STORMWATER REPORT

for

SINGLE-FAMILY DWELLING

33 Ripley Street
Worcester, MA 01610

Prepared for:
Habitat for Humanity
640 Lincoln Street
Worcester, MA 01605

Date:
November 27, 2024

Prepared By:

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Electronically stamped by
Michael Andrade, P.E: 11/27/24

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NARRATIVE

Project Description

Site Location: 33 Ripley Street, Worcester, MA 01610

Development Type: Single-Family Detached Dwelling

Project Summary:

The proposed project consists of the construction of one single-family detached dwelling with a paved driveway on a vacant vegetated lot. A subsurface infiltration system with overflow will be constructed for the proposed dwelling.

Existing Site Conditions

Location: The project site is located at 33 Ripley Street in Worcester, MA.

Ground Cover: The ground cover in the project area is pervious surfaces (lights woods, brush, and grass).

Slopes: The project area slopes in a southeasterly direction with runoff flowing overland to the existing municipal drainage system in Beacon Street.

Soil Types: Site soil types as mapped by the USDA-NRCS are “Urban Land” meaning the site has been disturbed and is excavated, filled or consists of developed and impervious surfaces. These soils can be classified as hydrologic soil group (HSG) “C”. Refer to Appendix A for more detailed USDA-NRCS soil information and to the site plans for the onsite soil testing log.

STORMWATER MANAGEMENT

The project consists of the construction of one single-family detached dwelling. There are no discharges to a critical area and although the project results in a net increase in impervious surfaces, per the MassDEP Stormwater Management Policy, compliance with Stormwater Standards is not required nor are hydrology calculations required.

Single-family residential driveways are not considered to generate total suspended solids and roof runoff is considered clean, thus no water quality best management practices are required nor proposed. Nevertheless, a Long-Term Drainage System Operation & Maintenance Plan (Appendix B) has been prepared.

Recharge to groundwater will be provided by the proposed subsurface infiltration system (sized to attenuate runoff for the 2-year rainfall event) for the dwelling which will capture runoff from the entire roof area. The proposed system will have an overflow outlet connected to the municipal drainage system when encountering larger rainfall events. The sizing calculations are as follows:

Roof area = 896 ft²

Based on the 2-year rainfall event, the volume of runoff generated from the roof area is 0.005 acre-foot.

Volume = 0.005 acre-foot x (43,560 ft² /acre) = 218 cubic feet

The proposed subsurface infiltration system provides a volume of 220 cubic feet (see HydroCAD calculations following this Narrative).

Based upon an exfiltration rate of 1.02 in./hr. (Rawls rate for sandy loam witnessed during soil testing; log provided in the site plans), the drawdown time is calculated as follows:

$Time_{drawdown} = R_v / (K \times Bottom\ Area)$ where, R_v= recharge BMP storage volume
K= Saturated Hydraulic Conductivity (Rawls) Rate

Subsurface Infiltration System
$Time_{drawdown}$ = 220 ft³ / (0.27 in./hr./12" x 121 ft²) = 21.4 hours < 72 hours

Summary for Subcatchment 1: Roof Area

Runoff = 0.06 cfs @ 12.13 hrs, Volume= 0.005 af, Depth> 2.92"
Routed to Pond 1P : UG Roof Infiltration

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
NRCC 24-hr D 2 year Rainfall=3.16"

Area (sf)	CN	Description
896	98	Roofs, HSG A
896		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	40		0.11		**Direct Entry, Tc**

Volume = 0.005 acre-foot

1 acre = 43,560 square feet

0.005 x 43,560 = 217.8 cubic feet (minimum)

Summary for Pond 1P: UG Roof Infiltration

Inflow Area = 0.021 ac,100.00% Impervious, Inflow Depth > 2.92" for 2 year event
Inflow = 0.06 cfs @ 12.13 hrs, Volume= 0.005 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 3.45' @ 24.00 hrs Surf.Area= 118 sf Storage= 218 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
#1A	0.00'	129 cf	**11.00'W x 10.74'L x 3.50'H Field A** 413 cf Overall - 92 cf Embedded = 321 cf x 40.0% Voids
#2A	0.50'	92 cf	**ADS_StormTech SC-740 +Cap** x 2 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 2 Chambers in 2 Rows
		220 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Pond 1P: UG Roof Infiltration - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

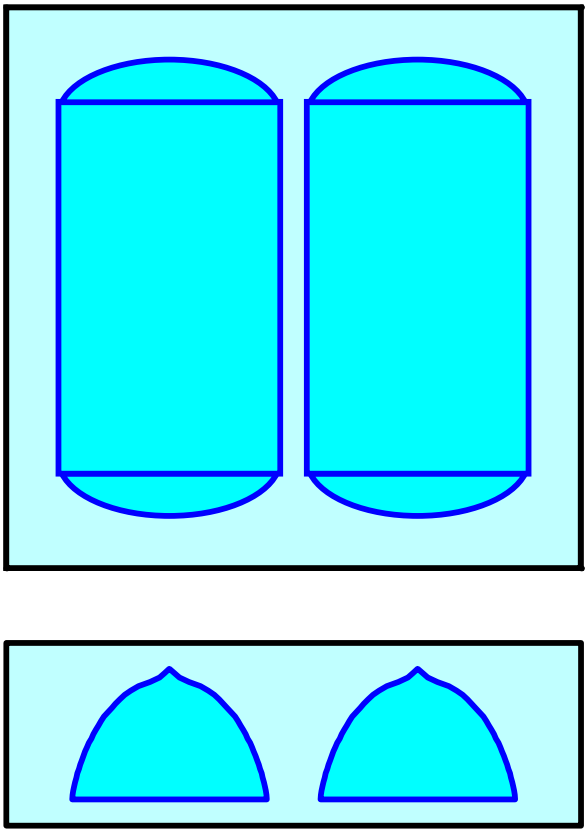
1 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 8.74' Row Length +12.0" End Stone x 2 = 10.74' Base Length
2 Rows x 51.0" Wide + 6.0" Spacing x 1 + 12.0" Side Stone x 2 = 11.00' Base Width
6.0" Stone Base + 30.0" Chamber Height + 6.0" Stone Cover = 3.50' Field Height

2 Chambers x 45.9 cf = 91.9 cf Chamber Storage

413.4 cf Field - 91.9 cf Chambers = 321.5 cf Stone x 40.0% Voids = 128.6 cf Stone Storage

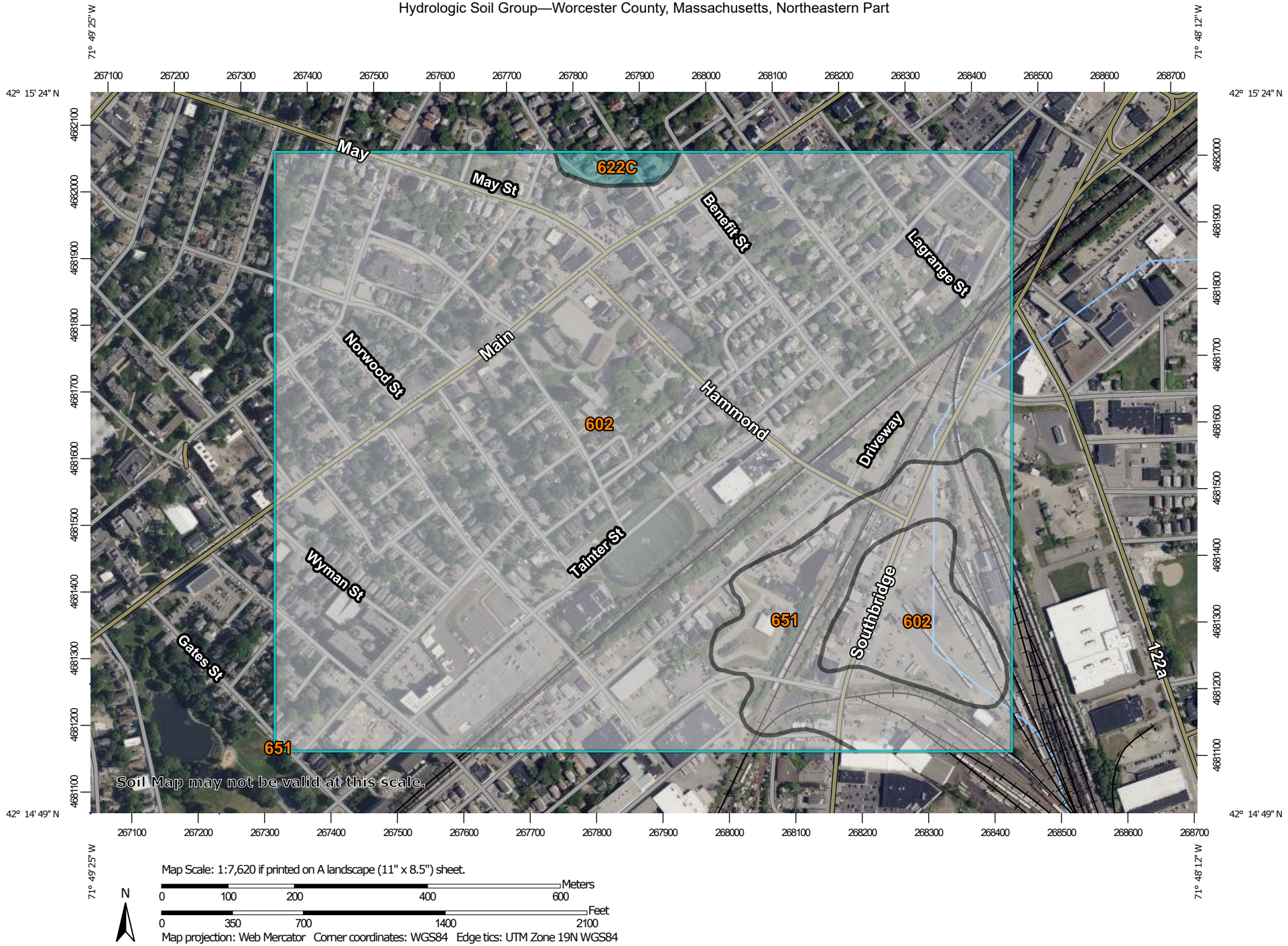
Chamber Storage + Stone Storage = 220.5 cf = 0.005 af
Overall Storage Efficiency = 53.3%
Overall System Size = 10.74' x 11.00' x 3.50'

2 Chambers
15.3 cy Field
11.9 cy Stone



APPENDIX A

USDA-NRCS SITE SOILS MAP



Map Scale: 1:7,620 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Worcester County, Massachusetts, Northeastern Part
Survey Area Data: Version 19, Aug 27, 2024

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
602	Urban land		219.7	88.7%
622C	Paxton-Urban land complex, 8 to 15 percent slopes	C	1.9	0.8%
651	Udorthents, smoothed		26.1	10.5%
Totals for Area of Interest			**247.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX B

LONG-TERM DRAINAGE SYSTEM OPERATION & MAINTENANCE PLAN

Single-Family Dwelling
33 Ripley Street, Worcester, MA 01610

LONG-TERM DRAINAGE SYSTEM OPERATION & MAINTENANCE PLAN

System

The drainage system associated with the subject parcel is a closed drainage system consisting of a subsurface infiltration system that collects roof runoff from the new dwelling.

Responsible Parties

The drainage system located on the subject parcel will be operated and maintained by the respective property owner. Drainage system maintenance tasks shall include routine cleaning of the overall system and specific duties as listed below.

Operation and Maintenance Duties

The following duties shall be considered the minimum required and may be supplemented by additional measures as necessary to maintain the function of the drainage system.

General:
The property should be maintained on a routine basis to ensure sediment and debris does not enter the roadway drainage system. Yard clippings and trimmings should be properly disposed of in a timely manner. All sediments containing hydrocarbons shall be handled properly and disposed of in accordance with local, state, and federal guidelines and regulations.

Roof Drains:
Roof drains and gutters are to be inspected annually for sediment and debris and cleaned as necessary to avoid accumulation in the subsurface infiltration system.

Subsurface Infiltration System:
There is no routine maintenance for a subsurface infiltration system therefore an aggressive inspection and maintenance schedule of all upstream BMPs must be maintained to prolong its operational life. Utilizing the inspection ports, the system shall be inspected after the first several rain events upon installation. A log shall be kept noting the date and time of the inspection and the level of standing water or sediment (if any) observed within each port. The system must be inspected at least every 6 months or after every rainfall event exceeding the 2-year storm frequency (3 inches within 24 hours). The owner should follow the recommendations of the manufacturer.

The subsurface infiltration system is designed to fully drain after a storm event therefore if standing water is observed within the system beyond 24 hours since the cessation of inflow to the system from a rainstorm, this may indicate a problem and should be noted on the inspection log and further inspected for repairs. Additionally, should the owner notice continued and repeated discharge of stormwater from the overflow, it may also indicate failure of the system. The Owner may need to contact a Registered Professional Engineer to evaluate the system in the event of major problems.

Annual Budget

For the homeowner, an annual budget for the operation and maintenance tasks described above is estimated at $500.00 (unless services of a “qualified professional” are needed).

O&M LOG

PROJECT: Single-Family Dwelling
ADDRESS: 33 Ripley Street, Worcester, MA 01610

					ACTION		
LOG #	BY	DATE	BMP FEATURE	OBSERVATIONS	CORRECTIVE ACTION TAKEN (IF NEEDED)	DATE	NOTES

SINGLE-FAMILY DWELLING

33 RIPLEY STREET

WORCESTER, MA 01610

GEI Project No.: 24133

SHEET INDEX

No.	Title	Issue Date
C001	Cover Sheet	November 27, 2024
C101	Site Demo & Sediment and Erosion Control Plan	November 27, 2024
C102	Layout Plan	November 27, 2024
C103	Grading & Drainage Plan	November 27, 2024
C104	Utilities Plan	November 27, 2024
C501	Site Details - 1	November 27, 2024
C502	Site Details - 2	November 27, 2024

REFERENCE PLAN INDEX

No.	Title	Issue Date
E1	Existing Conditions Plan (B&R Survey, Inc.)	October 10, 2024
-	Construction Drawings (KMA, LLC)	January 16, 2024

REVISIONS/ISSUES

No.	Note	Date
1	Issued for Permitting	November 27, 2024

LOCUS PLAN - AERIAL

SCALE: 1"=1,000'

SOURCE: GOOGLE EARTH

N

LOCUS PLAN - GIS

SCALE: 1"=1,000'

SOURCE: MASSGIS

N

OWNER/APPLICANT

Habitat for Humanity

640 Lincoln Street

Worcester, MA 01605

SURVEYOR

B&R Survey, Inc.

100 Grove Street

Worcester, MA 01605

ARCHITECT

KMA, LLC

1 Bridge Street

Newton, MA 02458

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COMMONWEALTH OF MASSACHUSETTS
MICHAEL R. ANDRADE
CIVIL
No. 45686
REGISTERED PROFESSIONAL ENGINEER

ELECTRONICALLY STAMPED BY MICHAEL ANDRADE, P.E.

GENERAL NOTES

PARCEL DATA:
STREET ADDRESS: 33 RIPLEY STREET, WORCESTER, MA 01610

AREA: ±5,769 SQ. FT. (0.132 ACRES)

OWNER: HABITAT FOR HUMANITY METROWEST/GREATER WORCESTER, INC.
640 LINCOLN STREET
WORCESTER, MA 01605 ZONE: RG-5 (RESIDENCE, GENERAL)

NOTES:
1) THIS PLAN WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND IS SUBJECT TO ANY FINDINGS SUCH A REPORT MIGHT DISCLOSE.

2) LOCATION OF UNDERGROUND UTILITIES SHOWN HEREON ARE APPROXIMATE AND ARE BASED ON THE FIELD LOCATION OF VISIBLE STRUCTURES SUCH AS CATCH BASINS, MANHOLES, WATER GATES, ETC. IN ACCORDANCE WITH CHAPTER 82 SECTION 40 INCLUDING AMENDMENTS, ALL CONTRACTORS SHOULD NOTIFY IN WRITING ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO ANY EXCAVATION WORK AND CALL DIG-SAFE AT 811. THE CITY OF WORCESTER SHALL ALSO BE CONTACTED FOR UTILITY MARKOUTS.

3) PROPERTY LINE DATA AND TOPOGRAPHIC FEATURES ON THIS PLAN ARE BASED ON A PLAN PREPARED BY B&R SURVEY, INC., DATED OCTOBER 10, 2024.

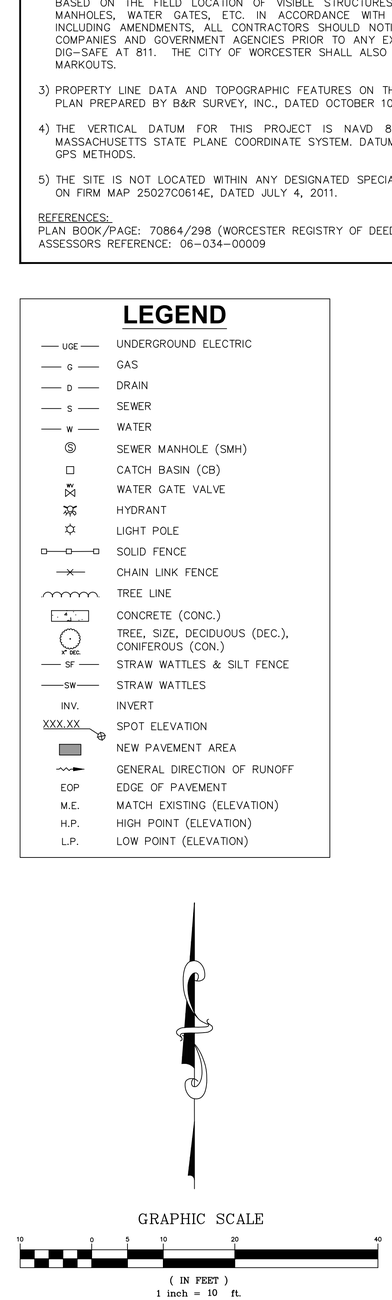
4) THE VERTICAL DATUM FOR THIS PROJECT IS NAVD 88; HORIZONTAL DATUM IS MASSACHUSETTS STATE PLANE COORDINATE SYSTEM. DATUMS ARE AS ESTABLISHED BY GPS METHODS.

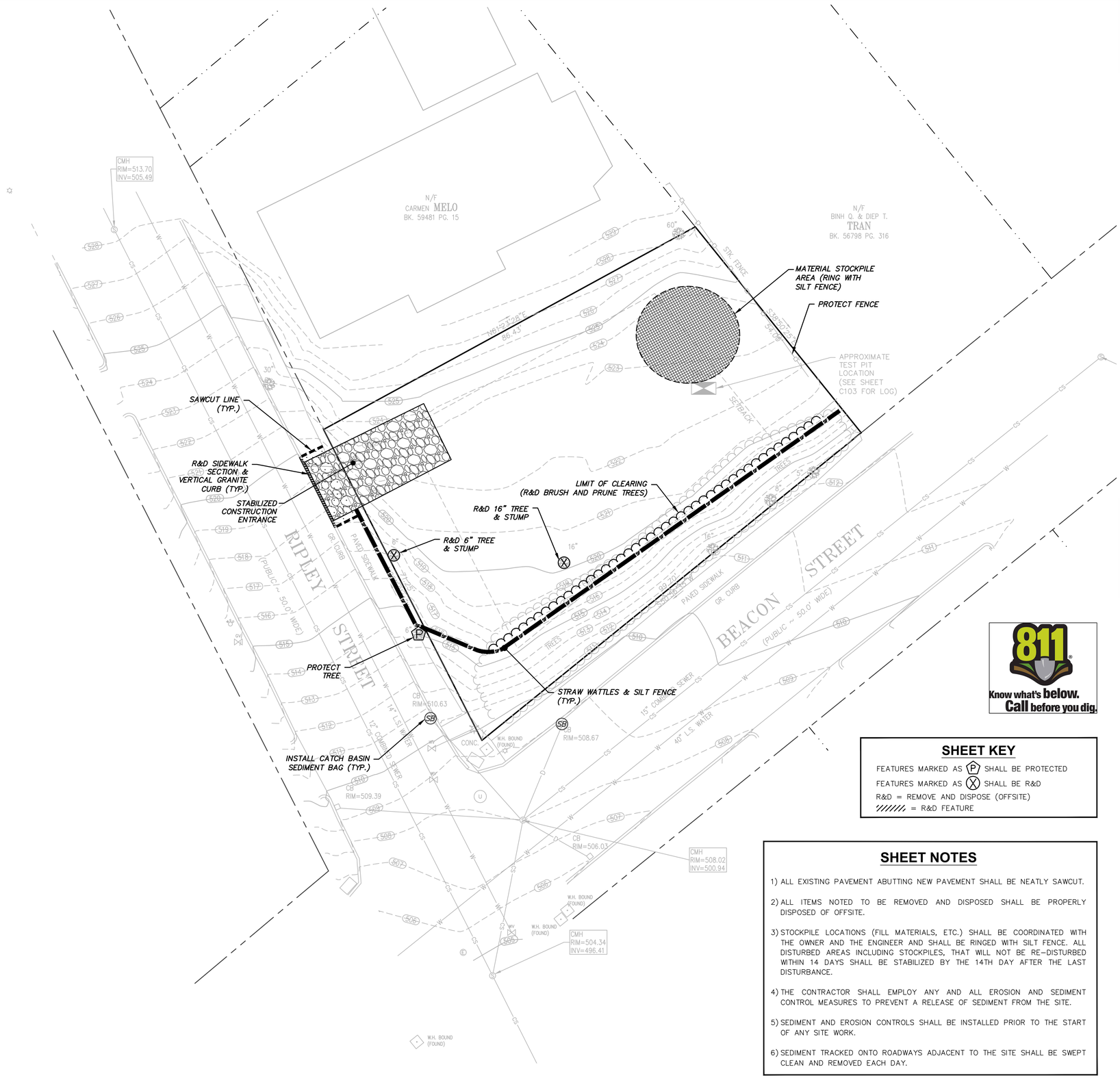
5) THE SITE IS NOT LOCATED WITHIN ANY DESIGNATED SPECIAL FLOOD ZONES AS SHOWN ON FIRM MAP 25027C0614E, DATED JULY 4, 2011.

REFERENCES:
PLAN BOOK/PAGE: 70864/298 (WORCESTER REGISTRY OF DEEDS)
ASSESSORS REFERENCE: 06-034-00009

LEGEND

- UGE — UNDERGROUND ELECTRIC
- G — GAS
- D — DRAIN
- S — SEWER
- W — WATER
- SEWER MANHOLE (SMH)
- CATCH BASIN (CB)
- WATER GATE VALVE
- HYDRANT
- LIGHT POLE
- SOLID FENCE
- CHAIN LINK FENCE
- TREE LINE
- CONCRETE (CONC.)
- TREE, SIZE, DECIDUOUS (DEC.), CONIFEROUS (CON.)
- SF — STRAW WATTLES & SILT FENCE
- SW — STRAW WATTLES
- INV. INVERT
- XXX.XX SPOT ELEVATION
- NEW PAVEMENT AREA
- GENERAL DIRECTION OF RUNOFF
- EOP EDGE OF PAVEMENT
- M.E. MATCH EXISTING (ELEVATION)
- H.P. HIGH POINT (ELEVATION)
- L.P. LOW POINT (ELEVATION)





SHEET KEY

FEATURES MARKED AS (P) SHALL BE PROTECTED
FEATURES MARKED AS (X) SHALL BE R&D
R&D = REMOVE AND DISPOSE (OFFSITE)
//////// = R&D FEATURE

SHEET NOTES

1) ALL EXISTING PAVEMENT ABUTTING NEW PAVEMENT SHALL BE NEATLY SAWCUT.

2) ALL ITEMS NOTED TO BE REMOVED AND DISPOSED SHALL BE PROPERLY DISPOSED OF OFFSITE.

3) STOCKPILE LOCATIONS (FILL MATERIALS, ETC.) SHALL BE COORDINATED WITH THE OWNER AND THE ENGINEER AND SHALL BE RINGED WITH SILT FENCE. ALL DISTURBED AREAS INCLUDING STOCKPILES, THAT WILL NOT BE RE-DISTURBED WITHIN 14 DAYS SHALL BE STABILIZED BY THE 14TH DAY AFTER THE LAST DISTURBANCE.

4) THE CONTRACTOR SHALL EMPLOY ANY AND ALL EROSION AND SEDIMENT CONTROL MEASURES TO PREVENT A RELEASE OF SEDIMENT FROM THE SITE.

5) SEDIMENT AND EROSION CONTROLS SHALL BE INSTALLED PRIOR TO THE START OF ANY SITE WORK.

6) SEDIMENT TRACKED ONTO ROADWAYS ADJACENT TO THE SITE SHALL BE SWEPT CLEAN AND REMOVED EACH DAY.

811 Know what's below. Call before you dig.

GRAVES ENGINEERING, Inc.
100 GROVE STREET | WORCESTER MA 01605
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NO.	DATE	BY	DESCRIPTION
1	11/27/24	ROM	ISSUED FOR PERMITTING

REVISIONS

COMMONWEALTH OF MASSACHUSETTS — MICHAEL R. ANDRADE — No. 45648 — REGISTERED PROFESSIONAL ENGINEER

CERTIFIED, SIGNED & STAMPED BY: MICHAEL R. ANDRADE, P.E.

SITE DEMO & SEDIMENT AND EROSION CONTROL PLAN

SINGLE-FAMILY DWELLING
33 RIPLEY STREET, WORCESTER, MA 01610

PREPARED FOR:
HABITAT FOR HUMANITY
640 LINCOLN STREET, WORCESTER, MA 01605

PRJ. NO.: 24133	CHK. BY: MRA	DRW. BY: ROM	DES. BY: ROM	SCALE: 1"=10'	DATE: 11/27/24

C101

PROJECT ZONING INFORMATION

CRITERIA	REQUIRED	EXISTING	PROPOSED
ZONING DISTRICT	RG-5	RG-5	RG-5
MINIMUM LOT AREA	5,000 SQ. FT.	5,769 SQ. FT. (0.132 ACRES)	5,769 SQ. FT. (0.132 ACRES)
MINIMUM FRONTAGE	50 FT.	71.25 FT.	71.25 FT.
FRONT SETBACK	15 FT.	N/A	25.5 FT.
SIDE SETBACK (PER ZONE)	8 FT.	N/A	17.6 FT.
SIDE SETBACK (CORNER LOT)	10 FT.	N/A	15.6 FT.
REAR SETBACK	15 FT.	N/A	33.7 FT.
MAXIMUM BLDG. STORIES	2+	N/A	2+
MAXIMUM BLDG. HEIGHT	35 FT.	N/A	29.0 FT.
MAXIMUM F.A.R.	N/A	N/A	N/A
LANDSCAPE PARKING BUFFER	3 FT.	N/A	>3 FT.
FRONT YARD IMPERVIOUS	50% MAX.	N/A	24.4%

ZONING INFORMATION SOURCE: THE ABOVE INFORMATION WAS OBTAINED FROM THE CITY OF WORCESTER ZONING ORDINANCE, ORDAINED IN CITY COUNCIL APRIL 2, 1991, AMENDED THROUGH MAY 9, 2023.

SHEET NOTES

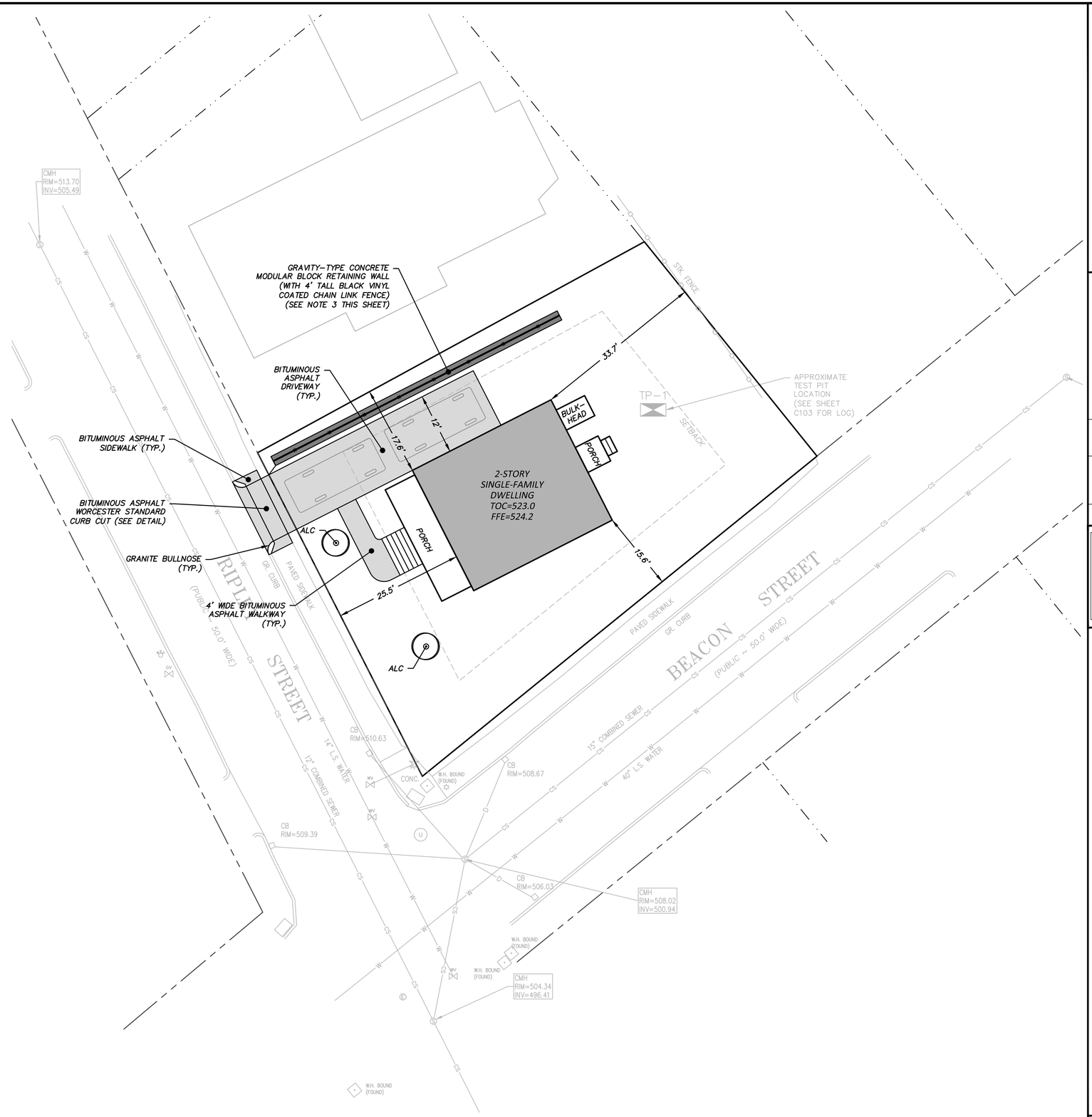
1) PROPOSED WALKWAYS AND DRIVEWAYS SHALL MEET FLUSH WITH FINISH GRADES OF EXISTING AND PROPOSED BIT. WALKS, CONCRETE PADS, ETC.

2) ALL JOINTS OF EXISTING & PROPOSED BITUMINOUS PAVEMENT SHALL BE SEALED WITH HOT RUBBERIZED ASPHALT JOINT SEALANT AND SANDED.

3) THE PROPOSED BLOCK RETAINING WALL SHOWN IS A DEFERRED DESIGN ITEM AS IT MAY REQUIRE A BUILDING PERMIT AND DESIGN BY A STRUCTURAL ENGINEER. IF SO REQUIRED, A COPY OF THE STAMPED RETAINING WALL DESIGN PLAN(S) SHALL BE PROVIDED TO THE WORCESTER DIVISION OF PLANNING & REGULATORY SERVICES OFFICE PRIOR TO OR AT THE SAME TIME AS SUBMITTAL OF THE BUILDING PERMIT APPLICATION. RETAINING WALL LOCATIONS, HEIGHTS, AND CONSTRUCTION MATERIALS SHALL REMAIN AS SHOWN ON THESE PLANS. RETAINING WALL DRAINS SHALL DAYLIGHT TO A POSITIVE OUTFALL OR CONNECT TO THE PROPOSED DRAINAGE SYSTEM.

PLANTING LIST

CODE	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	NOTES
TREES					
ALC	2	AMELANCHIER LAEVIS "CUMULUS"	CUMULUS ALLEGHANY SERVICEBERRY	3'-4' HT.	PLANT WHERE SHOWN



GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

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NO.	DATE	BY	DESCRIPTION
1	11/27/24	MRA	ISSUED FOR PERMITTING

REVISIONS

COMMONWEALTH OF MASSACHUSETTS MICHAEL R. ANDROSE 49548 REGISTERED PROFESSIONAL ENGINEER

CERTIFIED & STAMPED BY: MICHAEL ANDROSE, P.E.

LAYOUT PLAN
SINGLE-FAMILY DWELLING
33 RIPLEY STREET, WORCESTER, MA 01610

PREPARED FOR:
HABITAT FOR HUMANITY
640 LINCOLN STREET, WORCESTER, MA 01605

DATE: 11/27/24 | SCALE: 1"=10' | DES. BY: ROM | DRW. BY: ROM | CHK. BY: MRA | PRJ. NO.: 24133

C102

SHEET NOTES

1) ADJUST ALL STRUCTURES (MANHOLES, WATER GATE VALVES, SHUTOFFS, ETC.) TO PROPOSED FINISH GRADES WITHIN THE LIMIT OF WORK.

2) ALL DISTURBED AREAS OUTSIDE OF PAVEMENT SHALL BE RESTORED WITH 6 INCHES OF SCREENED LOAM AND SEEDED OR OTHERWISE LANDSCAPED.

3) ALL FINISHED GRASSED SLOPES EQUAL TO OR STEEPER THAN A 3:1 SLOPE SHALL BE STABILIZED WITH AN EROSION CONTROL MATTING SUCH AS SC–150 BY NORTH AMERICAN GREEN, CURLEX II BY AMERICAN EXCELSIOR, OR ENGINEER APPROVED EQUAL. COORDINATE MATTING LOCATIONS WITH THE PLANTINGS AND GROUND COVER MATERIALS.

4) SPOT GRADE KEY:

(E)	= EXISTING ELEVATION TO BE MAINTAINED	CB	= CATCH BASIN
TC	= TOP OF CURB FINISH ELEVATION	HP	= HIGH POINT
BC	= BOTTOM OF CURB FINISH ELEVATION	LP	= LOW POINT
FFE	= BUILDING FINISH FLOOR ELEVATION	ME	= MATCH EXISTING
TW	= TOP OF WALL (FINISH ELEVATION)	VIF	= VERIFY IN FIELD
BW	= BOTTOM OF WALL (FINISH ELEVATION)		

5) SITE SOILS PER USDA–NRCS WEB SOIL SURVEY ARE URBAN LAND (MAP UNIT 602; HYDROLOGIC SOIL GROUP C). ONSITE SOIL TESTING WAS CONDUCTED ON NOVEMBER 22, 2024 (SEE LOG THIS SHEET).

6) ALL NEW PAVEMENT AND CONCRETE SURFACES SHALL BE CONSTRUCTED TO PROPOSED GRADES AS SHOWN AND SHALL BE SMOOTH AND UNIFORM ELIMINATING DEFORMITIES, DEPRESSIONS, PUDDLES, AND TRIP HAZARDS. PROVIDE POSITIVE DRAINAGE ON ALL NEW PAVEMENT AND CONCRETE SURFACES, AWAY FROM BUILDINGS, AND TO EXISTING CATCH BASINS, OUTFALLS OR OTHER COLLECTION POINTS.

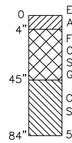
7) FOUNDATION DRAINS, IF PROPOSED, SHALL EITHER DAYLIGHT TO GRADE OR CONNECT SEPARATELY TO THE ROOF INFILTRATION SYSTEM.

8) UTILITY MATERIALS, CONSTRUCTION, AND TESTING SHALL COMPLY WITH THE WORCESTER DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS, LATEST EDITION.

9) PRIOR TO WORK, THE CONTRACTOR SHALL VERIFY THE DEPTH OF COVER OVER THE EXISTING UNDERGROUND UTILITIES IN THE AREA OF THE PROPOSED WORK. IF ADEQUATE COVER IS NOT PRESENT TO THE PROPOSED FINISH GRADES, THE CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER IMMEDIATELY BEFORE BEGINNING WORK IN THIS AREA.

SOIL TESTING DATA

TP–1



Existing Grade=522.5±
A, Sandy Loam

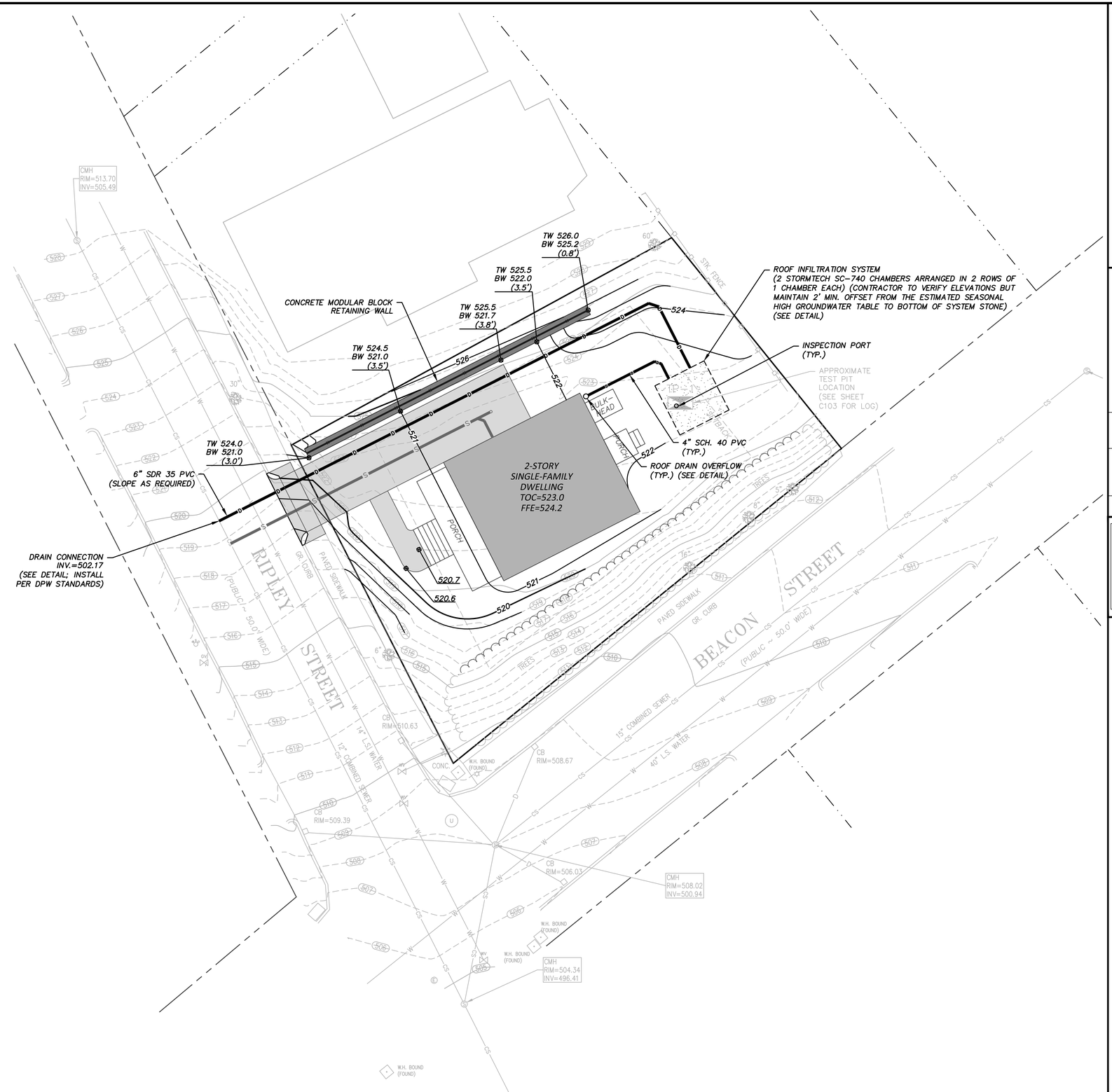
Fill, Mixed Debris, Brick, Concrete, & Trash with Sandy Loam Soil, Some Granite Blocks

C, Sandy Loam, Compact, Some Cobbles (6"±), Dry

No Refusal
No Weeping Observed
No ESHGWT Observed

NOTES:
1) SOIL TESTING TEST PIT WAS CONDUCTED BY MICHAEL ANDRADE, P.E., MASSDEP SOIL EVALUATOR #SE2681, OF GRAVES ENGINEERING ON 11/22/24. TEST PIT EXCAVATED BY SOPER CONSTRUCTION WITH A DEERE 350 MINI EXCAVATOR. TEST PIT WAS PERFORMED FOR STORMWATER MANAGEMENT DESIGN PURPOSES ONLY.

2) ESHGWT= ESTIMATED SEASONAL HIGH GROUNDWATER TABLE



GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

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NO.	DATE	BY	REVISIONS DESCRIPTION
1	11/27/24	ROM	ISSUED FOR PERMITTING

COMMONWEALTH OF MASSACHUSETTS
MICHAEL A. ANDRADE
NO. 45648
REGISTERED PROFESSIONAL ENGINEER
CERTIFIED BY: MICHAEL ANDRADE, P.E.

GRADING & DRAINAGE PLAN

SINGLE-FAMILY DWELLING
33 RIPLEY STREET, WORCESTER, MA 01610

PREPARED FOR:
HABITAT FOR HUMANITY
640 LINCOLN STREET, WORCESTER, MA 01605

PRJ. NO.: 24133
CHK. BY: MRA
DRW. BY: ROM
DES. BY: ROM
SCALE: 1"=10'
DATE: 11/27/24

C103

SHEET NOTES

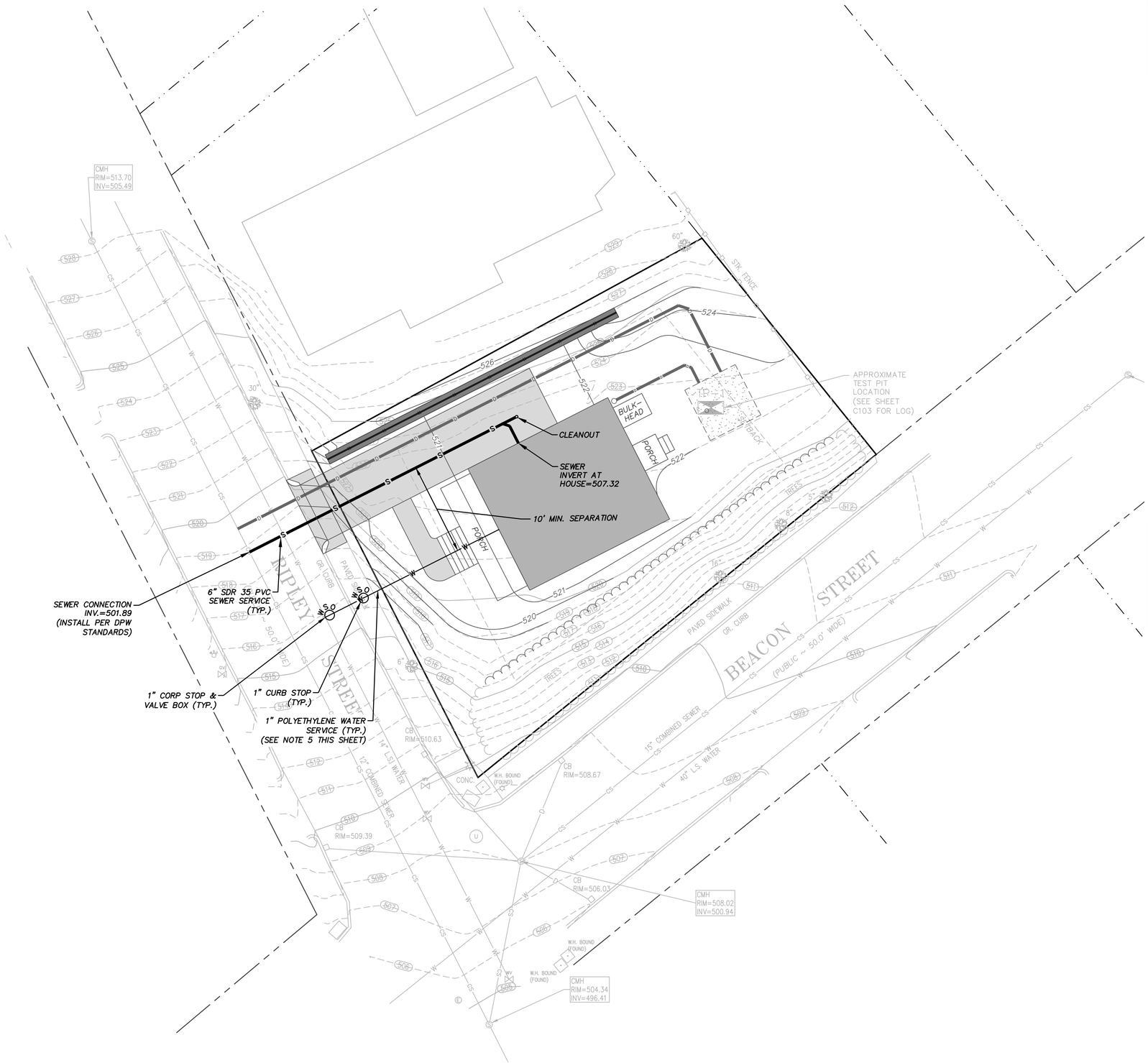
1) PRIOR TO WORK, THE CONTRACTOR SHALL VERIFY THE DEPTH OF COVER OVER THE EXISTING UNDERGROUND UTILITIES IN THE AREA OF THE PROPOSED WORK. IF ADEQUATE COVER IS NOT PRESENT TO THE PROPOSED FINISH GRADES, THE CONTRACTOR SHALL CONTACT THE DESIGN ENGINEER IMMEDIATELY BEFORE BEGINNING WORK IN THIS AREA.

2) UTILITY MATERIALS, CONSTRUCTION, AND TESTING SHALL COMPLY WITH THE WORCESTER DEPARTMENT OF PUBLIC WORKS SPECIFICATIONS, LATEST EDITION.

3) THE CONTRACTOR SHALL COORDINATE THE UTILITY WORK WITH THE PROPOSED BUILDING PLANS.

4) ALL UTILITY WORK SHALL BE COORDINATED BY THE CONTRACTOR WITH THE PROPER UTILITY COMPANIES.

5) THE CONTRACTOR SHALL VERIFY THE LOCATION AND ELEVATION OF ALL EXISTING WATER AND SEWER SERVICE UTILITIES (CONTRACTOR SHALL CONTACT WORCESTER DPW FOR RESPECTIVE SERVICE CARDS AND VERIFY LOCATION AND DEPTH). IF CONFLICTS ARE FOUND THAT PROHIBIT THE INSTALLATION OF THE UTILITIES AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY BEFORE PROCEEDING WITH THE WORK.



GRAPHIC SCALE

10 0 5 10 20 40

(IN FEET)
1 inch = 10 ft.

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COMMONWEALTH OF MASSACHUSETTS
MICHAEL R. ANDRADE
NO. 45858
REGISTERED PROFESSIONAL ENGINEER
CERTIFICATION STAMPED BY MICHAEL ANDRADE, P.E.

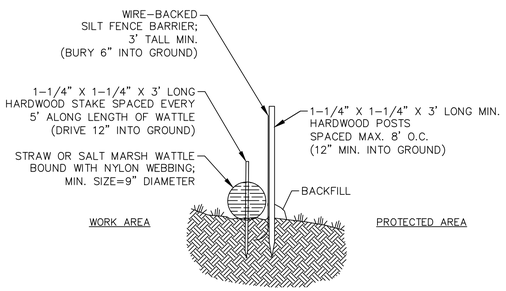
UTILITIES PLAN

SINGLE-FAMILY DWELLING
33 RIPLEY STREET, WORCESTER, MA 01610

PREPARED FOR:
HABITAT FOR HUMANITY
640 LINCOLN STREET, WORCESTER, MA 01605

DATE: 11/27/24 | SCALE: 1"=10' | DES. BY: ROM | DRW. BY: ROM | CHK. BY: MRA | PRJ. NO.: 24133

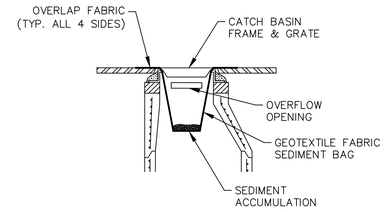
C104



WATTLE & SILT FENCE NTS

NOTE:

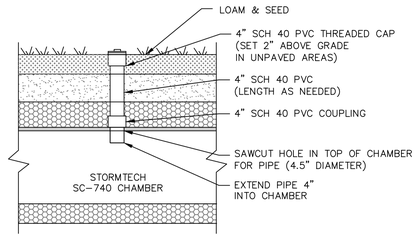
1) PROVIDE A 3' TO 6' LEVEL AREA BETWEEN THE WATTLE AND THE TOE OF ANY SLOPE TO PROVIDE AREA FOR SEDIMENT ACCUMULATION.



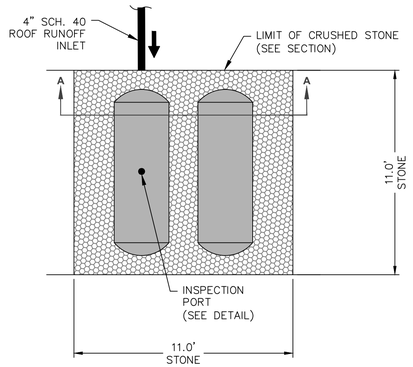
CATCH BASIN SEDIMENT BAG NTS

NOTES:

1) SEDIMENT BAG SHALL BE SILTSACK BY ACF ENVIRONMENTAL, OR APPROVED EQUAL.
2) OIL ABSORPTION MEDIUM MAY ALSO BE PLACED IN BAG (OPTIONAL).
3) INSTALL AND MAINTAIN PER MANUFACTURER'S INSTRUCTIONS.

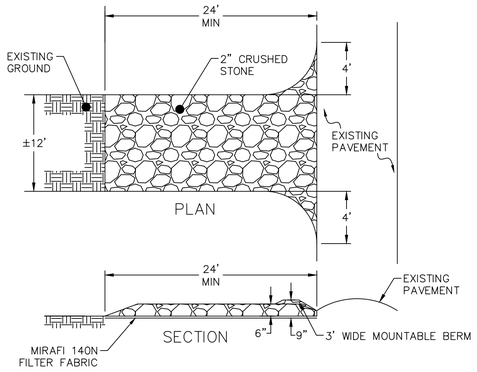


INSPECTION PORT NTS

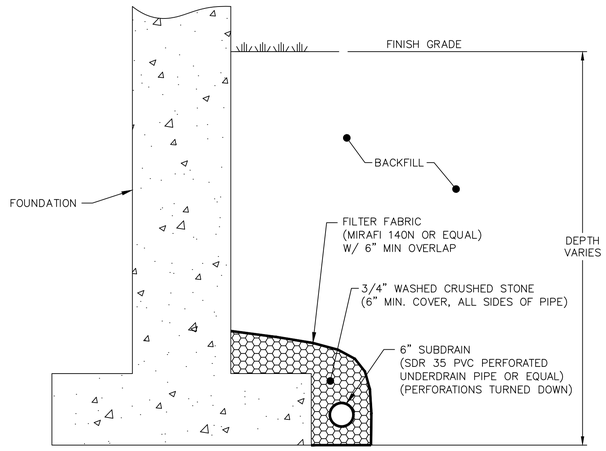


2 STORMTECH SC-740 CHAMBERS ARRANGED IN 2 ROWS OF 1 CHAMBER EACH
WITH END CAPS
INSTALLED WITH 6" COVER STONE & 6" BASE STONE

SYSTEM LAYOUT



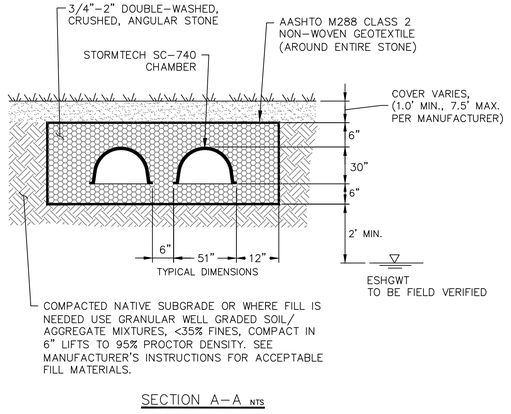
STABILIZED CONSTRUCTION ENTRANCE NTS



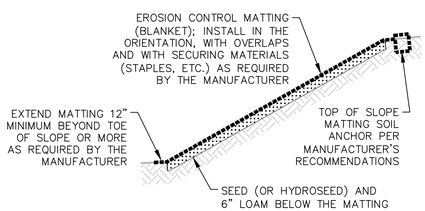
FOUNDATION DRAIN DETAIL NTS

NOTE:

1) SEE STRUCTURAL DRAWINGS FOR FOUNDATION DRAIN.



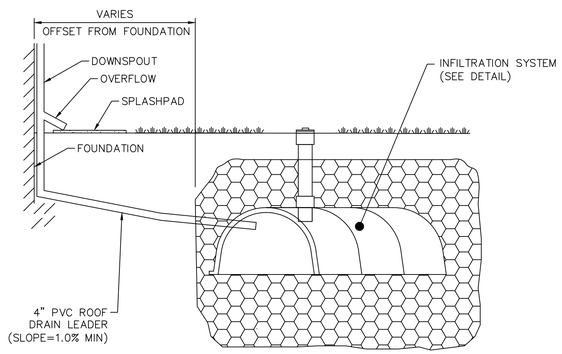
SECTION A-A NTS



EROSION CONTROL BLANKET SLOPE STABILIZATION NTS

NOTES:

1) EROSION CONTROL MATTING (BLANKETS) SHALL BE INSTALLED ON ALL FINISHED SLOPES SHOWN EQUAL TO OR STEEPER THAN A 3:1 SLOPE (33.5%).
2) INSTALLATION SHALL STRICTLY FOLLOW THE MANUFACTURER'S RECOMMENDATIONS AND INSTRUCTIONS.
3) UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS FOR A PARTICULAR LOCATION AND APPLICATION, ACCEPTABLE EROSION CONTROL BLANKETS FOR GENERAL SLOPE STABILIZATION ARE: SC150 BY NORTH AMERICAN GREEN, CURLEX II BY AMERICAN EXCELSIOR COMPANY, OR LANDLOK C2 BY PROPEX (OR ENGINEER APPROVED EQUAL).



ROOF DRAIN OVERFLOW NTS

PROPOSED ELEVATIONS

COMPONENT	ELEVATION
MAX. GRADE OVER CHAMBERS	522.8 (3.3' COVER)
MIN. GRADE OVER CHAMBERS	522.0 (2.5' COVER)
TOP OF STONE	520.00
TOP OF CHAMBERS	519.50
4" INLET (FROM ROOF DRAIN)	519.00
6" OUTLET (TO EXISTING DRAIN)	519.00
BOTTOM OF CHAMBERS	517.00
BOTTOM OF STONE	516.50

SUBSURFACE ROOF INFILTRATION SYSTEM NTS

NOTE:

1) THE SYSTEM STORAGE VOLUME IS 220 CU. FT.

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COMMONWEALTH OF MASSACHUSETTS — MICHAEL R. ANDRADE — NO. 45648 — REGISTERED PROFESSIONAL ENGINEER — CIVIL

ELECTRONICALLY SIGNED BY MICHAEL ANDRADE, P.E.

SITE DETAILS - 1
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PREPARED FOR:
HABITAT FOR HUMANITY
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PRJ. NO.: 24133
CHK. BY: MRA
DRW. BY: ROM
DES. BY: ROM
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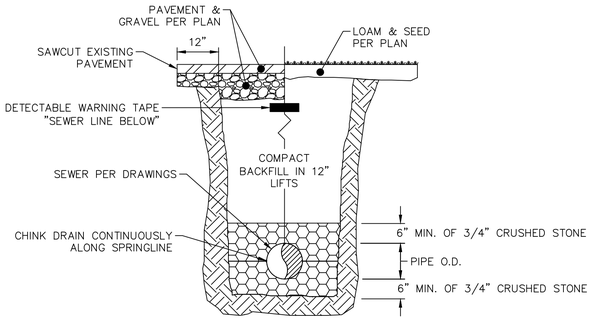
DATE: 11/27/24

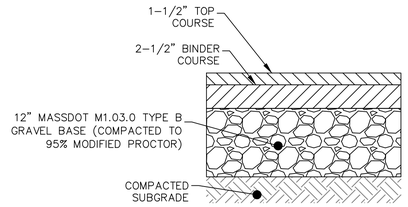
C501



SEWER TRENCH SECTION NTS

NOTE:

1) BACKFILL SHALL BE AN AASHTO CLASS III SOIL; EITHER TRENCH SPOILS OR AN IMPORTED SAND AND GRAVEL WITH FINES AND COMPACTED TO 90% OF THE PROCTOR DENSITY.



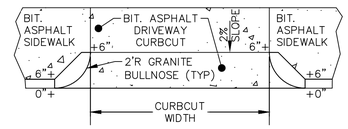
PAVEMENT SECTION NTS

NOTES:

1) TAMP ALL ASPHALT EDGES THAT ABUT LAWN, LANDSCAPED AREA, OR OTHER SOFT SURFACE.

2) BINDER COURSE: – MASSDOT M3.11.03, TABLE A, "HMA INTERMEDIATE COURSE DENSE BINDER" OR SUPERPAVE INTERMEDIATE COURSE – 19.0MM (MIXTURE DESIGNATION SIC – 19.0).

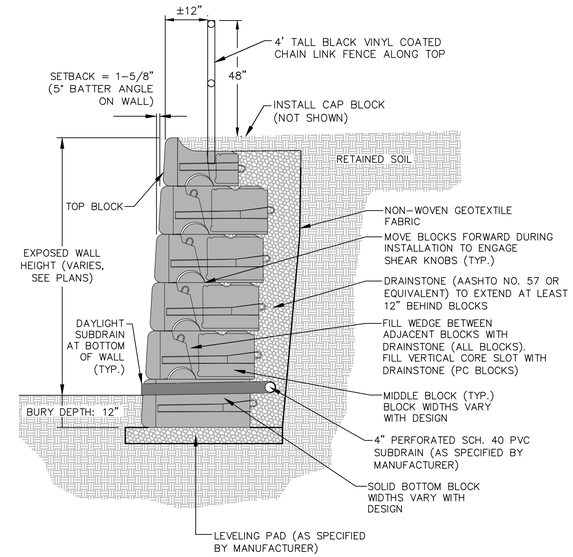
3) TOP COURSE: – MASSDOT M3.11.03, TABLE A, "SURFACE COURSE STANDARD TOP" OR SUPERPAVE SURFACE COURSE – 12.5MM (MIXTURE DESIGNATION SSC – 12.5).



WORCESTER STANDARD CURB CUT NTS

NOTE:

1) BIT. ASPHALT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE PAVEMENT SECTION DETAIL ON THESE PLANS (6" THICKNESS ACROSS CURB CUTS).



TYPICAL GRAVITY-TYPE PRECAST CONCRETE MODULAR BLOCK RETAINING WALL SECTION NTS

NOTES:

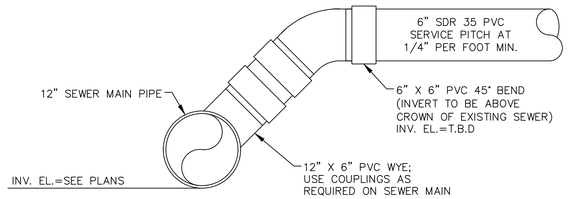
1) BLOCK TEXTURE (FINISH) SHALL BE SIMILAR TO "LIMESTONE" BY REDI-ROCK INTERNATIONAL, LLC. AND BASED ON CONTRACTOR-SELECTED WALL MANUFACTURER.

2) BLOCK COLOR SHALL BE GRAY.

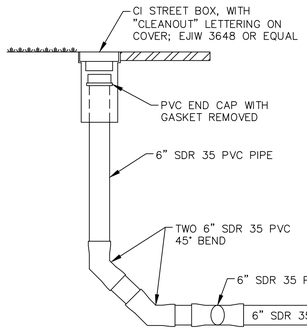
3) CONTRACTOR IS RESPONSIBLE FOR WALL MANUFACTURER'S COST OF PREPARING STRUCTURAL ENGINEERING DRAWINGS.

4) CONTRACTOR IS RESPONSIBLE FOR OBTAINING A BUILDING PERMIT AS REQUIRED.

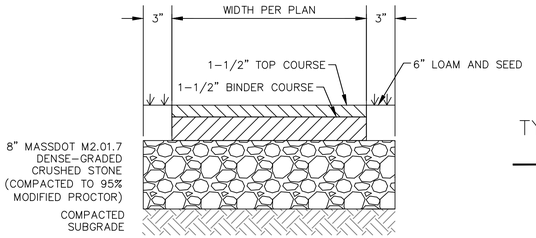
5) DESIGN SUBJECT TO CHANGE BASED ON STRUCTURAL ENGINEER-PREPARED DRAWINGS AND OWNER MATERIAL SELECTIONS.



SEWER SERVICE CONNECTION DETAIL NTS



SEWER CLEANOUT NTS



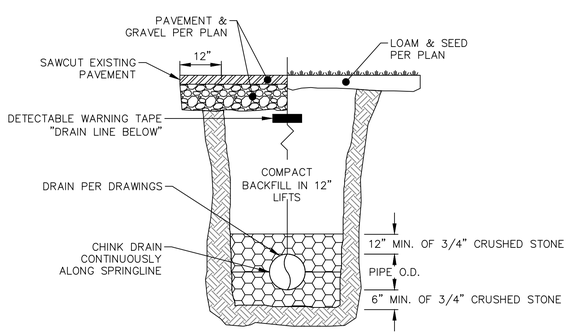
BITUMINOUS WALKWAY SECTION NTS

NOTES:

1) DO NOT EXTEND BASE GRAVEL AS SHOWN WHEN PAVED AREAS ARE ABUTTING ROAD, WALKWAY, OR OTHER HARD SURFACE.

2) BINDER COURSE: – MASSDOT M3.11.03, TABLE A, "HMA INTERMEDIATE COURSE DENSE BINDER" OR SUPERPAVE INTERMEDIATE COURSE – 19.0MM (MIXTURE DESIGNATION SIC – 19.0).

3) TOP COURSE: – MASSDOT M3.11.03, TABLE A, "SURFACE COURSE STANDARD TOP" OR SUPERPAVE SURFACE COURSE – 12.5MM (MIXTURE DESIGNATION SSC – 12.5).

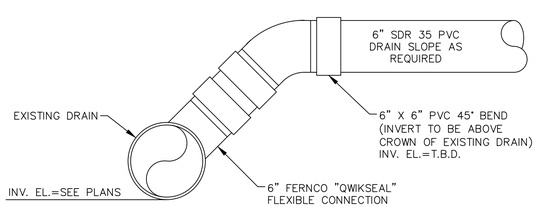


HDPE/PVC DRAIN TRENCH SECTION NTS

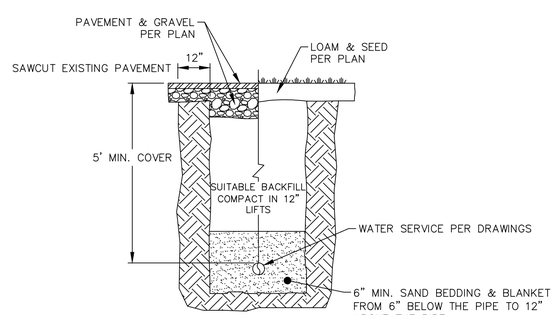
NOTES:

1) BACKFILL SHALL BE AN AASHTO CLASS III SOIL; EITHER TRENCH SPOILS OR AN IMPORTED SAND AND GRAVEL WITH FINES AND COMPACTED TO 90% OF THE PROCTOR DENSITY.

2) BACKFILL OF HDPE PIPE SHALL CONFORM TO ASTM D2321 AND/OR MANUFACTURER'S SPECIFICATIONS.



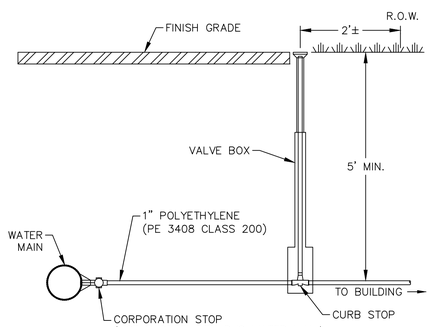
DRAIN CONNECTION DETAIL NTS



WATER SERVICE TRENCH SECTION NTS

NOTE:

1) SUITABLE BACKFILL SHALL BE AN AASHTO CLASS III SOIL; EITHER TRENCH SPOILS OR AN IMPORTED SAND AND GRAVEL WITH FINES AND COMPACTED TO 90% OF THE PROCTOR DENSITY.



WATER SERVICE NTS

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COMMONWEALTH OF MASSACHUSETTS – MICHAEL R. ANDRADE – No. 45658 – REGISTERED PROFESSIONAL ENGINEER – CIVIL
ELECTRONICALLY SIGNED BY: MICHAEL ANDRADE, P.E.

SITE DETAILS - 2
SINGLE-FAMILY DWELLING
33 RIPLEY STREET, WORCESTER, MA 01610

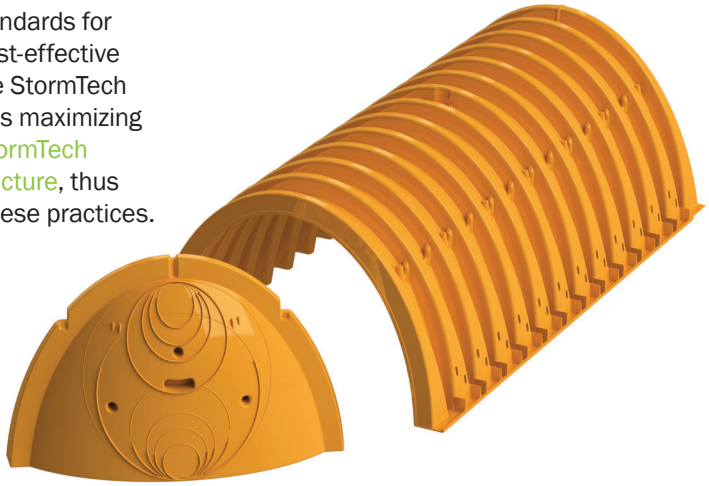
PREPARED FOR:
HABITAT FOR HUMANITY
640 LINCOLN STREET, WORCESTER, MA 01605

DATE: 11/27/24 | SCALE: 1"=10' | DES. BY: ROM | DRW. BY: ROM | CHK. BY: MRA | PRJ. NO.: 24133

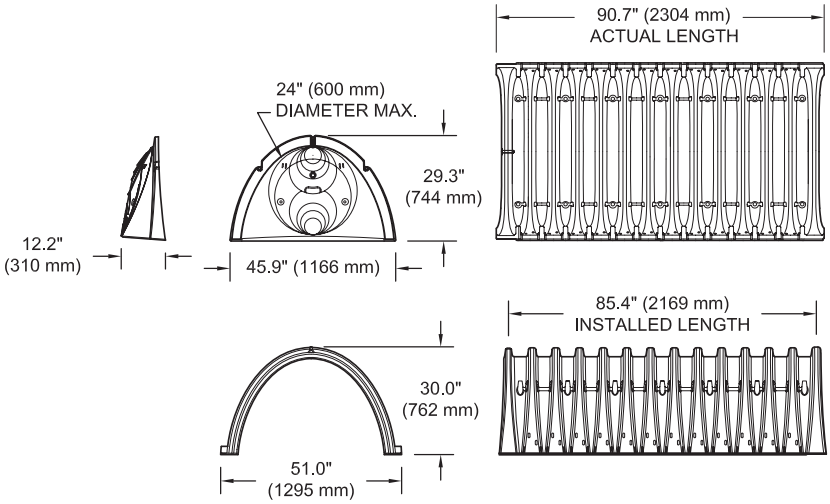
C502

STORMTECH SC-740 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



STORMTECH SC-740 CHAMBER
(not to scale)



Nominal Chamber Specifications

Size (L x W x H)
85.4" x 51" x 30"
2,170 mm x 1,295 mm x 762 mm

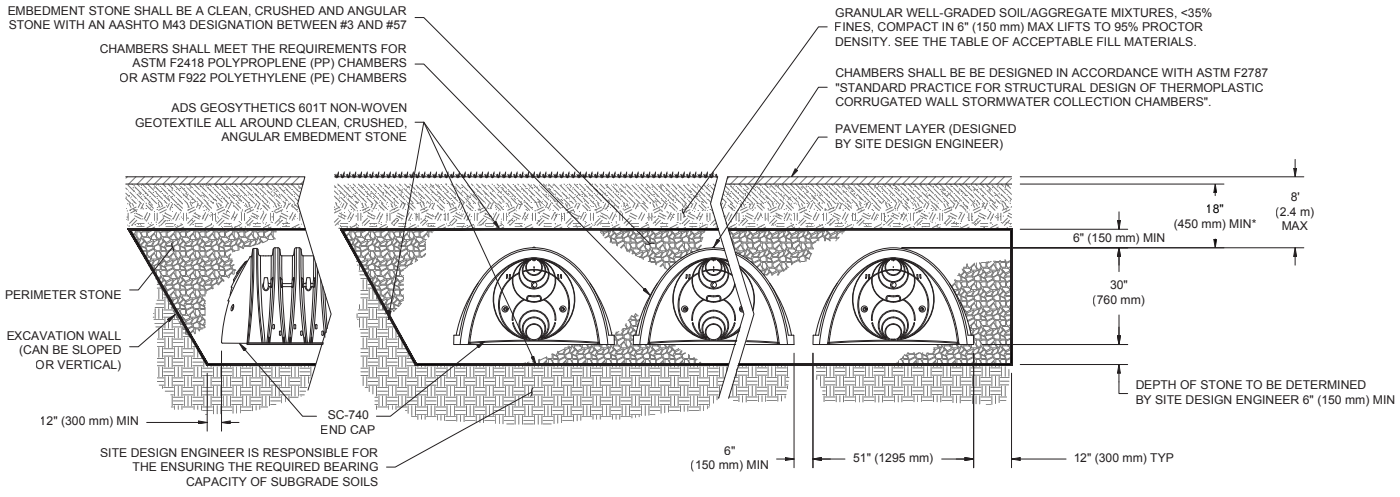
Chamber Storage
45.9 ft³ (1.30 m³)

Min. Installed Storage*
74.9 ft³ (2.12 m³)

Weight
74.0 lbs (33.6 kg)

Shipping
30 chambers/pallet
60 end caps/pallet
12 pallets/truck

*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

SC-740 CUMULATIVE STORAGE VOLUMES PER CHAMBER

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)		Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
42 (1067)		45.90 (1.300)	74.90 (2.121)
41 (1041)		45.90 (1.300)	73.77 (2.089)
40 (1016)	Stone	45.90 (1.300)	72.64 (2.057)
39 (991)	Cover	45.90 (1.300)	71.52 (2.025)
38 (965)		45.90 (1.300)	70.39 (1.993)
37 (940)		45.90 (1.300)	69.26 (1.961)
36 (914)		45.90 (1.300)	68.14 (1.929)
35 (889)		45.85 (1.298)	66.98 (1.897)
34 (864)		45.69 (1.294)	65.75 (1.862)
33 (838)		45.41 (1.286)	64.46 (1.825)
32 (813)		44.81 (1.269)	62.97 (1.783)
31 (787)		44.01 (1.246)	61.36 (1.737)
30 (762)		43.06 (1.219)	59.66 (1.689)
29 (737)		41.98 (1.189)	57.89 (1.639)
28 (711)		40.80 (1.155)	56.05 (1.587)
27 (686)		39.54 (1.120)	54.17 (1.534)
26 (660)		38.18 (1.081)	52.23 (1.479)
25 (635)		36.74 (1.040)	50.23 (1.422)
24 (610)		35.22 (0.977)	48.19 (1.365)
23 (584)		33.64 (0.953)	46.11 (1.306)
22 (559)		31.99 (0.906)	44.00 (1.246)
21 (533)		30.29 (0.858)	1.85 (1.185)
20 (508)		28.54 (0.808)	39.67 (1.123)
19 (483)		26.74 (0.757)	37.47 (1.061)
18 (457)		24.89 (0.705)	35.23 (0.997)
17 (432)		23.00 (0.651)	32.96 (0.939)
16 (406)		21.06 (0.596)	30.68 (0.869)
15 (381)		19.09 (0.541)	28.36 (0.803)
14 (356)		17.08 (0.484)	26.03 (0.737)
13 (330)		15.04 (0.426)	23.68 (0.670)
12 (305)		12.97 (0.367)	21.31 (0.608)
11 (279)		10.87 (0.309)	18.92 (0.535)
10 (254)		8.74 (0.247)	16.51 (0.468)
9 (229)		6.58 (0.186)	14.09 (0.399)
8 (203)		4.41 (0.125)	11.66 (0.330)
7 (178)		2.21 (0.063)	9.21 (0.264)
6 (152)		0 (0)	6.76 (0.191)
5 (127)		0 (0)	5.63 (0.160)
4 (102)	Stone	0 (0)	4.51 (0.128)
3 (76)	Foundation	0 (0)	3.38 (0.096)
2 (51)		0 (0)	2.25 (0.064)
1 (25)		0 (0)	1.13 (0.032)

Note: Add 1.13 ft³ (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-740 Chamber	45.9 (1.3)	74.9 (2.1)	81.7 (2.3)	88.4 (2.5)

Note: Assumes 6" (150 mm) stone above chambers, 6" (150 mm) row spacing and 40% stone porosity.

AMOUNT OF STONE PER CHAMBER

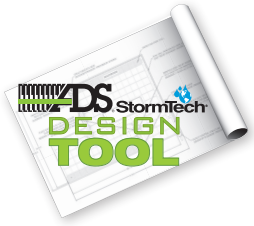
ENGLISH TONS (yds³)	Stone Foundation Depth		
	6"	12"	16"
SC-740	3.8 (2.8)	4.6 (3.3)	5.5 (3.9)
METRIC KILOGRAMS (m³)	**150 mm**	**300 mm**	**450 mm**
SC-740	3,450 (2.1)	4,170 (2.5)	4,490 (3.0)

Note: Assumes 6" (150 mm) of stone above and between chambers.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth		
	6 (150)	12 (300)	18 (450)
SC-740	5.5 (4.2)	6.2 (4.7)	6.8 (5.2)

Note: Assumes 6" (150 mm) of row separation and 18" (450 mm) of cover. The volume of excavation will vary as depth of cover increases.



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For more information on the StormTech SC-740 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

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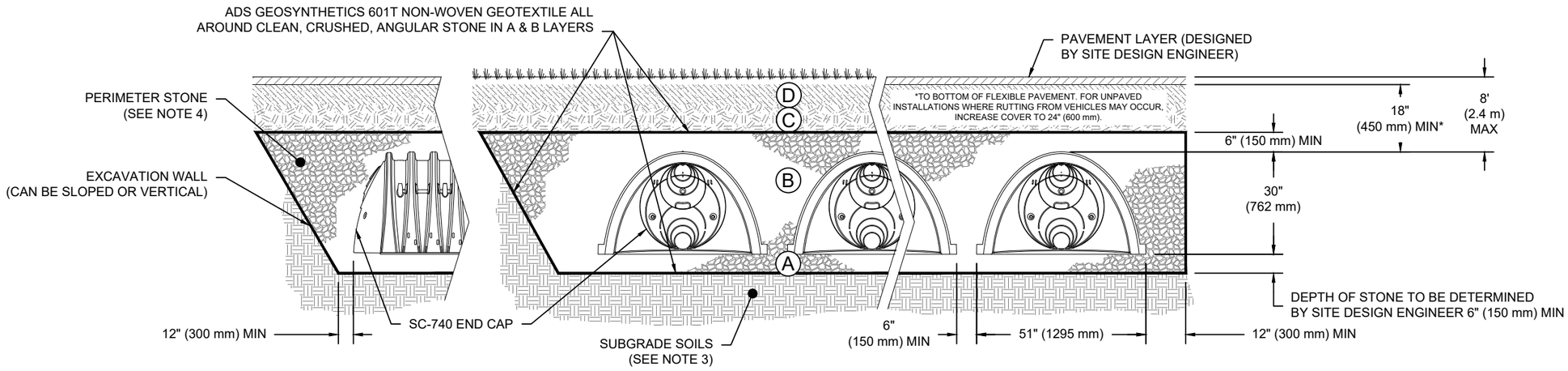
ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

SC-740
STANDARD CROSS SECTION
DATE: 05-10-19
DRAWN: KR
CHECKED: KR
PROJECT #:

DATE	DRWN	CHKD	DESCRIPTION

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HILLIARD, OH 43026

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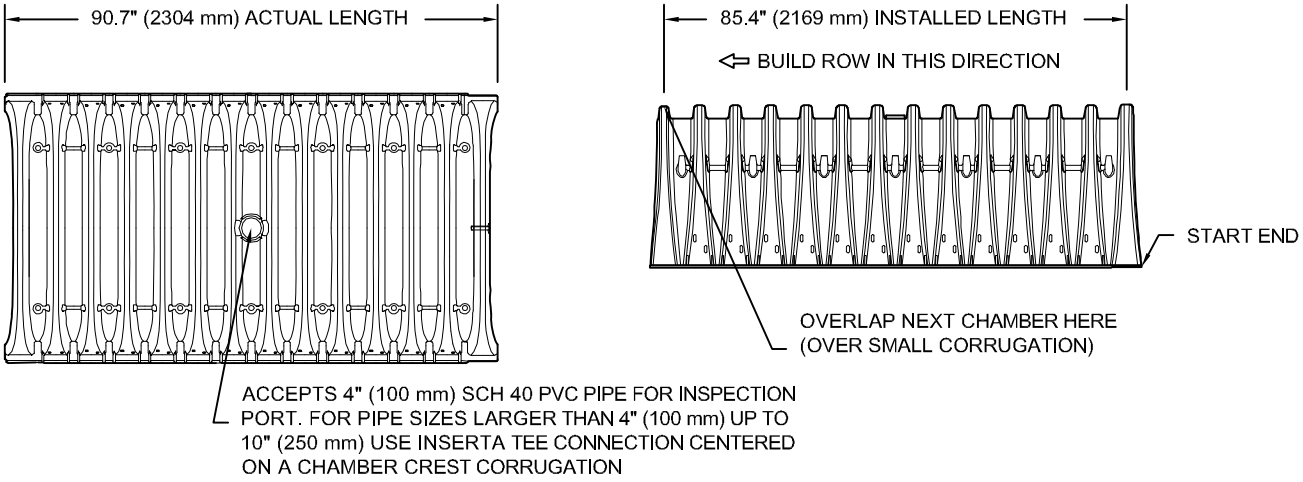
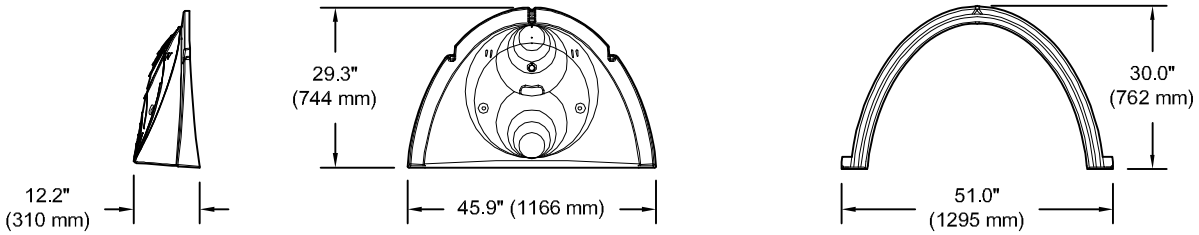
SC-740 TECHNICAL SPECIFICATION

NTS

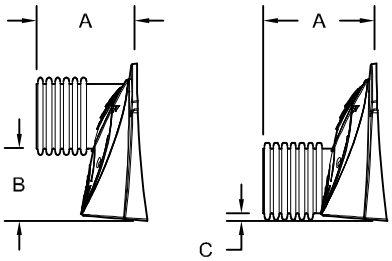




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



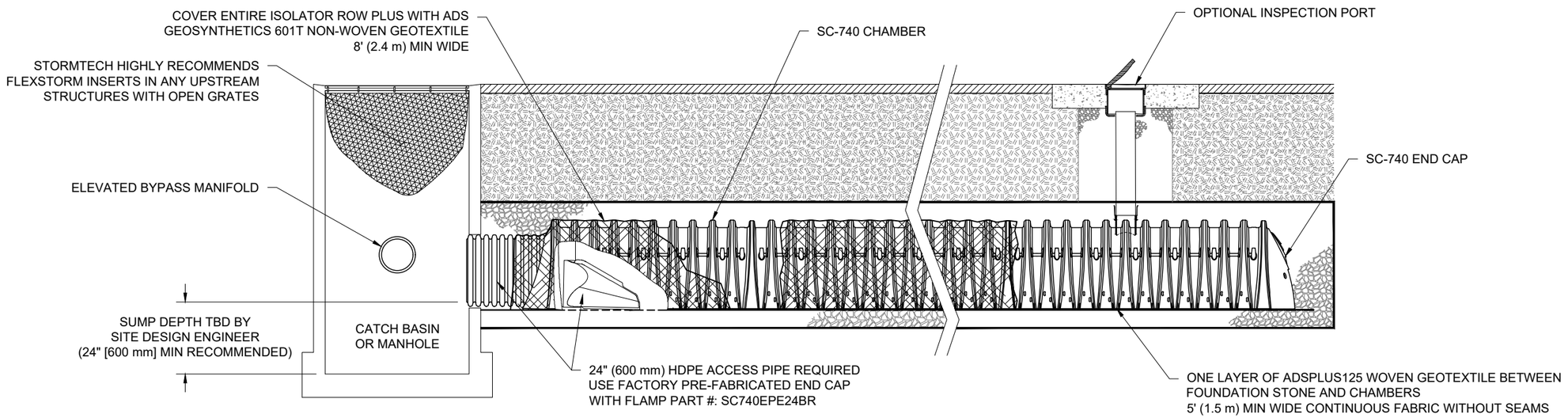
STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	—
SC740EPE06B / SC740EPE06BPC			—	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	—
SC740EPE08B / SC740EPE08BPC			—	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	—
SC740EPE10B / SC740EPE10BPC			—	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	—
SC740EPE12B / SC740EPE12BPC			—	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	—
SC740EPE15B / SC740EPE15BPC			—	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	—
SC740EPE18B / SC740EPE18BPC			—	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	—	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL



SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

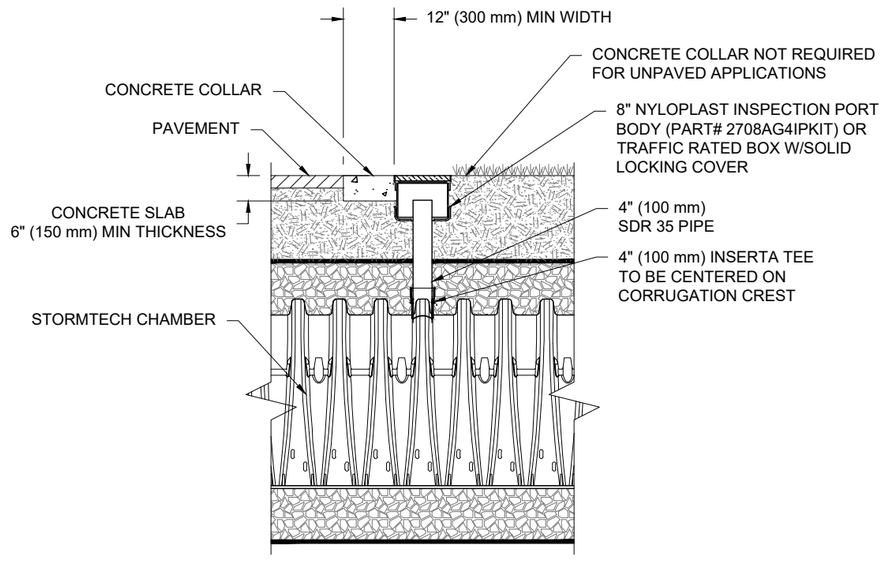
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)
NTS

SC-740
ISOLATOR ROW PLUS DETAILS
DATE: 08/26/20
PROJECT #: ---
DRAWN: ALI
CHECKED: ALI

DATE	DRWN	CHKD	DESCRIPTION

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