

SITE PLAN

“ EXCHANGE PLACE ”

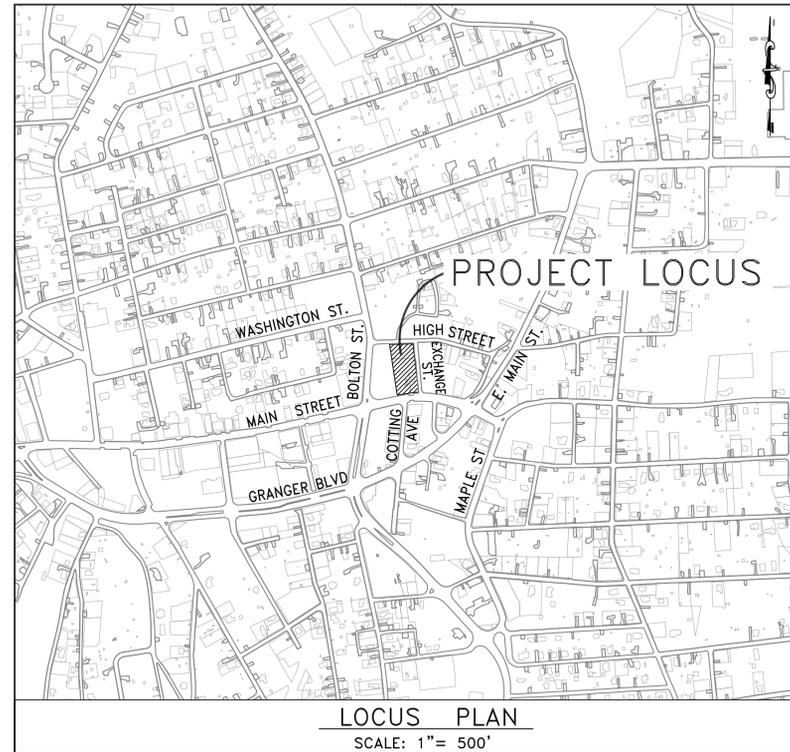
57 MAIN STREET MARLBOROUGH, MA

| MARLBOROUGH, MA ZONING CHART | | |
|--|-------------|----------------------|
| THE LAND SHOWN IS LISTED AS ASSESSOR LOT 291 ON MAP 70 AND IS LOCATED IN THE MARLBOROUGH VILLAGE DISTRICT. | | |
| ITEM | REQUIRED | PROPOSED |
| LOT AREA (MIN.) | 5000 SF | 38,505 SF |
| FRONTAGE (EXCHANGE STREET) | 50 FT | 285.48 FT |
| MAIN ST SETBACK | 0 FT | 3.0 FT |
| HIGH & EXCHANGE ST SETBACKS | 10 FT | 10.5 FT & 12.9 FT |
| SIDE SETBACK (UNION COMMON) | 0 FT | 5.5 FT |
| COVERAGE | 80% MAX | 78.4% *1 |
| BUILDING HEIGHT BEYOND 50 FT. OF RBD*2 | 70 FT (MAX) | 59.7 FT *3 |
| BUILDING HEIGHT WITHIN 50 FT. OF RBD*2 | 52 FT (MAX) | 48.4 FT *3 |
| LOT DISTANCE FROM A RESIDENTIAL DISTRICT | ----- | 12.5' FROM ZONE 'RB' |
| TOTAL OPEN SPACE | 9,200 SF | 10,237 SF *4 |

| PARKING SCHEDULE | | |
|-----------------------------|-------------------------|----------|
| ITEM | REQUIRED | PROPOSED |
| COMPACT PARKING (8' x 16') | 33% MAX | 27(33%) |
| STANDARD PARKING (9' x 18') | 76 MINUS COMPACT SPACES | 51 |
| HANDICAP PARKING | 4 | 4 |
| TOTAL PARKING | 80 *5 | 82 *5 |

FOOTNOTE:

- *1 - SEE NOTE#3 ON SHEET C1 FOR COVERAGE CALCULATION.
- *2 - BUILDING HEIGHT RESTRICTION AT THE RESIDENTIAL DISTRICT BOUNDARY(RDB).
- *3 - BUILDING HEIGHTS FROM AVERAGE FINISHED GRADE AT THE FRONT OF BUILDING FACING MAIN, HIGH AND EXCHANGE STREETS(ELEV.=391.8).
- *4 - SEE NOTE#2 ON SHEET C1 FOR CALCULATION OF OPEN SPACE AREA.
- *5 - THE 10% RIDE SHARE REDUCTION WAS APPLIED. SEE NOTE #1 ON SHEET C2 FOR PARKING CALCULATIONS.



| SHEET INDEX | DATE | REV. DATE |
|-------------------------------------|---------|-----------|
| C0.0: TITLE SHEET ----- | 9-6-22 | 4-22-24 |
| C0.1: EXISTING CONDITIONS PLAN----- | 9-6-22 | 3-28-24 |
| C1: LAYOUT PLAN ----- | 9-6-22 | 4-22-24 |
| C2: LAYOUT PLAN ----- | 9-6-22 | 4-22-24 |
| C3: GRADING & EROSION CONTROL ----- | 9-6-22 | 4-22-24 |
| C4: DRAINAGE PLAN ----- | 9-6-22 | 4-22-24 |
| C5: SEWER, WATER & UTILITIES ----- | 9-6-22 | 4-22-24 |
| LA: PLANTING PLAN ----- | 3-27-24 | --- |
| C6: DETAILS ----- | 9-6-22 | 4-22-24 |
| C7: DETAILS ----- | 9-6-22 | 4-22-24 |
| C8: DETAILS ----- | 9-6-22 | 3-28-24 |

SITE PLAN APPROVAL # _____

PLANS LISTED ON THIS SHEET WITH REVISION DATES AS SHOWN

APPROVED:

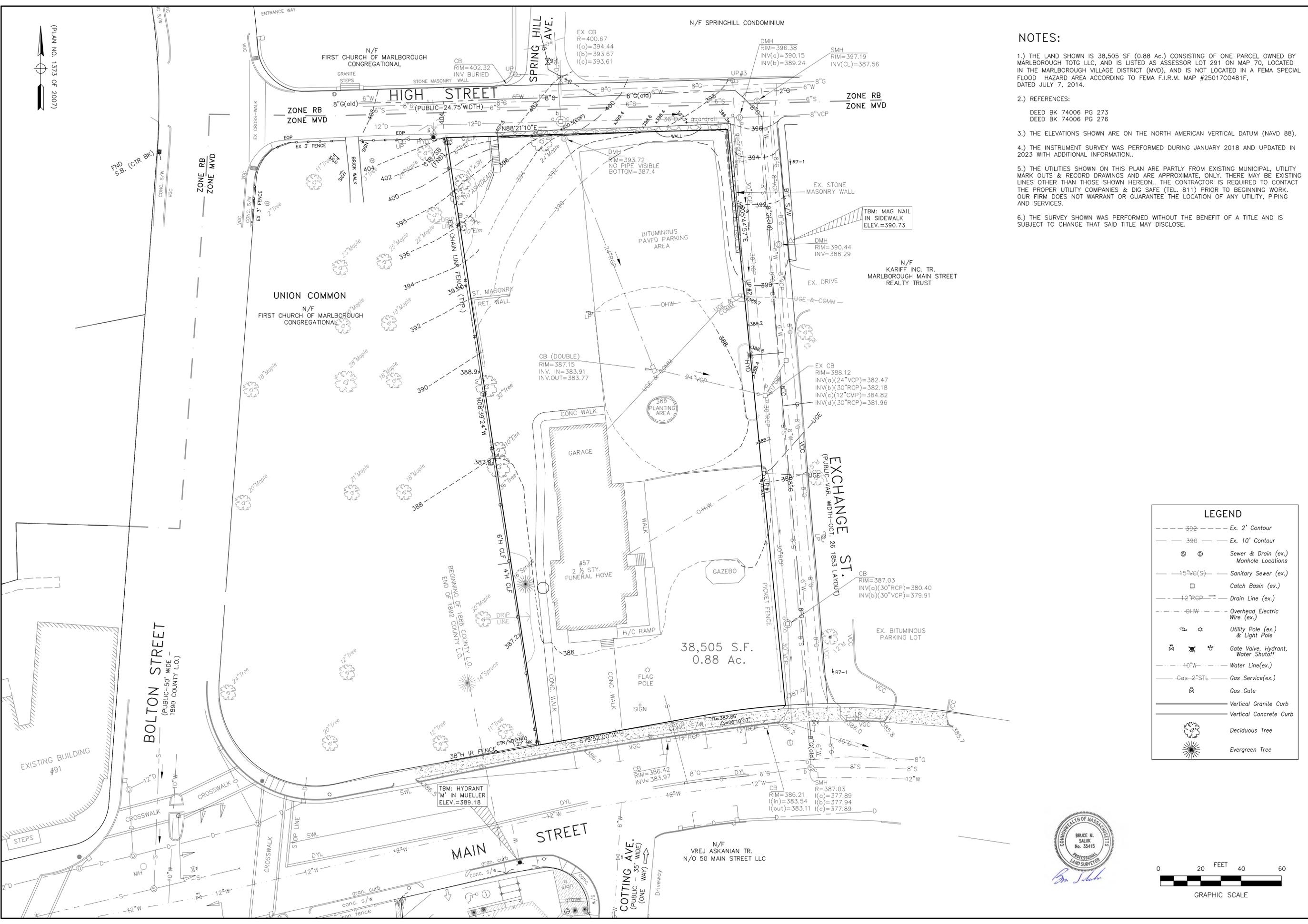
ENGINEERING: _____ DATE: _____
 BUILDING: _____ DATE: _____
 CONSERVATION: _____ DATE: _____
 FIRE DEPT.: _____ DATE: _____
 POLICE DEPT.: _____ DATE: _____
 BOARD OF HEALTH: _____ DATE: _____

ARCHITECT: THE ARCHITECTURAL TEAM, INC.
 50 COMMANDANT'S WAY
 AT ADMIRAL'S HILL
 CHELSEA, MA 02150
 TEL: (617) 889-4402

ENGINEER & SURVEYOR: BRUCE SALUK & ASSOC., INC.
 CIVIL ENGINEERING & LAND SURVEYING
 576 BOSTON POST ROAD EAST
 MARLBOROUGH, MA 01752
 TEL: (508) 485-1662

LANDSCAPE ARCHITECT: VERDANT
 LANDSCAPE ARCHITECTURE
 318 HARVARD STREET, SUITE 25
 BROOKLINE, MA 02446
 TEL: (617) 735-1180

(PLAN NO. 1373 OF 2007)

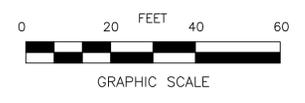


NOTES:

- 1.) THE LAND SHOWN IS 38,505 SF (0.88 Ac.) CONSISTING OF ONE PARCEL OWNED BY MARLBOROUGH TOTG LLC, AND IS LISTED AS ASSESSOR LOT 291 ON MAP 70, LOCATED IN THE MARLBOROUGH VILLAGE DISTRICT (MVD), AND IS NOT LOCATED IN A FEMA SPECIAL FLOOD HAZARD AREA ACCORDING TO FEMA F.I.R.M. MAP #25017C0481F, DATED JULY 7, 2014.
- 2.) REFERENCES:
DEED BK 74006 PG 273
DEED BK 74006 PG 276
- 3.) THE ELEVATIONS SHOWN ARE ON THE NORTH AMERICAN VERTICAL DATUM (NAVD 88).
- 4.) THE INSTRUMENT SURVEY WAS PERFORMED DURING JANUARY 2018 AND UPDATED IN 2023 WITH ADDITIONAL INFORMATION.
- 5.) THE UTILITIES SHOWN ON THIS PLAN ARE PARTLY FROM EXISTING MUNICIPAL, UTILITY MARK OUTS & RECORD DRAWINGS AND ARE APPROXIMATE, ONLY. THERE MAY BE EXISTING LINES OTHER THAN THOSE SHOWN HEREON. THE CONTRACTOR IS REQUIRED TO CONTACT THE PROPER UTILITY COMPANIES & DIG SAFE (TEL. 811) PRIOR TO BEGINNING WORK. OUR FIRM DOES NOT WARRANT OR GUARANTEE THE LOCATION OF ANY UTILITY, PIPING AND SERVICES.
- 6.) THE SURVEY SHOWN WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE AND IS SUBJECT TO CHANGE THAT SAID TITLE MAY DISCLOSE.

LEGEND

| | |
|-------------------|--|
| --- 392 --- | Ex. 2' Contour |
| --- 390 --- | Ex. 10' Contour |
| ⊙ ⊙ | Sewer & Drain (ex.) Manhole Locations |
| --- 15"VC(S) --- | Sanitary Sewer (ex.) |
| □ | Catch Basin (ex.) |
| --- 12"RCP --- | Drain Line (ex.) |
| --- 0HW --- | Overhead Electric Wire (ex.) |
| ⊙ ☆ | Utility Pole (ex.) & Light Pole |
| ⊙ ⊙ ⊙ | Gate Valve, Hydrant, Water Shutoff |
| --- 40"W --- | Water Line(ex.) |
| --- Gas 2"STL --- | Gas Service(ex.) |
| ⊙ | Gas Gate |
| --- | Vertical Granite Curb |
| --- | Vertical Concrete Curb |
| ⊙ | Deciduous Tree |
| ⊙ | Evergreen Tree |



| NO. | DATE | DESCRIPTION | BY |
|-----|------|-------------|----|
| | | | |
| | | | |
| | | | |

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-485-1662

EXISTING CONDITIONS
"EXCHANGE PLACE"
SITE PLAN
- 57 MAIN STREET -
MARLBOROUGH, MA

APPLICANT:
WILLIAM D. ADAMS
JW CAPITAL PARTNERS, LLC
34 WASHINGTON STREET, SUITE 230
WELLESLEY, MA 02841
TEL: (781) 366 2436

OWNER:
MARLBOROUGH TOTG LLC
206 AYER ROAD, SUITE 5
HARVARD, MA 01451
TEL: (978) 456 8388



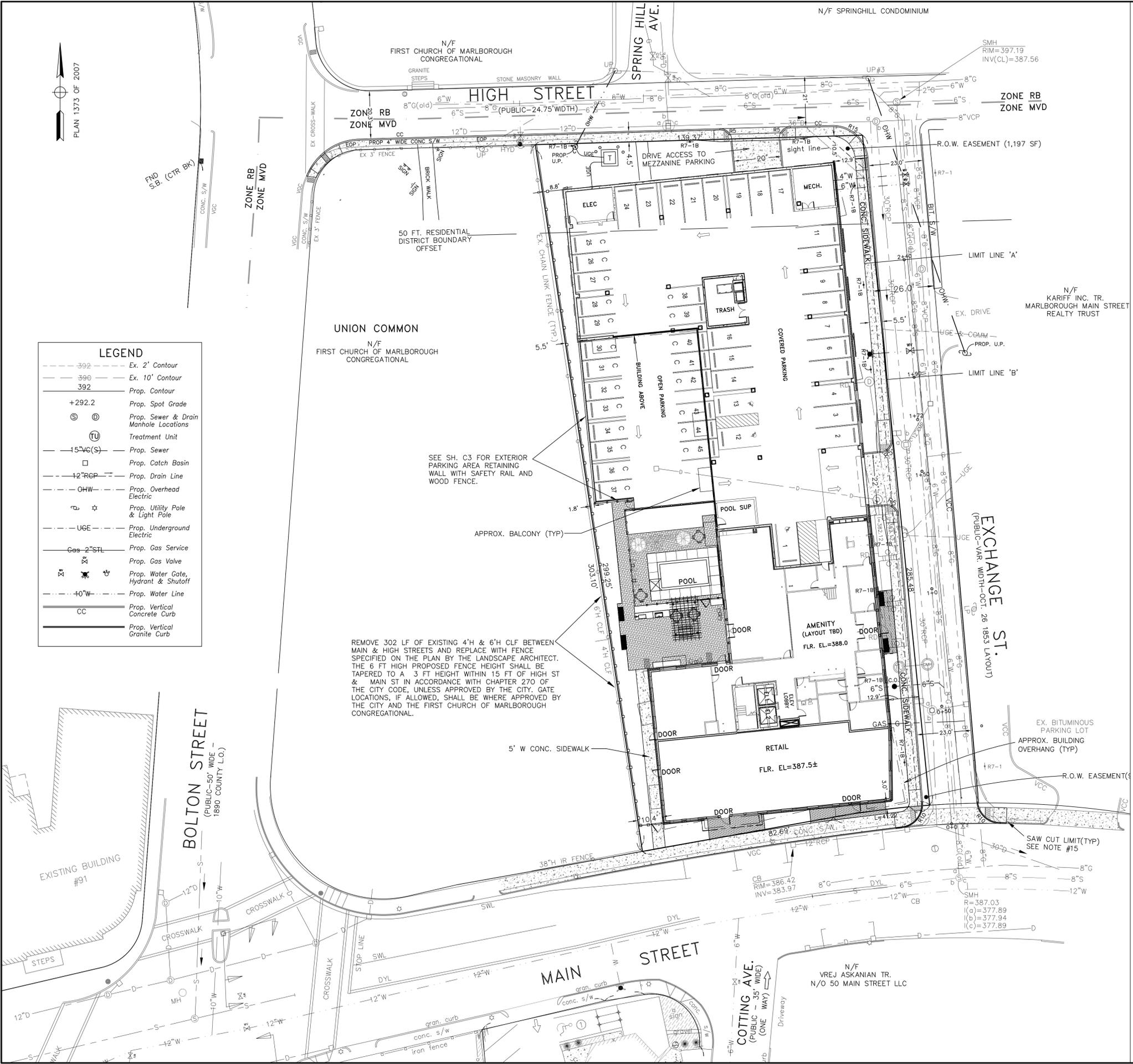
FILE: 2916.dwg

DATE: SEPTEMBER 6, 2022

PLAN 1373 OF 2007

LEGEND

| | |
|--------------------|---------------------------------------|
| --- 392 --- | Ex. 2' Contour |
| --- 390 --- | Ex. 10' Contour |
| --- 392 --- | Prop. Contour |
| ⊙ ⊙ | Prop. Sewer & Drain Manhole Locations |
| ⊕ | Treatment Unit |
| --- 15" V.C. --- | Prop. Sewer |
| □ | Prop. Catch Basin |
| --- 12" RCP --- | Prop. Drain Line |
| --- OHW --- | Prop. Overhead Electric |
| ⊙ ☆ | Prop. Utility Pole & Light Pole |
| --- UGE --- | Prop. Underground Electric |
| --- Gas-2" STL --- | Prop. Gas Service |
| ⊗ | Prop. Gas Valve |
| ⊗ ⊗ ⊗ | Prop. Water Gate, Hydrant & Shutoff |
| --- 40" W --- | Prop. Water Line |
| CC | Prop. Vertical Concrete Curb |
| --- | Prop. Vertical Granite Curb |



NOTES:

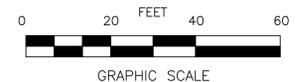
- THE BUILDING USE AND AREA SCHEDULE IS AS FOLLOWS:
 - LEVEL 1 PARKING(COVERED).....13,546 SF
 - LEVEL 1M PARKING(COVERED).....13,514 SF
 - LEVEL 1 RETAIL SPACE3,365 SF
 - LEVEL 1 AMENITY6,105 SF
 - LEVEL 1M AMENITY3,328 SF
 - LEVELS 2-4 RESIDENTIAL23,340 SF(EACH)
 - LEVEL 5 RESIDENTIAL20,342 SF
 - TOTAL.....130,220 SF
 - EXTERIOR PARKING AREA.....3,667 SF
 - TOTAL.....133,687 SF
- PRIVATE OPEN SPACE:
 - REQUIRED: 100 x 92 UNITS = 9,200 SF
 - PROVIDED: BALCONIES = 1,387 SF
 - FIFTH FLOOR DECKS = 1,224 SF
 - CLUB ROOM & FITNESS = 2,000 SF
 - COURTYARD & WALK = 4,100 SF
 - SIDEWALK PATIOS = 476 SF
 - LANDSCAPE AREAS = 1,050 SF
 - TOTAL PROVIDED PRIVATE OPEN SPACE = 10,237 SF
- LOT COVERAGE ("SECTION 650-5, DEFINITIONS 'LOT COVERAGE'"):
 - TOTAL LOT AREA = 38,505 SF
 - PROPOSED COVERAGE AREA = 30,203 SF
 - TOTAL % COVERAGE = 78.4%

PERMEABLE AREAS OF THE PATIO INTERPRETED AS OPEN SPACE FOR COVERAGE PURPOSES. THIS AREA WILL NOT BE USED FOR COMMERCIAL PURPOSES.
- ANY MINOR MODIFICATIONS, AS DETERMINED BY THE CITY ENGINEER, TO THE INFORMATION SHOWN ON THE APPROVED SITE PLANS SHALL BE SUBMITTED TO THE CITY ENGINEER AS A MINOR PLAN REVISION FOR APPROVAL PRIOR TO THE WORK BEING PERFORMED. THE CONTRACTOR SHALL BE PROPERLY LICENSED AND BONDED WITH THE CITY PRIOR TO CONSTRUCTION, AND SHALL OBTAIN A STREET OPENING PERMIT PRIOR TO ANY CONSTRUCTION WITHIN THE CITY RIGHT OF WAY.
- ALL HANDICAP PARKING, RAMPS AND ACCESS SHALL CONFORM TO ABB REQUIREMENTS. REFER TO 521 CMR.
- ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO MUTCD REQUIREMENTS.
- ALL PROPOSED SIGNAGE SHALL COMPLY WITH THE CITY OF MARLBOROUGH SIGN ORDINANCE.
- CURBING TYPE & ENTRANCES SHOWN ARE SUBJECT TO APPROVALS BY THE CITY OF MARLBOROUGH PER THE ROAD OPENING PERMIT REQUIREMENTS.
- ALL MATERIALS/CONSTRUCTION WITHIN THE CITY RIGHT-OF-WAY SHALL BE IN CONFORMANCE WITH THE CODE OF THE CITY OF MARLBOROUGH. ALL EROSION CONTROL MEASURES SHALL BE IN PLACE PRIOR TO CONSTRUCTION. EROSION CONTROL SHALL CONFORM TO THE CITY CONSERVATION COMMISSION REQUIREMENTS (SEE SHEET C3 FOR ADDITIONAL REQUIREMENTS). REFER TO THE GRADING PLAN NOTES CONCERNING EROSION CONTROL.
- CITY INSPECTORS REQUIRE A MINIMUM NOTICE OF 24 HOURS PRIOR TO INSPECTION.
- REFER TO THE ARCHITECTURAL PLANS FOR BUILDING AREA, SCENCE LIGHTING AND SIGNAGE.
- A PRE-CONSTRUCTION MEETING IS REQUIRED BETWEEN THE DEVELOPER, CONTRACTOR, POLICE AND FIRE DEPARTMENTS. THE CONTRACTOR SHALL SUBMIT A TRAFFIC MANAGEMENT PLAN TO THE CITY ENGINEER 5 DAYS PRIOR TO THE MEETING.
- ALL OPEN SPACE AREAS ARE PRIVATE.
 - MAIN STREET TO STATION 1+72:.....1.45% SLOPE
 - FROM STATION 1+72 TO 1+90:.....3.42% SLOPE
 - PROVIDE ROAD CROWN AT 2% PITCH FROM CENTERLINE TO CURB LINE. REMOVE & REPLACE CURB ON BOTH SIDES OF THE ROAD FOR THIS SECTION.
- SAW CUTS SHALL BE AT THE NEAREST PANEL JOINT ON THE EXTERIOR SIDE OF THE SAW CUTS SHOWN. THE SIDEWALK ALONG THE FRONTAGE OF THE PROPERTY SHALL BE REPLACED WHERE EXCAVATION FOR THE BUILDING FOUNDATION DISTURBS OR COMPROMISES THE INTEGRITY OF THE EXISTING WALK. THE SIDEWALK SHALL BE FRAMED AND POURED THE FULL WIDTH OF THE SIDEWALK AND FORMED TO LEAVE A SPACE FOR THE BRICK TO SIT ON TOP (BONDED TO THE CONCRETE). THE CONCRETE WALK SHALL BE FLUSH WITH THE EXISTING WALK.
- CONVERT EXISTING CB ON HIGH STREET TO DOUBLE CATCH BASIN WITH CURB INLET AS SHOWN.
- SIDEWALK CURB CUTS AND ACCESSIBLE ROUTES SHALL MEET ADA & ABB REQUIREMENTS.
- SNOW REMOVAL AND DISPOSAL AT THE OPEN PARKING AREA SHALL BE IN ACCORDANCE WITH MASS DEP 2020 GUIDELINE REQUIREMENTS, AS AMENDED. SALT APPLICATION SHALL BE MINIMAL AND ONLY BE USED WHERE NECESSARY. THE USE OF SODIUM CHLORIDE (NACL) IS PROHIBITED.

*...DENOTES TOTAL RESIDENTIAL, COMMERCIAL AND GARAGE FLOOR AREAS.

| FLOOR | FLR ELEV | 1 BEDROOM | 2 BEDROOMS | STUDIO |
|-----------|-------------|-----------|------------|--------|
| LEVEL 1 | 387.5-388.0 | - | - | - |
| LEVEL 1M | 398.67 | - | - | - |
| 2ND FLOOR | 409.83 | 14 | 10 | 0 |
| 3RD FLOOR | 420.50 | 14 | 10 | 0 |
| 4TH FLOOR | 431.16 | 14 | 10 | 0 |
| 5TH FLOOR | 442.50 | 10 | 10 | 0 |
| ROOF | --- | 4 | 0 | 0 |
| TOTALS: | | 52 | 40 | 0 |

TOTAL: UNITS 92



| NO. | DATE | DESCRIPTION |
|-----|---------|--------------------|
| P7 | 4/22/24 | PLAN UPDATE |
| P8 | 4/24/24 | BEDROOM COUNT EDIT |
| P9 | 4/28/24 | PLAN MODIFICATIONS |

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
 CIVIL ENGINEERING & LAND SURVEYING
 576 BOSTON POST ROAD EAST
 MARLBOROUGH, MA 01752
 TEL: 508-485-1662

LAYOUT PLAN
 "EXCHANGE PLACE"
 SITE PLAN
 - 57 MAIN STREET -
 MARLBOROUGH, MA

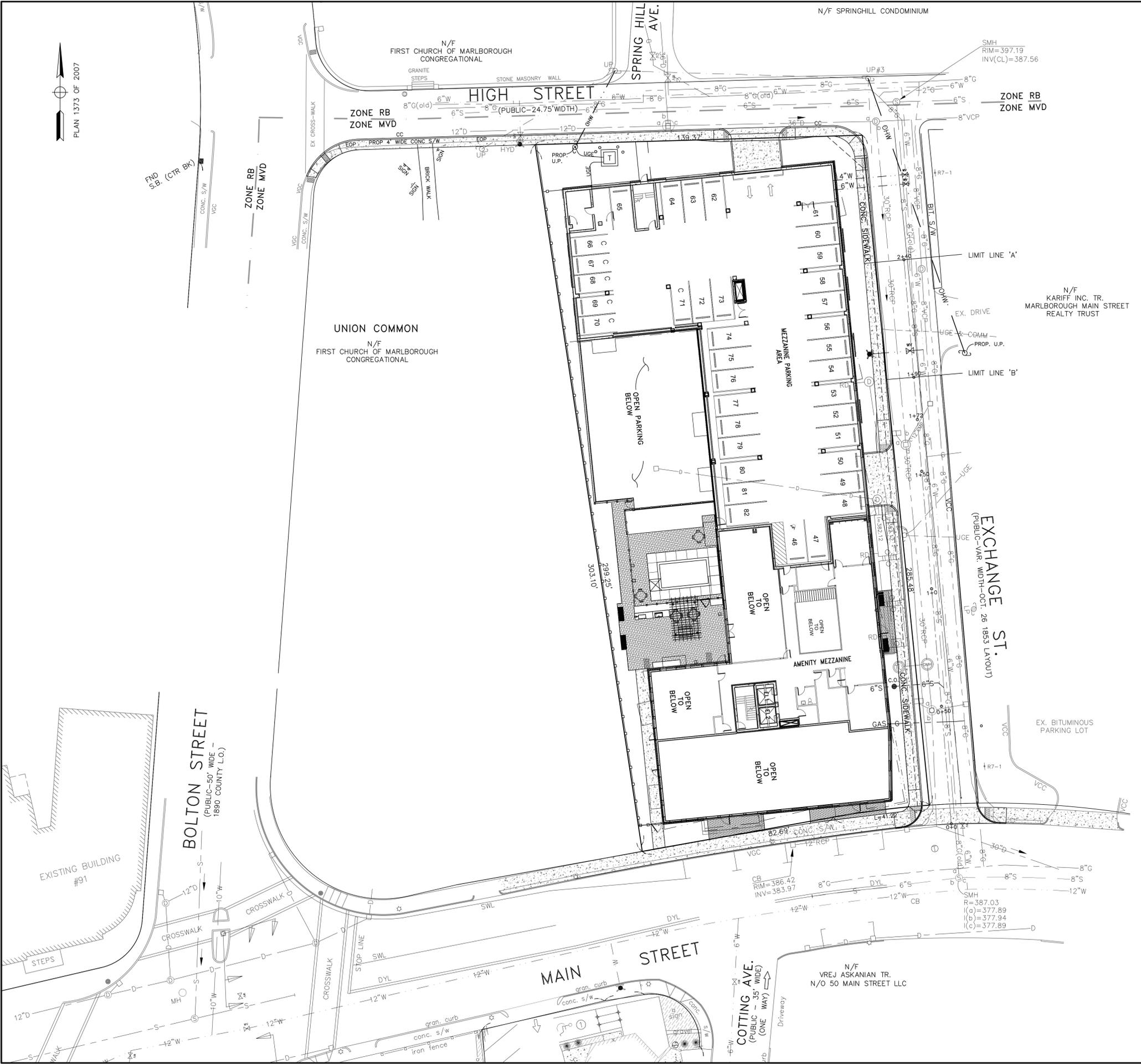
APPLICANT:
PROCOPIO COMPANIES
 35 VILLAGE ROAD
 7TH FLOOR, SUITE 702
 MIDDLETON, MA 01949
 TEL: (781) 233-3190

OWNER:
MARLBOROUGH TOTG LLC
 206 AYER ROAD, SUITE 5
 HARVARD, MA 01451
 TEL: (978) 456 8388

DATE: JUNE 23, 2023

C1

PLAN 1373 OF 2007



LEGEND

| | |
|--------------------|---------------------------------------|
| --- 392 --- | Ex. 2' Contour |
| --- 390 --- | Ex. 10' Contour |
| 392 | Prop. Contour |
| +292.2 | Prop. Spot Grade |
| ⊙ | Prop. Sewer & Drain Manhole Locations |
| ⊕ | Treatment Unit |
| --- 15" V.C. --- | Prop. Sewer |
| □ | Prop. Catch Basin |
| --- 12" RCP --- | Prop. Drain Line |
| --- OHW --- | Prop. Overhead Electric |
| ⊕ ☆ | Prop. Utility Pole & Light Pole |
| --- UGE --- | Prop. Underground Electric |
| --- Gas 2" STL --- | Prop. Gas Service |
| ⊕ | Prop. Gas Valve |
| ⊕ | Prop. Water Gate, Hydrant & Shutoff |
| --- 40" W --- | Prop. Water Line |
| CC | Prop. Vertical Concrete Curb |
| --- | Prop. Vertical Granite Curb |

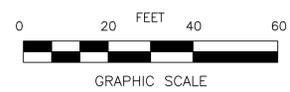
ON SITE PARKING ALLOCATION

| ITEM | PROPOSED |
|------------------|----------|
| COMPACT PARKING | 27(33%) |
| STANDARD PARKING | 51 |
| HANDICAP PARKING | 4 |
| TOTAL PARKING | 82 |

FOOTNOTES:

- REQUIRED AND PROPOSED PARKING WITH EXCEPTION IN NOTE #2:
REQUIRED PARKING:
 52 ONE-BEDROOM UNITS AT 0.75/UNIT
 40 TWO-BEDROOM UNITS AT 1.25/UNIT
 RESIDENTIAL PARKING=(52x0.75)+(40x1.25)=.....89 SPACES
 RETAIL.....0 SPACES
 SUBTOTAL.....89 SPACES
 10% CAR SHARE REDUCTION.....9 SPACES
 TOTAL REQUIRED PARKING.....80 SPACES

PROPOSED PARKING:
 OFF-SITE PARKING ALLOCATION.....0 SPACES
 ON-SITE PARKING ALLOCATION.....82 SPACES
 TOTAL PROPOSED PARKING.....82 SPACES
- EXCEPTION REQUIRED FOR 5 FT OFFSET BETWEEN EXTERIOR PARKING AND BUILDING (SEC 650-48(C)(5)(C)); OR DESIGN PARKING GARAGE WALL NOT FULLY ENCLOSED ADJACENT TO EXTERIOR PARKING.



| NO. | DATE | DESCRIPTION |
|-----|---------|-------------------------|
| P7 | 4/22/24 | PLAN UPDATE |
| P6 | 4/16/24 | EDIT BEDROOM COUNT EDIT |
| P5 | 1/28/24 | SITE MODIFICATIONS |

PREPARED BY:
 BRUCE SALUK & ASSOC., INC.
 CIVIL ENGINEERING & LAND SURVEYING
 576 BOSTON POST ROAD EAST
 MARLBOROUGH, MA 01752
 TEL: 508-485-1662

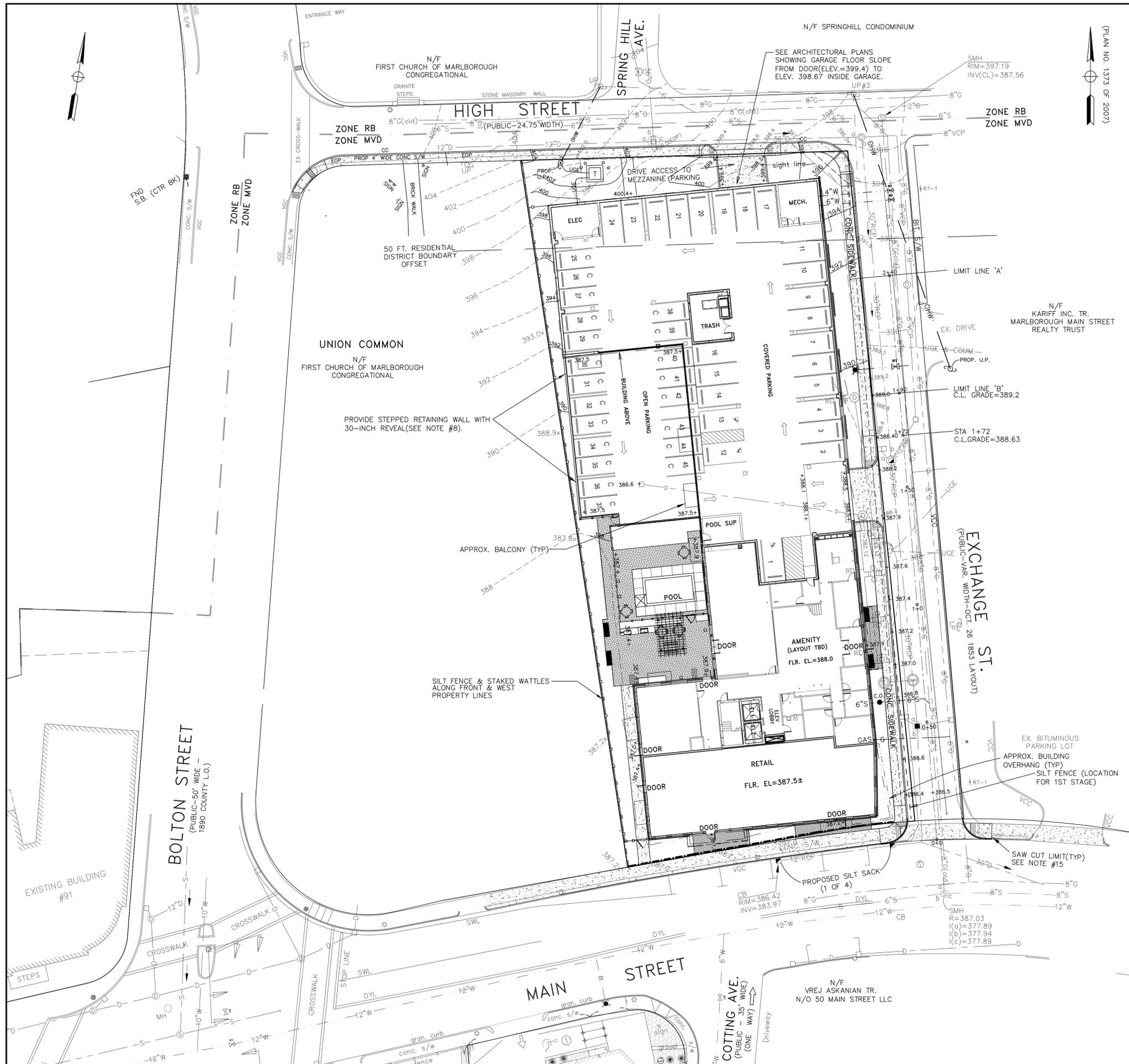
LAYOUT PLAN
 "EXCHANGE PLACE"
 SITE PLAN
 - 57 MAIN STREET -
 MARLBOROUGH, MA

APPLICANT:
 PROCOPIO COMPANIES
 35 VILLAGE ROAD
 7TH FLOOR, SUITE 702
 MIDDLETON, MA 01949
 TEL: (781) 233-3190

OWNER:
 MARLBOROUGH TOTG LLC
 206 AYER ROAD, SUITE 5
 HARVARD, MA 01451
 TEL: (978) 456 8388

DATE: JUNE 23, 2023

C2

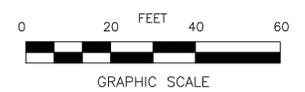


(PLAN NO. 1373 OF 2007)

GRADING & EROSION CONTROL NOTES:

- 1.) The elevations shown are based on Mean Sea Level datum (1988 N.A.V.D.)
- 2.) All work, material storage & stockpile areas shall include erosion control barriers consisting of staked haybales, wattles and siltation fence to prevent erosion onto the public way and abutting properties.
- 3.) Prior to commencing work, the contractor shall familiarize himself with the soil types on the site, and provide the appropriate erosion control measures, as outlined on this plan and required by the Marlborough Conservation Commission agent. The contractor shall be responsible for providing erosion and temporary storm runoff control measures that include siltation fence, wattles, dams, ditches, temporary sediment basins, etc. as necessary to contain soil and excess runoff on the site.
The general sequence of erosion control measures shall be as follows:
 - a) Install all siltation fencing and staked wattles, along the front and west property lines. Install silt fence along Exchange Street frontage. Install silt sacks in the existing CB's where shown.
 - b) Construct a sedimentation trap down gradient of the excavation area during the construction earthwork stage. Construct other temporary sedimentation trap(s) where required at the beginning stage of earthwork. Retain storm water within the trap(s), and filter the water using silt bags or other approved means prior to discharge. Periodically remove sediment at bottom of the silt traps to allow for natural infiltration.
 - c) Construct the anti-tracking berm at site entrances consisting of a 3/4"-3" crushed stone 12" depth by 30' long times the width of all traveled construction accesses. The stone shall project above grade to form a berm barrier that prevents sediment from washing into abutting properties and the public road.
 - 4.) Demolished material from the existing buildings & site shall be stockpiled, transported, disposed of or reprocessed in accordance with state and federal regulations.
 - 5.) Provide excavation & trench wall protection in accordance with OSHA Standards, as specified by the geotechnical engineer.
 - 6.) The contractor shall follow the stabilization management practices and sequence proposed by the structural and geotechnical engineers. Said management plan includes protection and stabilization of the soils and walls on the abutting High Street & Exchange Street R.O.W.'s.
 - 7.) Soil stabilization measures shall be implemented immediately after finish grading. Loam and seed shall be applied as soon as reasonably possible.
 - 8.) Provide 30-inch high retaining wall along the exterior parking area. The wall facing Union Common shall include safety rail extending 42-inch (Min.) above finished grade at top of wall. The wall facing the court yard shall include a 30-inch high privacy board fence mounted at the top of the wall. (see architectural plans).

| LEGEND | |
|-------------|---------------------------------------|
| --- 392 --- | Ex. 2' Contour |
| --- 390 --- | Ex. 10' Contour |
| x398.6 | Ex. Spot Grade |
| 392 | Prop. Contour |
| +292.2 | Prop. Spot Grade |
| ⊙ | Prop. Sewer & Drain Manhole Locations |
| ⊕ | Treatment Unit |
| 15"VC(S) | Prop. Sewer |
| □ | Prop. Catch Basin |
| 12"RCP | Prop. Drain Line |
| OHW | Prop. Overhead Electric |
| ☆ | Prop. Utility Pole & Light Pole |
| UG | Prop. Underground Electric |
| Gas-2"STL | Prop. Gas Service |
| ⊕ | Prop. Gas Valve |
| ⊕ | Prop. Water Gate, Hydrant & Shutoff |
| 40"W | Prop. Water Line |
| — | Prop. Vertical Concrete Curb |
| — | Prop. Vertical Granite Curb |



| NO. | DATE | DESCRIPTION |
|-----|---------|--------------------|
| P7 | 4/22/24 | PLAN UPDATE |
| P8 | 4/26/24 | PLAN MODIFICATIONS |
| P9 | 4/28/24 | PLAN MODIFICATIONS |

PREPARED BY:
 BRUCE SALUK & ASSOC., INC.
 CIVIL ENGINEERING & LAND SURVEYING
 576 BOSTON POST ROAD EAST
 MARLBOROUGH, MA 01752
 TEL: 508-485-1662

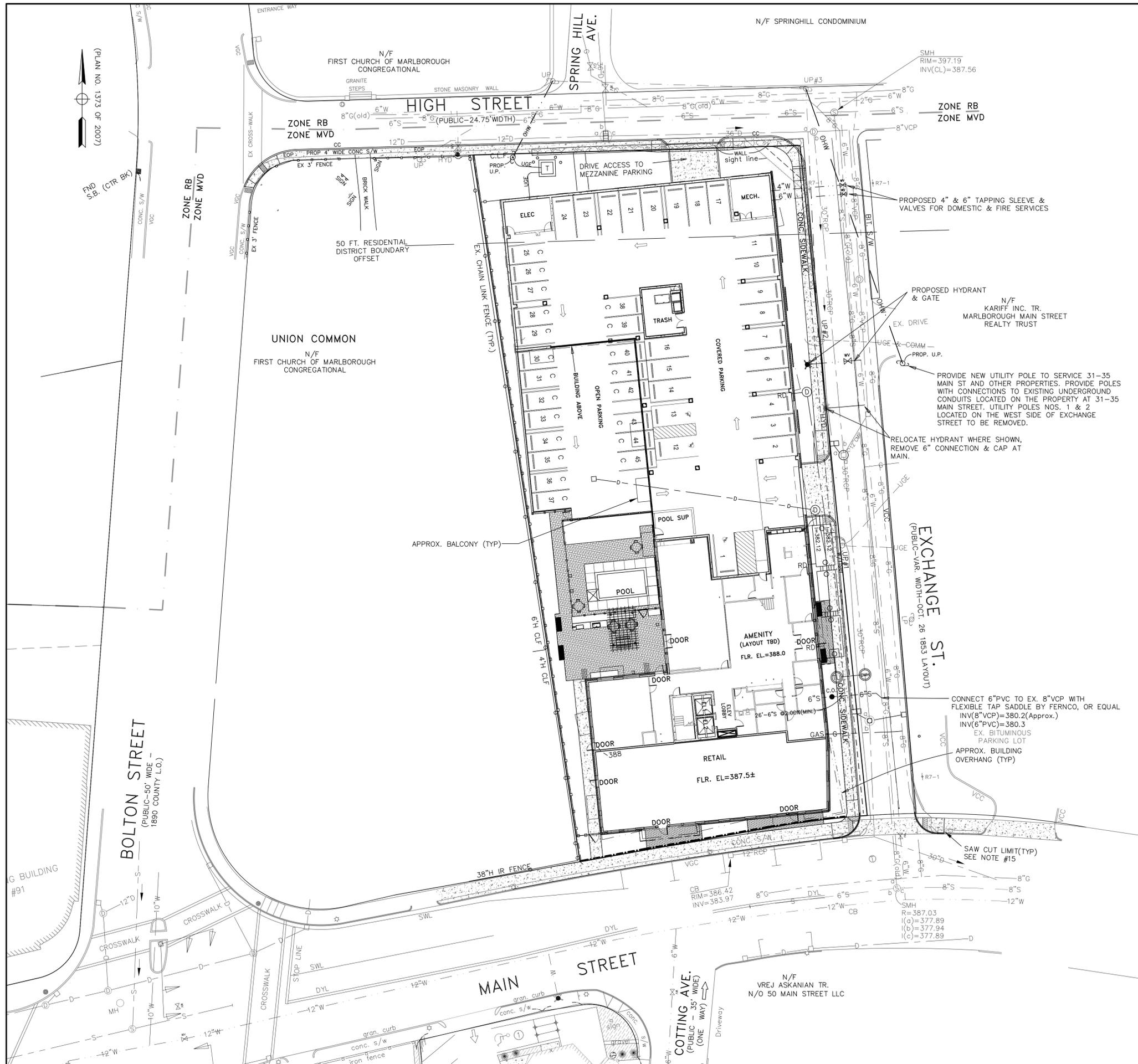
GRADING & EROSION CONTROL
 "EXCHANGE PLACE"
 SITE PLAN
 - 57 MAIN STREET -
 MARLBOROUGH, MA

APPLICANT:
 WILLIAM D. ADAMS
 J.W. CAPITAL PARTNERS, LLC
 34 WASHINGTON STREET, SUITE 230
 WELLESLEY, MA 02841
 TEL: (781) 366 2436

OWNER:
 MARLBOROUGH TOTG LLC
 206 AYER ROAD, SUITE 5
 HARVARD, MA 01451
 TEL: (978) 456 8388

DATE: SEPTEMBER 6, 2022

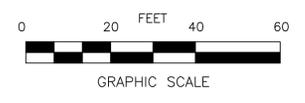
C3



WATER & SEWER NOTES:

- Materials and construction and associated work shall conform to MassDOT, ASTM and other specifications noted. Refer to the document entitled Commonwealth of Massachusetts Department of Transportation Standard Specifications for Highways and Bridges, 2022 edition.
- Manhole frames & covers shall be East Jordan Iron Works. See detail sheet for Product numbers.
- Provide pipe joint a maximum of 3' from manhole walls.
- Reinforcing for all precast units shall conform to ASTM Specification Section A 185 and shall include reinforcing in bell spigot of riser sections. Reinforcing shall be placed in accordance with AASHTO Designation N199.
- In the event that rock is encountered, the contractor shall maintain a 12-inch minimum separation between the pipe, appurtenances and the rock.
- Suitable backfill material shall be select excavated material from which frozen material, humus, peat, roots, vegetation, trash, rocks, and stones larger than 6-inches have been removed.
- Compaction of backfill material between centerline of pipe and trench pavement shall be done in 12-inch layers, or less, as required to prevent trench settlement. The contractor will be responsible for excessive trench settlement following final paving.
- Utilities shown on this plan are partly from existing available City and utility Co. records information and are approximate, only. There may be existing lines other than those shown hereon. The contractor is required to contact the proper utility companies & Digsafe prior to beginning any construction on the site. Our firm does not warrant or guarantee the location of any utilities hereon.
- The elevations shown are based on NAVD 1988 datum.
- Refer to additional Water & Sewer requirements on the Detail Sheets.
- The contractor shall obtain a Street Opening Permit prior to any construction within the City right-of-way. All water and sewer material and construction shall conform to the City of Marlborough requirements (see Street Opening Permit).
- All water and sewer construction shall be inspected by the City of Marlborough before being backfilled.
- The City shall be notified at least 24 hours prior to the required inspections.
- Where sewer and water lines cross, install the sewer below the water service and provide 18" minimum separation between the pipe outside diameters. Provide 1 full length of sewer pipe centered at the crossing. The full length of sewer pipe shall be SDR-26, Specification ASTM D2241 with a 160 PSI rating. Connect the SDR 35 & SDR 26 pipes using pressure rated adaptors by Fernco, or approved equal.
- The contractor shall be properly licensed and bonded with the City prior to construction and shall obtain a Trenching Permit prior to any trenching on public or private property.
- A gas, oil and sand separator (GOSS) is required inside the parking garage. Floor drains shall be connected to the GOSS. The GOSS discharge pipe shall be connected to the interior building sewer in accordance with the Plumbing Code. See the gas, oil and sand separator detail.
- The restaurant grease interceptor shall be designed by the mechanical engineer as part of the kitchen plumbing system. The design shall be in accordance with 248 CMR 10.09. The grease trap shall be sized, tested and certified according to PDI-G101 or ASME A112.14.3 or ASME A112.14.4.
- All existing water and sewer service lines that are to be discontinued shall be cut and capped at the main.

| LEGEND | |
|--------------------|---------------------------------------|
| --- 392 --- | Ex. 2' Contour |
| --- 390 --- | Ex. 10' Contour |
| --- 392 --- | Prop. Contour |
| +292.2 | Prop. Spot Grade |
| ⊙ ⊙ | Prop. Sewer & Drain Manhole Locations |
| ⊕ | Treatment Unit |
| --- 15" V(S) --- | Prop. Sewer |
| □ | Prop. Catch Basin |
| --- 12" RCP --- | Prop. Drain Line |
| --- OHW --- | Prop. Overhead Electric |
| ⊙ ⊙ | Prop. Utility Pole & Light Pole |
| --- UGE --- | Prop. Underground Electric |
| --- Gas-2" STL --- | Prop. Gas Service |
| ⊕ | Prop. Gas Valve |
| ⊕ ⊕ | Prop. Water Gate, Hydrant & Shutoff |
| --- 40" --- | Prop. Water Line |
| --- | Prop. Vertical Concrete Curb |
| --- | Prop. Vertical Granite Curb |



| NO. | DATE | DESCRIPTION |
|-----|---------|-------------------------|
| PS | 1/28/24 | PLAN UPDATE |
| PE | 4/22/24 | SITE PLAN MODIFICATIONS |
| BMC | | |
| BMC | | |

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
 CIVIL ENGINEERING & LAND SURVEYING
 576 BOSTON POST ROAD EAST
 MARLBOROUGH, MA 01752
 TEL: 508-485-1662

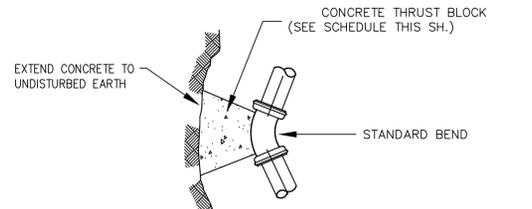
SEWER, WATER & UTILITIES
 "EXCHANGE PLACE"
 SITE PLAN
 - 57 MAIN STREET -
 MARLBOROUGH, MA

APPLICANT:
WILLIAM D. ADAMS
 J.W. CAPITAL PARTNERS, LLC
 34 WASHINGTON STREET, SUITE 230
 WELLESLEY, MA 02841
 TEL: (781) 366 2436

OWNER:
MARLBOROUGH TOTG LLC
 206 AYER ROAD, SUITE 5
 HARVARD, MA 01451
 TEL: (978) 456 8388

DATE: SEPTEMBER 6, 2022
 FILE: 2916.dwg

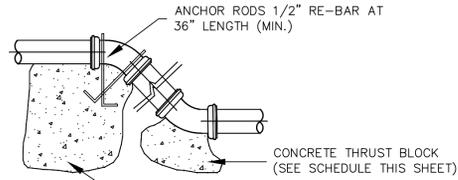




| THRUST BLOCK SCHEDULE | | | |
|-----------------------|--------------|-----|---------|
| MAIN | TEES & PLUGS | 45° | 22 1/2° |
| 4" | 16 | 4 | 4 |

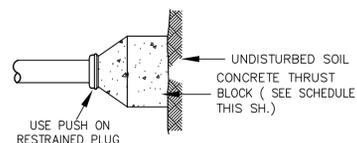
THRUST BLOCK DETAIL - STANDARD BEND

N. T. S. thrustblock.dwg



THRUST BLOCK - VERTICAL BEND

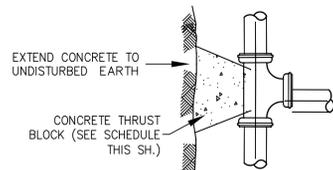
N. T. S.



THRUST BLOCK DETAIL - PLUG

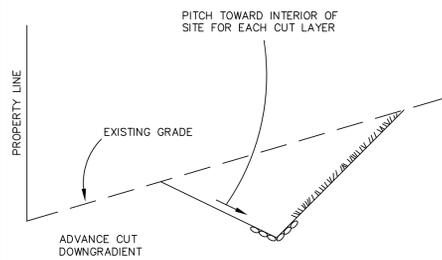
N. T. S.

- NOTES:
- VALUES IN TABLE ARE REQUIRED CONCRETE THRUST BLOCK BEARING AREA IN SQUARE FEET AGAINST UNDISTURBED SOIL.
 - USE TIE RODS AND MEGA LUGS FOR ALL FITTINGS.



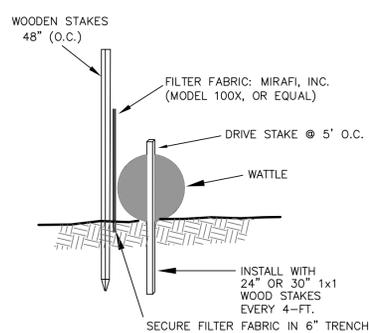
THRUST BLOCK DETAIL - TEE

N. T. S.



EROSION CONTROL FOR CUT AREAS

N. T. S.



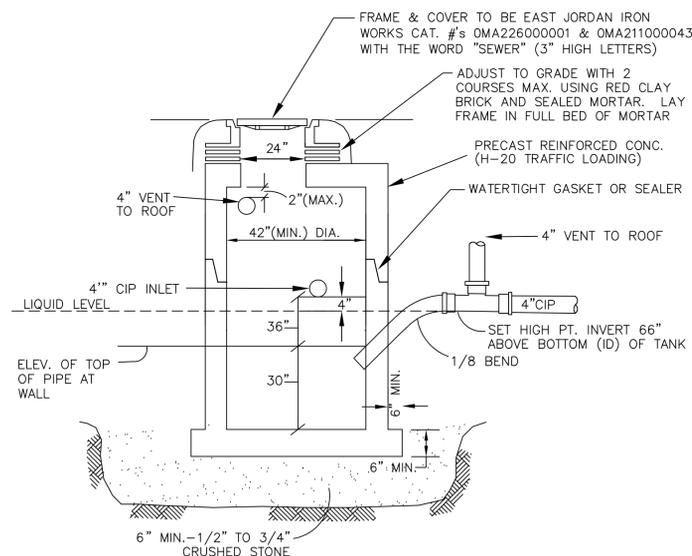
STAKED WATTLE DETAIL

N. T. S.

Wattles AND silt fence.dwg

CONSTRUCTION NOTES FOR GASOLINE, OIL & SAND SEPARATOR

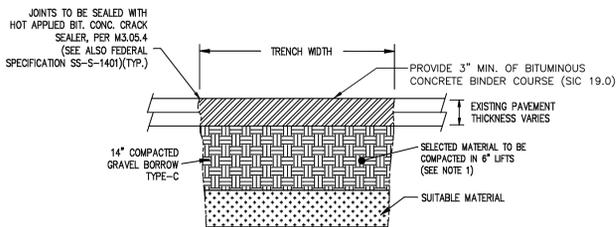
- SEPARATOR IS TO BE LOCATED OUTSIDE OF A BUILDING WHERE POSSIBLE AND THE COVER SHALL BE A MINIMUM OF 24" IN DIAMETER. IF THE SEPARATOR MUST BE INSTALLED INSIDE OF A BUILDING, THE COVER MUST BE SEALED TIGHT.
- THE SEPARATOR MUST BE CONSTRUCTED AND INSTALLED TO PREVENT SURFACE WATER FROM ENTERING.
- THE INVERT OF THE SEPARATOR INLET PIPE SHALL BE NO LESS THAN 4" ABOVE THE LIQUID LEVEL.
- THE SEPARATOR SHALL BE FILLED WITH WATER, TESTED AND INSPECTED PRIOR TO BEING PUT INTO SERVICE.
- THE NON CORROSIVE STEPS SHALL BE INSTALLED 18" APART.
- THE CHAMBER VENT AND OUTLET VENT SHALL BE RETURNED TO THE INSIDE OF THE BUILDING AND EXTENDED THROUGH THE ROOF.
- THE CHAMBER VENT MUST BE LOCATED AS CLOSE TO THE TOP OF THE TANK AS POSSIBLE.
- PRECAST CONCRETE UNITS SHALL MEET OR EXCEED ASTM C-478 STANDARD OF 4,000 PSI.
- JOINT SECTIONS ON PRECAST CONCRETE SEPARATORS SHALL USE BUTYL RUBBER JOINT SEALANT PER ASTM C-990.
- ALL PIPE PENETRATIONS IN THE SEPARATOR SHALL BE SEALED WITH HYDRAULIC CEMENT ONLY.
- ALLOWABLE PIPING MATERIAL:
 - NO-HUB CAST IRON WITH PRODUCT ACCEPTED CLAMPS
 - SERVICE WEIGHT CAST IRON WITH PRODUCT ACCEPTED GASKETS OR LEAD & OAKUM JOINTS
 - EXTRA HEAVY CAST IRON WITH PRODUCT ACCEPTED GASKETS OR LEAD & OAKUM JOINTS
- THE CAPACITY OF THE GAS, OIL & SAND SEPARATOR SHALL BE AS SHOWN IN FIGURE 15 OF 248 CMR 10.22.



GAS, OIL & SAND SEPARATOR

N. T. S.

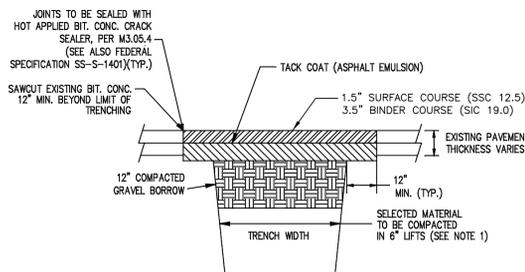
Gas & Oil Trap.dwg



TEMPORARY TRENCH PAVING TYPICAL SECTION

N.T.S.

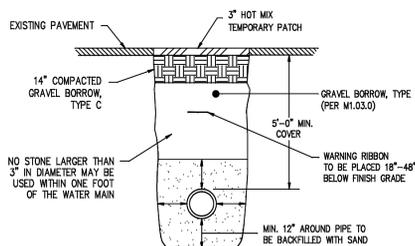
- NOTE 1:
- COMPACTION EQUIPMENT SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES, UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.



TYPICAL FINAL TRENCH PAVING

N.T.S.

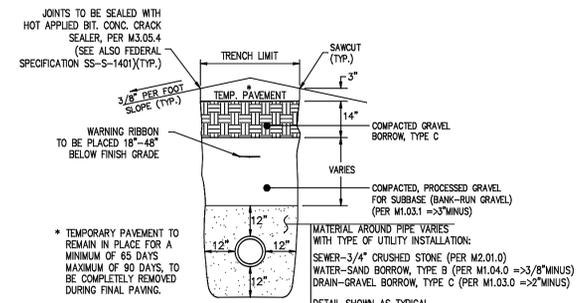
- NOTE 1:
- COMPACTION EQUIPMENT SHALL MEET OR EXCEED THE MINIMUM REQUIREMENTS TO OBTAIN THE COMPACTION STANDARDS DESCRIBED IN THE CONSTRUCTION NOTES UNLESS OTHERWISE APPROVED BY THE CITY ENGINEER. IN PROXIMITY TO STRUCTURES, A JUMPING JACK COMPACTOR SHALL BE REQUIRED.



TYPICAL WATER TRENCH

N.T.S.

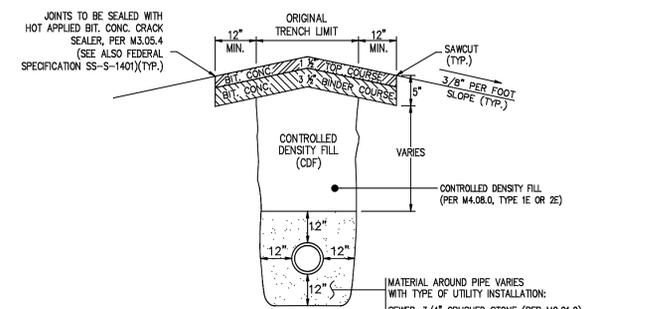
- * TEMPORARY PAVEMENT TO REMAIN IN PLACE FOR A MINIMUM OF 65 DAYS, TO BE COMPLETELY REMOVED DURING FINAL PAVING.



TYPICAL EXCAVATION TRENCH

N.T.S.

- * TEMPORARY PAVEMENT TO REMAIN IN PLACE FOR A MINIMUM OF 65 DAYS MAXIMUM OF 90 DAYS, TO BE COMPLETELY REMOVED DURING FINAL PAVING.
- MATERIAL AROUND PIPE VARIES WITH TYPE OF UTILITY INSTALLATION:
SEWER-3/4" CRUSHED STONE (PER M2.01.0)
WATER-SAND BORROW, TYPE B (PER M1.04.0 =>3/8"MINUS)
DRAIN-GRAVEL BORROW, TYPE C (PER M1.03.0 =>2"MINUS)
DETAIL SHOWN AS TYPICAL.
MAINTAIN 12" (MIN.) SEPARATION BETWEEN THE PIPE AND LEDGE



TYPICAL FLOWABLE FILL TRENCH

N.T.S.

- MATERIAL AROUND PIPE VARIES WITH TYPE OF UTILITY INSTALLATION:
SEWER-3/4" CRUSHED STONE (PER M2.01.0)
WATER-SAND BORROW, TYPE B (PER M1.04.0 =>3/8"MINUS)
DRAIN-GRAVEL BORROW, TYPE C (PER M1.03.0 =>2"MINUS)
DETAIL SHOWN AS TYPICAL.

CONSTRUCTION NOTES FOR EXCHANGE STREET

- BACKFILL MATERIALS

EXCAVATIONS IN THE STREET PAVEMENT AREAS SHALL BE CAREFULLY BACKFILLED WITH LAYERS OF SUITABLE GRAVEL. THE TWELVE (12) INCHES OF BEDDING MATERIAL AROUND PIPES SHALL BE SAND (M1.04.0) FOR WATER, CRUSHED STONE (M2.01.0) FOR SEWER, GRAVEL BORROW - TYPE C (M1.03.0) FOR DRAIN OR AS SPECIFIED BY THE OWNER OF THE UTILITY AND APPROVED BY THE CITY OF MARLBOROUGH. BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL (CDF) - TYPE 1E OR 2E (M4.08.0) FOR ALL MAJOR ROADWAYS OF THE CITY OR AS DIRECTED BY THE COMMISSIONER OF PUBLIC WORKS.

SUITABLE GRAVEL MATERIAL FOR BACKFILLING SHALL BE GRANULAR FILL CONSISTING OF SOIL SUBSTANTIALLY FREE FROM CLAY, ORGANIC MATERIALS, LOAM, WOOD, TRASH OR OTHER OBJECTIONABLE MATERIAL WHICH MAY COMPRESSIBLE OR WHICH CANNOT BE PROPERLY COMPACTED. IT SHALL NOT CONTAIN STONES, BROKEN CONCRETE MASONRY RUBBLE OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED. IT SHALL NOT CONTAIN ANY SNOW, ICE OR FROZEN SOIL.
- COMPACTION OF BACKFILL

BACKFILL SHALL BE UNIFORMLY DISTRIBUTED IN SUCCESSIVE LAYERS, EACH LAYER BEING THOROUGHLY COMPACTED BEFORE THE SUCCEEDING LAYER IS PLACED. THE ENTIRE WIDTH OF THE TRENCH SHALL BE MECHANICALLY OR HAND TAMPED IN SIX (6) INCH LIFTS, A MINIMUM OF TWO (2) FEET ABOVE THE UTILITY INSTALLATION, AND MECHANICALLY TAMPED THE REMAINDER OF THE FILL IN LIFT DEPTHS NOT GREATER THAN SIX (6) INCHES. THE TOP LAYER OF BACKFILL SHALL BE FOURTEEN (14) INCHES (IN A TEMPORARY TRENCH), AND TWELVE (12) INCHES (IN A PERMANENT TRENCH) OF GRAVEL COMPACTED TO 97% OF MAXIMUM DENSITY.
- GRADING ROLLING AND FINISHING

PAVEMENT PLACED SHALL BE PLACED AND RAKED TO A UNIFORM SURFACE, ROLLED TO THE REQUIRED THICKNESS AND TO A GRADE THAT WILL MATCH THE EXISTING BITUMINOUS ROAD SURFACE. THE PERMITTEE SHALL MAINTAIN THE SURFACING AND SHALL PROMPTLY FILL WITH SIMILAR MATERIAL ANY DEPRESSION AND HOLES THAT MAY OCCUR SO AS TO KEEP THE SURFACING IN A SAFE AND SATISFACTORY CONDITION FOR TRAFFIC.
- TEMPORARY PAVEMENT

A TEMPORARY PAVEMENT SHALL BE PLACED ON THE SURFACE OF THE FILL AND THOROUGHLY COMPACTED. A TEMPORARY PAVEMENT SHALL BE CLASS I BITUMINOUS CONCRETE TYPE I-1 THREE (3) INCHES THICK (SEE EXCAVATION TRENCH DETAIL). "COLD PATCH" MAY BE ALLOWED IF APPROVED BY THE COMMISSIONER OF PUBLIC WORKS DUE TO ADVERSE WEATHER CONDITIONS. IF PLATES ARE USED THEY SHALL BE RAMPED TO MATCH THE EXISTING PAVEMENT. TEMPORARY PAVING OR STEEL PLATING SHALL IMMEDIATELY FOLLOW THE BACKFILLING OPERATION.
- PERMANENT PAVING

THE FINAL BITUMINOUS CONCRETE SURFACE SHALL NOT BE PLACED ANY EARLIER THAN 65 DAYS OR NO LATER THAN 90 DAYS FROM THE DATE OF COMPLETION OF THE TEMPORARY SURFACE WITHOUT APPROVAL FROM THE COMMISSIONER OF PUBLIC WORKS. THE TEMPORARY PAVEMENT AND SUB-BASE SHALL BE EXCAVATED TO THE GRADE REQUIRED BY THE PERMIT PRIOR TO PLACEMENT OF THE FINAL BITUMINOUS CONCRETE SURFACE. THE BINDER COURSE SHALL NOT BE LESS THAN THE EXISTING ROADWAY BINDER COURSE AND SHALL NOT BE LESS THAN THREE AND ONE-HALF (3 1/2) INCHES IN DEPTH AND THE TOP COURSE SHALL BE ONE AND ONE-HALF (1 1/2) INCHES IN DEPTH. IN SOME INSTANCES, BEYOND A SIMPLE TRENCH EXCAVATION, PAVEMENT DETAILS AND RESURFACING REQUIREMENTS WILL BE INCLUDED AS A SPECIAL CONDITION IN THE PERMIT.



| NO. | DATE | DESCRIPTION |
|-----|----------|-------------|
| P1 | 11/28/24 | PLAN UPDATE |
| P2 | 11/22/24 | PLAN UPDATE |
| BMC | | BMC |
| BMC | | BMC |

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-485-1662

DETAILS
"EXCHANGE PLACE"
SITE PLAN
- 57 MAIN STREET -
MARLBOROUGH, MA

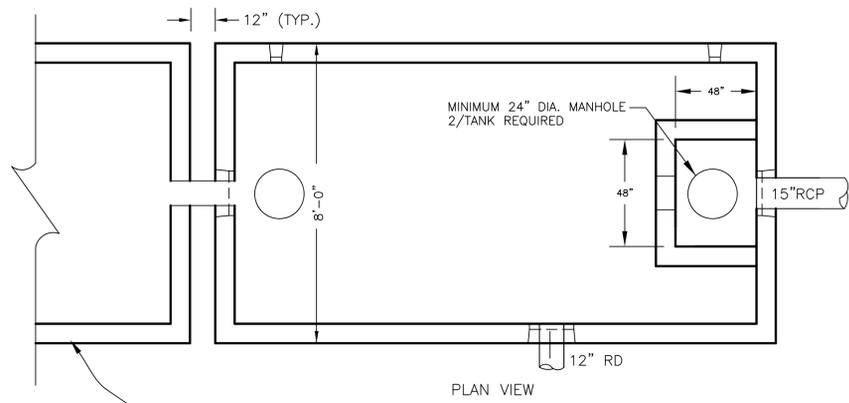
APPLICANT:
WILLIAM D. ADAMS
JW CAPITAL PARTNERS, LLC
34 WASHINGTON STREET, SUITE 230
WELLESLEY, MA 02841
TEL: (781) 366 2436

OWNER:
MARLBOROUGH TOTG LLC
206 AYER ROAD, SUITE 5
HARVARD, MA 01451
TEL: (978) 456 8388

DATE: SEPTEMBER 6, 2022

C6

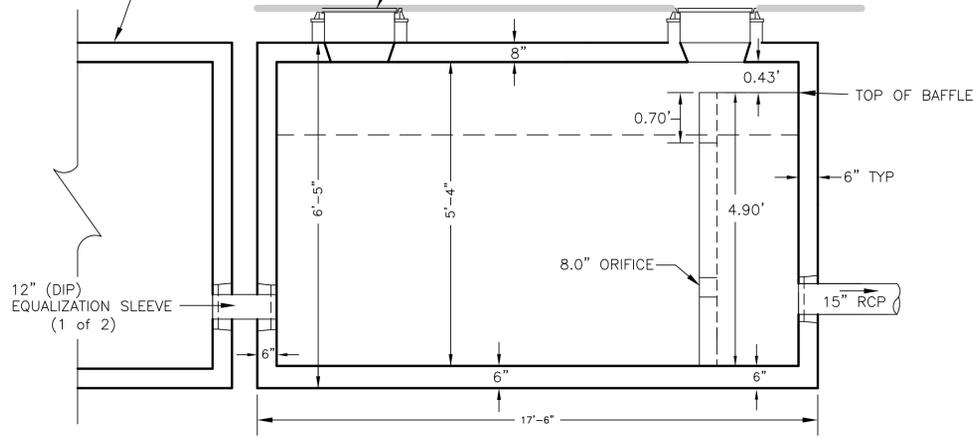
FILE: 2916.dwg



PLAN VIEW

CONNECTED DETENTION TANK.(SEE NOTE#7).

FRAME & COVER (EAST JORDAN IRON WORKS CAT., #'S OMA22600001 & OMA211000041) CAST WITH THE WORD 'DRAIN'



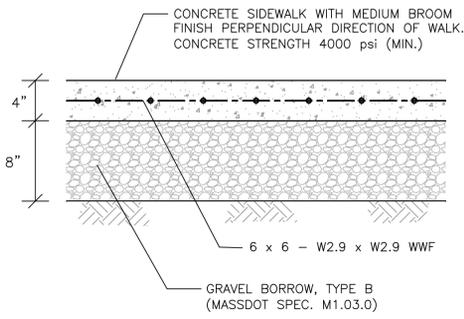
SECTION VIEW

NOTES:

1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. ALL REINFORCEMENT PER ASTM C1227.
3. TONGUE AND GROOVE JOINT SEALED WITH BUTYL RESIN.
4. EXISTING PIPE SEALS TO BE CORED OR PRECAST FOR DRAIN PIPE SHOWN.
5. USE SHEA CONCRETE 3500 GALLON H-20 TRAFFIC LOADING OR APPROVED EQUAL.
6. SEE PLAN FOR PIPE INVERTS
7. OTHER TANKS SHALL HAVE SAME DIMENSIONS AND MEET CONSTRUCTION SPECIFICATIONS WITHOUT THE BAFFLE OF THE TANK SHOWN.

DETENTION/WATER QUALITY TANKS

N. T. S. WATER QUALITY TANK.DWG

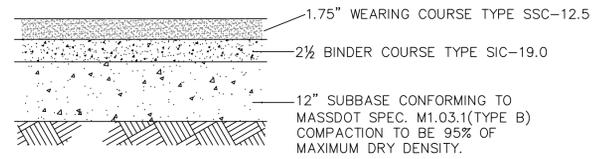


NOTES:

- 1.) PROVIDE 3/4" DEEP SCORE CONTROL JOINTS AT 5 FT. INTERVALS.
- 2.) EXPANSION JOINTS (1/2"X4"D PREMOULDED BITUMASTIC FILLER) TO BE PLACED AT 30 FT. (MIN.) INTERVALS, BUILDING AND OTHER CONCRETE STRUCTURES. PROVIDE WATER STOP APPLICATIONS TO SURFACE AT ALL EXPANSION JOINTS.
- 3.) SIDEWALK FOUNDATION AND SOILS BELOW TO BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY.

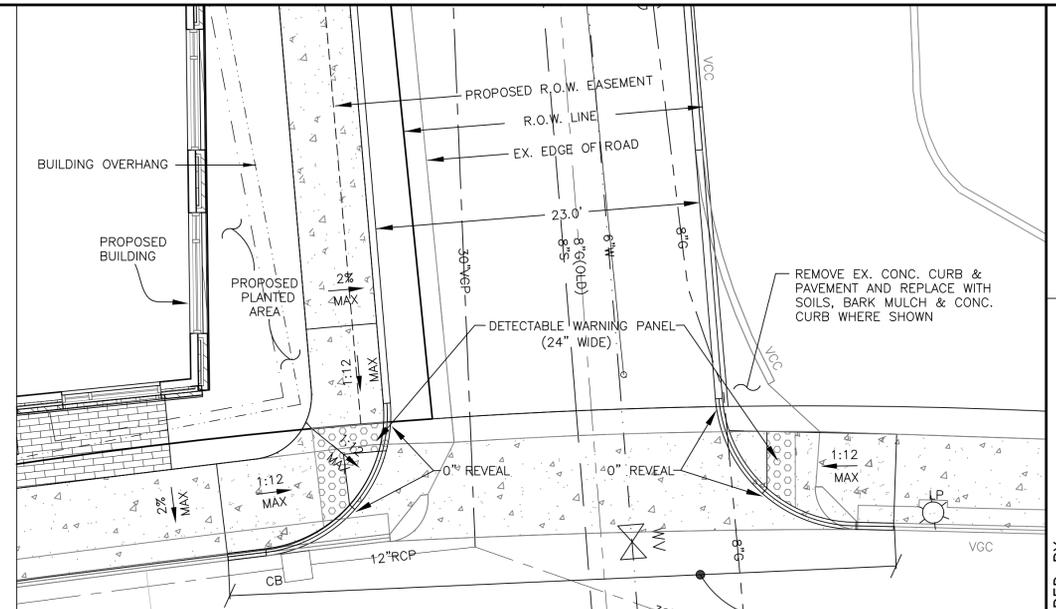
CONCRETE SIDEWALK DETAIL

N. T. S. Concsidewalk.dwg



DRIVE & PARKING PAVEMENT SECTION

N. T. S.



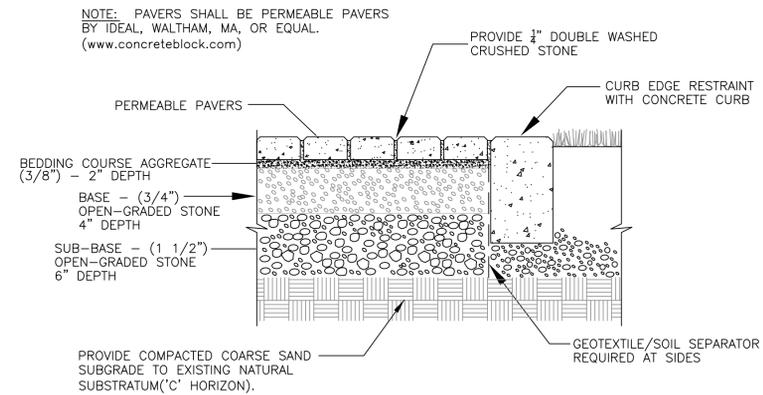
EXCHANGE STREET INTERSECTION

SCALE: 1"=6'

NOTE: SIDEWALK CURB CUTS & PAVEMENT CROSSWALK SHALL MEET ADA REQUIREMENTS.

REMOVE EX. CONC. CURB & PAVEMENT AND REPLACE WITH SOILS, BARK MULCH & CONC. CURB WHERE SHOWN

REMOVE CONCRETE SIDEWALK AND GRANITE CURB. REPLACE WITH VERTICAL GRANITE & CONCRETE CURBS, CURB CUTS AND BITUMINOUS CONCRETE ROAD ENTRANCE. SEE NOTE#14 ON SHEET C1 FOR PAVEMENT REPLACEMENT WITHIN TRAVELED WAY OF EXCHANGE STREET



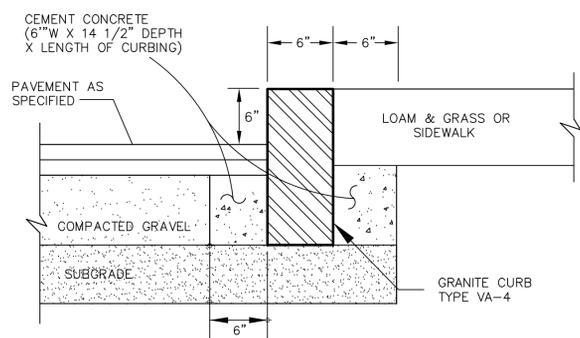
PERMEABLE CONCRETE PAVERS

N. T. S.

NOTE: PAVERS SHALL BE PERMEABLE PAVERS BY IDEAL, WALTHAM, MA, OR EQUAL. (www.concreteblock.com)

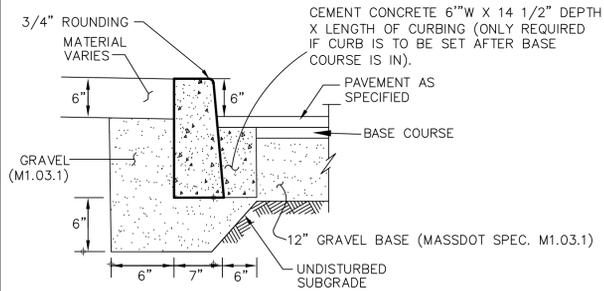
PROVIDE 1" DOUBLE WASHED CRUSHED STONE

PROVIDE COMPACTED COARSE SAND SUBGRADE TO EXISTING NATURAL SUBSTRATUM('C' HORIZON).



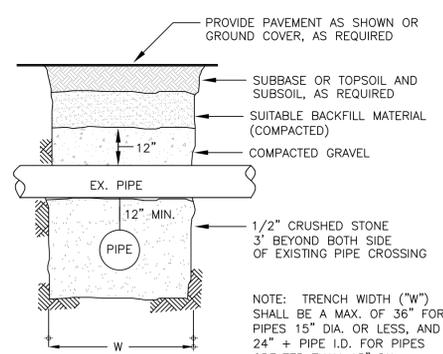
VERTICAL GRANITE CURB DETAIL

N. T. S. Curbgran.dwg



CONCRETE CURB

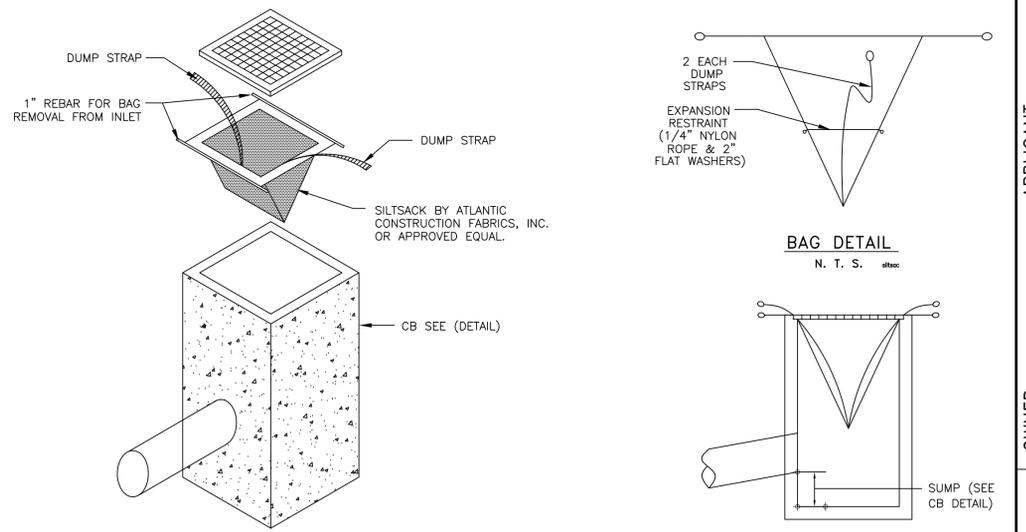
N. T. S. concurb.dwg



PIPE CROSSING DETAIL

N. T. S.

NOTE: TRENCH WIDTH ("W") SHALL BE A MAX. OF 36" FOR PIPES 15" DIA. OR LESS, AND 24" + PIPE I.D. FOR PIPES GREATER THAN 15" DIA.



SILTSACK DETAIL

N. T. S.

INSTALLATION DETAIL

N. T. S.

| NO. | DATE | DESCRIPTION | BY |
|-----|---------|-------------|-----|
| P2 | 4/22/24 | PLAN UPDATE | BMS |
| P1 | 1/28/24 | PLAN UPDATE | BMS |

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-483-1662

DETAILS
"EXCHANGE PLACE"
SITE PLAN
- 57 MAIN STREET -
MARLBOROUGH, MA

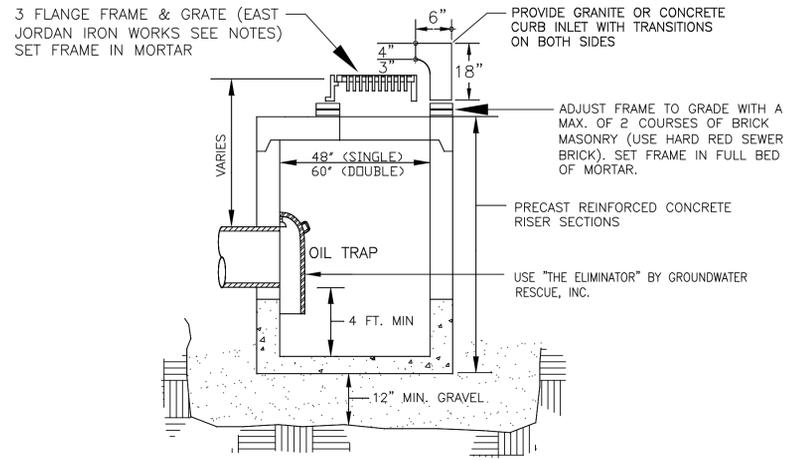
APPLICANT:
WILLIAM D. ADAMS
JW CAPITAL PARTNERS, LLC
34 WASHINGTON STREET, SUITE 230
WELLESLEY, MA 02841
TEL: (781) 366 2436

OWNER:
MARLBOROUGH TOTG LLC
206 AYER ROAD, SUITE 5
HARVARD, MA 01451
TEL: (978) 456 8388

DATE: SEPTEMBER 6, 2022

C7

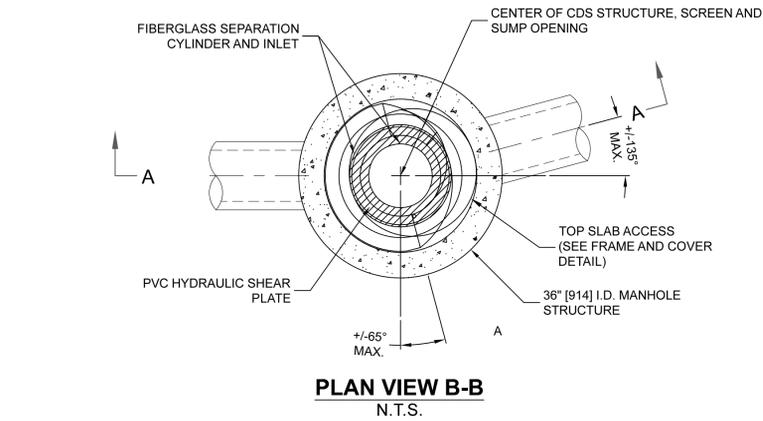
FILE: 2916.dwg



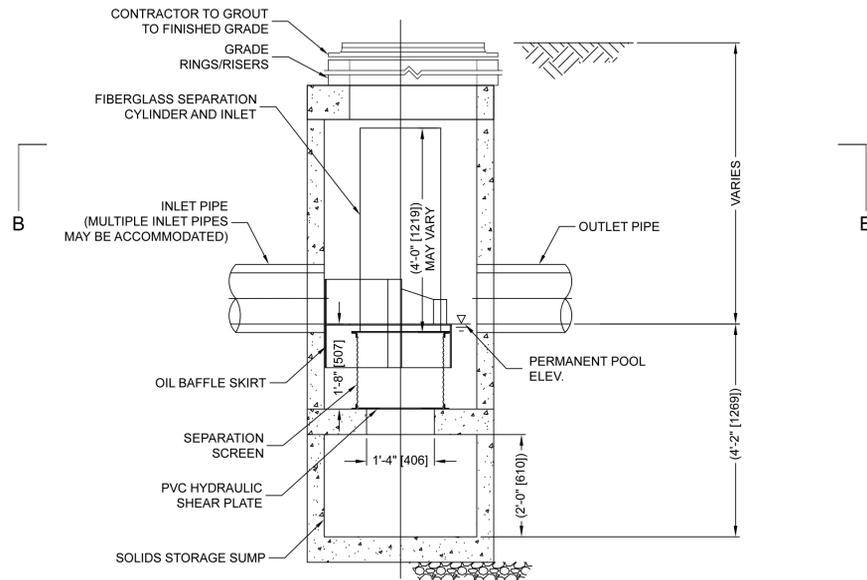
NOTES:

- 1.) SINGLE FRAME & GRATE:
EJW FRAME CAT# OMA552000024
EJW GRATE CAT# OMA552000075
- 2.) DOUBLE FRAME & GRATE:
EJW FRAME CAT# OMA544000001(FOR LONG FLANGE DELETED)
EJW FRAME CAT# OMA54400107(FOR SHORT FLANGE DELETED)
EJW GRATE CAT# OMA552000075
- 3.) FLAT TOP SLAB HOLE TO ACCOMMODATE FRAME AND CURB INLET OPENING.

SINGLE & DOUBLE CATCH BASIN WITH CURB INLET
N. T. S. CB1-Marlboro.Dwg



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.

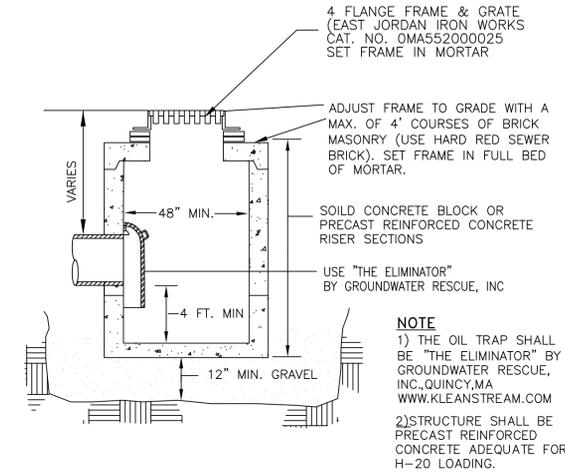
GENERAL NOTES

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 LLC REPRESENTATIVE. www.ContechES.com
3. STORMCEPTOR 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. STORMCEPTOR STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2' (610), AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. STORMCEPTOR STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C478 AND AASHTO LOAD FACTOR DESIGN METHOD.
6. COVERS AND GRATES SHALL BE STORMCEPTOR FRAMES & COVERS FOR NON-INLET UNITS(TU'S) AND FRAME & GRATES FOR INLET UNITS(WQI'S). FRAMES AND GRATES SHALL MATCH YARD DRAIN DETAIL SPECIFICATIONS(EAST JORDAN IRON WORKS CAT# OMA552000025).

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 STORMCEPTOR MANHOLE STRUCTURE.
- C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
- D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
- E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

STORMWATER TREATMENT UNIT (TU)
MODEL CDS 1515-3-C BY CONTECH
N. T. S.



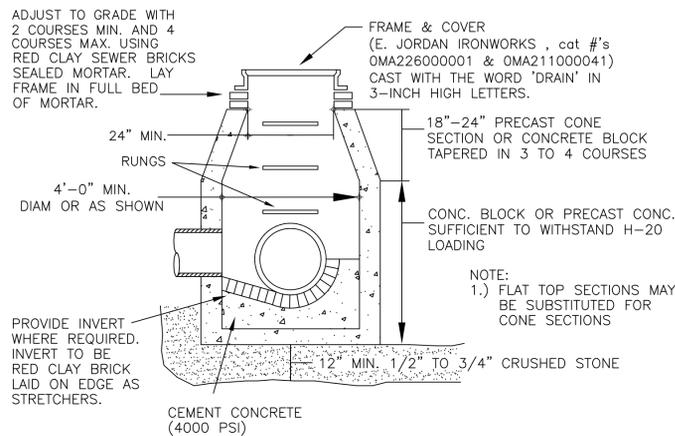
CATCH BASIN

N. T. S. CB6.dwg

- NOTE**
- 1) THE OIL TRAP SHALL BE "THE ELIMINATOR" BY GROUNDWATER RESCUE, INC., QUINCY, MA WWW.KLEANSTREAM.COM
 - 2) STRUCTURE SHALL BE PRECAST REINFORCED CONCRETE ADEQUATE FOR H-20 LOADING.

| SIGN WITH IDENTIFICATION | DIMENSIONS (FT.) | MOUNTING HEIGHT |
|---|------------------|-----------------|
| R7-8 <p>NOTE: SIGNAGE SHALL COMPLY WITH 521CMR 23.6 SUCH SIGN SHALL BE PERMANENTLY LOCATED AT A HEIGHT OF NOT LESS THAN FIVE FEET NOR MORE THAN EIGHT FEET TO THE TOP OF THE SIGN. MOUNT SIGN ON BUILDING OR POST WHEN ADJACENT TO A BUILDING.</p> | 12" X 18" | 6.5' |
| R7-8P <p>NOTE: SIGNAGE SHALL COMPLY WITH 521CMR 23.6 SUCH SIGN SHALL BE PERMANENTLY LOCATED AT A HEIGHT OF NOT LESS THAN FIVE FEET NOR MORE THAN EIGHT FEET TO THE TOP OF THE SIGN. MOUNT SIGN ON BUILDING OR POST WHEN ADJACENT TO A BUILDING.</p> | 6" X 12" | 5' |
| R7-1B <p>* TEXT, BACKGROUND, LEGEND, BORDER & COLOR SHALL COMPLY WITH 2022 MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAY, AS AMENDED. ** LETTER HEIGHT AND SPACING SHALL CONFORM WITH MUTCD.</p> | 12" X 18" | 6.5' |

SIGNAGE
N. T. S.



STORM DRAIN MANHOLE W/ STEP

N. T. S. DMH4Marlboro.dwg

| NO. | DATE | BY | DESCRIPTION |
|-----|----------|-----|---------------|
| P1 | 10/27/22 | BMC | SPRC COMMENTS |
| P2 | 11/28/24 | BMC | PLAN UPDATE |

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-485-1662

APPLICANT:
"EXCHANGE PLACE"
SITE PLAN
- 57 MAIN STREET -
MARLBOROUGH, MA

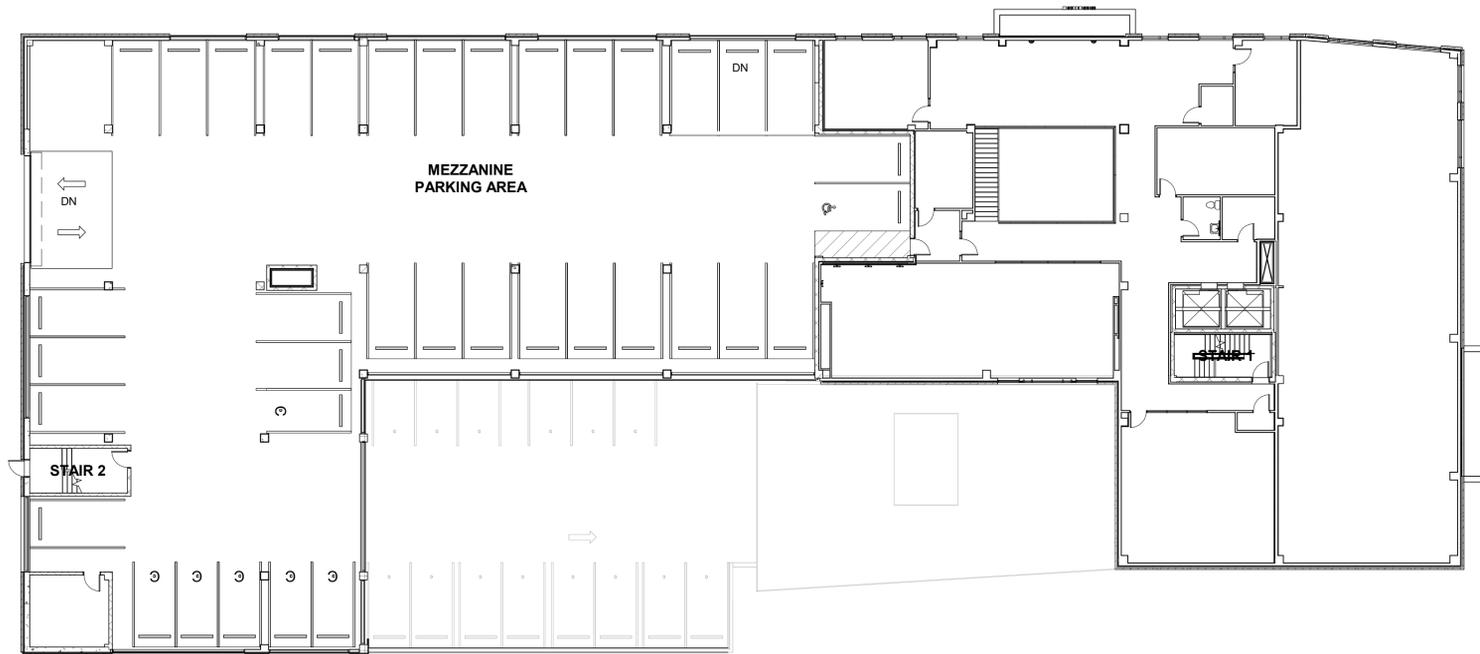
APPLICANT:
WILLIAM D. ADAMS
JW CAPITAL PARTNERS, LLC
34 WASHINGTON STREET, SUITE 230
WELLESLEY, MA 02841
TEL: (781) 366 2436

OWNER:
MARLBOROUGH TOTG LLC
206 AYER ROAD, SUITE 5
HARVARD, MA 01451
TEL: (978) 456 8388

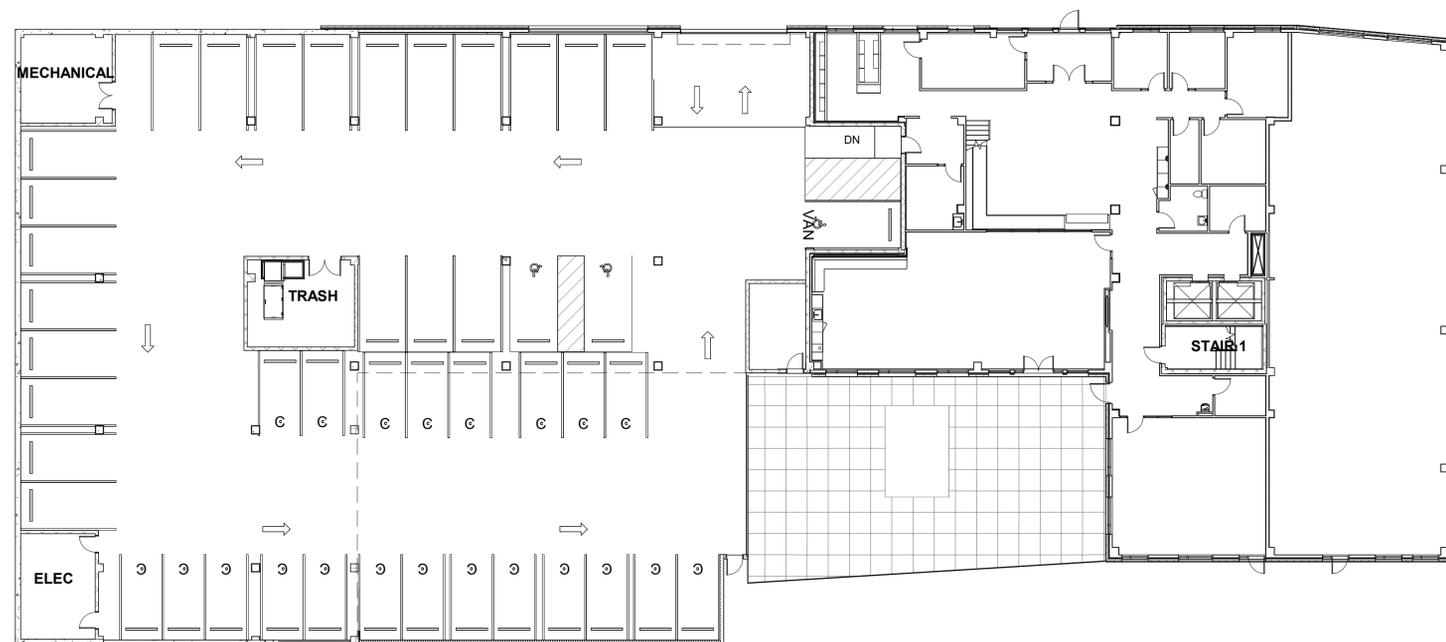
DATE: SEPTEMBER 6, 2022



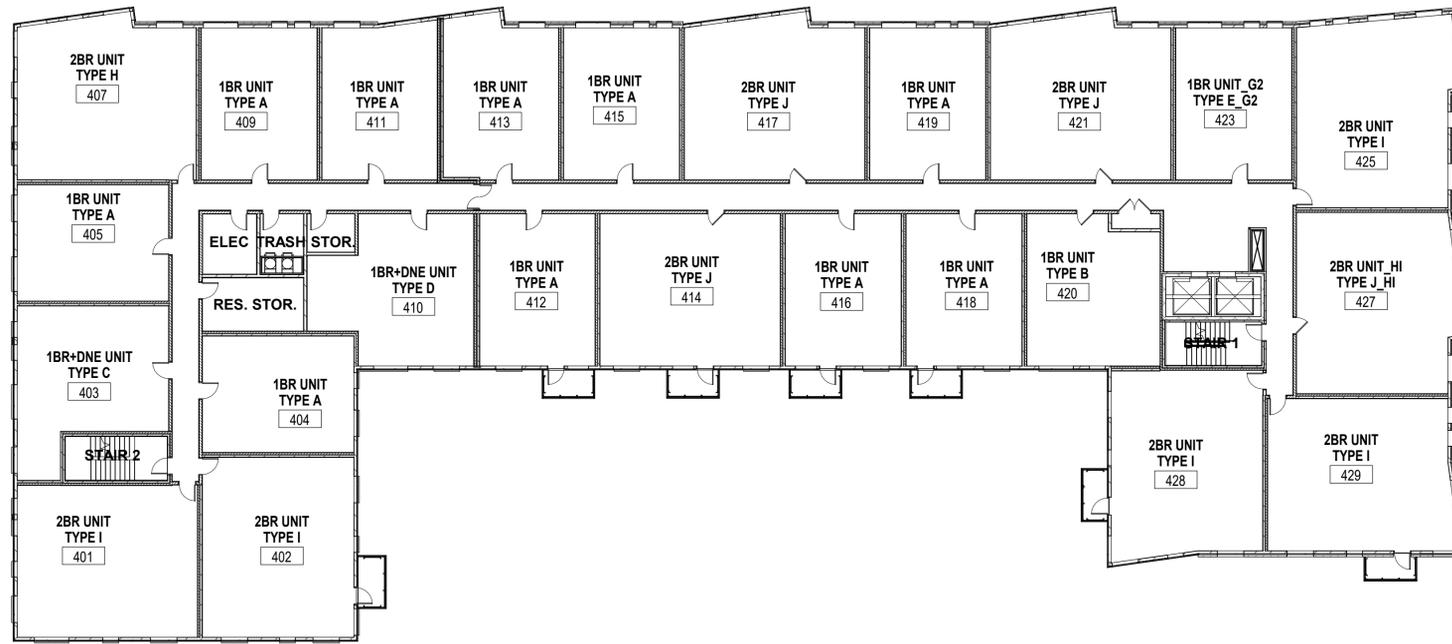
C8



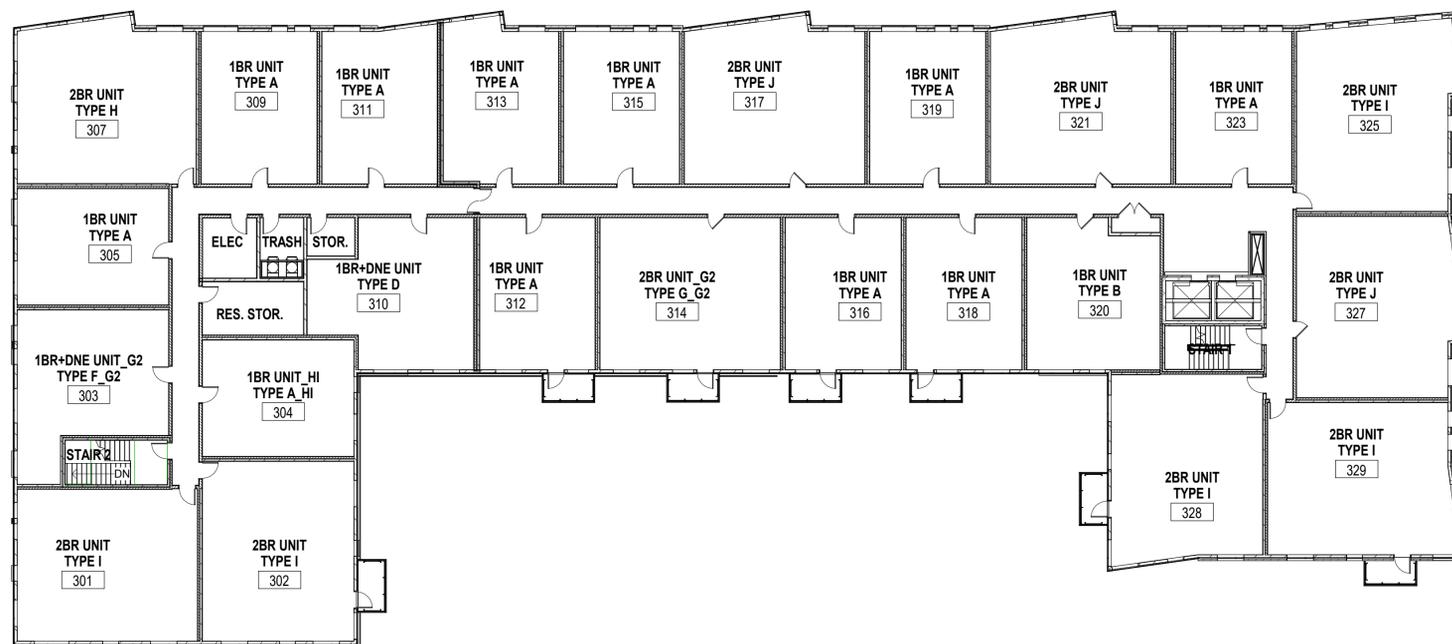
20 BOX PLAN OVERALL FLOOR PLAN - LEVEL 1M
Scale: 1/16" = 1'-0"



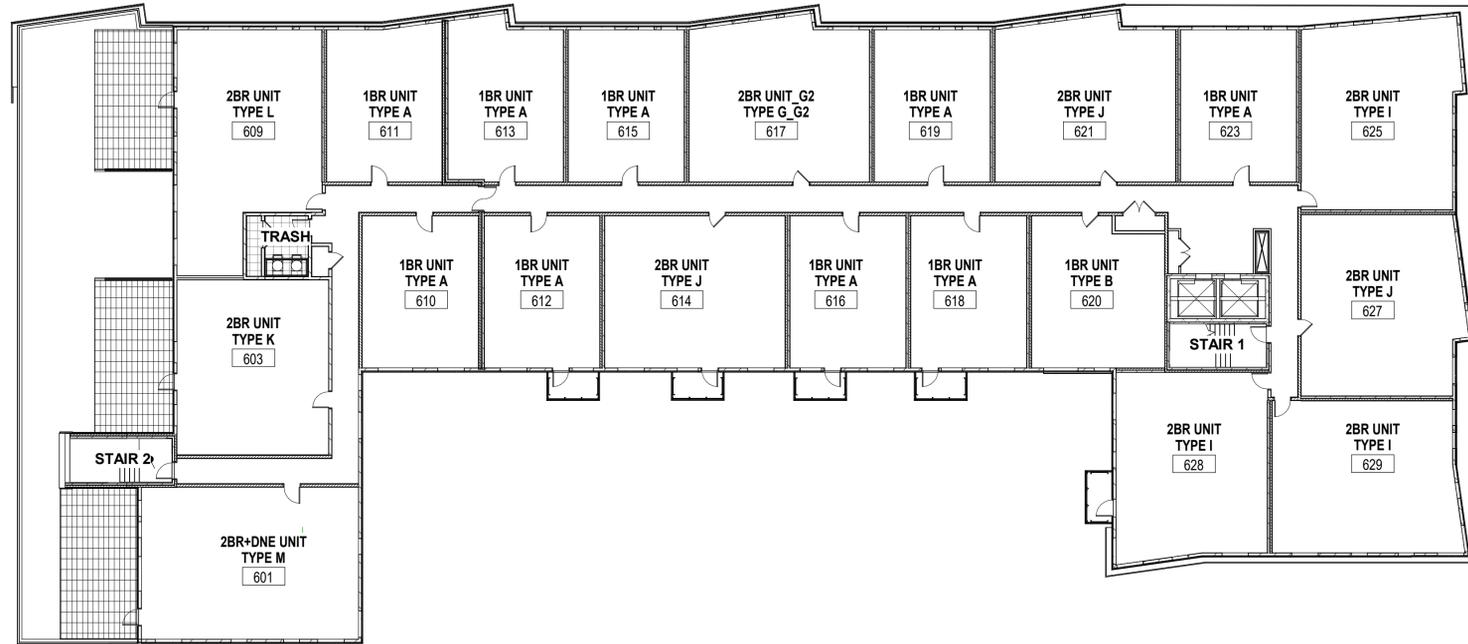
10 BOX PLAN OVERALL FLOOR PLAN - LEVEL 1
Scale: 1/16" = 1'-0"



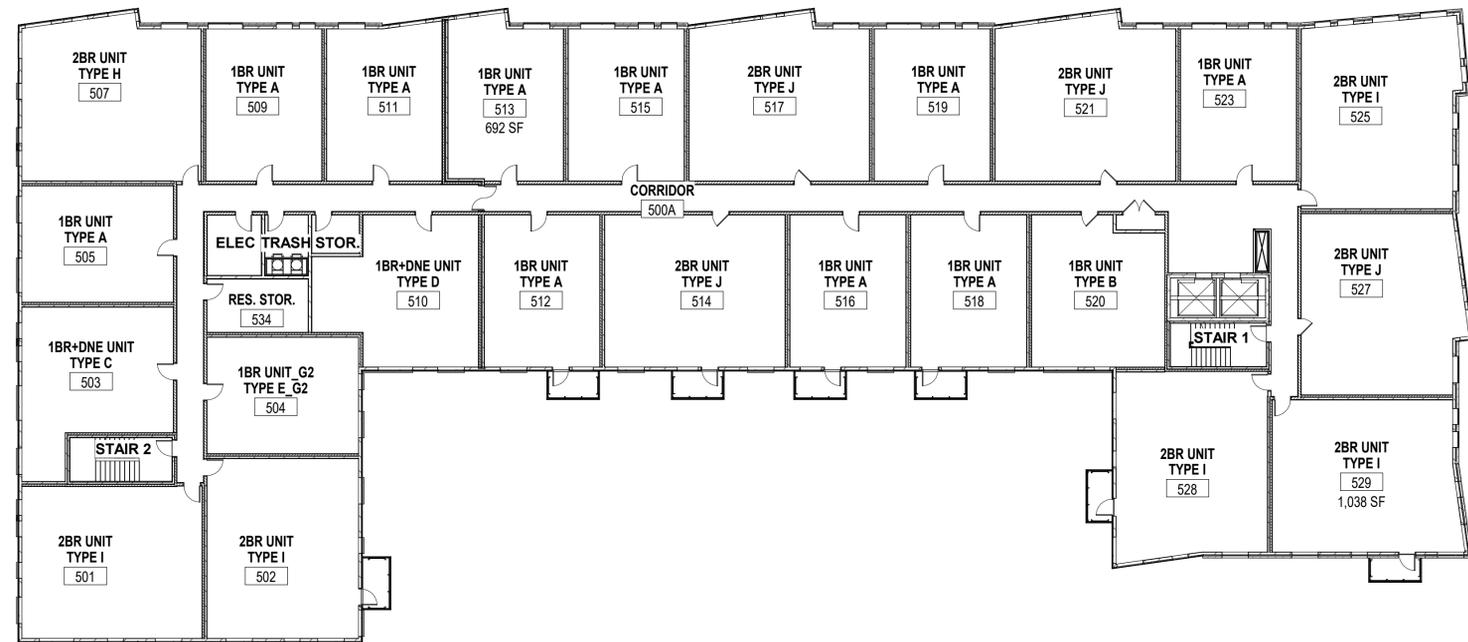
20 BOX PLAN OVERALL FLOOR PLAN - LEVEL 3
Scale: 1/16" = 1'-0"



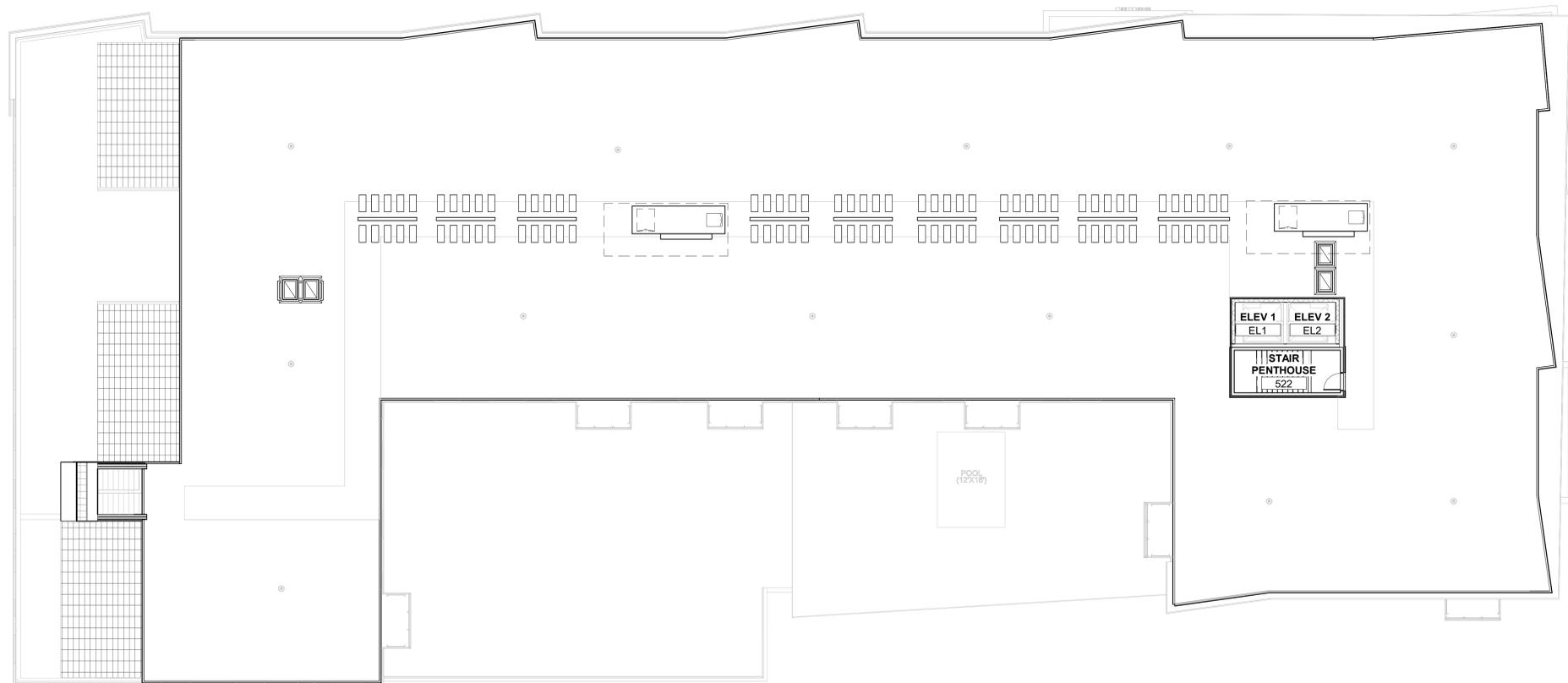
10 BOX PLAN OVERALL FLOOR PLAN - LEVEL 2
Scale: 1/16" = 1'-0"



20 BOX PLAN OVERALL FLOOR PLAN - LEVEL 5
Scale: 1/16" = 1'-0"



10 BOX PLAN OVERALL FLOOR PLAN - LEVEL 4
Scale: 1/16" = 1'-0"



10 BOX PLAN OVERALL FLOOR PLAN - ROOF LEVEL
 Scale: 3/32" = 1'-0"



10 EXCHANGE STREET ELEVATION
Scale: 3/32" = 1'-0"



20 MAIN STREET ELEVATION
Scale: 3/32" = 1'-0"



30 HIGH STREET ELEVATION
Scale: 3/32" = 1'-0"



10 REAR YARD - WEST ELEVATION
Scale: 3/32" = 1'-0"



20 COURTYARD SOUTH ELEVATION
Scale: 3/32" = 1'-0"



30 COURTYARD NORTH ELEVATION
Scale: 3/32" = 1'-0"

Addendum#1

Storm Water Management Report

Exchange Place
57 Main Street
Marlborough, MA

Prepared By: Bruce Saluk & Associates, Inc.
Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
Tel# 508-485-1662



Applicant & Developer: Will Adams
JW Capitol Partners, LLC
34 Washington Street, Suite 230
Wellesley, MA 02481

March 2024

This Addendum updates the Stormwater Section 2 and Appendices: A,B,C, the stormwater calculations for proposed conditions and the drainage areas for proposed conditions. For the convenience purposes portions of the report that have not changed are also included, which includes: Section 1, Appendix 'E' existing condition runoff calculations and the existing conditions Drainage area plan

TABLE OF CONTENTS

| | |
|--------------------|--|
| SECTION 1: | Hydrologic Design Criteria |
| SECTION 2: | Summary and Conclusions |
| APPENDIX A: | DEP Stormwater Management Standards |
| APPENDIX B: | Long Term Pollution Prevention, Operation and Maintenance Plan |
| APPENDIX C: | Construction Period Operation & Maintenance Plan |
| APPENDIX D: | Soil Data |
| APPENDIX E: | Hydrologic Calculations for Peak Runoff Rates For Existing Conditions & Proposed Conditions |
| PLANS: | DA1-Existing Conditions Drainage Areas DA2-Proposed Conditions Drainage Areas |

SECTION 1: Hydrologic Design Criteria

SECTION 1: Hydrologic Design Criteria

1. **DESIGN STORMS:** Both the existing and proposed conditions were analyzed for the 2, 10, 25 and 100-year storm frequencies. The rainfalls used for the above storms were 3.2, 4.5, 5.5 and 7.0 inches, respectively. The rainfall distribution used for each of the storms was a SCS type III, 24-hour rainfall distribution.
2. **METHODOLOGY:** The HYDROCAD Stormwater Modeling Software was used to calculate the runoff and route the hydrographs through the Stormwater system. This Program uses the hydrology techniques developed by the Soil Conservation Services (SCS) now the Natural Resource Conservation Services (NRCS). The runoff values were derived by the SCS unit hydrograph procedure.
3. **HYDROLOGIC SOIL GROUP:** NRCS mapping defined the onsite soil to be comprised of Charlton Urban Land Complex sandy loam soils at the rear half of the property. The front half of the property has been classified by NRCS as Urban Land with no HSG value. This soil type is classified with a Hydrologic Soil Group (HSG) range from HSG 'A' –'D'. The NRCS soil surveys are mapped at 1:25,000 and include the following statement *“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 a map unit boundaries may be evident.”* On site soil testing revealed a top layer of fill that ranged from 40” to 74” deep throughout the property. This fill is representative of a HSG 'C' soil; therefore, HSG 'C' was used for the stormwater calculations.
4. **RUNOFF:** The quantity of rainfall that was calculated as runoff was based on (1) soil types and associated hydrologic soil classification, (2) the area of existing and proposed impervious and pervious surfaces; i.e. driveways, and man-made and natural surface slopes.

SECTION 2: Summary and Conclusions

SECTION 2: Summary & Conclusion

The performance objective was achieved to maintain the peak runoff rates at or below existing conditions rates, provide Stormwater treatment to remove TSS and groundwater recharge.

The table below summarizes compliance with Standard #2 for Post Development Peak Discharge Rates, and provides a comparison between peak rate of runoff for existing and proposed conditions.

| TABLE 4-1: PEAK FLOW (CFS) | | | | |
|----------------------------|------|------|------|-------|
| DESIGN POINT | 2 YR | 10YR | 25YR | 100YR |
| TOTAL | | | | |
| -EXISTING | 1.88 | 3.10 | 4.04 | 5.47 |
| -PROPOSED | 1.88 | 3.03 | 3.88 | 5.38 |
| % REDUCTION (TOTAL) | 0% | 2% | 4% | 2% |
| | | | | |

The flow values given in the above table were taken from the HYDROCAD calculations in Appendix "E"

APPENDIX A
DEP Stormwater Management Standards

Documentation & Calculations for DEP Stormwater Management Policy Standards

This project will meet the Stormwater Management Standards. The proposed Best Management Practices (BMP's) will reduce and improve the water quality leaving the site. The following stormwater management standards pertain to the DEP Stormwater Policy.

Standard #1-Untreated Stormwater

This development project was designed to not discharge untreated contaminated stormwater into, or cause erosion to wetlands or waters of the Commonwealth to the maximum extent practicable. Standards 1, 2, 4, 5-10 have been fully met and Standard #3 has been met to the maximum extent practicable.

Standard #2-Post Development Peak Discharge Rates

All performance requirements for this standard have been met. Refer to summary and conclusions in Section 4 of this report where runoff flow summaries for both existing and proposed conditions are given.

Standard #3-Recharge To Groundwater

The 2824 SF court patio and other paved areas will be permeable pavers for groundwater recharge. Table 'RR' of Volume #1, Chapter 1 of the Massachusetts Stormwater Handbook "*Required recharge volume must be infiltrated to the maximum extent practicable, if: The site is comprised wholly of C and D soils and bedrock at the land surface....*" This site falls into this soil classification.

Standard #4 (Water Quality)

Project TSS removal has been maximized to remove greater than 80% TSS. Installation of a proprietary TSS removal structure (CDS Hydrodynamic Separator) will treat 27,137 SF of roof and open parking area runoff. Additional onsite TSS removal will be provided using large sumps capacity within the 3 detention tanks. These tanks include 1.7 FT sumps with a total of 589 CF(4406 Gallons) sump volume for additional TSS removal. By definition in MassDEP SW Handbook Vo; 2, Chap 2 , P 13 these tanks fall into the category of a sediment forebay which states "*A sediment forebay is a post construction practice consisting ofor a cast structure combined with a weir, designed to slow incoming stormwater runoff and facilitating gravity separation of suspended solids.*" Also stated : "*When they provide pretreatment for other BMP's sediment forebays receive a 25% TSS removal credit.*" Additional TSS removal for site and offsite impervious areas will be provided along Exchange Street where 2 existing inline CB's will be converted to DMH's and 2 Double and 1 single catch basins will be connected to the converted DMH's. So, 25% TSS removal will be removed from sidewalk and driveway site flows and existing street flows. Refer to the TSS removal calculations on the next page.

Standard #5 Land Uses with Higher Potential Pollutant Loads (LUHPPLs)

This project land use is not subject to higher pollution control requirements

Standard #6 (Protection of Critical Areas)

The project is not located near a Critical area.

Standard #7 (Redevelopment)

The work associated with the proposed road upgrades is redevelopment work.

Standard #8 (Erosion /Sediment Control)

This standard has been fully met. Refer to the “Construction Period Operation and Maintenance Plan” included in Appendix ‘C’

Standard #9 (Operation & Maintenance Plan)

This standard has been fully met. Refer to the Long-Term Pollution Prevention & Operation and Maintenance Plan in Appendix “B”

Standard #10 (Illicit Discharge Compliance Statement)

This standard has been fully met. The applicant will submit an illicit discharge compliance statement prior to the discharge of any stormwater to post-development BMP's.

BSA

Bruce Saluk & Associates, Inc.

Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Exchange Place , Marlborough, MA

Proj. No.: 2916

Date: 4/01/24

Computed by: BMS

Location: 57 Main Street
Marlborough, MA

| | A BMP | B TSS Removal Rate (%) | C Starting TSS Load* | D Amount Removed (BxC) | E Remaining Load (C-D) |
|--|----------------------------|------------------------------|----------------------------|------------------------------|------------------------------|
| Open Parking Lot imperv. Area 3672 SF | CB | 25 | 1.00 | 0.25 | 0.75 |
| | CAST FOREBAY | 25.0 | 0.75 | 0.19 | 0.56 |
| | TRMT UNIT | 82.2 | 0.56 | 0.46 | 0.10 |
| | Total TSS Removal = | | | | 90.0% |

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

2) Cast Forebay (See note #2 of summary Page).

BSA

Bruce Saluk & Associates, Inc.

Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Exchange Place , Marlborough, MA

Proj. No.: 2916

Date: 4/01/24

Computed by: BMS

Location: 57 Main Street
Marlborough, MA

| | A | B | C | D | E |
|--------------------------------|----------------------------|----------------------|--------------------|----------------------|----------------------|
| Roof imperv. Area 23,465 SF | BMP | TSS Removal Rate (%) | Starting TSS Load* | Amount Removed (BxC) | Remaining Load (C-D) |
| | | | 1.00 | 0.00 | 1.00 |
| | CAST FOREBAY | 25.0 | 1.00 | 0.25 | 0.75 |
| | TRMT UNIT | 82.2 | 0.75 | 0.62 | 0.13 |
| | Total TSS Removal = | | | | 86.7% |

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

2) Cast Forebay (See note #2 of summary Page).

BSA

Bruce Saluk & Associates, Inc.

Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Exchange Place , Marlborough, MA

Proj. No.: 2916

Date: 4/01/24

Computed by: BMS

Location: 57 Main Street
Marlborough, MA

**Permeable
Pavers**

**imperv. Area
2,824 SF**

| | A BMP | B TSS Removal Rate (%) | C Starting TSS Load* | D Amount Removed (BxC) | E Remaining Load (C-D) |
|--|----------------------------|---|---|---|---|
| | | | 1.00 | 0.00 | 1.00 |
| | GW Recharge | 80.0 | 1.00 | 0.80 | 0.20 |
| | | 0 | 0.20 | 0.00 | 0.20 |
| | Total TSS Removal = | | | | 80.0% |

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

Bruce Saluk & Associates, Inc.

Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

Misc . TSS
Removal @
Prop. CB's in
Exchange ST
Lot
imperv. Area
1717 SF

Proj. No.: 2916
Date: 4/01/24
Computed by: BMS

Location: 57 Main Street
Marlborough, MA

TSS Removal Calculation Worksheet

Name: Exchange Place , Marlborough, MA

| A BMP | B TSS Removal Rate (%) | C Starting TSS Load* | D Amount Removed (BxC) | E Remaining Load (C-D) |
|----------------------------|------------------------------|----------------------------|------------------------------|------------------------------|
| CB | 25 | 1.00 | 0.25 | 0.75 |
| | 0.0 | 0.75 | 0.00 | 0.75 |
| | 0 | 0.75 | 0.00 | 0.75 |
| Total TSS Removal = | | | | 25.0% |

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

Bruce Saluk & Associates, Inc.

Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

**Misc.
Impervious
with no TSS
removal**

693 SF

TSS Removal Calculation Worksheet

Name: Exchange Place , Marlborough, MA

Proj. No.: 2916

Date: 4/01/24

Computed by: BMS

Location: 57 Main Street
Marlborough, MA

| A BMP | B TSS Removal Rate (%) | C Starting TSS Load* | D Amount Removed (BxC) | E Remaining Load (C-D) |
|----------------------------|------------------------------|----------------------------|------------------------------|------------------------------|
| | | 1.00 | 0.00 | 1.00 |
| | 0.0 | 1.00 | 0.00 | 1.00 |
| | 0 | 1.00 | 0.00 | 1.00 |
| Total TSS Removal = | | | | 0.0% |

Notes:

1) Starting TSS Load for first BMP= 1.00. TSS load for subsequent BMP's is equal to the Remaining Load (E) from the previous BMP.

BSA

Bruce Saluk & Associates, Inc.

Civil Engineering & Land Surveying
576 Boston Post Road East
Marlborough, MA 01752
(508) 485-1662

TSS Removal Calculation Worksheet

Name: Exchange Place
Location: 57 Main Street
Marlborough, MA
Proj. No.: 2916
Date: 4/01/24
Computed by: BMS

TSS SUMMARY SHEET

Total impervious site area=32,371

Site TSS Removal :
$$\frac{[(90 \times 3672) + (86.7 \times 23465) + (80 \times 2824) + (25 \times 1717) + (0 \times 693)]}{32371} = 81.4\%$$

Note:

- 1) 693 SF of impervious area is not tributary to a TSS removal BMP .
- 2) All 3 Detention Tanks have 1.7 FT deep sumps, which function as a cast forebay and provides 25% TSS removal . See explanation under Standard #4 in Appendix 'A'.
- 3) Road drainage upgrades will provide additional offsite TSS removal.

**CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD**

**57 MAIN
MARLBOROUGH, MA**

Area **0.62 ac**
 Weighted C **0.9**
 t_c **5 min**
 CDS Model **1515-3**

Unit Site Designation **TU**
 Rainfall Station # **68**

CDS Treatment Capacity **1.0 cfs**

| <u>Rainfall Intensity¹</u> (in/hr) | <u>Percent Rainfall Volume¹</u> | <u>Cumulative Rainfall Volume</u> | <u>Total Flowrate (cfs)</u> | <u>Treated Flowrate (cfs)</u> | <u>Incremental Removal (%)</u> |
|---|--|-----------------------------------|-----------------------------|-------------------------------|--------------------------------|
| 0.02 | 9.3% | 9.3% | 0.01 | 0.01 | 9.0 |
| 0.04 | 9.5% | 18.8% | 0.02 | 0.02 | 9.1 |
| 0.06 | 8.7% | 27.5% | 0.03 | 0.03 | 8.3 |
| 0.08 | 10.1% | 37.6% | 0.04 | 0.04 | 9.5 |
| 0.10 | 7.2% | 44.8% | 0.06 | 0.06 | 6.7 |
| 0.12 | 6.0% | 50.8% | 0.07 | 0.07 | 5.6 |
| 0.14 | 6.3% | 57.1% | 0.08 | 0.08 | 5.8 |
| 0.16 | 5.6% | 62.7% | 0.09 | 0.09 | 5.1 |
| 0.18 | 4.7% | 67.4% | 0.10 | 0.10 | 4.2 |
| 0.20 | 3.6% | 71.0% | 0.11 | 0.11 | 3.2 |
| 0.25 | 8.2% | 79.1% | 0.14 | 0.14 | 7.2 |
| 0.50 | 14.9% | 94.0% | 0.28 | 0.28 | 11.6 |
| 0.75 | 3.2% | 97.3% | 0.42 | 0.42 | 2.2 |
| 1.00 | 1.2% | 98.5% | 0.56 | 0.56 | 0.7 |
| 1.50 | 0.7% | 99.2% | 0.84 | 0.84 | 0.3 |
| 2.00 | 0.8% | 100.0% | 1.12 | 1.00 | 0.2 |
| 0.00 | 0.0% | 100.0% | 0.00 | 0.00 | 0.0 |
| 0.00 | 0.0% | 100.0% | 0.00 | 0.00 | 0.0 |
| 0.00 | 0.0% | 100.0% | 0.00 | 0.00 | 0.0 |
| 0.00 | 0.0% | 100.0% | 0.00 | 0.00 | 0.0 |
| 0.00 | 0.0% | 100.0% | 0.00 | 0.00 | 0.0 |
| | | | | | 88.7 |
| Removal Efficiency Adjustment ² = | | | | | 6.5% |
| Predicted % Annual Rainfall Treated = | | | | | 93.5% |
| Predicted Net Annual Load Removal Efficiency = | | | | | 82.2% |

1 - Based on 10 years of rainfall data from NCDC station 736, Blue Hill, Norfolk County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Project: 57 Main
Location: Marlborough, MA
Prepared For: Bruce Saluk & Associates



Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the t_c , read the unit peak discharge (q_u) from Figure 1 or Table in Figure 2. q_u is expressed in the following units: cfs/mi²/watershed inches (csm/in).

Compute Q Rate using the following equation:

$$Q = (q_u) (A) (WQV)$$

where:

Q = flow rate associated with first 1" of runoff

q_u = the unit peak discharge, in csm/in.

A = impervious surface drainage area (in square miles)

WQV = water quality volume in watershed inches (1" in this case)

| Structure Name | Impv. (acres) | A (miles ²) | t_c (min) | t_c (hr) | WQV (in) | q_u (csm/in.) | Q (cfs) |
|----------------|---------------|-------------------------|-------------|------------|----------|-----------------|---------|
| TU | 0.62 | 0.0009734 | 5.0 | 0.083 | 1.00 | 795.00 | 0.77 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

The WQf sizing calculation selects the minimum size CDS/Cascade/StormCeptor model capable of operating at the computed WQf peak flowrate prior to bypassing. It assumes free discharge of the WQf through the unit and ignores the routing effect of any upstream storm drain piping. As with all hydrodynamic separators, there will be some impact to the Hydraulic Gradient of the corresponding drainage system, and evaluation of this impact should be considered in the design.

APPENDIX B:

Long Term Pollution Prevention, Operation and Maintenance Plan

LONG TERM POLLUTION PREVENTION, OPERATION AND MAINTENANCE PLAN

-STANDARDS 4,9 &10-

For

**#57 Main Street
Marlborough, MA**

The following items are intended as a guideline for continued maintenance of the storm drain system, permeable pavers, and site after construction. There may be other measures that should be applied to certain drainage appurtenances not mentioned herein. Therefore, the applicant, followed by the future users of the Stormwater system should be updating this plan on a as needed basis. The responsible party shall issue a copy of this Long-Term Pollution Prevention, Operation and Maintenance Plan to each of the Companies that will be providing site services for this project, Landscaping, inspection , maintenance work, infrastructure work, property management, etc..

Responsible Party for the Operation, Maintenance & Financing repairs

The responsible party will be the property owner

Inspection and Maintenance Requirements

The applicant and future occupant shall be responsible to retain and pay for inspectional services by a designated person that is qualified and approved to perform such inspectional services. The responsible party shall also pay the maintenance and repair costs. After each inspection, the inspector shall complete the inspection report forms. These reports shall be kept for future review by Federal, State or Local authorities. The frequency of the inspections shall be as updated to the amended DEP Stormwater Management Regulations. Refer to the stated inspection frequency requirements listed on each attached inspection form.

The estimated annual operation & Maintenance Budget for the Stormwater system is \$2000

The inspection and maintenance outlined below shall be followed and submitted by the inspector to the owner and the Conservation Commission Officer and the City Engineer by June 1st of each year.

Erosion

Significant erosion along slopes shall be protected with engineered soil reinforcement, jute mesh, ground cover and/or erosion control, as approved.

Detention Tanks

Inspection of the tanks shall determine if the 4ftx4ft outlet control structure located in the tank is clear of debris and sediment. This includes reviewing the orifice, the 4'x4' weir wall and the 15" diameter outlet pipe. All 3 tanks have a sump below the lowest orifice for the purpose of settlement of suspended solids. The sumps shall be cleaned of sediment and debris once the sediment depth reaches $\frac{1}{2}$ the sump depth. To prevent muddy water from entering the downstream municipal system during cleaning, the tanks must be dewatered prior to cleaning to a sufficient depth to prevent water from leaving the tanks during cleaning.

Catch Basin

In accordance with DEP Stormwater Manual the Catch Basin shall be inspected 4 times per year and cleaned of debris when the depth of sediment reaches 2FT(50 % of the sump depth). The grates shall also be cleaned 4 times per year. Disposal shall comply with local, State and Federal regulations.

Storm Water Check Valve

The storm water check located in the drain manhole(DMH) located at the egress lane from the parking garage to Exchange Street. The purpose of check valve is to prevent storm water surcharge within the open parking during a failure or blockage of the public drain system. Annual inspection of the check valve must be done to assure that debris within the DMH is not blocking the valve and that the valve is functioning properly.

Good House Keeping Practices & Illicit Discharge Prevention

Inspect the entire site and shall identify and report to the owner any erosion, pollution, and accumulation of any unsuitable material on the site. The inspector shall note and report any sign of an illicit discharge on the property. These illicit discharges may include spills, wastewater discharges, illegal pipe connections to the storm water system, oil and grease. The owner shall hire a qualified Company to fulfill recommendations by the inspector for cleanup and illicit discharge elimination.

All hazardous waste materials discovered will be disposed of in the manner specified by local and state regulation. The owner will be responsible for seeing that these procedures are followed.

Snow removal, Deicing Treatment & Storage Operations

Snow disposal, if required, shall be in accordance with Mass DEP 2020 Guideline , as amended. Salt application shall be minimal and shall only be used where necessary. The use of sodium Chloride (NaCl) is prohibited. Snow quantities more than onsite storage capacity shall be removed from the site by the snow removal contractor.

Accidental Spill Containment & Proper Disposal

The company providing the cleanup services for the spill shall follow public safety practices and cordon off the spill containment work zone for the protection of the public.

Spills of toxic or hazardous material will be reported to the proper State or local government agency, regardless of the size.

Storage of Materials and Waste

Long term storage of waste or trash that is harmful to the groundwater and wetland resources is prohibited. Such waste shall be immediately removed from the property by a licensed contractor. Garbage shall be stored inside the building and removal shall be by a commercial trash removal company.

Permeable Concrete Pavers

Vacuum sweeping permeable pavers are required as outlined in the inspection form. Replacement of top layers of joint stone should be done in accordance with the requirements of the inspection report.

The inspector shall report all inspections and make recommendations to the owner for actions and maintenance deemed necessary by the inspector.

The above recommendations are applicable to project completion with 100% established vegetative cover and are not intended for construction progress measures.

Vehicle Washing

Vehicle washing is not allowed and shall instead be at commercial car washing facility that already has Environmental controls in place.

Pet Waste Disposal Practices

The property manager shall implement a mandatory policy for pet waste control that includes use of dog waste bags, containment, and removal.

Fertilizers, Herbicides, Pesticides and Fungicides

It is recommended that the common application of fertilizers, herbicides, pesticides and fungicides be restricted, and only used on a limited basis in the approved application zone as follows: Application for such chemicals shall only be used on a limited basis. Applications of chemicals shall be applied in a manner that prevents the chemical from being washed down gradient of the application zone, e.g., fertilizer shall be worked into the soil to prevent washout.

INSPECTION REPORT No.
#57 Main Street
Marlborough, MA

INSPECTION DATE:

INSPECTOR:

1) WATER QUALITY/DETENTION TANKS

The inspector shall refer to the narrative. Inspection frequency shall be once per year.

COMMENTS & RECOMMENDATIONS:

MEASUREMENTS: _____

SIGNS OF ILLICIT DISCHARGES: YES NO

REMOVAL OF SEDIMENT AND /OR DEBRIS REQUIRED: YES NO

IS THE ORIFICE, 4'X4' WEIR AND 15" OUTLET PIPE ARE CLEAR OF DEBRIS?

**HAS THE SEDIMENT DEPTH ANY OF THE SUMPS IN THE 3 TANKS REACHED ½
THE SUMP DEPTH: _____**

DATE ACTION TAKEN: _____

PERFORMED BY: _____

2) STORMWATER TREATMENT UNIT:

The procedures and Inspection & maintenance shall follow the manual entitled “ CDS Inspection & Maintenance Guide,” by Contech at www.conteches.com Inspection frequency shall be 2 times per year for the first 2 years following construction, then no less than once per year thereafter, or as recommended by the manufacturer, whichever occurs more often.

COMMENTS & RECOMMENDATIONS: _____

OBSERVATIONS: _____

CLEANING REQUIRED: YES NO
DATE CLEANED: _____

PERFORMED BY: _____

3) PERMEABLE CONCRETE PAVERS:

Inspection frequency: quarterly

The inspector shall refer to the narrative. The frequency of required vacuum shall be recommended by the inspector followed by each inspection.

COMMENTS & RECOMMENDATIONS: _____

MEASUREMENTS: _____

VACUUM CLEANING REQUIRED: YES NO
JOINT AGGREGATE REPLACEMENT REQUIRED: YES NO
DATE VACCUMED: _____
PERFORMED BY: _____

4) EROSION

The inspector shall refer to the narrative. Inspection frequency shall be once per year.

COMMENTS & RECOMMENDATIONS: _____

MEASUREMENTS: _____

CLEANING REQUIRED: YES NO

DATE CLEANED: _____

PERFORMED BY: _____

5) CATCH BASIN

The inspector shall refer to the narrative on the previous pages.

COMMENTS & RECOMMENDATIONS: _____

MEASUREMENTS: _____

SIGNS OF ILLICIT DISCHARGES: YES NO

CLEANING REQUIRED: YES NO

GRATES CLEAR OF DEBRIS: YES NO

DEPTH OF SEDIMENT: _____

DATE CLEANED: _____

PERFORMED BY: _____

6) Stormwater Check Valve

The inspector shall refer to the narrative on the previous pages.

COMMENTS & RECOMMENDATIONS:

MEASUREMENTS: _____

| | | |
|------------------------------|-------|----|
| SIGNS OF BLOCKAGE: | YES | NO |
| CLEANING REQUIRED: | YES | NO |
| DMH & VALVE CLEAR OF DEBRIS: | YES | NO |
| DOES VALVE NEED MAINTENANCE: | YES | NO |
| DATE CLEANED: | _____ | |
| PERFORMED BY: | _____ | |

7) GOOD HOUSE KEEPING & PREVENTION OF ILLICIT DISCHARGES:

The inspector shall refer to the narrative.
Inspection frequency: once per year

COMMENTS & RECOMMENDATIONS: _____

MEASUREMENTS: _____

| | | |
|--------------------|-------|----|
| CLEANING REQUIRED: | YES | NO |
| DATE CLEANED: | _____ | |
| PERFORMED BY: | _____ | |

8) PAVEMENT SWEEPING:

The inspector shall refer to the narrative.

Inspection: twice per year

COMMENTS & RECOMMENDATIONS: _____

MEASUREMENTS: _____

CLEANING REQUIRED: YES NO

DATE CLEANED: _____

PERFORMED BY: _____

APPENDIX C:

Construction Period Operation & Maintenance Plan

Construction Pollution Prevention & Erosion/Sedimentation Control Plan

- #57 Main Street- Marlborough, MA-
-STANDARD #8-

Purpose:

The following provides the Construction Period Sequencing, Erosion/ Sedimentation measures, Operation, Maintenance & Pollution Prevention in accordance with Standard #8.

Narrative of surface water flow through the site and receiving downstream resource areas:

The surface runoff enters the municipal drain system that flows in a southerly direction to the Sudbury Reservoir in Southborough.

Responsible Party for Compliance to the Construction Pollution Prevention & Erosion/Sedimentation Control Plan:

The responsible party will be the property owner(s).

Construction Sequencing:

Refer to the general contractor's construction sequence for both the demolition and construction stages.

Throughout the construction period the contractor shall provide erosion control operation, Maintenance & Pollution Prevention Measures in accordance with Standard #8, outlined below.

Erosion and Sedimentation Controls:

Structural Practices

Wattles & Siltation Fencing

Siltation fencing with wattles to be installed to protect the abutting properties, Exchange Street and Main Street. All Erosion control shall be maintained throughout the course of construction until the site has been fully stabilized. The contractor shall have additional straw bales, siltation fencing available to address washouts and other emergencies.

Additional straw bales and siltation fence shall be stored at the site for quick access and reinforcement of selected sections of the erosion control line where necessary.

Exposed Slopes

On exposed slopes, mechanical cultivation of soils shall include grooves created by dozer treads set perpendicular to the slope direction. On long slopes, runoff shall be directed via swales to temporary sedimentation traps where directed by the construction manager.

Demolition, Clearing and Grubbing

Soil stripping shall be done to minimize soil tracking and site erosion. The site superintendent shall implement soil striping if the exposed soil is or will soon become eroded or tracked by vehicles. It is recommended that stripping & stockpile of soils be done in stages to minimize the amount overall exposed soils. Soil stabilization measures shall be implemented immediately after finish grading.

Temporary Sedimentation Traps

Provide sedimentation containment intended for short-term use (overnight to several months). Temporary sedimentation containment can be produced by an excavated depression, or with an impoundment berm. The sediment containment area shall include a dewatering filtration system that treats water before discharge.

Dewatering

Excavated areas, trenches and sediment traps that require dewatering shall not be discharged without treatment. Acceptable practices will include the use of filtration bags and/or additional sedimentation traps where water can be collected and recharged into the ground.

Catch Basin filters

Provide silt sacks at the existing CB's. Provide additional silt sacks where required. Silt sacks shall be installed and maintained until the site has been fully stabilized.

Drainage swales

Swales will be constructed at various locations throughout the site during construction to divert runoff to the sedimentation containment.

Offsite Vehicle Tracking

A stabilized construction entrance (anti-tracking pad) shall be provided at the construction access point shown on the grading Plan. The anti-tracking pad will be approximately 30-feet long by the width of the drive and will be constructed of 12-inches of 3/4 to 3-inch crushed stone. The removal and stockpiling of topsoil and subsoil in the work zone shall be accomplished as soon as feasible to minimize the amount of cohesive soil exposure to vehicles.

Pavement Sweeping

Pavement areas that have deposits of sediment from the construction area shall be swept using a mechanical street sweeper on an as needed basis.

Stabilization Practices

Temporary Stabilization

Top-soil stockpiles and disturbed portions of the site where construction activity ceases for a growing season will be stabilized with temporary seed and mulch . The temporary seed shall be as follows:

New England Erosion Control / Restoration Mix

Application Rate: 35 lbs. /acre 1,245 sq. ft. /lb.

The New England Erosion Control/Restoration Mix contains a selection of native grasses and wildflowers designed to colonize generally moist, recently disturbed sites where quick growth of vegetation is desired to stabilize the soil surface. This mix is particularly appropriate for detention basins that do not normally hold standing water. The plants in this mix can tolerate infrequent inundation, but no constant flooding. In New England, the best results are obtained with a spring or early fall seeding. Summer and fall seeding can be successful with a light mulching of weed-free straw to conserve moisture. Late fall and winter dormant seeding require a slight increase in the seeding rate. Fertilization is not required unless the soil is particularly infertile. Species include: Switch grass (*Panicum virgatum*), Creeping Red Fescue (*Festuca rubra*), Virginia Wild Rye (*Elymus vierinicus*), Fox Sedge (*Carex vulpinoidea*), Creeping Bentgrass (*Agrostis stolonifera*), Silky Wild Rye (*Elymus villosus*), Nodding Bur-marigold (*Bidens cernua*), Soft Rush (*Juncus effuses*), Grass-leaved Goldenrod (*Solidago graminifolia*), Sensitive fern (*Onoclea sensibilis*), Joe-Pye Weed (*Eupatorium maculatum*), boneset (*Eupatorium perfoliatum*), Flat-top Aster (*Aster umbellatus*), New York Aster (*Aster novi-belgii*), and Blue Vervain (*Verbena hastate*).

Areas of the site that are to be paved will be temporarily stabilized by installing the subbase until bituminous pavement can be applied.

Other Controls

Waste Disposal

Waste Materials

All waste materials will be collected and stored in metal dumpsters rented from a licensed solid waste management company. The dumpsters will meet all local and state solid waste management regulations. All trash and construction debris from the site will be deposited in the dumpsters. No construction waste will be buried or burned onsite. All personnel will be instructed about the correct procedure for waste disposal. The construction site superintendent will be responsible for enforcing that procedures are followed.

Hazardous Waste

All hazardous waste materials will be disposed of in the manner specified by local and state regulations or by the manufacturer. Site personnel will be instructed in these practices and the construction site superintendent will be responsible for enforcement that these procedures are followed.

Sanitary Waste

All sanitary waste will be collected from the portable units by a licensed sanitary waste management company, as required by local and state regulations.

Construction Stage Maintenance / Inspection Procedures

Erosion and Sediment Control Inspection and Maintenance Practices

- All control measures will be inspected at least once each week and following any storm event of 0.5 inches or greater
- All measures will be kept in good working order; if a repair is necessary, it will be initiated within 24 hours of report
- Accumulated sediment will be removed from silt fence when it has reached a depth of 6-inches.
- Silt fencing will be inspected for depth of sediment to check that fabric is securely set along the bottom attached to the fence posts. Inspection shall confirm that the fence posts are firmly set in the ground.
- All sedimentation containment areas will be inspected for depth of sediment, and accumulated sediment will be removed on a regular basis to allow natural recharge into the ground.
- All diversion dikes and channels will be inspected, and any breaches promptly repaired.
- Temporary and permanent seeding and plantings will be inspected for bare spots, washouts, and healthy growth.
- A Construction Stormwater Maintenance Inspection Report will be submitted after each inspection. A copy of the report form to be completed by the inspector is attached.
- The site superintendent will select a site worker who will be responsible for inspections, maintenance, and repair activities, and filling out the inspection and maintenance report.

- Personnel selected for inspection and maintenance responsibilities will receive training from the site superintendent. They will be trained in all the inspection and maintenance practices necessary for keeping the erosion and sediment controls used onsite in good working order.

Non-Storm Water Discharges

It is expected that non-rainfall discharges from the site during the construction period will not occur. However, if does occur, non-stormwater discharges will be directed to the sedimentation area.

Construction Spill Prevention

Material Management Practices

The following are the material management practices that will be used to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff.

Good Housekeeping – The following good housekeeping practices will be followed onsite during the construction project:

- An effort will be made to store only enough product needed to do the job
- All materials stored onsite will be stored in a neat, orderly manner in their proper containers and if possible under a roof or other enclosure
- Products will be kept in their original containers with the manufacturer's label affixed
- Substances will not be mixed with one another unless recommended by the manufacturer
- Whenever possible, all products will be used up before disposing of the container
- Manufacturer's recommendations for proper use and disposal will be followed
- The site superintendent will inspect daily to ensure proper use and disposal of materials

Hazardous Products – These practices are used to reduce the risks associated with hazardous materials.

- Products will be kept in original containers unless they are not resealable
- Original labels and material safety data will be kept; they contain important product information

- If surplus product must be disposed in accordance with manufacturers' or local and state recommended methods for proper disposal will be followed.

Construction Practices for Equipment & Products

Use and storage of motorized vehicles/Machinery

Petroleum Products

All onsite vehicles will be checked for leaks and receive regular preventative maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers that are clearly labeled. Any asphalt substances used onsite will be applied according to the manufacturer's recommendations.

Fertilizers

Fertilizers used will be applied only in the minimum amounts recommended by the manufacturer. Once applied, fertilizer will be worked into the soil to limit exposure to stormwater. The contents of any partially used bags of fertilizer will be transferred to a sealable plastic bin to avoid spills.

Paints

All containers will be tightly sealed and stored when not needed for use. Excess paint will not be discharged to the stormwater system but will be properly disposed of according to manufacturer's instructions or State and local regulations.

Spill Control Practices

In addition to the good housekeeping and material management practices discussed in the earlier sections of this plan, the following practices will be followed for spill prevention and cleanup:

- Manufacturer's recommended methods for spill cleanup will be clearly posted and site personnel will be made aware of the procedures and the location of the information and cleanup supplies.
- Materials and equipment necessary for spill cleanup will be kept in the material storage area onsite. Equipment and materials will include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for this purpose.
- All spills will be cleaned up immediately after discovery.

- The spill area will be kept well-ventilated, and personnel will wear protective clothing to prevent injury from contact with a hazardous substance.
- Spills of toxic or hazardous material will be reported to the proper State or local government agency, regardless of the size.
- The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring and how to clean up the spill if there is another one. A description of the spill, what caused it, and the cleanup measures will also be included.
- The site superintendent will be the spill prevention and cleanup coordinator. This individual will appoint a site worker who will receive spill prevention and cleanup training. These individuals will each become responsible for a particular phase of prevention and cleanup. The names of responsible spill personnel will be posted in the material storage areas and in the office trailer onsite.

Record Keeping

The construction trailer shall include, but not limited to the following:

- Dates of grading, construction activity, and stabilization
- Construction plans
- Inspection reports prepared by the contractor during construction
- Emergency Response Contact & Telephone list of State & Local authorities
- Construction Pollution Prevention & Erosion/Sedimentation Control Plan

INSPECTION AND MAINTENANCE REPORT FORM

For
#57 Main Street
Marlborough, MA

TO BE COMPLETED EVERY 7 DAYS AND WITHIN 24 HOURS OF A RAINFALL
 EVENT OF 0.5 INCHES OR MORE.

INSPECTOR: _____ DATE: _____

INSPECTOR'S JOB TITLE: _____

DAYS SINCE LAST RAINFALL: _____ AMOUNT OF LAST RAINFALL: _____ INCHES

STABILIZATION MEASURES

| ACTION ITEM | (Y/N) | CONDITIION | COMMENTS |
|--|-------|------------|----------|
| Any signs of sediment by-passing wattles or siltation fencing | | | |
| Is there sufficient storage available in both sedimentation traps for the next 2-inch rainfall | | | |
| Are CBs protected with Silt-Sacs and has the accumulated silt exceeding 6-inches been removed | | | |
| Is there sufficient capacity in the sedimentation traps to retain the next rainfall? | | | |
| Has any dirt been tracked onto Public Way | | | |
| Are materials that are potential stormwater contaminants stored inside or under cover? | | | |
| Is the water quality leaving the site clean | | | |
| Has the contractor complied with the applicable requirements of the Construction Pollution Prevention & Erosion/Sedimentation Control Plan | | | |

STABILIZATION
 REQUIRED: _____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

INSPECTION AND MAINTENANCE REPORT FORM

For
#57 Main Street
Marlborough, MA

ANTI-TRACKING PAD

| LOCATION | SEDIMENT ON ROAD? | IS THE STONE SILTED-UP? | DOES ALL TRAFFIC USE THE PAD? | CONDITION OF DRAINAGE DIVERSION |
|----------|-------------------|-------------------------|-------------------------------|---------------------------------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

MAINTENANCE REQUIRED FOR ANTI-TRACKING PADS: _____

TO BE PERFORMED BY: _____ ON OR BEFORE: _____

APPENDIX D:
Soil data



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

2685
4/6/18
#57 HAWK ST
MAELBOROUGH

CONTRACTOR: ASSABET CAUST.
SOIL EVALUATOR: BRUCE SALUK
REG. S.E. # 2129

C. On-Site Review (continued)

Deep Observation Hole Number: T1

| Depth (in.) | Soil Horizon/ Layer | Soil Matrix: Color-Moist (Munsell) | Redoximorphic Features | | Soil Texture (USDA) | Coarse Fragments % by Volume | | Soil Structure | Soil Consistence (Moist) | Other |
|-------------|---------------------|------------------------------------|------------------------|-------|---------------------|------------------------------|--------|----------------|--------------------------|-------|
| | | | Depth | Color | | Percent | Gravel | | | |
| -40 | Fill | | | | | | | | | |
| -43-63 | BW | 2.5YR 6/4 | | | SL | | | LG | V.Fri | |
| -67 | C1 | 2.5YR 4/6 | | | SL | | | LG | V.Fri | |
| -119 | C2 | " | | | LS | 30% | 10% | SG | loose | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Additional Notes:

GW @ 78" weeps @ 28" west side (Perched)

" @ 63" East "

No Refusal ESH @ 63"

2623
4/4/18



Commonwealth of Massachusetts
City/Town of

Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: T2 & T3

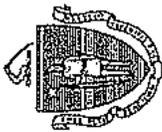
| Depth (in.) | Soil Horizon/ Layer | Soil Matrix: Color-Moist (Munsell) | Redoximorphic Features | | Soil Texture (USDA) | Coarse Fragments % by Volume | | Soil Structure | Soil Consistence (Moist) | Other |
|-------------|---------------------|------------------------------------|------------------------|-------|---------------------|------------------------------|--------|----------------|--------------------------|-------|
| | | | Depth | Color | | Percent | Gravel | | | |
| -40 | Fill | - | | | | | | | | |
| -78 | C | 2.5YR 4/6 | | | SL | 10 | 30 | SG | loose | |
| -54 | Fill | | | | - | | | | | |
| -58 | A | | | | - | | | | | |
| -65 | DW | 10R 7/1 | | | SL | | | G | loose | |
| -98 | C1 | 2.5YR 4/6 | | | SL | 10 | 30 | SG | loose | |

T2

T3

Additional Notes:

T2 Refusal @ 78" ; GW @ 59" ESHGW @ 59"
T3 " @ 98" ; GW @ 77" " @ 77"



Form 11 - Soil Suitability Assessment for On-Site Sewage Disposal

C. On-Site Review (continued)

Deep Observation Hole Number: T4

| Depth (in.) | Soil Horizon/ Layer | Soil Matrix: Color-Moist (Munsell) | Redoximorphic Features | | Soil Texture (USDA) | Coarse Fragments % by Volume | | | Soil Structure | Soil Consistence (Moist) | Other |
|-------------|---------------------|------------------------------------|------------------------|-------|---------------------|------------------------------|--------|------------------|----------------|--------------------------|-------|
| | | | Depth | Color | | Percent | Gravel | Cobbles & Stones | | | |
| -74 | Fill | | | | - | | | | | | |
| -106 | C | 2.5YR 4/6 | | | L/S | 15 | 30 | 5G | loose | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Additional Notes:

6W @ 102" E & H GW @ 102" No weeds
TEST @ OLD STONE MASONRY & BRICK FOUNDATION

6000
46118



United States
Department of
Agriculture

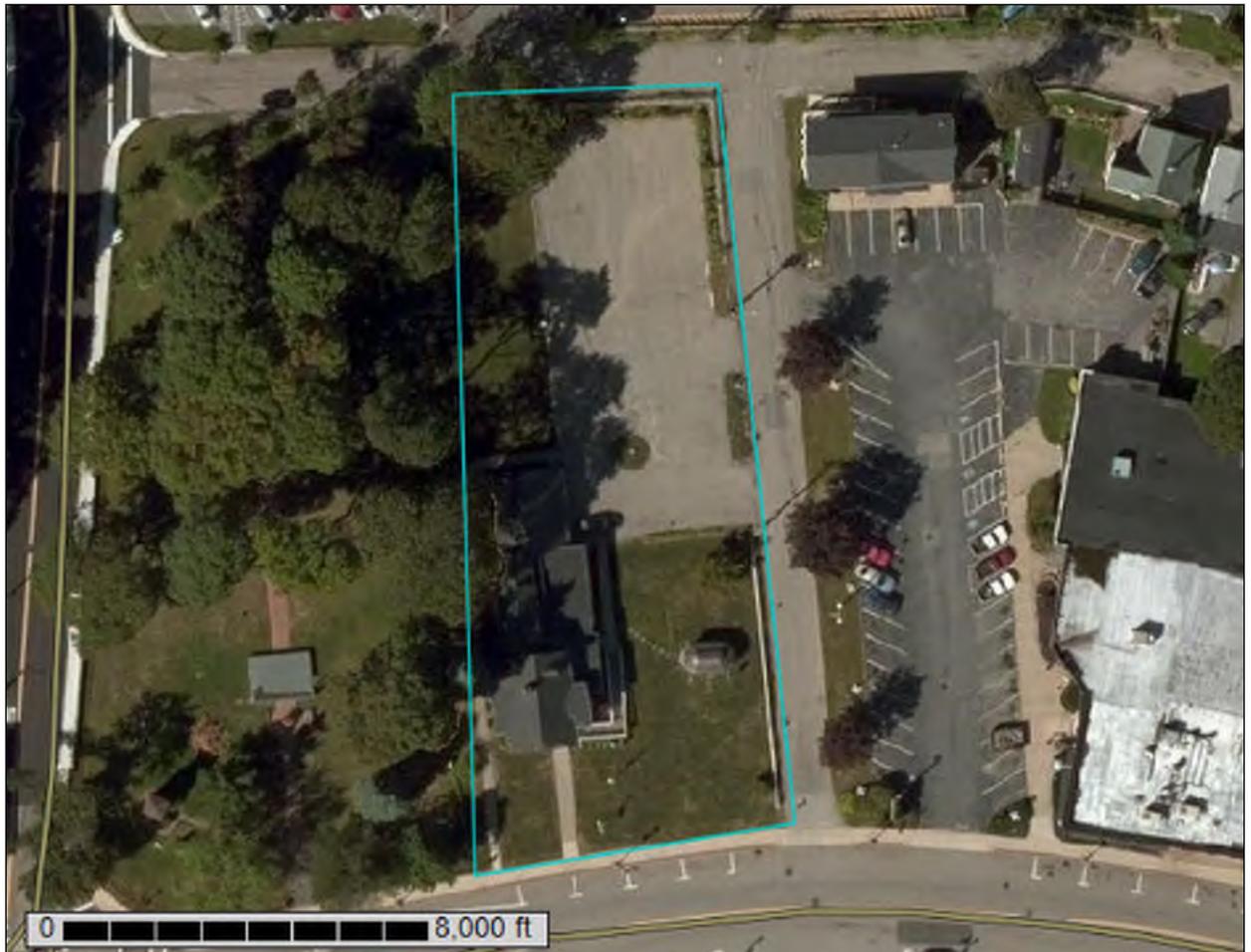
NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for Middlesex County, Massachusetts

57 Main Street



May 12, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

| | |
|--|----|
| Preface | 2 |
| Soil Map | 5 |
| Soil Map..... | 6 |
| Legend..... | 7 |
| Map Unit Legend..... | 8 |
| Map Unit Descriptions..... | 8 |
| Middlesex County, Massachusetts..... | 10 |
| 602—Urban land..... | 10 |
| 631C—Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky..... | 10 |

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:554 if printed on A portrait (8.5" x 11") sheet.



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
- Water Features**
 -  Streams and Canals
- Transportation**
 -  Rails
 -  Interstate Highways
 -  US Routes
 -  Major Roads
 -  Local Roads
- Background**
 -  Aerial Photography
- Other**
 -  Spoil Area
 -  Stony Spot
 -  Very Stony Spot
 -  Wet Spot
 -  Other
 -  Special Line Features

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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: Middlesex County, Massachusetts
 Survey Area Data: Version 17, Oct 6, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 12, 2014—Sep 28, 2014

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 |
|------------------------------------|---|--------------|----------------|
| 602 | Urban land | 0.4 | 47.8% |
| 631C | Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky | 0.4 | 52.2% |
| Totals for Area of Interest | | 0.8 | 100.0% |

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

Custom Soil Resource Report

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Middlesex County, Massachusetts

602—Urban land

Map Unit Setting

National map unit symbol: 9950
Elevation: 0 to 3,000 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 45 to 50 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Minor Components

Rock outcrop

Percent of map unit: 5 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Udorthents, wet substratum

Percent of map unit: 5 percent
Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 5 percent
Hydric soil rating: No

631C—Charlton-Urban land-Hollis complex, 3 to 15 percent slopes, rocky

Map Unit Setting

National map unit symbol: vr1g
Elevation: 0 to 1,000 feet

Custom Soil Resource Report

Mean annual precipitation: 32 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 110 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Charlton and similar soils: 40 percent
Urban land: 40 percent
Hollis and similar soils: 10 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Charlton

Setting

Landform: Drumlins, ground moraines
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable loamy eolian deposits over friable loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 22 inches: sandy loam
H3 - 22 to 65 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Urban Land

Setting

Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Excavated and filled land

Description of Hollis

Setting

Landform: Ridges, hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable, shallow loamy basal till over granite and gneiss

Typical profile

H1 - 0 to 2 inches: fine sandy loam
H2 - 2 to 14 inches: fine sandy loam
H3 - 14 to 18 inches: unweathered bedrock

Properties and qualities

Slope: 3 to 15 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 8 to 20 inches to lithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.14 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Canton

Percent of map unit: 4 percent
Landform: Hills
Landform position (two-dimensional): Backslope, toeslope
Landform position (three-dimensional): Side slope, base slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Udorthents, loamy

Percent of map unit: 2 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Landform: Ledges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Concave
Across-slope shape: Concave

Custom Soil Resource Report

Scituate

Percent of map unit: 1 percent

Landform: Depressions, hillslopes

Landform position (two-dimensional): Toeslope, summit

Landform position (three-dimensional): Base slope, head slope

Down-slope shape: Linear

Across-slope shape: Concave

Hydric soil rating: No

Montauk

Percent of map unit: 1 percent

Landform: Hillslopes

Landform position (two-dimensional): Shoulder, summit

Landform position (three-dimensional): Nose slope, head slope

Down-slope shape: Convex

Across-slope shape: Convex

Hydric soil rating: No

APPENDIX E:
Hydrologic Calculations for Peak Runoff Rates
-Existing & Proposed Conditions-

| | | |
|-----|---------|-------------------|
| NO. | DATE | DESCRIPTION |
| 1 | 1/28/24 | ISSUED FOR PERMIT |
| 2 | | |
| 3 | | |
| 4 | | |

PREPARED BY:
BRUCE SALUK & ASSOC., INC.
CIVIL ENGINEERING & LAND SURVEYING
576 BOSTON POST ROAD EAST
MARLBOROUGH, MA 01752
TEL: 508-459-1682

PROJ. CONDITIONS DRAINAGE AREA
"EXCHANGE PLACE"
SITE PLAN
- 57 MAIN STREET -
MARLBOROUGH, MA

OWNER:
MARBOROUGH TOTG LLC
206 AYER ROAD, SUITE 5
HAYWARD, MA 01451
TEL: (978) 456 8388
WELLESLEY, MA 02841
MELLESLEY, MA 02841
ILLICIAN D. ADAMS
JW CAPITAL PARTNERS, LLC
34 WASHINGTON STREET, SUITE 230
MARLBOROUGH, MA 01752
TEL: (781) 366 2436

DATE: SEPTEMBER 7, 2022
FILE: 2016.dwg

DA2

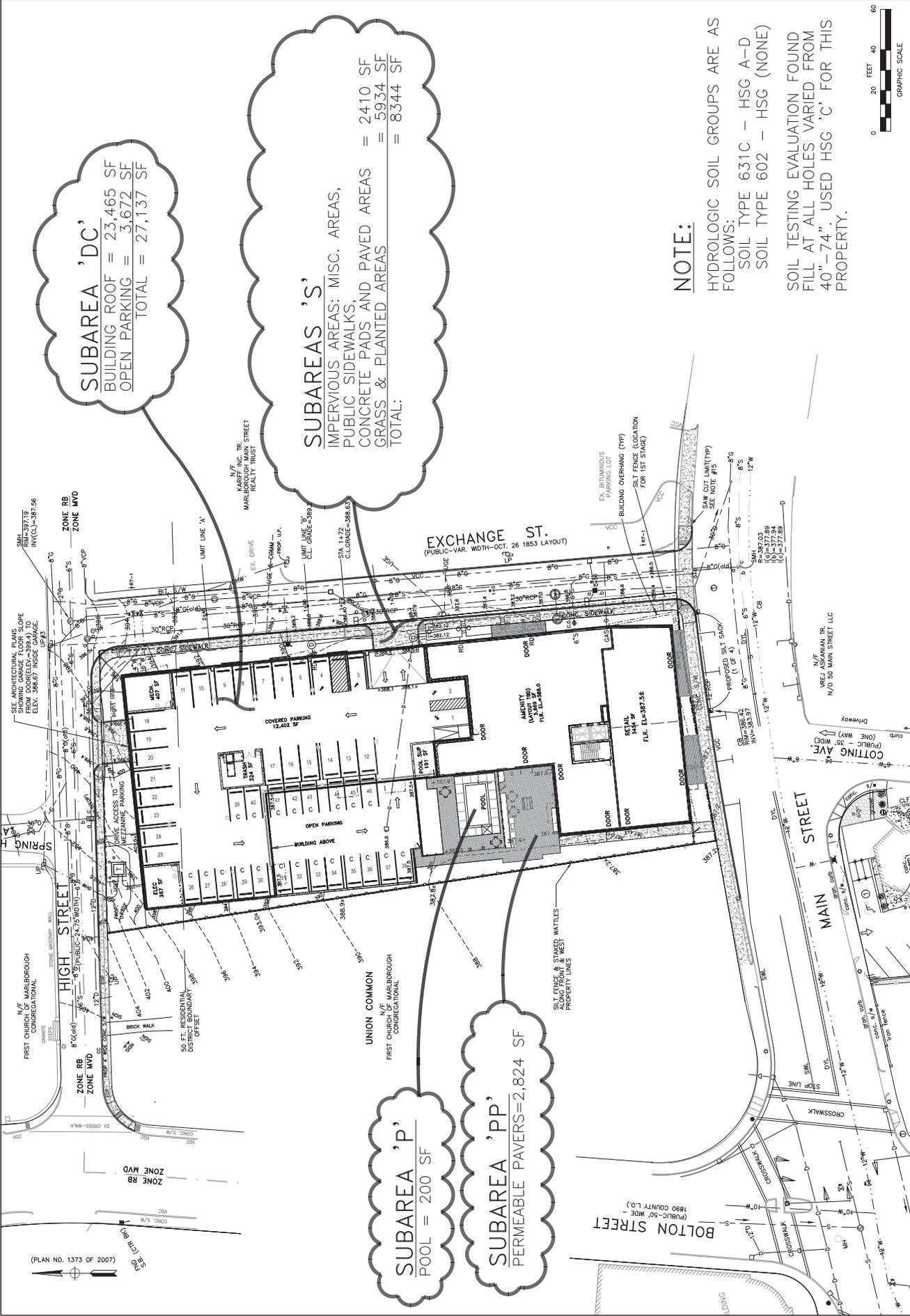
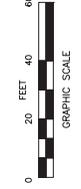
SUBAREA 'DC'
BUILDING ROOF = 23,465 SF
OPEN PARKING = 3,672 SF
TOTAL = 27,137 SF

SUBAREAS 'S'
IMPERVIOUS AREAS: MISC. AREAS,
PUBLIC SIDEWALKS,
CONCRETE PADS AND PAVED AREAS = 2410 SF
GRASS & PLANTED AREAS = 5934 SF
TOTAL: = 8344 SF

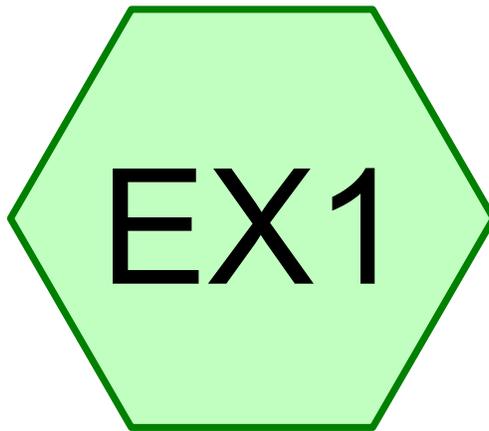
SUBAREA 'P'
POOL = 200 SF

SUBAREA 'PP'
PERMEABLE PAVERS=2,824 SF

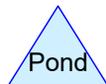
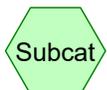
NOTE:
HYDROLOGIC SOIL GROUPS ARE AS FOLLOWS:
SOIL TYPE 631C - HSG A-D
SOIL TYPE 602 - HSG (NONE)
SOIL TESTING EVALUATION FOUND FILL AT ALL HOLES VARIED FROM 40" - 74". USED HSG 'C' FOR THIS PROPERTY.



(PLAN NO. 1373 OF 2007)



EXISTING CONDITIONS



Existing Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2f s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main ST, Marlborough, MA

Table of Contents

Printed 9/7/2022

TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Rainfall Events Listing

2 YR STORM Event

- 3 Subcat EX1: EXISTING CONDITIONS

10 YR STORM Event

- 4 Subcat EX1: EXISTING CONDITIONS

25 YR STORM Event

- 5 Subcat EX1: EXISTING CONDITIONS

100 YR STORM Event

- 6 Subcat EX1: EXISTING CONDITIONS

Existing Conditions-2916

Prepared by Bruce Saluk & Associates

Printed 9/7/2022

HydroCAD® 10.20-2f s/n 02049 © 2022 HydroCAD Software Solutions LLC

Page 2

Rainfall Events Listing

| Event# | Event Name | Storm Type | Curve | Mode | Duration (hours) | B/B | Depth (inches) | AMC |
|--------|--------------|----------------|-------|---------|------------------|-----|----------------|-----|
| 1 | 2 YR STORM | Type III 24-hr | | Default | 24.00 | 1 | 3.20 | 2 |
| 2 | 10 YR STORM | Type III 24-hr | | Default | 24.00 | 1 | 4.50 | 2 |
| 3 | 25 YR STORM | Type III 24-hr | | Default | 24.00 | 1 | 5.50 | 2 |
| 4 | 100 YR STORM | Type III 24-hr | | Default | 24.00 | 1 | 7.00 | 2 |

Existing Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2f s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main ST, Marlborough, MA

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 9/7/2022

Page 3

Summary for Subcatchment EX1: EXISTING CONDITIONS

Runoff = 1.88 cfs @ 12.08 hrs, Volume= 0.129 af, Depth> 1.76"
Routed to nonexistent node T

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR STORM Rainfall=3.20"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------------|
| * | 17,079 | 98 | Impervious |
| | 21,426 | 74 | >75% Grass cover, Good, HSG C |
| | 38,505 | 85 | Weighted Average |
| | 21,426 | | 55.64% Pervious Area |
| | 17,079 | | 44.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0 | | | | | Direct Entry, |

Existing Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2f s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main ST, Marlborough, MA

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 9/7/2022

Page 4

Summary for Subcatchment EX1: EXISTING CONDITIONS

Runoff = 3.10 cfs @ 12.07 hrs, Volume= 0.214 af, Depth> 2.91"
Routed to nonexistent node T

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR STORM Rainfall=4.50"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------------|
| * | 17,079 | 98 | Impervious |
| | 21,426 | 74 | >75% Grass cover, Good, HSG C |
| | 38,505 | 85 | Weighted Average |
| | 21,426 | | 55.64% Pervious Area |
| | 17,079 | | 44.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0 | | | | | Direct Entry, |

Existing Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2f s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main ST, Marlborough, MA

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 9/7/2022

Page 5

Summary for Subcatchment EX1: EXISTING CONDITIONS

Runoff = 4.04 cfs @ 12.07 hrs, Volume= 0.282 af, Depth> 3.83"
Routed to nonexistent node T

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR STORM Rainfall=5.50"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------------|
| * | 17,079 | 98 | Impervious |
| | 21,426 | 74 | >75% Grass cover, Good, HSG C |
| | 38,505 | 85 | Weighted Average |
| | 21,426 | | 55.64% Pervious Area |
| | 17,079 | | 44.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0 | | | | | Direct Entry, |

Existing Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2f s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main ST, Marlborough, MA
Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 9/7/2022

Page 6

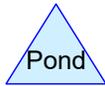
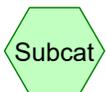
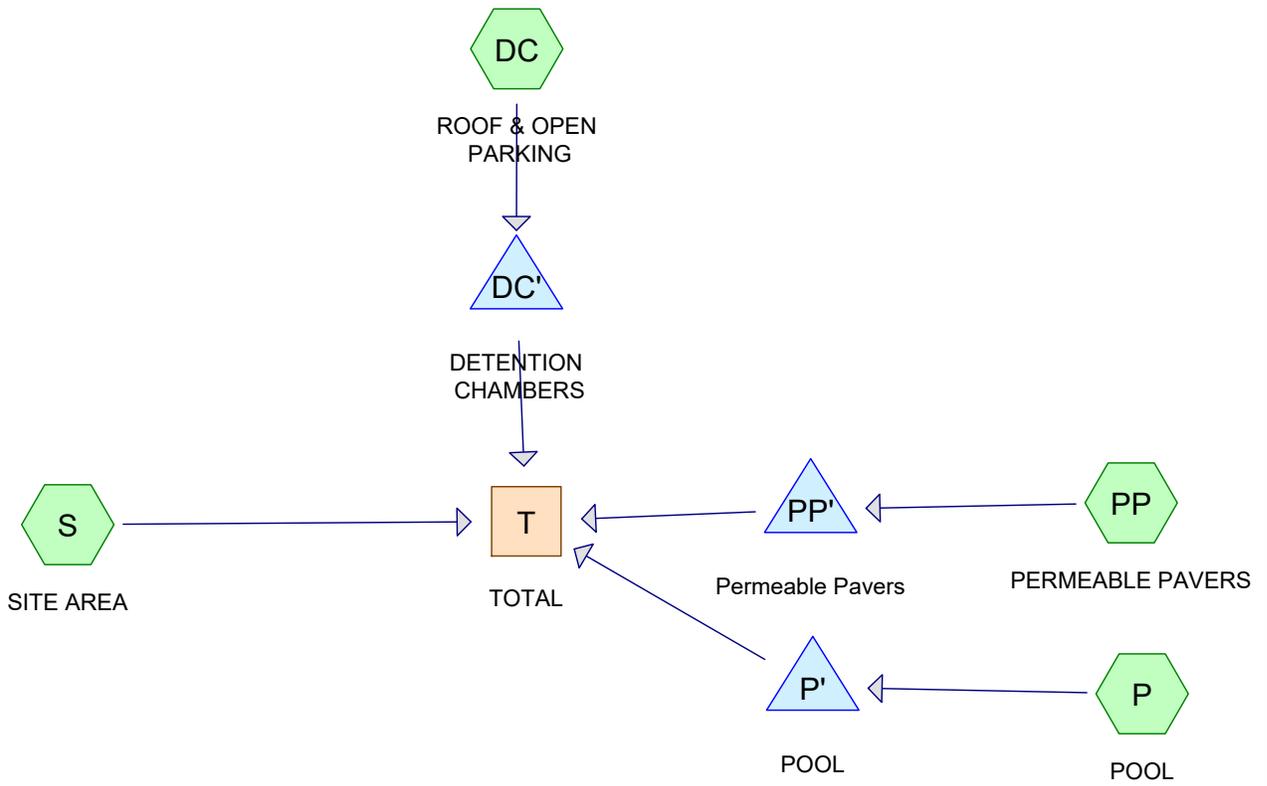
Summary for Subcatchment EX1: EXISTING CONDITIONS

Runoff = 5.47 cfs @ 12.07 hrs, Volume= 0.387 af, Depth> 5.25"
Routed to nonexistent node T

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR STORM Rainfall=7.00"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------------|
| * | 17,079 | 98 | Impervious |
| | 21,426 | 74 | >75% Grass cover, Good, HSG C |
| | 38,505 | 85 | Weighted Average |
| | 21,426 | | 55.64% Pervious Area |
| | 17,079 | | 44.36% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|----------------------|
| 5.0 | | | | | Direct Entry, |



Routing Diagram for Proposed Conditions-2916
 Prepared by Bruce Saluk & Associates, Printed 3/30/2024
 HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Table of Contents

Printed 3/30/2024

TABLE OF CONTENTS

Project Reports

- 1 Routing Diagram
- 2 Area Listing (all nodes)

2 YR STORM Event

- 3 Subcat DC: ROOF & OPEN PARKING
- 4 Subcat P: POOL
- 5 Subcat PP: PERMEABLE PAVERS
- 6 Subcat S: SITE AREA
- 7 Reach T: TOTAL
- 8 Pond DC': DETENTION CHAMBERS
- 10 Pond P': POOL
- 12 Pond PP': Permeable Pavers

10 YR STORM Event

- 14 Subcat DC: ROOF & OPEN PARKING
- 15 Subcat P: POOL
- 16 Subcat PP: PERMEABLE PAVERS
- 17 Subcat S: SITE AREA
- 18 Reach T: TOTAL
- 19 Pond DC': DETENTION CHAMBERS
- 21 Pond P': POOL
- 23 Pond PP': Permeable Pavers

25 YR STORM Event

- 25 Subcat DC: ROOF & OPEN PARKING
- 26 Subcat P: POOL
- 27 Subcat PP: PERMEABLE PAVERS
- 28 Subcat S: SITE AREA
- 29 Reach T: TOTAL
- 30 Pond DC': DETENTION CHAMBERS
- 32 Pond P': POOL
- 34 Pond PP': Permeable Pavers

100 YR STORM Event

- 36 Subcat DC: ROOF & OPEN PARKING
- 37 Subcat P: POOL
- 38 Subcat PP: PERMEABLE PAVERS
- 39 Subcat S: SITE AREA
- 40 Reach T: TOTAL
- 41 Pond DC': DETENTION CHAMBERS
- 43 Pond P': POOL
- 45 Pond PP': Permeable Pavers

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

Printed 3/30/2024

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

Page 2

Area Listing (all nodes)

| Area (sq-ft) | CN | Description (subcatchment-numbers) |
|-----------------|-----------|---|
| 5,934 | 74 | >75% Grass & Planted Areas, Good, HSG C (S) |
| 2,410 | 98 | Impervious (S) |
| 3,672 | 98 | OPEN PARKING (DC) |
| 2,824 | 98 | Permeable Pavers (PP) |
| 200 | 98 | Pool (P) |
| 23,465 | 98 | ROOF AREA (DC) |
| 38,505 | 94 | TOTAL AREA |

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 3

Summary for Subcatchment DC: ROOF & OPEN PARKING

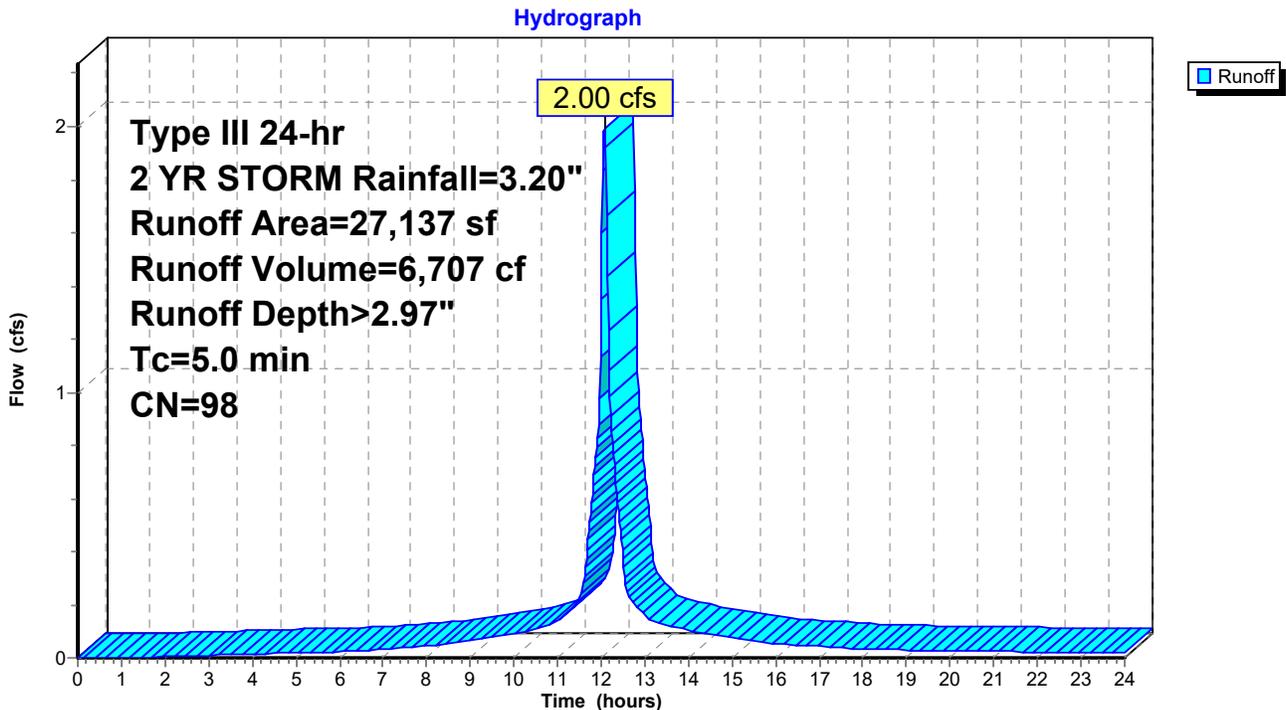
Runoff = 2.00 cfs @ 12.07 hrs, Volume= 6,707 cf, Depth> 2.97"
Routed to Pond DC' : DETENTION CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR STORM Rainfall=3.20"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 23,465 | 98 | ROOF AREA |
| * | 3,672 | 98 | OPEN PARKING |
| | 27,137 | 98 | Weighted Average |
| | 27,137 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment DC: ROOF & OPEN PARKING



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 4

Summary for Subcatchment P: POOL

Runoff = 0.01 cfs @ 12.07 hrs, Volume= 49 cf, Depth> 2.97"
Routed to Pond P' : POOL

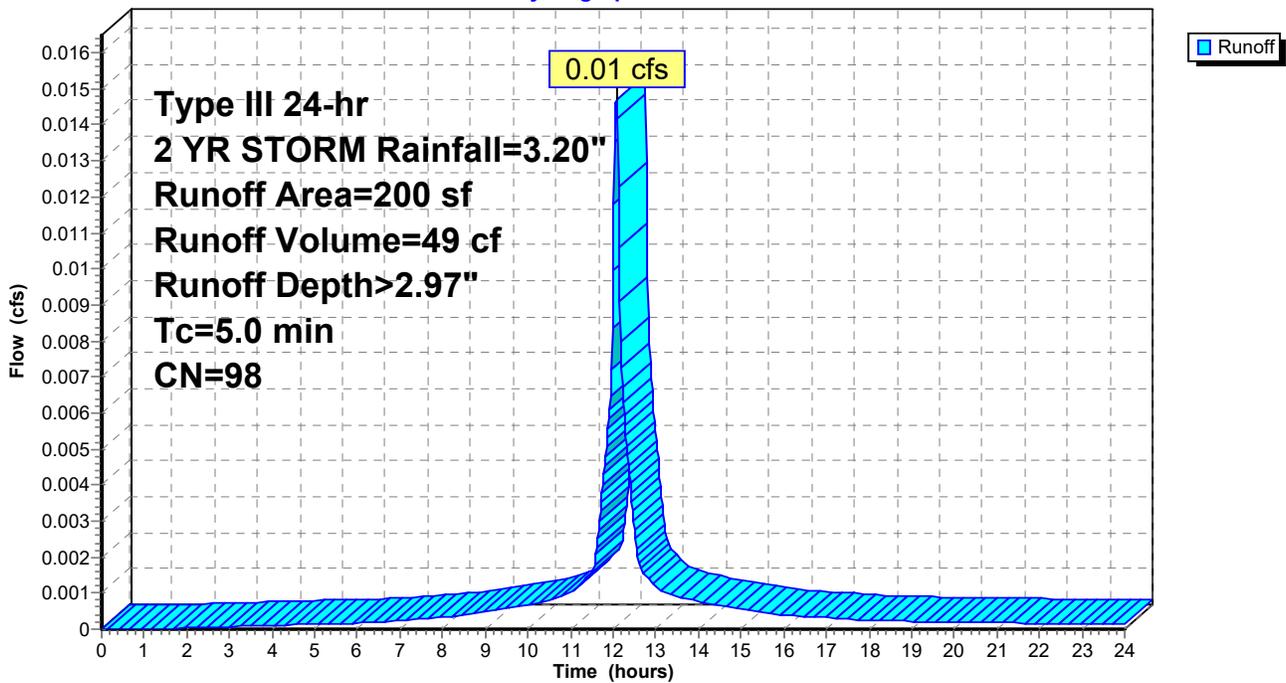
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR STORM Rainfall=3.20"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 200 | 98 | Pool |
| 200 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment P: POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 5

Summary for Subcatchment PP: PERMEABLE PAVERS

Runoff = 0.21 cfs @ 12.07 hrs, Volume= 698 cf, Depth> 2.97"
Routed to Pond PP' : Permeable Pavers

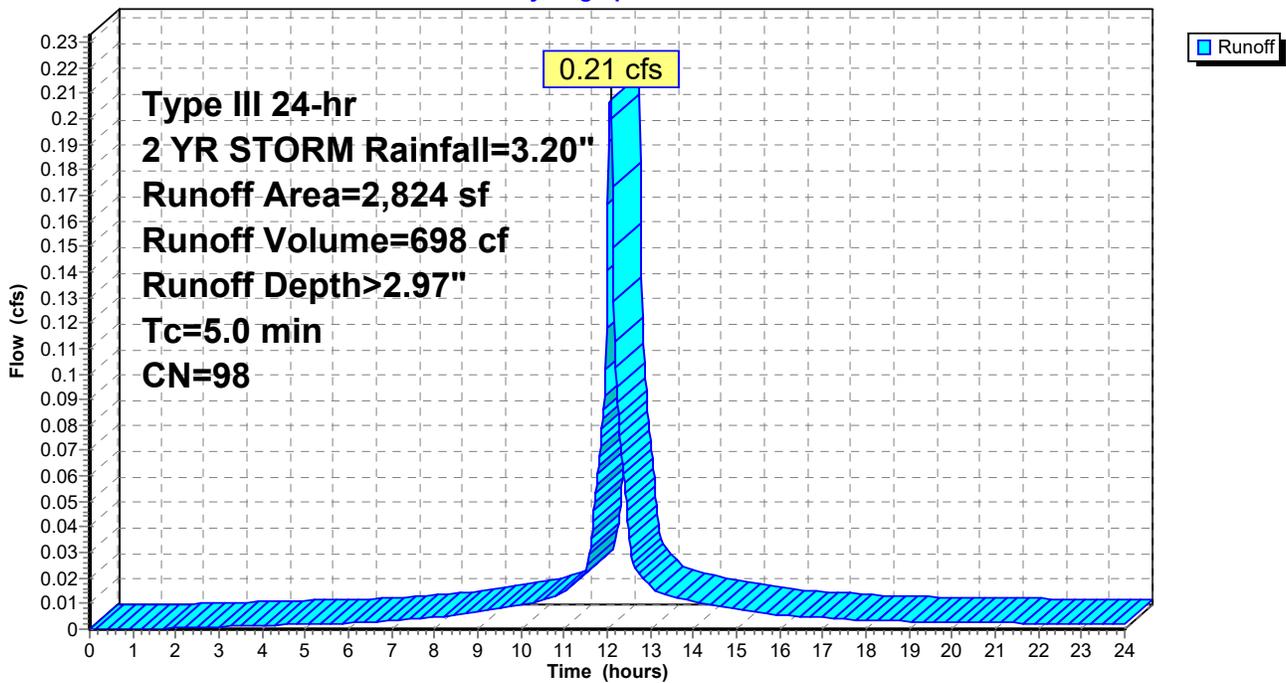
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR STORM Rainfall=3.20"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 2,824 | 98 | Permeable Pavers |
| 2,824 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment PP: PERMEABLE PAVERS

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 6

Summary for Subcatchment S: SITE AREA

Runoff = 0.34 cfs @ 12.08 hrs, Volume= 1,020 cf, Depth> 1.47"
Routed to Reach T : TOTAL

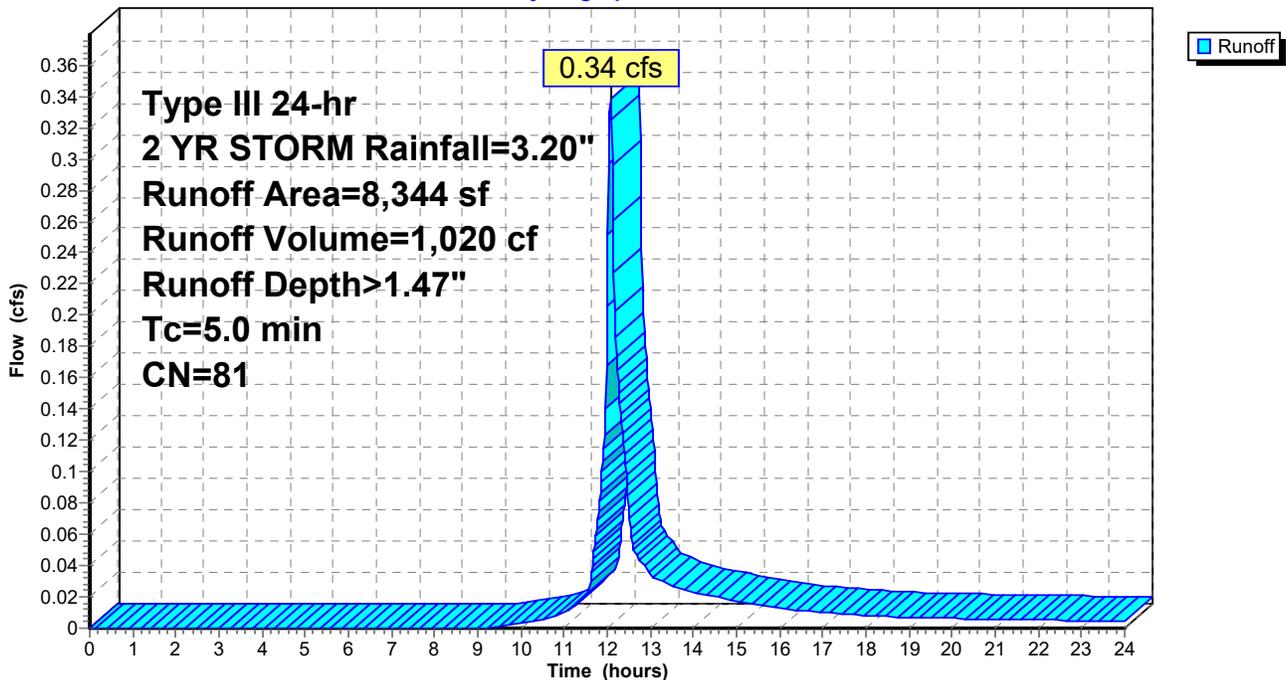
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2 YR STORM Rainfall=3.20"

| | Area (sf) | CN | Description |
|---|-----------|----|---|
| * | 2,410 | 98 | Impervious |
| * | 5,934 | 74 | >75% Grass & Planted Areas, Good, HSG C |
| | 8,344 | 81 | Weighted Average |
| | 5,934 | | 71.12% Pervious Area |
| | 2,410 | | 28.88% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment S: SITE AREA

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 7

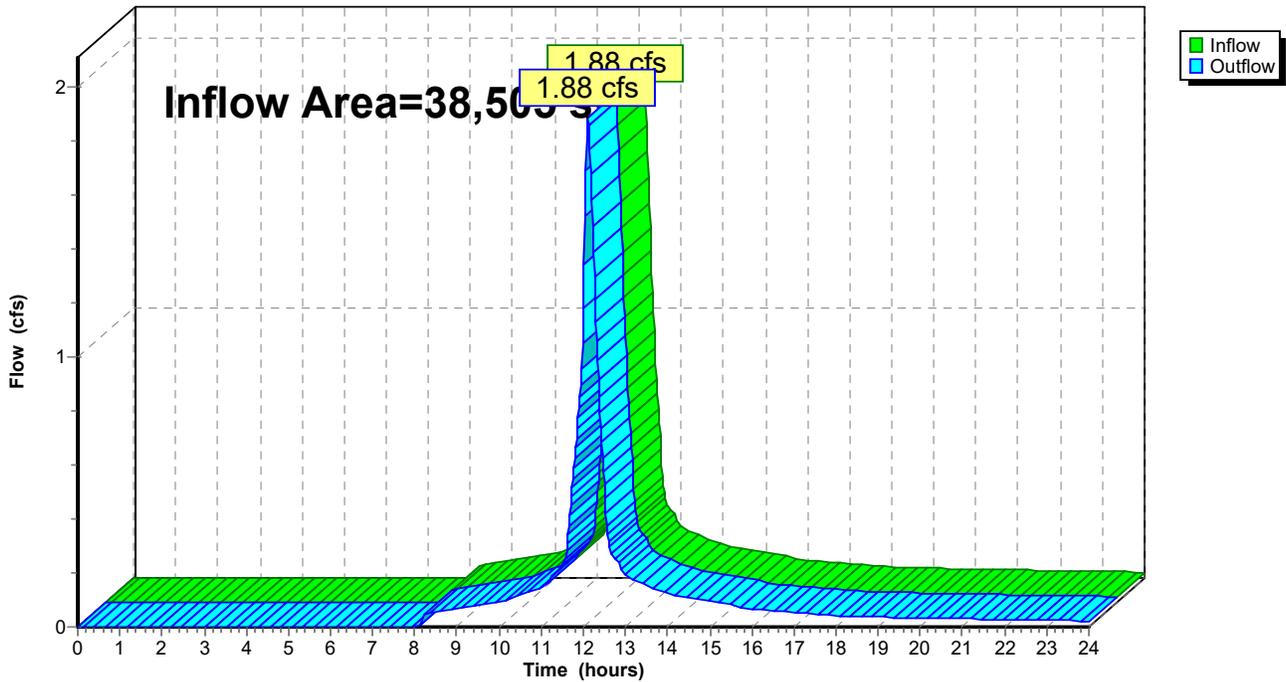
Summary for Reach T: TOTAL

Inflow Area = 38,505 sf, 84.59% Impervious, Inflow Depth > 2.26" for 2 YR STORM event
Inflow = 1.88 cfs @ 12.11 hrs, Volume= 7,258 cf
Outflow = 1.88 cfs @ 12.11 hrs, Volume= 7,258 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach T: TOTAL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 8

Summary for Pond DC': DETENTION CHAMBERS

Inflow Area = 27,137 sf, 100.00% Impervious, Inflow Depth > 2.97" for 2 YR STORM event
 Inflow = 2.00 cfs @ 12.07 hrs, Volume= 6,707 cf
 Outflow = 1.59 cfs @ 12.13 hrs, Volume= 6,237 cf, Atten= 21%, Lag= 3.4 min
 Primary = 1.59 cfs @ 12.13 hrs, Volume= 6,237 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 4
 Peak Elev= 384.39' @ 12.13 hrs Surf.Area= 360 sf Storage= 802 cf

Plug-Flow detention time= 68.3 min calculated for 6,232 cf (93% of inflow)
 Center-of-Mass det. time= 30.8 min (785.9 - 755.0)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 382.40' | 1,503 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| #2 | 382.12' | 77 cf | 12.0" Round Pipe Storage L= 98.0' S= 0.0100 '/' |
| #3 | 381.60' | 6 cf | 12.0" Round Pipe Storage L= 8.0' |
| #4 | 382.17' | 58 cf | 4.00'D x 4.60'H Vertical Cone/Cylinder |
| | | 1,644 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 382.40 | 347 | 0 | 0 |
| 386.73 | 347 | 1,503 | 1,503 |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 381.76' | 15.0" Round Culvert L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 381.76' / 381.60' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #2 | Device 1 | 382.10' | 15.0" Round Culvert L= 7.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.10' / 382.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #3 | Device 2 | 382.30' | 8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 2 | 384.40' | 0.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.0' Crest Height |
| #5 | Device 2 | 385.30' | 11.3' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.9' Crest Height |

Primary OutFlow Max=1.58 cfs @ 12.13 hrs HW=384.39' TW=383.50' (Fixed TW Elev= 383.50')

- 1=Culvert (Passes 1.58 cfs of 5.56 cfs potential flow)
- 2=Culvert (Passes 1.58 cfs of 5.56 cfs potential flow)
- 3=Orifice/Grate (Orifice Controls 1.58 cfs @ 4.53 fps)
- 4=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

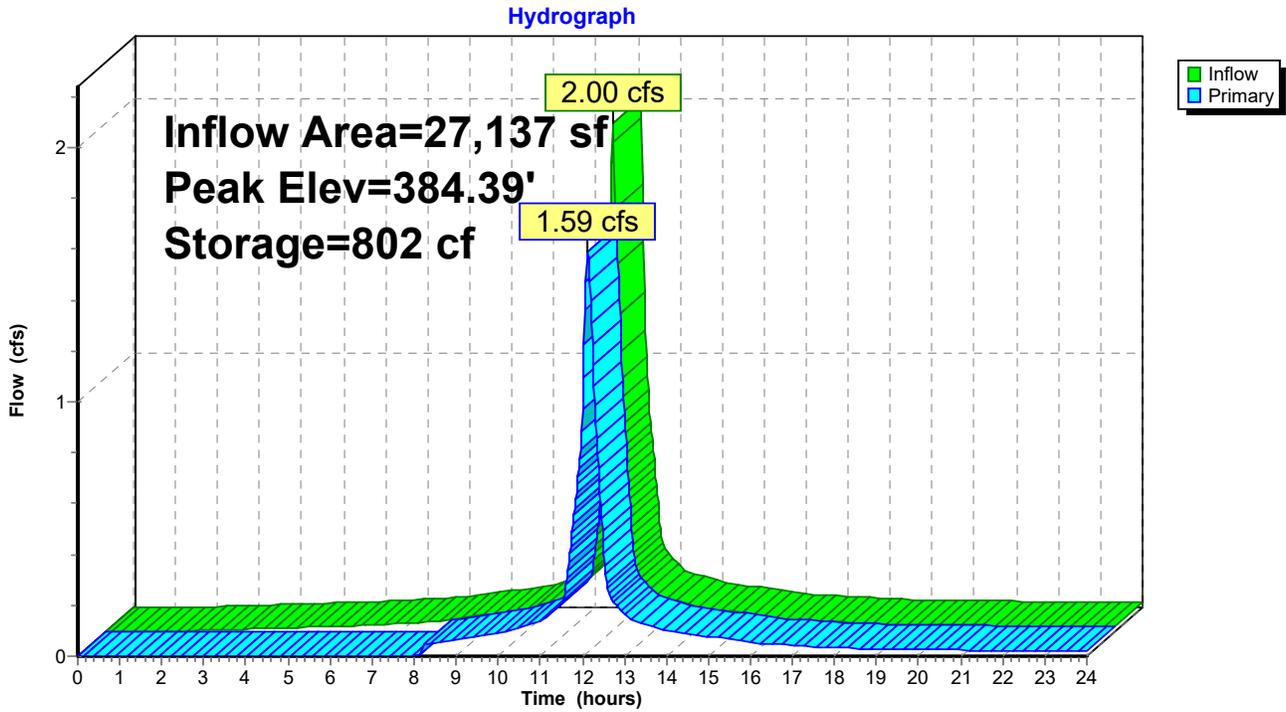
57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 9

Pond DC': DETENTION CHAMBERS



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 10

Summary for Pond P': POOL

Inflow Area = 200 sf, 100.00% Impervious, Inflow Depth > 2.97" for 2 YR STORM event
 Inflow = 0.01 cfs @ 12.07 hrs, Volume= 49 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 388.15' @ 24.00 hrs Surf.Area= 200 sf Storage= 49 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 387.90' | 120 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 387.90 | 200 | 0 | 0 |
| 388.50 | 200 | 120 | 120 |

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 388.45' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=387.90' (Free Discharge)
 ↑1=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

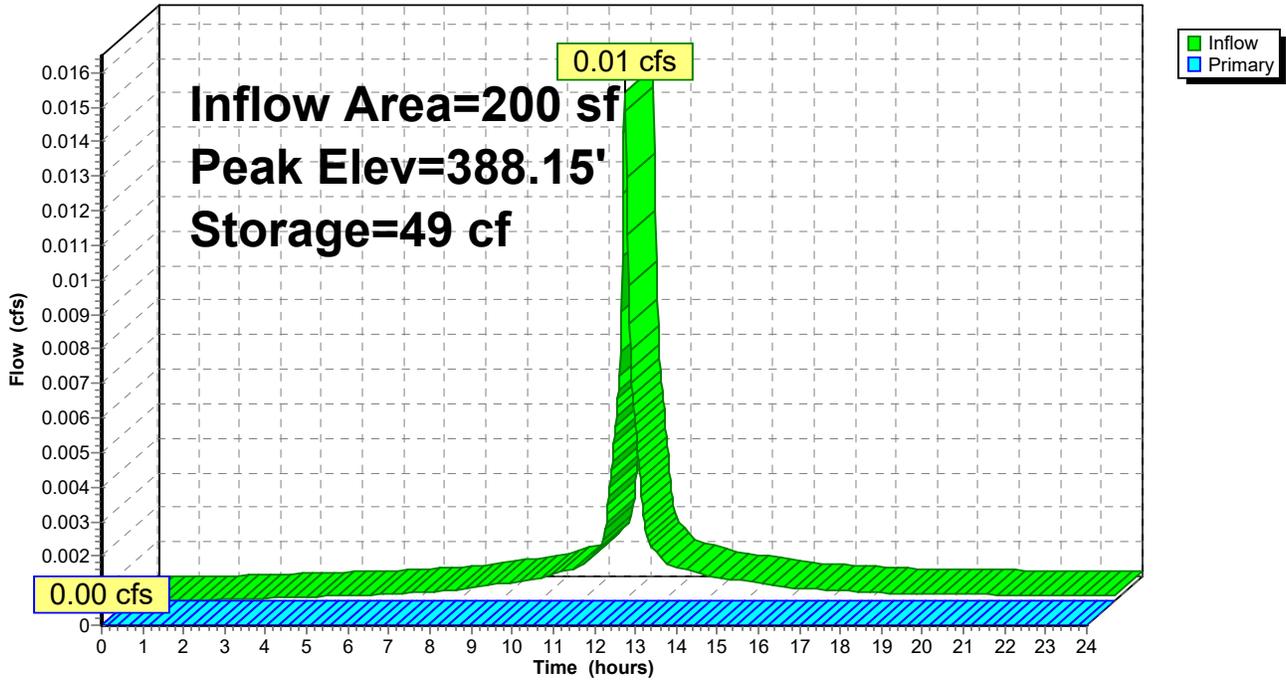
Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 11

Pond P': POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 12

Summary for Pond PP': Permeable Pavers

Inflow Area = 2,824 sf, 100.00% Impervious, Inflow Depth > 2.97" for 2 YR STORM event
 Inflow = 0.21 cfs @ 12.07 hrs, Volume= 698 cf
 Outflow = 0.07 cfs @ 11.86 hrs, Volume= 698 cf, Atten= 68%, Lag= 0.0 min
 Discarded = 0.07 cfs @ 11.86 hrs, Volume= 698 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 386.50' @ 12.35 hrs Surf.Area= 2,824 sf Storage= 105 cf

Plug-Flow detention time= 8.2 min calculated for 697 cf (100% of inflow)
 Center-of-Mass det. time= 7.9 min (763.0 - 755.0)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 386.41' | 565 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 1,412 cf Overall x 40.0% Voids |
| #2 | 386.91' | 233 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 932 cf Overall x 25.0% Voids |
| #3 | 387.24' | 45 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 452 cf Overall x 10.0% Voids |
| | | 843 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.41 | 2,824 | 0 | 0 |
| 386.91 | 2,824 | 1,412 | 1,412 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.91 | 2,824 | 0 | 0 |
| 387.24 | 2,824 | 932 | 932 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 387.24 | 2,824 | 0 | 0 |
| 387.40 | 2,824 | 452 | 452 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Discarded | 386.41' | 1.020 in/hr Exfiltration over Horizontal area |
| #2 | Primary | 387.35' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 2 YR STORM Rainfall=3.20"

Printed 3/30/2024

Page 13

Discarded OutFlow Max=0.07 cfs @ 11.86 hrs HW=386.42' (Free Discharge)

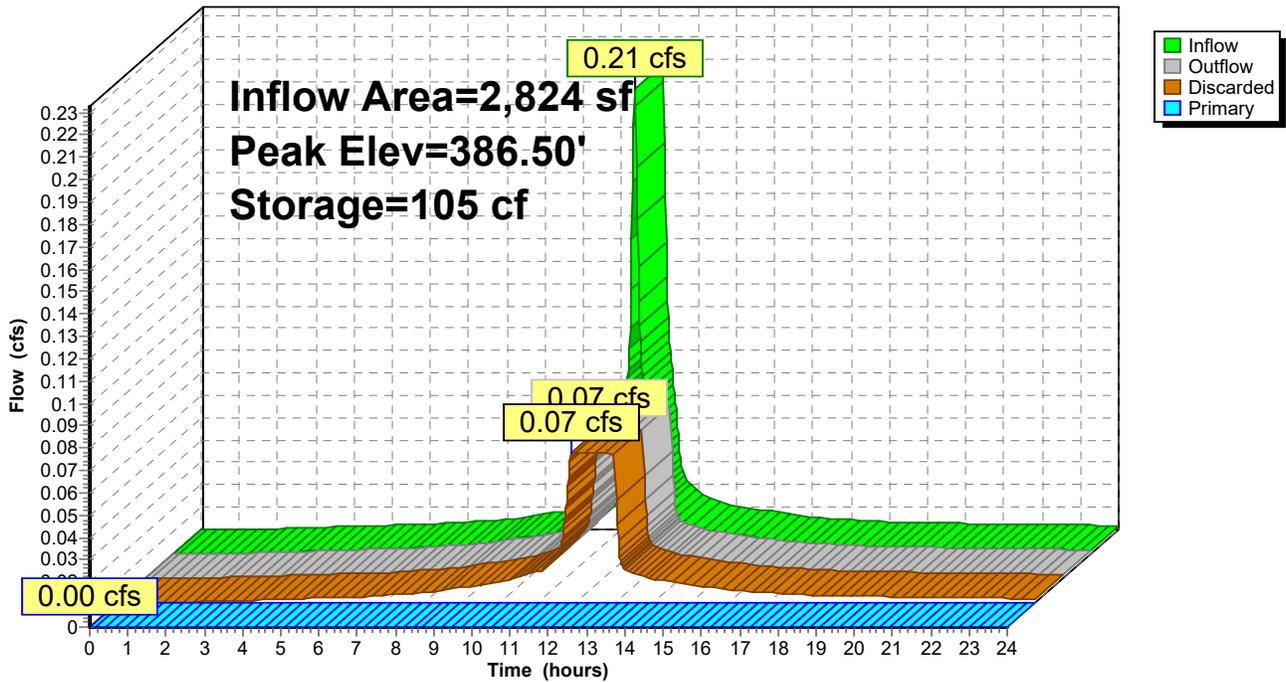
↑1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=386.41' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP': Permeable Pavers

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 14

Summary for Subcatchment DC: ROOF & OPEN PARKING

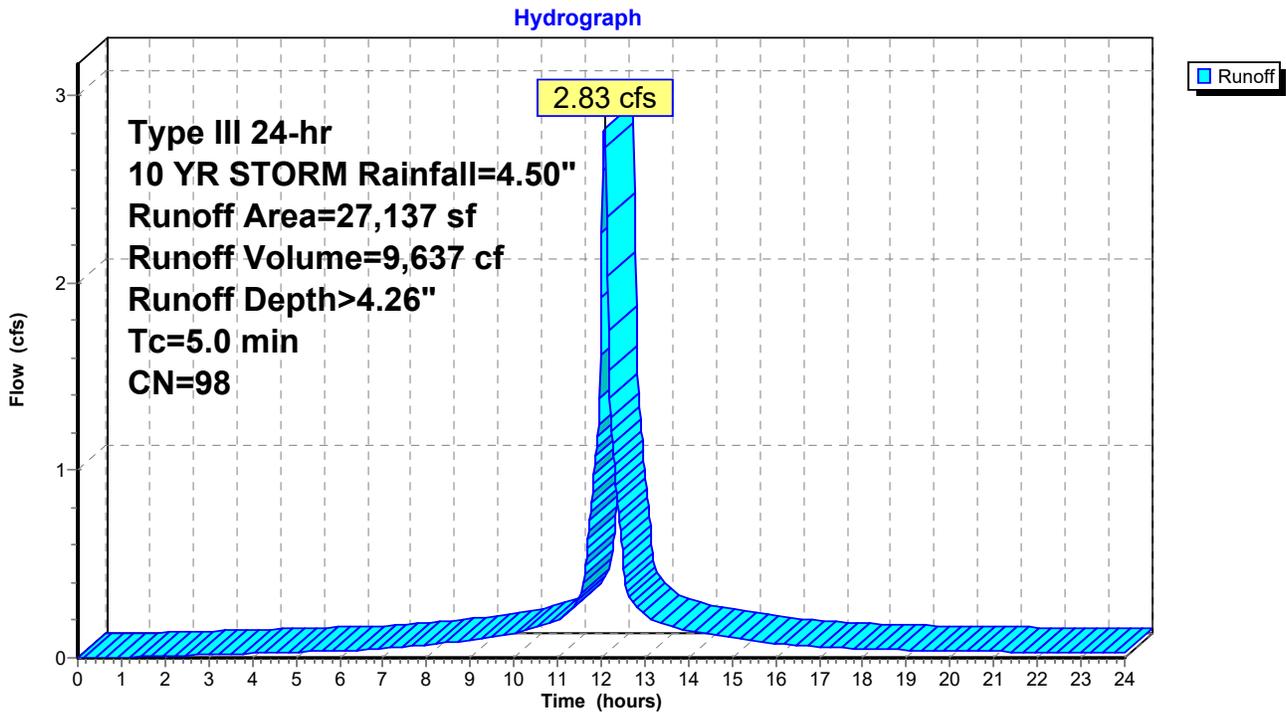
Runoff = 2.83 cfs @ 12.07 hrs, Volume= 9,637 cf, Depth> 4.26"
Routed to Pond DC' : DETENTION CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR STORM Rainfall=4.50"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 23,465 | 98 | ROOF AREA |
| * | 3,672 | 98 | OPEN PARKING |
| | 27,137 | 98 | Weighted Average |
| | 27,137 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment DC: ROOF & OPEN PARKING



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 15

Summary for Subcatchment P: POOL

Runoff = 0.02 cfs @ 12.07 hrs, Volume= 71 cf, Depth> 4.26"
Routed to Pond P' : POOL

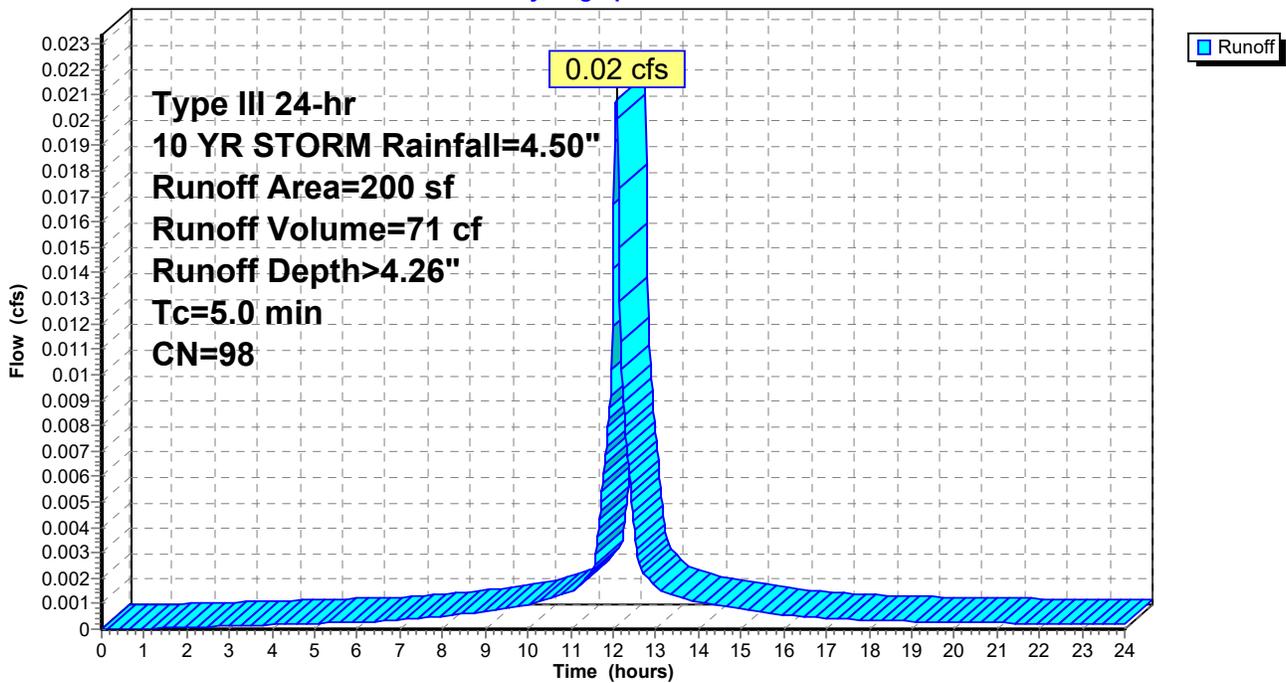
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR STORM Rainfall=4.50"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 200 | 98 | Pool |
| 200 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment P: POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 16

Summary for Subcatchment PP: PERMEABLE PAVERS

Runoff = 0.29 cfs @ 12.07 hrs, Volume= 1,003 cf, Depth> 4.26"
Routed to Pond PP' : Permeable Pavers

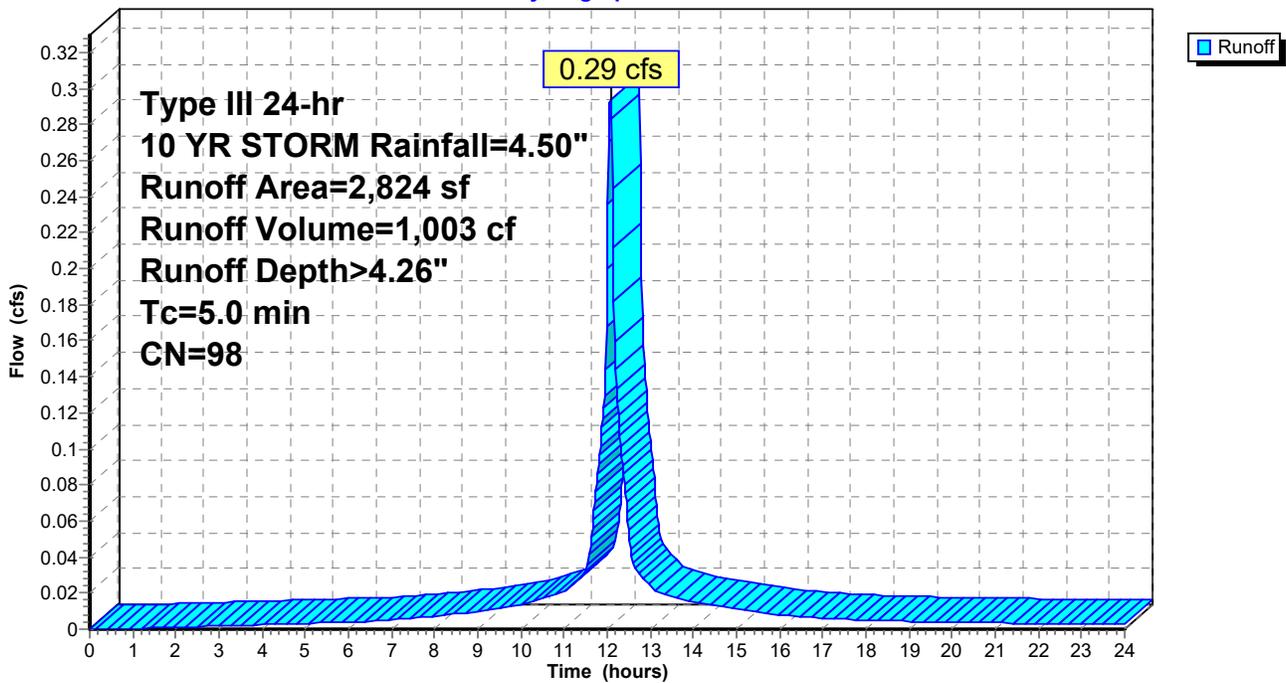
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10 YR STORM Rainfall=4.50"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 2,824 | 98 | Permeable Pavers |
| 2,824 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment PP: PERMEABLE PAVERS

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 17

Summary for Subcatchment S: SITE AREA

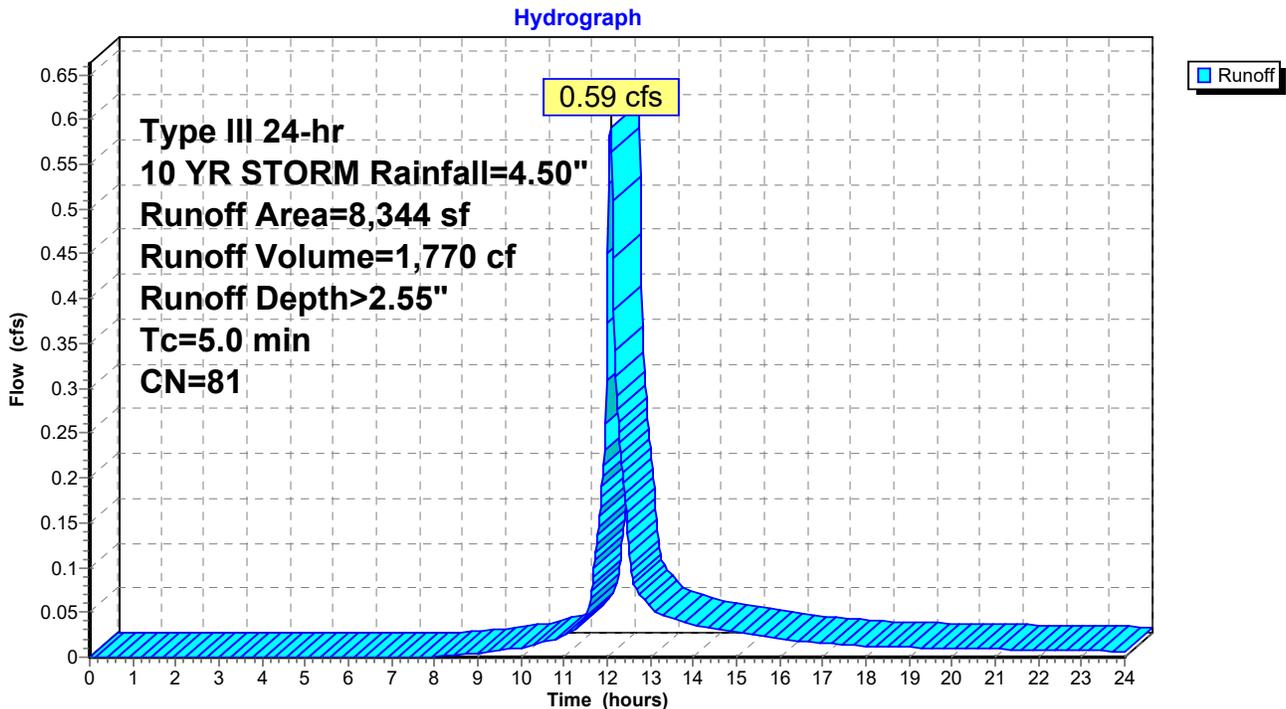
Runoff = 0.59 cfs @ 12.08 hrs, Volume= 1,770 cf, Depth> 2.55"
 Routed to Reach T : TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Type III 24-hr 10 YR STORM Rainfall=4.50"

| | Area (sf) | CN | Description |
|---|-----------|----|---|
| * | 2,410 | 98 | Impervious |
| * | 5,934 | 74 | >75% Grass & Planted Areas, Good, HSG C |
| | 8,344 | 81 | Weighted Average |
| | 5,934 | | 71.12% Pervious Area |
| | 2,410 | | 28.88% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment S: SITE AREA



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 18

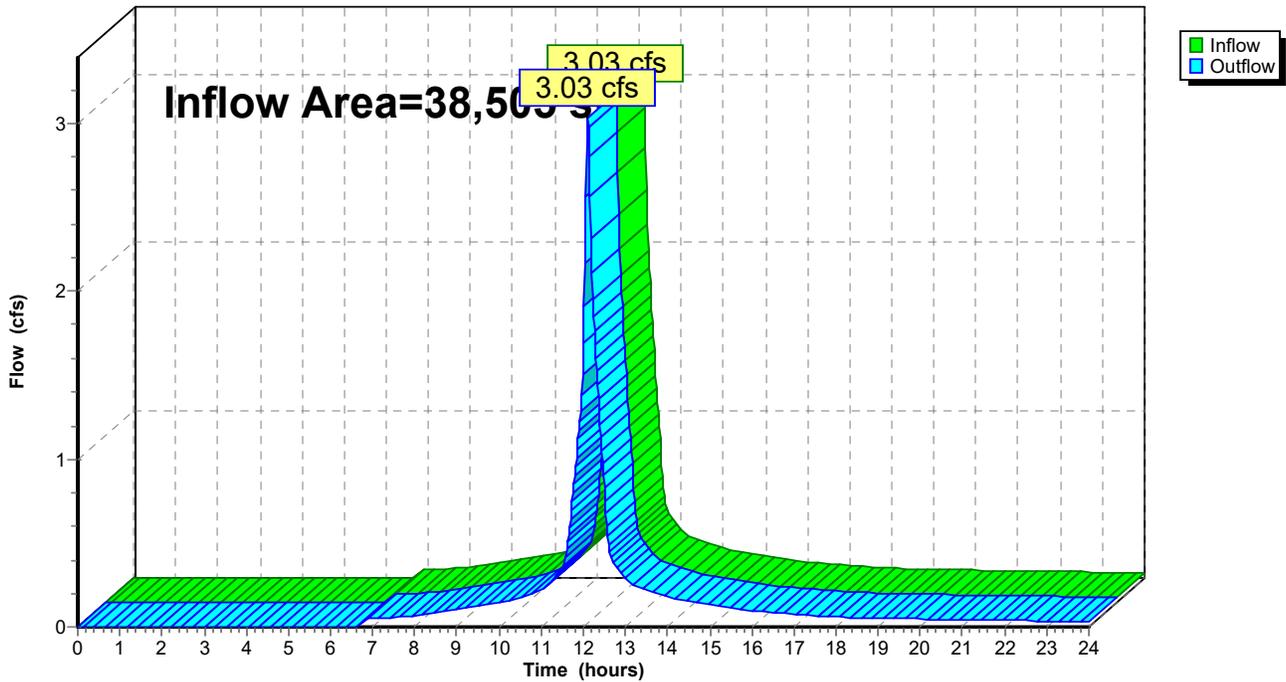
Summary for Reach T: TOTAL

Inflow Area = 38,505 sf, 84.59% Impervious, Inflow Depth > 3.41" for 10 YR STORM event
Inflow = 3.03 cfs @ 12.11 hrs, Volume= 10,937 cf
Outflow = 3.03 cfs @ 12.11 hrs, Volume= 10,937 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach T: TOTAL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 19

Summary for Pond DC': DETENTION CHAMBERS

Inflow Area = 27,137 sf, 100.00% Impervious, Inflow Depth > 4.26" for 10 YR STORM event
 Inflow = 2.83 cfs @ 12.07 hrs, Volume= 9,637 cf
 Outflow = 2.48 cfs @ 12.11 hrs, Volume= 9,167 cf, Atten= 12%, Lag= 2.5 min
 Primary = 2.48 cfs @ 12.11 hrs, Volume= 9,167 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 4
 Peak Elev= 384.82' @ 12.11 hrs Surf.Area= 360 sf Storage= 955 cf

Plug-Flow detention time= 53.5 min calculated for 9,159 cf (95% of inflow)
 Center-of-Mass det. time= 25.2 min (773.7 - 748.5)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 382.40' | 1,503 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| #2 | 382.12' | 77 cf | 12.0" Round Pipe Storage L= 98.0' S= 0.0100 '/' |
| #3 | 381.60' | 6 cf | 12.0" Round Pipe Storage L= 8.0' |
| #4 | 382.17' | 58 cf | 4.00'D x 4.60'H Vertical Cone/Cylinder |
| | | 1,644 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 382.40 | 347 | 0 | 0 |
| 386.73 | 347 | 1,503 | 1,503 |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 381.76' | 15.0" Round Culvert L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 381.76' / 381.60' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #2 | Device 1 | 382.10' | 15.0" Round Culvert L= 7.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.10' / 382.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #3 | Device 2 | 382.30' | 8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 2 | 384.40' | 0.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.0' Crest Height |
| #5 | Device 2 | 385.30' | 11.3' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.9' Crest Height |

Primary OutFlow Max=2.47 cfs @ 12.11 hrs HW=384.81' TW=383.50' (Fixed TW Elev= 383.50')

- 1=Culvert (Passes 2.47 cfs of 6.77 cfs potential flow)
- 2=Culvert (Passes 2.47 cfs of 6.77 cfs potential flow)
- 3=Orifice/Grate (Orifice Controls 1.92 cfs @ 5.51 fps)
- 4=Sharp-Crested Rectangular Weir (Weir Controls 0.54 cfs @ 2.12 fps)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

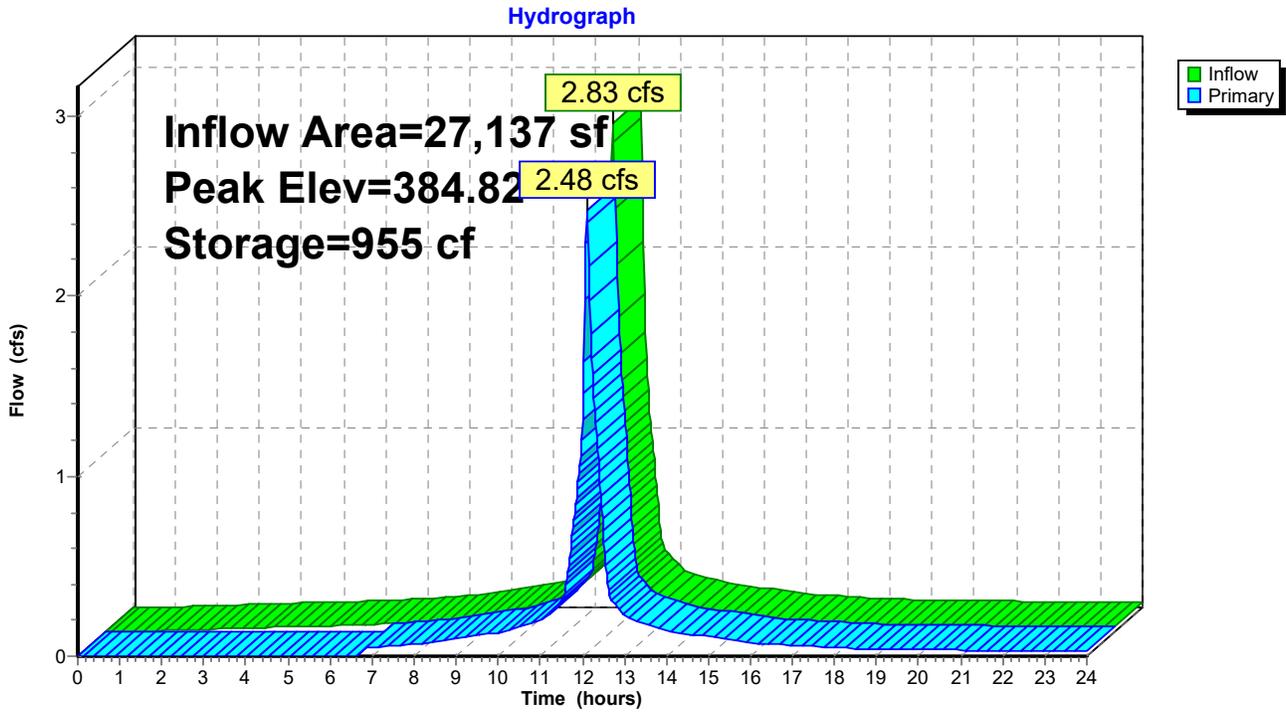
57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 20

Pond DC': DETENTION CHAMBERS



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 21

Summary for Pond P': POOL

Inflow Area = 200 sf, 100.00% Impervious, Inflow Depth > 4.26" for 10 YR STORM event
 Inflow = 0.02 cfs @ 12.07 hrs, Volume= 71 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 388.26' @ 24.00 hrs Surf.Area= 200 sf Storage= 71 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 387.90' | 120 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 387.90 | 200 | 0 | 0 |
| 388.50 | 200 | 120 | 120 |

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 388.45' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=387.90' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

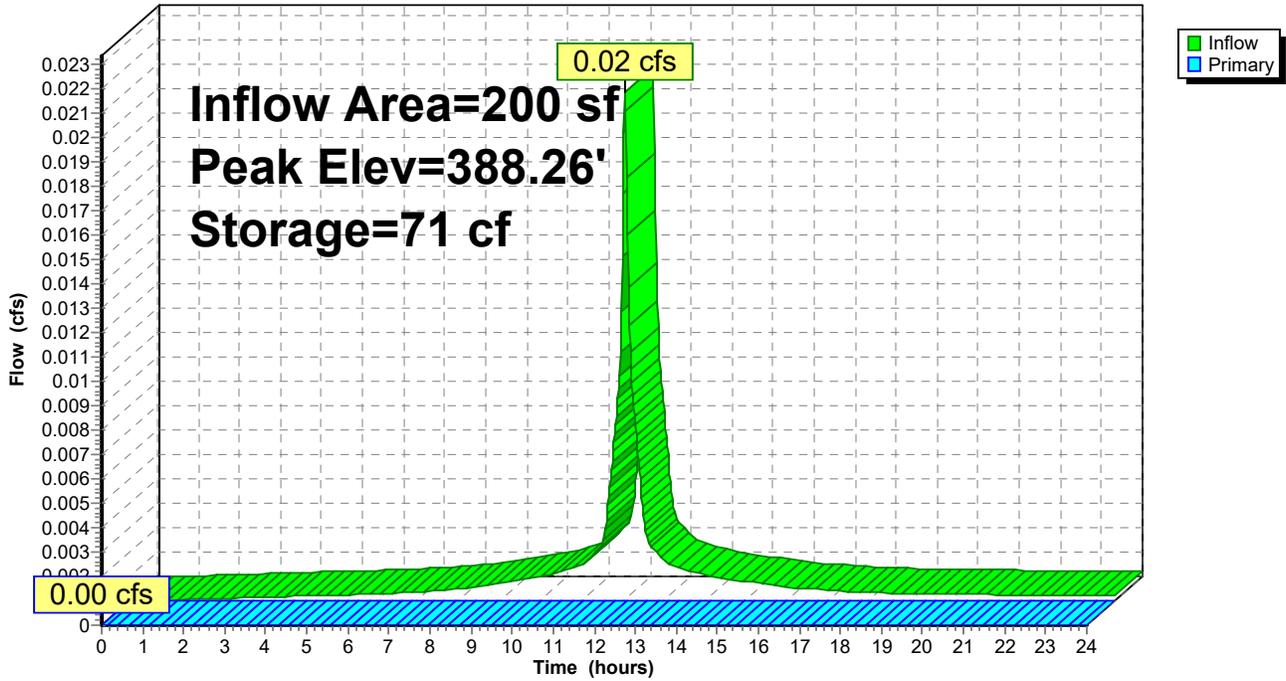
Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 22

Pond P': POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 23

Summary for Pond PP': Permeable Pavers

Inflow Area = 2,824 sf, 100.00% Impervious, Inflow Depth > 4.26" for 10 YR STORM event
 Inflow = 0.29 cfs @ 12.07 hrs, Volume= 1,003 cf
 Outflow = 0.07 cfs @ 11.76 hrs, Volume= 1,002 cf, Atten= 77%, Lag= 0.0 min
 Discarded = 0.07 cfs @ 11.76 hrs, Volume= 1,002 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 386.59' @ 12.45 hrs Surf.Area= 2,824 sf Storage= 208 cf

Plug-Flow detention time= 15.9 min calculated for 1,002 cf (100% of inflow)
 Center-of-Mass det. time= 15.6 min (764.1 - 748.5)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 386.41' | 565 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 1,412 cf Overall x 40.0% Voids |
| #2 | 386.91' | 233 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 932 cf Overall x 25.0% Voids |
| #3 | 387.24' | 45 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 452 cf Overall x 10.0% Voids |
| | | 843 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.41 | 2,824 | 0 | 0 |
| 386.91 | 2,824 | 1,412 | 1,412 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.91 | 2,824 | 0 | 0 |
| 387.24 | 2,824 | 932 | 932 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 387.24 | 2,824 | 0 | 0 |
| 387.40 | 2,824 | 452 | 452 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Discarded | 386.41' | 1.020 in/hr Exfiltration over Horizontal area |
| #2 | Primary | 387.35' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 10 YR STORM Rainfall=4.50"

Printed 3/30/2024

Page 24

Discarded OutFlow Max=0.07 cfs @ 11.76 hrs HW=386.42' (Free Discharge)

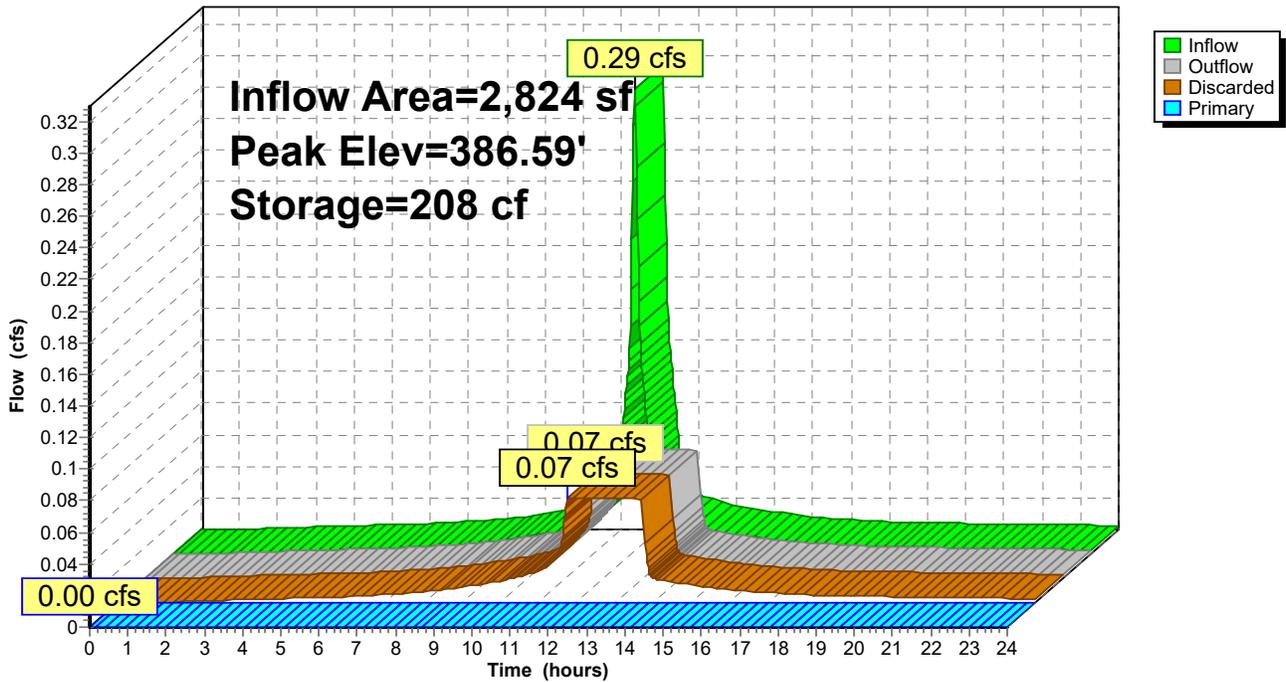
↳ **1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=386.41' (Free Discharge)

↳ **2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond PP': Permeable Pavers

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 25

Summary for Subcatchment DC: ROOF & OPEN PARKING

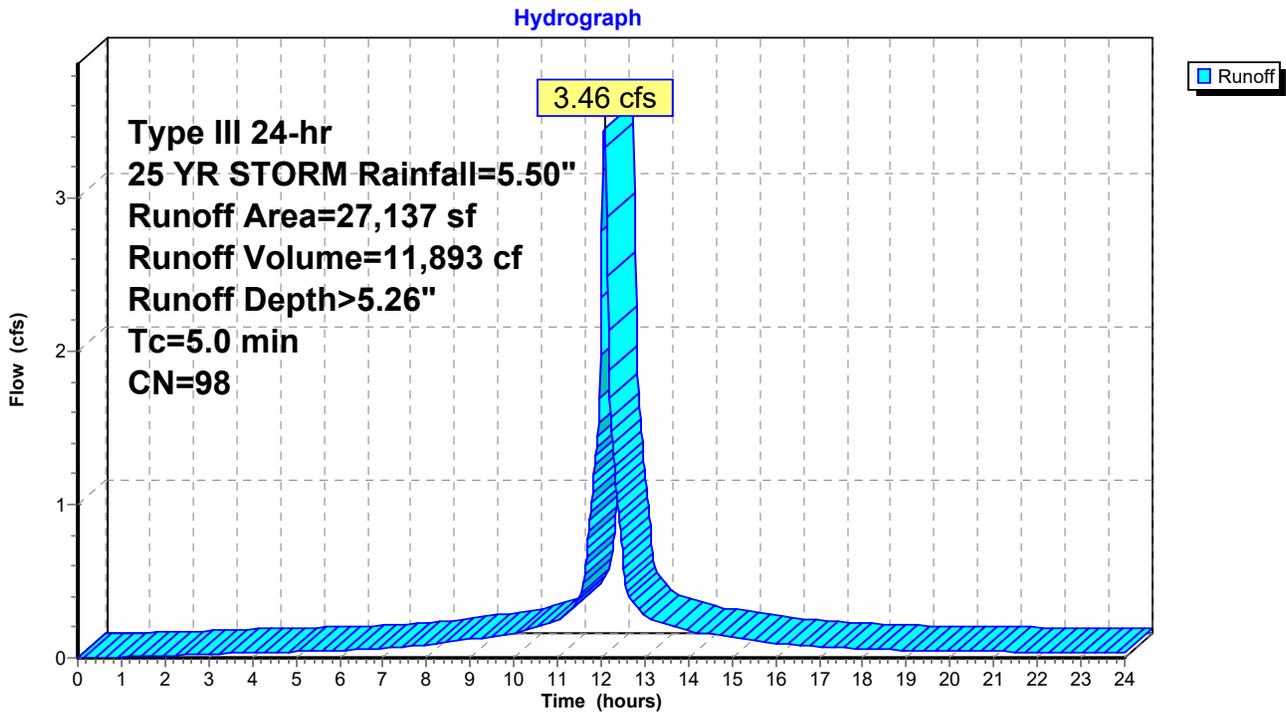
Runoff = 3.46 cfs @ 12.07 hrs, Volume= 11,893 cf, Depth> 5.26"
Routed to Pond DC' : DETENTION CHAMBERS

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR STORM Rainfall=5.50"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 23,465 | 98 | ROOF AREA |
| * | 3,672 | 98 | OPEN PARKING |
| | 27,137 | 98 | Weighted Average |
| | 27,137 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment DC: ROOF & OPEN PARKING



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 26

Summary for Subcatchment P: POOL

Runoff = 0.03 cfs @ 12.07 hrs, Volume= 88 cf, Depth> 5.26"
Routed to Pond P' : POOL

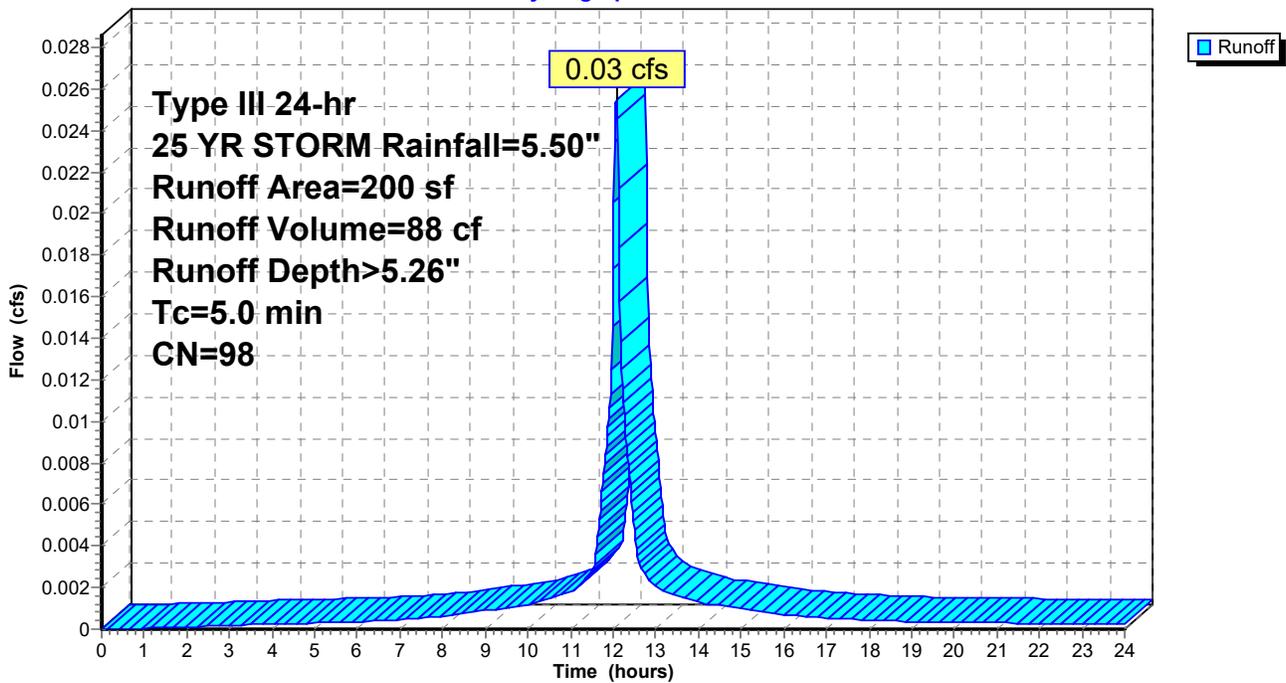
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR STORM Rainfall=5.50"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 200 | 98 | Pool |
| 200 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment P: POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 27

Summary for Subcatchment PP: PERMEABLE PAVERS

Runoff = 0.36 cfs @ 12.07 hrs, Volume= 1,238 cf, Depth> 5.26"
Routed to Pond PP' : Permeable Pavers

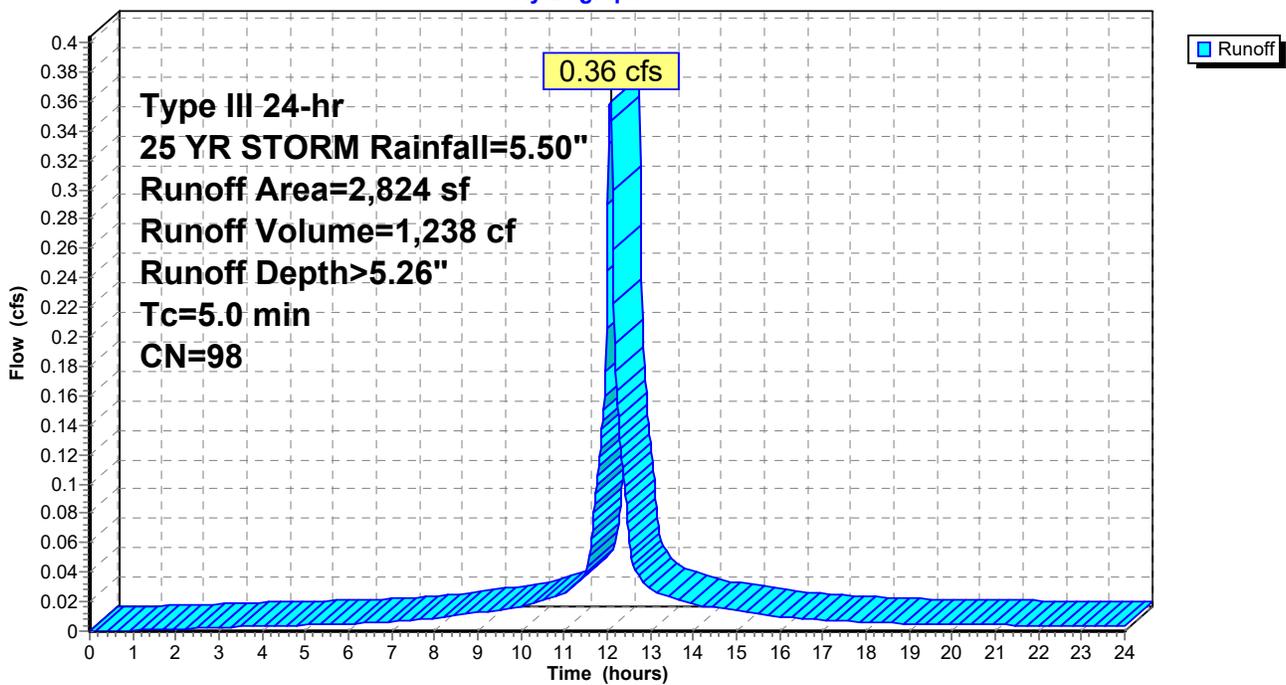
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR STORM Rainfall=5.50"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 2,824 | 98 | Permeable Pavers |
| 2,824 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment PP: PERMEABLE PAVERS

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 28

Summary for Subcatchment S: SITE AREA

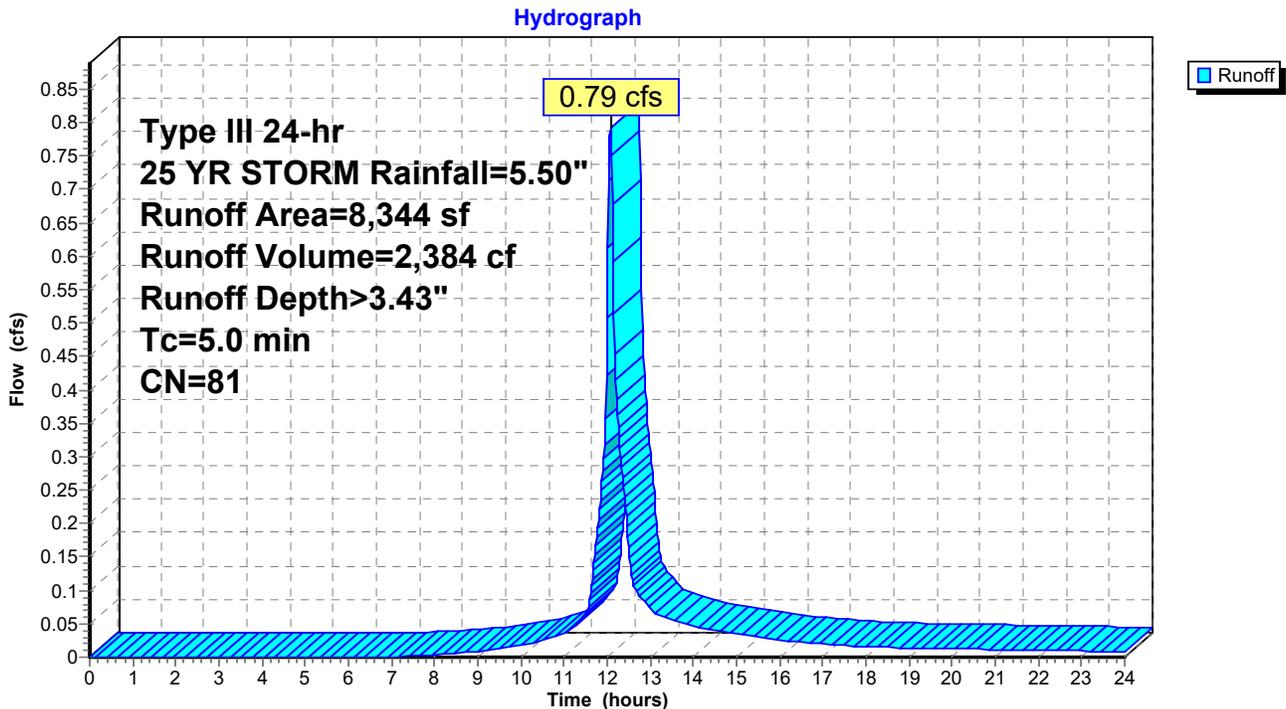
Runoff = 0.79 cfs @ 12.07 hrs, Volume= 2,384 cf, Depth> 3.43"
Routed to Reach T : TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 25 YR STORM Rainfall=5.50"

| | Area (sf) | CN | Description |
|---|-----------|----|---|
| * | 2,410 | 98 | Impervious |
| * | 5,934 | 74 | >75% Grass & Planted Areas, Good, HSG C |
| | 8,344 | 81 | Weighted Average |
| | 5,934 | | 71.12% Pervious Area |
| | 2,410 | | 28.88% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment S: SITE AREA



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 29

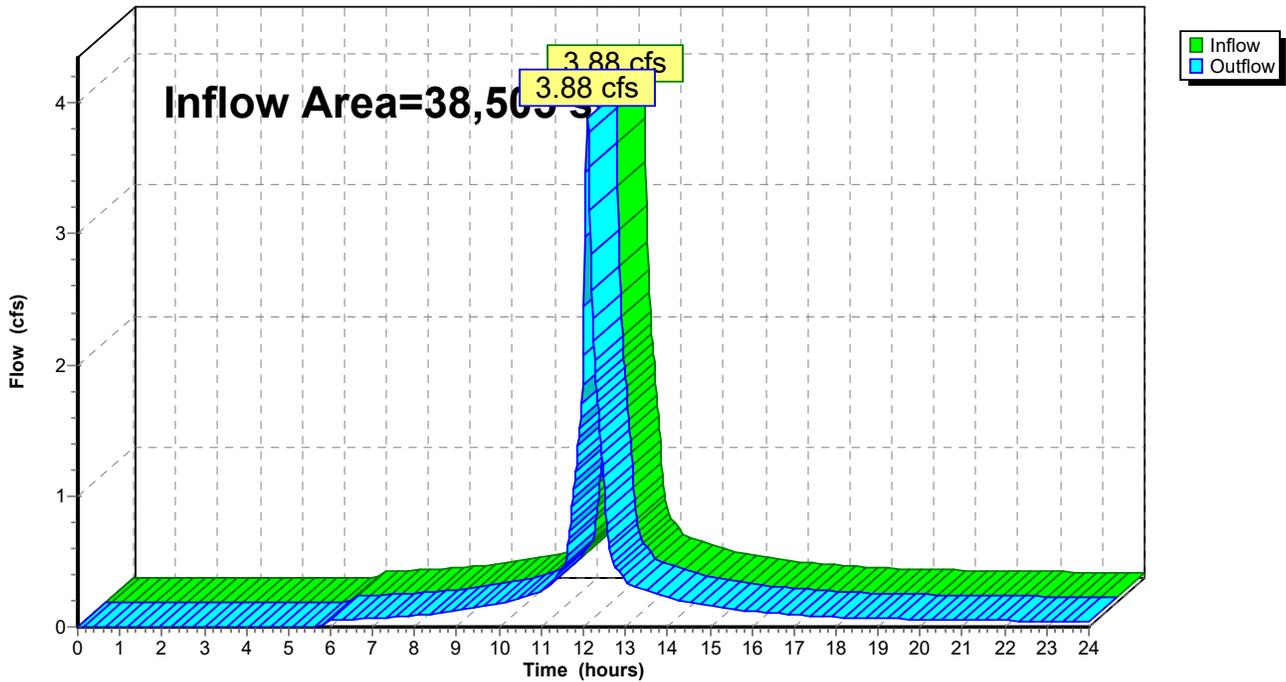
Summary for Reach T: TOTAL

Inflow Area = 38,505 sf, 84.59% Impervious, Inflow Depth > 4.30" for 25 YR STORM event
Inflow = 3.88 cfs @ 12.10 hrs, Volume= 13,808 cf
Outflow = 3.88 cfs @ 12.10 hrs, Volume= 13,808 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach T: TOTAL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 30

Summary for Pond DC': DETENTION CHAMBERS

Inflow Area = 27,137 sf, 100.00% Impervious, Inflow Depth > 5.26" for 25 YR STORM event
 Inflow = 3.46 cfs @ 12.07 hrs, Volume= 11,893 cf
 Outflow = 3.14 cfs @ 12.11 hrs, Volume= 11,424 cf, Atten= 9%, Lag= 2.1 min
 Primary = 3.14 cfs @ 12.11 hrs, Volume= 11,424 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 4
 Peak Elev= 385.07' @ 12.11 hrs Surf.Area= 360 sf Storage= 1,045 cf

Plug-Flow detention time= 45.9 min calculated for 11,424 cf (96% of inflow)
 Center-of-Mass det. time= 22.2 min (767.3 - 745.1)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 382.40' | 1,503 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| #2 | 382.12' | 77 cf | 12.0" Round Pipe Storage L= 98.0' S= 0.0100 '/' |
| #3 | 381.60' | 6 cf | 12.0" Round Pipe Storage L= 8.0' |
| #4 | 382.17' | 58 cf | 4.00'D x 4.60'H Vertical Cone/Cylinder |
| | | 1,644 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 382.40 | 347 | 0 | 0 |
| 386.73 | 347 | 1,503 | 1,503 |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 381.76' | 15.0" Round Culvert L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 381.76' / 381.60' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #2 | Device 1 | 382.10' | 15.0" Round Culvert L= 7.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.10' / 382.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #3 | Device 2 | 382.30' | 8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 2 | 384.40' | 0.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.0' Crest Height |
| #5 | Device 2 | 385.30' | 11.3' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.9' Crest Height |

Primary OutFlow Max=3.12 cfs @ 12.11 hrs HW=385.06' TW=383.50' (Fixed TW Elev= 383.50')

- 1=Culvert (Passes 3.12 cfs of 7.38 cfs potential flow)
- 2=Culvert (Passes 3.12 cfs of 7.38 cfs potential flow)
- 3=Orifice/Grate (Orifice Controls 2.10 cfs @ 6.02 fps)
- 4=Sharp-Crested Rectangular Weir (Weir Controls 1.02 cfs @ 2.71 fps)
- 5=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

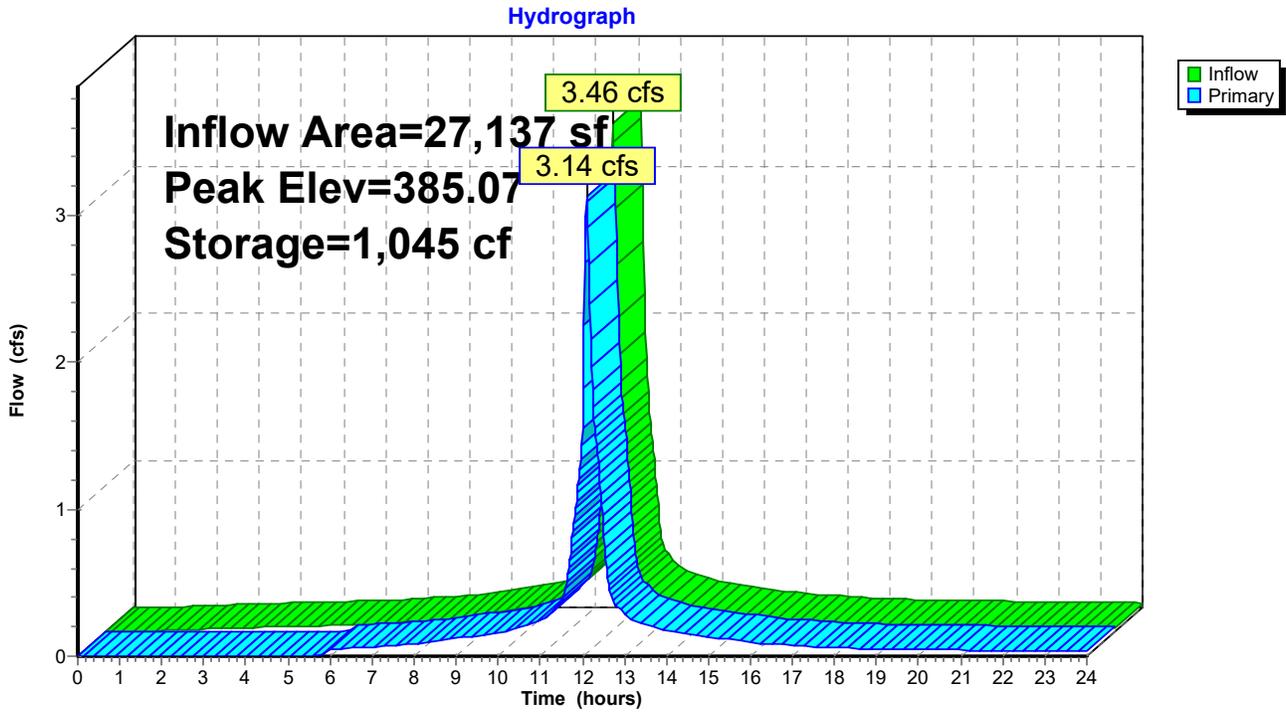
57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 31

Pond DC': DETENTION CHAMBERS



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 32

Summary for Pond P': POOL

Inflow Area = 200 sf, 100.00% Impervious, Inflow Depth > 5.26" for 25 YR STORM event
 Inflow = 0.03 cfs @ 12.07 hrs, Volume= 88 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 388.34' @ 24.00 hrs Surf.Area= 200 sf Storage= 88 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 387.90' | 120 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 387.90 | 200 | 0 | 0 |
| 388.50 | 200 | 120 | 120 |

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 388.45' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=387.90' (Free Discharge)
 ↑1=**Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

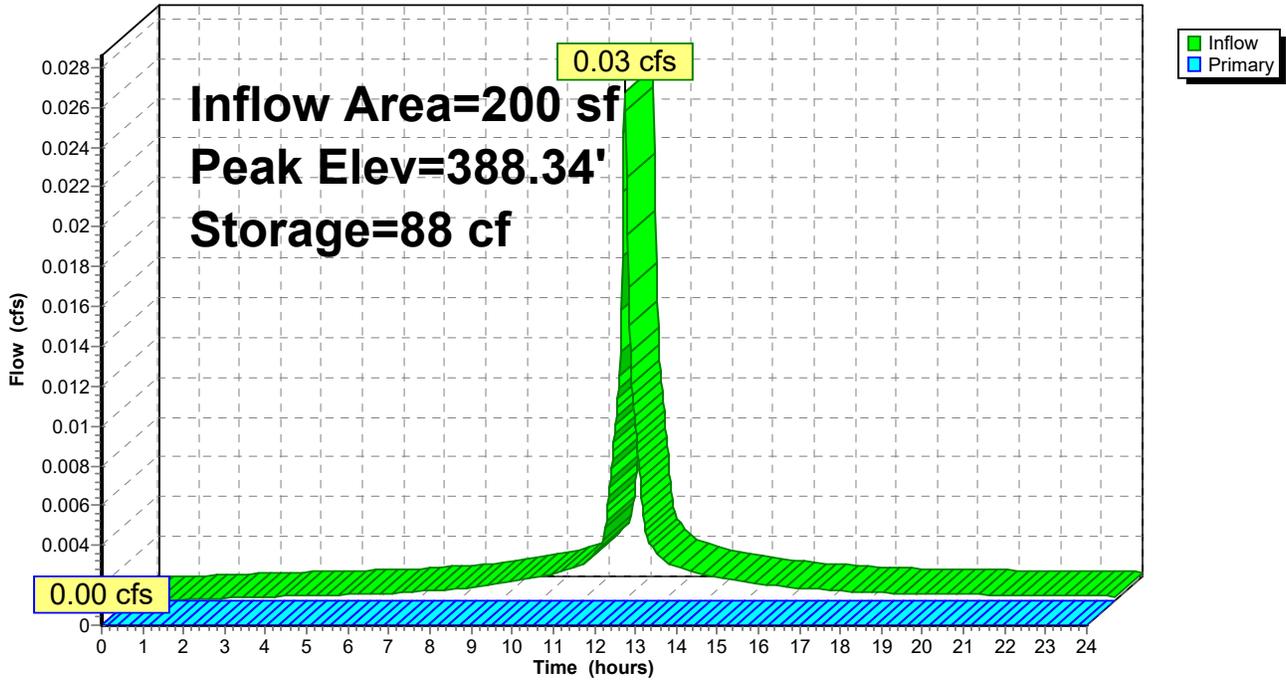
Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 33

Pond P': POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 34

Summary for Pond PP': Permeable Pavers

Inflow Area = 2,824 sf, 100.00% Impervious, Inflow Depth > 5.26" for 25 YR STORM event
 Inflow = 0.36 cfs @ 12.07 hrs, Volume= 1,238 cf
 Outflow = 0.07 cfs @ 11.70 hrs, Volume= 1,237 cf, Atten= 82%, Lag= 0.0 min
 Discarded = 0.07 cfs @ 11.70 hrs, Volume= 1,237 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 386.67' @ 12.50 hrs Surf.Area= 2,824 sf Storage= 295 cf

Plug-Flow detention time= 23.4 min calculated for 1,237 cf (100% of inflow)
 Center-of-Mass det. time= 23.1 min (768.2 - 745.1)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 386.41' | 565 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 1,412 cf Overall x 40.0% Voids |
| #2 | 386.91' | 233 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 932 cf Overall x 25.0% Voids |
| #3 | 387.24' | 45 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 452 cf Overall x 10.0% Voids |
| | | 843 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.41 | 2,824 | 0 | 0 |
| 386.91 | 2,824 | 1,412 | 1,412 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.91 | 2,824 | 0 | 0 |
| 387.24 | 2,824 | 932 | 932 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 387.24 | 2,824 | 0 | 0 |
| 387.40 | 2,824 | 452 | 452 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Discarded | 386.41' | 1.020 in/hr Exfiltration over Horizontal area |
| #2 | Primary | 387.35' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 25 YR STORM Rainfall=5.50"

Printed 3/30/2024

Page 35

Discarded OutFlow Max=0.07 cfs @ 11.70 hrs HW=386.42' (Free Discharge)

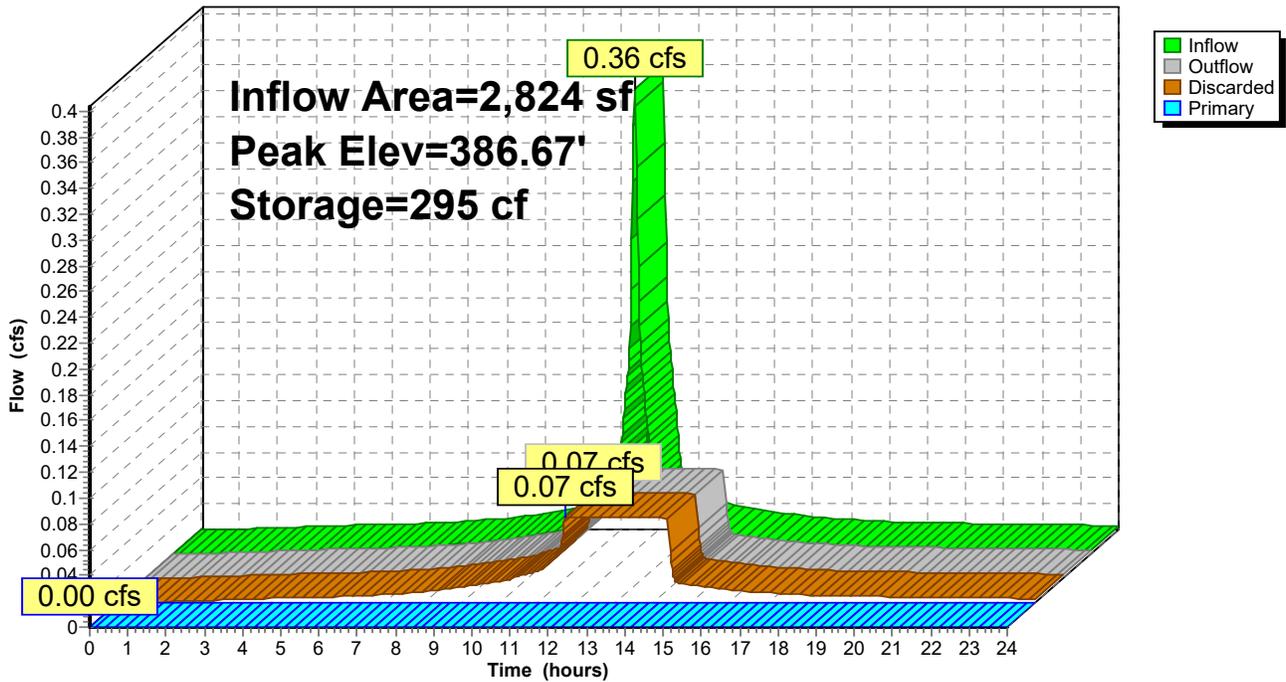
↑1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=386.41' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP': Permeable Pavers

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 36

Summary for Subcatchment DC: ROOF & OPEN PARKING

Runoff = 4.42 cfs @ 12.07 hrs, Volume= 15,280 cf, Depth> 6.76"
Routed to Pond DC' : DETENTION CHAMBERS

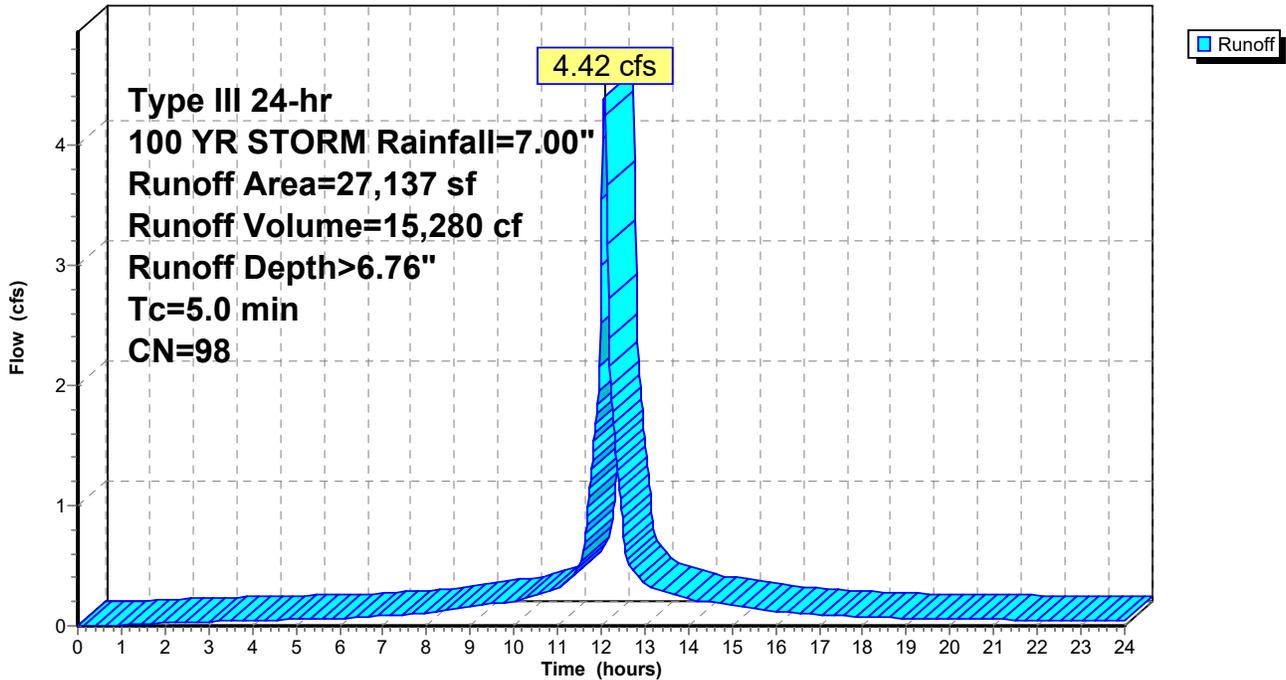
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR STORM Rainfall=7.00"

| | Area (sf) | CN | Description |
|---|-----------|----|-------------------------|
| * | 23,465 | 98 | ROOF AREA |
| * | 3,672 | 98 | OPEN PARKING |
| | 27,137 | 98 | Weighted Average |
| | 27,137 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment DC: ROOF & OPEN PARKING

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 37

Summary for Subcatchment P: POOL

Runoff = 0.03 cfs @ 12.07 hrs, Volume= 113 cf, Depth> 6.76"
Routed to Pond P' : POOL

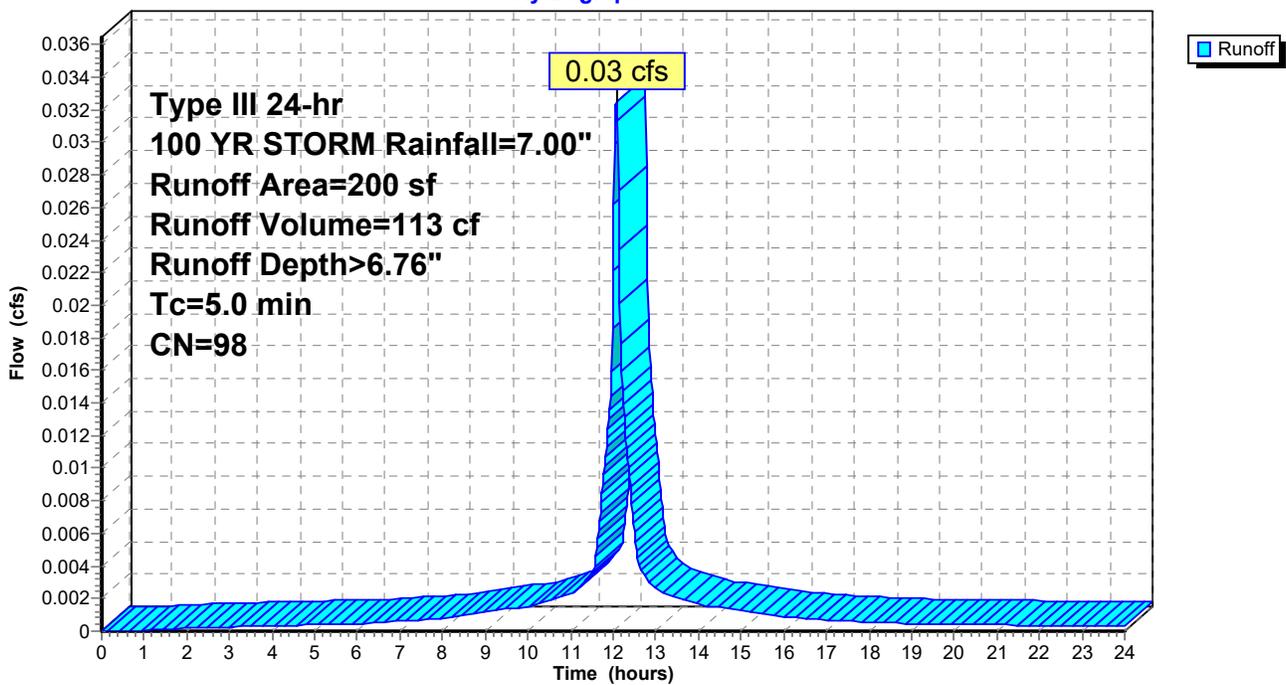
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR STORM Rainfall=7.00"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 200 | 98 | Pool |
| 200 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment P: POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 38

Summary for Subcatchment PP: PERMEABLE PAVERS

Runoff = 0.46 cfs @ 12.07 hrs, Volume= 1,590 cf, Depth> 6.76"
Routed to Pond PP' : Permeable Pavers

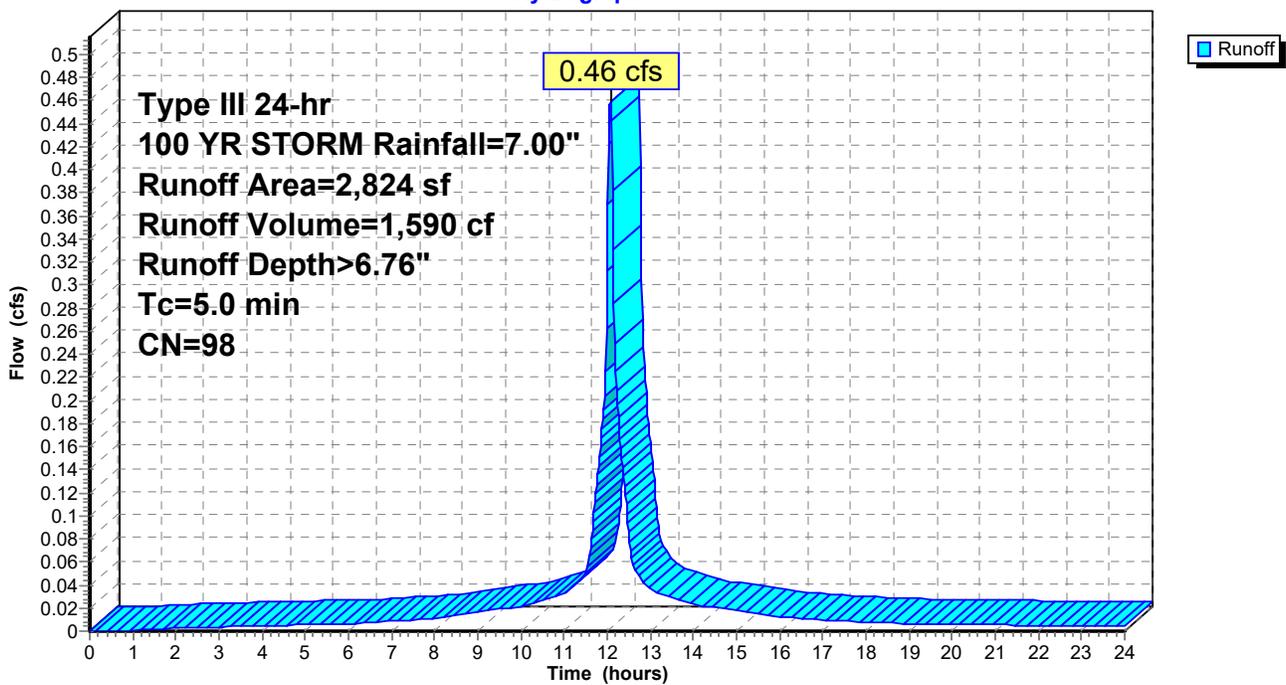
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100 YR STORM Rainfall=7.00"

| Area (sf) | CN | Description |
|-----------|----|-------------------------|
| * 2,824 | 98 | Permeable Pavers |
| 2,824 | | 100.00% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment PP: PERMEABLE PAVERS

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 39

Summary for Subcatchment S: SITE AREA

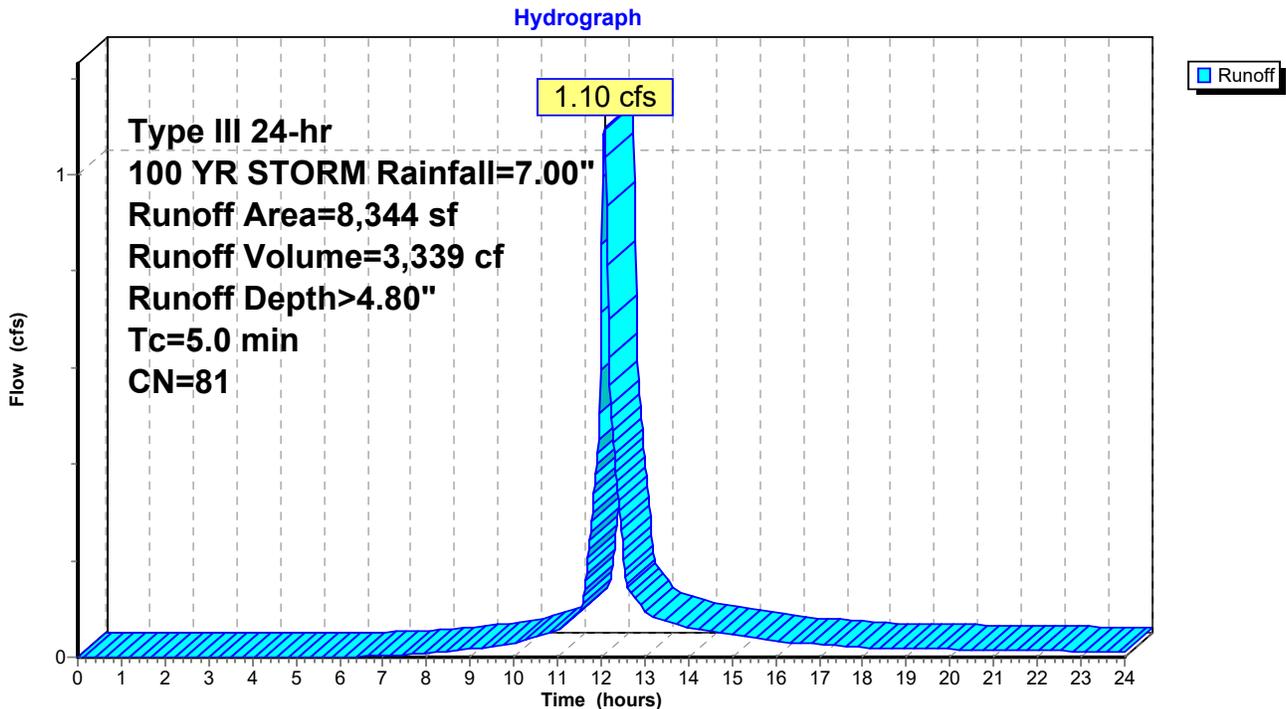
Runoff = 1.10 cfs @ 12.07 hrs, Volume= 3,339 cf, Depth> 4.80"
 Routed to Reach T : TOTAL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Type III 24-hr 100 YR STORM Rainfall=7.00"

| | Area (sf) | CN | Description |
|---|-----------|----|---|
| * | 2,410 | 98 | Impervious |
| * | 5,934 | 74 | >75% Grass & Planted Areas, Good, HSG C |
| | 8,344 | 81 | Weighted Average |
| | 5,934 | | 71.12% Pervious Area |
| | 2,410 | | 28.88% Impervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description |
|----------|---------------|---------------|-------------------|----------------|---------------|
| 5.0 | | | | | Direct Entry, |

Subcatchment S: SITE AREA



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 40

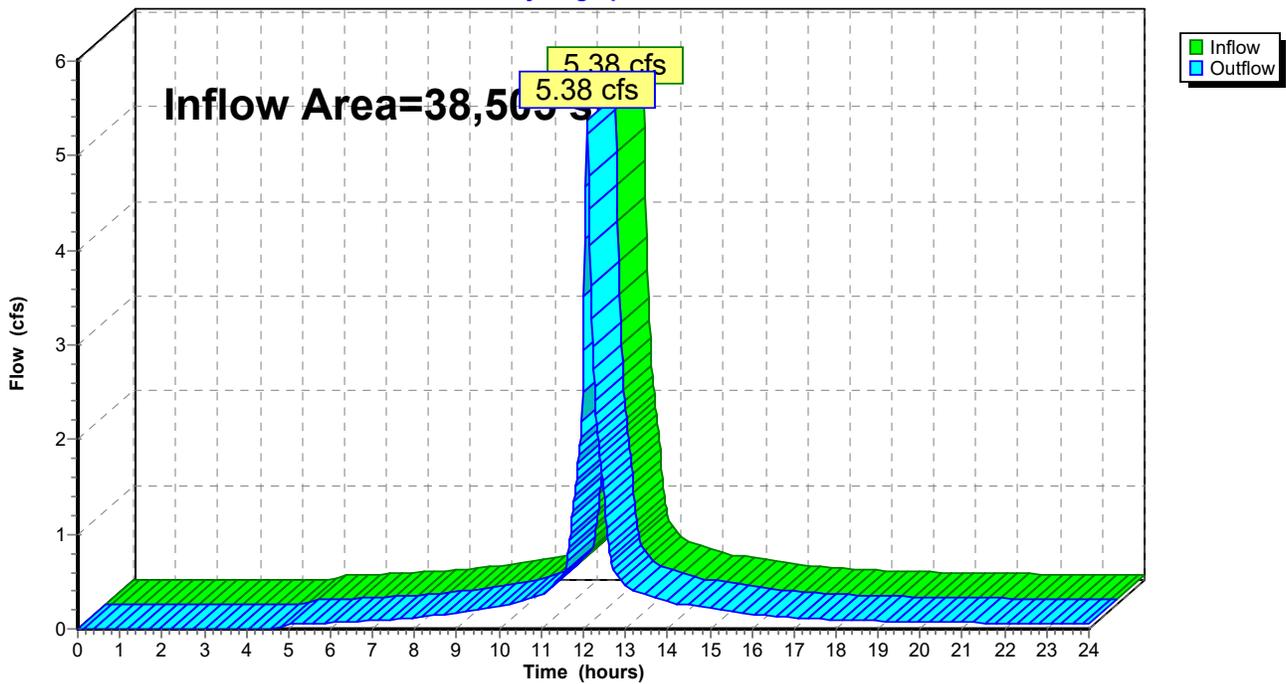
Summary for Reach T: TOTAL

Inflow Area = 38,505 sf, 84.59% Impervious, Inflow Depth > 5.66" for 100 YR STORM event
Inflow = 5.38 cfs @ 12.09 hrs, Volume= 18,156 cf
Outflow = 5.38 cfs @ 12.09 hrs, Volume= 18,156 cf, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs

Reach T: TOTAL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 41

Summary for Pond DC': DETENTION CHAMBERS

Inflow Area = 27,137 sf, 100.00% Impervious, Inflow Depth > 6.76" for 100 YR STORM event
 Inflow = 4.42 cfs @ 12.07 hrs, Volume= 15,280 cf
 Outflow = 4.30 cfs @ 12.09 hrs, Volume= 14,815 cf, Atten= 3%, Lag= 1.1 min
 Primary = 4.30 cfs @ 12.09 hrs, Volume= 14,815 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs / 4
 Peak Elev= 385.36' @ 12.09 hrs Surf.Area= 360 sf Storage= 1,149 cf

Plug-Flow detention time= 37.6 min calculated for 14,802 cf (97% of inflow)
 Center-of-Mass det. time= 18.8 min (760.4 - 741.6)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 382.40' | 1,503 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| #2 | 382.12' | 77 cf | 12.0" Round Pipe Storage L= 98.0' S= 0.0100 '/' |
| #3 | 381.60' | 6 cf | 12.0" Round Pipe Storage L= 8.0' |
| #4 | 382.17' | 58 cf | 4.00'D x 4.60'H Vertical Cone/Cylinder |
| | | 1,644 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 382.40 | 347 | 0 | 0 |
| 386.73 | 347 | 1,503 | 1,503 |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 381.76' | 15.0" Round Culvert L= 8.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 381.76' / 381.60' S= 0.0200 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #2 | Device 1 | 382.10' | 15.0" Round Culvert L= 7.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 382.10' / 382.00' S= 0.0143 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf |
| #3 | Device 2 | 382.30' | 8.0" Vert. Orifice/Grate C= 0.600 Limited to weir flow at low heads |
| #4 | Device 2 | 384.40' | 0.7' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.0' Crest Height |
| #5 | Device 2 | 385.30' | 11.3' long Sharp-Crested Rectangular Weir 2 End Contraction(s) 4.9' Crest Height |

Primary OutFlow Max=4.17 cfs @ 12.09 hrs HW=385.34' TW=383.50' (Fixed TW Elev= 383.50')

- 1=Culvert (Passes 4.17 cfs of 8.02 cfs potential flow)
- 2=Culvert (Passes 4.17 cfs of 8.02 cfs potential flow)
- 3=Orifice/Grate (Orifice Controls 2.28 cfs @ 6.53 fps)
- 4=Sharp-Crested Rectangular Weir (Weir Controls 1.57 cfs @ 3.26 fps)
- 5=Sharp-Crested Rectangular Weir (Weir Controls 0.32 cfs @ 0.67 fps)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

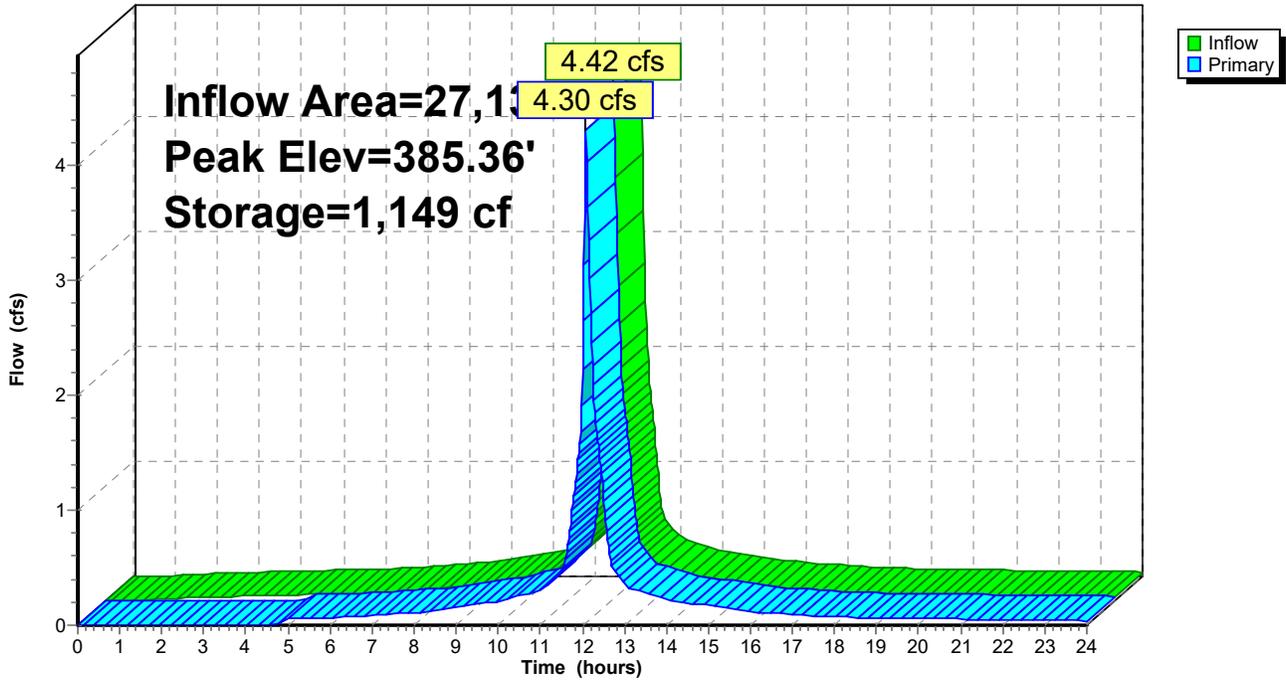
Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 42

Pond DC': DETENTION CHAMBERS

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 43

Summary for Pond P': POOL

Inflow Area = 200 sf, 100.00% Impervious, Inflow Depth > 6.76" for 100 YR STORM event
 Inflow = 0.03 cfs @ 12.07 hrs, Volume= 113 cf
 Outflow = 0.00 cfs @ 21.89 hrs, Volume= 3 cf, Atten= 99%, Lag= 589.1 min
 Primary = 0.00 cfs @ 21.89 hrs, Volume= 3 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 388.45' @ 21.89 hrs Surf.Area= 200 sf Storage= 110 cf

Plug-Flow detention time= 1,195.7 min calculated for 3 cf (2% of inflow)
 Center-of-Mass det. time= 628.6 min (1,370.2 - 741.6)

| Volume | Invert | Avail.Storage | Storage Description |
|---------------------|----------------------|---------------------------|--|
| #1 | 387.90' | 120 cf | Custom Stage Data (Prismatic) Listed below (Recalc) |
| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
| 387.90 | 200 | 0 | 0 |
| 388.50 | 200 | 120 | 120 |

| Device | Routing | Invert | Outlet Devices |
|--------|---------|---------|---|
| #1 | Primary | 388.45' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Primary OutFlow Max=0.00 cfs @ 21.89 hrs HW=388.45' (Free Discharge)
 ↑1=Broad-Crested Rectangular Weir (Weir Controls 0.00 cfs @ 0.03 fps)

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

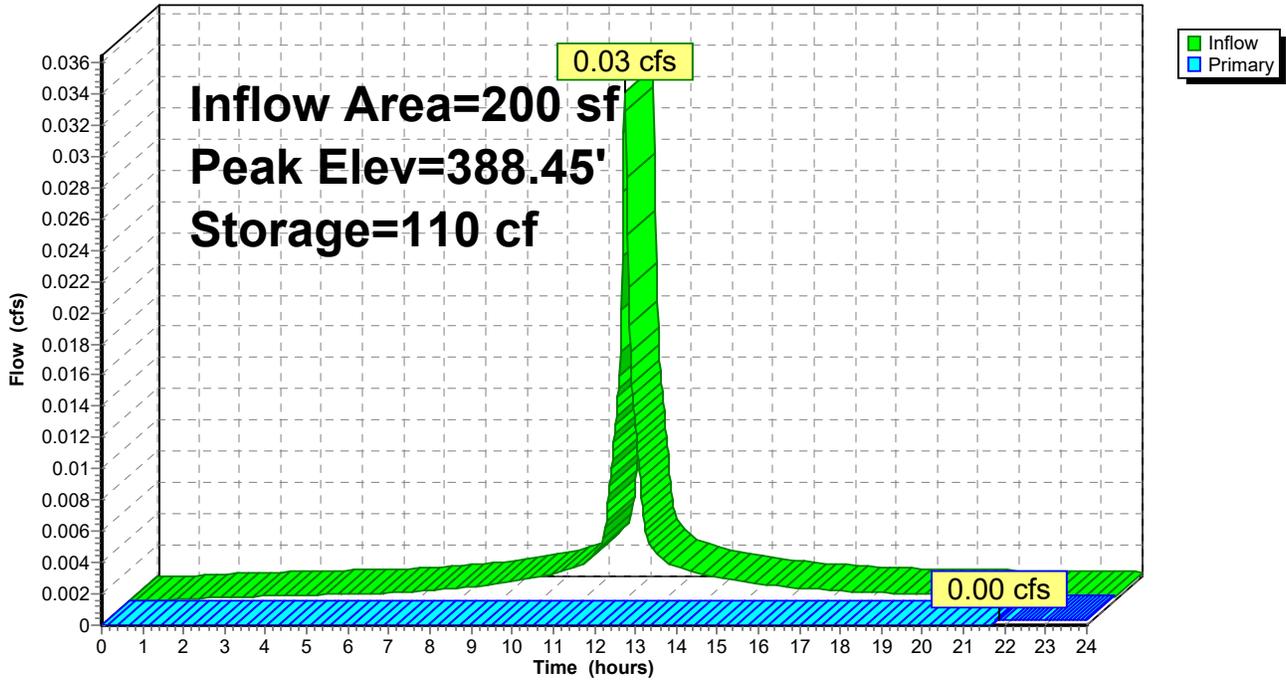
Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 44

Pond P': POOL

Hydrograph



Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 45

Summary for Pond PP': Permeable Pavers

Inflow Area = 2,824 sf, 100.00% Impervious, Inflow Depth > 6.76" for 100 YR STORM event
 Inflow = 0.46 cfs @ 12.07 hrs, Volume= 1,590 cf
 Outflow = 0.07 cfs @ 11.66 hrs, Volume= 1,589 cf, Atten= 85%, Lag= 0.0 min
 Discarded = 0.07 cfs @ 11.66 hrs, Volume= 1,589 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Routed to Reach T : TOTAL

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.02 hrs
 Peak Elev= 386.79' @ 12.55 hrs Surf.Area= 2,824 sf Storage= 433 cf

Plug-Flow detention time= 36.8 min calculated for 1,589 cf (100% of inflow)
 Center-of-Mass det. time= 36.5 min (778.1 - 741.6)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 386.41' | 565 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 1,412 cf Overall x 40.0% Voids |
| #2 | 386.91' | 233 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 932 cf Overall x 25.0% Voids |
| #3 | 387.24' | 45 cf | Custom Stage Data (Prismatic) Listed below (Recalc) 452 cf Overall x 10.0% Voids |
| | | 843 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.41 | 2,824 | 0 | 0 |
| 386.91 | 2,824 | 1,412 | 1,412 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 386.91 | 2,824 | 0 | 0 |
| 387.24 | 2,824 | 932 | 932 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|------------------|-------------------|------------------------|------------------------|
| 387.24 | 2,824 | 0 | 0 |
| 387.40 | 2,824 | 452 | 452 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Discarded | 386.41' | 1.020 in/hr Exfiltration over Horizontal area |
| #2 | Primary | 387.35' | 20.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88 |

Proposed Conditions-2916

Prepared by Bruce Saluk & Associates

HydroCAD® 10.20-2g s/n 02049 © 2022 HydroCAD Software Solutions LLC

57 Main Street, Marlborough

Type III 24-hr 100 YR STORM Rainfall=7.00"

Printed 3/30/2024

Page 46

Discarded OutFlow Max=0.07 cfs @ 11.66 hrs HW=386.42' (Free Discharge)

↑1=Exfiltration (Exfiltration Controls 0.07 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=386.41' (Free Discharge)

↑2=Broad-Crested Rectangular Weir (Controls 0.00 cfs)

Pond PP': Permeable Pavers

Hydrograph

