

OPERATIONS AND MAINTENANCE MANUAL FOR BMP at

Johnson County Health Department and Coroner's Office

Hospital Road and Drake Road

**Submitted:
October 6, 2022**

Prepared by:



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TABLE OF CONTENTS

BMP OWNER & OPERATOR INFORMATION.....	3
BMP LOCATION AND DESCRIPTION	3
MAINTENANCE AND INSPECTION GUIDELINES	4
ROUTINE MAINTENANCE	4
REMEDIAL MAINTENANCE	5
BMP INSPECTION	5
SEDIMENT REMOVAL	6
APPENDIX A	7
BMP SITE DRAWINGS	7
APPENDIX B.....	8
STORMWATER EASEMENTS	8
APPENDIX C.....	9
MAINTENANCE PLAN AND INSPECTION FORMS.....	9

BMP Owner & Operator Information

Owner: Johnson County Board of Commissioners
Contact: Kevin Walls
Address: 86 W Court Street
Franklin, IN 46131
Email Address: kwalls@co.johnson.in.us
Business Phone: 317-346-4306

The BMP Owner is responsible for all costs associated with the maintenance and inspection of all BMPs as required by the City of Franklin. The term “BMP Owner” shall mean the owner at any time and from time to time of the property upon which the BMP is situated and any and all successors or assigns of such person or entity as the owner or owners of fee simple title to all or any portion of the real property covered hereby, whether by sale, assignment, inheritance, operation of law, trustee’s sale, foreclosure, or otherwise, but not including the holder of any lien or encumbrance on such real property.

The BMP Owner also grants the City of Franklin personnel right-of-entry to the property to inspect and maintain the BMP.

BMP Location and Description

A BMP, Best Management Practice, is defined as a structural measure (wetland, pond, sand filter, mechanical unit, etc.) or non-structural measure (restrictive zoning, reduced impervious area, etc.). BMP’s are designed for the benefit of stormwater quality and quantity. An isolator row via an underground chamber detention system is being utilized for the Johnson County Health Department and Coroner’s Office project:

- An underground detention chamber system will be utilized for the stormwater quantity treatment from the project. The underground detention chamber system shall collect surface water from impervious areas via a storm sewer network. In addition to stormwater quantity treatment, the underground detention chamber system also provides stormwater quality treatment as a result of the runoff & sediment filtering through the surrounding geotextile fabric & stone as water fills the system via the isolator row. The underground detention chamber system shall be maintained and inspected per the check list within **Appendix C**. Please refer to **Appendix A** for the underground detention chamber and outlet structure details.

The Johnson County Health Department and Coroner’s Office project is located at the northeast corner of the intersection of Hospital Road and Drake Road in Franklin, IN. The underground detention chamber system is located beneath the south parking lot on the south half of the project site.

The underground detention chamber system and outlet structure are located in a drainage easement. Direct maintenance access to the system is provided from the proposed right-of-way of Drake Road. See **Appendix B** for easement exhibit and description.

The following operations and maintenance information shall be utilized to properly inspect and maintain the underground detention and storm sewer infrastructure.

Maintenance and Inspection Guidelines

Maintenance and inspection as described below is the responsibility of the BMP Owner. Any additional procedures deemed necessary by annual City inspections shall be incorporated into these guidelines.

Routine Maintenance

The BMP Owner shall be responsible for the following minimum operations for maintaining the BMPs, in addition to maintaining and updating the BMP Operations and Maintenance Manual per the City of Franklin requirements:

Storm Sewer Infrastructure

- Remove trash and debris from inlet castings
- Remove trash and debris from inside of any storm structures
- Remove sediment deposits from structures and pipes when accumulated depth reaches 1/4 of pipe diameter

Swales and Ditches

- Mow and maintain vegetation to a maximum height of 5 inches
- Maintain swales with uniform slopes and unobstructed by buildings and fences
- Remove trash and debris from swales
- Grade and reseed eroded areas
- Mowing and/or trimming vegetation within the grassed areas. All clippings should be removed and properly disposed of.
- Maintain grass areas without the overuse of fertilizers, herbicides, pesticides, etc.

Underground Detention, Detention Outfall, and Emergency Spillway

- Removal of sediment, debris and litter from inlet and outlet structures within the underground detention chamber system and storm sewer system.
- Remove debris from outlet control structure, detention outfall, and emergency spillway
- Inspect outfall and emergency spillway for erosion, regrade, and replace riprap as necessary
- Remove sediment accumulation from underground detention in accordance with typical operations and maintenance underground detention and isolator row guidelines
- Maintain and update the BMP Operations and Maintenance Manual as necessary.
- Inspection and removal of debris and sediment from underground detention chamber system Isolator Rows.

Remedial Maintenance

The owner shall be responsible for correcting and/or replacing any portions of the BMP in unsatisfactory condition. Corrections and/or replacement of any portions of the BMP in unsatisfactory condition shall be required. This includes, but is not limited to:

- Repairing/replacing the outlet control structure.
- Replacing any portion of the inlet/outlet pipes within the detention facility.
- Grading and reseeding eroded areas.
- Replacing end sections at all inlets and outlets
- Replacing any portion of damaged storm sewer or underdrain pipes
- Replacing riprap as necessary at pipe inlet and outlet locations

BMP Inspection

Annual inspections of permanent BMPs shall be performed by the City. Routine inspections are the responsibility of the BMP Owner. These inspections shall be accomplished as scheduled below:

MAINTENANCE ITEM	INSPECTION SCHEDULE
Outlet Control Structure	Quarterly and After Major Storms
Isolator Rows	Quarterly and After Major Storms
Underground Detention Sediment Removal	Biannually
Pond Outlet and Principal Spillway	Annually
Storm Inlets, Pipes, and Swales	Monthly and After Major Storms
Vegetated Open Areas	Monthly and After Major Storms
Miscellaneous	Monthly

The approved maintenance plan and inspection forms provided in **Appendix C** shall be used as guidance for performing maintenance and inspections activities. These forms shall be completed and retained by the BMP Owner and produced upon request by the City.

The City shall be notified of any changes in BMP ownership, major repairs, or BMP failure in writing within 30 days. Notification shall be addressed to:

*City of Franklin
Department of Public Works
796 S State Street
Franklin, IN 46131*

In the event that the City finds a BMP in need of maintenance or repair, the City will notify the BMP Owner of the necessary maintenance or repairs and give the landowner a timeframe for completing the maintenance or repairs. If the maintenance or repairs are not completed within the designated timeframe, the City shall perform the repairs or maintenance and bill the landowner for the actual costs for the work.

The BMP Owner shall be responsible for all costs associated with the maintenance and inspection of the BMP and all fees required by the City of Franklin.

Sediment Removal

Sediment accumulation in the Isolator Rows shall be inspected on a quarterly basis and after major storm events. Sediment accumulation in the storm sewer inlets and manholes shall be inspected on a monthly basis and after major storm events. In order to determine sediment accumulation in the Isolator Rows, a visual inspection through the inspection ports shall be completed using a flashlight. Sediment accumulation depth shall be checked through the inspection port utilizing a stadia rod. If the average sediment accumulation depth is 3 inches or greater, sediment removal shall be required.

Sediment removal from the Isolator Rows shall be accomplished using the JetVac or similar process which will not disturb or destroy the underground chambers, base stone or geotextile fabric wrap. A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable. Multiple passes of the JetVac shall be applied until backflush water is clean.

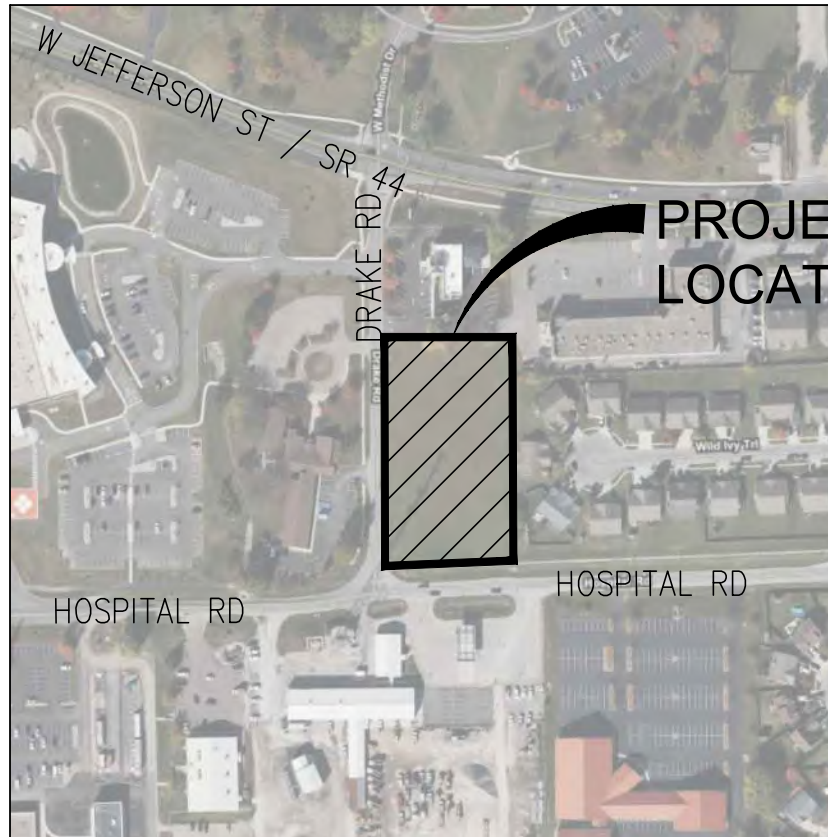
The sedimentation and any other debris taken from the system shall be disposed of in compliance with all applicable Federal, State and Local requirements. Immediate remedial maintenance shall be completed if any damage to system occurs.

Removal of the sediment accumulation from the storm sewer inlets and manholes shall be performed every year. The sedimentation and any other debris taken from the structures shall be disposed of in compliance with all applicable Federal, State and Local requirements. The removal of sediment shall be accomplished by methods which will not disturb or destroy the structures. Immediate remedial maintenance shall be completed in the case of any of the aforementioned occurrences.

APPENDIX A

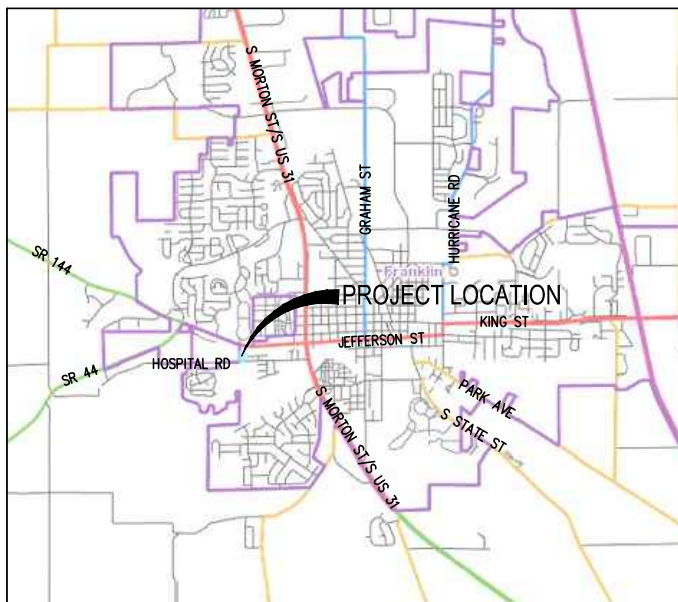
BMP Site Drawings

JOHNSON COUNTY CORONER'S OFFICE
HOSPITAL ROAD AND DRAKE ROAD
EXHIBIT 1 - LOCATION AND VICINITY MAPS



LOCATION MAP

NOT TO SCALE



VICINITY MAP

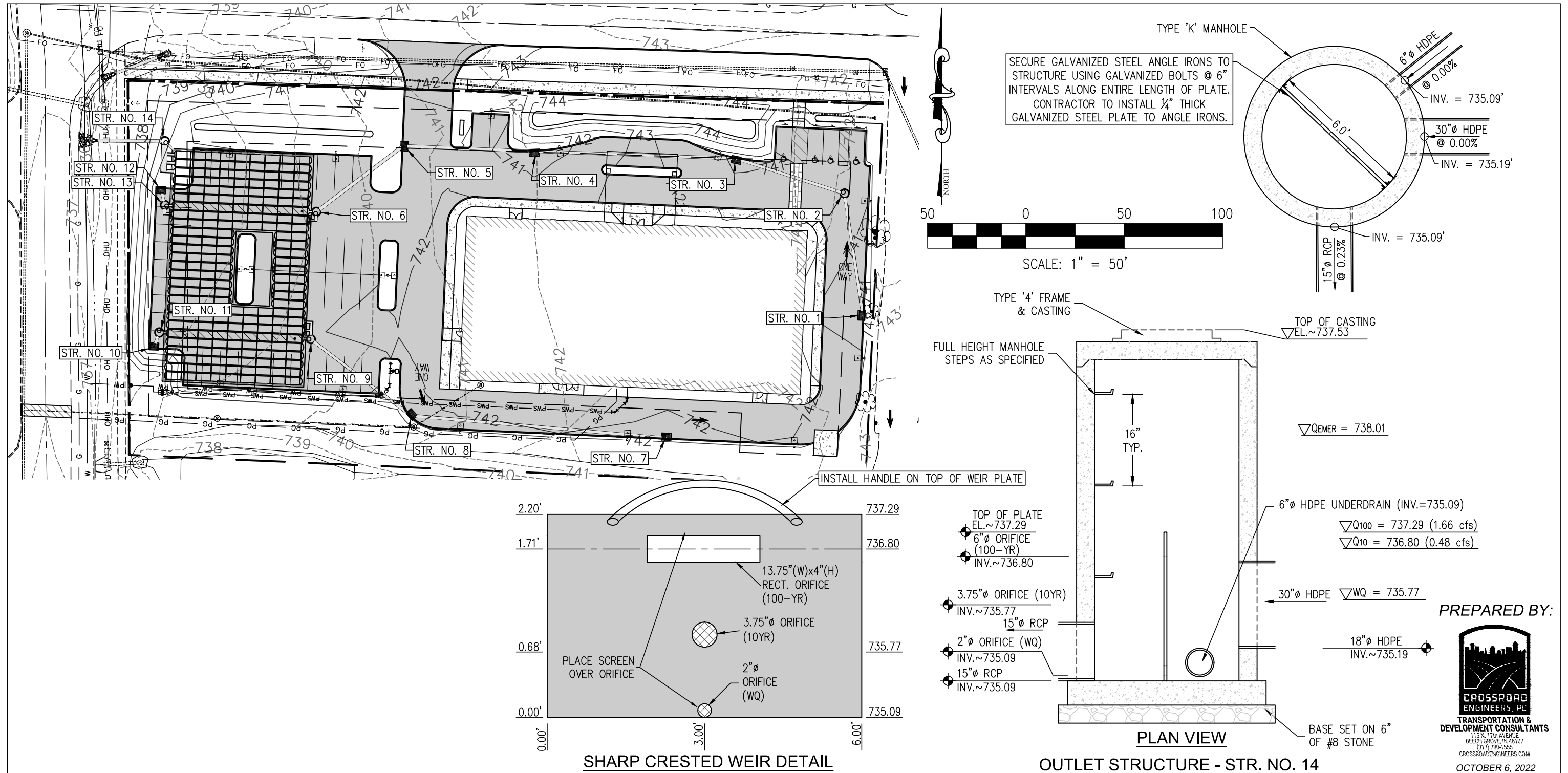
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**TRANSPORTATION &
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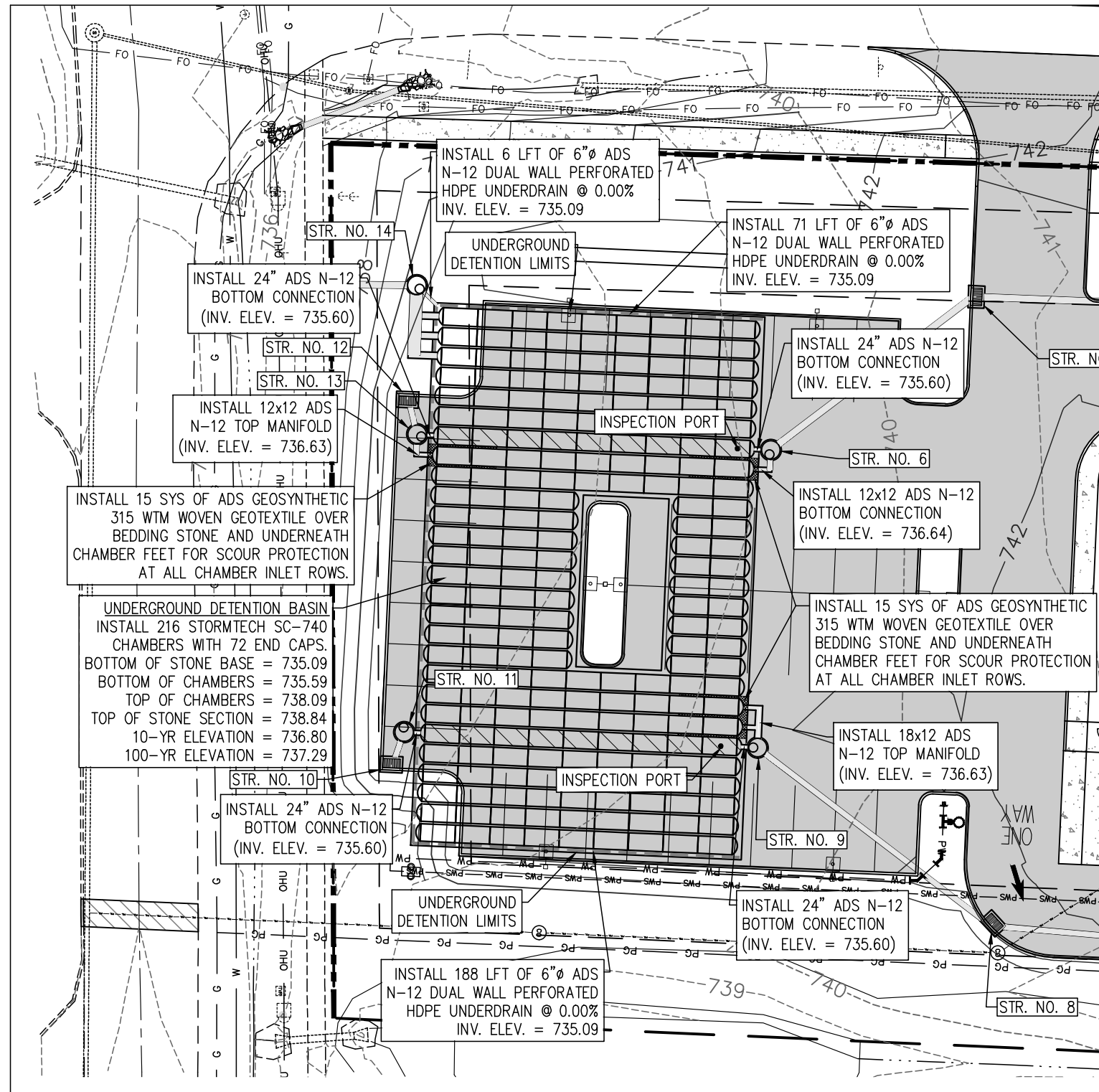
JOHNSON CO. HEALTH DEPARTMENT S DRAKE ROAD EXHIBIT 2 - OVERALL DRAINAGE PLAN



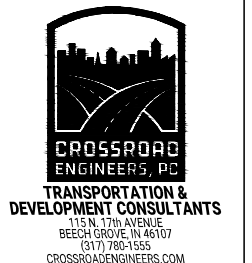
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EXHIBIT 3 - DETENTION PLAN



PREPARED BY:



OCTOBER 6, 2022

JOHNSON CO. HEALTH DEPARTMENT

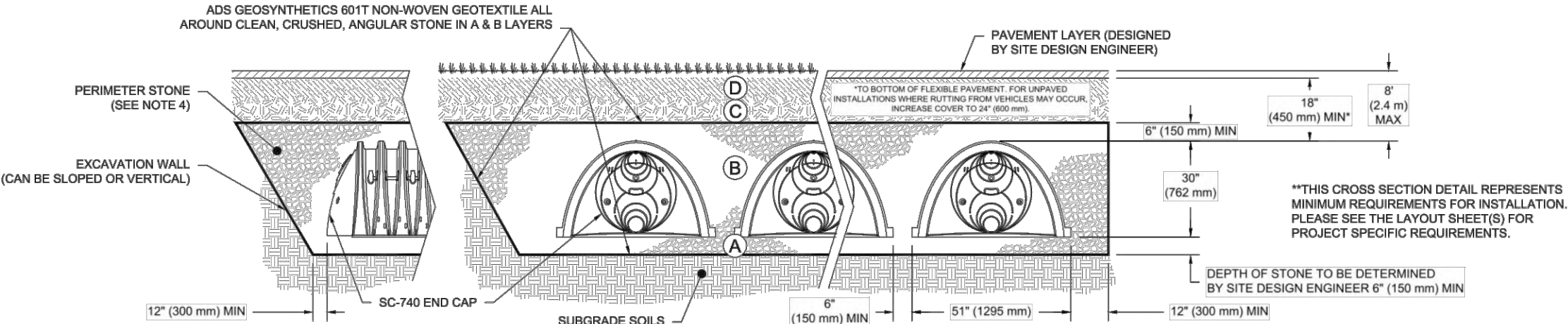
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EXHIBIT 4 - UNDERGROUND BASIN SC-740 CROSS SECTION

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:
- 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".
 - 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.
 - 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.
 - 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:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- 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.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- 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.

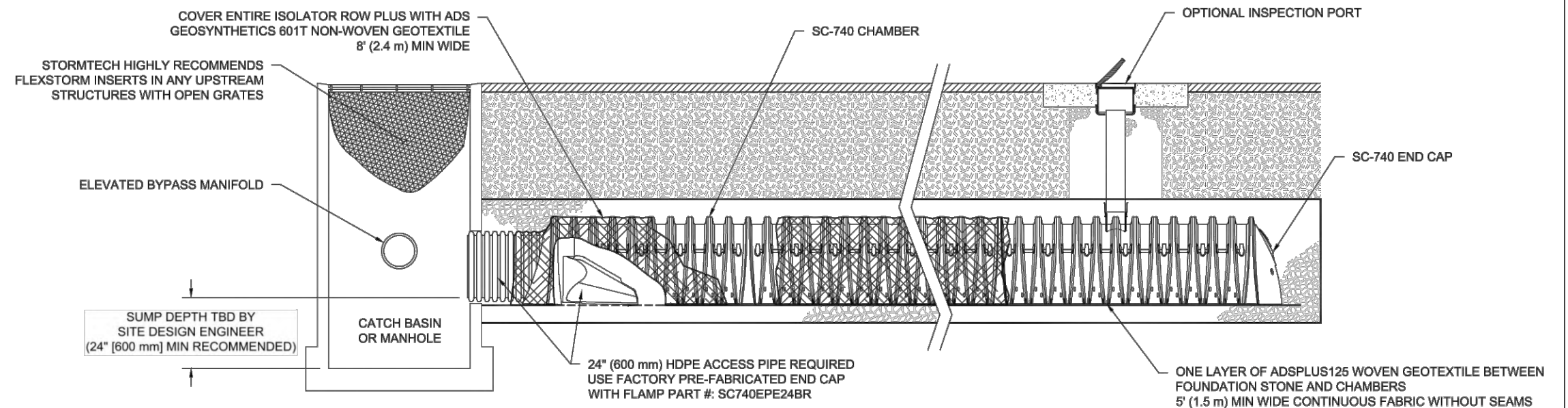
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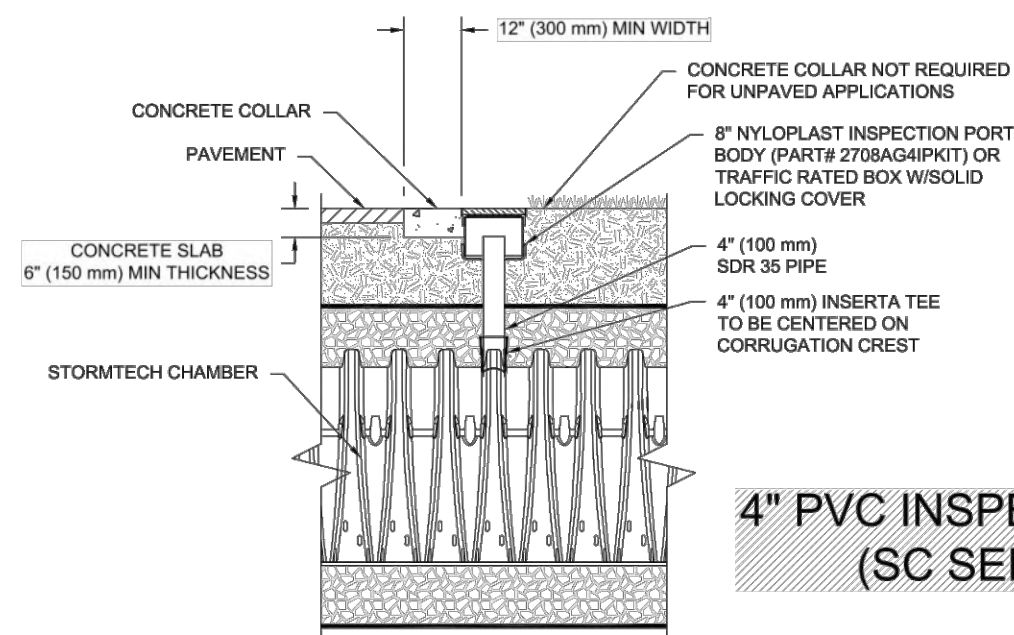
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EXHIBIT 5 - SC-740 ISOLATOR & INSPECTION PORT DETAILS



SC-740 ISOLATOR ROW PLUS DETAIL



4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)

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

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

- 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.
- CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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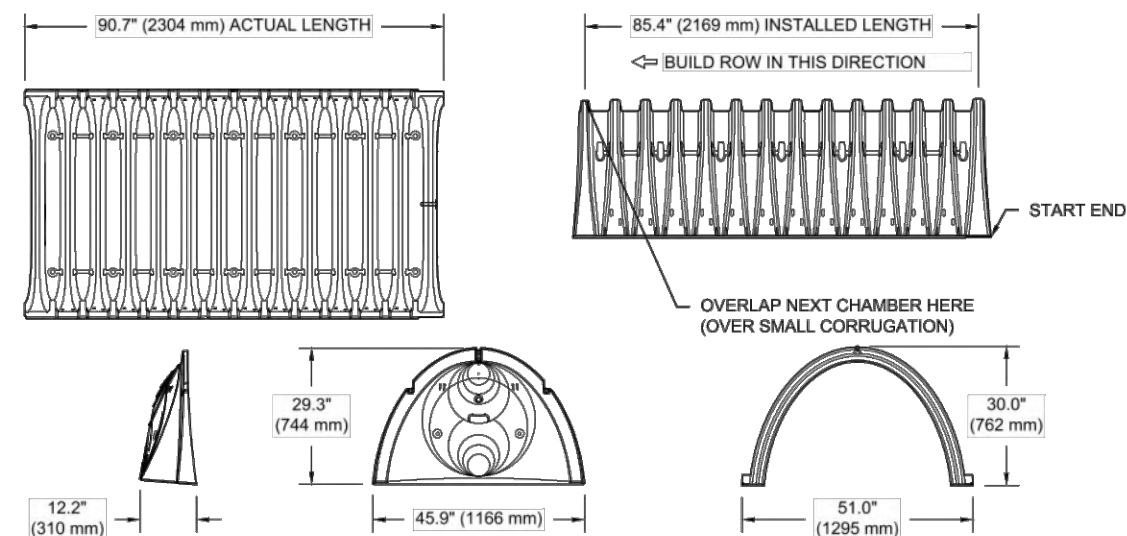
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EXHIBIT 6 - SC-740 TECH. SPECS & INSERTA-TEE DETAIL



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

PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"
PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

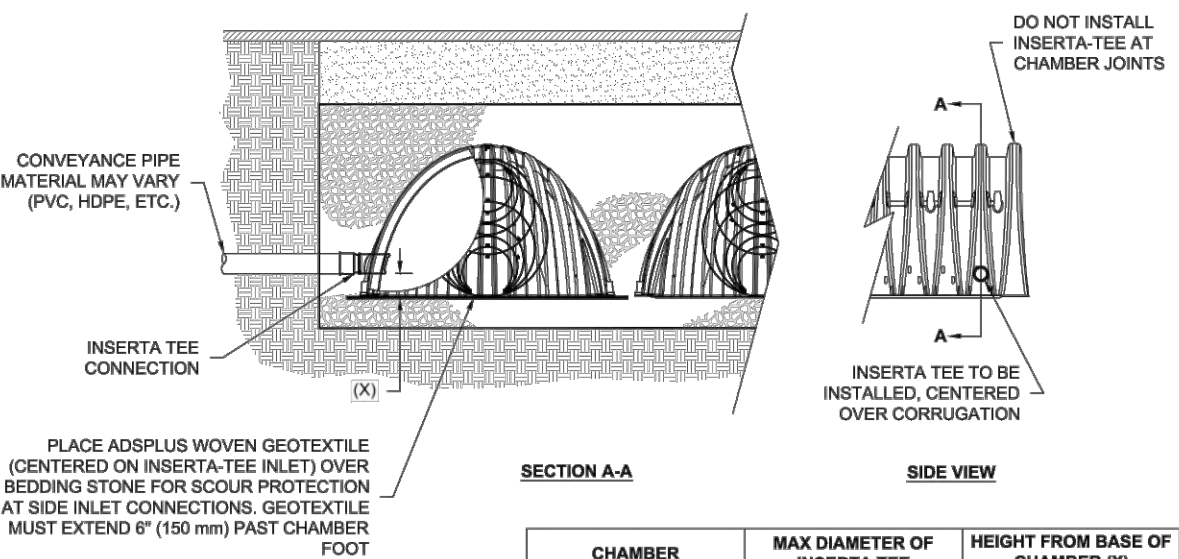
PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC	---	---	---	0.5" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC	---	---	---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (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)
SC740EPE24BR*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B/SC740EPE24BR 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/SC740EPE24BR 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 TECHNICAL SPECIFICATIONS



NOTE:
PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS.
CONTACT STORMTECH FOR MORE INFORMATION.

INSERTA-TEE SIDE INLET DETAIL

CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-740	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)

INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON

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EXHIBIT 7 - SC-740 IMPORTANT NOTES & UNDERDRAIN DETAIL

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. 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.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

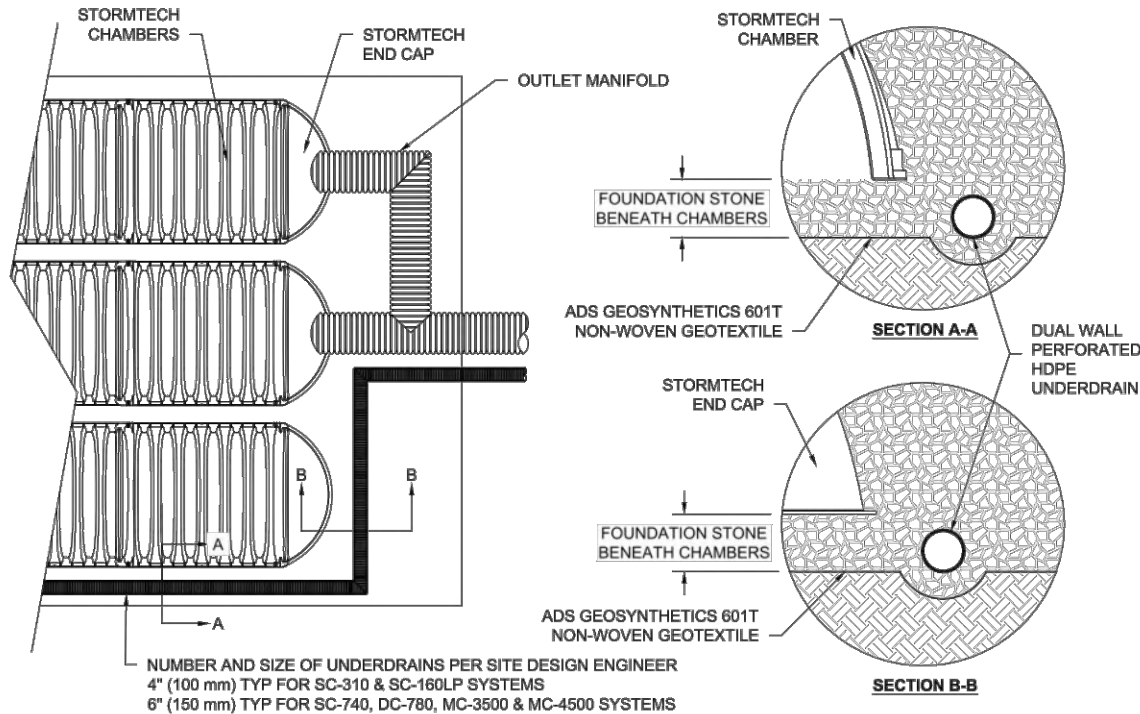
1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.



UNDERDRAIN DETAIL

PREPARED BY:



APPENDIX B

Stormwater Easements

APPENDIX C

Maintenance Plan and Inspection Forms

Isolator[®] Row

O&M Manual



The Isolator[®] Row

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) and Total Phosphorus (TP) removal with easy access for inspection and maintenance.

The Isolator Row

The Isolator Row is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-7200 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row and passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC-310-3 and SC-740 models) allow stormwater to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS geotextile fabric is placed between the stone and the Isolator Row chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the chamber's sidewall. The non-woven fabric is not required over the SC-160, DC-780, MC-3500 or MC-7200 models as these chambers do not have perforated side walls.

The Isolator Row is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row. After Stormwater flows through the Isolator Row and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row to minimize maintenance requirements and maintenance costs.

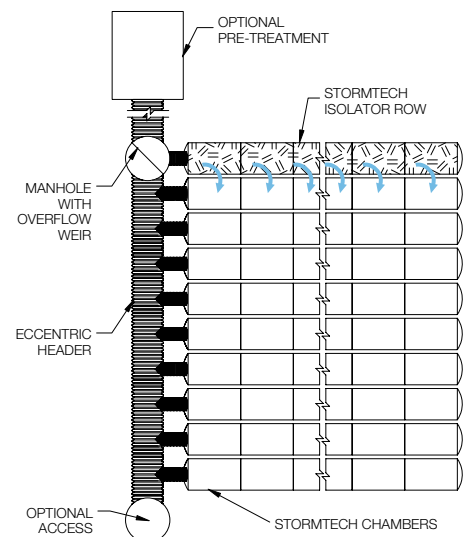
Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.



Looking down the Isolator Row from the manhole opening, woven geotextile fabric is shown between the chamber and stone base.



StormTech Isolator Row with Overflow Spillway (not to scale)



Isolator Row Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the **actual frequency of inspection and maintenance practices**.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

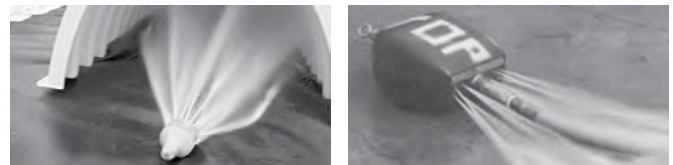
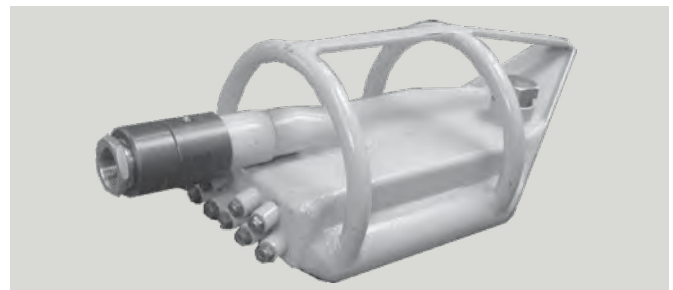
If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

Maintenance

The Isolator Row was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided

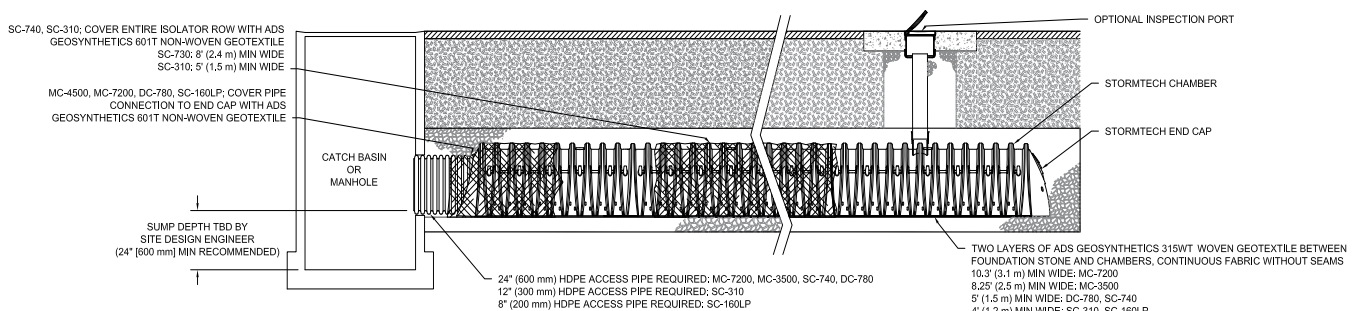
via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row lengths up to 200” (61 m). **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row (not to scale)

Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-7200 chamber models and is not required over the entire Isolator Row.



Isolator Row Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row for sediment.

- A) Inspection ports (if present)
 - i. Remove lid from floor box frame
 - ii. Remove cap from inspection riser
 - iii. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log.
 - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Row
 - i. Remove cover from manhole at upstream end of Isolator Row
 - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
 - 1. Mirrors on poles or cameras may be used to avoid a confined space entry
 - 2. Follow OSHA regulations for confined space entry if entering manhole
 - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

Step 2

Clean out Isolator Row using the JetVac process.

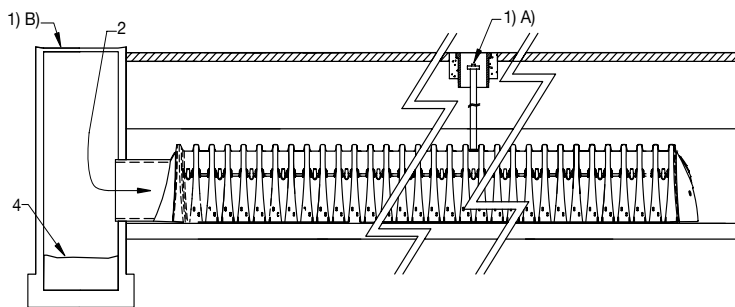
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sedi- ment Depth (1)-(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

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800-821-6710

Stormwater Pond Operation, Maintenance, and Management Inspection Checklist for BMP Owners

Project: _____ Owner Change since last inspection? Y N

Owner Name, Address, Phone _____

Number _____

Location: _____

Site Status: ____

Date: _____

Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Embankment and Emergency Spillway (Inspect annually and after major storms)		
1. Vegetation		
2. Erosion on embankment		
3. Animal burrows		
4. Cracking, bulging or sliding of dam		
A. Location:		
B. Describe		
5. Drains clear and functioning		
6. Leaks or seeps on embankment		
A. Location		
B. Describe		
7. Slope protection failure		
8. Emergency spillway clear of obstructions		
9. Other (describe)		

FIGURE 702-05: Private Operation, Maintenance & Management – Stormwater Ponds

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Riser and Principal spillway (Inspect annually)		
Circle Type: Reinforced concrete, corrugated pipe, masonry		
1. Low flow orifice blocked		
2. Trash rack		
A. debris removal needed		
B. corrosion noted		
3. Excessive sediment buildup in riser		
4. Concrete/Masonry condition		
A. cracks or displacement		
B. spalling		
5. Metal pipe condition		
6. Control Valve operational		
7. Pond drain valve operational		
8. Outfall channels functioning		
9. Other (describe)		
Permanent Pool (Inspect monthly)		
1. Undesirable vegetative growth		
2. Floatable debris removal needed		
3. Visible pollution		
4. Shoreline problem		
5. Other (describe)		

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
<u>Sediment Forebays</u>		
1. Sedimentation noted		
2. Sediment cleanout needed (over 50% full)		
Other (Inspect monthly)		
1. Erosion at outfalls into pond		
2. Headwalls and endwalls		
3. Encroachment into pond or easement area		
4. Complaints from residents		
5. Public hazards (describe)		

Additional Comments

Actions to be taken:

Timeframe:

Stormwater Infrastructure Operation, Maintenance, and Management Inspection Checklist for BMP Owners

Project: _____ Owner Change since last Inspection? ☐ Y

Owner Name, Address, Phone: _____

Number: _____

Location: _____

Site Status: _____

Date: _____

Time: _____

Inspector: _____

Maintenance Item	Satisfactory/ Unsatisfactory	Comments
Storm Inlets and Pipes (Inspect Monthly and After Major Storms)		
1. Inlet castings clear of trash/debris		
2. Inlet structures clear of trash/debris		
3. Sediment deposits in structures and pipes (max. accumulated depth 1/4 of pipe diameter)		
Drainage Swales (Inspect Monthly and After Major Storms)		
1. Mow and maintain vegetation (max. height 5 inches)		
2. Uniform swale slopes maintained		
3. Flowline unobstructed by buildings/fences		
4. Grade and reseed eroded areas		

Additional Comments:

Actions to be taken:	Timeframe:
_____	_____
_____	_____
_____	_____
_____	_____

Inspection and Maintenance Checklist Catch Basins, Manholes, and Inlets

Site Name:			
Owner Name:			
Owner Address:			
Owner Phone Number:			
Emergency Phone Number:			
Location:			
Date:			
Time:			
Inspector:			
Change in ownership since last inspection?	Y OR N		

Maintenance Item	Maintenance (1 or 2)*	Maintenance is needed:	Comments
Trash & Debris		Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%	
		Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe.	
		Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	
		Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	
Sediment		Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	
Structure Damage to Frame and/or Top Slab		Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (Intent is to make sure no material is running into basin).	
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	
Fractures or Cracks in Basin Walls/Bottom		Maintenance person judges that structure is unsound.	
		Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	
Settlement/Misalignment		If failure of basin has created a safety, function, or design problem.	
Vegetation		Vegetation growing across and blocking more than 10% of the basin opening.	
		Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	
Contaminants and Pollution		Any evidence of oil, gasoline, contaminants or other pollutants (Coordinate removal/cleanup with local water quality response agency).	
Catch Basin Cover		Cover is missing or only partially in place. Any open catch basin requires maintenance.	
		Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	
		One maintenance person cannot remove lid after applying normal lifting pressure (Intent is to keep cover from sealing off access to maintenance).	
Ladder		Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	
Metal Grates		Trash and debris that is blocking more than 20% of grate surface inletting capacity.	

*Maintenance: Enter 1 if maintenance is need and include WO#. Enter 2 if maintenance was performed same day

Inspection and Maintenance Checklist Conveyance Stormwater Pipe

Site Name:	
Owner Name:	
Owner Address:	
Owner Phone Number:	
Emergency Phone Number:	
Location:	
Date:	
Time:	
Inspector:	
Change in ownership since last inspection?	Y OR N

Maintenance Item	Maintenance (1 or 2)*	Maintenance is needed:	Comments
Sediment & Debris		Accumulated sediment exceeds buildup 1/4" of the pipe diameter up to maximum of 6"	
Vegetation		Vegetation that reduces free movement of water through the pipes	
Damaged Pipe		Protective coating is damaged; rust is causing more than 50% deterioration to any part of the pipe	
		Any dent that decreases the cross section area of pipe by more than 20% or puncture that impacts performance	

*Maintenance: Enter 1 if maintenance is need and include WO#. Enter 2 if maintenance was performed same day.