of one left/through shared lane and one right/through shared lane. Hanover Street eastbound approach consists of an exclusive left turn lane and a right/through shared lane. Hanover Street westbound approach consists of an exclusive right turn lane and a left/through shared lane. The intersection is equipped with an exclusive actuated pedestrian phase. Each leg of the intersection has painted crosswalks.

Maplewood Avenue at U.S. Route 1 Bypass SB Ramps (Cutts Street) and Cutts Street

The U.S. Route 1 Bypass SB Ramps (Cutts Street) intersect Maplewood Avenue from the north and south to form a four-way unsignalized. Both roadways provide a single lane of travel in each direction. Vehicles exiting from the U.S. Route 1 Bypass SB Ramps (Cutts Street) and Cutts Street operate under stop control with a flashing beacon. Maplewood Avenue consists of 11-foot travel lanes and 4-foot shoulders. The U.S. Route 1 Bypass SB Ramps (Cutts Street) consist of 14-foot travel lanes and 1-foot shoulders.

Maplewood Avenue at U.S. Route 1 Bypass NB Ramps

The U.S. Route 1 Bypass NB Ramps intersect Maplewood Avenue from the south, forming a three-way unsignalized intersection. Both roadways provide a single lane of travel in each direction. Vehicles exiting from the U.S. Route 1 Bypass NB ramps operate under stop control. Maplewood Avenue consists of 11-foot travel lanes and 8-foot shoulders. The U.S. Route 1 Bypass NB Ramps consist of 12-foot travel lanes and 1-foot shoulders.

Deer Street at Russell Street

Russell Street intersects Deer Street from the north to form a three-way unsignalized intersection. The southbound approach on Russell Street provides a single lane that operates under a stop control. The westbound and eastbound approaches on Deer Street both provide a single lane. The intersection provides sidewalks on all sides of the intersection approaches. A crosswalk is available for pedestrians crossing Deer Street east of Russell Street.

Russell Street at Sheraton Driveway and Parking Lot Driveway

The Sheraton Harborside driveway and parking lot driveway intersect Russell Street from the east and west respectively, to form a four-way unsignalized intersection. All approaches provide a single lane of travel in each direction. Vehicles exiting from the Sheraton and parking lot driveways operate under stop control. Sidewalk is provided on both sides of Russell Street with a crosswalk and in-road pedestrian crossing sign provided at the intersection. On-street metered parking is provided on Russell Street north and south of the intersection.

Russell Street at Green Street

Green Street intersects Russell Street from the west, forming a three-way unsignalized intersection. All approaches provide a single travel lane. The Green Street approach is under stop control. Sidewalk is provided on both sides of Russell Street with a crosswalk provided across Green Street. On-street metered parking is provided on both sides of Russell Street south of the intersection.

Market Street at Russell Street

Russell Street intersects Market Street from the southwest, forming a three-way unsignalized intersection. Market Street southbound consists of a through lane and a channelized right turn lane that operates as free flow movements. The northbound approach consists of a single through lane. The intersection geometry is designed to prohibit northbound left turns from Market Street to Russell Street. The Russell Street approach is a single lane that is wide enough for right turning vehicles to bypass waiting left turning vehicles. The Russell Street approach operates under stop control. Pedestrian crosswalks are provided along Russell Street and the westbound Market Street approach with sidewalks provided on all approaches. It is noted that the intersection is fully signalized with mast arms, vehicular and pedestrian signal heads, etc. However, the signal indications are in flashing mode, with yellow indications facing Market Street and red indication facing Russell Street.

2.3 Existing Traffic Data

Evaluation of the traffic impacts related to the Project requires the quantification of existing roadway and traffic conditions throughout the study area. Turning movement counts (TMC) from traffic studies collected prior to the start of the COVID-19 pandemic were used where possible. Because the study area includes three additional intersections not included in recent previous studies, additional turning movement counts were collected in February 2022. Automatic traffic recorder (ATR) data was collected concurrently to validate the turning movement counts.

Manual turning movement counts at the study area intersections for the previous study were collected in January 2019 during the weekday afternoon peak period (4:00 PM to 6:00 PM). Traffic counts for both the morning (7:00 AM to 9:00 AM) and afternoon peak periods (4:00 PM to 6:00 PM) were collected in February 2022 for the remaining intersections. The raw traffic counts are enclosed in Appendix A.

The February 2022 turning movement counts collected were validated by comparing the automatic traffic recorder (ATR) volumes collected concurrently to historical NHDOT volumes at the same location, on Maplewood Avenue approximately 100 feet southeast of Raynes Avenue. The ATR volumes during the peak hours were compared to the historical NHDOT volumes. The detailed comparison and 2019 NHDOT traffic volumes are included in Appendix C. Additionally, as shown in Table 1 below, average daily traffic volumes were observed to have been higher in 2022 than those collected prior to the start of the pandemic, further validating the volumes. The historical NHDOT average daily traffic volumes are also included in Appendix C.

TABLE 1
Maplewood Avenue Historical Average Annual Daily Traffic (ADT)

Year	ADT (vehicles per day)	Source
2017	6,474	NHDOT AADT (ID 82379035)
2018	6,603	NHDOT Growth Estimate
2019	6,682	NHDOT Growth Estimate
2020	5,727	NHDOT AADT (ID 82379035)
2022	7,596	Tighe & Bond February 2022 ATR

2.3.1 Seasonal Variation

The raw traffic counts were seasonally adjusted to peak month conditions based on the 2019 Urban Highway Group 4 Seasonal Adjustment Factors published by the New Hampshire Department of Transportation (NHDOT). Seasonal adjustment factors of 1.23 and 1.18 were applied to traffic volumes collected in January 2019 and February 2022, respectively. The NHDOT Group 4 Seasonal Adjustment Factor worksheet is enclosed in Appendix B.

Section 3
No-Build Conditions

The following section describes the estimation of traffic volumes in the study area for the No-Build Conditions. The 2025 and 2035 No-Build Conditions will serve as the baseline for comparison purposes to measure the impacts of the Project.

3.1 Planned Roadway and Intersection Projects

Information obtained from the City traffic department staff was used to identify planned roadway improvement and new development projects in the area that could affect future traffic conditions. One improvement was identified within the study area and considered when developing the No-Build conditions analysis.

> *Market Street and Russell Street Roundabout:* The City is in the early planning stages of a proposed roundabout at the intersection of Market Street and Russell Street. Funding for the design of the project is included in the City's Capital Improvements Plan (CIP) for FY 2026. Potential funding sources for construction has not been identified. This improvement is modeled under the 2035 Future Build-Improved Conditions.

3.2 Traffic Growth

The 2025 No-Build Conditions traffic volumes were developed by growing the existing traffic volumes for the weekday morning and afternoon peak hours to the projected build year. Two components of traffic growth were incorporated. The first component was to estimate an annual average traffic growth rate. Based on a review of recent studies in the vicinity of the Project and NHDOT standards, a one percent per year background traffic growth rate was assumed in the analysis.

The second component to determining traffic growth was identifying any proposed development projects that are near or within the study area. Based on discussions with the City of Portsmouth staff during the previous study, it was determined that the following projects are approved or pending:

- *Deer Street Garage and Mixed-Use Development:* This project will be located in the northwest corner of the Maplewood Avenue/Deer Street intersection. The traffic study for the project indicates that the full build-out of the project consists of a 600-stall municipal public parking garage with 4,700 SF of integral retail; and four mixed-use buildings. The four mixed-use buildings include a combination of 80 residential apartments, 108 hotel rooms, 41,300 SF of office, 20,000 SF of retail, 9,900 SF of restaurants, a 4,700 SF bar, and a 2,700 SF bank. The project is currently approved with no imminent construction start date. The project traffic volumes were included in the 2035 No-Build conditions analyses.

- *Raynes Avenue Development:* This project located on Raynes Avenue includes the construction of a 128-room hotel, 60-unit residential building, 5,200 SF of retail space, and 4,400 SF of restaurant space. The project has been approved but is currently pending. The development traffic volumes are incorporated into the 2025 No-Build conditions analyses.

Traffic volumes related to these projects were obtained from record studies and assigned to the study area intersections to develop the 2025 and 2035 No-Build conditions traffic volumes. The traffic volumes from these other major developments are included in Appendix G. It is assumed that other smaller developments or small vacancies in existing developments are captured by the background traffic growth rate previously mentioned.

The 2025 and 2035 No-Build conditions volumes for the weekday morning and weekday afternoon peak hours are shown in Figures 2 and 3, respectively.

3.3 Traffic Operations Analysis – No-Build Conditions

Capacity and queue analyses were conducted for the 2025 and 2035 No-Build Conditions during the weekday morning and afternoon peak hours using Trafficware Synchro Studio 11 – Traffic Analysis Software. The software conducts the analysis based up on the methodology provided in the Highway Capacity Manual, 6th Edition, 2016. The analysis results are categorized in terms of Level of Service (LOS), which describes the qualitative intersection operation conditions based on the calculated average delay per vehicle. A summary of the HCM capacity analysis methodology and a detailed definition of LOS is provided in Appendix D. The queue analysis results are summarized in terms of the 50th percentile queue length, and the 95th percentile queue length. The 50th percentile queue length represents the approximate average queue length, and the 95th percentile queue length represents the design queue length under peak traffic conditions. Tables 2 and 3 summarize the capacity and queue analyses results, respectively. Capacity analyses worksheets with full inputs, settings, and results are provided in Appendix E.

During the weekday morning peak hour all movements at the Maplewood Avenue at Deer Street intersection experience LOS D or better during the weekday morning peak hour under 2025 and 2035 No-Build Conditions except the southbound shared through/ right movement which experiences LOS E under 2035 No-Build Conditions. Overall failing operations of LOS E and LOS F are experienced at the intersection during the weekday afternoon peak hour under 2025 No-Build Conditions and 2035 No-Build Conditions, respectively. Vehicular queues exceed available storage on the westbound left-turn lanes under 2025 and 2035 No-Build Conditions during both peak periods. Queues exceed the available storage on the northbound approach at the intersection under both 2025 and 2035 No-Build Conditions during the weekday afternoon peak hour.

Acceptable operations of LOS D or better are experienced on all approaches of the Maplewood Avenue at Hanover Street intersection except for the westbound shared through/ left movement which experiences LOS E under the 2035 No-Build Conditions during the weekday afternoon peak hour. Queues at the intersection are within available storage.

The unsignalized intersections experience operations of LOS D or better on all movements/approaches under 2025 No-Build Conditions during both peak hours. During the 2035 No-Build Conditions, LOS D or better operation is present for all movements/approaches during the weekday morning peak hour except for the Cutts Street southbound approach to Maplewood Avenue which operates at LOS E. Under the 2035 No-Build Conditions during the afternoon peak hour, the additional traffic volumes realized by the ambient background growth rate for the 10-year horizon to 2035 results in the following approaches/movements exceeding capacity and experiencing failing operations:

- Maplewood Avenue at Cutts Street (U.S. Route 1 SB Ramps) northbound and southbound approaches
- Maplewood Avenue at U.S. Route 1 Bypass NB Ramps northbound approach
- Market Street at Russell Street eastbound left movement

Significant queuing is experienced on the eastbound left movement at the intersection of Market Street at Russell Street under both 2025 and 2035 No-Build Conditions during the weekday afternoon peak hour. The remainder of the movements/approaches to the unsignalized intersections have queues that are within available storage lengths.

Section 4
Proposed Conditions

The proposed development includes three separate building units. The proposed 46,000 SF four-story office building is located on the west side of the Site. The center five-story building is comprised of 56 residential units with approximately 10,000 SF of retail space located on the ground floor. The final building, a five-story structure located on the northeast side of the Site includes 24 residential units with 8,500 SF of retail space on the ground floor as well. Approximately 189 parking spaces will be provided on Site for the proposed development on the lower and ground levels. The following sections describe the methodology to estimate the total number of site generated trips and their distribution within the study area roadway network.

4.1 Site Access

Three driveways are proposed to provide access to the upper level and lower-level parking areas. The upper-level parking access will be provided via one unsignalized full access driveway on Russell Street, directly across from the existing Sheraton Harborside driveway. The lower-level entrance is proposed on Maplewood Avenue, approximately 100 feet north of Deer Street. The lower-level exit is proposed 50 feet west of Russell Street and exit only on Green Street, west of Russell Street.

Intersection sight distance was reviewed at the proposed Site driveways on Russell Street and Green Street in accordance with criteria set forth in the AASHTO publication *A Policy on the Geometric Design of Highways and Streets*, 7th Edition, 2018. Available site distances were estimated based on the site layout plan and available aerial mapping. Based on AASHTO guidelines and the posted speed on Russell Street, the intersection sight distance requirement is 239 feet looking left to the north and 276 feet looking right to the south on Russell Street at the Site driveway. The available intersection sight distance is approximately 450 feet looking left to the north and 145 feet looking right to the south on Russell Street. While sight distance looking left to the north is in excess of the requirements, the sight distance looking right to the south is limited due to the termination of Russell Street. It is important to note that the proposed upper-level Site driveway will replace an existing parking lot driveway. Similar to the upper-level Site driveway, the required sight distance at the proposed lower-level Site driveway exit on Green Street is 239 feet looking left to the west and 276 feet looking right to the east based on the posted speed. The available sight distance looking left is approximately 330 feet, which is in excess of the requirement. While sight distance is not met looking right with only 75 feet of available sight distance due to the termination of Green Street, all site traffic is anticipated to exit to the right toward Russell Street which provides adequate sight distance as previously mentioned. Finally, it is important to note that meeting sight distance requirements is not always possible in dense urban environments due to closely spaced intersections and geometric limitations as is experienced at both site driveways.

The Project will include geometric roadway improvements to Deer Street, and Russell Street as shown on the proposed Site Plan (C-102.1), enclosed in Appendix F. The following improvements are proposed:

- Curb extensions and crosswalks on all approaches at the proposed Site driveway intersection and the Russell Street at Deer Street intersections
- Minor re-alignment of Russell Street and removal of the existing median island to eliminate the approach skew at the intersection with Deer Street
- Pavement marking improvements on Green Street at the intersection with Russell Street
- Pedestrian crosswalk across Deer Street at Portwalk Place
- Bi-directional bicycle lanes on Russell Street from Deer Street to Green Street
- Landscaping and streetscape improvements along Russell Street and Deer Street

In addition to the improvements listed above, the existing railroad crossing beacon located on the east side of Maplewood Avenue is proposed to be relocated to accommodate the proposed lower-level site entrance driveway on Maplewood Avenue. This work will be coordinated with the rail owner.

4.2 Trip Generation

Site generated traffic volumes for the Project were estimated using rates published in the Institute of Transportation Engineers (ITE) Trip Generation, 11th edition, 2021. ITE provides data to estimate the total number of vehicular trips associated with a site based on the specific land uses. To estimate the trip generation for the Project, ITE Land Use Code (LUC) 221 – Multifamily Housing (Mid-Rise), LUC 710 – General Office Building, and LUC 822 – Strip Retail Plaza Center (<40,000 SF).

Mixed-use developments typically generate shared trips, also known as internal capture. The internal capture rate for the proposed development was determined using the *National Cooperative Highway Research Program (NCHRP) Report 684: Enhancing Internal Trip Capture Estimation for Mixed-Use Developments* by the Transportation Research Board, 2011. The internal capture rate is estimated to be 4% for entering vehicles and 8% for exiting vehicles during the weekday morning peak hour, and 23% for entering vehicles and 16% for exiting vehicles during the weekday afternoon peak hour. The detailed calculation spreadsheet is included in Appendix H.

Because the existing traffic volumes entering and exiting the existing Sheraton Public Parking Lot driveway from Russell Street were minimal, these traffic volumes were not deducted from the trip generation estimate. This results in a conservative existing traffic volume estimate as the parking lot is currently utilized and will be replaced with the proposed development.

Based on the ITE data and the calculated internal capture rates, the proposed development is expected to generate approximately 136 trips (91 entering, 45 exiting) during the weekday morning peak hour and 177 trips (70 entering, 107 exiting) during the weekday afternoon peak hour. The proposed trip generation for the weekday morning and afternoon peak hours is presented in Table 4.

4.3 Arrival and Departure Distribution

The trip distribution identifies the various travel paths for vehicles arriving and departing the Project site. Trip distribution patterns for the Project were based on a review of previous traffic studies conducted for nearby projects, observed travel patterns, and the proposed parking layout. Because the upper and lower parking levels are not interconnected, the trip distribution was based on the parking provided on each level. Trip distributions of 55% and 45% were applied to the lower-level and upper-level site driveways, respectively.

The following arrival/ departure distributions are anticipated for the residential trips:

Arrival
- 40% from the west via Maplewood Avenue
- 35% from the east via Maplewood Avenue
- 25% from the northwest via Market Street

Departure
- 5% to the west via Maplewood Avenue
- 35% to the east via Maplewood Avenue
- 60% to the northwest via Market Street

The following arrival/ departure distributions are anticipated for the office trips:

Arrival
- 50% from the west via Maplewood Avenue
- 20% from the east via Maplewood Avenue
- 30% from the northwest via Market Street

Departure
- 5% to the west via Maplewood Avenue
- 20% to the east via Maplewood Avenue
- 75% to the northwest via Market Street

The following arrival/ departure distributions are anticipated for the retail trips:

Arrival
- 30% from the west via Maplewood Avenue
- 55% from the east via Maplewood Avenue
- 15% from the northwest via Market Street

Departure
- 5% to the west via Maplewood Avenue
- 55% to the east via Maplewood Avenue
- 40% to the northwest via Market Street

The trip distribution patterns for the residential, office, and retail uses are shown in Figure 4. The vehicular trips associated with the Project were assigned to the study area and are shown in Figure 5 for the weekday morning and weekday afternoon peak hours.

Section 5
Build Conditions

The anticipated site generated traffic volumes associated with the proposed development were added to the 2025 and 2035 No-Build Conditions traffic volumes to develop the 2025 and 2035 Build Conditions traffic volumes for both peak periods. The 2025 and 2035 Build Conditions traffic volumes are presented in Figures 6 and 7, respectively.

5.1 Capacity and Queue Analyses – Build Conditions

Capacity and queue analyses were conducted for the 2025 and 2035 Build Conditions for the peak hours using the methodology described in Section 3.3. Tables 2 and 3 in Section 7 summarize the capacity and queue results, respectively. Capacity analysis worksheets with full inputs, settings, and results are provided in Appendix E.

A majority of the study area intersections and movements will continue to operate with the same LOS under Build Conditions as No-Build Conditions during both peak hours.

Under 2025 Build Conditions, the movements/approaches to all intersections either operate at the same LOS under Build Conditions when compared to No-Build Conditions or operate at LOS D or better with one exception. During the weekday afternoon peak hour, the intersection of Maplewood Avenue at Deer Street continues to operate at overall LOS E under 2025 Build Conditions with timing optimization. The southbound left movement experiences degradation in LOS from C to D under 2025 Build Conditions but still experiences acceptable operations.

Under 2035 Build Conditions, the movements/approaches to all intersections operate at No-Build LOS or operate at LOS D or better with four exceptions. In the morning peak hour, the U.S. Route 1 northbound ramp approach to Maplewood Avenue operates at LOS E, though queues remain within available storage. Similar to 2035 No-Build Conditions, the Maplewood Avenue at Deer Street intersection eastbound approach continues to operate at LOS F during the afternoon peak hour with optimization. The eastbound approach does experience a degradation in LOS from E to F under 2035 Build Conditions, but remains below capacity (v/c = 0.98). The Site Driveway and Sheraton Harborside Driveway approaches to Russell Street operate at LOS E in the afternoon peak hour.

As mentioned in Section 3.1, a modern roundabout is planned for the Market Street and Russell Street intersection in FY 2026. Because the roundabout will not be constructed prior to the 2025 opening year, the improvement was analyzed under 2035 Build Conditions only. Under the improved condition the intersection experiences improved operations of overall LOS A during the weekday morning peak hour and LOS C during the weekday afternoon peak hour. Additionally, vehicular queues that exceed available storage under 2035 No-Build and 2035 Build Conditions with the existing configuration are now accommodated within available storage during the weekday afternoon peak hour.

Based on the capacity analysis results, the proposed development and its site generated traffic is not expected to have a significant detrimental effect on the intersection operations beyond what is already expected to be experienced under 2025 and 2035 No-Build Conditions.

Section 6
Conclusions and Recommendations

1. The proposed Russell Street Mixed Use development is proposing to replace the existing parking lot currently utilized by the Sheraton Hotel on Russell Street with a mixed-use development to include 80 residential units, 46,000 SF of office space, and 18,500 SF of retail space. Approximately 189 parking spaces will be provided as part of the development. The proposed development is estimated to be constructed and occupied in 2025.

2. The traffic volumes utilized in the study were a compilation of previous traffic counts collected in January 2019 and February 2022. The traffic counts were seasonally adjusted. The February 2022 traffic volumes were validated by comparing collected traffic volume data along Maplewood Avenue to historic NHDOT traffic volume data at the same location to confirm traffic volumes reflect typical conditions.

3. The proposed development is expected to generate approximately 136 vehicular trips during the weekday morning peak hour (91 entering trips, 45 exiting trips), and 177 new vehicular trips during the weekday afternoon peak hour (70 entering trips, 107 exiting trips). Due to the mixed-use nature of the development, an internal capture calculation was applied to the trip generation calculation. This methodology aligns with industry standard practices and was utilized for the previously approved studies in the area.

4. Proposed roadway, pavement marking, and signage improvements along Russell Street, Green Street, Maplewood Avenue, and Deer Street as discussed in Section 4.1 will improve safety for vehicles, pedestrians, and bicyclists.

5. As discussed in Section 3.1, the intersection of Market Street at Russell Street is currently programmed for design of a proposed roundabout in FY 2026. The roundabout aims to improve both existing and future deficiencies at the existing condition stop-controlled intersection. As mentioned in Section 5.1, acceptable traffic operations are experienced under 2035 Build Conditions during the weekday morning and afternoon peak hours with the improvement.

6. The traffic capacity and queue analyses results indicate that when potential future projects in the area are all constructed, substantial traffic volumes will be added to the study area network which will cause increases congestion at a number of intersections within the study area which will exacerbate existing capacity issues at select intersection approaches. Site generated traffic represents a relatively small percentage of the cumulative traffic volume expected to be generated by the potential future projects. Following optimization and installation of planed roadway improvements, the proposed development is not expected to have a significant detrimental effect on the intersection operations beyond what is already expected to be experienced under 2025 and 2035 No-Build Conditions.

7. While signal timing optimization is recommended at the intersection of Maplewood Avenue at Deer Street during the afternoon peak hour as mentioned in Section 5.1, signal timing optimization should also be reviewed regularly as other planned projects get implemented to improve intersection operations in the study area.

8. The existing railroad crossing beacon on the east side of Maplewood Avenue will be relocated in coordination with the rail owner to support the proposed lower-level site driveway entrance on Maplewood Avenue.

9. System-wide traffic improvement measures, such as promotion of reduced automobile usage, enhanced transit services to the area and promotion of remote/underutilized parking areas can also be considered by the City to reduce the volume of vehicular traffic generated within the downtown street network during peak times.

10. Based on the results of the analysis, it is the professional opinion of Tighe & Bond that the additional traffic expected to be generated by the proposed Russell Street Mixed Use Development is not expected to have a significant impact to traffic operations on the surrounding roadway network.

Section 7
Additional Tables

TABLE 2
Intersection Operation Summary - Capacity

		Weekday Morning Peak Hour												Weekday Afternoon Peak Hour											
	Lane Use	2025 No Build			2025 Build			2035 No Build			2035 Build			2025 No Build			2025 Build			2035 No Build			2035 Build		
		LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C	LOS	Delay	V/C
Traffic Signal - Maplewood Avenue at Deer Street																									
Overall		**C**	**25.3**	**0.74**	**C**	**25.2**	**0.74**	**D**	**40.1**	**0.98**	**D**	**41.4**	**0.98**	**E**	**66.2**	**1.11**	**E**	**79.9**	**1.27**	**F**	**86.9**	**1.29**	**F**	**82.0**	**1.21**
Deer Street	EB	C	20.9	0.10	C	20.9	0.10	C	26.0	0.31	C	26.0	0.31	F	87.1	0.99	F	87.0	0.96	E	74.4	0.97	F	84.7	0.98
	WBL	C	28.3	0.32	C	28.9	0.36	C	29.7	0.38	C	30.6	0.42	F	120.1	1.10	F	177.3	1.27	D	43.9	0.71	D	54.8	0.83
	WBTR	C	20.2	0.13	B	19.9	0.13	C	23.5	0.19	C	23.4	0.20	C	30.8	0.39	C	29.5	0.39	C	24.7	0.32	C	24.6	0.33
Maplewood Avenue	NBL	B	11.5	0.04	B	10.7	0.04	D	49.1	0.56	D	49.7	0.56	C	20.3	0.08	C	21.0	0.09	D	50.0	0.51	D	48.3	0.52
	NBT	C	21.6	0.54	C	22.2	0.58	C	23.7	0.60	C	26.0	0.64	F	98.9	1.11	F	108.8	1.14	F	175.6	1.29	F	139.8	1.21
	NBR	A	3.5	0.21	A	3.6	0.23	A	3.1	0.23	A	3.4	0.25	A	4.0	0.39	A	3.9	0.41	A	6.9	0.45	A	6.2	0.44
	SBL	B	19.8	0.09	B	20.0	0.11	B	19.9	0.11	C	20.3	0.13	C	26.4	0.45	D	42.8	0.66	C	24.3	0.34	C	30.3	0.48
	SBTR	C	33.7	0.74	C	33.7	0.74	E	65.9	0.98	E	69.7	0.98	D	39.3	0.81	D	42.2	0.83	F	96.4	1.00	F	100.7	1.00
Traffic Signal - Maplewood Avenue at Hanover Street																									
Overall		**B**	**19.0**	**0.43**	**B**	**18.5**	**0.44**	**B**	**19.5**	**0.49**	**B**	**19.4**	**0.51**	**C**	**20.6**	**0.60**	**C**	**20.9**	**0.64**	**C**	**22.5**	**0.61**	**C**	**23.2**	**0.65**
Hanover Street	EBL	D	44.9	0.21	D	44.9	0.21	D	44.8	0.22	D	44.8	0.22	D	54.0	0.52	D	54.0	0.52	D	49.4	0.42	D	49.4	0.42
	EBTR	D	36.7	0.35	D	36.7	0.35	C	33.4	0.45	C	33.4	0.45	C	32.6	0.21	C	32.6	0.21	C	22.3	0.37	C	22.3	0.37
	WBLT	D	51.8	0.39	D	51.8	0.39	D	52.9	0.43	D	52.9	0.43	D	49.2	0.43	D	49.2	0.43	E	55.7	0.57	E	55.7	0.57
	WBR	A	8.4	0.17	A	8.4	0.17	A	7.8	0.18	A	7.8	0.18	A	6.2	0.28	A	6.2	0.28	A	6.0	0.35	A	6.0	0.35
Maplewood Avenue	NB	B	19.1	0.26	B	19.4	0.28	C	21.1	0.35	C	21.5	0.37	C	26.7	0.49	C	27.5	0.51	C	27.8	0.59	C	28.6	0.62
	SBL	B	13.5	0.14	B	12.3	0.14	B	11.9	0.17	B	11.4	0.17	A	9.3	0.33	A	8.3	0.35	B	11.7	0.38	B	11.3	0.40
	SBTR	B	15.2	0.43	B	14.1	0.44	B	14.7	0.49	B	14.4	0.51	B	12.0	0.60	B	12.5	0.64	B	16.0	0.61	B	17.0	0.65
Unsignalized TWSC - Maplewood Avenue at Cutts Street (U.S. Route 1 Bypass SB Ramps)/ Cutts Street																									
Maplewood Avenue	EBL	A	7.4	0.00	A	7.4	0.00	A	7.5	0.00	A	7.5	0.00	A	7.6	0.00	A	7.6	0.00	A	7.8	0.00	A	7.8	0.00
	WBL	A	8.2	0.19	A	8.2	0.19	A	8.5	0.25	A	8.6	0.25	A	9.0	0.35	A	9.0	0.36	B	10.9	0.55	B	11.0	0.55
Cutts Street (U.S. Route 1 Bypass SB Ramps)	NB	B	13.3	0.15	B	13.1	0.16	C	17.0	0.23	C	16.7	0.24	D	26.7	0.34	D	26.5	0.35	F	389.0	1.48	F	396.8	1.51
Cutts Street	SB	C	23.8	0.00	C	24.3	0.24	E	37.3	0.37	E	38.5	0.38	F	62	0.37	F	64.2	0.38	F	638.1	1.52	F	731.9	1.67
Unsignalized TWSC - Maplewood Avenue at U.S. Route 1 Bypass NB Ramps																									
Maplewood Avenue	WBL	A	7.8	0.01	A	7.8	0.01	A	7.9	0.01	A	7.9	0.01	A	8	0.02	A	7.7	0.02	A	8.0	0.03	A	8.0	0.03
U.S. Route 1 Bypass NB Ramps	NB	C	15.8	0.58	C	17.4	0.64	D	26.5	0.80	D	32.5	0.86	C	19.3	0.59	C	20.4	0.62	F	71.6	1.00	F	83.1	1.04
Unsignalized TWSC - Russell Street at Deer Street																									
Deer Street	EBL	A	7.6	0.08	A	7.6	0.09	A	7.6	0.10	A	7.7	0.12	A	8.2	0.24	A	8.3	0.25	A	8.7	0.29	A	8.8	0.31
Russel Street	SB	A	9.8	0.25	B	10.0	0.28	B	10.4	0.33	B	10.5	0.35	C	16	0.61	C	18.4	0.67	C	18.9	0.68	C	21.9	0.74
Unsignalized TWSC - Russell Street at Site Driveway (Upper Level)/ Sheratron Driveway																									
Site Driveway (Existing Parking Lot)	EB	B	12.0	0.02	B	12.2	0.11	B	13.3	0.02	B	13.5	0.13	C	15.5	0.09	C	23.9	0.43	C	18.5	0.14	E	38.0	0.63
Sheraton Harborside Dwy	WB	A	9.5	0.03	A	9.7	0.03	A	9.7	0.04	B	10.0	0.04	C	16.0	0.06	C	19.1	0.07	C	20.7	0.23	D	27.1	0.30
Russell Street	NBL	A	7.8	0.01	A	7.9	0.02	A	7.9	0.01	A	8.1	0.02	A	8.3	0.01	A	8.5	0.03	A	8.5	0.01	A	8.7	0.04
	SBL	A	7.5	0.01	A	7.5	0.01	A	7.5	0.01	A	7.5	0.01	A	8.0	0.01	A	8.0	0.01	A	8.2	0.01	A	8.2	0.01
Unsignalized TWSC - Russell Street at Green Street																									
Green Street	EB	B	10.2	0.03	B	10.8	0.08	B	10.8	0.04	B	11.6	0.09	C	16.8	0.16	C	19.6	0.34	C	20.4	0.22	D	25.3	0.42
Russell Street	NBL	A	7.8	0.00	A	7.8	0.00	A	8.0	0.00	A	8.0	0.00	A	8.4	0.01	A	8.4	0.01	A	8.6	0.01	A	8.7	0.01
Unsignalized TWSC - Maplewood Avenue at Site Entrance (Lower Level)																									
Maplewood Avenue	SBL	--	--	--	A	8.1	0.03	--	--	--	A	8.2	0.03	--	--	--	A	9.1	0.02	--	--	--	A	9.8	0.03
Unsignalized TWSC - Green Street at Site Exit (Lower Level)																									
Site Exit (Lower Level)	NB	--	--	--	A	8.5	0.03	--	--	--	A	8.5	0.03	--	--	--	A	8.8	0.06	--	--	--	A	8.8	0.06

TABLE 2 (CONTINUED)
Intersection Operation Summary - Capacity

		Weekday Morning Peak Hour															Weekday Afternoon Peak Hour														
	Lane Use	**2025 No Build**			**2025 Build**			**2035 No Build**			**2035 Build**			**2025 Build-Improved**			**2025 No Build**			**2025 Build**			**2035 No Build**			**2035 Build**			**2025 Build-Improved**		
		LOS	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**	**LOS**	**Delay**	**V/C**
Unsignalized TWSC - Market Street at Russell Street																															
Overall		**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**A**	**7.4**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**C**	**18.0**	**--**
	EBL	B	14.4	0.26	C	15.1	0.32	C	16.5	0.36	C	17.6	0.42	--	--	--	F	454.5	1.89	F	598.9	2.22	F	549.5	2.12	F	684.9	2.42	--	--	--
Russell Street	EBR	B	10.4	0.01	B	10.4	0.01	B	10.7	0.01	B	10.7	0.01	--	--	--	B	10.9	0.02	B	10.9	0.02	B	11.6	0.02	B	11.6	0.02	--	--	--
	EB	--	--	--	--	--	--	--	--	--	--	--	--	A	6.0	--	--	--	--	--	--	--	--	--	--	--	--	--	B	15.0	--
Market Street	NB	--	--	--	--	--	--	--	--	--	--	--	--	A	5.0	--	--	--	--	--	--	--	--	--	--	--	--	--	D	25.4	--
	SB	--	--	--	--	--	--	--	--	--	--	--	--	A	8.4	--	--	--	--	--	--	--	--	--	--	--	--	--	C	15.2	--

TABLE 3
Intersection Operation Summary - Queues

			Weekday Morning Peak Hour								Weekday Afternoon Peak Hour							
			2025 No Build		2025 Build		2035 No Build		2035 Build		2025 No Build		2025 Build		2035 No Build		2035 Build	
	Lane Use	Available Storage	50^{th}	95^{th}	50^{th}	95^{th}	50^{th}	95^{th}	50^{th}	95^{th}	50^{th}	95^{th}	50^{th}	95^{th}	50^{th}	95^{th}	50^{th}	95^{th}
Traffic Signal - Maplewood Avenue at Deer Street																		
	EB	590	13	55	13	55	50	144	50	144	257	356	249	349	211	586	212	588
Deer Street	WBL	100	60	163	68	182	68	185	77	220	275	291	351	354	114	363	143	433
	WBTR	350	22	78	22	78	44	124	44	126	107	143	107	142	74	194	75	197
	NBL	100	3	5	2	4	25	81	22	82	2	6	2	6	10	47	10	22
	NBT	350	165	137	173	70	180	112	193	296	434	585	422	565	481	691	474	660
Maplewood Avenue	NBR	350	23	0	33	1	9	14	2	22	0	34	0	39	14	43	21	47
	SBL	150	11	29	13	33	12	30	14	34	41	47	44	51	27	57	29	59
	SBTR	>500	253	380	253	380	384	627	384	627	315	418	321	426	407	652	407	652
Traffic Signal - Maplewood Avenue at Hanover Street																		
	EBL	90	14	36	14	36	16	38	16	38	47	55	47	55	35	67	35	67
Hanover Street	EBTR	90	21	52	21	52	24	58	24	58	15	25	15	25	12	44	12	44
	WBLT	250	28	49	28	49	31	54	31	54	40	76	40	76	53	80	53	80
	WBR	75	0	19	0	19	0	20	0	20	0	37	0	37	0	23	0	23
	NB	325	98	141	108	154	132	185	143	199	185	261	199	278	263	353	281	381
Maplewood Avenue	SBL	175	29	24	27	24	32	22	31	22	14	31	12	29	46	34	48	32
	SBTR	350	218	277	213	281	260	251	263	266	128	287	183	304	290	325	320	415
Unsignalized TWSC - Maplewood Avenue at Cutts Street (U.S. Route 1 Bypass SB Ramps)/ Cutts Street																		
Maplewood Avenue	EBL	>500	--	0	--	0	--	0	--	0	--	0	--	0	--	0	--	0
	WBL	>500	--	18	--	18	--	25	--	25	--	40	--	40	--	88	--	88
Cutts Street (U.S. Route 1 Bypass SB Ramps)	NB	350	--	13	--	15	--	23	--	23	--	35	--	38	--	208	--	217
Cutts Street	SB	>500	--	0	--	0	--	0	--	0	--	0	--	0	--	0	--	0
Unsignalized TWSC - Maplewood Avenue at U.S. Route 1 Bypass NB Ramps																		
Maplewood Avenue	WBL	>500	--	0	--	0	--	0	--	0	--	3	--	3	--	3	--	3
U.S. Route 1 Bypass NB Ramps	NB	800	--	95	--	115	--	208	--	258	--	95	--	105	--	333	--	373
Unsignalized TWSC - Russell Street at Deer Street																		
Deer Street	EBL	390	--	8	--	8	--	8	--	10	--	23	--	25	--	30	--	33
Russell Street	SB	150	--	25	--	28	--	35	--	40	--	105	--	133	--	135	--	170
Unsignalized TWSC - Russell Street at Site Driveway (Upper Level)/ Sheratron Driveway																		
Site Driveway (Existing Parking Lot)	EB	300	--	0	--	10	--	3	--	10	--	8	--	53	--	13	--	98
Sheraton Harborside Dwy	WB	100	--	3	--	3	--	3	--	3	--	5	--	5	--	23	--	30
Russell Street	NBL	150	--	0	--	3	--	0	--	3	--	0	--	3	--	0	--	3
	SBL	200	--	0	--	0	--	0	--	0	--	0	--	0	--	0	--	0
Unsignalized TWSC - Russell Street at Green Street																		
Green Street	EB	75	--	3	--	5	--	3	--	8	--	15	--	35	--	20	--	50
Russell Street	NBL	225	--	0	--	0	--	0	--	0	--	0	--	0	--	0	--	0
Unsignalized TWSC - Maplewood Avenue at Site Entrance (Lower Level)																		
Maplewood Avenue	SBL	50	--	--	--	3	--	--	--	3	--	--	--	3	--	--	--	3
Unsignalized TWSC - Green Street at Site Exit (Lower Level)																		
Site Exit (Lower Level)	NB	225	--	--	--	3	--	--	--	3	--	--	--	5	--	--	--	5

TABLE 3 (CONTINUED)
Intersection Operation Summary - Queues

			Weekday Morning Peak Hour										Weekday Afternoon Peak Hour									
			2025 No Build		2025 Build		2035 No Build		2035 Build		2035 Build-Improved		2025 No Build		2025 Build		2035 No Build		2035 Build		2035 Build-Improved	
	Lane Use	Available Storage	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
Unsignalized TWSC - Market Street at Russell Street																						
Russell Street	EBL	150	--	28	--	35	--	40	--	50	--	--	--	763	--	982	--	973	--	1198	--	--
	EBR	150	--	0	--	0	--	0	--	0	--	--	--	3	--	3	--	3	--	3	--	--
	EB	150	--	--	--	--	--	--	--	--	--	20	--	--	--	--	--	--	--	--	--	120
Market Street	NB	575	--	--	--	--	--	--	--	--	--	15	--	--	--	--	--	--	--	--	--	208
	SB	400	--	--	--	--	--	--	--	--	--	80	--	--	--	--	--	--	--	--	--	208

TABLE 4
Site-Generated Traffic Summary

Proposed - 80 Residential Units			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	7	23	30
Weekday Afternoon	19	12	31
Proposed - 46,000 SF Office Space			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	62	8	70
Weekday Afternoon	11	55	66
Proposed - 18,500 SF Retail Space			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	26	18	44
Weekday Afternoon	61	61	122
Total Trips			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	95	49	144
Weekday Afternoon	91	128	219
Internal Capture[1]			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning[2]	4	4	8
Weekday Afternoon[3]	21	21	42
Net Vehicular Trips (Total minus Internal Capture)			
Peak Hour Period	**Enter**	**Exit**	**Total**
Weekday Morning	**91**	**45**	**136**
Weekday Afternoon	**70**	**107**	**177**

Source: Institute of Transportation Engineers, Trip Generation, 11th Edition, 2021.
Land Use - 221 Multifamily Housing (Mid-Rise)
Land Use - 710 General Office Building
Land Use - 822 Strip Retail Plaza (<40,000 SF)

[1]NCHRP Report 684-Enhancing Internal Trip Capture Estimation for Mixed-Use Developments, Transportation Research Board, Washington, DC, 2011
[2]Based on NCHRP 8-51 Table 5-A Computations Summary (4% Entering, 8% Exiting)
[3]Based on NCHRP 8-51 Table 5-P Computations Summary (23% Entering, 16% Exiting)

Section 8
Figures

LEGEND

STUDY AREA INTERSECTION

RUSSELL STREET MIXED USE DEVELOPMENT TRAFFIC IMPACT STUDY
PORTSMOUTH, NH

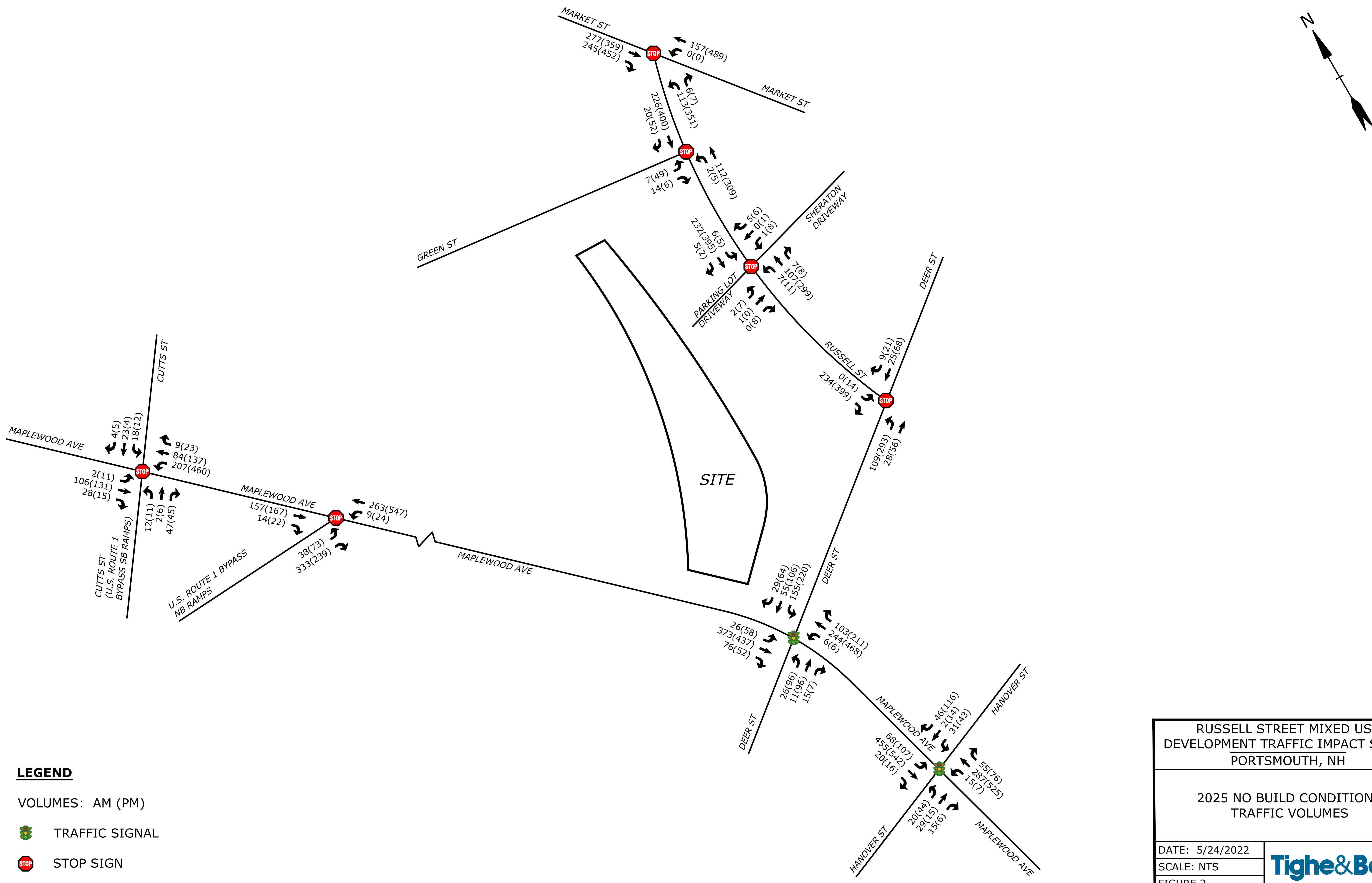
TRAFFIC IMPACT STUDY AREA

DATE: 5/24/2022

SCALE: 1" = 400'

FIGURE 1

Tighe&Bond

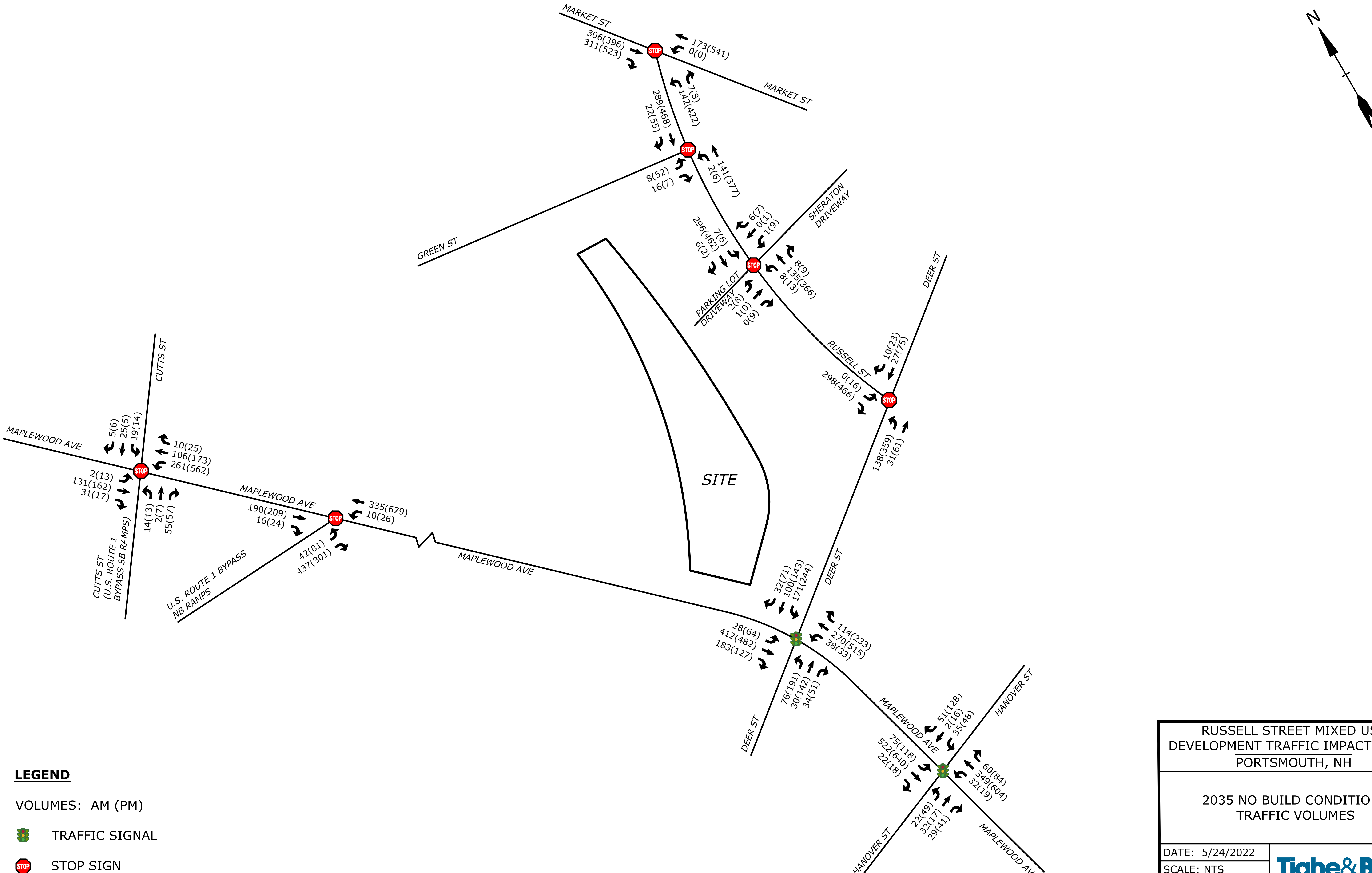


RUSSELL STREET MIXED USE DEVELOPMENT TRAFFIC IMPACT STUDY
PORTSMOUTH, NH

2025 NO BUILD CONDITIONS TRAFFIC VOLUMES

DATE: 5/24/2022
SCALE: NTS
FIGURE 2

Tighe&Bond



LEGEND

VOLUMES: AM (PM)

TRAFFIC SIGNAL

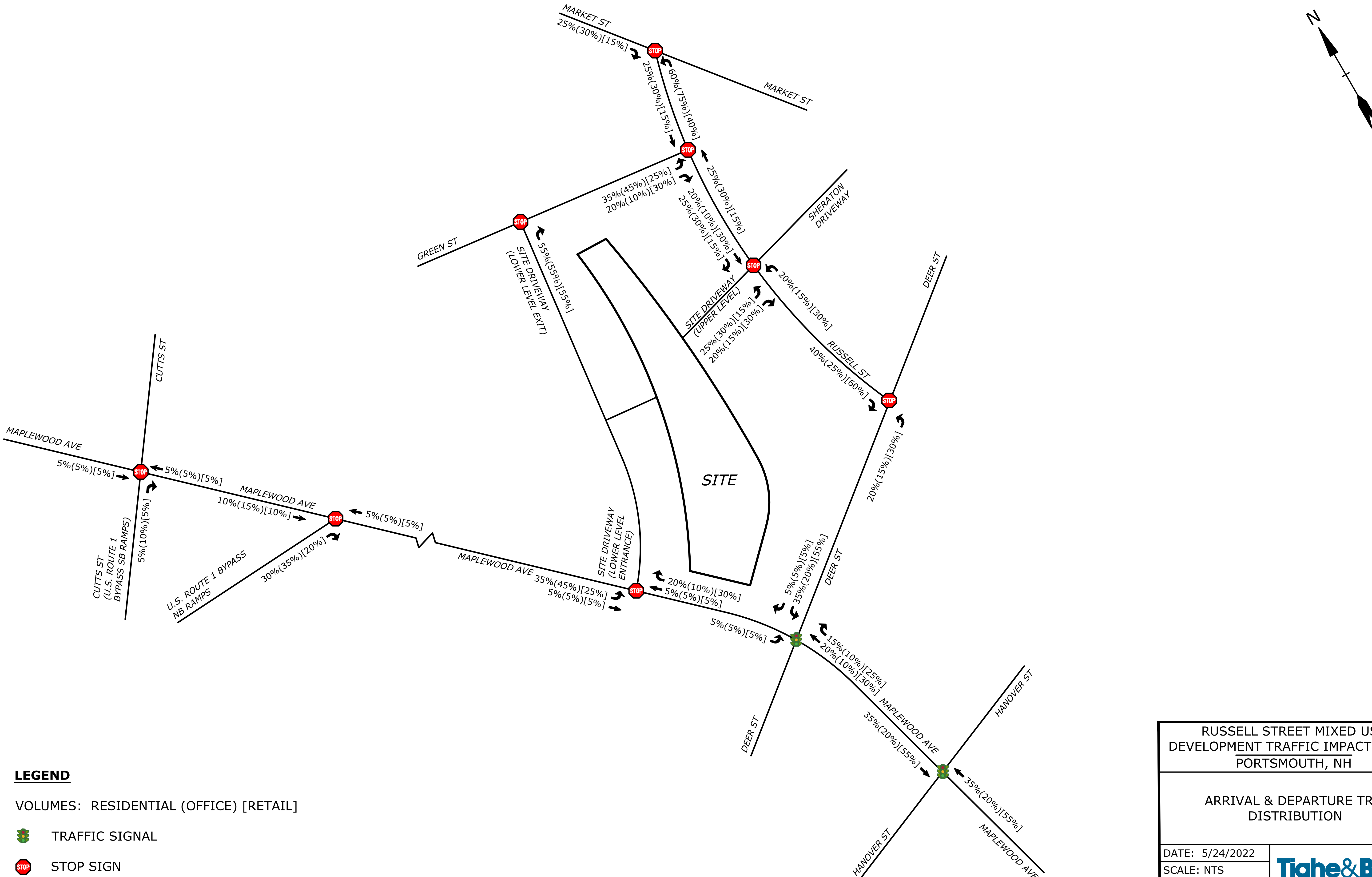
STOP SIGN

Plotted On:May 18, 2022-3:09pm By: MStoutz
Tighe & Bond:J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\Figures\T5037-002-TRAFFIC-VOLUME-FIGURES.dwg

RUSSELL STREET MIXED USE DEVELOPMENT TRAFFIC IMPACT STUDY
PORTSMOUTH, NH

2035 NO BUILD CONDITIONS
TRAFFIC VOLUMES

DATE: 5/24/2022	Tighe&Bond
SCALE: NTS	
FIGURE 3	



LEGEND

VOLUMES: RESIDENTIAL (OFFICE) [RETAIL]

TRAFFIC SIGNAL

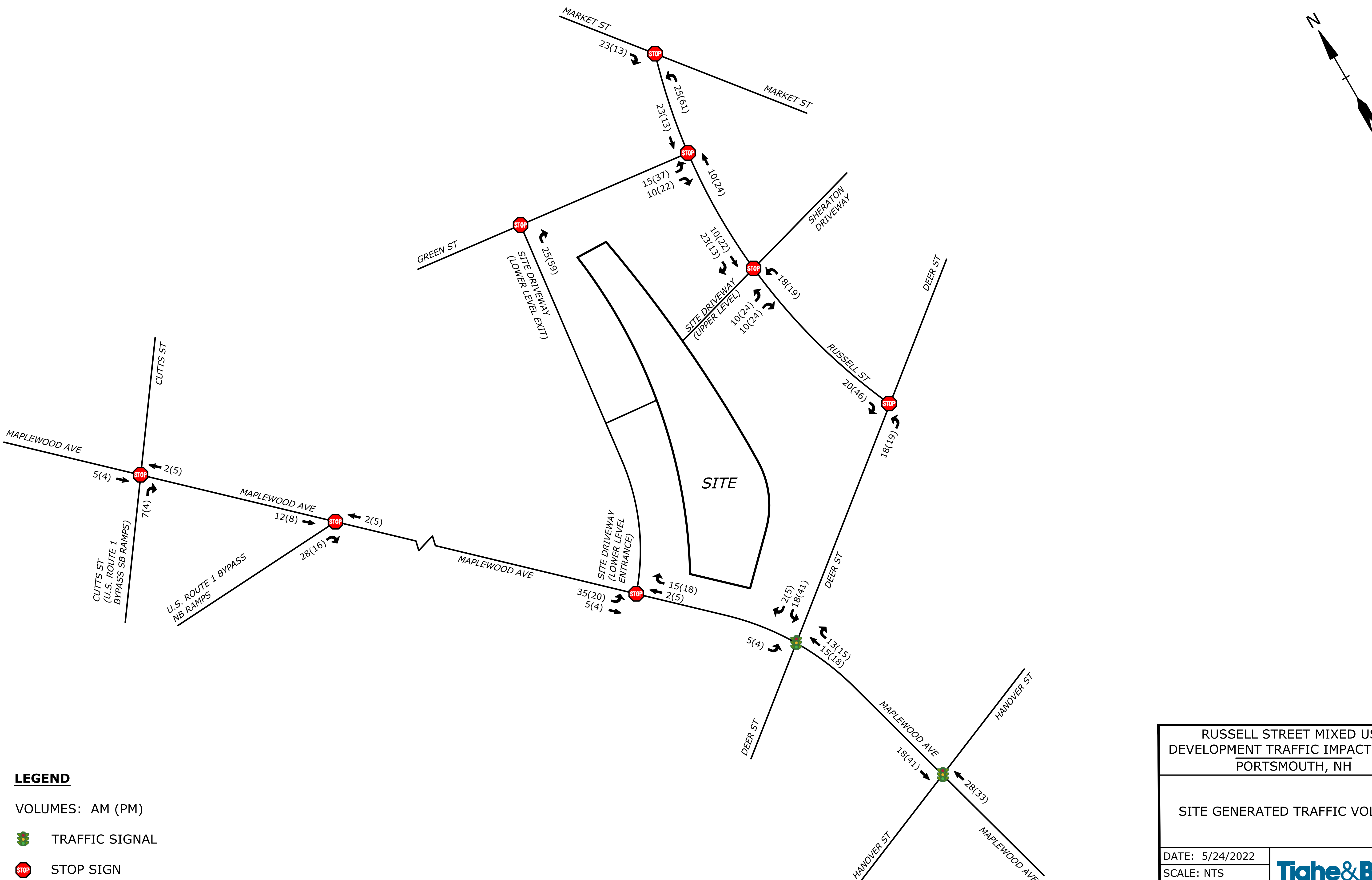
STOP STOP SIGN

RUSSELL STREET MIXED USE DEVELOPMENT TRAFFIC IMPACT STUDY
PORTSMOUTH, NH

ARRIVAL & DEPARTURE TRIP DISTRIBUTION

DATE: 5/24/2022
SCALE: NTS
FIGURE 4

Tighe&Bond



LEGEND

VOLUMES: AM (PM)

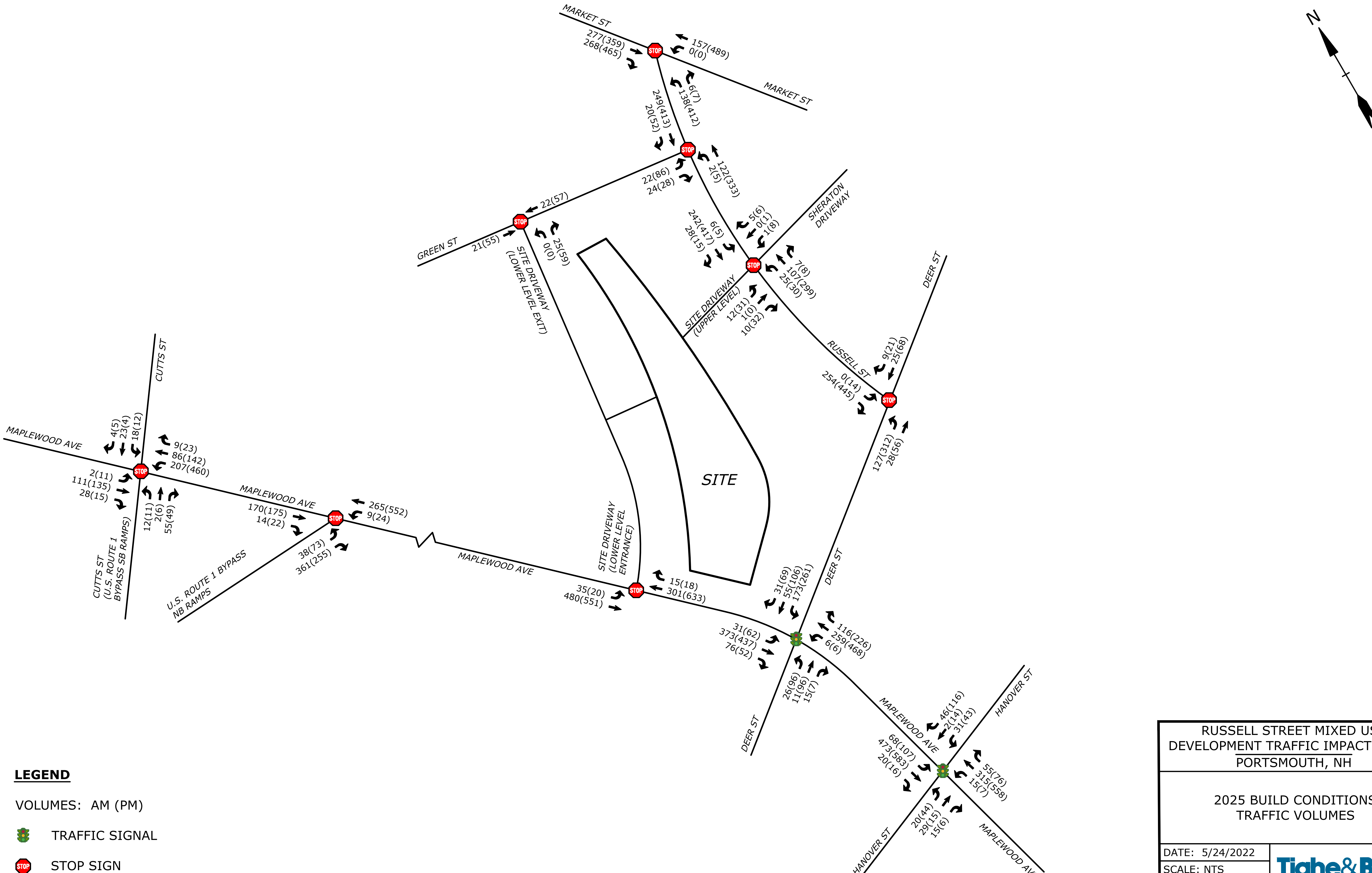
TRAFFIC SIGNAL

STOP SIGN

RUSSELL STREET MIXED USE DEVELOPMENT TRAFFIC IMPACT STUDY
PORTSMOUTH, NH

SITE GENERATED TRAFFIC VOLUMES

DATE: 5/24/2022	Tighe&Bond
SCALE: NTS	
FIGURE 5	



LEGEND

VOLUMES: AM (PM)

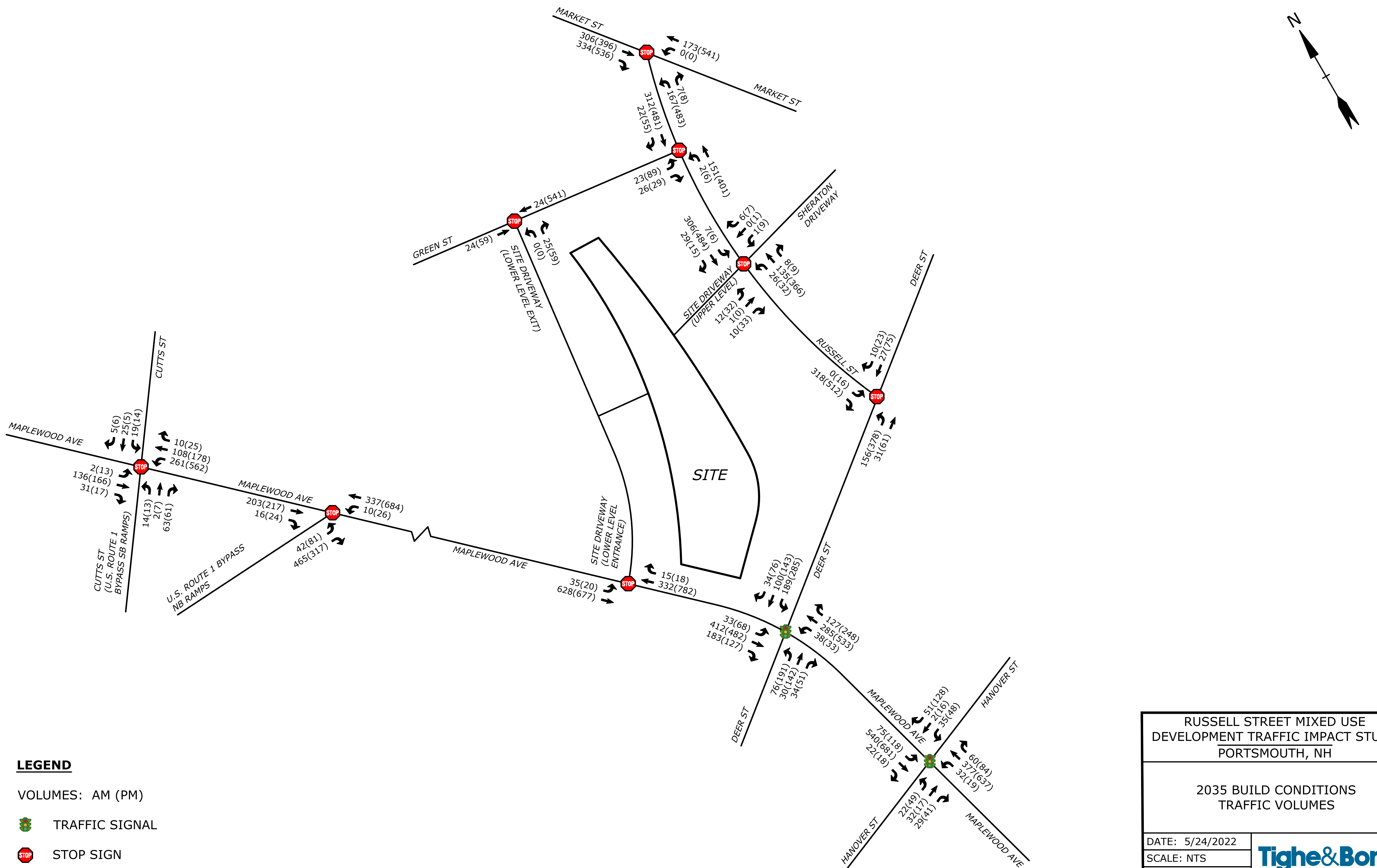
TRAFFIC SIGNAL

STOP SIGN

RUSSELL STREET MIXED USE DEVELOPMENT TRAFFIC IMPACT STUDY
PORTSMOUTH, NH

2025 BUILD CONDITIONS TRAFFIC VOLUMES

DATE: 5/24/2022	Tighe&Bond
SCALE: NTS	
FIGURE 6	



LEGEND

VOLUMES: AM (PM)

TRAFFIC SIGNAL

STOP SIGN

RUSSELL STREET MIXED USE DEVELOPMENT TRAFFIC IMPACT STUDY
PORTSMOUTH, NH

2035 BUILD CONDITIONS
TRAFFIC VOLUMES

DATE: 5/24/2022
SCALE: NTS
FIGURE 7

Tighe&Bond

APPENDIX A
Traffic Count Data

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 2
Location: Portsmouth, NH
Street 1: Maplewood Avenue
Street 2: Deer Street
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

PASSENGER CARS & HEAVY VEHICLES COMBINED

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Deer Street Eastbound				Deer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	19	10	0	4	33	3	0	4	1	0	0	15	4	6
7:15 AM	0	0	25	19	0	7	44	3	0	3	4	0	0	21	4	6
7:30 AM	0	0	44	20	0	8	37	5	0	3	2	0	0	24	10	1
7:45 AM	0	0	41	16	0	7	80	18	0	7	2	2	0	35	13	5
8:00 AM	0	2	48	21	0	8	73	12	0	4	0	7	0	36	8	8
8:15 AM	0	3	53	24	0	3	83	19	0	6	3	3	0	34	7	5
8:30 AM	0	0	59	24	0	3	71	14	0	4	4	1	0	22	17	6
8:45 AM	0	1	30	14	0	7	72	19	0	7	7	2	0	29	18	1

AM PEAK HOUR 7:45 AM to 8:45 AM	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Deer Street Eastbound				Deer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**5**	**201**	**85**	**0**	**21**	**307**	**63**	**0**	**21**	**9**	**13**	**0**	**127**	**45**	**24**
PHF	**0.88**				**0.93**				**0.90**				**0.92**			
HV %	**0.0%**	**20.0%**	**10.0%**	**4.7%**	**0.0%**	**0.0%**	**2.0%**	**6.3%**	**0.0%**	**9.5%**	**11.1%**	**7.7%**	**0.0%**	**5.5%**	**8.9%**	**4.2%**

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 2
Location:	Portsmouth, NH
Street 1:	Maplewood Avenue
Street 2:	Deer Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

BOSTON TRAFFIC DATA
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Office: 978-746-1259
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www.BostonTrafficData.com

HEAVY VEHICLES

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Deer Street Eastbound				Deer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	2	1	0	0	3	0	0	1	0	0	0	2	0	0
7:15 AM	0	0	0	1	0	1	5	1	0	0	0	0	0	1	2	0
7:30 AM	0	0	3	1	0	0	2	0	0	0	0	0	0	1	0	0
7:45 AM	0	0	2	0	0	0	0	3	0	0	0	0	0	3	0	0
8:00 AM	0	1	1	0	0	0	4	0	0	0	0	1	0	2	3	1
8:15 AM	0	0	4	1	0	0	1	1	0	1	0	0	0	1	1	0
8:30 AM	0	0	13	3	0	0	1	0	0	1	1	0	0	1	0	0
8:45 AM	0	0	3	0	0	0	1	2	0	1	1	1	0	2	0	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Deer Street Eastbound				Deer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**1**	**21**	**4**	**0**	**0**	**7**	**3**	**0**	**3**	**2**	**2**	**0**	**6**	**4**	**1**
PHF	**0.41**				**0.63**				**0.58**				**0.46**			

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 2
Location: Portsmouth, NH
Street 1: Maplewood Avenue
Street 2: Deer Street
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

BOSTON TRAFFIC DATA
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PEDESTRIANS & BICYCLES

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Deer Street Eastbound				Deer Street Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	1
7:30 AM	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8:00 AM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	2	1	0	0	1	0	0	0	0	0	0	0	1
8:30 AM	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	5	0	0	0	1	0	0	0	3

AM PEAK HOUR[1]	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Deer Street Eastbound				Deer Street Westbound			
7:45 AM to 8:45 AM	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	7	1	0	0	3	0	0	0	3	0	0	0	1

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

PDI File #: **196718 D**
Location: **N: Maplewood Avenue S: Maplewood Avenue**
Location: **E: Deer Street W: Deer Street**
City, State: **Portsmouth, NH**
Client: **Tighe & Bond/ M. Santos**
Site Code: **200076019**
Count Date: **Thursday, January 31, 2019**
Start Time: **4:00 PM**
End Time: **6:00 PM**
Class: **Cars and Heavy Vehicles (Combined)**

	Maplewood Avenue					Deer Street					Maplewood Avenue					Deer Street					
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Total
4:00 PM	13	57	11	0	81	10	9	29	0	48	43	66	1	0	110	1	18	12	0	31	270
4:15 PM	14	57	12	0	83	11	13	25	0	49	39	78	3	0	120	2	14	17	0	33	285
4:30 PM	13	57	7	0	77	8	18	24	0	50	50	81	4	0	135	3	7	17	0	27	289
4:45 PM	11	70	12	0	93	8	12	43	0	63	31	76	3	0	110	3	14	16	0	33	299
Total	51	241	42	0	334	37	52	121	0	210	163	301	11	0	475	9	53	62	0	124	1143
5:00 PM	10	71	7	0	88	13	27	37	0	77	45	99	2	0	146	1	21	36	0	58	369
5:15 PM	11	77	8	0	96	15	14	34	0	63	39	79	1	0	119	1	21	12	0	34	312
5:30 PM	10	95	19	0	124	13	22	63	0	98	37	82	2	0	121	0	23	13	0	36	379
5:45 PM	9	81	10	0	100	8	18	35	0	61	41	83	0	0	124	4	8	12	0	24	309
Total	40	324	44	0	408	49	81	169	0	299	162	343	5	0	510	6	73	73	0	152	1369
Grand Total	91	565	86	0	742	86	133	290	0	509	325	644	16	0	985	15	126	135	0	276	2512
Approach %	12.3	76.1	11.6	0.0		16.9	26.1	57.0	0.0		33.0	65.4	1.6	0.0		5.4	45.7	48.9	0.0		
Total %	3.6	22.5	3.4	0.0	29.5	3.4	5.3	11.5	0.0	20.3	12.9	25.6	0.6	0.0	39.2	0.6	5.0	5.4	0.0	11.0	
Exiting Leg Total					865					537					870					240	2512
Cars	90	562	86	0	738	86	133	284	0	503	318	638	14	0	970	15	125	134	0	274	2485
% Cars	98.9	99.5	100.0	0.0	99.5	100.0	100.0	97.9	0.0	98.8	97.8	99.1	87.5	0.0	98.5	100.0	99.2	99.3	0.0	99.3	98.9
Exiting Leg Total					858					529					861					237	2485
Heavy Vehicles	1	3	0	0	4	0	0	6	0	6	7	6	2	0	15	0	1	1	0	2	27
% Heavy Vehicles	1.1	0.5	0.0	0.0	0.5	0.0	0.0	2.1	0.0	1.2	2.2	0.9	12.5	0.0	1.5	0.0	0.8	0.7	0.0	0.7	1.1
Exiting Leg Total					7					8					9					3	27

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

5:00 PM	Maplewood Avenue					Deer Street					Maplewood Avenue					Deer Street					
	from North					from East					from South					from West					
	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Right	Thru	Left	U-Turn	Total	Total
5:00 PM	10	71	7	0	88	13	27	37	0	77	45	99	2	0	146	1	21	36	0	58	369
5:15 PM	11	77	8	0	96	15	14	34	0	63	39	79	1	0	119	1	21	12	0	34	312
5:30 PM	10	95	19	0	124	13	22	63	0	98	37	82	2	0	121	0	23	13	0	36	379
5:45 PM	9	81	10	0	100	8	18	35	0	61	41	83	0	0	124	4	8	12	0	24	309
Total Volume	40	324	44	0	408	49	81	169	0	299	162	343	5	0	510	6	73	73	0	152	1369
% Approach Total	9.8	79.4	10.8	0.0		16.4	27.1	56.5	0.0		31.8	67.3	1.0	0.0		3.9	48.0	48.0	0.0		
PHF	0.909	0.853	0.579	0.000	0.823	0.817	0.750	0.671	0.000	0.763	0.900	0.866	0.625	0.000	0.873	0.375	0.793	0.507	0.000	0.655	0.903
Cars	40	324	44	0	408	49	81	166	0	296	158	341	5	0	504	6	73	73	0	152	1360
Cars %	100.0	100.0	100.0	0.0	100.0	100.0	100.0	98.2	0.0	99.0	97.5	99.4	100.0	0.0	98.8	100.0	100.0	100.0	0.0	100.0	99.3
Heavy Vehicles	0	0	0	0	0	0	0	3	0	3	4	2	0	0	6	0	0	0	0	0	9
Heavy Vehicles %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	0.0	1.0	2.5	0.6	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.7
Cars Enter Leg	40	324	44	0	408	49	81	166	0	296	158	341	5	0	504	6	73	73	0	152	1360
Heavy Enter Leg	0	0	0	0	0	0	0	3	0	3	4	2	0	0	6	0	0	0	0	0	9
Total Entering Leg	40	324	44	0	408	49	81	169	0	299	162	343	5	0	510	6	73	73	0	152	1369
Cars Exiting Leg					463					275					496					126	1360
Heavy Exiting Leg					2					4					3					0	9
Total Exiting Leg					465					279					499					126	1369

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 1
Location:	Portsmouth, NH
Street 1:	Maplewood Avenue
Street 2:	Hanover Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	2	24	3	0	4	45	0	0	2	4	1	0	2	0	5
7:15 AM	0	0	38	3	0	4	56	3	0	3	0	2	0	4	3	3
7:30 AM	0	4	47	8	0	4	58	1	0	5	3	1	0	5	1	11
7:45 AM	0	1	49	11	0	16	99	1	0	0	7	3	0	12	1	9
8:00 AM	0	2	51	9	0	13	97	3	0	7	4	5	0	6	0	9
8:15 AM	0	4	68	10	0	15	105	3	0	3	6	4	0	3	0	10
8:30 AM	0	6	68	15	0	12	73	9	0	6	7	1	0	4	1	10
8:45 AM	0	5	36	6	0	22	71	9	0	1	4	0	0	5	3	6

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	82	11	0	12	58	3	0	2	1	0	0	4	3	14
4:15 PM	0	1	78	14	0	11	65	0	0	5	4	6	0	6	2	13
4:30 PM	0	1	92	16	0	16	67	2	0	20	1	1	0	9	1	21
4:45 PM	0	3	89	8	0	16	92	2	0	5	3	0	0	7	1	19
5:00 PM	0	1	105	19	0	14	74	4	0	6	7	1	0	15	4	16
5:15 PM	0	1	91	20	0	14	70	1	0	1	2	3	0	5	6	27
5:30 PM	0	5	81	18	0	21	58	2	0	4	8	4	0	9	4	24
5:45 PM	0	8	53	14	0	22	72	6	0	0	2	2	0	8	5	18

AM PEAK HOUR 7:45 AM to 8:45 AM	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**13**	**236**	**45**	**0**	**56**	**374**	**16**	**0**	**16**	**24**	**13**	**0**	**25**	**2**	**38**
PHF	**0.83**				**0.91**				**0.83**				**0.74**			
HV %	**0.0%**	**23.1%**	**9.7%**	**2.2%**	**0.0%**	**10.7%**	**2.1%**	**0.0%**	**0.0%**	**6.3%**	**12.5%**	**38.5%**	**0.0%**	**4.0%**	**0.0%**	**2.6%**

PM PEAK HOUR 4:30 PM to 5:30 PM	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**6**	**377**	**63**	**0**	**60**	**303**	**9**	**0**	**32**	**13**	**5**	**0**	**36**	**12**	**83**
PHF	**0.89**				**0.85**				**0.57**				**0.86**			
HV %	**0.0%**	**0.0%**	**2.1%**	**0.0%**	**0.0%**	**6.7%**	**1.0%**	**0.0%**	**0.0%**	**0.0%**	**23.1%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 1
Location:	Portsmouth, NH
Street 1:	Maplewood Avenue
Street 2:	Hanover Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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HEAVY VEHICLES

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	1	2	1	0	2	3	0	0	0	0	0	0	0	0	1
7:15 AM	0	0	2	1	0	1	5	0	0	0	0	1	0	1	0	0
7:30 AM	0	1	3	0	0	1	2	0	0	0	1	0	0	0	0	0
7:45 AM	0	1	2	0	0	2	1	0	0	0	0	3	0	1	0	0
8:00 AM	0	0	2	1	0	1	5	0	0	0	1	2	0	0	0	0
8:15 AM	0	1	6	0	0	2	1	0	0	0	0	0	0	0	0	0
8:30 AM	0	1	13	0	0	1	1	0	0	1	2	0	0	0	0	1
8:45 AM	0	3	2	0	0	2	2	0	0	0	0	0	0	0	0	1

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
4:30 PM	0	0	3	0	0	2	0	0	0	0	1	0	0	0	0	0
4:45 PM	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	1	0	0	0	0	0	0	0	2	0	0	0	0	0
5:15 PM	0	0	4	0	0	0	1	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0
5:45 PM	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	1

AM PEAK HOUR 7:45 AM to 8:45 AM	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**3**	**23**	**1**	**0**	**6**	**8**	**0**	**0**	**1**	**3**	**5**	**0**	**1**	**0**	**1**
PHF	**0.48**				**0.58**				**0.75**				**0.50**			

PM PEAK HOUR 4:30 PM to 5:30 PM	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**8**	**0**	**0**	**4**	**3**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**0**	**0**
PHF	**0.50**				**0.44**				**0.38**				**0.00**			

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 1
Location:	Portsmouth, NH
Street 1:	Maplewood Avenue
Street 2:	Hanover Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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PEDESTRIANS & BICYCLES

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	4	0	0	0	2	0	0	0	1	0	0	0	2
7:30 AM	0	0	0	1	0	0	0	4	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	6	0	0	0	1	0	0	0	1	0	0	0	0
8:00 AM	0	0	0	6	0	0	0	2	0	0	0	1	0	0	0	0
8:15 AM	0	0	0	9	0	0	0	3	0	0	0	1	0	0	0	1
8:30 AM	0	0	0	2	0	0	0	5	0	0	0	1	0	0	0	0
8:45 AM	0	0	0	9	0	0	0	6	0	0	0	2	0	0	0	1

	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	0	0	19	0	0	0	2	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0	3
4:30 PM	0	0	0	13	0	1	0	3	0	0	0	6	0	0	0	0
4:45 PM	0	0	0	7	0	0	0	6	0	0	0	0	0	0	0	2
5:00 PM	0	0	0	14	0	0	0	5	0	0	0	2	0	0	0	1
5:15 PM	0	0	0	8	0	0	0	4	0	0	0	1	0	0	0	0
5:30 PM	0	0	0	8	0	0	0	8	0	0	0	2	0	0	0	2
5:45 PM	0	0	0	9	0	0	0	3	0	0	0	1	0	0	0	2

AM PEAK HOUR[1]	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
7:45 AM to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
8:45 AM	0	0	0	23	0	0	0	11	0	0	0	4	0	0	0	1

PM PEAK HOUR[1]	Maplewood Avenue Northbound				Maplewood Avenue Southbound				Hanover Street Eastbound				Hanover Street Westbound			
4:30 PM to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
5:30 PM	0	0	0	42	0	1	0	18	0	0	0	9	0	0	0	3

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 7
Location: Portsmouth, NH
Street 1: Maplewood Avenue
Street 2: Route 1 ByPass SB Ramp (Cutts St)
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	2	0	6	0	1	2	1	0	0	4	6	0	21	6	0
7:15 AM	0	1	0	4	0	1	4	0	0	0	17	11	0	37	7	1
7:30 AM	0	0	2	6	0	0	3	0	0	1	12	3	0	44	11	0
7:45 AM	0	1	0	7	0	4	5	1	0	0	29	6	0	46	12	3
8:00 AM	0	3	0	11	0	6	6	0	0	2	24	6	0	40	14	2
8:15 AM	0	3	1	9	0	3	2	1	0	0	20	8	0	35	13	1
8:30 AM	0	3	1	12	0	1	6	1	0	0	14	3	0	48	30	2
8:45 AM	0	0	0	9	0	0	1	0	0	0	13	4	0	31	10	1

	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	3	0	5	0	0	3	2	0	4	19	4	0	81	26	4
4:15 PM	0	1	0	7	0	0	3	0	0	0	24	4	0	69	22	2
4:30 PM	0	1	1	6	0	2	0	1	0	1	19	3	0	95	31	4
4:45 PM	0	4	2	11	0	1	1	0	0	3	33	2	0	88	17	6
5:00 PM	0	2	1	9	0	2	1	1	0	5	24	7	0	102	26	5
5:15 PM	0	2	1	10	0	4	1	2	0	0	26	1	0	83	35	3
5:30 PM	0	3	1	4	0	2	1	1	0	2	15	1	0	88	21	3
5:45 PM	0	1	1	2	0	1	2	0	0	1	22	3	0	47	17	2

AM PEAK HOUR	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
7:45 AM to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
8:45 AM	**0**	**10**	**2**	**39**	**0**	**14**	**19**	**3**	**0**	**2**	**87**	**23**	**0**	**169**	**69**	**8**
PHF	**0.80**				**0.75**				**0.80**				**0.77**			
HV %	**0.0%**	**20.0%**	**0.0%**	**2.6%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.6%**	**13.0%**	**0.0%**	**4.1%**	**24.6%**	**0.0%**

PM PEAK HOUR	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
4:30 PM to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
5:30 PM	**0**	**9**	**5**	**36**	**0**	**9**	**3**	**4**	**0**	**9**	**102**	**13**	**0**	**368**	**109**	**18**
PHF	**0.74**				**0.57**				**0.82**				**0.93**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**1.6%**	**3.7%**	**0.0%**

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 7
Location:	Portsmouth, NH
Street 1:	Maplewood Avenue
Street 2:	Route 1 ByPass SB Ramp (Cutts St)
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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HEAVY VEHICLES

	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	0	0	0	1	3	0	1	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	3	3	0	2	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	1	2	0	1	1	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	2	2	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0
8:15 AM	0	1	0	0	0	0	0	0	0	0	1	1	0	3	1	0
8:30 AM	0	1	0	1	0	0	0	0	0	0	1	0	0	2	13	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	2	1	0

	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	2	4	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**3**	**0**	**7**	**17**	**0**
PHF	**0.38**				**0.00**				**0.88**				**0.40**			

PM PEAK HOUR 4:00 PM to 5:00 PM	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**6**	**6**	**0**
PHF	**0.00**				**0.00**				**0.25**				**0.50**			

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 7
Location: Portsmouth, NH
Street 1: Maplewood Avenue
Street 2: Route 1 ByPass SB Ramp (Cutts St)
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

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PEDESTRIANS & BICYCLES

	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1
8:30 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0

	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR[1]	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
7:45 AM to 8:45 AM	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	1	0	0	0	3	0	0	0	3	0	1	0	1

PM PEAK HOUR[1]	Route 1 ByPass SB Ramp (Cutts Street) Northbound				Cutts Street Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
4:30 PM to 5:30 PM	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 6
Location: Portsmouth, NH
Street 1: Maplewood Avenue
Street 2: Route 1 ByPass NB Ramp
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	5	0	33	0	0	0	0	0	0	8	3	0	2	23	0
7:15 AM	0	7	0	40	0	0	0	0	0	0	17	4	0	4	40	0
7:30 AM	0	6	0	35	0	0	0	0	0	0	14	5	0	2	47	0
7:45 AM	0	7	0	75	0	0	0	0	0	0	36	4	0	2	54	0
8:00 AM	0	7	0	49	0	0	0	0	0	0	37	4	0	2	48	0
8:15 AM	0	7	0	66	0	0	0	0	0	0	31	2	0	3	45	0
8:30 AM	0	10	0	84	0	0	0	0	0	0	24	2	0	1	69	0
8:45 AM	0	3	0	69	0	0	0	0	0	0	20	3	0	2	38	0

	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	15	0	40	0	0	0	0	0	0	24	2	0	8	97	0
4:15 PM	0	15	0	34	0	0	0	0	0	0	22	8	0	4	78	0
4:30 PM	0	11	0	39	0	0	0	0	0	0	22	5	0	5	119	0
4:45 PM	0	16	0	53	0	0	0	0	0	0	40	5	0	6	96	0
5:00 PM	0	15	0	49	0	0	0	0	0	0	30	4	0	3	118	0
5:15 PM	0	18	0	44	0	0	0	0	0	0	37	4	0	5	104	0
5:30 PM	0	16	0	48	0	0	0	0	0	0	18	4	0	8	92	0
5:45 PM	0	13	0	73	0	0	0	0	0	0	20	5	0	4	55	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**31**	**0**	**274**	**0**	**0**	**0**	**0**	**0**	**0**	**128**	**12**	**0**	**8**	**216**	**0**
PHF	**0.81**				**0.00**				**0.85**				**0.80**			
HV %	**0.0%**	**12.9%**	**0.0%**	**1.8%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**3.9%**	**8.3%**	**0.0%**	**12.5%**	**10.2%**	**0.0%**

PM PEAK HOUR 4:30 PM to 5:30 PM	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**60**	**0**	**185**	**0**	**0**	**0**	**0**	**0**	**0**	**129**	**18**	**0**	**19**	**437**	**0**
PHF	**0.89**				**0.00**				**0.82**				**0.92**			
HV %	**0.0%**	**5.0%**	**0.0%**	**0.5%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.8%**	**0.0%**	**0.0%**	**0.0%**	**1.4%**	**0.0%**

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 6
Location:	Portsmouth, NH
Street 1:	Maplewood Avenue
Street 2:	Route 1 ByPass NB Ramp
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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HEAVY VEHICLES

	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	3	0	0	0	0	0	0	1	0	0	0	2	0
7:15 AM	0	1	0	3	0	0	0	0	0	0	3	1	0	0	1	0
7:30 AM	0	0	0	2	0	0	0	0	0	0	1	0	0	0	2	0
7:45 AM	0	0	0	1	0	0	0	0	0	0	2	0	0	1	4	0
8:00 AM	0	1	0	2	0	0	0	0	0	0	1	0	0	0	0	0
8:15 AM	0	1	0	1	0	0	0	0	0	0	1	0	0	0	4	0
8:30 AM	0	2	0	1	0	0	0	0	0	0	1	1	0	0	14	0
8:45 AM	0	0	0	1	0	0	0	0	0	0	1	0	0	1	4	0

	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0
4:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4	0
4:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0
5:30 PM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0

AM PEAK HOUR	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
7:45 AM to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
8:45 AM	**0**	**4**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**0**	**1**	**22**	**0**
PHF	**0.75**				**0.00**				**0.75**				**0.41**			

PM PEAK HOUR	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
4:00 PM to	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
5:00 PM	**0**	**5**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**0**
PHF	**0.58**				**0.00**				**0.00**				**0.44**			

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 6
Location: Portsmouth, NH
Street 1: Maplewood Avenue
Street 2: Route 1 ByPass NB Ramp
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

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PEDESTRIANS & BICYCLES

	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR[1] 7:45 AM to 8:45 AM	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

PM PEAK HOUR[1] 4:30 PM to 5:30 PM	Route 1 ByPass NB Ramp Northbound				Southbound				Maplewood Avenue Eastbound				Maplewood Avenue Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 3
Location:	Portsmouth, NH
Street 1:	Deer Street
Street 2:	Russell Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Northbound				Russell Street Southbound				Deer Street Eastbound				Deer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	25	0	12	2	0	0	0	3	2
7:15 AM	0	0	0	0	0	1	0	27	0	22	5	0	0	0	4	0
7:30 AM	0	0	0	0	0	0	0	37	0	25	4	0	0	0	4	0
7:45 AM	0	0	0	0	0	0	0	50	0	18	3	0	0	0	6	0
8:00 AM	0	0	0	0	0	0	0	50	0	19	6	0	0	0	8	5
8:15 AM	0	0	0	0	0	0	0	49	0	23	9	0	0	0	2	2
8:30 AM	0	0	0	0	0	0	0	41	0	29	2	0	0	0	6	1
8:45 AM	0	0	0	0	0	0	0	52	0	19	6	0	0	0	4	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Northbound				Russell Street Southbound				Deer Street Eastbound				Deer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**0**	**0**	**192**	**0**	**90**	**23**	**0**	**0**	**0**	**20**	**8**
PHF	**0.00**				**0.92**				**0.88**				**0.54**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**6.3%**	**0.0%**	**3.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**5.0%**	**37.5%**

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 3
Location:	Portsmouth, NH
Street 1:	Deer Street
Street 2:	Russell Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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HEAVY VEHICLES

	Northbound				Russell Street Southbound				Deer Street Eastbound				Deer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	2	0	1	1	0	0	0	1	0
7:30 AM	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	1	0	2	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	3	0	1	0	0	0	0	1	0

AM PEAK HOUR 7:15 AM to 8:15 AM	Northbound				Russell Street Southbound				Deer Street Eastbound				Deer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**2**	**1**	**0**	**0**	**0**	**1**	**3**
PHF	**0.00**				**0.50**				**0.38**				**0.33**			

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 3
Location:	Portsmouth, NH
Street 1:	Deer Street
Street 2:	Russell Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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PEDESTRIANS & BICYCLES

		Northbound				Russell Street Southbound				Deer Street Eastbound				Deer Street Westbound		
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1

AM PEAK HOUR[1]		Northbound				Russell Street Southbound				Deer Street Eastbound				Deer Street Westbound		
8:00 AM to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
9:00 AM	0	0	0	0	0	0	0	3	0	0	0	3	0	0	0	1

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

PDI File #: **196718 H**
Location: **N: Russell Street**
Location: **E: Deer Street W: Deer Street**
City, State: **Portsmouth, NH**
Client: **Tighe & Bond/ M. Santos**
Site Code: **200076019**
Count Date: **Thursday, January 31, 2019**
Start Time: **4:00 PM**
End Time: **6:00 PM**
Class: **Cars and Heavy Vehicles (Combined)**

	Russell Street				Deer Street				Deer Street				
	from North				from East				from West				
	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Total
4:00 PM	48	2	0	50	4	8	0	12	5	55	0	60	122
4:15 PM	40	3	0	43	4	16	1	21	8	50	0	58	122
4:30 PM	51	7	0	58	5	9	0	14	9	50	0	59	131
4:45 PM	52	3	0	55	6	18	0	24	15	36	0	51	130
Total	191	15	0	206	19	51	1	71	37	191	0	228	505
5:00 PM	76	6	0	82	7	9	0	16	8	63	0	71	169
5:15 PM	65	0	1	66	3	16	0	19	10	51	0	61	146
5:30 PM	86	2	0	88	3	16	0	19	15	54	0	69	176
5:45 PM	79	2	0	81	2	11	0	13	9	46	1	56	150
Total	306	10	1	317	15	52	0	67	42	214	1	257	641
Grand Total	497	25	1	523	34	103	1	138	79	405	1	485	1146
Approach %	95.0	4.8	0.2		24.6	74.6	0.7		16.3	83.5	0.2		
Total %	43.4	2.2	0.1	45.6	3.0	9.0	0.1	12.0	6.9	35.3	0.1	42.3	
Exiting Leg Total				440				105				601	1146
Cars	488	25	1	514	34	103	1	138	79	398	1	478	1130
% Cars	98.2	100.0	100.0	98.3	100.0	100.0	100.0	100.0	100.0	98.3	100.0	98.6	98.6
Exiting Leg Total				433				105				592	1130
Heavy Vehicles	9	0	0	9	0	0	0	0	0	7	0	7	16
% Heavy Vehicles	1.8	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	1.7	0.0	1.4	1.4
Exiting Leg Total				7				0				9	16

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

5:00 PM	Russell Street				Deer Street				Deer Street				
	from North				from East				from West				
	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Thru	Left	U-Turn	Total	Total
5:00 PM	76	6	0	82	7	9	0	16	8	63	0	71	169
5:15 PM	65	0	1	66	3	16	0	19	10	51	0	61	146
5:30 PM	86	2	0	88	3	16	0	19	15	54	0	69	176
5:45 PM	79	2	0	81	2	11	0	13	9	46	1	56	150
Total Volume	306	10	1	317	15	52	0	67	42	214	1	257	641
% Approach Total	96.5	3.2	0.3		22.4	77.6	0.0		16.3	83.3	0.4		
PHF	0.890	0.417	0.250	0.901	0.536	0.813	0.000	0.882	0.700	0.849	0.250	0.905	0.911
Cars	301	10	1	312	15	52	0	67	42	210	1	253	632
Cars %	98.4	100.0	100.0	98.4	100.0	100.0	0.0	100.0	100.0	98.1	100.0	98.4	98.6
Heavy Vehicles	5	0	0	5	0	0	0	0	0	4	0	4	9
Heavy Vehicles %	1.6	0.0	0.0	1.6	0.0	0.0	0.0	0.0	0.0	1.9	0.0	1.6	1.4
Cars Enter Leg	301	10	1	312	15	52	0	67	42	210	1	253	632
Heavy Enter Leg	5	0	0	5	0	0	0	0	0	4	0	4	9
Total Entering Leg	306	10	1	317	15	52	0	67	42	214	1	257	641
Cars Exiting Leg				226				52				354	632
Heavy Exiting Leg				4				0				5	9
Total Exiting Leg				230				52				359	641

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 4
Location:	Portsmouth, NH
Street 1:	Russell Street
Street 2:	Sheraton Portsmouth Harborside Dr
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	1	12	1	0	0	21	2	0	0	2	2	0	1	0	2
7:15 AM	0	1	20	1	0	1	26	2	0	1	0	2	0	0	0	2
7:30 AM	0	4	20	1	0	0	36	1	0	0	0	2	0	0	0	1
7:45 AM	0	0	15	2	0	1	51	2	0	1	0	0	0	0	0	0
8:00 AM	0	4	21	1	0	1	50	0	0	1	0	0	0	0	0	0
8:15 AM	0	0	22	4	0	3	49	1	0	0	0	0	0	0	0	0
8:30 AM	0	1	27	0	0	0	40	0	0	1	1	0	0	1	0	4
8:45 AM	0	1	18	1	0	1	52	3	0	0	0	0	0	0	0	0

	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	33	1	0	1	31	0	0	1	0	2	0	3	0	3
4:15 PM	0	1	38	2	0	2	46	0	0	5	0	0	0	2	0	1
4:30 PM	0	1	35	1	0	0	36	1	0	0	0	2	0	0	0	1
4:45 PM	0	2	31	0	0	2	38	0	0	0	0	1	0	1	0	2
5:00 PM	0	2	46	1	0	0	40	1	0	1	0	0	0	0	1	1
5:15 PM	0	1	44	1	0	0	37	2	0	3	0	2	0	0	0	2
5:30 PM	0	0	26	1	0	0	42	1	0	2	0	1	0	1	0	2
5:45 PM	0	3	17	0	0	0	39	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**6**	**88**	**6**	**0**	**5**	**191**	**4**	**0**	**2**	**1**	**0**	**0**	**1**	**0**	**4**
PHF	**0.89**				**0.89**				**0.38**				**0.25**			
HV %	**0.0%**	**0.0%**	**8.0%**	**0.0%**	**0.0%**	**0.0%**	**7.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

PM PEAK HOUR 4:15 PM to 5:15 PM	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**6**	**150**	**4**	**0**	**4**	**160**	**2**	**0**	**6**	**0**	**3**	**0**	**3**	**1**	**5**
PHF	**0.82**				**0.86**				**0.45**				**0.75**			
HV %	**0.0%**	**0.0%**	**2.0%**	**0.0%**	**0.0%**	**0.0%**	**1.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 4
Location:	Portsmouth, NH
Street 1:	Russell Street
Street 2:	Sheraton Portsmouth Harborside Dr
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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HEAVY VEHICLES

	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	3	0	0	0	2	0	0	0	1	0	0	0	0	0
7:15 AM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	3	0	0	0	7	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0

	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**6**	**0**	**0**	**0**	**16**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.50**				**0.57**				**0.00**				**0.00**			

PM PEAK HOUR 5:00 PM to 6:00 PM	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**0**	**5**	**0**	**0**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PHF	**0.42**				**0.42**				**0.00**				**0.00**			

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 4
Location:	Portsmouth, NH
Street 1:	Russell Street
Street 2:	Sheraton Portsmouth Harborside Dr
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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PEDESTRIANS & BICYCLES

	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	10	0	0	0	1	0	0	0	0

	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	0	0	1	0	0	0	6	0	0	0	1	0	0	0	0
4:15 PM	0	0	0	3	0	0	0	7	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	6	0	0	0	2	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0
5:00 PM	0	0	0	2	0	0	0	5	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	1	0	0	0	5	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	3	0	0	0	3	0	0	0	1	0	0	0	0
5:45 PM	0	0	0	1	0	0	0	2	0	0	0	1	0	0	0	0

AM PEAK HOUR[1] 8:00 AM to 9:00 AM	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	0	0	0	0	18	0	0	0	2	0	0	0	0

PM PEAK HOUR[1] 4:15 PM to 5:15 PM	Russell Street Northbound				Russell Street Southbound				Sheraton Public Parking Drive Eastbound				Sheraton Portsmouth Harborside Driveway Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	5	0	0	0	20	0	0	0	3	0	0	0	0

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 5
Location: Portsmouth, NH
Street 1: Market Street
Street 2: Russell Street
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

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PASSENGER CARS & HEAVY VEHICLES COMBINED

	Russell Street Northbound				Southbound				Market Street Eastbound				Market Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	14	0	2	0	0	0	0	0	0	19	24	0	0	17	0
7:15 AM	0	24	0	0	0	0	0	0	0	0	23	34	0	0	18	0
7:30 AM	0	23	0	1	0	0	0	0	0	0	45	40	0	0	15	0
7:45 AM	0	17	0	1	0	0	0	0	0	0	72	58	0	0	35	0
8:00 AM	0	23	0	2	0	0	0	0	0	0	50	49	0	0	28	0
8:15 AM	0	23	0	2	0	0	0	0	0	0	54	56	0	0	33	0
8:30 AM	0	30	0	0	0	0	0	0	0	0	52	39	0	0	33	0
8:45 AM	0	20	0	1	0	0	0	0	0	0	64	58	0	0	24	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Russell Street Northbound				Southbound				Market Street Eastbound				Market Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**93**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**228**	**202**	**0**	**0**	**129**	**0**
PHF	0.82				0.00				0.83				0.92			
HV %	**0.0%**	**5.4%**	**0.0%**	**20.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**3.5%**	**5.9%**	**0.0%**	**0.0%**	**7.0%**	**0.0%**

Client: Matthew Stoutz, PE, PTOE, RSP1
Project #: 857_002_TB
BTD #: Location 5
Location: Portsmouth, NH
Street 1: Market Street
Street 2: Russell Street
Count Date: 2/1/2022
Day of Week: Tuesday
Weather: Clouds & Sun, 30°F

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HEAVY VEHICLES

	Russell Street Northbound				Southbound				Market Street Eastbound				Market Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	0	1	0	0	0	0	0	0	0	2	0	0	2	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	3	0	0	0	1	0
7:30 AM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	2	0
8:00 AM	0	2	0	1	0	0	0	0	0	0	2	7	0	0	2	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	3	1	0	0	3	0
8:30 AM	0	3	0	0	0	0	0	0	0	0	3	1	0	0	2	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	4	3	0	0	2	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Russell Street Northbound				Southbound				Market Street Eastbound				Market Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**6**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**12**	**0**	**0**	**9**	**0**
PHF	**0.58**				**0.00**				**0.67**				**0.75**			

Client:	Matthew Stoutz, PE, PTOE, RSP1
Project #:	857_002_TB
BTD #:	Location 5
Location:	Portsmouth, NH
Street 1:	Market Street
Street 2:	Russell Street
Count Date:	2/1/2022
Day of Week:	Tuesday
Weather:	Clouds & Sun, 30°F

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PEDESTRIANS & BICYCLES

	Russell Street Northbound				Southbound				Market Street Eastbound				Market Street Westbound			
Start Time	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

AM PEAK HOUR[1]	Russell Street Northbound				Southbound				Market Street Eastbound				Market Street Westbound			
7:45 AM to	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

[1] *NOTE: Peak hour summaries here correspond to peak hours identified for passenger cars and heavy vehicles combined.*

PDI File #: **196718 J**
Location: **S: Russell Street**
Location: **E: Market Street W: Market Street**
City, State: **Portsmouth, NH**
Client: **Tighe & Bond/ M. Santos**
Site Code: **200076019**
Count Date: **Thursday, January 31, 2019**
Start Time: **4:00 PM**
End Time: **6:00 PM**
Class: **Cars and Heavy Vehicles (Combined)**

	Market Street from East				Russell Street from South				Market Street from West				
	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Total
4:00 PM	72	0	0	72	2	62	0	64	48	39	0	87	223
4:15 PM	78	0	0	78	0	57	0	57	54	53	0	107	242
4:30 PM	88	0	0	88	4	54	0	58	62	60	1	123	269
4:45 PM	86	0	0	86	2	53	0	55	55	71	0	126	267
Total	324	0	0	324	8	226	0	234	219	223	1	443	1001
5:00 PM	132	0	0	132	3	78	0	81	81	63	0	144	357
5:15 PM	84	0	0	84	0	64	0	64	69	59	0	128	276
5:30 PM	78	0	0	78	3	54	0	57	95	84	0	179	314
5:45 PM	81	0	0	81	0	60	0	60	84	69	0	153	294
Total	375	0	0	375	6	256	0	262	329	275	0	604	1241
Grand Total	699	0	0	699	14	482	0	496	548	498	1	1047	2242
Approach %	100.0	0.0	0.0		2.8	97.2	0.0		52.3	47.6	0.1		
Total %	31.2	0.0	0.0	31.2	0.6	21.5	0.0	22.1	24.4	22.2	0.0	46.7	
Exiting Leg Total				512				548				1182	2242
Cars	697	0	0	697	14	475	0	489	539	495	1	1035	2221
% Cars	99.7	0.0	0.0	99.7	100.0	98.5	0.0	98.6	98.4	99.4	100.0	98.9	99.1
Exiting Leg Total				509				539				1173	2221
Heavy Vehicles	2	0	0	2	0	7	0	7	9	3	0	12	21
% Heavy Vehicles	0.3	0.0	0.0	0.3	0.0	1.5	0.0	1.4	1.6	0.6	0.0	1.1	0.9
Exiting Leg Total				3				9				9	21

Peak Hour Analysis from 04:00 PM to 06:00 PM begins at:

5:00 PM	Market Street from East				Russell Street from South				Market Street from West				
	Thru	Left	U-Turn	Total	Right	Left	U-Turn	Total	Right	Thru	U-Turn	Total	Total
5:00 PM	132	0	0	132	3	78	0	81	81	63	0	144	357
5:15 PM	84	0	0	84	0	64	0	64	69	59	0	128	276
5:30 PM	78	0	0	78	3	54	0	57	95	84	0	179	314
5:45 PM	81	0	0	81	0	60	0	60	84	69	0	153	294
Total Volume	375	0	0	375	6	256	0	262	329	275	0	604	1241
% Approach Total	100.0	0.0	0.0		2.3	97.7	0.0		54.5	45.5	0.0		
PHF	0.710	0.000	0.000	0.710	0.500	0.821	0.000	0.809	0.866	0.818	0.000	0.844	0.869
Cars	375	0	0	375	6	252	0	258	324	273	0	597	1230
Cars %	100.0	0.0	0.0	100.0	100.0	98.4	0.0	98.5	98.5	99.3	0.0	98.8	99.1
Heavy Vehicles	0	0	0	0	0	4	0	4	5	2	0	7	11
Heavy Vehicles %	0.0	0.0	0.0	0.0	0.0	1.6	0.0	1.5	1.5	0.7	0.0	1.2	0.9
Cars Enter Leg	375	0	0	375	6	252	0	258	324	273	0	597	1230
Heavy Enter Leg	0	0	0	0	0	4	0	4	5	2	0	7	11
Total Entering Leg	375	0	0	375	6	256	0	262	329	275	0	604	1241
Cars Exiting Leg				279				324				627	1230
Heavy Exiting Leg				2				5				4	11
Total Exiting Leg				281				329				631	1241

Volume Report

Job 857_002_TB_ATR
Area Portsmouth, NH
Location Maplewood Avenue, 100' east of Raynes Avenue

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Tuesday, February 1, 2022

Time	Total		EB		WB			Time	Total		EB		WB	
0000	10		1		9			1200	128		58		70	
0015	6		2		4			1215	125		58		67	
0030	1		0		1			1230	140		63		77	
0045	9	26	5	8	4	18		1245	120	513	57	236	63	277
0100	4		2		2			1300	117		55		62	
0115	5		0		5			1315	141		67		74	
0130	6		1		5			1330	121		67		54	
0145	3	18	1	4	2	14		1345	121	500	58	247	63	253
0200	4		2		2			1400	115		58		57	
0215	2		0		2			1415	151		79		72	
0230	4		3		1			1430	143		73		70	
0245	4	14	3	8	1	6		1445	153	562	72	282	81	280
0300	6		2		4			1500	155		74		81	
0315	2		0		2			1515	184		74		110	
0330	1		0		1			1530	162		72		90	
0345	1	10	1	3	0	7		1545	177	678	86	306	91	372
0400	1		1		0			1600	184		76		108	
0415	7		2		5			1615	146		70		76	
0430	4		2		2			1630	211		81		130	
0445	9	21	5	10	4	11		1645	192	733	86	313	106	420
0500	8		4		4			1700	200		83		117	
0515	13		6		7			1715	175		68		107	
0530	18		12		6			1730	165		68		97	
0545	29	68	21	43	8	25		1745	158	698	91	310	67	388
0600	28		20		8			1800	131		63		68	
0615	39		25		14			1815	139		64		75	
0630	56		35		21			1830	110		57		53	
0645	82	205	50	130	32	75		1845	106	486	49	233	57	253
0700	69		45		24			1900	93		40		53	
0715	91		57		34			1915	70		28		42	
0730	102		58		44			1930	68		23		45	
0745	184	446	131	291	53	155		1945	63	294	26	117	37	177
0800	143		94		49			2000	80		33		47	
0815	167		117		50			2015	62		24		38	
0830	176		104		72			2030	61		26		35	
0845	135	621	100	415	35	206		2045	34	237	14	97	20	140
0900	98		62		36			2100	39		16		23	
0915	98		57		41			2115	51		17		34	
0930	98		52		46			2130	45		11		34	
0945	101	395	73	244	28	151		2145	26	161	7	51	19	110
1000	100		63		37			2200	38		12		26	
1015	84		43		41			2215	1		1		0	
1030	104		50		54			2230	0		0		0	
1045	113	401	63	219	50	182		2245	0	39	0	13	0	26
1100	97		43		54			2300	0		0		0	
1115	110		55		55			2315	0		0		0	
1130	136		70		66			2330	0		0		0	
1145	127	470	67	235	60	235		2345	0	0	0	0	0	0
								Total	**7596**		**3815**		**3781**	

APPENDIX B
NHDOT Seasonal Adjustment Factors

Year 2019 Monthly Data

Group 4 Averages: Urban Highways

Month	ADT	Adjustment to Average	Adjustment to Peak
January	11,431	1.12	1.23
February	11,848	1.08	1.18
March	12,141	1.06	1.15
April	12,860	1.00	1.09
May	13,551	0.95	1.03
June	13,785	0.93	1.02
July	13,942	0.92	1.01
August	14,016	0.92	1.00
September	13,379	0.96	1.05
October	13,339	0.96	1.05
November	12,265	1.05	1.14
December	11,496	1.12	1.22

Average ADT: 12,838
Peak ADT: 14,016

GROUP	COUNTER	TOWN	LOCATION
04	02051003	BOW	NH 3A south of Robinson Rd
04	02089001	CHICHESTER	NH 28 (Suncook Valley Rd) north of Bear Hill Rd
04	02091001	CLAREMONT	NH 12/103 east of Vermont SL
04	62099056	CONCORD	NH 106 (Sheep Davis Rd) at Loudon TL (north of Ashby Rd)
04	72099278	CONCORD	US 3 (Fisherville Rd) north of Sewalls Falls Rd
04	02125001	DOVER	Dover Point Rd south of Thornwood Ln
04	02133021	DURHAM	US 4 east of NH 108
04	82197076	HAMPTON	US 1 (Lafayette Rd) south of Ramp to NH 101
04	*02229022*	*HUDSON**	*Circumferential Hwy east of Nashua TL*
04	02253025	LEBANON	NH 120 1 mile south of Hanover TL (south of Lahaye Dr)
04	02255001	LEE	NH 125 (Calef Hwy) north of Pinkham Rd
04	02287001	MARLBOROUGH	NH 12 at Swanzey TL
04	02297001	MERRIMACK	US 3 (Daniel Webster Hwy) north of Hilton Dr
04	*02303001*	*MILFORD**	*NH 101A at Amherst TL (west of Overlook Dr)*
04	*02315051*	*NASHUA**	*NH 111 (Bridge / Ferry St) at Hudson TL*
04	02339001	NEWPORT	NH 10 1 mile south of Croydon TL (north of Corbin Rd)
04	02345001	NORTH HAMPTON	US 1 (Lafayette Rd) north of North Rd
04	*62387052*	*RINDGE**	*US 202 at Jaffrey TL (north of County Rd)*
04	02445001	TEMPLE	NH 101 at Wilton TL (west of Old County Farm Rd)
04	02489001	WINDHAM	NH 28 at Derry TL (north of Northland Rd)

** denotes counter that is not included in calculation*

APPENDIX C

Traffic Volume Adjustment Calculations

COVID-19 Pandemic Adjustment Factor Calculation

February 2022 Traffic Counts				NHDOT Count Station Data (Loc ID 82379035)							
Peak Hour (Based on TMC)		February 2022 ATR	2022 ATR - Seasonally Adjusted[1]	Aug 2017	Grown to 2018[2]	Grown to 2019[3]	Grown to 2020[4]	Grown to 2021[4]	Grown to 2022[4]	Percent Change	Adjustment
AM Peak	8:00-9:00 am	621	**733**	596	608	614	620	626	**633**	**-14%**	None
PM Peak	5:00-6:00 pm	698	**824**	648	661	668	674	681	**688**	**-16%**	None

[1] 2019 NHDOT Group 4 February Seasonal Adjustment Factor to Peak (1.18)
[2] Maplewood Avenue annual growth rate from 2017 to 2018
[3] Maplewood Avenue annual growth rate from 2018 to 2019
[4] Estimated annual growth rate

Location Info

Location ID	82379035
Type	I-SECTION
Functional Class	4
Located On	Maplewood Ave
Direction	2-WAY
Community	PORTSMOUTH
MPO_ID	
HPMS ID	
Agency	New Hampshire DOT

Count Data Info

Start Date	8/30/2017
End Date	8/31/2017
Start Time	12:00 AM
End Time	12:00 AM
Direction	
Notes	nhdot
Count Source	8.2379E+11
File Name	823790350000.prn
Weather	
Study	
Owner	iwong
QC Status	Accepted

Interval: 60 mins

Time	Hourly Count
00:00 - 01:00	30
01:00 - 02:00	13
02:00 - 03:00	8
03:00 - 04:00	4
04:00 - 05:00	42
05:00 - 06:00	91
06:00 - 07:00	202
07:00 - 08:00	416
08:00 - 09:00	596
09:00 - 10:00	452
10:00 - 11:00	392
11:00 - 12:00	435
12:00 - 13:00	523
13:00 - 14:00	525
14:00 - 15:00	523
15:00 - 16:00	549
16:00 - 17:00	596
17:00 - 18:00	648
18:00 - 19:00	472
19:00 - 20:00	361
20:00 - 21:00	276
21:00 - 22:00	220
22:00 - 23:00	114
23:00 - 24:00	72
TOTAL	7560

List View | All DIRs

Record 1 of 1 Goto Record go

Location ID	82379035	MPO ID	
Type	SPOT	HPMS ID	
On NHS	No	On HPMS	No
LRS ID	L3790368__	LRS Loc Pt.	
SF Group	04	Route Type	
AF Group	04	Route	
GF Group	E	Active	Yes
Class Dist Grp	Default	Category	3
Seas Clss Grp	Default		
WIM Group	Default		
QC Group	Default		
Fnct'l Class	Minor Arterial	Milepost	
Located On	Maplewood Ave		
Loc On Alias	MAPLEWOOD AVENUE EAST OF RAYNES AVENUE		

More Detail

STATION DATA

Directions: 2-WAY

AADT

	Year	AADT	DHV-30	K %	D %	PA	BC	Src
	2020	5,727	580	10		5,213 (91%)	514 (9%)	
	2019	6,682 [3]		10		6,121 (92%)	561 (8%)	Grown from 2018
	2018	6,603 [3]		10		6,087 (92%)	516 (8%)	Grown from 2017
	2017	6,474	648	10		6,010 (93%)	464 (7%)	
	2016	7,564 [3]				6,898 (91%)	666 (9%)	Grown from 2015

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Travel Demand Model

	Model Year	Model AADT	AM PHV	AM PPV	MD PHV	MD PPV	PM PHV	PM PPV	NT PHV	NT PPV

VOLUME COUNT

	Date	Int	Total
	Thu 8/13/2020	60	7,025
	Wed 8/12/2020	60	6,688
	Tue 8/11/2020	60	6,568
	Thu 8/31/2017	60	7,305
	Wed 8/30/2017	60	7,560
	Tue 8/29/2017	60	7,433
	Thu 8/7/2014	60	8,598
	Wed 8/6/2014	60	8,961
	Tue 8/5/2014	60	8,284
	Mon 8/4/2014	60	7,973

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mm/dd/yyyy To Date

VOLUME TREND

Year	Annual Growth
2020	-14%
2019	1%
2018	2%
2017	-14%
2016	2%
2015	3%
2014	-13%
2011	0%
2008	-1%
2002	0%

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SPEED

CLASSIFICATION

APPENDIX D

Capacity Analysis Methodology

CAPACITY ANALYSIS METHODOLOGY

A primary result of capacity analysis is the assignment of levels of service to traffic facilities under various traffic flow conditions. The capacity analysis methodology is based on the concepts and procedures in the *Highway Capacity Manual* (HCM).[1] The concept of level of service (LOS) is defined as a qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers. A level-of-service definition provides an index to quality of traffic flow in terms of such factors as speed, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety.

Six levels of service are defined for each type of facility. They are given letter designations from A to F, with LOS A representing the best operating conditions and LOS F the worst. Since the level of service of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of levels of service, depending on the time of day, day of week, or period of year. A description of the operating condition under each level of service is provided below:

- *LOS A* describes conditions with little to no delay to motorists.
- *LOS B* represents a desirable level with relatively low delay to motorists.
- *LOS C* describes conditions with average delays to motorists.
- *LOS D* describes operations where the influence of congestion becomes more noticeable. Delays are still within an acceptable range.
- *LOS E* represents operating conditions with high delay values. This level is considered by many agencies to be the limit of acceptable delay.
- *LOS F* is considered to be unacceptable to most drivers with high delay values that often occur, when arrival flow rates exceed the capacity of the intersection.

Signalized Intersections

Levels of service for signalized intersections are also calculated using the operational analysis methodology of the HCM. The methodology for signalized intersections assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on average *control* delay. Control delay is used to establish the operating characteristics for an intersection or an approach to an intersection. Volume-to-capacity (v/c) ratios are also used to help signify the utilization of a lane group's capacity at an intersection. A v/c ratio of ≥1.00 represents conditions when the traffic signal cycle capacity is fully utilized and indicates a capacity failure. The level-of-service criteria for signalized intersections are shown in Table A-1.

[1] *Highway Capacity Manual, 6TH Edition: A Guide for Multimodal Mobility Analysis.* Washington, D.C.: Transportation Research Board, 2016.

Unsignalized Intersections

Levels of service for unsignalized intersections are calculated using the operational analysis methodology of the HCM. The procedure accounts for lane configuration on both the minor and major street approaches, conflicting traffic stream volumes, and the type of intersection control (STOP, YIELD, or all-way STOP control). The definition of level of service for unsignalized intersections is a function of average *control* delay. Control delay at an unsignalized intersection is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line. This time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position.

Volume-to-capacity (v/c) ratios are also used to help signify the utilization of a movement's capacity at an intersection. A v/c ratio of ≥1.00 represents conditions when the movement is fully utilized and indicates a capacity failure. The capacity of the movements is based on the distribution of gaps in the major street traffic stream, the selection of gaps to complete the desired movement, and the follow-up headways for each driver in the queue. When an unsignalized intersection is located within 0.25 miles of a signalized intersection, traffic flows may not be random and some platoon structure may exist, thereby affecting the minor street operations. The level-of-service criteria for unsignalized intersections are shown in Table A-1.

TABLE A-1
Level-of-Service Criteria for Intersections

Level of Service	**Signalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**Unsignalized Intersection Criteria** Average Control Delay (Seconds per Vehicle)	**V/C Ratio >1.00[a]**
A	≤10	≤10	F
B	>10 and ≤20	>10 and ≤15	F
C	>20 and ≤35	>15 and ≤25	F
D	>35 and ≤55	>25 and ≤35	F
E	>55 and ≤80	>35 and ≤50	F
F	>80	>50	F

Note: [a]For approach-based and intersection-wide assessments, LOS is defined solely by control delay.

Source: *Highway Capacity Manual, 6th Edition: A Guide for Multimodal Mobility Analysis.* Washington, D.C.: Transportation Research Board, 2016. Exhibit 19-8, Pg. 19-16.

For signalized intersections, this delay criterion may be applied in assigning level-of-service designations to individual lane groups, to individual intersection approaches, or to the entire intersection. For unsignalized intersections, this delay criterion may be applied in assigning level-of-service designations to individual lane groups on the minor street approaches or to the left turns from the major street approaches.

APPENDIX E

Capacity Analysis Worksheets

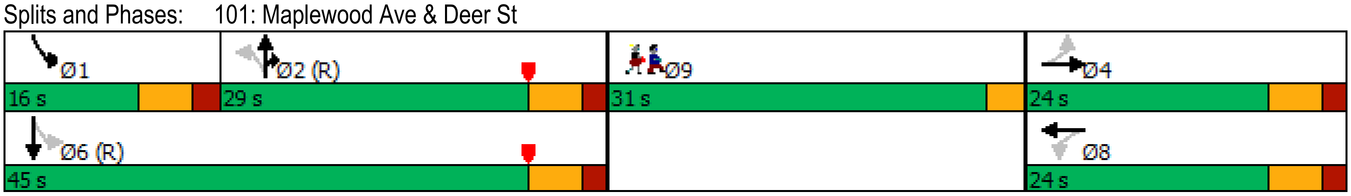
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	11	15	155	55	29	6	244	103	26	373	76
Future Volume (vph)	26	11	15	155	55	29	6	244	103	26	373	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.960			0.948				0.850		0.975	
Flt Protected		0.976		0.950			0.950			0.950		
Satd. Flow (prot)	0	1620	0	1805	1858	0	1586	1655	1545	1646	1656	0
Flt Permitted		0.860		0.719			0.367			0.350		
Satd. Flow (perm)	0	1428	0	1366	1858	0	613	1655	1545	606	1656	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			23				131		12	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Heavy Vehicles (%)	20%	10%	5%	0%	2%	6%	10%	11%	8%	6%	9%	4%
Adj. Flow (vph)	29	12	17	168	60	32	7	277	117	28	401	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	58	0	168	92	0	7	277	117	28	483	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	24.0	24.0		24.0	24.0		29.0	29.0	29.0	16.0	45.0	
Total Split (%)	24.0%	24.0%		24.0%	24.0%		29.0%	29.0%	29.0%	16.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		38.6		38.6	38.6		31.0	31.0	31.0	39.0	39.0	
Actuated g/C Ratio		0.39		0.39	0.39		0.31	0.31	0.31	0.39	0.39	
v/c Ratio		0.10		0.32	0.13		0.04	0.54	0.21	0.09	0.74	
Control Delay		20.9		28.3	20.2		11.5	21.6	3.5	19.8	33.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		20.9		28.3	20.2		11.5	21.6	3.5	19.8	33.7	
LOS		C		C	C		B	C	A	B	C	
Approach Delay		20.9			25.4			16.2			32.9	
Approach LOS		C			C			B			C	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	31.0
Total Split (%)	31%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		13		60	22		3	165	23	11	253	
Queue Length 95th (ft)		55		163	78		m5	137	0	29	380	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		561		527	731		190	513	569	340	653	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		0		0	0		0	0	0	0	0	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.10		0.32	0.13		0.04	0.54	0.21	0.08	0.74	

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 25.3	Intersection LOS: C
Intersection Capacity Utilization 49.4%	ICU Level of Service A
Analysis Period (min) 15	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	29	15	31	2	46	15	287	55	68	455	20
Future Volume (vph)	20	29	15	31	2	46	15	287	55	68	455	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.949				0.850		0.977			0.994	
Flt Protected	0.950				0.955			0.998		0.950		
Satd. Flow (prot)	1703	1492	0	0	1749	1568	0	3220	0	1626	1853	0
Flt Permitted	0.728				0.702			0.924		0.437		
Satd. Flow (perm)	1305	1492	0	0	1286	1568	0	2981	0	748	1853	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				62		21			3	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.83	0.83	0.83	0.74	0.74	0.74	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	6%	12%	38%	4%	0%	3%	23%	10%	2%	11%	2%	0%
Adj. Flow (vph)	24	35	18	42	3	62	18	346	66	75	500	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	53	0	0	45	62	0	430	0	75	522	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	9.0	9.0			9.0	20.4		54.3		64.5	65.7	
Actuated g/C Ratio	0.09	0.09			0.09	0.20		0.54		0.64	0.66	
v/c Ratio	0.21	0.35			0.39	0.17		0.26		0.14	0.43	
Control Delay	44.9	36.7			51.8	8.4		19.1		13.5	14.9	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.2	
Total Delay	44.9	36.7			51.8	8.4		19.1		13.5	15.2	
LOS	D	D			D	A		B		B	B	
Approach Delay		39.2			26.7			19.1			15.0	
Approach LOS		D			C			B			B	
Queue Length 50th (ft)	14	21			28	0		98		29	218	

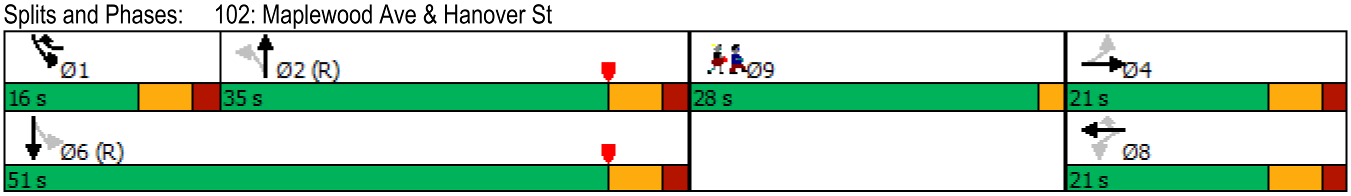
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	36	52			49	19		141		m24	277	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	195	239			192	404		1628		571	1218	
Starvation Cap Reductn	0	0			0	0		0		0	207	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.12	0.22			0.23	0.15		0.26		0.13	0.52	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 58.8%	ICU Level of Service B
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	106	28	207	84	9	12	2	47	18	23	4
Future Vol, veh/h	2	106	28	207	84	9	12	2	47	18	23	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	77	77	77	80	80	80	75	75	75
Heavy Vehicles, %	0	5	13	4	25	0	20	0	3	0	0	0
Mvmt Flow	3	133	35	269	109	12	15	3	59	24	31	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	121	0	0	168	0	0	828	816	151	841	827	115
Stage 1	-	-	-	-	-	-	157	157	-	653	653	-
Stage 2	-	-	-	-	-	-	671	659	-	188	174	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.3	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.68	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1479	-	-	1398	-	-	271	314	893	287	309	943
Stage 1	-	-	-	-	-	-	804	772	-	460	467	-
Stage 2	-	-	-	-	-	-	418	464	-	818	759	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1479	-	-	1398	-	-	205	248	893	223	244	943
Mov Cap-2 Maneuver	-	-	-	-	-	-	205	248	-	223	244	-
Stage 1	-	-	-	-	-	-	802	770	-	459	370	-
Stage 2	-	-	-	-	-	-	302	368	-	760	757	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	5.6	13.3	23.8
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	512	1479	-	-	1398	-	-	251
HCM Lane V/C Ratio	0.149	0.002	-	-	0.192	-	-	0.239
HCM Control Delay (s)	13.3	7.4	0	-	8.2	0	-	23.8
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.5	0	-	-	0.7	-	-	0.9

Intersection	
Int Delay, s/veh	7.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	157	14	9	263	38	333
Future Vol, veh/h	157	14	9	263	38	333
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	80	80	81	81
Heavy Vehicles, %	4	8	12	10	13	2
Mvmt Flow	185	16	11	329	47	411

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	201	0	544	193
Stage 1	-	-	-	-	193	-
Stage 2	-	-	-	-	351	-
Critical Hdwy	-	-	4.22	-	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	-	-	2.308	-	3.617	3.318
Pot Cap-1 Maneuver	-	-	1313	-	482	849
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	689	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1313	-	477	849
Mov Cap-2 Maneuver	-	-	-	-	477	-
Stage 1	-	-	-	-	814	-
Stage 2	-	-	-	-	682	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	15.8
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	786	-	-	1313	-
HCM Lane V/C Ratio	0.583	-	-	0.009	-
HCM Control Delay (s)	15.8	-	-	7.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.8	-	-	0	-

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	109	28	25	9	0	234
Future Vol, veh/h	109	28	25	9	0	234
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	54	54	92	92
Heavy Vehicles, %	3	0	5	38	0	6
Mvmt Flow	124	32	46	17	0	254

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	63	0	-	0	335	55
Stage 1	-	-	-	-	55	-
Stage 2	-	-	-	-	280	-
Critical Hdwy	4.13	-	-	-	6.4	6.26
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.354
Pot Cap-1 Maneuver	1533	-	-	-	664	1001
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	772	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1533	-	-	-	610	1001
Mov Cap-2 Maneuver	-	-	-	-	610	-
Stage 1	-	-	-	-	893	-
Stage 2	-	-	-	-	772	-

Approach	EB	WB	SB
HCM Control Delay, s	6	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1533	-	-	-	1001
HCM Lane V/C Ratio	0.081	-	-	-	0.254
HCM Control Delay (s)	7.6	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	-	-	1

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	0	1	0	5	7	107	7	6	232	5
Future Vol, veh/h	2	1	0	1	0	5	7	107	7	6	232	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	25	25	25	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	8	0
Mvmt Flow	5	3	0	4	0	20	8	120	8	7	261	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	428	422	264	420	421	124	267	0	0	128	0	0
Stage 1	278	278	-	140	140	-	-	-	-	-	-	-
Stage 2	150	144	-	280	281	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	541	526	780	547	527	932	1308	-	-	1470	-	-
Stage 1	733	684	-	868	785	-	-	-	-	-	-	-
Stage 2	857	782	-	731	682	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	524	519	780	539	520	932	1308	-	-	1470	-	-
Mov Cap-2 Maneuver	524	519	-	539	520	-	-	-	-	-	-	-
Stage 1	728	680	-	862	780	-	-	-	-	-	-	-
Stage 2	833	777	-	724	678	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12	9.5	0.4	0.2
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1308	-	-	522	831	1470	-	-
HCM Lane V/C Ratio	0.006	-	-	0.015	0.029	0.005	-	-
HCM Control Delay (s)	7.8	0	-	12	9.5	7.5	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	7	14	2	112	226	20
Future Vol, veh/h	7	14	2	112	226	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	15	2	122	246	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	383	257	268	0	-	0
Stage 1	257	-	-	-	-	-
Stage 2	126	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	620	782	1296	-	-	-
Stage 1	786	-	-	-	-	-
Stage 2	900	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	619	782	1296	-	-	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	784	-	-	-	-	-
Stage 2	900	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	10.2		0.1		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1296	-	719	-	-
HCM Lane V/C Ratio	0.002	-	0.032	-	-
HCM Control Delay (s)	7.8	0	10.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	113	6	0	157	277	245
Future Vol, veh/h	113	6	0	157	277	245
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	83	83
Heavy Vehicles, %	5	20	0	7	4	6
Mvmt Flow	138	7	0	171	334	295

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	505	334	-	0	-	0
Stage 1	334	-	-	-	-	-
Stage 2	171	-	-	-	-	-
Critical Hdwy	6.45	6.4	-	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.48	-	-	-	-
Pot Cap-1 Maneuver	522	668	0	-	-	0
Stage 1	719	-	0	-	-	0
Stage 2	852	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	522	668	-	-	-	-
Mov Cap-2 Maneuver	522	-	-	-	-	-
Stage 1	719	-	-	-	-	-
Stage 2	852	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	522	668	-
HCM Lane V/C Ratio	-	0.264	0.011	-
HCM Control Delay (s)	-	14.4	10.4	-
HCM Lane LOS	-	B	B	-
HCM 95th %tile Q(veh)	-	1.1	0	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	96	7	220	106	64	6	468	211	58	437	52
Future Volume (vph)	96	96	7	220	106	64	6	468	211	58	437	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.947				0.850		0.985	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	1877	0	1770	1919	0	1558	1818	1636	1745	1807	0
Flt Permitted		0.606		0.568			0.284			0.129		
Satd. Flow (perm)	0	1170	0	1058	1919	0	466	1818	1636	237	1807	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			24				224		7	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.51	0.79	0.38	0.67	0.75	0.82	0.63	0.87	0.90	0.58	0.85	0.91
Heavy Vehicles (%)	1%	1%	0%	2%	0%	0%	12%	1%	2%	0%	0%	1%
Adj. Flow (vph)	188	122	18	328	141	78	10	538	234	100	514	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	328	0	328	219	0	10	538	234	100	571	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	24.0	24.0		24.0	24.0		29.0	29.0	29.0	16.0	45.0	
Total Split (%)	24.0%	24.0%		24.0%	24.0%		29.0%	29.0%	29.0%	16.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		28.2		28.2	28.2		26.8	26.8	26.8	39.0	39.0	
Actuated g/C Ratio		0.28		0.28	0.28		0.27	0.27	0.27	0.39	0.39	
v/c Ratio		0.99		1.10	0.39		0.08	1.11	0.39	0.45	0.81	
Control Delay		87.1		120.1	30.8		20.3	98.9	4.0	26.4	37.3	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	2.0	
Total Delay		87.1		120.1	30.8		20.3	98.9	4.0	26.4	39.3	
LOS		F		F	C		C	F	A	C	D	
Approach Delay		87.1			84.4			69.5			37.4	
Approach LOS		F			F			E			D	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	31.0
Total Split (%)	31%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		~257		~275	107		2	~434	0	41	315	
Queue Length 95th (ft)		#356		#291	143		m6	#585	34	47	418	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		332		298	558		124	486	601	243	709	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		0		0	0		0	0	0	0	53	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.99		1.10	0.39		0.08	1.11	0.39	0.41	0.87	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.11

Intersection Signal Delay: 66.2 Intersection LOS: E

Intersection Capacity Utilization 77.5% ICU Level of Service D

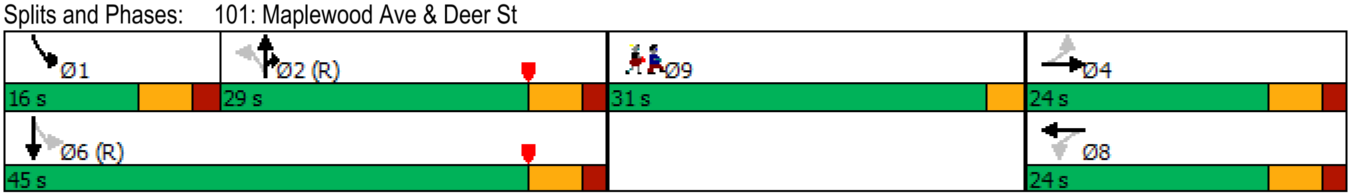
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	15	6	43	14	116	7	525	76	107	542	16
Future Volume (vph)	44	15	6	43	14	116	7	525	76	107	542	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.955				0.850		0.981			0.996	
Flt Protected	0.950				0.964			0.999		0.950		
Satd. Flow (prot)	1805	1562	0	0	1832	1615	0	3478	0	1687	1874	0
Flt Permitted	0.714				0.754			0.947		0.268		
Satd. Flow (perm)	1357	1562	0	0	1433	1615	0	3297	0	476	1874	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				135		16			2	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.57	0.57	0.57	0.86	0.86	0.86	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles (%)	0%	23%	0%	0%	0%	0%	0%	2%	0%	7%	1%	0%
Adj. Flow (vph)	77	26	11	50	16	135	8	590	85	126	638	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	37	0	0	66	135	0	683	0	126	657	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	10.8	10.8			10.7	23.3		42.3		57.2	58.4	
Actuated g/C Ratio	0.11	0.11			0.11	0.23		0.42		0.57	0.58	
v/c Ratio	0.52	0.21			0.43	0.28		0.49		0.33	0.60	
Control Delay	54.0	32.6			49.2	6.2		26.7		9.3	11.6	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.5	
Total Delay	54.0	32.6			49.2	6.2		26.7		9.3	12.0	
LOS	D	C			D	A		C		A	B	
Approach Delay		47.1			20.3			26.7			11.6	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	47	15			40	0		185		14	128	

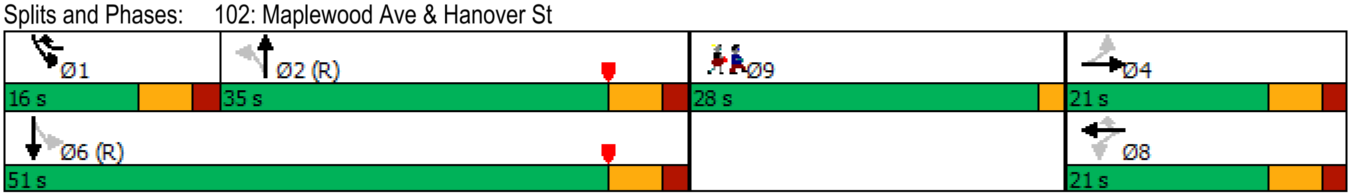
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	55	25			76	37		261		m31	m287	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	203	243			214	499		1404		395	1095	
Starvation Cap Reductn	0	0			0	0		0		0	132	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.38	0.15			0.31	0.27		0.49		0.32	0.68	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.60	
Intersection Signal Delay: 20.6	Intersection LOS: C
Intersection Capacity Utilization 71.4%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection												
Int Delay, s/veh	9.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	11	131	15	460	137	23	11	6	45	12	4	5
Future Vol, veh/h	11	131	15	460	137	23	11	6	45	12	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	93	93	93	74	74	74	57	57	57
Heavy Vehicles, %	0	0	0	2	4	0	0	0	0	0	0	0
Mvmt Flow	13	160	18	495	147	25	15	8	61	21	7	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	172	0	0	178	0	0	1353	1357	169	1380	1354	160
Stage 1	-	-	-	-	-	-	195	195	-	1150	1150	-
Stage 2	-	-	-	-	-	-	1158	1162	-	230	204	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1417	-	-	1398	-	-	128	150	880	123	151	890
Stage 1	-	-	-	-	-	-	811	743	-	243	275	-
Stage 2	-	-	-	-	-	-	241	272	-	777	737	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1417	-	-	1398	-	-	83	90	880	74	91	890
Mov Cap-2 Maneuver	-	-	-	-	-	-	83	90	-	74	91	-
Stage 1	-	-	-	-	-	-	803	736	-	241	167	-
Stage 2	-	-	-	-	-	-	139	165	-	708	730	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	6.7	26.7	61.5
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	248	1417	-	-	1398	-	-	99
HCM Lane V/C Ratio	0.338	0.009	-	-	0.354	-	-	0.372
HCM Control Delay (s)	26.7	7.6	0	-	9	0	-	61.5
HCM Lane LOS	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	1.4	0	-	-	1.6	-	-	1.5

Intersection						
Int Delay, s/veh	5.8					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	167	22	24	547	73	239
Future Vol, veh/h	167	22	24	547	73	239
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	89	89
Heavy Vehicles, %	1	0	0	1	5	0
Mvmt Flow	204	27	26	595	82	269

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	231	0	865	218
Stage 1	-	-	-	-	218	-
Stage 2	-	-	-	-	647	-
Critical Hdwy	-	-	4.1	-	6.45	6.2
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.2	-	3.545	3.3
Pot Cap-1 Maneuver	-	-	1349	-	320	827
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	516	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1349	-	311	827
Mov Cap-2 Maneuver	-	-	-	-	311	-
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	501	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	19.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	596	-	-	1349	-
HCM Lane V/C Ratio	0.588	-	-	0.019	-
HCM Control Delay (s)	19.3	-	-	7.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	3.8	-	-	0.1	-

Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	293	56	68	21	14	399
Future Vol, veh/h	293	56	68	21	14	399
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	70	81	54	42	89
Heavy Vehicles, %	2	0	0	0	0	2
Mvmt Flow	345	80	84	39	33	448

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	123	0	-	0	874	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	770	-
Critical Hdwy	4.12	-	-	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1464	-	-	-	323	951
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	460	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1464	-	-	-	243	951
Mov Cap-2 Maneuver	-	-	-	-	243	-
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	460	-

Approach	EB	WB	SB
HCM Control Delay, s	6.7	0	16.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1464	-	-	-	791
HCM Lane V/C Ratio	0.235	-	-	-	0.609
HCM Control Delay (s)	8.2	0	-	-	16.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.9	-	-	-	4.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	7	0	8	8	1	6	11	299	8	5	395	2
Future Vol, veh/h	7	0	8	8	1	6	11	299	8	5	395	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	45	45	45	75	75	75	82	82	82	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	2	0
Mvmt Flow	16	0	18	11	1	8	13	365	10	6	459	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	873	873	460	877	869	370	461	0	0	375	0	0
Stage 1	472	472	-	396	396	-	-	-	-	-	-	-
Stage 2	401	401	-	481	473	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	273	291	605	271	292	680	1111	-	-	1195	-	-
Stage 1	576	562	-	633	607	-	-	-	-	-	-	-
Stage 2	630	604	-	570	562	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	264	285	605	259	286	680	1111	-	-	1195	-	-
Mov Cap-2 Maneuver	264	285	-	259	286	-	-	-	-	-	-	-
Stage 1	567	558	-	624	598	-	-	-	-	-	-	-
Stage 2	612	595	-	549	558	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.5	16	0.3	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1111	-	-	377	347	1195	-	-
HCM Lane V/C Ratio	0.012	-	-	0.088	0.058	0.005	-	-
HCM Control Delay (s)	8.3	0	-	15.5	16	8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.2	0	-	-

Intersection						
Int Delay, s/veh	1.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	49	6	5	309	400	52
Future Vol, veh/h	49	6	5	309	400	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	7	5	336	435	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	810	464	492	0	-	0
Stage 1	464	-	-	-	-	-
Stage 2	346	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	349	598	1071	-	-	-
Stage 1	633	-	-	-	-	-
Stage 2	716	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	347	598	1071	-	-	-
Mov Cap-2 Maneuver	347	-	-	-	-	-
Stage 1	629	-	-	-	-	-
Stage 2	716	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.8	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1071	-	364	-	-
HCM Lane V/C Ratio	0.005	-	0.164	-	-
HCM Control Delay (s)	8.4	0	16.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.6	-	-

Intersection	
Int Delay, s/veh	124.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	351	7	0	489	359	452
Future Vol, veh/h	351	7	0	489	359	452
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	50	25	71	82	87
Heavy Vehicles, %	2	0	0	0	1	2
Mvmt Flow	428	14	0	689	438	520

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1127	438	-	0	-	0
Stage 1	438	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	-	-
Pot Cap-1 Maneuver	~ 226	623	0	-	-	0
Stage 1	651	-	0	-	-	0
Stage 2	498	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	~ 226	623	-	-	-	-
Mov Cap-2 Maneuver	~ 226	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	498	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 440.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	226	623	-
HCM Lane V/C Ratio	-	1.894	0.022	-
HCM Control Delay (s)	-	$ 454.5	10.9	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	30.5	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

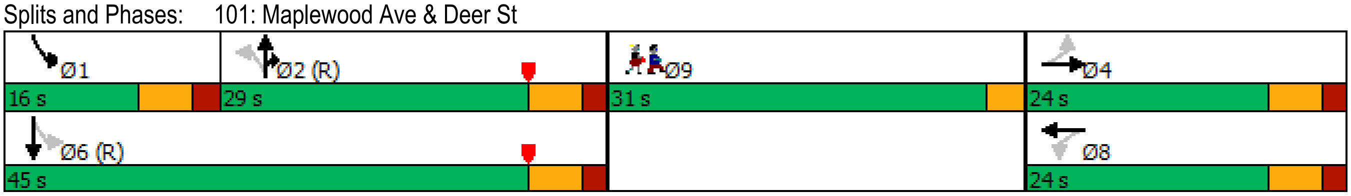
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	30	34	171	100	32	38	270	114	28	412	183
Future Volume (vph)	76	30	34	171	100	32	38	270	114	28	412	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.964				0.850		0.954	
Flt Protected		0.974		0.950			0.950			0.950		
Satd. Flow (prot)	0	1619	0	1805	1897	0	1586	1655	1545	1646	1631	0
Flt Permitted		0.773		0.669			0.149			0.310		
Satd. Flow (perm)	0	1285	0	1271	1897	0	249	1655	1545	537	1631	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			14				131		26	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Heavy Vehicles (%)	20%	10%	5%	0%	2%	6%	10%	11%	8%	6%	9%	4%
Adj. Flow (vph)	84	33	38	186	109	35	43	307	130	30	443	197
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	155	0	186	144	0	43	307	130	30	640	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	24.0	24.0		24.0	24.0		29.0	29.0	29.0	16.0	45.0	
Total Split (%)	24.0%	24.0%		24.0%	24.0%		29.0%	29.0%	29.0%	16.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		38.6		38.6	38.6		31.0	31.0	31.0	39.0	39.0	
Actuated g/C Ratio		0.39		0.39	0.39		0.31	0.31	0.31	0.39	0.39	
v/c Ratio		0.31		0.38	0.19		0.56	0.60	0.23	0.11	0.98	
Control Delay		26.0		29.7	23.5		49.1	23.7	3.1	19.9	61.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	4.1	
Total Delay		26.0		29.7	23.5		49.1	23.7	3.1	19.9	65.9	
LOS		C		C	C		D	C	A	B	E	
Approach Delay		26.0			27.0			20.4			63.8	
Approach LOS		C			C			C			E	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	31.0
Total Split (%)	31%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		50		68	44		25	180	9	12	384	
Queue Length 95th (ft)		144		185	124		#81	#112	14	30	#627	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		504		490	740		77	512	569	320	651	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		0		0	0		0	0	0	0	12	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.31		0.38	0.19		0.56	0.60	0.23	0.09	1.00	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.98	
Intersection Signal Delay: 40.1	Intersection LOS: D
Intersection Capacity Utilization 65.2%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	32	29	35	2	51	32	349	60	75	522	22
Future Volume (vph)	22	32	29	35	2	51	32	349	60	75	522	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.929				0.850		0.980			0.994	
Flt Protected	0.950				0.955			0.996		0.950		
Satd. Flow (prot)	1703	1420	0	0	1749	1568	0	3207	0	1626	1853	0
Flt Permitted	0.724				0.685			0.874		0.378		
Satd. Flow (perm)	1298	1420	0	0	1254	1568	0	2814	0	647	1853	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35				69		18			3	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.83	0.83	0.83	0.74	0.74	0.74	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	6%	12%	38%	4%	0%	3%	23%	10%	2%	11%	2%	0%
Adj. Flow (vph)	27	39	35	47	3	69	39	420	72	82	574	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	74	0	0	50	69	0	531	0	82	598	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	9.4	9.4			9.4	21.1		53.6		64.1	65.3	
Actuated g/C Ratio	0.09	0.09			0.09	0.21		0.54		0.64	0.65	
v/c Ratio	0.22	0.45			0.43	0.18		0.35		0.17	0.49	
Control Delay	44.8	33.4			52.9	7.8		21.1		11.9	14.4	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.4	
Total Delay	44.8	33.4			52.9	7.8		21.1		11.9	14.7	
LOS	D	C			D	A		C		B	B	
Approach Delay		36.5			26.7			21.1			14.4	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	16	24			31	0		132		32	260	

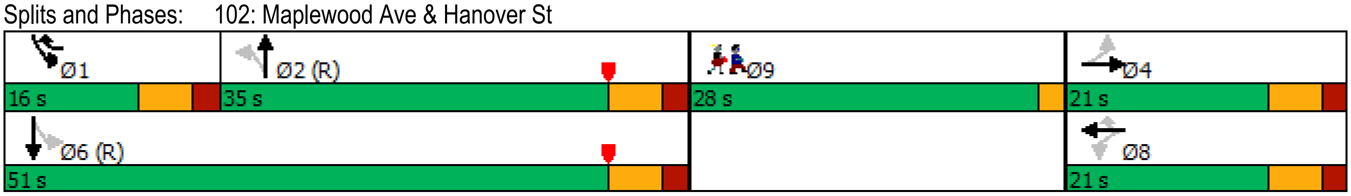
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	38	58			54	20		185		m22	m251	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	194	242			188	417		1517		514	1211	
Starvation Cap Reductn	0	0			0	0		0		0	213	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.14	0.31			0.27	0.17		0.35		0.16	0.60	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.49	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 65.0%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	131	31	261	106	10	14	2	55	19	25	5
Future Vol, veh/h	2	131	31	261	106	10	14	2	55	19	25	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	77	77	77	80	80	80	75	75	75
Heavy Vehicles, %	0	5	13	4	25	0	20	0	3	0	0	0
Mvmt Flow	3	164	39	339	138	13	18	3	69	25	33	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	151	0	0	203	0	0	1033	1019	184	1049	1032	145
Stage 1	-	-	-	-	-	-	190	190	-	823	823	-
Stage 2	-	-	-	-	-	-	843	829	-	226	209	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.3	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.68	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1442	-	-	1357	-	-	195	239	856	207	235	908
Stage 1	-	-	-	-	-	-	772	747	-	371	391	-
Stage 2	-	-	-	-	-	-	334	388	-	781	733	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1442	-	-	1357	-	-	131	174	856	148	171	908
Mov Cap-2 Maneuver	-	-	-	-	-	-	131	174	-	148	171	-
Stage 1	-	-	-	-	-	-	770	746	-	370	284	-
Stage 2	-	-	-	-	-	-	213	282	-	714	732	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	5.9	17	37.3
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	389	1442	-	-	1357	-	-	175
HCM Lane V/C Ratio	0.228	0.002	-	-	0.25	-	-	0.373
HCM Control Delay (s)	17	7.5	0	-	8.5	0	-	37.3
HCM Lane LOS	C	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.9	0	-	-	1	-	-	1.6

Intersection						
Int Delay, s/veh	12.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	190	16	10	335	42	437
Future Vol, veh/h	190	16	10	335	42	437
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	80	80	81	81
Heavy Vehicles, %	4	8	12	10	13	2
Mvmt Flow	224	19	13	419	52	540

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	243	0	679	234
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	445	-
Critical Hdwy	-	-	4.22	-	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	-	-	2.308	-	3.617	3.318
Pot Cap-1 Maneuver	-	-	1267	-	401	805
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	623	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1267	-	396	805
Mov Cap-2 Maneuver	-	-	-	-	396	-
Stage 1	-	-	-	-	780	-
Stage 2	-	-	-	-	615	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	26.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	738	-	-	1267	-
HCM Lane V/C Ratio	0.801	-	-	0.01	-
HCM Control Delay (s)	26.5	-	-	7.9	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	8.3	-	-	0	-

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	138	31	27	10	0	298
Future Vol, veh/h	138	31	27	10	0	298
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	54	54	92	92
Heavy Vehicles, %	3	0	5	38	0	6
Mvmt Flow	157	35	50	19	0	324

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	69	0	-	0	409	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	349	-
Critical Hdwy	4.13	-	-	-	6.4	6.26
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.354
Pot Cap-1 Maneuver	1526	-	-	-	602	994
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	719	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1526	-	-	-	539	994
Mov Cap-2 Maneuver	-	-	-	-	539	-
Stage 1	-	-	-	-	866	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	SB
HCM Control Delay, s	6.2	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1526	-	-	-	994
HCM Lane V/C Ratio	0.103	-	-	-	0.326
HCM Control Delay (s)	7.6	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	1.4

Intersection												
Int Delay, s/veh	0.9											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	2	1	0	1	0	6	8	135	8	7	296	6
Future Vol, veh/h	2	1	0	1	0	6	8	135	8	7	296	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	25	25	25	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	8	0
Mvmt Flow	5	3	0	4	0	24	9	152	9	8	333	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	540	532	337	529	531	157	340	0	0	161	0	0
Stage 1	353	353	-	175	175	-	-	-	-	-	-	-
Stage 2	187	179	-	354	356	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	456	456	710	463	457	894	1230	-	-	1430	-	-
Stage 1	668	634	-	832	758	-	-	-	-	-	-	-
Stage 2	819	755	-	667	633	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	439	449	710	456	450	894	1230	-	-	1430	-	-
Mov Cap-2 Maneuver	439	449	-	456	450	-	-	-	-	-	-	-
Stage 1	663	630	-	825	752	-	-	-	-	-	-	-
Stage 2	791	749	-	660	629	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.3	9.7	0.4	0.2
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1230	-	-	442	786	1430	-	-
HCM Lane V/C Ratio	0.007	-	-	0.018	0.036	0.006	-	-
HCM Control Delay (s)	7.9	0	-	13.3	9.7	7.5	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-	-

Intersection						
Int Delay, s/veh	0.6					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	16	2	141	289	22
Future Vol, veh/h	8	16	2	141	289	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	9	17	2	153	314	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	483	326	338	0	-	0
Stage 1	326	-	-	-	-	-
Stage 2	157	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	542	715	1221	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	871	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	541	715	1221	-	-	-
Mov Cap-2 Maneuver	541	-	-	-	-	-
Stage 1	730	-	-	-	-	-
Stage 2	871	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1221	-	646	-	-
HCM Lane V/C Ratio	0.002	-	0.04	-	-
HCM Control Delay (s)	8	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection						
Int Delay, s/veh	4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	142	7	0	173	306	311
Future Vol, veh/h	142	7	0	173	306	311
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	83	83
Heavy Vehicles, %	5	20	0	7	4	6
Mvmt Flow	173	9	0	188	369	375

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	557	369	-	0	-	0
Stage 1	369	-	-	-	-	-
Stage 2	188	-	-	-	-	-
Critical Hdwy	6.45	6.4	-	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.48	-	-	-	-
Pot Cap-1 Maneuver	486	638	0	-	-	0
Stage 1	693	-	0	-	-	0
Stage 2	837	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	486	638	-	-	-	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	693	-	-	-	-	-
Stage 2	837	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	486	638	-
HCM Lane V/C Ratio	-	0.356	0.013	-
HCM Control Delay (s)	-	16.5	10.7	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	1.6	0	-

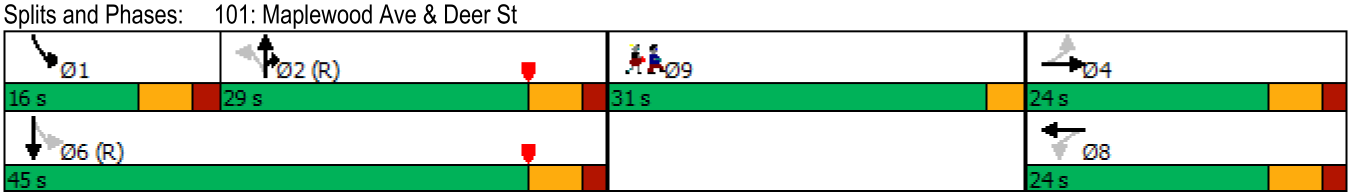
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	142	51	244	143	71	33	515	233	64	482	127
Future Volume (vph)	191	142	51	244	143	71	33	515	233	64	482	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.950				0.850		0.969	
Flt Protected		0.976		0.950			0.950			0.950		
Satd. Flow (prot)	0	1646	0	1805	1863	0	1586	1655	1545	1646	1649	0
Flt Permitted		0.669		0.509			0.165			0.132		
Satd. Flow (perm)	0	1128	0	967	1863	0	276	1655	1545	229	1649	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			22				233		16	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Heavy Vehicles (%)	20%	10%	5%	0%	2%	6%	10%	11%	8%	6%	9%	4%
Adj. Flow (vph)	212	158	57	265	155	77	38	585	265	69	518	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	427	0	265	232	0	38	585	265	69	655	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	24.0	24.0		24.0	24.0		29.0	29.0	29.0	16.0	45.0	
Total Split (%)	24.0%	24.0%		24.0%	24.0%		29.0%	29.0%	29.0%	16.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		38.6		38.6	38.6		27.3	27.3	27.3	39.0	39.0	
Actuated g/C Ratio		0.39		0.39	0.39		0.27	0.27	0.27	0.39	0.39	
v/c Ratio		0.97		0.71	0.32		0.51	1.29	0.45	0.34	1.00	
Control Delay		70.6		43.6	24.7		50.0	175.6	6.9	24.3	67.5	
Queue Delay		3.8		0.3	0.0		0.0	0.0	0.0	0.0	28.9	
Total Delay		74.4		43.9	24.7		50.0	175.6	6.9	24.3	96.4	
LOS		E		D	C		D	F	A	C	F	
Approach Delay		74.4			34.9			119.9			89.6	
Approach LOS		E			C			F			F	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	31.0
Total Split (%)	31%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		211		114	74		10	~481	14	27	~407	
Queue Length 95th (ft)		#586		#363	194		m#47	#691	43	57	#652	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		439		373	732		75	452	591	231	652	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		8		7	0		0	0	0	0	51	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.99		0.72	0.32		0.51	1.29	0.45	0.30	1.09	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.29	
Intersection Signal Delay: 86.9	Intersection LOS: F
Intersection Capacity Utilization 96.1%	ICU Level of Service F
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	
m Volume for 95th percentile queue is metered by upstream signal.	

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

102: Maplewood Ave & Hanover St
2035 No-Build Conditions Weekday PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	17	41	48	16	128	19	604	84	118	640	18
Future Volume (vph)	49	17	41	48	16	128	19	604	84	118	640	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.893				0.850		0.982			0.996	
Flt Protected	0.950				0.964			0.999		0.950		
Satd. Flow (prot)	1703	1301	0	0	1778	1568	0	3237	0	1626	1856	0
Flt Permitted	0.701				0.736			0.922		0.216		
Satd. Flow (perm)	1257	1301	0	0	1358	1568	0	2988	0	370	1856	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49				173		15			2	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.83	0.83	0.83	0.74	0.74	0.74	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	6%	12%	38%	4%	0%	3%	23%	10%	2%	11%	2%	0%
Adj. Flow (vph)	59	20	49	65	22	173	23	728	101	130	703	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	69	0	0	87	173	0	852	0	130	723	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	11.1	11.1			11.3	23.5		47.7		62.4	63.6	
Actuated g/C Ratio	0.11	0.11			0.11	0.24		0.48		0.62	0.64	
v/c Ratio	0.42	0.37			0.57	0.35		0.59		0.38	0.61	
Control Delay	49.4	22.3			55.7	6.0		27.8		11.7	15.5	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.5	
Total Delay	49.4	22.3			55.7	6.0		27.8		11.7	16.0	
LOS	D	C			E	A		C		B	B	
Approach Delay		34.8			22.7			27.8			15.3	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	35	12			53	0		263		46	290	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	67	44			80	23		#353		m34	m325	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	188	236			203	522		1432		359	1180	
Starvation Cap Reductn	0	0			0	0		0		0	148	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.31	0.29			0.43	0.33		0.59		0.36	0.70	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 22.5 | Intersection LOS: C

Intersection Capacity Utilization 79.9% | ICU Level of Service D

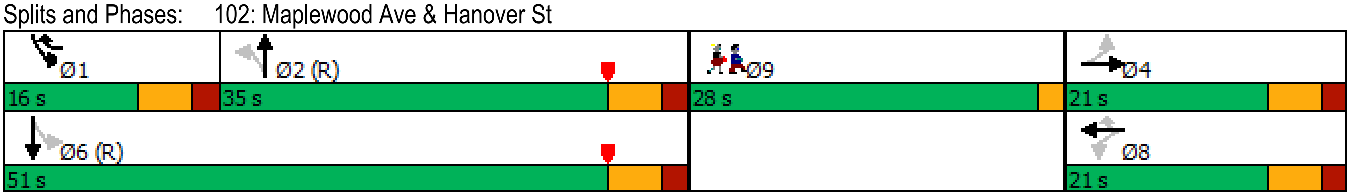
Analysis Period (min) 15

\# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	49.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	162	17	562	173	25	13	7	57	14	5	6
Future Vol, veh/h	13	162	17	562	173	25	13	7	57	14	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	77	77	77	80	80	80	75	75	75
Heavy Vehicles, %	0	5	13	4	25	0	20	0	3	0	0	0
Mvmt Flow	16	203	21	730	225	32	16	9	71	19	7	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	257	0	0	224	0	0	1955	1963	214	1987	1957	241
Stage 1	-	-	-	-	-	-	246	246	-	1701	1701	-
Stage 2	-	-	-	-	-	-	1709	1717	-	286	256	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.3	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.68	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1320	-	-	1333	-	-	43	64	823	46	64	803
Stage 1	-	-	-	-	-	-	719	706	-	118	149	-
Stage 2	-	-	-	-	-	-	104	146	-	726	699	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1320	-	-	1333	-	-	~ 16	23	823	~ 15	23	803
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 16	23	-	~ 15	23	-
Stage 1	-	-	-	-	-	-	709	696	-	116	53	-
Stage 2	-	-	-	-	-	-	32	52	-	646	689	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	8.1	$ 389	$ 638.1
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	65	1320	-	-	1333	-	-	22
HCM Lane V/C Ratio	1.481	0.012	-	-	0.548	-	-	1.515
HCM Control Delay (s)	$ 389	7.8	0	-	10.9	0	-	$ 638.1
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	8.3	0	-	-	3.5	-	-	4.3

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	20.9					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	209	24	26	679	81	301
Future Vol, veh/h	209	24	26	679	81	301
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	80	80	81	81
Heavy Vehicles, %	4	8	12	10	13	2
Mvmt Flow	246	28	33	849	100	372

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	274	0	1175	260
Stage 1	-	-	-	-	260	-
Stage 2	-	-	-	-	915	-
Critical Hdwy	-	-	4.22	-	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	-	-	2.308	-	3.617	3.318
Pot Cap-1 Maneuver	-	-	1234	-	201	779
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	373	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1234	-	191	779
Mov Cap-2 Maneuver	-	-	-	-	191	-
Stage 1	-	-	-	-	759	-
Stage 2	-	-	-	-	354	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	71.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1234	-
HCM Lane V/C Ratio	1.001	-	-	0.026	-
HCM Control Delay (s)	71.6	-	-	8	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	13.3	-	-	0.1	-

Intersection	
Int Delay, s/veh	11.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	359	61	75	23	16	466
Future Vol, veh/h	359	61	75	23	16	466
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	54	54	92	92
Heavy Vehicles, %	3	0	5	38	0	6
Mvmt Flow	408	69	139	43	17	507

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	182	0	-	0	1046	161
Stage 1	-	-	-	-	161	-
Stage 2	-	-	-	-	885	-
Critical Hdwy	4.13	-	-	-	6.4	6.26
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.354
Pot Cap-1 Maneuver	1387	-	-	-	255	874
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	407	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1387	-	-	-	177	874
Mov Cap-2 Maneuver	-	-	-	-	177	-
Stage 1	-	-	-	-	606	-
Stage 2	-	-	-	-	407	-

Approach	EB	WB	SB
HCM Control Delay, s	7.4	0	18.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1387	-	-	-	773
HCM Lane V/C Ratio	0.294	-	-	-	0.678
HCM Control Delay (s)	8.7	0	-	-	18.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	1.2	-	-	-	5.4

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	0	9	9	1	7	13	366	9	6	462	2
Future Vol, veh/h	8	0	9	9	1	7	13	366	9	6	462	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	25	25	25	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	8	0
Mvmt Flow	21	0	24	36	4	28	15	411	10	7	519	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	996	985	520	992	981	416	521	0	0	421	0	0
Stage 1	534	534	-	446	446	-	-	-	-	-	-	-
Stage 2	462	451	-	546	535	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	225	250	560	227	251	641	1056	-	-	1149	-	-
Stage 1	534	528	-	595	577	-	-	-	-	-	-	-
Stage 2	584	574	-	526	527	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	208	243	560	213	244	641	1056	-	-	1149	-	-
Mov Cap-2 Maneuver	208	243	-	213	244	-	-	-	-	-	-	-
Stage 1	524	523	-	584	566	-	-	-	-	-	-	-
Stage 2	544	563	-	499	522	-	-	-	-	-	-	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	18.5			20.7			0.3			0.1		
HCM LOS	C			C								

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1056	-	-	312	297	1149	-	-
HCM Lane V/C Ratio	0.014	-	-	0.143	0.229	0.006	-	-
HCM Control Delay (s)	8.5	0	-	18.5	20.7	8.2	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.9	0	-	-

Intersection						
Int Delay, s/veh	1.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	52	7	6	377	468	55
Future Vol, veh/h	52	7	6	377	468	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	8	7	410	509	60

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	963	539	569	0	-	0
Stage 1	539	-	-	-	-	-
Stage 2	424	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	284	542	1003	-	-	-
Stage 1	585	-	-	-	-	-
Stage 2	660	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	281	542	1003	-	-	-
Mov Cap-2 Maneuver	281	-	-	-	-	-
Stage 1	580	-	-	-	-	-
Stage 2	660	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1003	-	298	-	-
HCM Lane V/C Ratio	0.007	-	0.215	-	-
HCM Control Delay (s)	8.6	0	20.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.8	-	-

Intersection	
Int Delay, s/veh	178

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	422	8	0	541	396	523
Future Vol, veh/h	422	8	0	541	396	523
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	83	83
Heavy Vehicles, %	5	20	0	7	4	6
Mvmt Flow	515	10	0	588	477	630

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1065	477	-	0	-	0
Stage 1	477	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Critical Hdwy	6.45	6.4	-	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.48	-	-	-	-
Pot Cap-1 Maneuver	~ 243	553	0	-	-	0
Stage 1	618	-	0	-	-	0
Stage 2	549	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	~ 243	553	-	-	-	-
Mov Cap-2 Maneuver	~ 243	-	-	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	549	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 539.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	243	553	-
HCM Lane V/C Ratio	-	2.118	0.018	-
HCM Control Delay (s)	-	$ 549.5	11.6	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	38.9	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	11	15	173	55	31	6	259	116	31	373	76
Future Volume (vph)	26	11	15	173	55	31	6	259	116	31	373	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.960			0.946				0.850		0.975	
Flt Protected		0.976		0.950			0.950			0.950		
Satd. Flow (prot)	0	1620	0	1805	1853	0	1586	1655	1545	1646	1656	0
Flt Permitted		0.859		0.719			0.368			0.326		
Satd. Flow (perm)	0	1426	0	1366	1853	0	614	1655	1545	565	1656	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			25				132		12	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Heavy Vehicles (%)	20%	10%	5%	0%	2%	6%	10%	11%	8%	6%	9%	4%
Adj. Flow (vph)	29	12	17	188	60	34	7	294	132	33	401	82
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	58	0	188	94	0	7	294	132	33	483	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	24.0	24.0		24.0	24.0		29.0	29.0	29.0	16.0	45.0	
Total Split (%)	24.0%	24.0%		24.0%	24.0%		29.0%	29.0%	29.0%	16.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		38.6		38.6	38.6		30.9	30.9	30.9	39.0	39.0	
Actuated g/C Ratio		0.39		0.39	0.39		0.31	0.31	0.31	0.39	0.39	
v/c Ratio		0.10		0.36	0.13		0.04	0.58	0.23	0.11	0.74	
Control Delay		20.9		28.9	19.9		10.7	22.2	3.6	20.0	33.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Delay		20.9		28.9	19.9		10.7	22.2	3.6	20.0	33.7	
LOS		C		C	B		B	C	A	B	C	
Approach Delay		20.9			25.9			16.4			32.8	
Approach LOS		C			C			B			C	

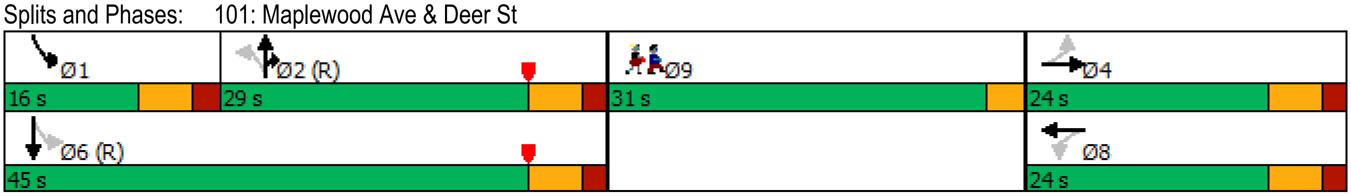
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	31.0
Total Split (%)	31%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		13		68	22		2	173	33	13	253	
Queue Length 95th (ft)		55		182	78		m4	#70	1	33	380	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		561		527	730		189	511	568	328	653	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		0		0	0		0	0	0	0	0	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.10		0.36	0.13		0.04	0.58	0.23	0.10	0.74	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.74
Intersection Signal Delay: 25.2 Intersection LOS: C
Intersection Capacity Utilization 52.0% ICU Level of Service A
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	29	15	31	2	46	15	315	55	68	473	20
Future Volume (vph)	20	29	15	31	2	46	15	315	55	68	473	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.949				0.850		0.979			0.994	
Flt Protected	0.950				0.955			0.998		0.950		
Satd. Flow (prot)	1703	1492	0	0	1749	1568	0	3225	0	1626	1853	0
Flt Permitted	0.728				0.702			0.925		0.417		
Satd. Flow (perm)	1305	1492	0	0	1286	1568	0	2989	0	714	1853	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				62		19			3	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.83	0.83	0.83	0.74	0.74	0.74	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	6%	12%	38%	4%	0%	3%	23%	10%	2%	11%	2%	0%
Adj. Flow (vph)	24	35	18	42	3	62	18	380	66	75	520	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	53	0	0	45	62	0	464	0	75	542	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	9.0	9.0			9.0	20.4		54.3		64.5	65.7	
Actuated g/C Ratio	0.09	0.09			0.09	0.20		0.54		0.64	0.66	
v/c Ratio	0.21	0.35			0.39	0.17		0.28		0.14	0.44	
Control Delay	44.9	36.7			51.8	8.4		19.4		12.3	13.8	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.2	
Total Delay	44.9	36.7			51.8	8.4		19.4		12.3	14.1	
LOS	D	D			D	A		B		B	B	
Approach Delay		39.2			26.7			19.4			13.9	
Approach LOS		D			C			B			B	
Queue Length 50th (ft)	14	21			28	0		108		27	213	

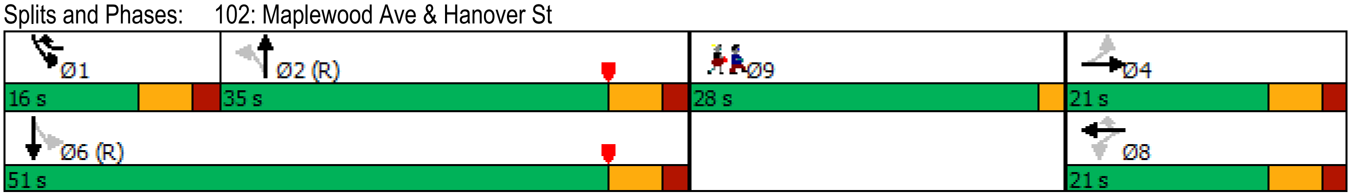
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	36	52			49	19		154		m24	281	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	195	239			192	404		1631		552	1218	
Starvation Cap Reductn	0	0			0	0		0		0	198	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.12	0.22			0.23	0.15		0.28		0.14	0.53	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 18.5	Intersection LOS: B
Intersection Capacity Utilization 60.5%	ICU Level of Service B
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	111	28	207	86	9	12	2	55	18	23	4
Future Vol, veh/h	2	111	28	207	86	9	12	2	55	18	23	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	77	77	77	80	80	80	75	75	75
Heavy Vehicles, %	0	5	13	4	25	0	20	0	3	0	0	0
Mvmt Flow	3	139	35	269	112	12	15	3	69	24	31	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	124	0	0	174	0	0	837	825	157	855	836	118
Stage 1	-	-	-	-	-	-	163	163	-	656	656	-
Stage 2	-	-	-	-	-	-	674	662	-	199	180	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.3	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.68	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1475	-	-	1391	-	-	267	310	886	281	305	939
Stage 1	-	-	-	-	-	-	798	767	-	458	465	-
Stage 2	-	-	-	-	-	-	416	462	-	807	754	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1475	-	-	1391	-	-	202	245	886	216	241	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	202	245	-	216	241	-
Stage 1	-	-	-	-	-	-	796	765	-	457	368	-
Stage 2	-	-	-	-	-	-	300	366	-	740	752	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	5.6	13.1	24.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	532	1475	-	-	1391	-	-	246
HCM Lane V/C Ratio	0.162	0.002	-	-	0.193	-	-	0.244
HCM Control Delay (s)	13.1	7.4	0	-	8.2	0	-	24.3
HCM Lane LOS	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	0.6	0	-	-	0.7	-	-	0.9

Intersection						
Int Delay, s/veh	8.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	170	14	9	265	38	361
Future Vol, veh/h	170	14	9	265	38	361
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	80	80	81	81
Heavy Vehicles, %	4	8	12	10	13	2
Mvmt Flow	200	16	11	331	47	446

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	216	0	561	208
Stage 1	-	-	-	-	208	-
Stage 2	-	-	-	-	353	-
Critical Hdwy	-	-	4.22	-	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	-	-	2.308	-	3.617	3.318
Pot Cap-1 Maneuver	-	-	1297	-	471	832
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	687	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1297	-	466	832
Mov Cap-2 Maneuver	-	-	-	-	466	-
Stage 1	-	-	-	-	801	-
Stage 2	-	-	-	-	680	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	17.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	774	-	-	1297	-
HCM Lane V/C Ratio	0.636	-	-	0.009	-
HCM Control Delay (s)	17.4	-	-	7.8	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	4.6	-	-	0	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	127	28	25	9	0	254
Future Vol, veh/h	127	28	25	9	0	254
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	54	54	92	92
Heavy Vehicles, %	3	0	5	38	0	6
Mvmt Flow	144	32	46	17	0	276

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	63	0	-	0	375	55
Stage 1	-	-	-	-	55	-
Stage 2	-	-	-	-	320	-
Critical Hdwy	4.13	-	-	-	6.4	6.26
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.354
Pot Cap-1 Maneuver	1533	-	-	-	630	1001
Stage 1	-	-	-	-	973	-
Stage 2	-	-	-	-	741	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1533	-	-	-	570	1001
Mov Cap-2 Maneuver	-	-	-	-	570	-
Stage 1	-	-	-	-	880	-
Stage 2	-	-	-	-	741	-

Approach	EB	WB	SB
HCM Control Delay, s	6.2	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1533	-	-	-	1001
HCM Lane V/C Ratio	0.094	-	-	-	0.276
HCM Control Delay (s)	7.6	0	-	-	10
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	1.1

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	1	10	1	0	5	25	107	7	6	242	28
Future Vol, veh/h	12	1	10	1	0	5	25	107	7	6	242	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	25	25	25	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	8	0
Mvmt Flow	32	3	26	4	0	20	28	120	8	7	272	31

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	492	486	288	496	497	124	303	0	0	128	0	0
Stage 1	302	302	-	180	180	-	-	-	-	-	-	-
Stage 2	190	184	-	316	317	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	490	484	756	487	477	932	1269	-	-	1470	-	-
Stage 1	712	668	-	826	754	-	-	-	-	-	-	-
Stage 2	816	751	-	699	658	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	468	469	756	457	463	932	1269	-	-	1470	-	-
Mov Cap-2 Maneuver	468	469	-	457	463	-	-	-	-	-	-	-
Stage 1	695	664	-	806	736	-	-	-	-	-	-	-
Stage 2	779	733	-	668	654	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	9.7	1.4	0.2
HCM LOS	B	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1269	-	-	561	794	1470	-	-
HCM Lane V/C Ratio	0.022	-	-	0.108	0.03	0.005	-	-
HCM Control Delay (s)	7.9	0	-	12.2	9.7	7.5	0	-
HCM Lane LOS	A	A	-	B	A	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0	-	-

Intersection						
Int Delay, s/veh	1.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	24	2	122	249	20
Future Vol, veh/h	22	24	2	122	249	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	26	2	133	271	22

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	419	282	293	0	-	0
Stage 1	282	-	-	-	-	-
Stage 2	137	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	591	757	1269	-	-	-
Stage 1	766	-	-	-	-	-
Stage 2	890	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	590	757	1269	-	-	-
Mov Cap-2 Maneuver	590	-	-	-	-	-
Stage 1	764	-	-	-	-	-
Stage 2	890	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10.8	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1269	-	667	-	-
HCM Lane V/C Ratio	0.002	-	0.075	-	-
HCM Control Delay (s)	7.8	0	10.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Intersection						
Int Delay, s/veh	3.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	138	6	0	157	277	268
Future Vol, veh/h	138	6	0	157	277	268
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	83	83
Heavy Vehicles, %	5	20	0	7	4	6
Mvmt Flow	168	7	0	171	334	323

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	505	334	-	0	-	0
Stage 1	334	-	-	-	-	-
Stage 2	171	-	-	-	-	-
Critical Hdwy	6.45	6.4	-	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.48	-	-	-	-
Pot Cap-1 Maneuver	522	668	0	-	-	0
Stage 1	719	-	0	-	-	0
Stage 2	852	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	522	668	-	-	-	-
Mov Cap-2 Maneuver	522	-	-	-	-	-
Stage 1	719	-	-	-	-	-
Stage 2	852	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.9	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	522	668	-
HCM Lane V/C Ratio	-	0.322	0.011	-
HCM Control Delay (s)	-	15.1	10.4	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	1.4	0	-

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	301	15	35	480
Future Vol, veh/h	0	0	301	15	35	480
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	327	16	38	522

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	933	335	0	0	343	0
Stage 1	335	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	295	707	-	-	1216	-
Stage 1	725	-	-	-	-	-
Stage 2	549	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	282	707	-	-	1216	-
Mov Cap-2 Maneuver	282	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	525	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1216	-
HCM Lane V/C Ratio	-	-	-	0.031	-
HCM Control Delay (s)	-	-	0	8.1	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	Y	
Traffic Vol, veh/h	21	0	0	22	0	25
Future Vol, veh/h	21	0	0	22	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	0	0	24	0	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	47	23
Stage 1	-	-	-	-	23	-
Stage 2	-	-	-	-	24	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	963	1054
Stage 1	-	0	0	-	1000	-
Stage 2	-	0	0	-	999	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	963	1054
Mov Cap-2 Maneuver	-	-	-	-	963	-
Stage 1	-	-	-	-	1000	-
Stage 2	-	-	-	-	999	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	1054	-	-
HCM Lane V/C Ratio	0.026	-	-
HCM Control Delay (s)	8.5	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	96	7	261	106	69	6	486	226	62	437	52
Future Volume (vph)	96	96	7	261	106	69	6	486	226	62	437	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.944				0.850		0.985	
Flt Protected		0.972		0.950			0.950			0.950		
Satd. Flow (prot)	0	1877	0	1770	1913	0	1558	1818	1636	1745	1807	0
Flt Permitted		0.603		0.568			0.244			0.123		
Satd. Flow (perm)	0	1165	0	1058	1913	0	400	1818	1636	226	1807	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			28				244		6	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.51	0.79	0.38	0.67	0.75	0.82	0.63	0.87	0.90	0.58	0.85	0.91
Heavy Vehicles (%)	1%	1%	0%	2%	0%	0%	12%	1%	2%	0%	0%	1%
Adj. Flow (vph)	188	122	18	390	141	84	10	559	251	107	514	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	328	0	390	225	0	10	559	251	107	571	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	30.0	30.0		30.0	30.0		33.0	33.0	33.0	11.0	44.0	
Total Split (%)	30.0%	30.0%		30.0%	30.0%		33.0%	33.0%	33.0%	11.0%	44.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		29.2		29.2	29.2		27.0	27.0	27.0	38.0	38.0	
Actuated g/C Ratio		0.29		0.29	0.29		0.27	0.27	0.27	0.38	0.38	
v/c Ratio		0.96		1.27	0.39		0.09	1.14	0.41	0.66	0.83	
Control Delay		79.0		176.9	29.5		21.0	108.8	3.9	42.8	39.8	
Queue Delay		8.0		0.4	0.0		0.0	0.0	0.0	0.0	2.4	
Total Delay		87.0		177.3	29.5		21.0	108.8	3.9	42.8	42.2	
LOS		F		F	C		C	F	A	D	D	
Approach Delay		87.0			123.2			75.6			42.3	
Approach LOS		F			F			E			D	

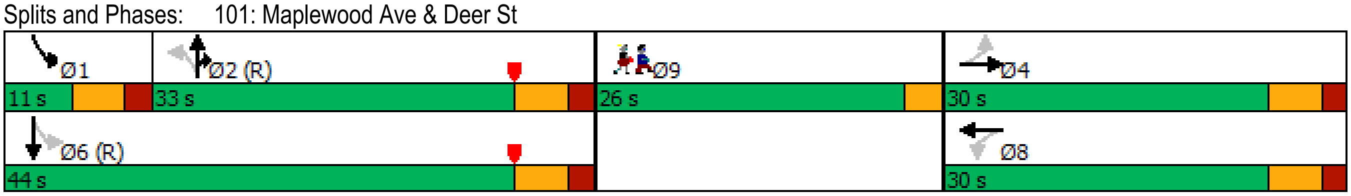
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		~249		~351	107		2	~422	0	44	321	
Queue Length 95th (ft)		#349		#354	142		m6	#565	39	51	426	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		342		308	578		108	490	619	161	690	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		13		11	0		0	0	0	0	48	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		1.00		1.31	0.39		0.09	1.14	0.41	0.66	0.89	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.27
Intersection Signal Delay: 79.9 Intersection LOS: E
Intersection Capacity Utilization 79.7% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	15	6	43	14	116	7	558	76	107	583	16
Future Volume (vph)	44	15	6	43	14	116	7	558	76	107	583	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.955				0.850		0.982			0.996	
Flt Protected	0.950				0.964			0.999		0.950		
Satd. Flow (prot)	1805	1562	0	0	1832	1615	0	3481	0	1687	1874	0
Flt Permitted	0.714				0.754			0.946		0.250		
Satd. Flow (perm)	1357	1562	0	0	1433	1615	0	3296	0	444	1874	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				135		15			2	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.57	0.57	0.57	0.86	0.86	0.86	0.89	0.89	0.89	0.85	0.85	0.85
Heavy Vehicles (%)	0%	23%	0%	0%	0%	0%	0%	2%	0%	7%	1%	0%
Adj. Flow (vph)	77	26	11	50	16	135	8	627	85	126	686	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	37	0	0	66	135	0	720	0	126	705	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	10.8	10.8			10.7	23.3		42.3		57.2	58.4	
Actuated g/C Ratio	0.11	0.11			0.11	0.23		0.42		0.57	0.58	
v/c Ratio	0.52	0.21			0.43	0.28		0.51		0.35	0.64	
Control Delay	54.0	32.6			49.2	6.2		27.3		8.3	11.8	
Queue Delay	0.0	0.0			0.0	0.0		0.2		0.0	0.6	
Total Delay	54.0	32.6			49.2	6.2		27.5		8.3	12.5	
LOS	D	C			D	A		C		A	B	
Approach Delay		47.1			20.3			27.5			11.8	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	47	15			40	0		199		12	183	

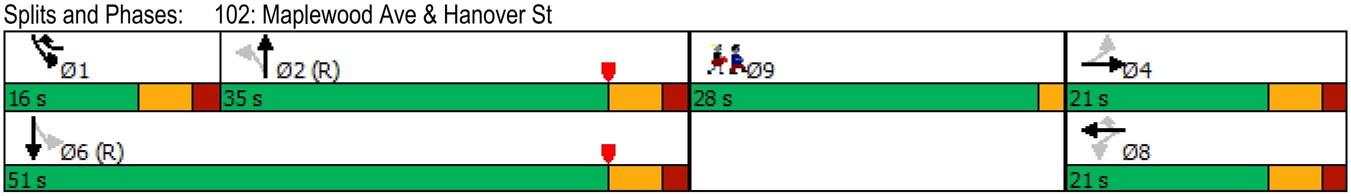
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	55	25			76	37		278		m29	m304	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	203	243			214	499		1403		380	1095	
Starvation Cap Reductn	0	0			0	0		0		0	133	
Spillback Cap Reductn	0	0			0	7		184		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.38	0.15			0.31	0.27		0.59		0.33	0.73	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 20.9	Intersection LOS: C
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	9.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	135	15	460	142	23	11	6	49	12	4	5
Future Vol, veh/h	11	135	15	460	142	23	11	6	49	12	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	82	82	82	93	93	93	74	74	74	57	57	57
Heavy Vehicles, %	0	0	0	2	4	0	0	0	0	0	0	0
Mvmt Flow	13	165	18	495	153	25	15	8	66	21	7	9

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	178	0	0	183	0	0	1364	1368	174	1393	1365	166
Stage 1	-	-	-	-	-	-	200	200	-	1156	1156	-
Stage 2	-	-	-	-	-	-	1164	1168	-	237	209	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.1	6.5	6.2	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.1	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1410	-	-	1392	-	-	126	148	875	120	149	884
Stage 1	-	-	-	-	-	-	806	739	-	242	273	-
Stage 2	-	-	-	-	-	-	239	270	-	771	733	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1410	-	-	1392	-	-	81	89	875	71	89	884
Mov Cap-2 Maneuver	-	-	-	-	-	-	81	89	-	71	89	-
Stage 1	-	-	-	-	-	-	798	732	-	240	165	-
Stage 2	-	-	-	-	-	-	137	163	-	698	726	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	6.6	26.5	64.2
HCM LOS			D	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	255	1410	-	-	1392	-	-	96
HCM Lane V/C Ratio	0.35	0.01	-	-	0.355	-	-	0.384
HCM Control Delay (s)	26.5	7.6	0	-	9	0	-	64.2
HCM Lane LOS	D	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	1.5	0	-	-	1.6	-	-	1.5

Intersection						
Int Delay, s/veh	6.2					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	175	22	24	552	73	255
Future Vol, veh/h	175	22	24	552	73	255
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	89	89
Heavy Vehicles, %	1	0	0	1	5	0
Mvmt Flow	213	27	26	600	82	287

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	240	0	879	227
Stage 1	-	-	-	-	227	-
Stage 2	-	-	-	-	652	-
Critical Hdwy	-	-	4.1	-	6.45	6.2
Critical Hdwy Stg 1	-	-	-	-	5.45	-
Critical Hdwy Stg 2	-	-	-	-	5.45	-
Follow-up Hdwy	-	-	2.2	-	3.545	3.3
Pot Cap-1 Maneuver	-	-	1339	-	314	817
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	513	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1339	-	305	817
Mov Cap-2 Maneuver	-	-	-	-	305	-
Stage 1	-	-	-	-	804	-
Stage 2	-	-	-	-	498	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	20.4
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	595	-	-	1339	-
HCM Lane V/C Ratio	0.619	-	-	0.019	-
HCM Control Delay (s)	20.4	-	-	7.7	0
HCM Lane LOS	C	-	-	A	A
HCM 95th %tile Q(veh)	4.2	-	-	0.1	-

Intersection	
Int Delay, s/veh	11.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	312	56	68	21	14	445
Future Vol, veh/h	312	56	68	21	14	445
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	85	70	81	54	42	89
Heavy Vehicles, %	2	0	0	0	0	2
Mvmt Flow	367	80	84	39	33	500

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	123	0	-	0	918	104
Stage 1	-	-	-	-	104	-
Stage 2	-	-	-	-	814	-
Critical Hdwy	4.12	-	-	-	6.4	6.22
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1464	-	-	-	304	951
Stage 1	-	-	-	-	925	-
Stage 2	-	-	-	-	439	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1464	-	-	-	224	951
Mov Cap-2 Maneuver	-	-	-	-	224	-
Stage 1	-	-	-	-	683	-
Stage 2	-	-	-	-	439	-

Approach	EB	WB	SB
HCM Control Delay, s	6.8	0	18.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1464	-	-	-	791
HCM Lane V/C Ratio	0.251	-	-	-	0.674
HCM Control Delay (s)	8.3	0	-	-	18.4
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	1	-	-	-	5.3

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✥			✥			✥			✥	
Traffic Vol, veh/h	31	0	32	8	1	6	30	299	8	5	417	15
Future Vol, veh/h	31	0	32	8	1	6	30	299	8	5	417	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	45	45	45	75	75	75	82	82	82	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0	0	2	0	0	2	0
Mvmt Flow	69	0	71	11	1	8	37	365	10	6	485	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	955	955	494	985	958	370	502	0	0	375	0	0
Stage 1	506	506	-	444	444	-	-	-	-	-	-	-
Stage 2	449	449	-	541	514	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	240	260	579	229	259	680	1073	-	-	1195	-	-
Stage 1	552	543	-	597	579	-	-	-	-	-	-	-
Stage 2	593	576	-	529	539	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	227	247	579	193	246	680	1073	-	-	1195	-	-
Mov Cap-2 Maneuver	227	247	-	193	246	-	-	-	-	-	-	-
Stage 1	528	539	-	571	554	-	-	-	-	-	-	-
Stage 2	559	551	-	461	535	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	23.9	19.1	0.8	0.1
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1073	-	-	328	276	1195	-	-
HCM Lane V/C Ratio	0.034	-	-	0.427	0.072	0.005	-	-
HCM Control Delay (s)	8.5	0	-	23.9	19.1	8	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.1	0.2	0	-	-

Intersection						
Int Delay, s/veh	2.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	86	28	5	333	413	52
Future Vol, veh/h	86	28	5	333	413	52
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	93	30	5	362	449	57

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	850	478	506	0	-	0
Stage 1	478	-	-	-	-	-
Stage 2	372	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	331	587	1059	-	-	-
Stage 1	624	-	-	-	-	-
Stage 2	697	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	329	587	1059	-	-	-
Mov Cap-2 Maneuver	329	-	-	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	697	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	19.6	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1059	-	369	-	-
HCM Lane V/C Ratio	0.005	-	0.336	-	-
HCM Control Delay (s)	8.4	0	19.6	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	1.4	-	-

Intersection						
Int Delay, s/veh	183.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	412	7	0	489	359	465
Future Vol, veh/h	412	7	0	489	359	465
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	50	25	71	82	87
Heavy Vehicles, %	2	0	0	0	1	2
Mvmt Flow	502	14	0	689	438	534

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1127	438	-	0	-	0
Stage 1	438	-	-	-	-	-
Stage 2	689	-	-	-	-	-
Critical Hdwy	6.42	6.2	-	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.3	-	-	-	-
Pot Cap-1 Maneuver	~ 226	623	0	-	-	0
Stage 1	651	-	0	-	-	0
Stage 2	~ 498	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	~ 226	623	-	-	-	-
Mov Cap-2 Maneuver	~ 226	-	-	-	-	-
Stage 1	651	-	-	-	-	-
Stage 2	~ 498	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 583	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	226	623	-
HCM Lane V/C Ratio	-	2.223	0.022	-
HCM Control Delay (s)	-	$ 598.9	10.9	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	39.3	0.1	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	633	18	20	551
Future Vol, veh/h	0	0	633	18	20	551
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	688	20	22	599

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1341	698	0	0	708	0
Stage 1	698	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	168	440	-	-	891	-
Stage 1	494	-	-	-	-	-
Stage 2	523	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	162	440	-	-	891	-
Mov Cap-2 Maneuver	162	-	-	-	-	-
Stage 1	494	-	-	-	-	-
Stage 2	504	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	891	-
HCM Lane V/C Ratio	-	-	-	0.024	-
HCM Control Delay (s)	-	-	0	9.1	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection						
Int Delay, s/veh	3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	Y	
Traffic Vol, veh/h	55	0	0	57	0	59
Future Vol, veh/h	55	0	0	57	0	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	0	0	62	0	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	122	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	62	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	873	1005
Stage 1	-	0	0	-	963	-
Stage 2	-	0	0	-	961	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	873	1005
Mov Cap-2 Maneuver	-	-	-	-	873	-
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	961	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	1005	-	-
HCM Lane V/C Ratio	0.064	-	-
HCM Control Delay (s)	8.8	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-

Intersection	
Int Delay, s/veh	8.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	136	31	261	108	10	14	2	63	19	25	5
Future Vol, veh/h	2	136	31	261	108	10	14	2	63	19	25	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	77	77	77	80	80	80	75	75	75
Heavy Vehicles, %	0	5	13	4	25	0	20	0	3	0	0	0
Mvmt Flow	3	170	39	339	140	13	18	3	79	25	33	7

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	153	0	0	209	0	0	1041	1027	190	1062	1040	147
Stage 1	-	-	-	-	-	-	196	196	-	825	825	-
Stage 2	-	-	-	-	-	-	845	831	-	237	215	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.3	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.68	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1440	-	-	1350	-	-	193	236	849	203	232	905
Stage 1	-	-	-	-	-	-	766	742	-	370	390	-
Stage 2	-	-	-	-	-	-	333	387	-	771	729	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1440	-	-	1350	-	-	129	171	849	143	168	905
Mov Cap-2 Maneuver	-	-	-	-	-	-	129	171	-	143	168	-
Stage 1	-	-	-	-	-	-	764	741	-	369	283	-
Stage 2	-	-	-	-	-	-	211	281	-	696	728	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	5.9	16.7	38.5
HCM LOS			C	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	406	1440	-	-	1350	-	-	171
HCM Lane V/C Ratio	0.243	0.002	-	-	0.251	-	-	0.382
HCM Control Delay (s)	16.7	7.5	0	-	8.6	0	-	38.5
HCM Lane LOS	C	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	0.9	0	-	-	1	-	-	1.6

Intersection						
Int Delay, s/veh	15.5					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	203	16	10	337	42	465
Future Vol, veh/h	203	16	10	337	42	465
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	80	80	81	81
Heavy Vehicles, %	4	8	12	10	13	2
Mvmt Flow	239	19	13	421	52	574

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	258	0	696	249
Stage 1	-	-	-	-	249	-
Stage 2	-	-	-	-	447	-
Critical Hdwy	-	-	4.22	-	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	-	-	2.308	-	3.617	3.318
Pot Cap-1 Maneuver	-	-	1251	-	391	790
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	622	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1251	-	386	790
Mov Cap-2 Maneuver	-	-	-	-	386	-
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	613	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	32.5
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	727	-	-	1251	-
HCM Lane V/C Ratio	0.861	-	-	0.01	-
HCM Control Delay (s)	32.5	-	-	7.9	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	10.3	-	-	0	-

Intersection						
Int Delay, s/veh	8					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	156	31	27	10	0	318
Future Vol, veh/h	156	31	27	10	0	318
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	54	54	92	92
Heavy Vehicles, %	3	0	5	38	0	6
Mvmt Flow	177	35	50	19	0	346

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	69	0	-	0	449	60
Stage 1	-	-	-	-	60	-
Stage 2	-	-	-	-	389	-
Critical Hdwy	4.13	-	-	-	6.4	6.26
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.354
Pot Cap-1 Maneuver	1526	-	-	-	571	994
Stage 1	-	-	-	-	968	-
Stage 2	-	-	-	-	689	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1526	-	-	-	504	994
Mov Cap-2 Maneuver	-	-	-	-	504	-
Stage 1	-	-	-	-	854	-
Stage 2	-	-	-	-	689	-

Approach	EB	WB	SB
HCM Control Delay, s	6.4	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1526	-	-	-	994
HCM Lane V/C Ratio	0.116	-	-	-	0.348
HCM Control Delay (s)	7.7	0	-	-	10.5
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.4	-	-	-	1.6

Intersection												
Int Delay, s/veh	2.1											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		✣			✣			✣			✣	
Traffic Vol, veh/h	12	1	10	1	0	6	26	135	8	7	306	29
Future Vol, veh/h	12	1	10	1	0	6	26	135	8	7	306	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	25	25	25	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	8	0
Mvmt Flow	32	3	26	4	0	24	29	152	9	8	344	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	604	596	361	606	608	157	377	0	0	161	0	0
Stage 1	377	377	-	215	215	-	-	-	-	-	-	-
Stage 2	227	219	-	391	393	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	413	420	688	412	413	894	1193	-	-	1430	-	-
Stage 1	649	619	-	792	729	-	-	-	-	-	-	-
Stage 2	780	726	-	637	609	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	392	406	688	384	399	894	1193	-	-	1430	-	-
Mov Cap-2 Maneuver	392	406	-	384	399	-	-	-	-	-	-	-
Stage 1	631	615	-	771	709	-	-	-	-	-	-	-
Stage 2	739	706	-	606	605	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.5	10	1.2	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1193	-	-	483	751	1430	-	-
HCM Lane V/C Ratio	0.024	-	-	0.125	0.037	0.006	-	-
HCM Control Delay (s)	8.1	0	-	13.5	10	7.5	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.1	0	-	-

Intersection						
Int Delay, s/veh	1.1					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	23	26	2	151	312	22
Future Vol, veh/h	23	26	2	151	312	22
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	28	2	164	339	24

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	519	351	363	0	-	0
Stage 1	351	-	-	-	-	-
Stage 2	168	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	517	692	1196	-	-	-
Stage 1	713	-	-	-	-	-
Stage 2	862	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	516	692	1196	-	-	-
Mov Cap-2 Maneuver	516	-	-	-	-	-
Stage 1	712	-	-	-	-	-
Stage 2	862	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	11.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1196	-	596	-	-
HCM Lane V/C Ratio	0.002	-	0.089	-	-
HCM Control Delay (s)	8	0	11.6	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection						
Int Delay, s/veh	4.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	167	7	0	173	306	334
Future Vol, veh/h	167	7	0	173	306	334
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	83	83
Heavy Vehicles, %	5	20	0	7	4	6
Mvmt Flow	204	9	0	188	369	402

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	557	369	-	0	-	0
Stage 1	369	-	-	-	-	-
Stage 2	188	-	-	-	-	-
Critical Hdwy	6.45	6.4	-	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.48	-	-	-	-
Pot Cap-1 Maneuver	486	638	0	-	-	0
Stage 1	693	-	0	-	-	0
Stage 2	837	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	486	638	-	-	-	-
Mov Cap-2 Maneuver	486	-	-	-	-	-
Stage 1	693	-	-	-	-	-
Stage 2	837	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.3	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	486	638	-
HCM Lane V/C Ratio	-	0.419	0.013	-
HCM Control Delay (s)	-	17.6	10.7	-
HCM Lane LOS	-	C	B	-
HCM 95th %tile Q(veh)	-	2	0	-

Intersection						
Int Delay, s/veh	0.3					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	332	15	35	628
Future Vol, veh/h	0	0	332	15	35	628
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	361	16	38	683

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1128	369	0	0	377	0
Stage 1	369	-	-	-	-	-
Stage 2	759	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	226	677	-	-	1181	-
Stage 1	699	-	-	-	-	-
Stage 2	462	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	214	677	-	-	1181	-
Mov Cap-2 Maneuver	214	-	-	-	-	-
Stage 1	699	-	-	-	-	-
Stage 2	438	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	1181	-
HCM Lane V/C Ratio	-	-	-	0.032	-
HCM Control Delay (s)	-	-	0	8.2	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection						
Int Delay, s/veh	2.9					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	24	0	0	24	0	25
Future Vol, veh/h	24	0	0	24	0	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	0	0	26	0	27

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	52	26
Stage 1	-	-	-	-	26	-
Stage 2	-	-	-	-	26	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	957	1050
Stage 1	-	0	0	-	997	-
Stage 2	-	0	0	-	997	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	957	1050
Mov Cap-2 Maneuver	-	-	-	-	957	-
Stage 1	-	-	-	-	997	-
Stage 2	-	-	-	-	997	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	1050	-	-
HCM Lane V/C Ratio	0.026	-	-
HCM Control Delay (s)	8.5	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	191	142	51	285	143	76	33	533	248	68	482	127
Future Volume (vph)	191	142	51	285	143	76	33	533	248	68	482	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.948				0.850		0.969	
Flt Protected		0.976		0.950			0.950			0.950		
Satd. Flow (prot)	0	1646	0	1805	1858	0	1586	1655	1545	1646	1649	0
Flt Permitted		0.661		0.509			0.147			0.120		
Satd. Flow (perm)	0	1115	0	967	1858	0	245	1655	1545	208	1649	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			25				256		16	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Heavy Vehicles (%)	20%	10%	5%	0%	2%	6%	10%	11%	8%	6%	9%	4%
Adj. Flow (vph)	212	158	57	310	155	83	38	606	282	73	518	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	427	0	310	238	0	38	606	282	73	655	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	29.0	29.0		29.0	29.0		34.0	34.0	34.0	11.0	45.0	
Total Split (%)	29.0%	29.0%		29.0%	29.0%		34.0%	34.0%	34.0%	11.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		38.6		38.6	38.6		30.2	30.2	30.2	39.0	39.0	
Actuated g/C Ratio		0.39		0.39	0.39		0.30	0.30	0.30	0.39	0.39	
v/c Ratio		0.98		0.83	0.33		0.52	1.21	0.44	0.48	1.00	
Control Delay		73.6		52.8	24.6		48.3	139.8	6.2	30.3	67.5	
Queue Delay		11.0		2.0	0.0		0.0	0.0	0.0	0.0	33.2	
Total Delay		84.7		54.8	24.6		48.3	139.8	6.2	30.3	100.7	
LOS		F		D	C		D	F	A	C	F	
Approach Delay		84.7			41.7			95.4			93.6	
Approach LOS		F			D			F			F	

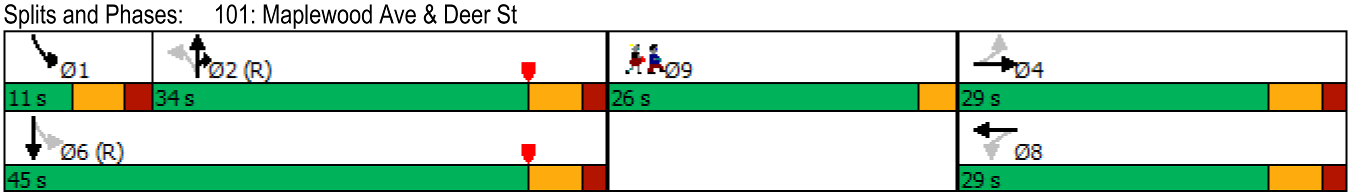
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	26%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		212		143	75		10	~474	21	29	~407	
Queue Length 95th (ft)		#588		#433	197		m22	#660	47	59	#652	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		434		373	732		73	499	644	153	652	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		18		15	0		0	0	0	0	74	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		1.03		0.87	0.33		0.52	1.21	0.44	0.48	1.13	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 82.0 Intersection LOS: F
Intersection Capacity Utilization 98.4% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	49	17	41	48	16	128	19	637	84	118	681	18
Future Volume (vph)	49	17	41	48	16	128	19	637	84	118	681	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.893				0.850		0.983			0.996	
Flt Protected	0.950				0.964			0.999		0.950		
Satd. Flow (prot)	1703	1301	0	0	1778	1568	0	3240	0	1626	1856	0
Flt Permitted	0.701				0.736			0.921		0.201		
Satd. Flow (perm)	1257	1301	0	0	1358	1568	0	2987	0	344	1856	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49				173		14			2	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.83	0.83	0.83	0.74	0.74	0.74	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	6%	12%	38%	4%	0%	3%	23%	10%	2%	11%	2%	0%
Adj. Flow (vph)	59	20	49	65	22	173	23	767	101	130	748	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	69	0	0	87	173	0	891	0	130	768	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	11.1	11.1			11.3	23.5		47.7		62.4	63.6	
Actuated g/C Ratio	0.11	0.11			0.11	0.24		0.48		0.62	0.64	
v/c Ratio	0.42	0.37			0.57	0.35		0.62		0.40	0.65	
Control Delay	49.4	22.3			55.7	6.0		28.6		11.3	16.4	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.6	
Total Delay	49.4	22.3			55.7	6.0		28.6		11.3	17.0	
LOS	D	C			E	A		C		B	B	
Approach Delay		34.8			22.7			28.6			16.2	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	35	12			53	0		281		48	320	

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

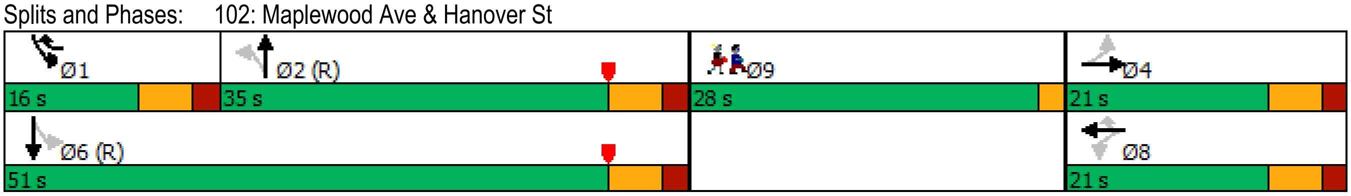
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	67	44			80	23		#381		m32	m415	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	188	236			203	522		1431		345	1180	
Starvation Cap Reductn	0	0			0	0		0		0	147	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.31	0.29			0.43	0.33		0.62		0.38	0.74	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 23.2	Intersection LOS: C
Intersection Capacity Utilization 82.9%	ICU Level of Service E
Analysis Period (min) 15	

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	30	34	189	100	34	38	285	127	33	412	183
Future Volume (vph)	76	30	34	189	100	34	38	285	127	33	412	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	13	13	12	14	14	11	11	13	11	11	11
Storage Length (ft)	0		0	75		100	75		0	100		0
Storage Lanes	0		0	1		0	1		1	1		0
Taper Length (ft)	25			75			75			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967			0.962				0.850		0.954	
Flt Protected		0.974		0.950			0.950			0.950		
Satd. Flow (prot)	0	1619	0	1805	1893	0	1586	1655	1545	1646	1631	0
Flt Permitted		0.772		0.669			0.150			0.286		
Satd. Flow (perm)	0	1284	0	1271	1893	0	250	1655	1545	496	1631	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			15				144		26	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		305			453			435			141	
Travel Time (s)		8.3			12.4			11.9			3.2	
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Heavy Vehicles (%)	20%	10%	5%	0%	2%	6%	10%	11%	8%	6%	9%	4%
Adj. Flow (vph)	84	33	38	205	109	37	43	324	144	35	443	197
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	155	0	205	146	0	43	324	144	35	640	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Prot	pm+pt	NA	
Protected Phases		4			8			2	2	1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2	2	1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0		10.0	10.0	10.0	5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0		16.0	16.0	16.0	11.0	16.0	
Total Split (s)	24.0	24.0		24.0	24.0		29.0	29.0	29.0	16.0	45.0	
Total Split (%)	24.0%	24.0%		24.0%	24.0%		29.0%	29.0%	29.0%	16.0%	45.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)		0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		6.0		6.0	6.0		6.0	6.0	6.0	6.0	6.0	
Lead/Lag							Lag	Lag	Lag	Lead		
Lead-Lag Optimize?							Yes	Yes	Yes	Yes		
Recall Mode	Max	Max		None	None		C-Max	C-Max	C-Max	None	C-Max	
Act Effct Green (s)		38.6		38.6	38.6		30.8	30.8	30.8	39.0	39.0	
Actuated g/C Ratio		0.39		0.39	0.39		0.31	0.31	0.31	0.39	0.39	
v/c Ratio		0.31		0.42	0.20		0.56	0.64	0.25	0.13	0.98	
Control Delay		26.0		30.6	23.4		49.7	26.0	3.4	20.3	61.7	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0	0.0	8.0	
Total Delay		26.0		30.6	23.4		49.7	26.0	3.4	20.3	69.7	
LOS		C		C	C		D	C	A	C	E	
Approach Delay		26.0			27.6			21.6			67.1	
Approach LOS		C			C			C			E	

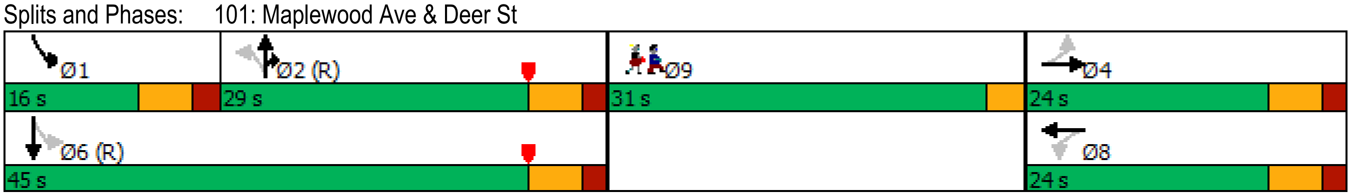
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Width (ft)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	1.0
Minimum Split (s)	26.0
Total Split (s)	31.0
Total Split (%)	31%
Yellow Time (s)	3.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		50		77	44		22	193	2	14	384	
Queue Length 95th (ft)		144		#220	126		#82	#296	22	34	#627	
Internal Link Dist (ft)		225			373			355			61	
Turn Bay Length (ft)				75			75			100		
Base Capacity (vph)		504		490	739		77	510	575	308	651	
Starvation Cap Reductn		0		0	0		0	0	0	0	0	
Spillback Cap Reductn		0		0	0		0	0	0	0	21	
Storage Cap Reductn		0		0	0		0	0	0	0	0	
Reduced v/c Ratio		0.31		0.42	0.20		0.56	0.64	0.25	0.11	1.02	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 6 (6%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 41.4 — Intersection LOS: D
Intersection Capacity Utilization 66.2% — ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 101: Maplewood Ave & Deer St



Lane Group	Ø9
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	32	29	35	2	51	32	377	60	75	540	22
Future Volume (vph)	22	32	29	35	2	51	32	377	60	75	540	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		75	0		0	175		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	25			25			25			75		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	1.00	1.00	1.00
Frt		0.929				0.850		0.981			0.994	
Flt Protected	0.950				0.955			0.997		0.950		
Satd. Flow (prot)	1703	1420	0	0	1749	1568	0	3213	0	1626	1853	0
Flt Permitted	0.724				0.685			0.875		0.360		
Satd. Flow (perm)	1298	1420	0	0	1254	1568	0	2820	0	616	1853	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		35				69		16			3	
Link Speed (mph)		25			25			25			30	
Link Distance (ft)		152			315			356			435	
Travel Time (s)		4.1			8.6			9.7			9.9	
Peak Hour Factor	0.83	0.83	0.83	0.74	0.74	0.74	0.83	0.83	0.83	0.91	0.91	0.91
Heavy Vehicles (%)	6%	12%	38%	4%	0%	3%	23%	10%	2%	11%	2%	0%
Adj. Flow (vph)	27	39	35	47	3	69	39	454	72	82	593	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	74	0	0	50	69	0	565	0	82	617	0
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		4			8	1		2		1	6	
Permitted Phases	4			8		8	2			6		
Detector Phase	4	4		8	8	1	2	2		1	6	
Switch Phase												
Minimum Initial (s)	5.0	5.0		5.0	5.0	5.0	10.0	10.0		5.0	10.0	
Minimum Split (s)	11.0	11.0		11.0	11.0	11.0	16.0	16.0		11.0	16.0	
Total Split (s)	21.0	21.0		21.0	21.0	16.0	35.0	35.0		16.0	51.0	
Total Split (%)	21.0%	21.0%		21.0%	21.0%	16.0%	35.0%	35.0%		16.0%	51.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Lost Time (s)	6.0	6.0			6.0	6.0		6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead		
Lead-Lag Optimize?						Yes	Yes	Yes		Yes		
Recall Mode	None	None		None	None	None	C-Min	C-Min		None	C-Min	
Act Effct Green (s)	9.4	9.4			9.4	21.1		53.6		64.1	65.3	
Actuated g/C Ratio	0.09	0.09			0.09	0.21		0.54		0.64	0.65	
v/c Ratio	0.22	0.45			0.43	0.18		0.37		0.17	0.51	
Control Delay	44.8	33.4			52.9	7.8		21.5		11.4	14.0	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.4	
Total Delay	44.8	33.4			52.9	7.8		21.5		11.4	14.4	
LOS	D	C			D	A		C		B	B	
Approach Delay		36.5			26.7			21.5			14.0	
Approach LOS		D			C			C			B	
Queue Length 50th (ft)	16	24			31	0		143		31	263	

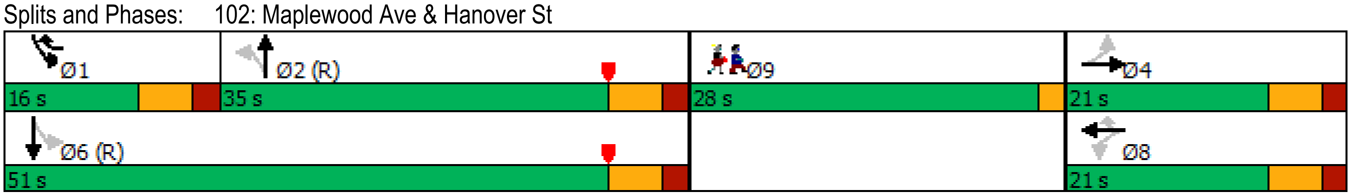
Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Storage Length (ft)	
Storage Lanes	
Taper Length (ft)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	28.0
Total Split (s)	28.0
Total Split (%)	28%
Yellow Time (s)	2.0
All-Red Time (s)	0.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	38	58			54	20		199		m22	m266	
Internal Link Dist (ft)		72			235			276			355	
Turn Bay Length (ft)						75				175		
Base Capacity (vph)	194	242			188	417		1520		498	1211	
Starvation Cap Reductn	0	0			0	0		0		0	201	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.14	0.31			0.27	0.17		0.37		0.16	0.61	

Intersection Summary	
Area Type: Other	
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 4 (4%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 19.4	Intersection LOS: B
Intersection Capacity Utilization 66.7%	ICU Level of Service C
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 102: Maplewood Ave & Hanover St



Lane Group	Ø9
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Intersection	
Int Delay, s/veh	53

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	166	17	562	178	25	13	7	61	14	5	6
Future Vol, veh/h	13	166	17	562	178	25	13	7	61	14	5	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	77	77	77	80	80	80	75	75	75
Heavy Vehicles, %	0	5	13	4	25	0	20	0	3	0	0	0
Mvmt Flow	16	208	21	730	231	32	16	9	76	19	7	8

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	263	0	0	229	0	0	1966	1974	219	2000	1968	247
Stage 1	-	-	-	-	-	-	251	251	-	1707	1707	-
Stage 2	-	-	-	-	-	-	1715	1723	-	293	261	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.3	6.5	6.23	7.1	6.5	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.3	5.5	-	6.1	5.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.68	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1313	-	-	1327	-	-	42	63	818	45	63	797
Stage 1	-	-	-	-	-	-	715	703	-	117	148	-
Stage 2	-	-	-	-	-	-	103	145	-	719	696	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1313	-	-	1327	-	-	~ 16	22	818	~ 14	22	797
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 16	22	-	~ 14	22	-
Stage 1	-	-	-	-	-	-	705	693	-	115	52	-
Stage 2	-	-	-	-	-	-	31	51	-	635	686	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.5	8.1	$ 396.8	$ 731.9
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	67	1313	-	-	1327	-	-	20
HCM Lane V/C Ratio	1.511	0.012	-	-	0.55	-	-	1.667
HCM Control Delay (s)	$ 396.8	7.8	0	-	11	0	-	$ 731.9
HCM Lane LOS	F	A	A	-	B	A	-	F
HCM 95th %tile Q(veh)	8.7	0	-	-	3.5	-	-	4.5

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	24.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	217	24	26	684	81	317
Future Vol, veh/h	217	24	26	684	81	317
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	80	80	81	81
Heavy Vehicles, %	4	8	12	10	13	2
Mvmt Flow	255	28	33	855	100	391

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	283	0	1190	269
Stage 1	-	-	-	-	269	-
Stage 2	-	-	-	-	921	-
Critical Hdwy	-	-	4.22	-	6.53	6.22
Critical Hdwy Stg 1	-	-	-	-	5.53	-
Critical Hdwy Stg 2	-	-	-	-	5.53	-
Follow-up Hdwy	-	-	2.308	-	3.617	3.318
Pot Cap-1 Maneuver	-	-	1224	-	197	770
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	371	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1224	-	187	770
Mov Cap-2 Maneuver	-	-	-	-	187	-
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	352	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.3	83.1
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	471	-	-	1224	-
HCM Lane V/C Ratio	1.043	-	-	0.027	-
HCM Control Delay (s)	83.1	-	-	8	0
HCM Lane LOS	F	-	-	A	A
HCM 95th %tile Q(veh)	14.9	-	-	0.1	-

Intersection						
Int Delay, s/veh	13					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	378	61	75	23	16	512
Future Vol, veh/h	378	61	75	23	16	512
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	88	88	54	54	92	92
Heavy Vehicles, %	3	0	5	38	0	6
Mvmt Flow	430	69	139	43	17	557

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	182	0	-	0	1090	161
Stage 1	-	-	-	-	161	-
Stage 2	-	-	-	-	929	-
Critical Hdwy	4.13	-	-	-	6.4	6.26
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.227	-	-	-	3.5	3.354
Pot Cap-1 Maneuver	1387	-	-	-	240	874
Stage 1	-	-	-	-	873	-
Stage 2	-	-	-	-	388	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1387	-	-	-	163	874
Mov Cap-2 Maneuver	-	-	-	-	163	-
Stage 1	-	-	-	-	592	-
Stage 2	-	-	-	-	388	-

Approach	EB	WB	SB
HCM Control Delay, s	7.5	0	21.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1387	-	-	-	772
HCM Lane V/C Ratio	0.31	-	-	-	0.743
HCM Control Delay (s)	8.8	0	-	-	21.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	1.3	-	-	-	6.8

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	32	0	33	9	1	7	32	366	9	6	484	15
Future Vol, veh/h	32	0	33	9	1	7	32	366	9	6	484	15
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	38	38	25	25	25	89	89	89	89	89	89
Heavy Vehicles, %	0	0	0	0	0	0	0	8	0	0	8	0
Mvmt Flow	84	0	87	36	4	28	36	411	10	7	544	17

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1071	1060	553	1098	1063	416	561	0	0	421	0	0
Stage 1	567	567	-	488	488	-	-	-	-	-	-	-
Stage 2	504	493	-	610	575	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.5	6.2	7.1	6.5	6.2	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.5	-	6.1	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	200	226	537	192	225	641	1020	-	-	1149	-	-
Stage 1	512	510	-	565	553	-	-	-	-	-	-	-
Stage 2	554	550	-	485	506	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	181	214	537	154	213	641	1020	-	-	1149	-	-
Mov Cap-2 Maneuver	181	214	-	154	213	-	-	-	-	-	-	-
Stage 1	488	505	-	539	528	-	-	-	-	-	-	-
Stage 2	502	525	-	403	501	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	38	27.1	0.7	0.1
HCM LOS	E	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1020	-	-	273	230	1149	-	-
HCM Lane V/C Ratio	0.035	-	-	0.627	0.296	0.006	-	-
HCM Control Delay (s)	8.7	0	-	38	27.1	8.2	0	-
HCM Lane LOS	A	A	-	E	D	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	3.9	1.2	0	-	-

205: Russell St & Green St
2035 Build Conditions Weekday PM Peak

Intersection	
Int Delay, s/veh	2.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	89	29	6	401	481	55
Future Vol, veh/h	89	29	6	401	481	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	97	32	7	436	523	60

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1003	553	583	0	-	0
Stage 1	553	-	-	-	-	-
Stage 2	450	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	268	533	991	-	-	-
Stage 1	576	-	-	-	-	-
Stage 2	642	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	266	533	991	-	-	-
Mov Cap-2 Maneuver	266	-	-	-	-	-
Stage 1	571	-	-	-	-	-
Stage 2	642	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	25.3	0.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	991	-	303	-	-
HCM Lane V/C Ratio	0.007	-	0.423	-	-
HCM Control Delay (s)	8.7	0	25.3	-	-
HCM Lane LOS	A	A	D	-	-
HCM 95th %tile Q(veh)	0	-	2	-	-

Intersection						
Int Delay, s/veh	242.5					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	483	8	0	541	396	536
Future Vol, veh/h	483	8	0	541	396	536
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Free
Storage Length	0	25	-	-	-	175
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	82	82	92	92	83	83
Heavy Vehicles, %	5	20	0	7	4	6
Mvmt Flow	589	10	0	588	477	646

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1065	477	-	0	-	0
Stage 1	477	-	-	-	-	-
Stage 2	588	-	-	-	-	-
Critical Hdwy	6.45	6.4	-	-	-	-
Critical Hdwy Stg 1	5.45	-	-	-	-	-
Critical Hdwy Stg 2	5.45	-	-	-	-	-
Follow-up Hdwy	3.545	3.48	-	-	-	-
Pot Cap-1 Maneuver	~ 243	553	0	-	-	0
Stage 1	618	-	0	-	-	0
Stage 2	~ 549	-	0	-	-	0
Platoon blocked, %				-	-	
Mov Cap-1 Maneuver	~ 243	553	-	-	-	-
Mov Cap-2 Maneuver	~ 243	-	-	-	-	-
Stage 1	618	-	-	-	-	-
Stage 2	~ 549	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	$ 673.9	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	EBLn1	EBLn2	SBT
Capacity (veh/h)	-	243	553	-
HCM Lane V/C Ratio	-	2.424	0.018	-
HCM Control Delay (s)	-	$ 684.9	11.6	-
HCM Lane LOS	-	F	B	-
HCM 95th %tile Q(veh)	-	47.9	0.1	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	0.1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	782	18	20	677
Future Vol, veh/h	0	0	782	18	20	677
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	850	20	22	736

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1640	860	0	0	870	0
Stage 1	860	-	-	-	-	-
Stage 2	780	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	110	356	-	-	775	-
Stage 1	414	-	-	-	-	-
Stage 2	452	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	105	356	-	-	775	-
Mov Cap-2 Maneuver	105	-	-	-	-	-
Stage 1	414	-	-	-	-	-
Stage 2	430	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	0	0	0.3
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	-	775	-
HCM Lane V/C Ratio	-	-	-	0.028	-
HCM Control Delay (s)	-	-	0	9.8	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	-	0.1	-

Intersection						
Int Delay, s/veh	2.9					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑	Y	
Traffic Vol, veh/h	59	0	0	61	0	59
Future Vol, veh/h	59	0	0	61	0	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	64	0	0	66	0	64

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	-	-	-	130	64
Stage 1	-	-	-	-	64	-
Stage 2	-	-	-	-	66	-
Critical Hdwy	-	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	-	0	0	-	864	1000
Stage 1	-	0	0	-	959	-
Stage 2	-	0	0	-	957	-
Platoon blocked, %	-			-		
Mov Cap-1 Maneuver	-	-	-	-	864	1000
Mov Cap-2 Maneuver	-	-	-	-	864	-
Stage 1	-	-	-	-	959	-
Stage 2	-	-	-	-	957	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	WBT
Capacity (veh/h)	1000	-	-
HCM Lane V/C Ratio	0.064	-	-
HCM Control Delay (s)	8.8	-	-
HCM Lane LOS	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	Tighe & Bond	Intersection	Market St at Russell St
Agency or Co.		E/W Street Name	Russell Street
Date Performed	5/19/2022	N/S Street Name	Market Street
Analysis Year	2035	Analysis Time Period (hrs)	0.25
Time Analyzed	Weekday AM Peak Hour	Peak Hour Factor	0.92
Project Description	Russell Street Development Build Conditi...	Jurisdiction	Portsmouth

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0
Lane Assignment			LR								LT				TR	
Volume (V), veh/h	0	167		7					0	0	173		0		306	334
Percent Heavy Vehicles, %	0	5		20					0	0	7		0		4	6
Flow Rate (v_{PCE}), pc/h	0	191		9					0	0	201		0		346	385
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1								1				1			
Pedestrians Crossing, p/h	0								0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763						4.9763			4.9763	
Follow-Up Headway (s)		2.6087						2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		200.00						201.00			731.00	
Entry Volume veh/h		189.40						187.85			695.90	
Circulating Flow (v_c), pc/h	346			392			191			0		
Exiting Flow (v_{ex}), pc/h	0			385			392			355		
Capacity (c_{pce}), pc/h		969.64						1135.72			1380.00	
Capacity (c), veh/h		918.27						1061.42			1313.73	
v/c Ratio (x)		0.21						0.18			0.53	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		6.0						5.0			8.4	
Lane LOS		A						A			A	
95% Queue, veh		0.8						0.6			3.2	
Approach Delay, s/veh	6.0						5.0			8.4		
Approach LOS	A						A			A		
Intersection Delay, s/veh | LOS	7.4						A					

HCS7 Roundabouts Report

General Information		Site Information	
Analyst	Tighe & Bond	Intersection	Market St at Russell St
Agency or Co.		E/W Street Name	Russell Street
Date Performed	5/19/2022	N/S Street Name	Market Street
Analysis Year	2035	Analysis Time Period (hrs)	0.25
Time Analyzed	Weekday PM Peak Hour	Peak Hour Factor	0.92
Project Description	Russell Street Development Build Conditions	Jurisdiction	Portsmouth

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0
Lane Assignment			LR								LT				TR	
Volume (V), veh/h	0	483		8					0	0	541		0		396	536
Percent Heavy Vehicles, %	0	5		20					0	0	7		0		4	6
Flow Rate (v_{PCE}), pc/h	0	551		10					0	0	629		0		448	618
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1								1				1			
Pedestrians Crossing, p/h	0								0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763						4.9763			4.9763	
Follow-Up Headway (s)		2.6087						2.6087			2.6087	

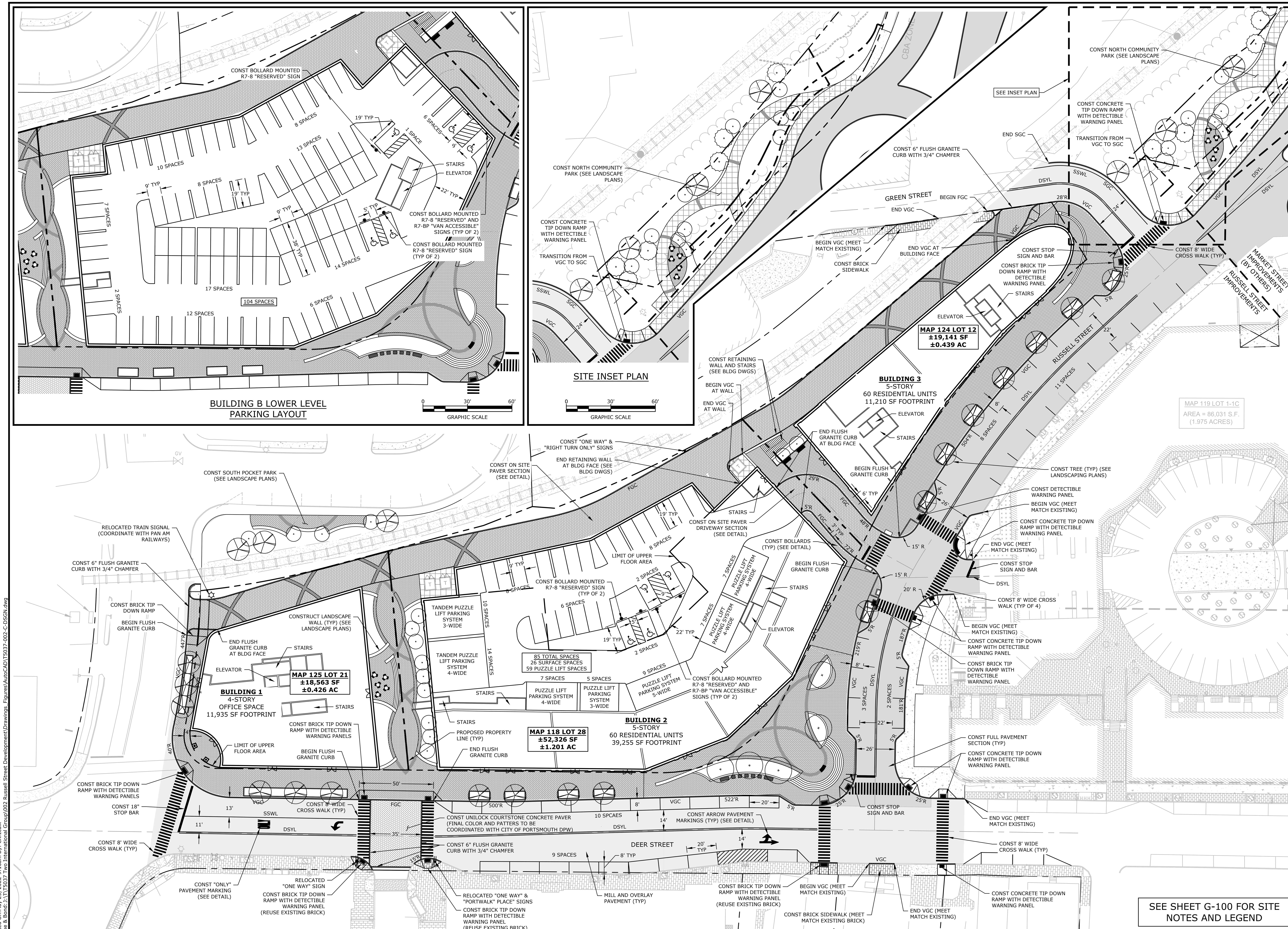
Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		561.00						629.00			1066.00	
Entry Volume veh/h		533.10						587.85			1013.79	
Circulating Flow (v_c), pc/h		448			1180			551			0	
Exiting Flow (v_{ex}), pc/h		0			618			1180			458	
Capacity (c_{pce}), pc/h		873.83						786.68			1380.00	
Capacity (c), veh/h		830.36						735.22			1312.41	
v/c Ratio (x)		0.64						0.80			0.77	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		15.0						25.4			15.2	
Lane LOS		B						D			C	
95% Queue, veh		4.8						8.3			8.3	
Approach Delay, s/veh		15.0						25.4			15.2	
Approach LOS		B						D			C	
Intersection Delay, s/veh | LOS	18.0						C					

APPENDIX F
Site Development Plan



Last Saved: 5/23/2022
Plotted On:May 23, 2022-9:16am By: CKrzcuik
Tighe & Bond: J:\T\T5037 Two International Group\002 Russell Street Development\Drawings_Figures\AutoCAD\T5037-002-C-DSGN.dwg

Tighe&Bond

North End Mixed Use Development

Two International Group

Russell Street & Deer Street
Portsmouth, NH

MARK	DATE	DESCRIPTION
E		
D		
C		
B		
A	5/24/2022	TAC Submission

PROJECT NO:	T5037-002
DATE:	January 4, 2022
FILE:	T5037-002-C-DSGN.DWG
DRAWN BY:	CJK
CHECKED:	NAH
APPROVED:	PMC

FIRST FLOOR SITE PLAN

SCALE: AS SHOWN

C-102.1

APPENDIX G

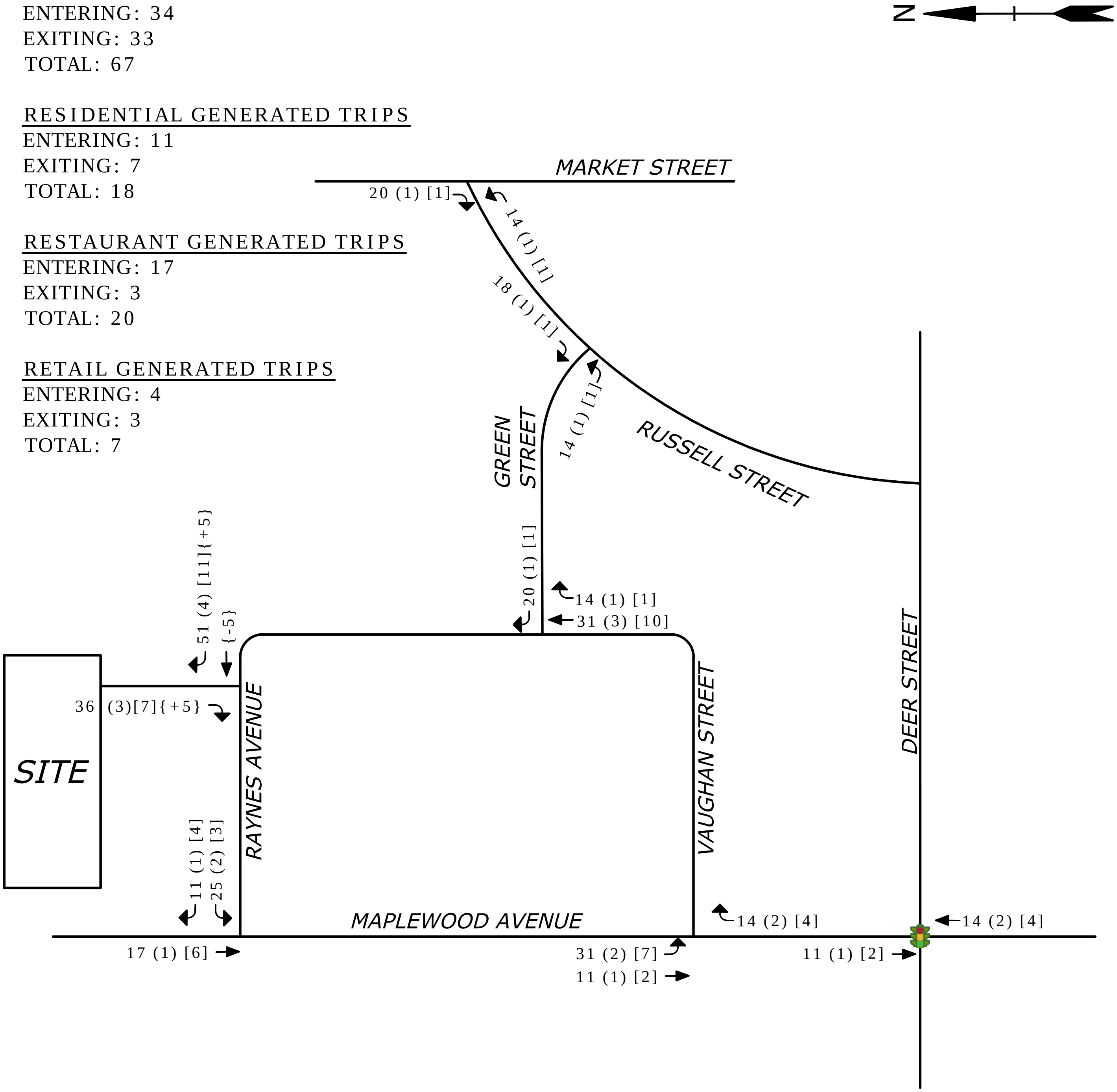
Other Development Traffic Volumes

HOTEL GENERATED TRIPS
ENTERING: 34
EXITING: 33
TOTAL: 67

RESIDENTIAL GENERATED TRIPS
ENTERING: 11
EXITING: 7
TOTAL: 18

RESTAURANT GENERATED TRIPS
ENTERING: 17
EXITING: 3
TOTAL: 20

RETAIL GENERATED TRIPS
ENTERING: 4
EXITING: 3
TOTAL: 7



LEGEND

TRAFFIC SIGNAL

XX HOTEL & RESTAURANT TRIPS
(XX) RETAIL TRIPS
[XX] RESIDENTIAL TRIPS
{XX} PASS-BY TRIPS

PROPOSED MIXED-USE DEVELOPMENT
RAYNES AVENUE, PORTSMOUTH, NH

WEEKDAY AFTERNOON PEAK HOUR SITE GENERATED TRIPS

DATE: 7/14/2021
SCALE: NO SCALE
FIGURE 13

Tighe&Bond
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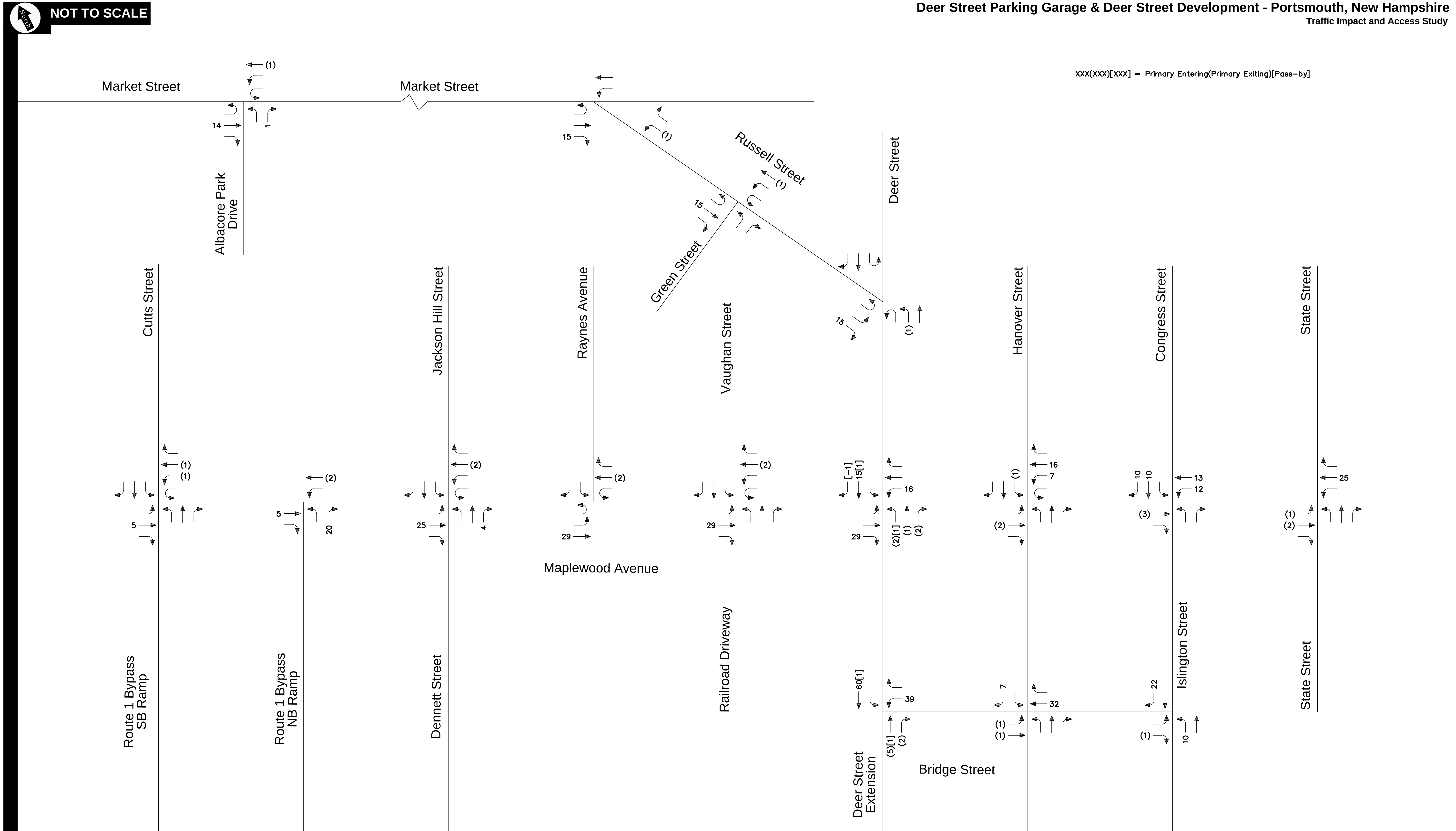

Figure 11A

Phase 1: Deer Street Parking Garage Site Generated Trip Assignment Weekday Morning Peak Hour Traffic Volumes

TEC, Inc.
65 Glenn Street, Lawrence, MA 01843, (978) 794.1792
169 Ocean Blvd, Unit 101, Hampton, NH 03842, (603) 601.8154
www.TheEngineeringCorp.com

NOT TO SCALE

XXX(XXX)[XXX] = Primary Entering(Primary Exiting)[Pass-by]

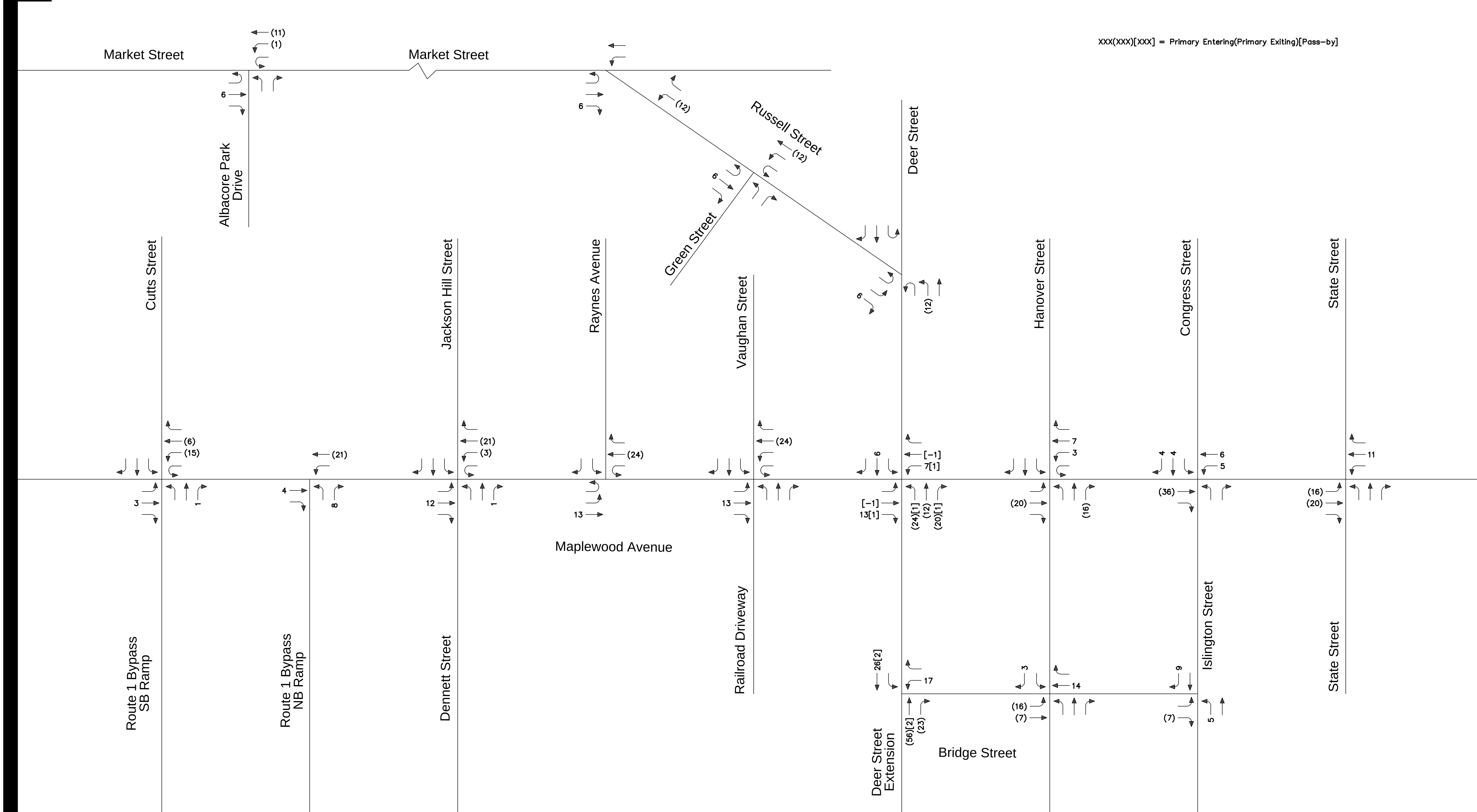

Figure 11B

Phase 1: Deer Street Parking Garage Site Generated Trip Assignment Weekday Evening Peak Hour Traffic Volumes

TEC
TEC, Inc.
65 Glenn Street
Lawrence, MA 01843
(978) 794.1792
169 Ocean Blvd, Unit 101
Hampton, NH 03842
(603) 601.8154
www.TheEngineeringCorp.com

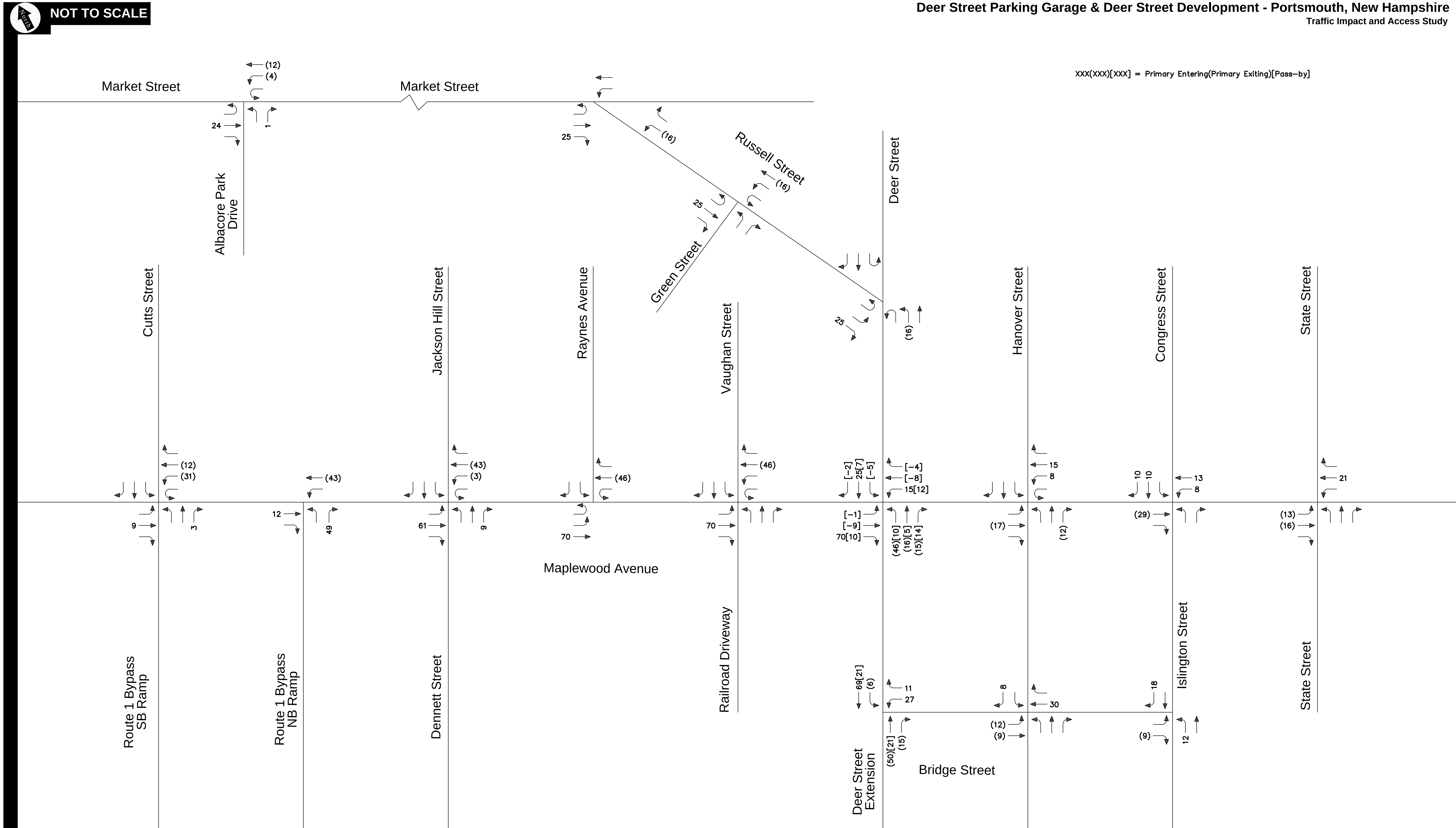

Figure 14A

Phases 2-4: Total Deer Street Development Site Generated Trip Assignment Weekday Morning Peak Hour Traffic Volumes

TEC, Inc.
65 Glenn Street, Lawrence, MA 01843, (978) 794.1792
169 Ocean Blvd, Unit 101, Hampton, NH 03842, (603) 601.8154
www.TheEngineeringCorp.com

NOT TO SCALE

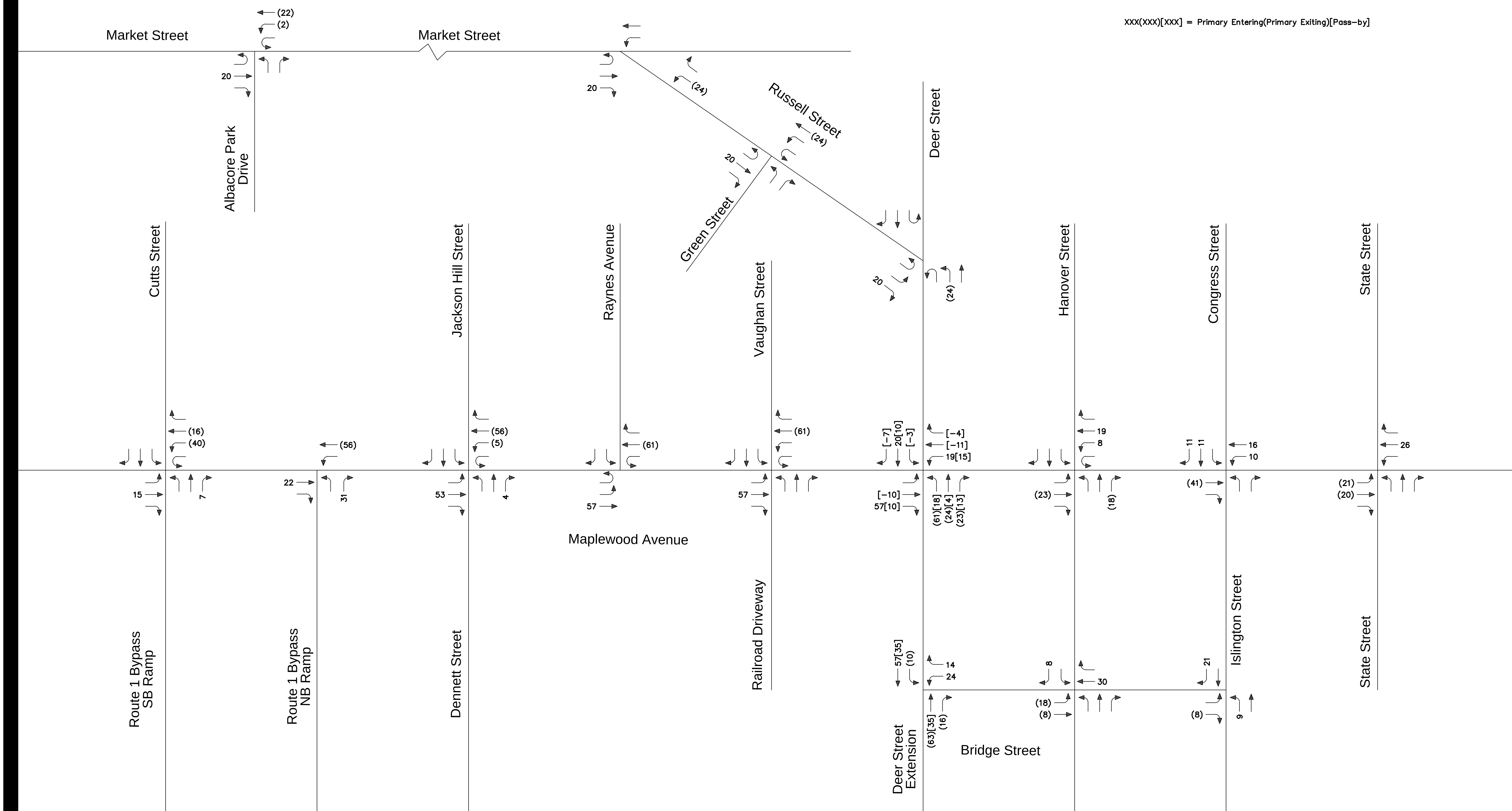

Figure 14B

Phases 2-4: Total Deer Street Development
Site Generated Trip Assignment
Weekday Evening
Peak Hour Traffic Volumes

TEC, Inc.
65 Glenn Street, Lawrence, MA 01843, (978) 794.1792
169 Ocean Blvd, Unit 101, Hampton, NH 03842, (603) 601.8154
www.TheEngineeringCorp.com

APPENDIX H
Internal Capture Calculation

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Russell Street Development	**Organization:**	Tighe & Bond
Project Location:	Portsmouth, NH	**Performed By:**	Ryan Case
Scenario Description:		**Date:**	2/22/2022
Analysis Year:	2022	**Checked By:**	Matt Stoutz
Analysis Period:	**AM Street Peak Hour**	**Date:**	3/2/2022

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				70	62	8
Retail				44	26	18
Restaurant				0		
Cinema/Entertainment				0		
Residential				30	7	23
Hotel				0		
All Other Land Uses[2]				0		
Total				144	95	49

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	0	0	0	0
Retail	2		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	144	95	49
Internal Capture Percentage	6%	4%	8%
External Vehicle-Trips[3]	136	91	45
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	3%	25%
Retail	8%	11%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	0%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.
[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
[4]Person-Trips
*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Russell Street Development
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips				Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*		Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	62	62		1.00	8	8
Retail	1.00	26	26		1.00	18	18
Restaurant	1.00	0	0		1.00	0	0
Cinema/Entertainment	1.00	0	0		1.00	0	0
Residential	1.00	7	7		1.00	23	23
Hotel	1.00	0	0		1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		2	5	0	0	0
Retail	5		2	0	3	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	5	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		8	0	0	0	0
Retail	2		0	0	0	0
Restaurant	9	2		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	4	0	0		0
Hotel	2	1	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates				External Trips by Mode*		
	Internal	External	Total		Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	2	60	62		60	0	0
Retail	2	24	26		24	0	0
Restaurant	0	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0	0
Residential	0	7	7		7	0	0
Hotel	0	0	0		0	0	0
All Other Land Uses[3]	0	0	0		0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates				External Trips by Mode*		
	Internal	External	Total		Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	2	6	8		6	0	0
Retail	2	16	18		16	0	0
Restaurant	0	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0	0
Residential	0	23	23		23	0	0
Hotel	0	0	0		0	0	0
All Other Land Uses[3]	0	0	0		0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
[2]Person-Trips
[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
*Indicates computation that has been rounded to the nearest whole number.

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Russell Street Development	**Organization:**	Tighe & Bond
Project Location:	Portsmouth, NH	**Performed By:**	Ryan Case
Scenario Description:		**Date:**	2/22/2022
Analysis Year:	2022	**Checked By:**	Matt Stoutz
Analysis Period:	**PM Street Peak Hour**	**Date:**	3/2/2022

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				66	11	55
Retail				122	61	61
Restaurant				0		
Cinema/Entertainment				0		
Residential				31	19	12
Hotel				0		
All Other Land Uses[2]				0		
Total				219	91	128

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	0	0	1	0
Retail	1		0	0	9	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	5	0	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	219	91	128
Internal Capture Percentage	19%	23%	16%
External Vehicle-Trips[3]	177	70	107
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	9%	11%
Retail	16%	16%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	53%	42%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator

[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[4]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Project Name:	Russell Street Development
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips				Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*		Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	11	11		1.00	55	55
Retail	1.00	61	61		1.00	61	61
Restaurant	1.00	0	0		1.00	0	0
Cinema/Entertainment	1.00	0	0		1.00	0	0
Residential	1.00	19	19		1.00	12	12
Hotel	1.00	0	0		1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		11	2	0	1	0
Retail	1		18	2	16	3
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	5	3	0		0
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	0	0	1	0
Retail	3		0	0	9	0
Restaurant	3	31		0	3	0
Cinema/Entertainment	1	2	0		1	0
Residential	6	6	0	0		0
Hotel	0	1	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates				External Trips by Mode*		
	Internal	External	Total		Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	1	10	11		10	0	0
Retail	10	51	61		51	0	0
Restaurant	0	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0	0
Residential	10	9	19		9	0	0
Hotel	0	0	0		0	0	0
All Other Land Uses[3]	0	0	0		0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates				External Trips by Mode*		
	Internal	External	Total		Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	6	49	55		49	0	0
Retail	10	51	61		51	0	0
Restaurant	0	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0	0
Residential	5	7	12		7	0	0
Hotel	0	0	0		0	0	0
All Other Land Uses[3]	0	0	0		0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P
[2]Person-Trips
[3]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
*Indicates computation that has been rounded to the nearest whole number.

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ENERGY

1700 Lafayette Road
Portsmouth, NH 03801

Michael J Busby
603-436-7708 x555-5678
michael.busby@eversource.com

May 23, 2022

Neil Hansen, PE
Tighe & Bond, Inc.
177 Corporate Drive
Portsmouth, NH 03801

Dear Neil:

I am responding to your request to confirm the availability of electric service for the proposed North End Mixed Use Development project being constructed for/by Port Harbor Land, LLC.

The proposed project consists of 3 separate buildings: a 4-story building with approximately 44,325 s/f of retail/office space, a 5-story building with 60 residential units approximately 10,500 s/f of retail/office space at the ground level and parking below grade, and a 5-story building with 24 residential units approximately 8,100 s/f of retail/office space at the ground level. The proposed development will be constructed at the corner of Russell Street and Deer Street in Portsmouth, NH.

The developer will be responsible for the installation of all underground facilities and infrastructure required to service the new buildings. The proposed building services will be fed from three loop fed pad mounted transformers as depicted on utility plan C-104. The developer will work with Eversource to obtain all necessary easements and licenses for the proposed underground facilities listed above.

This letter serves as confirmation that Eversource has sufficient capacity in the area to provide service to this proposed development. The cost of extending service to the aforementioned location and any associated infrastructure improvements necessary to provide service will be borne by the developer unless otherwise agreed upon.

The attached drawing titled "Utilities Plan C-104" dated 05/24/2022, shows transformers, manholes, and duct bank locations to service your proposed project.

Eversource approves the locations shown; assuming the final installed locations meet all clearances, physical protection, and access requirements as outlined in Eversource's "Information & Requirements For Electric Supply" (https://www.eversource.com/content/docs/default-source/pdfs/requirements-for-electric-service-connections.pdf?sfvrsn=2).

If you require additional information or I can be of further assistance please do not hesitate to contact me at our Portsmouth Office, 603-436-7708 Ext. 555-5678

Respectfully.

Michael J Busby

Michael J. Busby, PE
NH Eastern Regional Engineering and Design Manager, Eversource

cc: (via e-mail)
Thomas Boulter, Eastern Region Operations Manager, Eversource
Nickolai Kosko, Field Supervisor, Electric Design, Eversource

Northern Utilities, Inc.

April 19th, 2022

Neil Hansen, PE
Project Engineer
Tighe & Bond
177 Corporate Drive, Portsmouth, NH, 03801

Natural Gas to 2 Russell Street Project in Portsmouth, NH

Hi Neil,

Unitil/Northern Utilities Natural Gas Division has reviewed the requested site for natural gas service:

Unitil hereby confirms that natural gas is available for the proposed mixed-use development at 2 Russell Street in Portsmouth, NH.

If you have any questions, please contact me at 603-534-2379.

Sincerely,

Dave MacLean
Senior Business Development Rep

T 603.294.5261 **M** 603.534.2379 **F** 603.294.5264
Email macleand@unitil.com

GREEN BUILDING STATEMENT

RUSSELL STREET
004979.00

RUSSELL STREET
DEVELOPMENT
PORTSMOUTH, NH
03801

05/23/22

ARCHITECTURE | PLANNING
INTERIOR DESIGN | VDC
BRANDED ENVIRONMENTS

NEW YORK
54 W 21ST ST, SUITE 1201
NEW YORK, NY 10010

BOSTON
200 HIGH ST, FLOOR 2
BOSTON, MA 02110

SGA-ARCH.COM
857.300.2610

GREEN BUILDING STATEMENT

2 RUSSELL STREET, PORTSMOUTH, NH

The development at 2 Russell Street is a combination of three buildings with varying uses. Building 1 will accommodate office use, while Building 2 and 3 will provide residential units with an active, ground floor retail component. Each building is being designed to meet or exceed the current energy code requirements. An energy model will be developed and a tabular analysis of the envelope thermal performance will be submitted along with the building permit application.

New Hampshire is currently operating under the 2015 International Energy Conservation Code with amendments. The design of each of the new buildings will be constructed with best practices and will be designed to meet or exceed these standards where possible.

- **Foundation System:** Below-grade foundation walls and/or slabs on grade will include continuous extruded polystyrene (XPS) insulation (R-5 per inch).
- **Exterior Walls:** Exterior opaque wall assemblies will consist of a back-up wall construction consisting of either concrete masonry units (CMU's) or exterior sheathing on cold formed metal framing, continuous waterproofing and air barrier membrane, continuous mineral wool (R-4.3 per inch) insulation, and rainscreen cladding or veneer (e.g., metal panel or brick).
- **Exterior Windows:** Exterior fenestration, including fixed and operable windows and storefronts, will consist of aluminum-framed, thermally-broken glazing systems with insulating glass unit (IGU) infill including low emissivity (low e) coating. Systems may either be unitized or stick-built or a combination of both.
- **Roofing system:** will include two primary assembly configurations: Protected membrane roofing (PMR) systems at occupied terraces and conventional (aka "built-up") roofing systems at unoccupied (e.g., mechanical roofs) and bulkheads. PMR consists of roofing membrane applied to structural concrete slabs, drainage board, minimum 60 psi extruded polystyrene (XPS) or other roofing insulation, with precast concrete pavers on pedestals or landscape overburden acting as ballast. Conventional roofing systems will consist of tapered insulation (either polyisocyanurate or expanded polystyrene), roofing cover board, and roofing membrane on cover board. For both systems, roofing membrane material to be 2-ply SBS modified bitumen (or equivalent) with cold, fluid-applied PMMA flashings.

GREEN BUILDING STATEMENT

RUSSELL STREET
004979.00

RUSSELL STREET DEVELOPMENT
PORTSMOUTH, NH
03801

05/23/22

ARCHITECTURE | PLANNING
INTERIOR DESIGN | VDC
BRANDED ENVIRONMENTS

- **HVAC System**: Condominiums and Office spaces will be served by high-efficiency, air-cooled, variable refrigerant flow heat pump systems. Ventilation will be provided by high-efficiency, air-cooled DX, and dedicated outdoor air units with heat recovery wheels, which will provide outdoor air to Condominium Units, Office Floors, and common spaces. Toilet exhaust will be the medium for heat recovery.
- **Plumbing:** All fixtures will be low flow fixtures. The domestic hot water for the Condominium Buildings will be provided by central high-efficiency, gas-fired condensing hot water heaters for each building. The domestic hot water for the Office building will be provided by local electric storage-type domestic water heaters.
- **Lighting:** All lighting exterior lighting will be LED fixtures with dedicated controls to limit night time light pollution and unnecessary electrical expenditure while providing a safe and welcoming environment. All interior fixtures will be LED and provided with occupancy sensors where applicable.
- **Interior Appliances**: All residential appliances will be Energy Star certified.
- **Landscaping:** Local species that are drought tolerant will be incorporated into the plantings list.

NEW YORK
54 W 21ST ST, SUITE 1201
NEW YORK, NY 10010

BOSTON
200 HIGH ST, FLOOR 2
BOSTON, MA 02110

Brooks Slocum, AIA

Principal, SGA

SGA-ARCH.COM
857.300.2610

Michael W. Mehl, LC, LEED AP, IES
DIRECTOR

Exterior Lighting Compliance
Russell Street Mixed-Use Development
Portsmouth, NH
Project No. 27009.N.001

August 23, 2022

Mr. Ryan Plummer
Two International Group
1 New Hampshire Ave - Suite 123
Portsmouth, NH 03801

Dear Ryan:

In accordance with your inquiry, we herein confirm that the current exterior lighting design is compliant with Section 10.1140 of the Amended 2021, Portsmouth, NH Zoning Ordinance for the above project.

The exterior lighting as designed by our office, adheres to the ordinance requirements of minimizing light trespass, glare reduction, preserving the night sky and delivering an energy efficient lighting solution.

Specifically, project exterior lighting sources will utilize 3,000K LED sourced color temperature technology, have fixtures specified and designed within the maximum total outdoor lighting lumens/acre per Historic District requirements.

Lastly, all fixtures have been specified with ordinance-required maximum fixture lumens along with system controls calling for programming that operates the exterior lighting per the ordinance-required operational hour.

If you require further specifics, please do not hesitate to contact our office.

Very truly yours,

LightBox Studios

Michael W. Mehl , LC, LEED AP, IES
Director
MWM:jas

cc: (1) Mr. W. Shanklin
(1) Mr. P. Clark
(1) Mr. B Slocum
(1) Mr. N. Hansen
(1) Mr. R. Uhlig
(1) Mr. J. K. Lin
(1) Mr. R. T Stecher
(1) Ms. J. V. Reyes

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