

CITY OF DETROIT

Mike Duggan, Mayor

STANDARD DETAILS



BOARD OF WATER COMMISSIONERS

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Mary E. Blackmon, Vice Chairperson

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Deputy Director/Chief Engineer

Mohamad Farhat, P.E.

Director of Engineering and Construction

Samuel Smalley, PE

Chief Operating Officer

Thomas Naughton

Chief Financial Officer

MARCH 2021

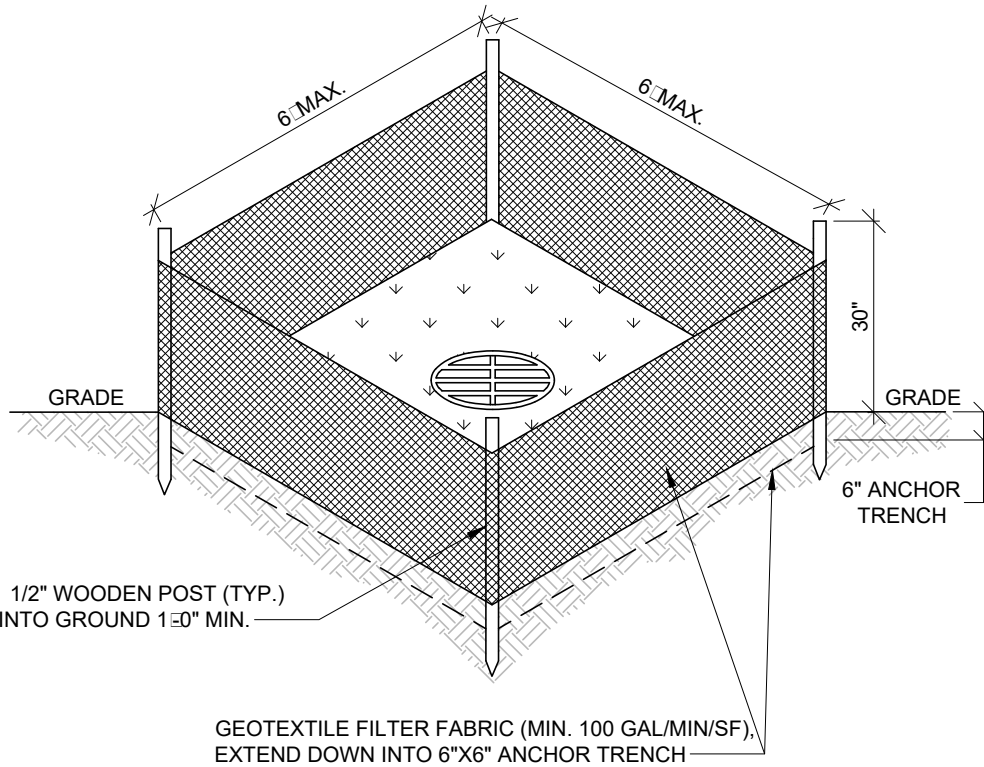
City of Detroit
Water and Sewerage Department - Engineering Division
Standard Details

015713-01	Drain Guard
015713-02	Erosion Control, Silt Fence
015713-03	Mulch Blankets / High Velocity Blankets
015713-04	Ditch Sediment Trap
015713-05	Inlet Protection Fabric Drop
015713-06	Check Dams
015713-07	Gravel Access Approach
015713-08	Sod Filter
015713-09	Vegetative Buffer Strip
015713-10	Soil Erosion and Sedimentation Control, Temporary Facilities
015713-11	Soil Erosion and Sedimentation Control, Maintenance Notes
015713-12	Soil Erosion and Sedimentation Control, General Notes
015713-13	Soil Erosion and Sedimentation Control, Measures (From 1-5)
015713-14	Soil Erosion and Sedimentation Control, Measures (From 6-10)
015713-15	Soil Erosion and Sedimentation Control, Measures (From 11-15)
015713-16	Soil Erosion and Sedimentation Control, Measures (From 16-20)
015713-17	Soil Erosion and Sedimentation Control, Measures (From 21-25)
015713-18	Soil Erosion and Sedimentation Control, Measures (From 26-30)
015713-19	Soil Erosion and Sedimentation Control, Measures (From 31-35)
015713-20	Mulch Blankets
260526-01	Water Service Grounding, Indoor Installation
260526-02	Water Service Grounding, Outdoor Installation
312333-01	Sanitary Sewer, Trench Detail (1 of 3)
312333-02	Sanitary Sewer, Trench Detail (2 of 3)
312333-03	Sanitary Sewer, Trench Detail (3 of 3)
312333-04	Utility Trench, Watermain (1 of 3)
312333-05	Utility Trench, Watermain (2 of 3)
312333-06	Utility Trench, Watermain (3 of 3)
312333-07	Utility Crossing
330507-01	Casing Pipe Section for Watermain
330561-02	Standard Manhole, Precast

330561-03	MH frame and cover with logo – Sewer
330561-04	Manhole, Water Cushions
330561-05	Manhole, Assembly
330561-06	Manhole, Exterior Drop
330561-07	Manhole, Interior Drop
330561-08	Manhole, Over Existing Sewer
330561-09	Gate Well, Precast (1 of 2)
330561-10	Gate Well, Precast (2 of 2)
330561-11	Gate Well Frame and Cover with Logo – Watermain
331413-01	Thrust Block, Horizontal Bend (Traditional DWSD Sizing)
331413-02	Thrust Block, Tees (Traditional DWSD Sizing)
331413-03	Thrust Block, Plugs and Caps (Traditional DWSD Sizing)
331413-04	Thrust Block, Vertical Bend (Traditional DWSD Sizing, 1 of 2)
331413-05	Thrust Block, Vertical Bend (Traditional DWSD Sizing, 2 of 2)
331413-06	Encasement, Water Distribution Pipe in Concrete (1 of 2)
331413-07	Encasement, Water Distribution Pipe in Concrete (2 of 2)
331413-08	Connection with Existing Watermain
331413-09	HDPE to Existing Pipe Transition (No Reducer)
331413-10	HDPE to Existing Pipe Transition (Reducer)
331417-01	Connection, Residential Service
331419-01	Valve, Gate, Cradle Support, Concrete
331419-02	Hydrant, 6 Inch, Installation Offset
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331419-04	Valve Box Installation
331419-05	Connection, New Main to Existing Main Using Tapping Valve
331419-06	Fire Hydrant Installation (HDPE Pipe)
331419-07	Valve Box Detail (HDPE Pipe)
331419-08	Valve Well Detail (HDPE Pipe)
331419-09	Concrete Valve Box Collar
333111-01	Connection, Saddle, to Lateral Sewer
333111-02	Wye, Connection and Extension
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333111-05	Connection, Residential Service
333111-06	Sewer Pipe Joint Detail
333111-07	Sewer Pipe Connection with Manhole


G/01	Permeable Concrete Pavement (Roadway, Parking Lot, and Alley)
G/01a	Permeable Concrete Pavement (Roadway, Parking Lot, and Alley)
G/02	Permeable Concrete Sidewalk
G/03	Permeable Concrete Pavement (Roadway, Parking Lot, and Alley)
G/04	Permeable Asphalt Sidewalk
G/05	Permeable Interlocking Unit Pavers (Roadway, Parking Lots, and Alley)
G/07	Permeable Unit Pavers (Sidewalk)
G/10	Permeable Pavement with Continuous Bottom Slope <2%
G/13	Permeable Pavement Edge Restraints
G/20	Bioretention in Open Area
G/21	Linear Bioretention Adjacent to Roadway No Step Out Zone
G/22	Linear Bioretention Adjacent to Roadway with Step Out Zone
G/23 page 1	Bioretention Planter Adjacent to Roadway (1 of 2)
G/23 page 2	Bioretention Planter Adjacent to Roadway (2 of 2)
G/24 page 1	Bioretention Planter Adjacent to Roadway with Step Out Zone (1 of 2)
G/24 page 2	Bioretention Planter Adjacent to Roadway with Step Out Zone (2 of 2)
G/25 page 1	Curb Bulb-Out In Planting Strip Bioretention (1 of 2)
G/25 page 2	Curb Bulb-Out In Planting Strip Bioretention (2 of 2)
G/30	Thickened Concrete Curb and Gutter Edge Treatment
G/32	Concrete Retaining Wall Edge Treatment with Footing
G/34	Modular Block Retaining Wall Edge Treatment
G/40	Inlet and Outlet for Curb Bulb-Out Bioretention
G/41	Curb Opening Inlet Type A
G/42	Curb Opening Inlet Type B
G/43 page 1	Curb Opening Inlet Type C with Trench Drain Cover (1 of 2)
G/43 page 2	Curb Opening Inlet Type C with Trench Drain Cover (2 of 2)
G/44	Area Inlet Type 1
G/45	Stone Splash Pad
G/46	Concrete Splash Pad
G/50	Overflow Riser with Beehive Grate
G/51	Stormwater Facility Underdrain Pipe Risers in Permeable Pavements
G/52	Stormwater Facility Underdrain Pipe Risers in Bioretention
G/53	Stormwater Facility Underdrain Bedding and Catch Basin Connection
G/54	Leaching Basin
G/55	Infiltration Trench

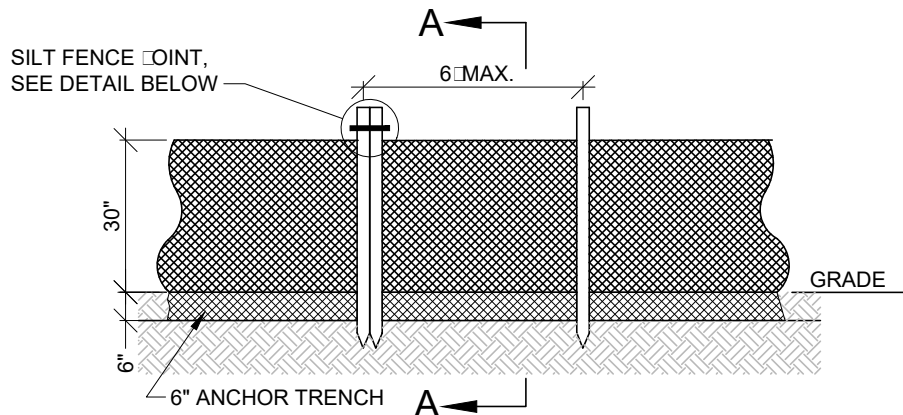
G/56	Stormwater Facility Anti-Seep Collar
G/60	Concrete Check Dam
G/62	Gabion Check Dam
G/65 page 1	Structural Cells for Urban Tree Planting (1 of 5)
G/65 page 2	Structural Cells for Urban Tree Planting (2 of 5)
G/65 page 3	Structural Cells for Urban Tree Planting (3 of 5)
G/65 page 4	Structural Cells for Urban Tree Planting (4 of 5)
G/65 page 5	Structural Cells for Urban Tree Planting (5 of 5)
G/70	Tree Planting
G/73	Object Marker for Obstruction Within Roadway



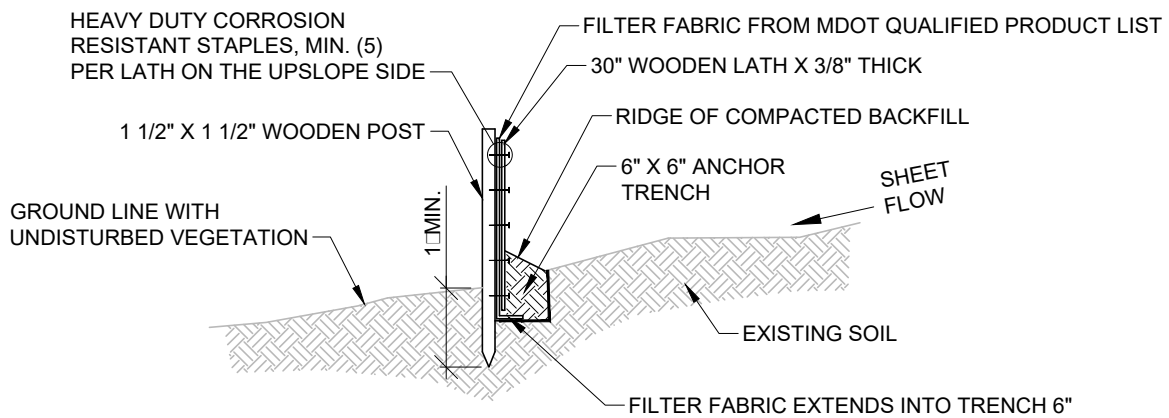
GENERAL NOTES:

1. REFER TO SILT FENCE DETAIL 015-13-02 FOR INSTALLATION PROCEDURES.
2. WEEKLY INSPECTION AND MAINTENANCE MUST BE PROVIDED TO INSURE THAT THE DRAIN GUARD OPERATES EFFICIENTLY.
3. SOD INTERIOR OF DRAIN GUARD UNLESS INDICATED OTHERWISE.
4. REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT AS NECESSARY, PER SPECIFICATION SECTION 015-13.

			DRAIN GUARD	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
REV	DESCRIPTION	DATE		SCALE NONE	1 OF 1 SHEET
REVISIONS				DATE 09/2018	015-13-01 DWG. No.

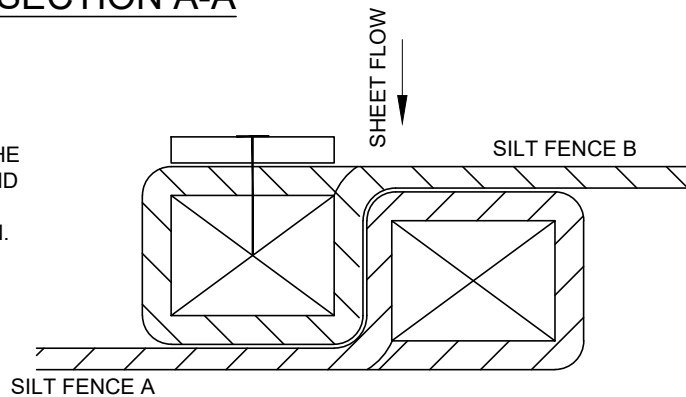


ELEVATION



SECTION A-A


GENERAL NOTE:
SILT FENCE MATERIAL SHALL MEET THE REQUIREMENTS IN SECTION 910.04 AND TABLE 910-1 IN MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

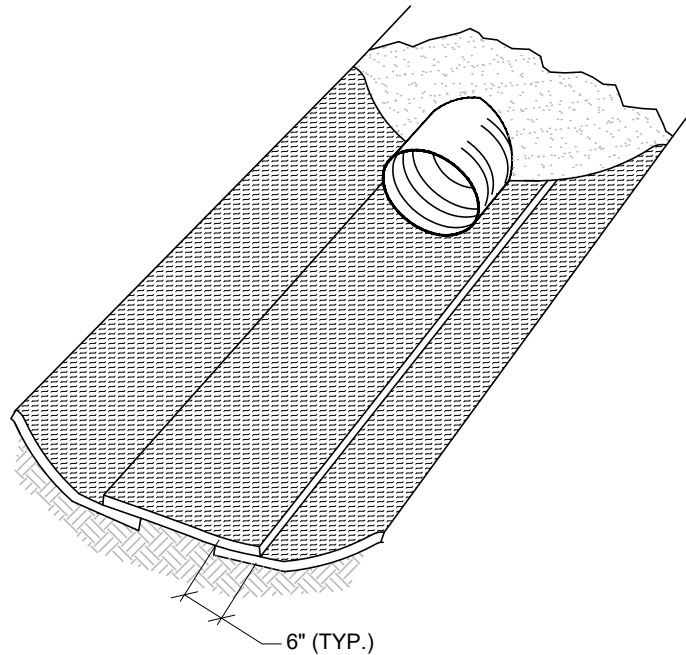


NOTE:

FABRIC TO BE WRAPPED AROUND FENCE POST.

SILT FENCE JOINT - TOP VIEW


			EROSION CONTROL, SILT FENCE	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 09/2018</div>
REVISIONS				<div>1 OF 1 SHEET</div> <div>01513-02 DWG. No.</div>

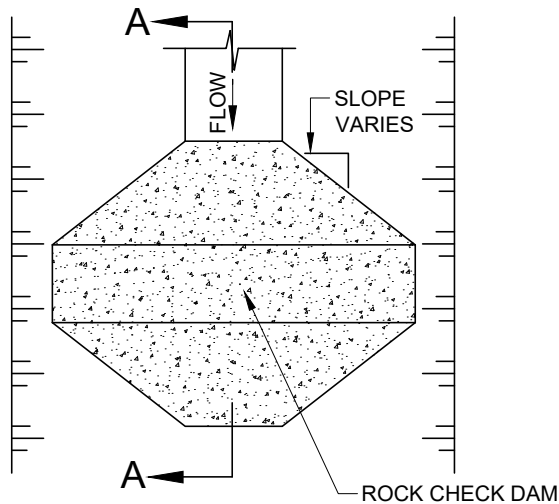


TYPICAL DITCH LINING

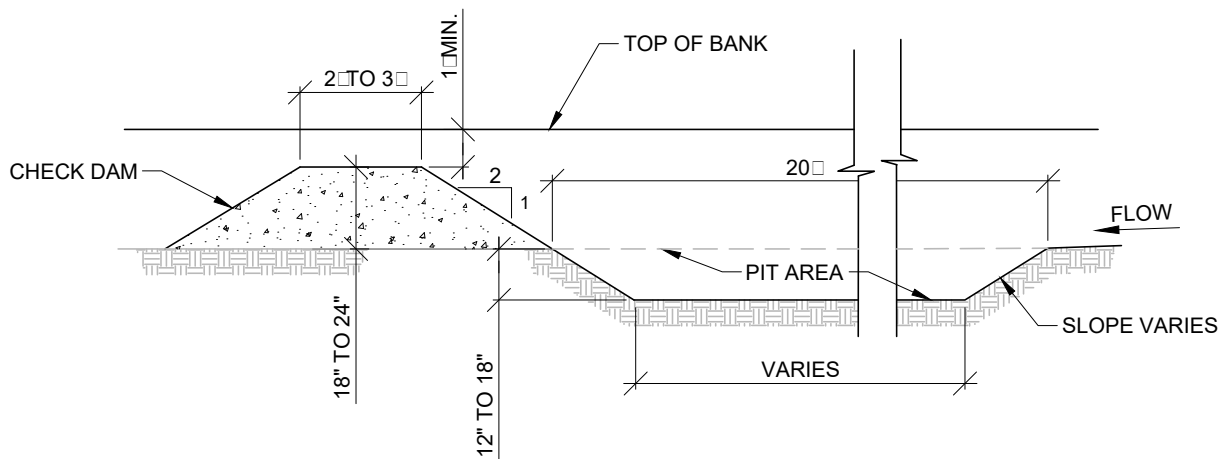
GENERAL NOTES: (FROM MDOT DRAINAGE MANUAL)

1. EROSION CONTROL BLANKETS PROTECT DENUDED SURFACES AGAINST WIND AND WATER EROSION, AND STABILIZE SOIL SURFACES WHILE VEGETATION IS BEING ESTABLISHED.
2. BLANKETS ARE PLACED IN DITCHES AND ON STEEP SLOPES USUALLY WITH RIP-RAP WHERE INDICATED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
3. EXTEND BLANKETS UNDER PIPE THREE (3) INCHES. ANCHOR BLANKETS IN ACCORDANCE WITH MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 816 TURF ESTABLISHMENT.
4. PROVIDE MULCH BLANKETS/HIGH VELOCITY BLANKETS SELECTED FROM THE MDOT QUALIFIED PRODUCTS LIST.
5. USE MULCH BLANKETS WITH NETTING ON TOP SIDE ON SLOPES FLATTER THAN 1:2.
6. USE HIGH VELOCITY BLANKETS WITH NETTING ON TOP AND FIBERS IN CONTACT WITH SOIL ON SLOPES 1:2 OR GREATER.
- USE MULCH BLANKET AS PERMANENT STABILIZATION TREATMENT FOR DITCHES WITH SLOPES BETWEEN 0.5□ AND 1.5□.
8. USE HIGH VELOCITY MULCH BLANKET AS PERMANENT STABILIZATION TREATMENT FOR DITCHES WITH SLOPES BETWEEN 1.5□ AND 3.0□.
9. USE ANCHOR TRENCH AT TOP OF SLOPE (SEE DETAIL 01014.02, SECTION A, FOR DETAILS ON TRENCH).

			MULCH BLANKETS AND HIGH VELOCITY BLANKETS		CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	
					SCALE NONE	1 OF 1 SHEET
					DATE 09/2018	015□13-03 DWG. No.
REV	DESCRIPTION	DATE				
REVISIONS						




PLAN VIEW

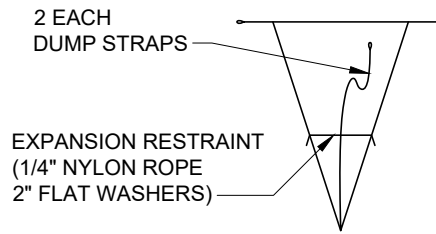


SECTION A-A

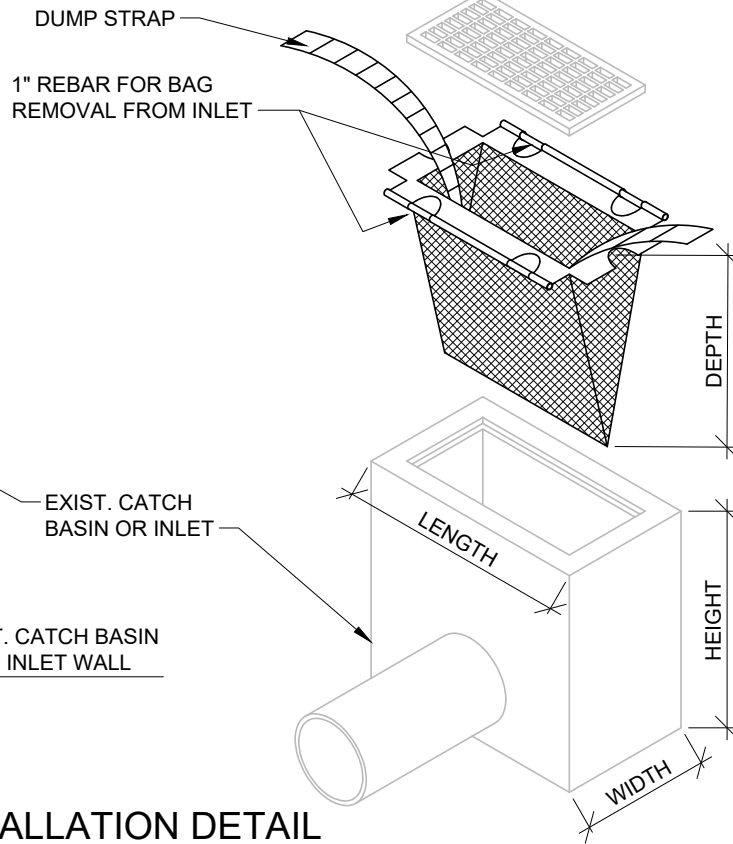
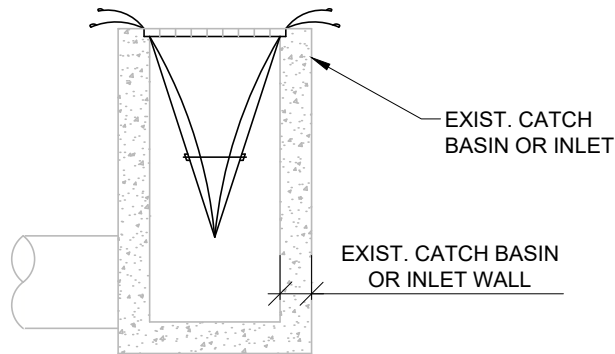
GENERAL NOTES:

1. THE DITCH CROSS-SECTION SHOULD ONLY BE PARTIALLY BLOCKED, IN ORDER TO MINIMIZE THE LOSS IN DITCH FLOW CAPACITY.
2. CHECK DAM SHOULD BE REMOVED AND THE SEDIMENT PIT FILLED AS SOON AS THE UPSTREAM AREAS CONTRIBUTING TO IT ARE STABILIZED. THIS WILL ALLOW THE DITCH TO FUNCTION AS DESIGNED.
3. WEEKLY INSPECTION AND MAINTENANCE MUST BE PROVIDED TO INSURE THAT THE DITCH SEDIMENT TRAP OPERATES EFFICIENTLY.
4. THE PERMISSION OF THE GOVERNMENTAL AGENCY, RESPONSIBLE FOR THE MAINTENANCE OF THE DITCH, MUST BE RECEIVED BEFORE A DITCH SEDIMENT TRAP IS INSTALLED.
5. SEE STANDARD DETAIL 015-13-06 OR DWSD FOR CHECK DAM SPECIFICATIONS FOR CONSTRUCTION.

			DITCH SEDIMENT TRAP	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
REV	DESCRIPTION	DATE		SCALE NONE	1 OF 1 SHEET
REVISIONS				DATE 09/2018	015-13-04 DWG. No.



BAG DETAIL

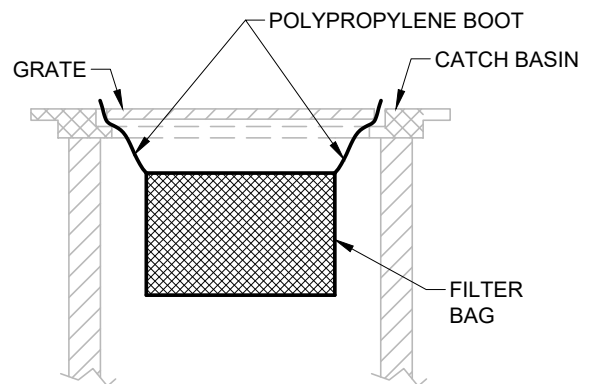


NOTE:

TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVED CATCH BASINS OR STORM INLETS. SEDIMENT FILTERS TO BE SIMILAR TO:


1. "SILTSACK" TYPE B, REGULAR FLOW, BY ACF ENVIRONMENTAL, INC.
2. "INLET PRO SEDIMENT BAG", STANDARD FLOW, WITH OPTIONAL FOAM DEFLECTOR BY HANES GEO COMPONENTS.
3. "DANDY CURB SACK" BY DANDY PRODUCTS, INC.
4. "BASIN BAG", REGULAR FLOW BY CSI GEOTURF, CLEAN FILTER AS NEEDED.

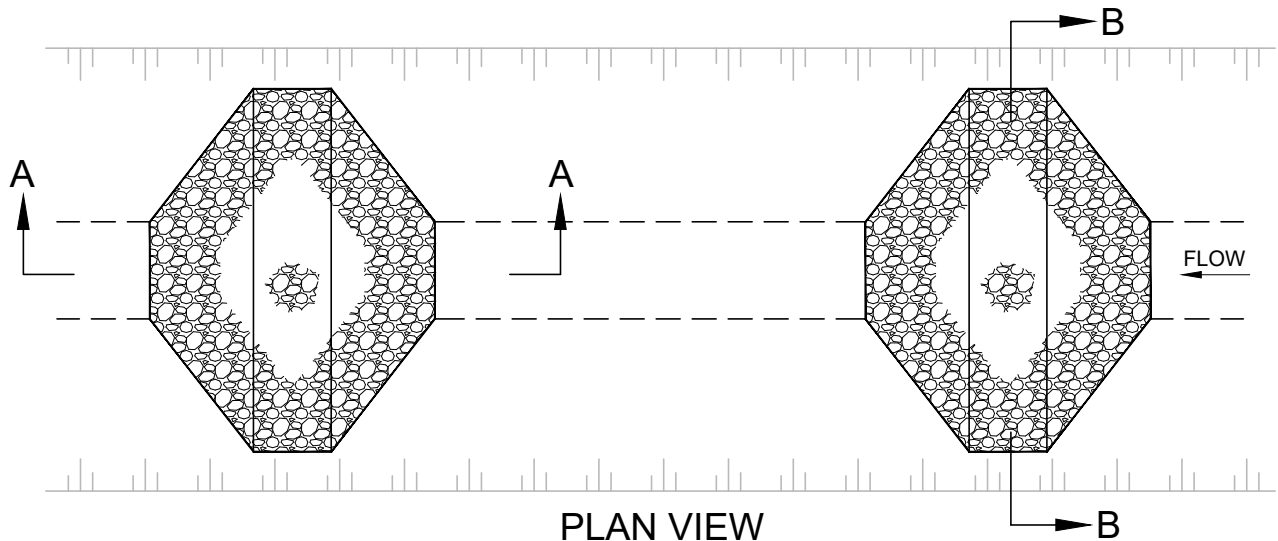
INSTALLATION DETAIL



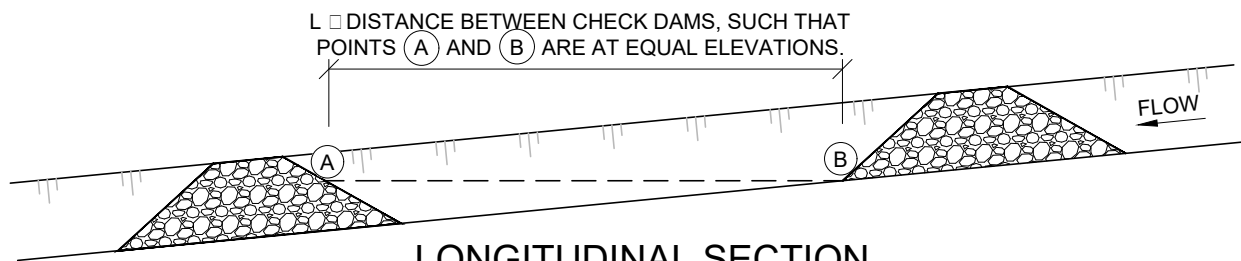
GENERAL NOTES

1. CONTRACTOR SHALL OBTAIN PERMISSION OF THE ENFORCING ROAD AGENCY BEFORE THIS TYPE OF CONTROL IS CONSTRUCTED IN THE ROAD RIGHT-OF-WAY.
2. CONTRACTOR SHALL KEEP CURBS ☐ GUTTER INLET FILTERS (AFTER PAVING) IN PLACE UNTIL ALL AREAS CONTRIBUTING TO THEM ARE STABILIZED WITH VEGETATION.
3. CONTRACTOR SHALL PERFORM WEEKLY INSPECTION AND MAINTENANCE TO ENSURE THAT THE CURB ☐ GUTTER INLET FILTER (AFTER PAVING) OPERATES EFFICIENTLY.

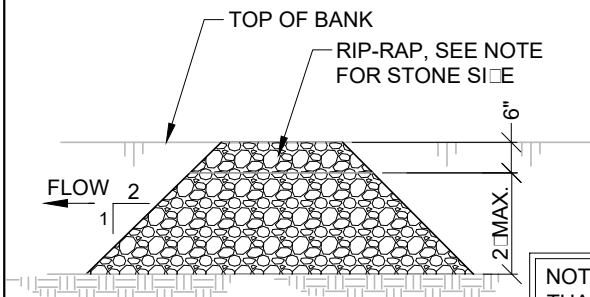
			<div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div> <div>INLET PROTECTION FABRIC DROP</div>	<div>SCALE NONE</div> <div>DATE 09/2018</div>	<div>1 OF 1</div> <div>01513-05</div>
				<div>SHEET</div> <div>DWG. No.</div>	
REV	DESCRIPTION	DATE			
REVISIONS					



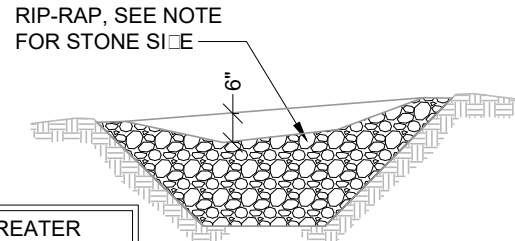
PLAN VIEW



LONGITUDINAL SECTION



SECTION A-A




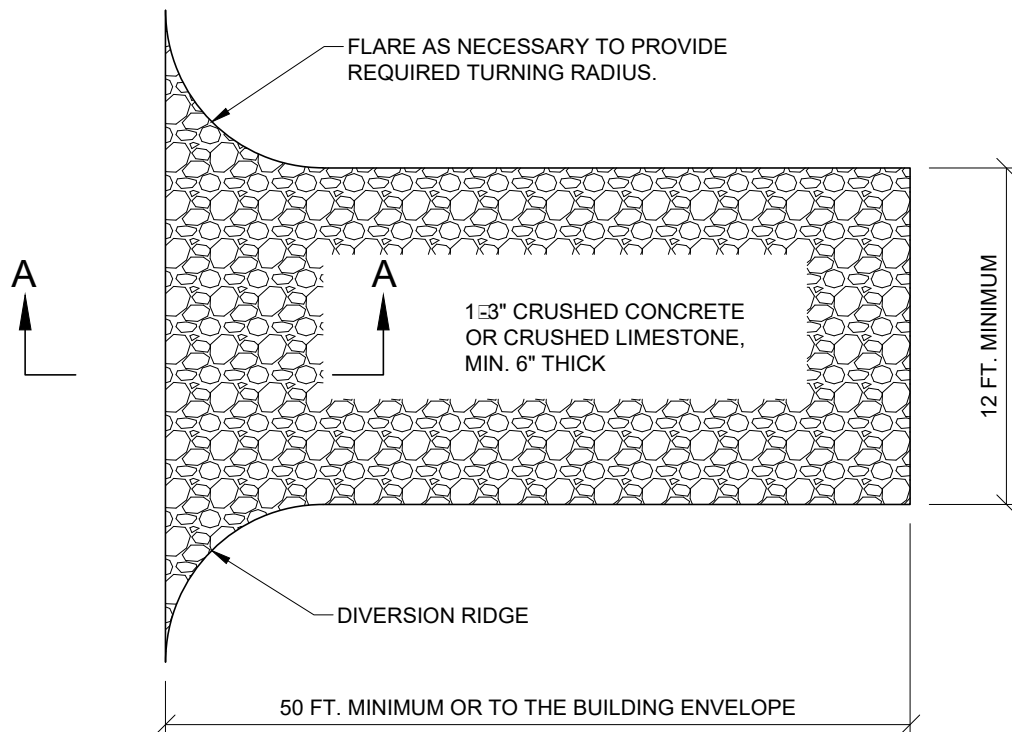
SECTION B-B

NOTE: CHECK DAMS GREATER THAN TWO FEET IN DEPTH MAY SERIOUSLY IMPACT THE FLOW CHARACTERISTICS OF THE DITCH.

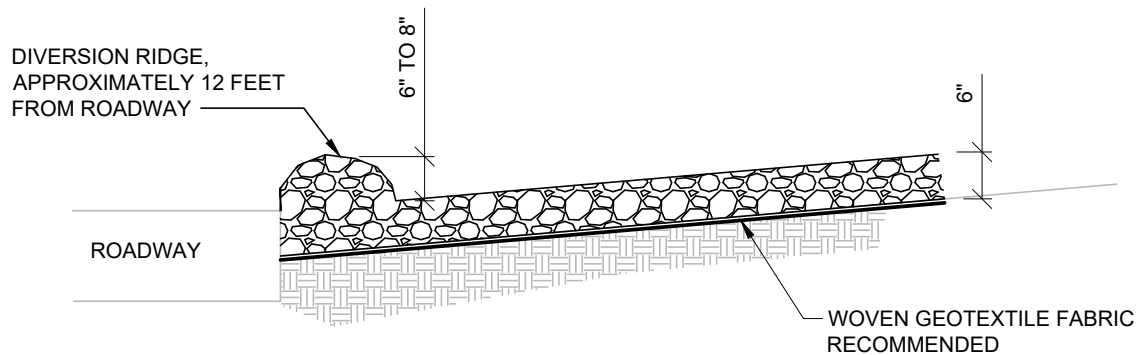
GENERAL NOTES:

1. DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZE RIP-RAP TO HANDLE THE SHEAR STRESS OF THE SLOPE/CHANNEL.
2. FOR SLOPE AND/OR CHANNEL PROTECTION, SEE THE MDOT CONSTRUCTION SITE SOIL EROSION PREVENTION POCKET GUIDE.
3. RIP-RAP SIZE SHOULD BE 2-4 INCHES FOR DITCH GRADES LESS THAN 2% AND 3-12 INCHES FOR DITCH GRADES GREATER THAN 2%.
4. BASE TO BE AT LEAST 2 X HEIGHT.


			CHECK DAMS	<div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div>
REV	DESCRIPTION	DATE		<div><div>SCALE NONE</div><div>DATE 09/2018</div></div>
REVISIONS				<div><div>1 OF 1 SHEET</div><div>015-13-06 DWG. No.</div></div>



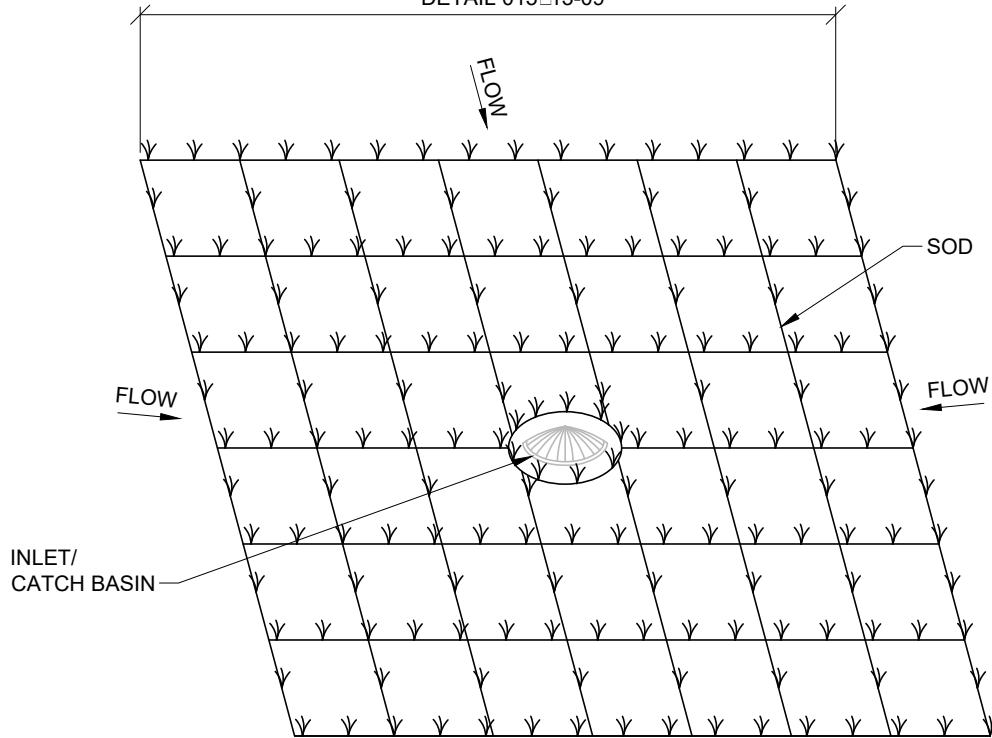
PLAN VIEW



CROSS-SECTION A-A

			GRAVEL ACCESS APPROACH	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	1 OF 1	
					SCALE NONE	SHEET
					DATE 09/2018	01513-01 DWG. No.
REV	DESCRIPTION	DATE				
REVISIONS						


25 MINIMUM OR USE
VEGETATIVE BUFFER STRIP CHART,
DETAIL 015-13-09



ISOMETRIC VIEW

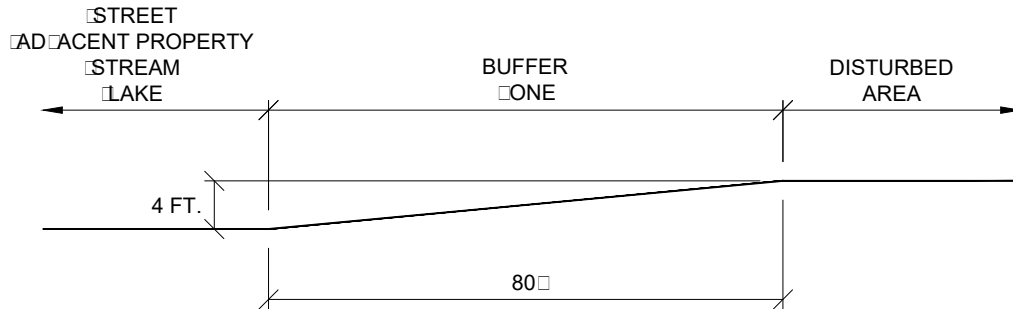
NOTES:

1. SOD INLET FILTERS ARE PADS OF SOD PLACED AROUND A STORM DRAIN INLET OR CATCH BASIN.
2. SOD INLET FILTERS ARE INSTALLED TO SLOW THE FLOW OF WATER INTO AN INLET OR CATCH BASIN AND FILTER OUT SEDIMENT IN THE PROCESS.
3. SOD INLET FILTERS SHOULD ONLY BE USED TO HANDLE LIGHT CONCENTRATIONS OF SEDIMENT. THEY ARE BEST USED AFTER FINAL GRADING IS COMPLETE AND DURING THE ESTABLISHMENT OF A VEGETATIVE COVER.

			SOD FILTER	<div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div>
REV	DESCRIPTION	DATE		<div><div>SCALE NONE</div><div>DATE 09/2018</div></div>
REVISIONS				<div><div>SHEET 1 OF 1</div><div>DWG. No. 015-13-08</div></div>

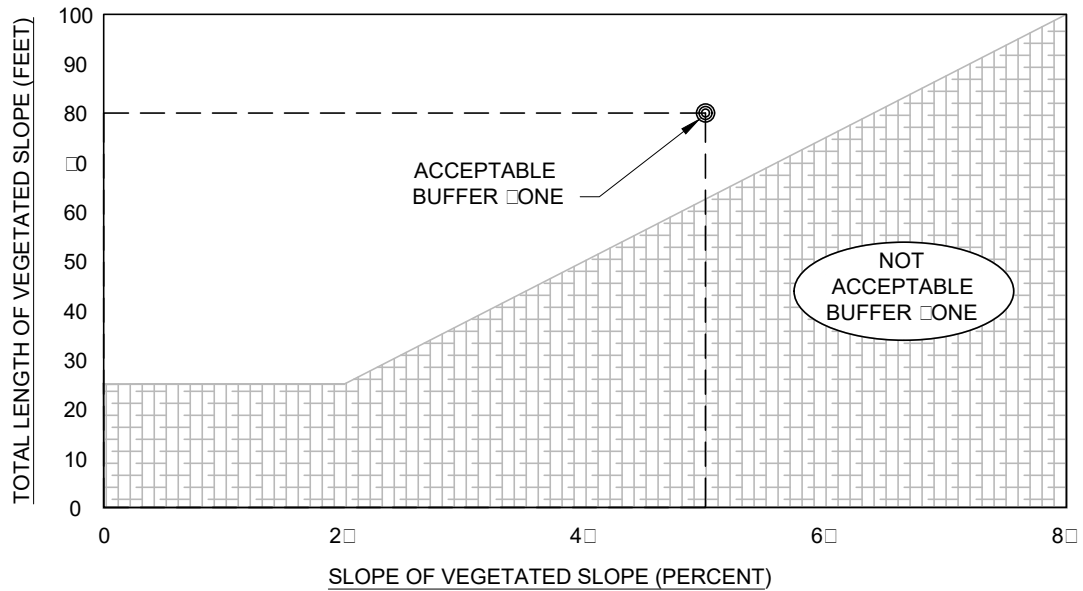
EXAMPLE:

LENGTH OF BUFFER ☐ ONE ☐ 80 ☐
☐ OF SLOPE OF BUFFER ☐ ONE ☐ 5 ☐




ELEVATION VIEW

THE GRAPH SHOWN BELOW IS USED TO DETERMINE THE ADEQUACY OF AN EXISTING VEGETATIVE BUFFER ☐ ONE FOR USE AS A SEDIMENT FILTER. THIS GRAPH IS ONLY APPLICABLE IF THE VEGETATION IS 90 ☐ DENSE AND AT LEAST 1" IN LENGTH OVER EVERY SQUARE FOOT OF DISTURBED SOIL. AN AREA COVERED WITH WEEDS OR BUSHES AND TREES, WITHOUT A GOOD GROUND COVER, IS NOT ACCEPTABLE.



VEGETATIVE BUFFER STRIP CHART

			VEGETATIVE BUFFER STRIP	<div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div>			
						SCALE NONE	1 OF 1 SHEET
						DATE 09/2018	01513-09 DWG. No.
REV	DESCRIPTION	DATE					
REVISIONS							

SOIL EROSION AND SEDIMENTATION CONTROL TEMPORARY FACILITIES


THE CONTRACTOR SHALL CONSTRUCT THIS PROJECT IN COMPLIANCE WITH PART 91 OF ACT NO. 451 OF 1994, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, OF THE MICHIGAN COMPILED LAWS ENTITLED "SOIL EROSION AND SEDIMENTATION CONTROL" UNDER THE CONTROL OF THE LOCAL PERMIT AGENCY CHARGED WITH ADMINISTERING THE PROVISIONS OF THIS ACT. THE CONTRACTOR SHALL FOLLOW THE PROCEDURES DELINEATED BELOW AND CONSTRUCT AND MAINTAIN THE FACILITIES SHOWN ON THE DRAWINGS TO CONTROL WATER AND WIND EROSION DURING CONSTRUCTION OF THIS PROJECT.

ALL DISTURBED SURFACE AREA (INCLUDING UTILITY TRENCHES) SHALL BE TEMPORARILY GRADED AND/OR DITCHED TO DIRECT ALL WATER RUNOFF FROM SUCH AREAS TO SEDIMENTATION CONTROL DEVICES WHICH WILL PREVENT WATER CARRYING ERODED SOIL FROM ENTERING A WATERCOURSE, SEWER, OR ADJACENT LANDS. SUCH SEDIMENTATION CONTROL DEVICES SHALL INCLUDE BUT NOT BE LIMITED TO PROTECTIVE DITCHES, SEDIMENT TRAPS, SEDIMENT FILTERS, DITCH TRAPS, PIPE BARRIERS, AND FILTERS AS DETAILED AND REQUIRED AND WHERE INDICATED ON THE DRAWINGS. AFTER THE PROJECT WORK HAS BEEN COMPLETED, INSPECTED, AND APPROVED, THE CONTRACTOR SHALL REMOVE ALL SEDIMENTATION CONTROL DEVICES, MATERIAL, AND THEIR COLLECTED SILT AND DEBRIS AND RESTORE THE AREA IN ACCORDANCE WITH THE DRAWINGS.

IN ROADWAY AREAS TEMPORARY AGGREGATE SURFACING SHALL BE PLACED IMMEDIATELY AFTER THE BACKFILLING OPERATION HAS BEEN COMPLETED. POSITIVE DUST CONTROL MEASURES SHALL BE TAKEN AT ALL TIMES.

PERMANENT STABILIZATION SHALL BE COMPLETED WITHIN 5 DAYS OF FINAL EARTH CHANGE. FINAL CLEANUP AND RESTORATION WILL CONSIST OF FINAL GRADING, TOPSOILING, SEEDING AND MULCHING AND/OR SODDING OF ALL DISTURBED AREAS OF THE PROJECT.

IF SEASONAL CONDITIONS PREVENT FINAL CLEANING AND RESTORATION, THE CONTRACTOR SHALL PROCEED WITH TEMPORARY STABILIZATION OF THE DISTURBED AREA. TEMPORARY STABILIZATION SHALL CONSIST OF ROUGH GRADING THE DISTURBED AREA IN ACCORDANCE WITH THESE SPECIFICATIONS. TEMPORARY STABILIZATION MATERIALS SHALL BE REMOVED AND DISPOSED OF AND FINAL CLEANUP AND RESTORATION SHALL BE COMPLETED NOT LATER THAN 5 DAYS AFTER SEASONAL CONDITIONS ALLOW PERFORMANCE OF THE REQUIRED WORK.

			SOIL EROSION SEDIMENTATION CONTROL, TEMPORARY FACILITIES		CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	
					SCALE NONE	1 OF 1 SHEET
					DATE 09/2018	01513-10 DWG. No.
REV	DESCRIPTION	DATE				
REVISIONS						

SOIL EROSION AND SEDIMENTATION CONTROL MAINTENANCE NOTES

THE CONTRACTOR SHALL INSPECT SOIL EROSION AND SEDIMENTATION CONTROL DEVICES WEEKLY AND WITHIN 24 HOURS OF A SIGNIFICANT RAIN EVENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

MAINTENANCE INCLUDES ALL WORK NECESSARY FOR PROPER OPERATION OF THE DEVICES. DEVICES WHICH CAN NOT BE REPAIRED MAY NEED TO BE REPLACED. MAINTENANCE OF THE DEVICES SHALL BE PERFORMED WITHIN 24 HOURS OF INSPECTION.


SEDIMENT SHALL BE REMOVED AS NECESSARY TO MAINTAIN THE EFFECTIVENESS OF SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

SEDIMENT DEPOSITED ALONG SILT FENCE SHALL BE REMOVED WHEN IT REACHES 1/3 TO 1/2 THE HEIGHT OF THE FENCE.

TURF ESTABLISHMENT MEASURES SHALL BE MAINTAINED AS WOULD ANY OTHER DEVICES PRIOR TO ESTABLISHMENT OF PERMANENT TURF.

ALL MUD, DIRT AND DEBRIS TRACKED ONTO EXISTING ROADS FROM THIS SITE SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR.

CONTRACTOR SHALL ENSURE THAT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES PROTECT AGAINST LOSS OF SOIL BY THE ACTION OF WATER, ICE, GRAVITY OR WIND.

			SOIL EROSION AND SEDIMENTATION CONTROL, MAINTENANCE NOTES		CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	
					SCALE NONE	1 OF 1 SHEET
				DATE 09/2018	01513-11 DWG. No.	
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REVISIONS						

SUMMARY OF BASIC PRINCIPLES:

1. KEEP DISTURBED AREA AS SMALL AS POSSIBLE.
2. STABILIZE AND/OR PROTECT DISTURBED AREAS AS SOON AS POSSIBLE.
3. KEEP STORM WATER RUNOFF VELOCITIES LOW.
4. RETAIN SEDIMENT WITHIN IMMEDIATE CONSTRUCTION AREA.

THE PURPOSE OF THIS PLAN IS TO SPECIFY METHODS FOR TEMPORARY EROSION CONTROL DURING CONSTRUCTION. IT IS INTENDED THAT MEASURES CALLED FOR IN THE SPECIFICATIONS AND SHOWN ON THESE STANDARD DETAILS PLANS BE STRICTLY ADHERED TO. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT CONSTRUCTION PROCEDURES UNDERTAKEN BE IN CONFORMANCE WITH THE STATE OF MICHIGAN ACT 451 OF 1994 PART 91, SOIL EROSION AND SEDIMENTATION CONTROL.

ALL SOIL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE REGULARLY MAINTAINED BY THE CONTRACTOR THROUGHOUT THE DURATION OF THE PROJECT. COLLECTED SILT AND SEDIMENTATION SHALL BE REMOVED PERIODICALLY TO MAINTAIN THE EFFECTIVENESS OF THE SILT TRAPS OR SEDIMENTATION CONTROL DEVICES. WHERE REQUIRED, THE CONTRACTOR SHALL REPLACE FILTER MATERIALS WHICH HAVE BECOME INEFFECTIVE DUE TO CONTAMINATION OR PHYSICAL DETERIORATION.


IF POSSIBLE, NO GRUBBING SHOULD BE DONE WITHIN 30' OF AN ACTIVE WATERCOURSE.

AGGREGATES PLACED IN STREAMS SHOULD CONTAIN A MINIMUM OF FINES. AS A GENERAL RULE FOR DAMS IN SMALL STREAMS, AT LEAST 50 STONE SHOULD BE 6" DIAMETER OR LARGER. 3" OR LARGER STONE SHALL BE USED FOR LINING STREAM BOTTOMS WHERE LINING IS REQUIRED.

ALL TEMPORARY EROSION CONTROL FACILITIES SHOULD BE REMOVED BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION UNLESS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE. CARE SHALL BE TAKEN DURING REMOVAL TO MINIMIZE SILTATION IN NEARBY DRAINAGE COURSES.

SURFACE DISRUPTION IN ADVANCE OF CONSTRUCTION INCLUDING CLEARING, GRADING OR SIGNIFICANT SOD REMOVAL SHALL BE LIMITED AS FOLLOWS, UNLESS PERMISSION IS OTHERWISE OBTAINED FROM THE GOVERNING AGENCY:

- A. WET WEATHER SEASON (MARCH, APRIL, MAY) - 5 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.
- B. DRY WEATHER SEASON (JUNE, JULY, AUGUST, SEPTEMBER, OCTOBER, NOVEMBER) - 10 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.
- C. COLD WEATHER SEASON (DECEMBER, JANUARY, FEBRUARY) - 15 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

			SOIL EROSION AND SEDIMENTATION CONTROL, GENERAL NOTES	 CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	
REV	DESCRIPTION	DATE			
REVISIONS					
				SCALE NONE	1 OF 1 SHEET
				DATE 09/2018	01513-12 DWG. No.

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REV	DESCRIPTION	DATE
REVISIONS		

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 6-10)



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	2 OF 2 SHEET
DATE 09/2018	015-13-14 DWG. No.



INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE
TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

KEY	DETAILS	CHARACTERISTICS
6		PROVIDES IMMEDIATE PROTECTION. CAN BE USED ON STEEP SLOPES WHERE SEED MAY BE DIFFICULT TO ESTABLISH. EASY TO PLACE. MAY BE REPAIRED IF DAMAGED. SHOULD INCLUDE PREPARED TOPSOIL BED.
		SLOWS RUNOFF VELOCITY. FILTERS SEDIMENT FROM RUNOFF. REDUCES VOLUME OF RUNOFF ON SLOPES. ASSISTS IN ESTABLISHING PERMANENT VEGETATIVE COVER.
8		USED ALONE TO PROTECT EXPOSED AREAS FOR SHORT PERIODS. PROTECTS SOIL FROM IMPACT OF FALLING RAIN. PRESERVES SOIL MOISTURE AND PROTECTS GERMINATING SEED FROM TEMPERATURE EXTREMES. SHOULD BE INSPECTED AFTER EVERY RAINSTORM AND REPAIRED AS NECESSARY UNTIL VEGETATION IS WELL ESTABLISHED.
9		CAN BE ACCOMPLISHED BY HARROWING WITH A DISK, BACK BLADING, OR TRACKING WITH A DOZER PERPENDICULAR TO THE SLOPE. REDUCES VELOCITY AND INCREASES INFILTRATION RATES. COLLECTS SEDIMENT. HOLDS WATER, SEED, AND MULCH BETTER THAN SMOOTH SURFACES.
10		USED WHERE VEGETATION IS NOT EASILY ESTABLISHED. EFFECTIVE FOR HIGH VELOCITIES OR HIGH CONCENTRATIONS. PERMITS RUNOFF TO INFILTRATE SOIL. DISSIPATES ENERGY FLOW AT SYSTEM OUTLETS. SHOULD BE PLACED ON A GEOTEXTILE LINER.

SLOPES	STREAMS AND WATERWAYS	SURFACE DRAINAGEWAYS	ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL)	LARGE FLAT SURFACE AREAS	BORROW AND STOCKPILE AREAS	ADJACENT PROPERTIES
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A	B	C	D	E	F	G
*	*	*	*	*	*	*
*	*	*	*	*	*	*
*	*	*	*	*	*	*
*	*	*	*	*	*	*

SLOPES

KEY

6

11

12

13

14

15



**CITY OF
DETROIT**
DETROIT
Water & Sewerage
Department

DWG. No.	015□13-15
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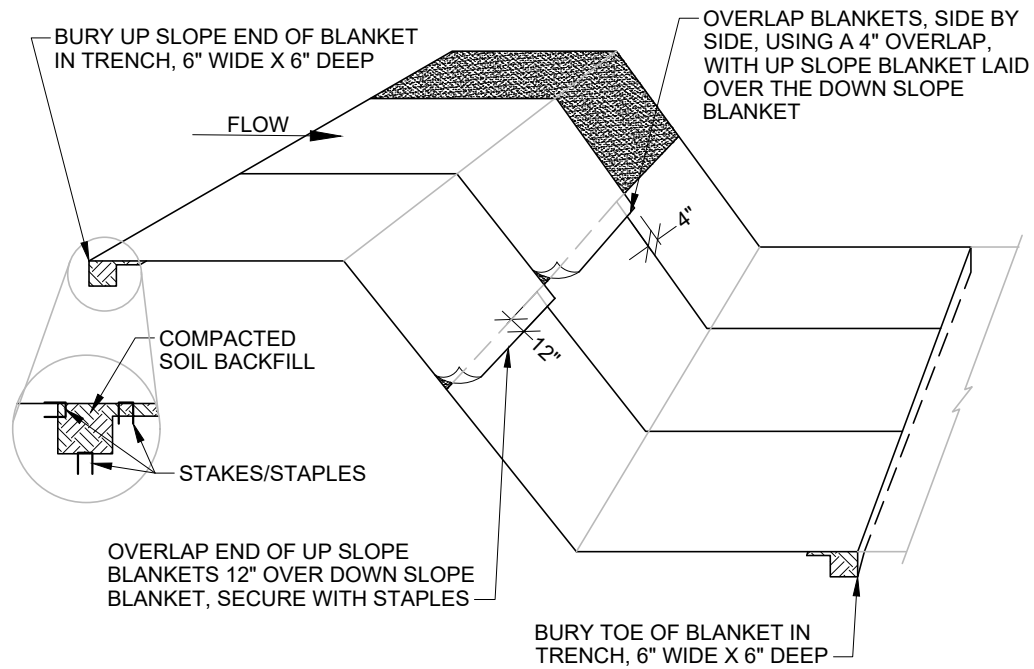
REVISIONS

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			<div>★ INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.</div>												
			KEY		DETAILS		CHARACTERISTICS		ADJACENT PROPERTIES						
			21				PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGE OF SLOPE AREA. USUALLY PERMANENT. CAN BE CONSTRUCTED OR EXTENDED AS GRADING PROGRESSES.		BORROW AND STOCKPILE AREAS						
			22				REDUCES RUNOFF VELOCITY. REMOVES SEDIMENT AND TURBIDITY. CAN BE DESIGNED TO HANDLE LARGE VOLUMES OF FLOW. ALLOWS WATER TO DROP RAPIDLY IN ELEVATION WITHOUT CAUSING EXCESSIVE EROSION.		LARGE FLAT SURFACE AREAS						
			23				INEXPENSIVE TO CONSTRUCT. PROVIDES IMMEDIATE PROTECTION. PROTECTS AREAS AROUND INLETS FROM EROSION.		ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL)						
			24				INEXPENSIVE AND EASY TO CONSTRUCT. CAN BE LOCATED AS NECESSARY TO COLLECT SEDIMENT. MAY BE USED IN CONNECTION WITH SNOW FENCE FOR ADDED STABILITY.		SURFACE DRAINAGEWAYS						
			25				CAN BE CONSTRUCTED ACROSS DITCHED OR ANY AREA OF CONCENTRATED FLOW. PROTECTS VEGETATION IN EARLY STAGES OF GROWTH. A CHECK DAM IS INTENDED TO REDUCE WATER VELOCITIES AND CAPTURE SEDIMENT. A CHECK DAM IS NOT A FILTERING DEVICE		STREAMS AND WATERWAYS						
									SLOPES						
									A						
									B						
									C						
									D						
									E						
									F						
									G						


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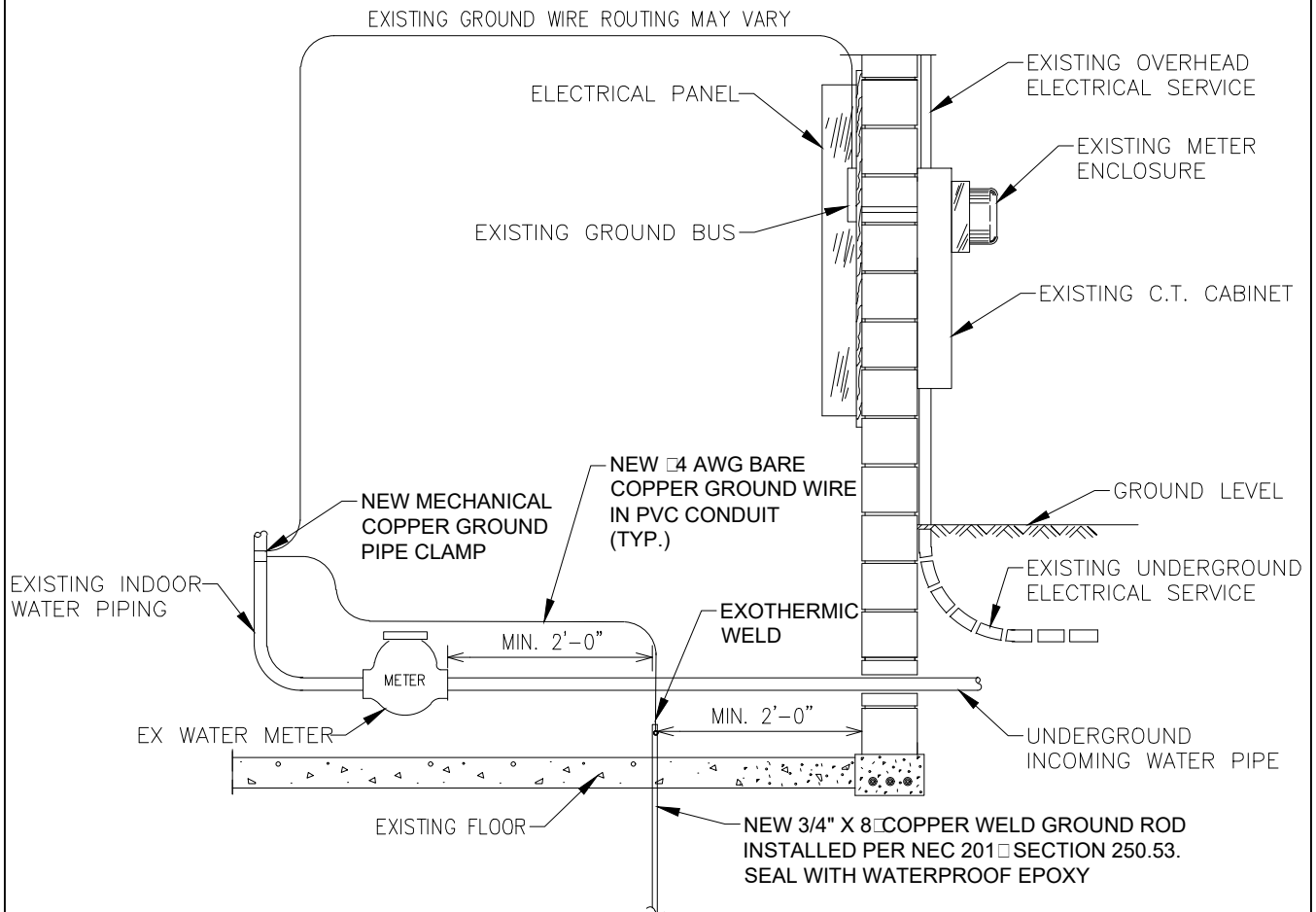
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NOTES:

1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.
2. WHEN BLANKETS ARE USED IN FLOWING DITCH, BLANKETS SHOULD NOT OVERLAP IN DITCH CENTER, PARALLEL TO FLOW.
3. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
4. WHERE POSSIBLE, CONSTRUCT WITH BIODEGRADABLE MATERIAL.

			MULCH BLANKETS	 CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	
				SCALE NONE	1 OF 1 SHEET
				DATE 09/2018	01513-20 DWG. No.
REV	DESCRIPTION	DATE			
REVISIONS					



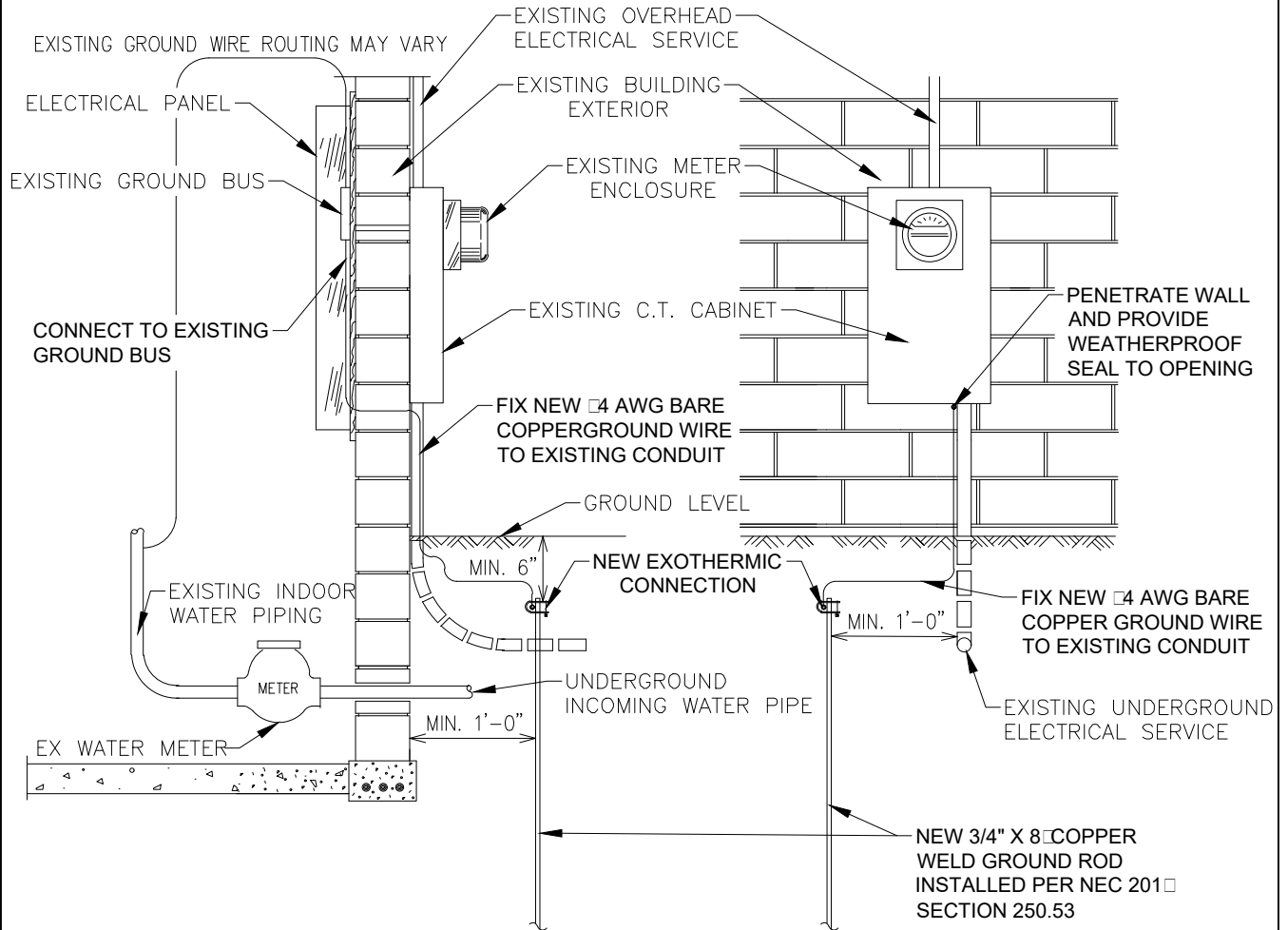
REV	DESCRIPTION	DATE
REVISIONS		

WATER SERVICE GROUNDING, INDOOR INSTALLATION



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 5/2020	260526-01 DWG. No.



REV	DESCRIPTION	DATE
REVISIONS		

WATER SERVICE GROUNDING, OUTDOOR INSTALLATION



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

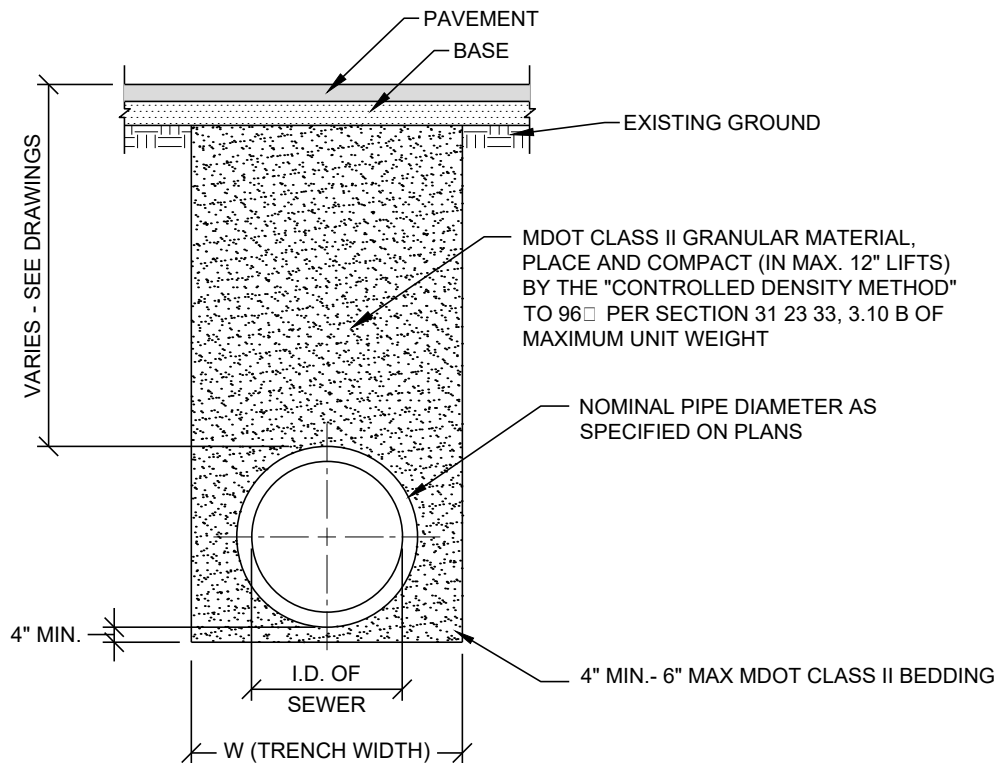
SCALE
NONE

SHEET

1 OF 1

DATE
5/2020

260526-02
DWG. No.



I.D. PIPE SIZE (INCHES)	18 OR LESS	21	24	30	36	42	48	54	60	66	72
MAXIMUM TRENCH WIDTH (FEET)	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00


W (TRENCH WIDTH) = 5 FEET, WHEN PIPE I.D. IS 18" OR LESS

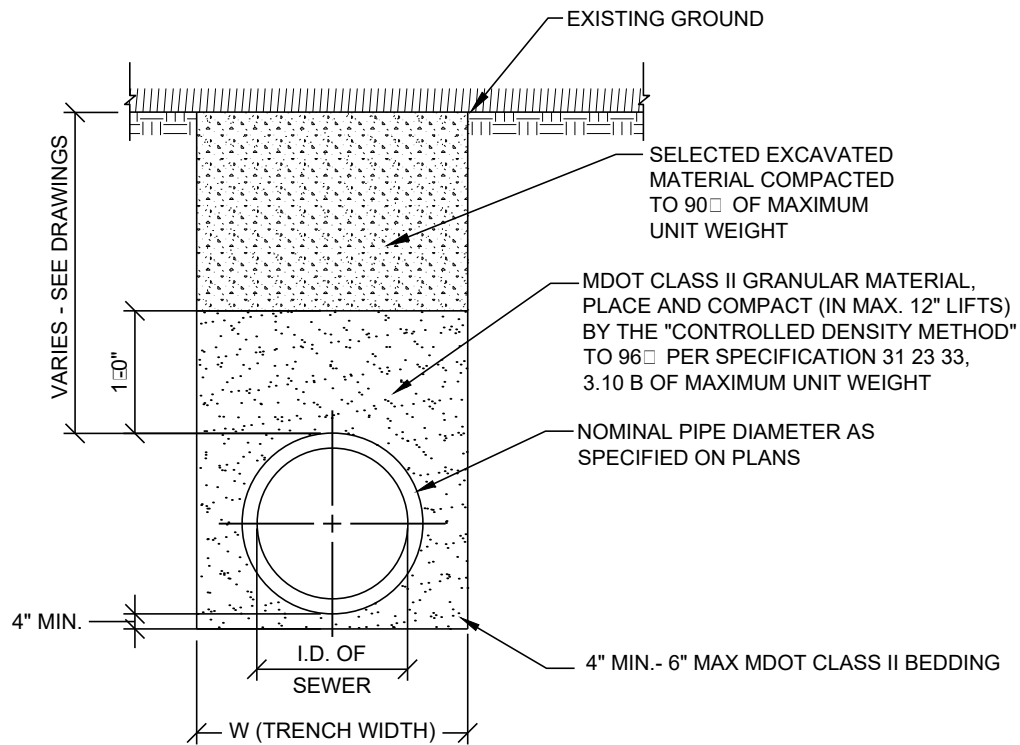
W (TRENCH WIDTH) = I.D. + 4 FEET, WHEN PIPE I.D. IS GREATER THAN 18"

NOTES:

- NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
- REFER TO PAVEMENT RESTORATION DETAILS FOR BASE AND PAVEMENT WIDTH.
- TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR SEWER UNDER ROAD BED, PARKING LOTS, SIDEWALKS, DRIVEWAYS, CURBS, GRAVEL ROADS AND ALLEYS

			<p>SANITARY SEWER TRENCH DETAIL</p>	 <p>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</p>
1	UPDATED	06/2020		<p>SCALE NONE</p> <p>DATE 09/2018</p>
REV	DESCRIPTION	DATE		
	REVISIONS			
				<p>1 OF 3 SHEET</p> <p>312333-01 DWG. No.</p>



I.D. PIPE SIZE (INCHES)	18 OR LESS	21	24	30	36	42	48	54	60	66	72
MAXIMUM TRENCH WIDTH (FEET)	5.00	5.25	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00


W (TRENCH WIDTH) = 5 FEET, WHEN PIPE I.D. IS 18" OR LESS

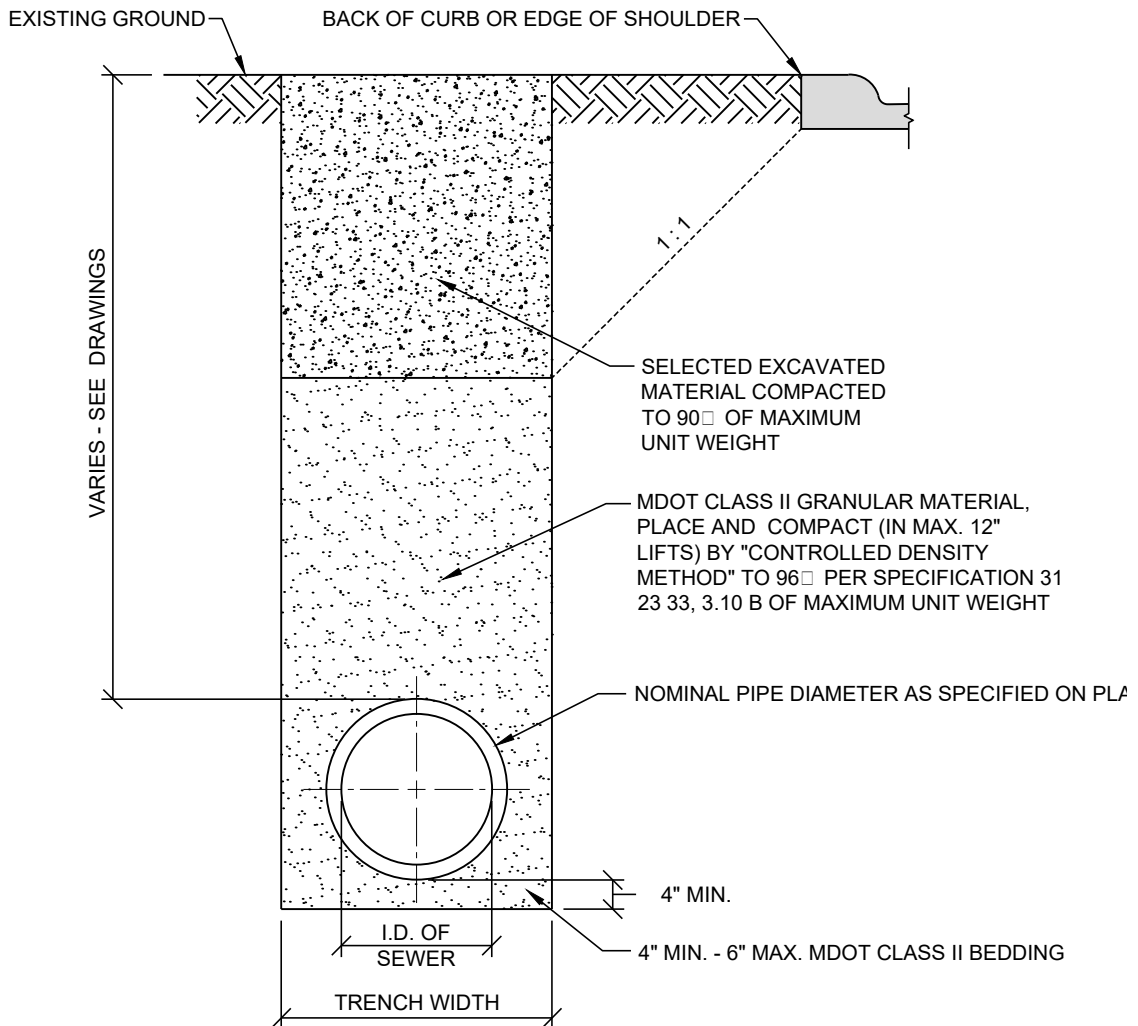
W (TRENCH WIDTH) = I.D. + 4 FEET, WHEN PIPE I.D. IS GREATER THAN 18"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

**STANDARD TRENCH DETAIL FOR SEWER
UNDER BERMS, LAWNS, GRASSY AREAS,
(OUTSIDE PAVEMENT INFLUENCE)**

			SANITARY SEWER TRENCH DETAIL	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
1	UPDATED	06/2020		SCALE NONE	2 OF 3 SHEET
REV	DESCRIPTION	DATE		DATE 09/2018	312333-02 DWG. No.
REVISIONS					



I.D. PIPE SIZE (INCHES)	18 OR LESS	21	24	30	36	42	48	54	60	66	72
MAXIMUM TRENCH WIDTH (FEET)	5.00	5.25	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50	10.00

W (TRENCH WIDTH) = 5 FEET, WHEN PIPE I.D. IS 18" OR LESS


W (TRENCH WIDTH) = I.D. + 4 FEET, WHEN PIPE I.D. IS GREATER THAN 18"

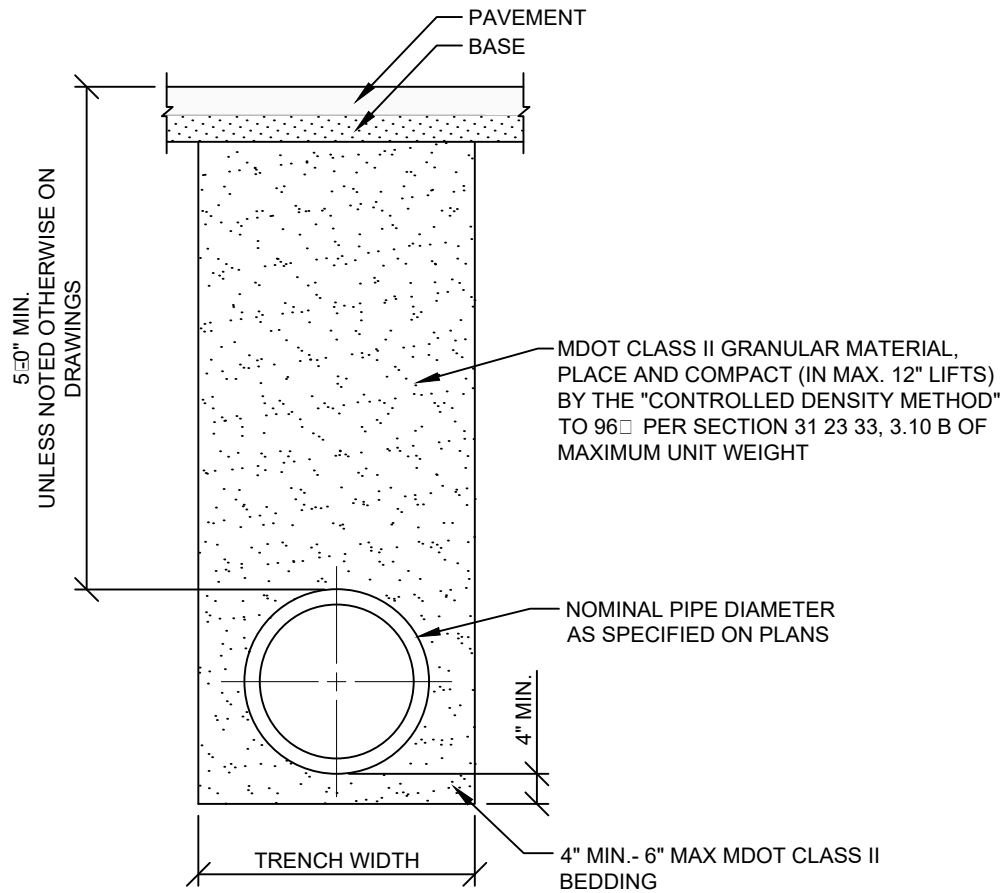
NOTES:

- NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
- TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR SEWER

WITHIN INFLUENCE OF ROAD BED

			SANITARY SEWER TRENCH DETAIL		CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	
					SCALE NONE	3 OF 3
					DATE 9/2018	312333-03
						DWG. No.
1	UPDATED	06/2020				
REV	DESCRIPTION	DATE				
REVISIONS						



NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. REFER TO PAVEMENT RESTORATION DETAILS FOR BASE AND PAVEMENT WIDTH.
3. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

**STANDARD TRENCH DETAIL FOR WATER MAIN
UNDER ROAD BED, PARKING LOTS, SIDEWALKS,
DRIVEWAYS, CURBS, GRAVEL ROADS AND ALLEYS**

-	-	-
-	-	-
-	-	-
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1	UPDATED	5/2020
REV	DESCRIPTION	DATE
REVISIONS		

**UTILITY TRENCH,
WATER MAIN**



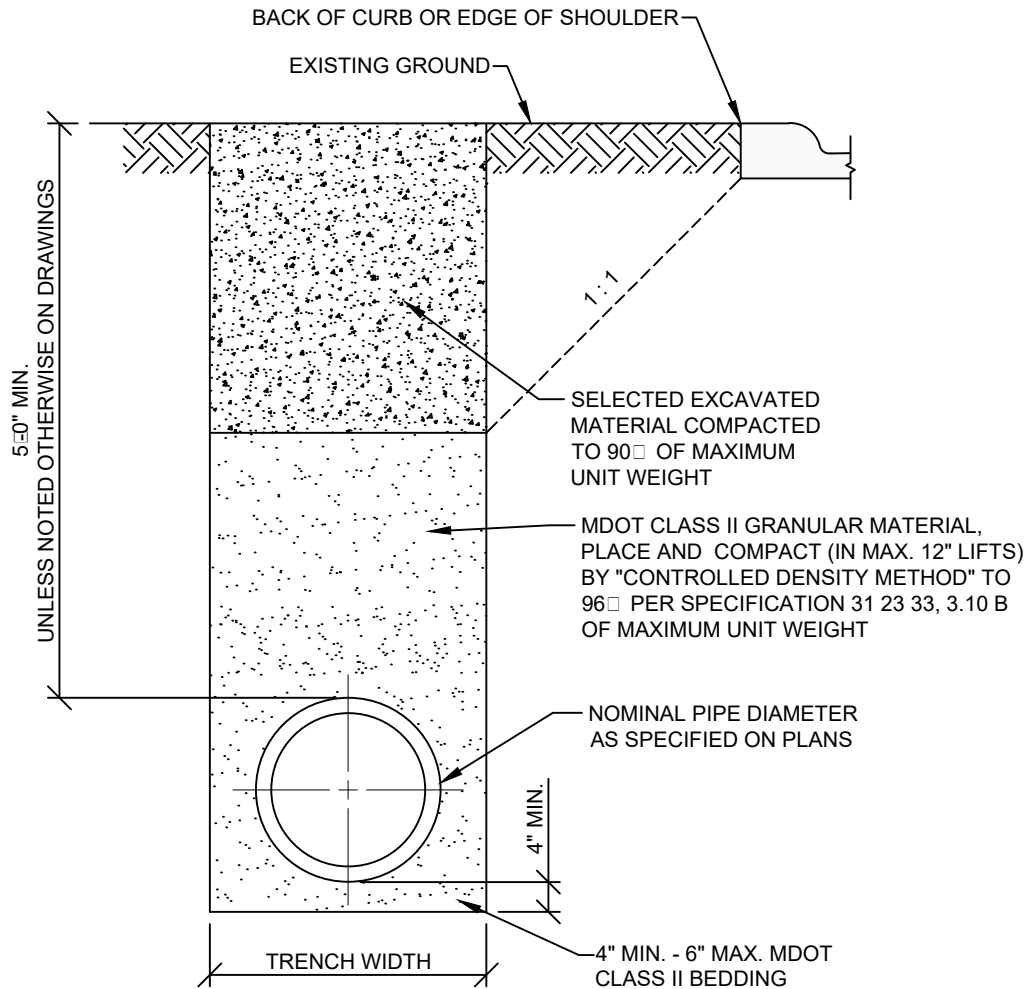
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

1 OF 3
SHEET

DATE
9/2018

312333-04
DWG. No.




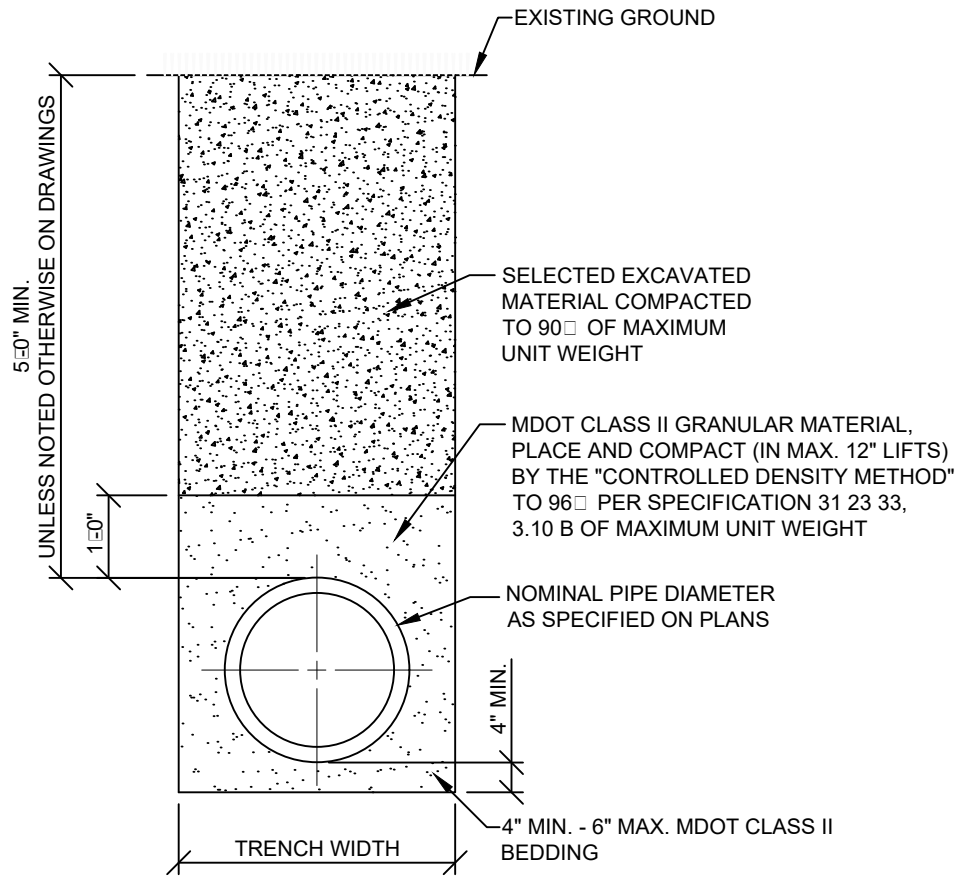
NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

**STANDARD TRENCH DETAIL FOR WATER MAIN
WITHIN INFLUENCE OF ROAD BED**

-	-	-	UTILITY TRENCH, WATER MAIN	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
-	-	-			
-	-	-			
-	-	-			
-	-	-			
1	UPDATED	5/2020			
REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 9/2018</div>	<div>2 OF 3 SHEET</div> <div>312333-05 DWG. No.</div>
REVISIONS					




NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

NOTES:

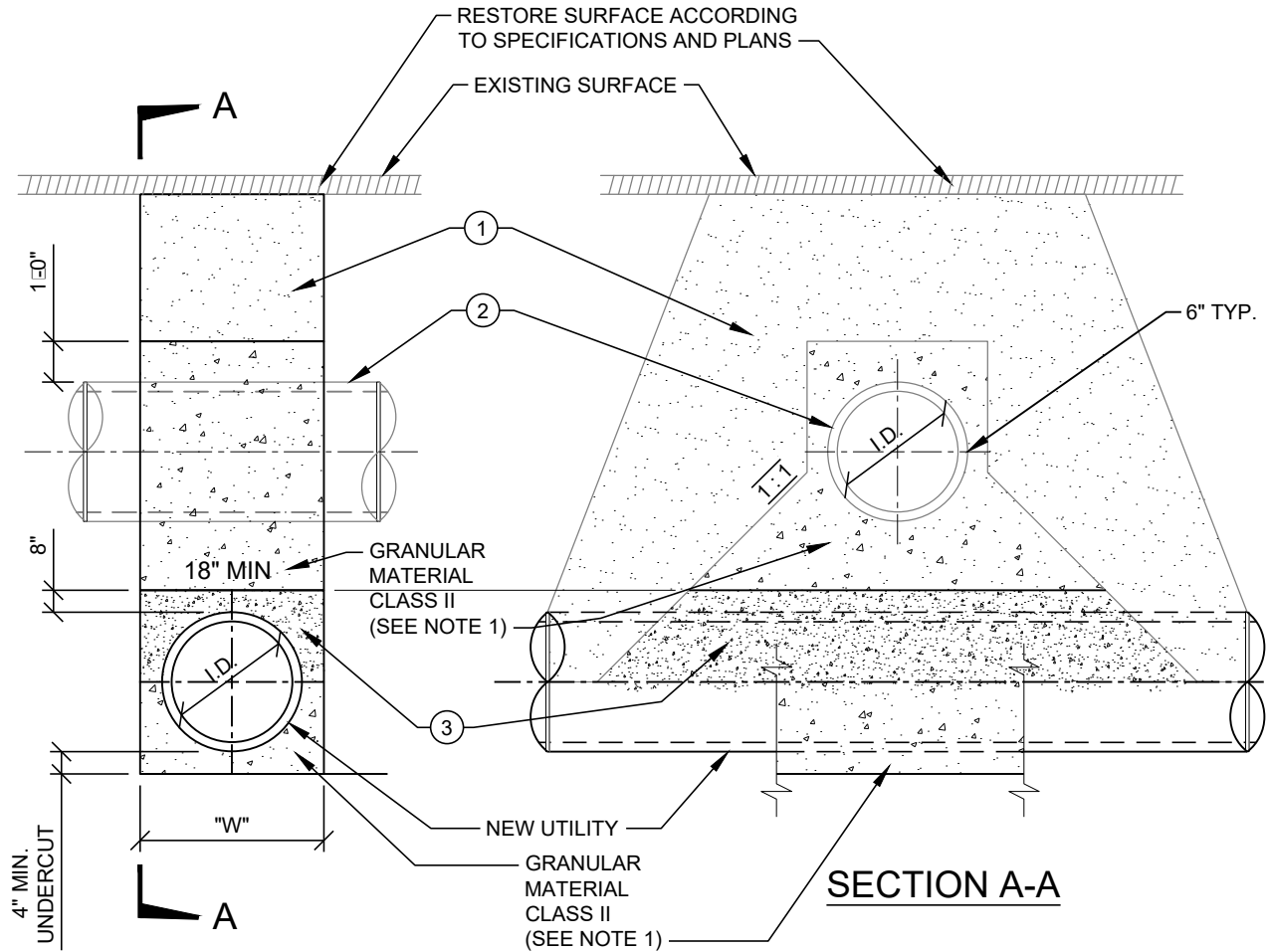
1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMIZE THE SURFACE DISRUPTION.

**STANDARD TRENCH DETAIL FOR WATER MAIN
UNDER BERMS, LAWNS, GRASSY AREAS,
(OUTSIDE PAVEMENT INFLUENCE)**

-	-	-	UTILITY TRENCH, WATER MAIN	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
-	-	-		
-	-	-		
-	-	-		
-	-	-		
1	UPDATED	5/2020		
REV	DESCRIPTION	DATE	SCALE NONE	3 OF 3 SHEET
REVISIONS			DATE 9/2018	312333-06 DWG. No.

CODED NOTES:


- ① BACKFILL ACCORDING TO SPECIFICATIONS AND TYPICAL TRENCH SECTION.
- ② EXISTING CATCH BASIN DRAIN, SEWER OR OTHER UNDERGROUND UTILITY CROSSING NEW OPEN CUT CONSTRUCTION.
- ③ BACKFILL WITH A DRY MIX OF ONE BAG CEMENT PER ONE BAG OF GRANULAR MATERIAL CLASS II.

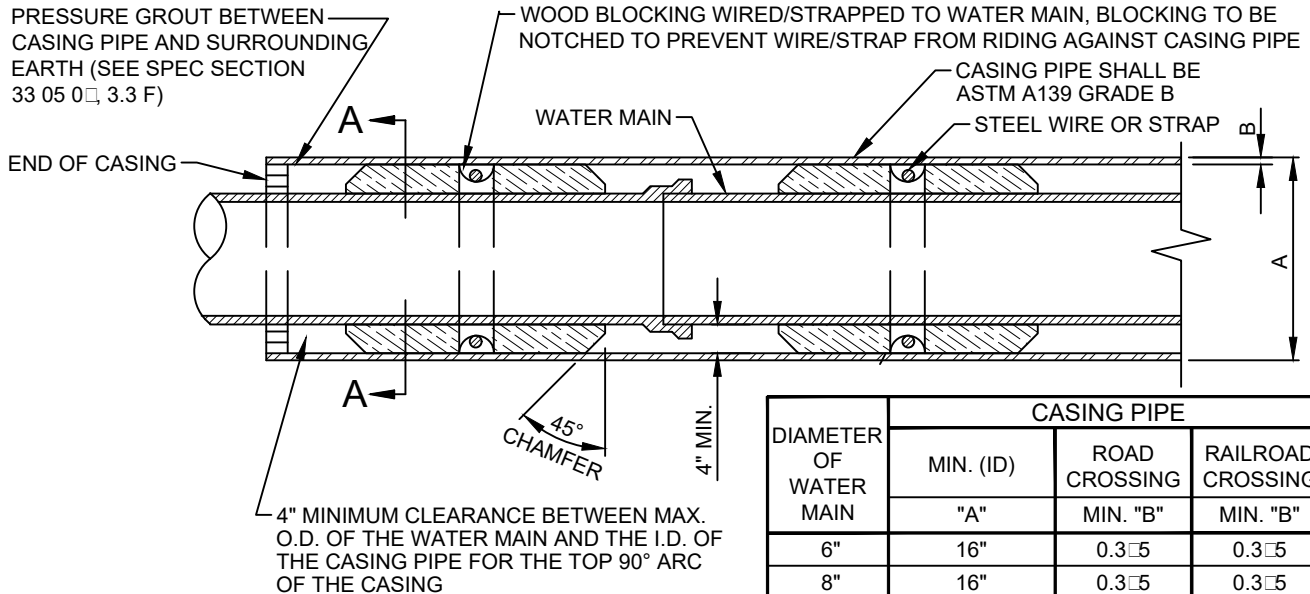


NOTES:

1. ALL MDOT CLASS II GRANULAR MATERIAL, PLACE AND COMPACT (IN MAX. 12" LIFTS) BY "CONTROLLED DENSITY METHOD" TO 96% PER SPECIFICATION 31 23 33, 3.10 B OF MAXIMUM UNIT WEIGHT.
2. WATERMAINS CROSSING UNDER SEWERS - WHEN IT IS IMPOSSIBLE TO OBTAIN THE MINIMUM 18-INCH CLEARANCE. REPLACE THE SEWER PIPE (MINIMUM OF 10 FT. ON BOTH SIDES OF WATERMAIN) WITH WATER WORKS GRADE 150PSI PRESSURE TESTED TO ENSURE WATER TIGHTNESS.
3. "W" - SEE TRENCH DETAILS FOR TRENCH WIDTH.
4. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P

TYPICAL DETAIL AT CROSSING UNDER EXISTING UTILITIES

			UTILITY CROSSING	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
1	UPDATED	06/2020			
REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 09/2018</div>	<div>SHEET 1 OF 1</div> <div>312333-01</div> <div>DWG. No.</div>
REVISIONS					



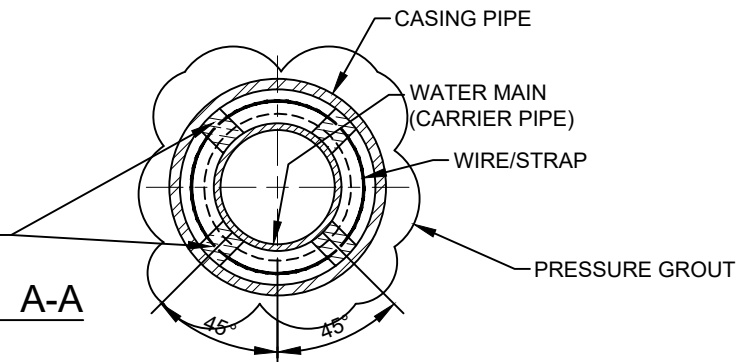
PIPE BARREL SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING PIPE

DIAMETER OF WATER MAIN	CASING PIPE		
	MIN. (ID)	ROAD CROSSING	RAILROAD CROSSING
	"A"	MIN. "B"	MIN. "B"
6"	16"	0.3'±	0.3'±
8"	16"	0.3'±	0.3'±
12"	20"	0.3'±	0.500
16"	24"	0.3'±	0.500
20"	30"	0.3'±	0.500
24"	36"	0.3'±	0.500

A □ PIPE INSIDE DIAMETER
B □ PIPE WALL THICKNESS

WATER MAIN SHALL BE WIRED/STRAPPED TO THE (4) WOLMANIZED WOOD SKID BLOCKS. 85% OF PIPE WITHIN CASING PIPE SHALL BE SUPPORTED. TERMINATE BLOCKS 12" FROM END OF CASING PIPE TO ALLOW BULKHEAD OF ENTIRE PIPE CIRCUMFERENCE. REFERENCE SPEC SECTION 33 05 00, 2.5 FOR ALTERNATE PIPE SUPPORT AND INSULATOR DETAILS.

SECTION A-A



NOTES:

- CONTRACTOR SHALL SUBMIT IN WRITING THE DETAILS OF THE APPROPRIATE PIPE CASING INSTALLATION FOR REVIEW AND APPROVAL BY THE ENGINEER BEFORE INSTALLATION OF ANY CASING STARTS. ALTERNATE METHODS OF SUPPORTING AND MAINTAINING THE POSITION OF THE CARRIER PIPE WITH RESPECT TO THE CASING PIPE (IN LIEU OF THE USE OF TIMBERS) WILL BE CONSIDERED.
- IN CASE OF RAILROAD OR BRIDGE FOUNDATION CROSSINGS, SPECIFICATIONS AND REQUIREMENTS OF THE RESPECTIVE RIGHT-OF-WAY AUTHORITY WILL BE CONSIDERED PRIORITY.
- CARRIER PIPE WITHIN CASING PIPE SHALL HAVE BOLTLESS RESTRAINED JOINTS.
- THE OUTSIDE DIAMETER OF BELL OF BOLTLESS RESTRAINED PIPE MAY VARY WITH THE SAME MANUFACTURER. THEREFORE, CONTRACTOR SHALL VERIFY O.D. OF BELL AND INCREASE SIZE OF STEEL CASING PIPE AS REQUIRED.
- DUCTILE IRON CARRIER PIPE SHALL BE POLYWRAPPED AND PIPE SHALL NOT REST ON BELLS.
- CASING CLOSURE SHALL BE IN ACCORDANCE WITH SPECIFICATION 33 05 00 - TRENCHLESS INSTALLATION OF UTILITY PIPING.

1	UPDATED	5/2020
REV	DESCRIPTION	DATE
REVISIONS		

CASING PIPE SECTION FOR WATER MAIN



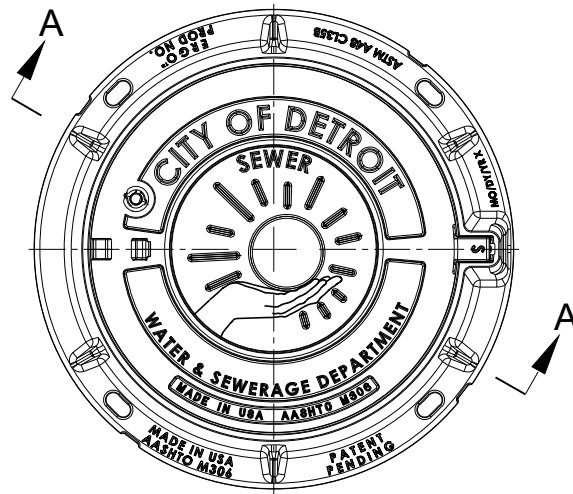
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

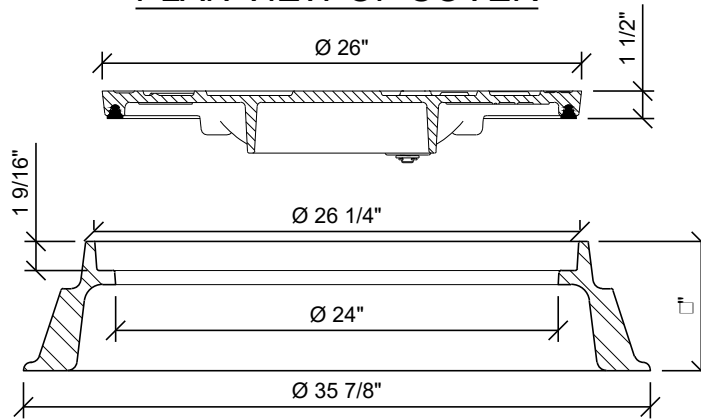
1 OF 1
SHEET

DATE
9/2018

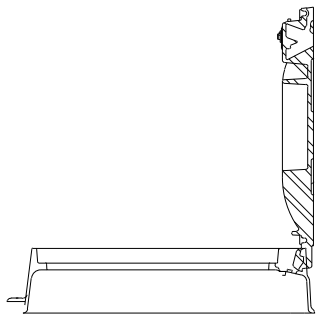
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DWG. No.



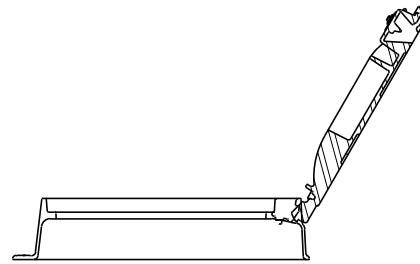
PLAN VIEW OF COVER



SECTION A-A



SAFETY LOCK @ 90°



**FULLY OPENED
REMOVAL POSITION @ 120°**

NOTE:

EAST JORDAN 00104050L01 ERGO COVER AND FRAME OR APPROVED EQUAL.

REV	DESCRIPTION	DATE
1	UPDATED	06/2020
REVISIONS		

**MANHOLE FRAME
AND COVER
WITH LOGO
- SEWER**



**CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION**

SCALE

NONE

DATE

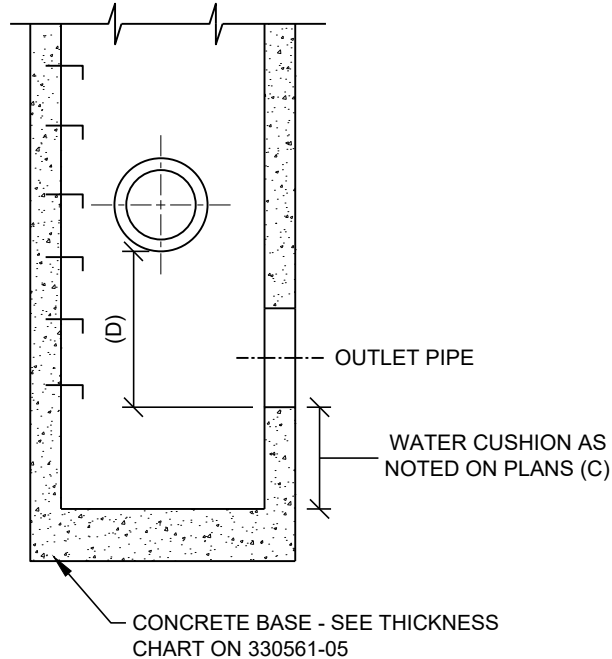
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1 OF 1

SHEET

330561-03


DWG. No.



DIFFERENCE BETWEEN HIGHEST INLET AND OUTLET INVERTS (D)	DEPTH OF CUSHION (C)
2'-6" TO 3'-11"	12"
4'-0" TO 5'-5"	18"
5'-6" TO 6'-11"	24"
8'-0" TO 9'-11"	30"
10'-0" OR MORE	36"

NOTES:

1. ALL OTHER REQUIREMENTS, SAME AS FOR PRECAST MANHOLE BASE SECTIONS.
2. FOR PIPE SIZE AND INVERT SEE PLAN AND PROFILE.

			<p>MANHOLE WATER CUSHION</p>	 <p>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</p>
1	UPDATED	06/2020		<p>SCALE NONE</p> <p>1 OF 1</p>
REV	DESCRIPTION	DATE		<p>DATE 09/2018</p> <p>330561-04 DWG. No.</p>
REVISIONS				

A	RISER DIAMETER	IN	48	60	72	84	96	108	120
B	WALL THICKNESS	IN	5	6	8	8	9	9	10
C	OUTSIDE DIAMETER	IN	58	72	86	100	114	126	140
D	Joint DEPTH	IN	4.25	4.5	5.0	5.0	5.0	5.0	6.0
E	-	-	-	-	-	-	-	-	-
F	INTEGRAL BASE	IN	8	8	8	8	8	8	8
G	RISER HEIGHTS	FT	1.33	1.42	1.42	1.42	2.0	2.0	2.0
		FT	2.6	2.60	3.00	2.00	2.00	2.00	2.00
		FT	4	4	4	4	4	4	4
		FT	5.33	6.0	6.0	6.0	6.0	6.0	6.0
		FT	6	8	8	8	8	8	8
H	BASE HEIGHT RISER HEIGHTS CAN ALSO BE USED AS BASE SECTIONS	FT	1.33	1.42	1.42	1.42	2.0	2.0	2.0
		FT	2.6	2.60	3.00	2.00	2.00	2.00	2.00
		FT	4	4	4	4	4	4	4
		FT	5.33	6.0	6.0	6.0	6.0	6.0	6.0
		FT	6	8	8	8	8	8	8
I	CONE HEIGHT TO 24"	FT	1						
		FT	2						
		FT	3						
		FT	4						
	(REDUCING CONE HEIGHT TO 48") CONE HEIGHT TO 48"	FT	5	2.6	2.6				
		FT	5						
K	LOOSE BASE - OUTSIDE DIA.	IN	72						
		IN	72	84	96				
		IN		84	96	108	120	132	156
L	STEP SPACING	IN	16	16	16	16	16	16	16
	APPROX. WEIGHT / FT.	LB	86	1295	1811	2409	3090	3865	4200


□N/A NOT AVAILABLE

NOTES:

- SOME DIMENSIONS MAY VARY BY MANUFACTURER. DESIGN ENGINEER SHALL ENSURE DETAIL MEETS DWSD REQUIREMENTS.
- SEE DETAIL SHEET 330561-02 FOR STANDARD MANHOLE PRECAST DESIGN.

MANHOLES ASTM C-408

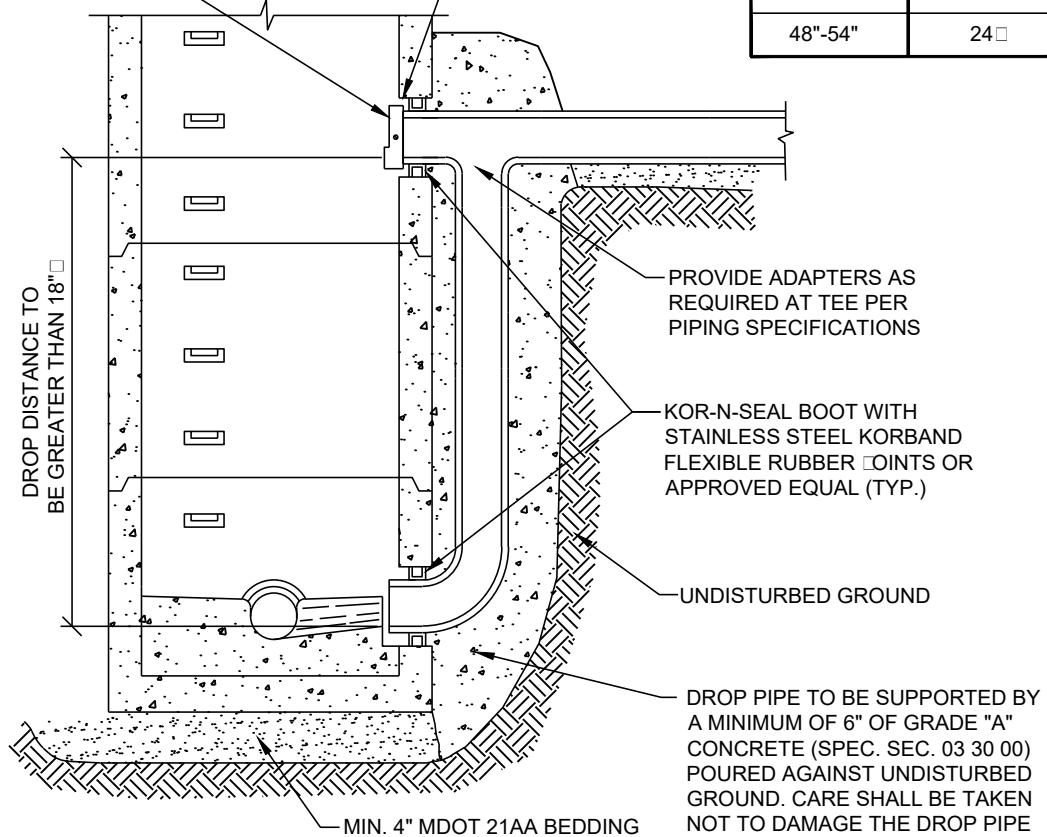
WEIGHTS AND DIMENSIONS - US CUSTOMARY

			MANHOLE, ASSEMBLY	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
1	UPDATED	06/2020		SCALE NONE	1 OF 1
REV	DESCRIPTION	DATE		DATE 09/2018	330561-05 DWG. No.
REVISIONS					

REMOVABLE PIPE CAP, SLIP-ON FIT
(TOP TWO THIRDS OF END REMOVED)
SECURE IN PLACE WITH 2 1/8X1" SHEET METAL SCREWS AT 180 DEGREES APART. COAT SCREWS W/BITUMINOUS SEALER


OPENING FOR TEE SECTION SHALL BE FACTORY MANUFACTURED

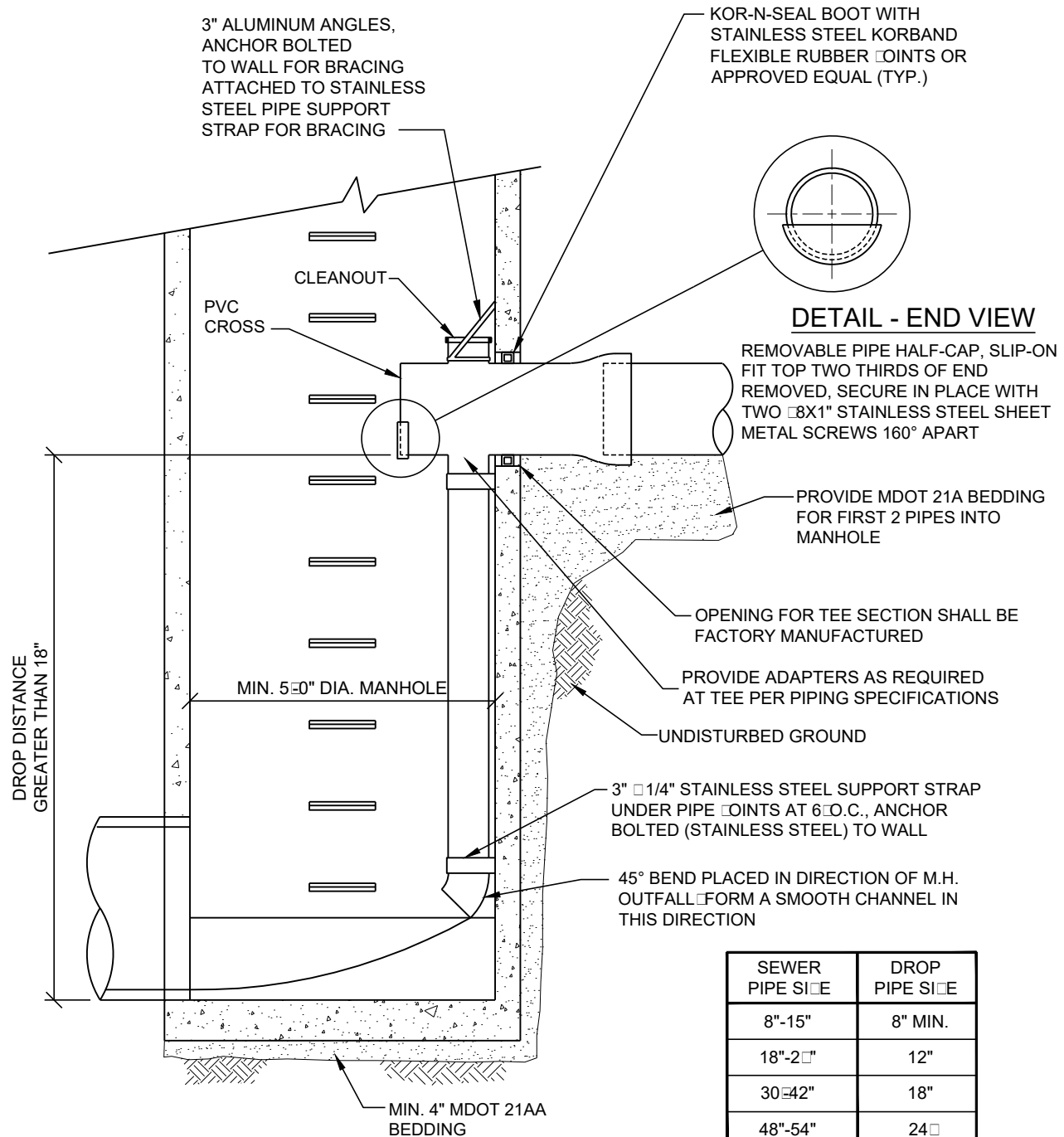
SEWER PIPE SIZE	DROP PIPE SIZE
8"-15"	8"
18"-24"	12"
30"-42"	18"
48"-54"	24"



NOTES:

1. DROP PIPE LOCATION SHALL NOT INTERFERE WITH MANHOLE STEPS, OR STEPS AND CONE SHALL BE REPOSITIONED.
2. SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE REQUIREMENTS.

			MANHOLE, EXTERIOR DROP	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
1	UPDATED	06/2020		SCALE NONE	1 OF 1
REV	DESCRIPTION	DATE		DATE 9/2018	SHEET 330561-06
REVISIONS				DWG. No.	



NOTES:

1. SIZE OF DROP PIPE WILL BE LIMITED BY SIZE OF MANHOLE AND AVAILABLE PVC CROSSES.
2. SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE REQUIREMENTS.

1	UPDATED	06/2020
REV	DESCRIPTION	DATE
REVISIONS		

MANHOLE, INTERIOR DROP



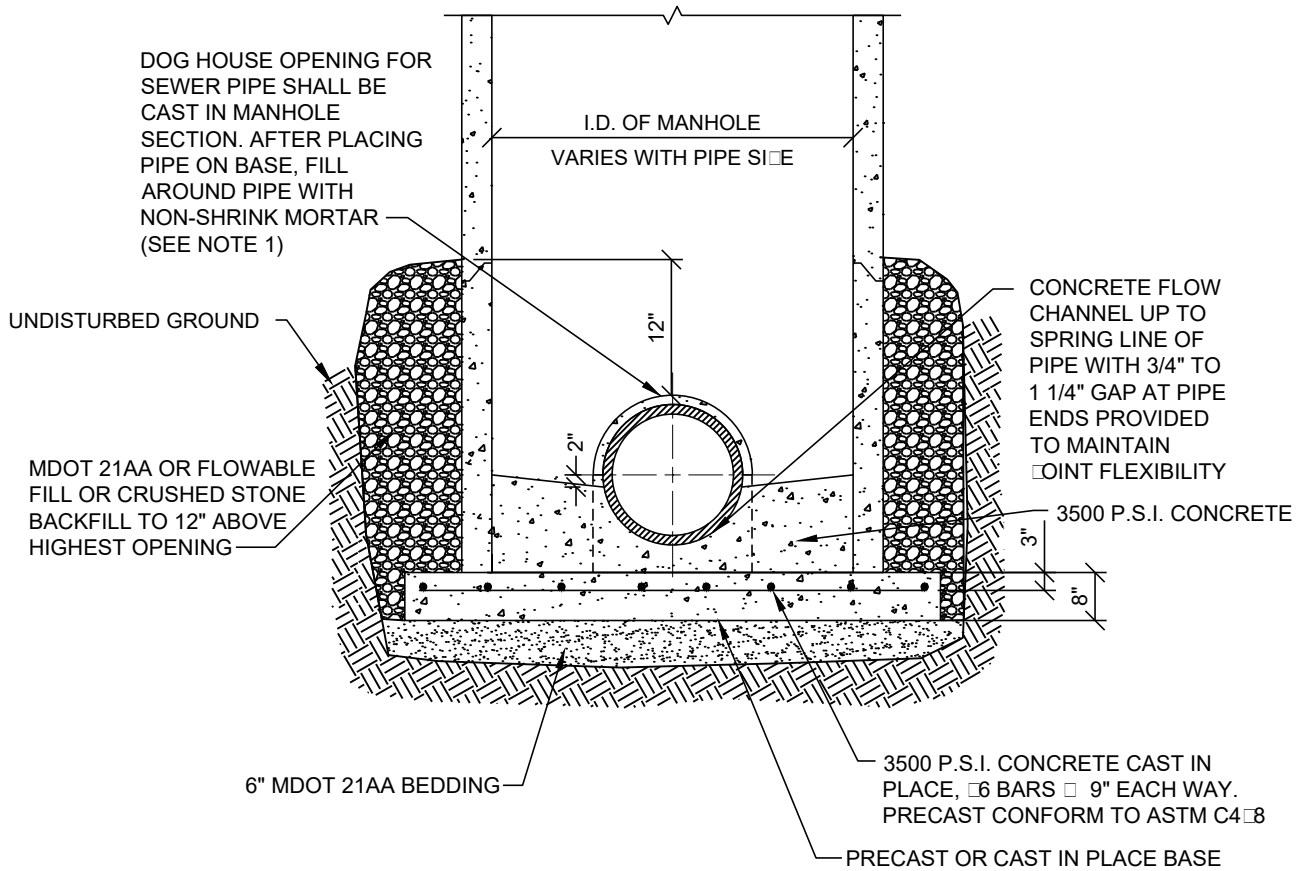
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 09/2018	330561-01 DWG. No.

DOG HOUSE OPENING SIZES	
SEWER SIZE	MAX OPENING
8" - 10"	1'-5"
12" - 15"	20"
18" - 24"	30"


FOR OTHER DETAILS OF
MANHOLE, SEE STANDARD
MANHOLE DETAIL 330561-02

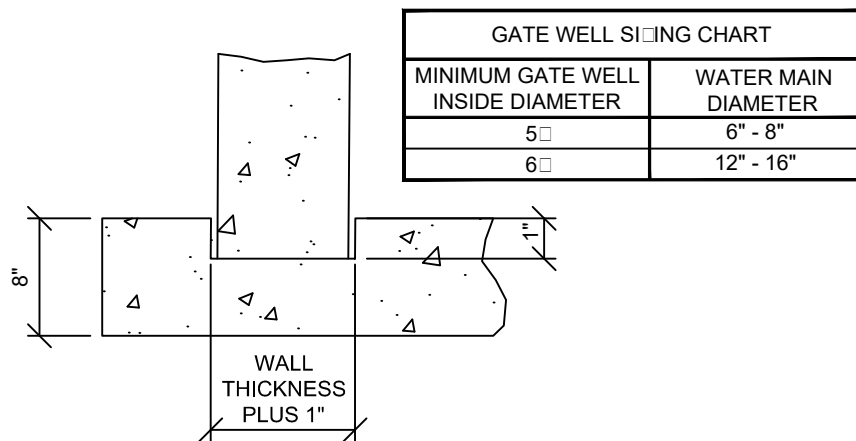
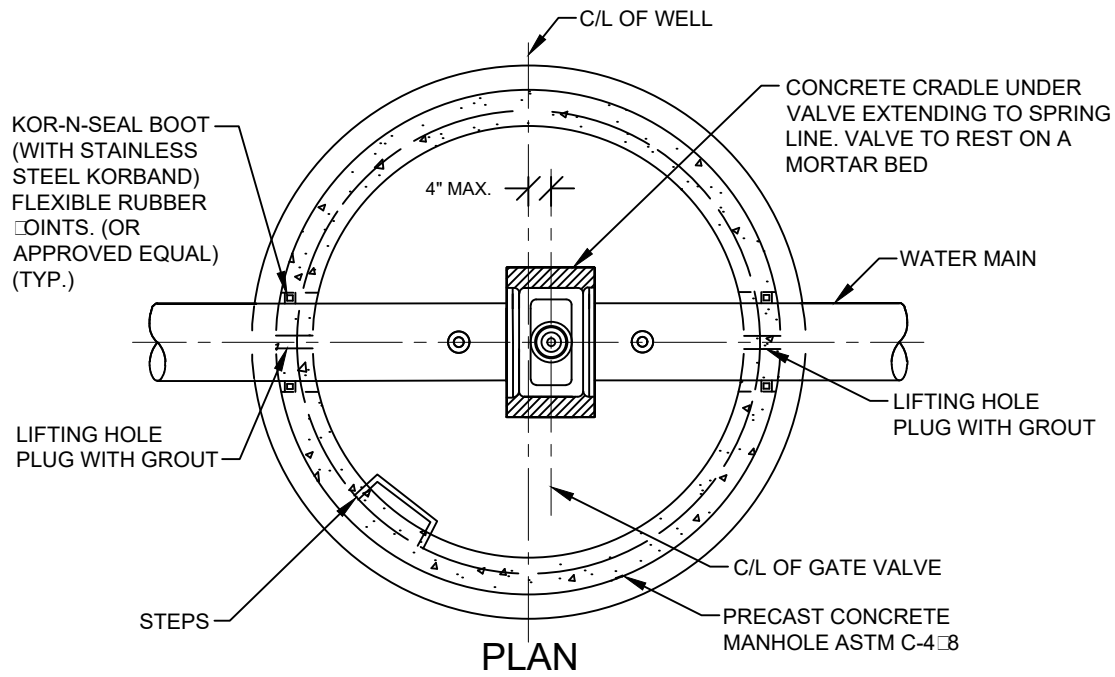
MANHOLE SIZING	
SEWER PIPE SIZE	MANHOLE DIAMETER
24"	4'-0"
30"	5'-0"
42"	6'-0"



NOTE:

1. DOG HOUSE MAY BE USED OVER EXISTING SEWER PIPE. NEW PIPE OPENINGS SHALL BE MANUFACTURED WITH KOR-N-SEAL BOOT AND STAINLESS STEEL KOR-BAND FLEXIBLE RUBBER JOINTS OR APPROVED EQUAL.

-	-	-	MANHOLE, OVER EXISTING SEWER	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
1	UPDATED	06/2020		SCALE NONE	1 OF 1
REV	DESCRIPTION	DATE		DATE 9/2018	330561-08 DWG. No.
REVISIONS					




GATE WELL SIZING CHART	
MINIMUM GATE WELL INSIDE DIAMETER	WATER MAIN DIAMETER
5'	6" - 8"
6'	12" - 16"

GROOVED BASE - DETAIL

NOTES:

1. MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5'-0".
2. PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ALL THE REQUIREMENTS OF "SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS" ASTM C-408 WITH SINGLE OFF-SET JOINT CONFORMS TO ASTM C-443.
3. EACH SECTION SHALL HAVE NOT MORE THAN TWO HOLES FOR HANDLING PURPOSES. THESE HOLES SHALL BE SATISFACTORILY PLUGGED WITH GROUT AFTER INSTALLATION.
4. STEPS TO BE INSTALLED DURING MANHOLE MANUFACTURE. PLACE 16" CEN. ON CEN. 45° FROM CENTERLINE OF WATER MAIN

-	-	-	GATE WELL, PRECAST	 CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	SCALE	1 OF 2
-	-	-			NONE	SHEET
-	-	-			DATE	330561-09
-	-	-			9/2018	DWG. No.
-	-	-				
1	UPDATED	5/2020	REVISIONS			
REV	DESCRIPTION	DATE				

1" □ 1" E-□ STIK PRE-FORMED BUTYL SEALANT - 2 EACH COURSE (OUTSIDE AND INSIDE OF THREADED STUDS) CONFORMING TO FEDERAL SPECIFICATION SS-SS-□ 10A AND AASHTO M-198 OR APPROVED EQUAL)

2" (MIN.) OR 6" CONCRETE GRADE RINGS WITH FINISH TOP AND BOTTOM SURFACES (8" DEEP). MAX. ADJUSTMENT □ 18"
 PLUG LIFTING HOLES WITH GROUT (TYP.) AFTER SETTING GATE WELL

FOUR CADMIUM COATED 5/8" DIA. THREADED STUDS WITH 3/4" □ 2" □ 1/8" THICK METAL WASHER, 3/4" □ 2" □ 1/16" THICK NEOPRENE SEALING WASHER AND NUTS. STUDS TO BE INSTALLED IN FOUR THREADED INSERTS PLACED WHEN CASTING ON CONE SECTION

STANDARD DWSD MANHOLE FRAME AND COVER. EAST □ ORDAN 00104050L01 ERGO COVER AND FRAME OR APPROVED EQUAL

FINAL GRADE

C/L OF WELL
 C/L OF GATE VALVE
 RUBBER GASKET

6" MIN. WALL THICKNESS

1" CORPORATION STOPS WITH MUELLER THREADED INLET AND OUTLET

WATER MAIN

8" CONCRETE BASE

MIN. 4" MDOT 21AA BEDDING UNDER GATE WELL BASE

UNDISTURBED GROUND

CONCRETE CRADLE

4" MAX.

9"

9"

LOOP WIRE, 6 FEET OF SLACK

KOR-N-SEAL BOOT (WITH STAINLESS STEEL KOR-BAND) FLEXIBLE RUBBER □ JOINTS. (OR APPROVED EQUAL) (TYP.)

PLACE TRACER WIRE IN LIFTING HOLES (TYP.)

CONTINUOUS 10 GA. SOLID CORE COPPER WIRE, THHN INSULATION (TYP.)

24" MIN. CLEAR OPENING

8" MIN. VARIES

UNLESS NOTED OTHERWISE ON DRAWINGS

SECTION THROUGH GATE WELL

NOTES:

- MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5' 0". TOP STEP SHALL NOT BE MORE THAN 16" BELOW MH COVER OR AS DIRECTED. BOTTOM STEP SHALL NOT BE MORE THAN 18" ABOVE THE BENCH OR FLOOR LEVEL.
- STEPS TO BE INSTALLED DURING MANHOLE MANUFACTURE. PLACE 16" CEN. ON CEN. 45° FROM CENTERLINE OF WATER MAIN.
- RUBBER "O" RINGS FOR ADJUSTING RINGS NOT USED IN PAVEMENT AREAS.
- TRACING WIRE ON HDPE PIPE ONLY.

GATE WELL SIZING CHART

MINIMUM GATE WELL INSIDE DIAMETER	WATER MAIN DIAMETER
5'	6" - 8"
6'	12" - 16"

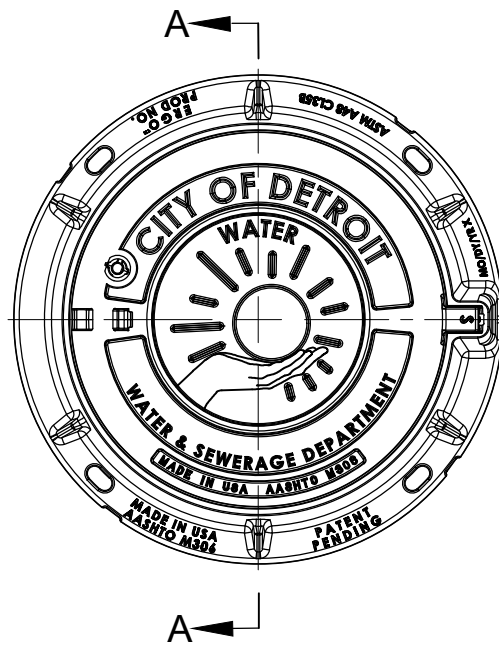
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1	UPDATED	5/2020
REV	DESCRIPTION	DATE
REVISIONS		

GATE WELL, PRECAST

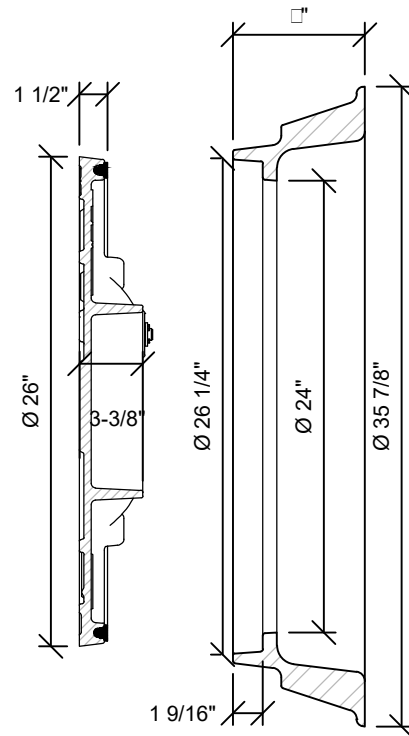


CITY OF DETROIT
 WATER AND SEWERAGE
 DEPARTMENT
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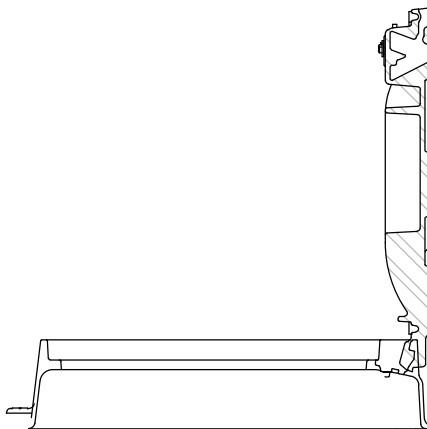
SCALE	2 OF 2
NONE	SHEET
DATE	330561-10
9/2018	DWG. No.



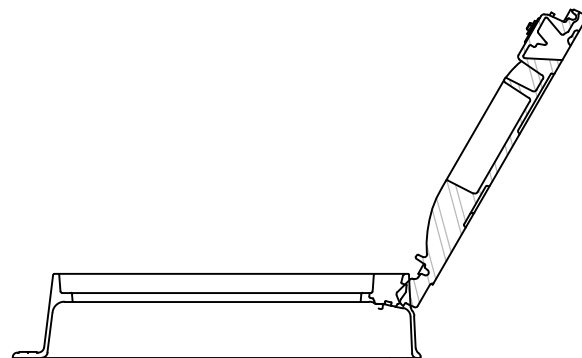
PLAN VIEW OF COVER



SECTION A-A



SAFETY LOCK @ 90°



FULLY OPENED ☐ REMOVAL POSITION @ 120°

NOTE:

1. EAST ☐ORDAN 00104050L01 ERGO COVER AND FRAME OR APPROVED EQUAL.

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REVISIONS		

**GATE WELL FRAME
AND COVER
WITH LOGO
- WATER MAIN**



**CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION**

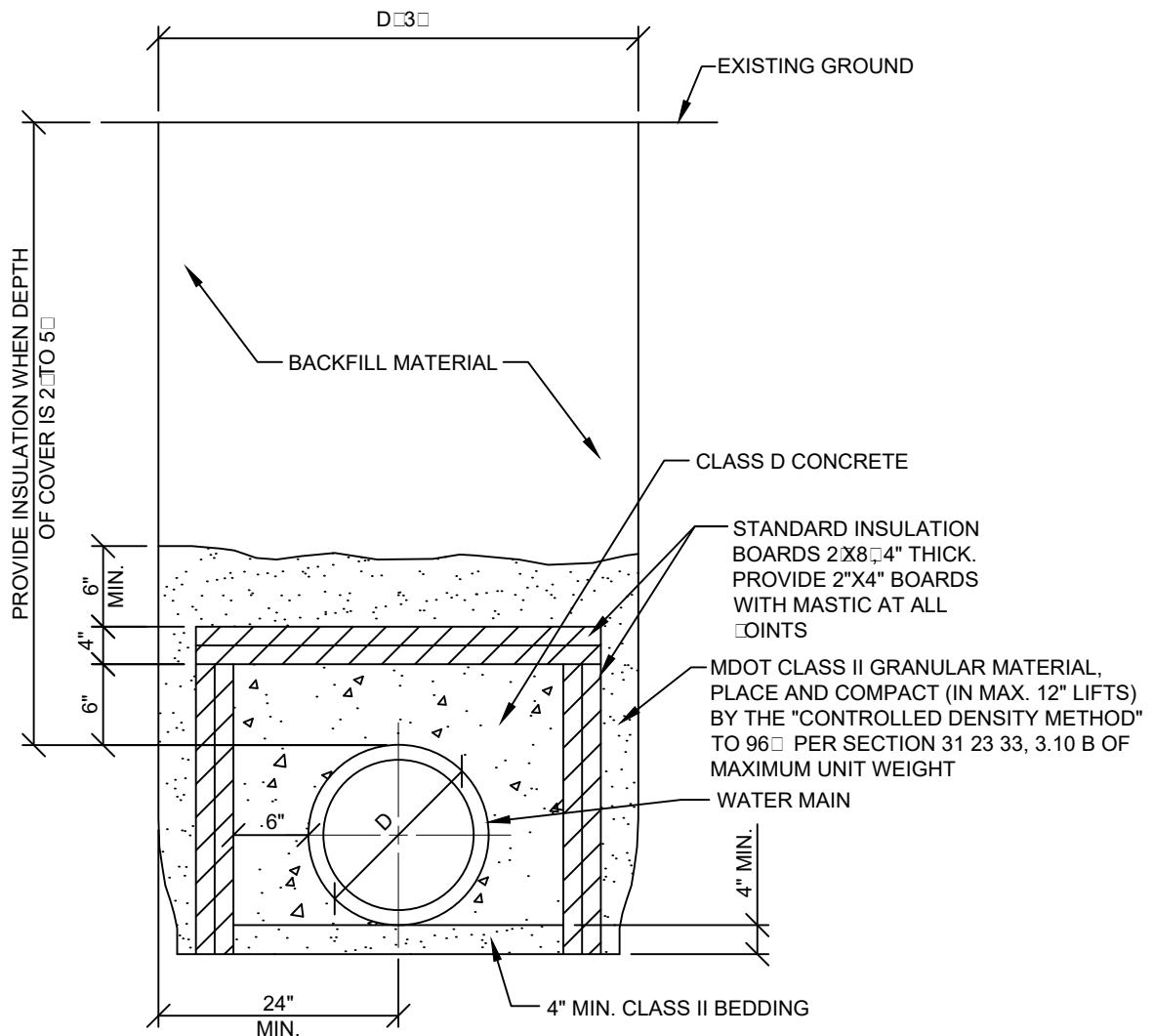
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DATE
9/2018

DWG. No. 330561-11



NOTES:

1. INSULATION BOARD TO BE CLOSED CELL, EXTRUDED POLYSTYRENE FOAM MEETING ASTM 558, TYP VI, 40 PSI COMPRESSING STRENGTH (ASTM D1621) 0.1% MAX. WATER ABSORPTION (ASTM C272).
2. OVERLAP ALL INSULATION BOARD JOINTS. 6" WIDE AND 2" THICK.
3. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS 4,000 PSI.
4. TRENCHING SHALL BE PER OSHA 29 CRF, SUBPART P.
5. ENCASEMENT IS REQUIRED FOR PIPING WITH LESS THAN 5 FT. OF COVER (LENGTH WILL VARY).

REV	DESCRIPTION	DATE
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REVISIONS		

WATER MAIN TRENCH INSULATION DETAIL



CITY OF DETROIT
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DIVISION

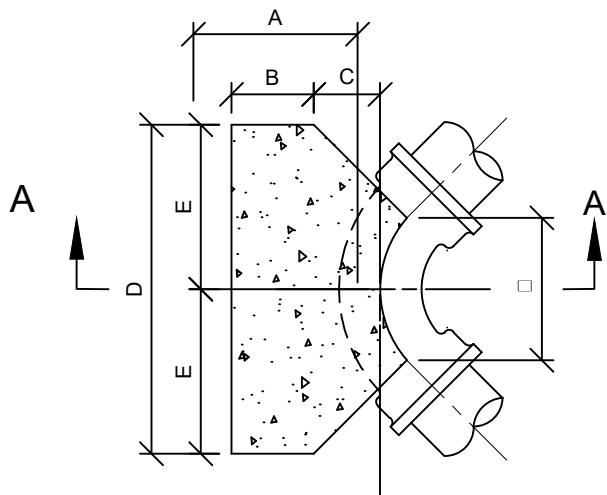
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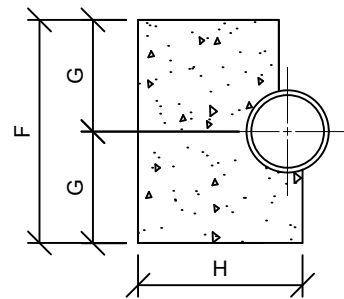
1 OF 1

DATE
5/2020

330-00-01
DWG. No.



PLAN



SECTION A-A

HORIZONTAL BENDS, 22.5, 45 & 90 DEGREE TURNS										
SIZE OF PIPE (IN)	DEGREE OF BEND	A (FT)	B MIN. (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H MIN. (FT)	□ (FT)
6	45	1.05	0.05	1.00	2.00	1.00	1.50	0.05	1.92	1.33
6	90	1.05	0.05	1.00	2.50	1.25	1.50	0.05	1.92	1.10
8	45	1.05	0.05	1.00	2.33	1.10	2.00	1.00	1.92	1.33
8	90	1.05	0.05	1.00	3.33	1.60	2.50	1.25	1.92	1.08
12	22.5	1.05	0.05	1.00	2.50	1.25	2.00	1.00	2.00	1.33
12	45	2.08	0.05	1.33	3.50	1.05	2.50	1.25	2.33	1.33
12	90	2.08	0.05	1.33	5.50	2.05	3.00	1.50	2.33	1.60
16	22.5	2.60	1.00	1.60	3.33	1.60	2.50	1.25	3.00	1.10
16	45	2.60	1.00	1.60	5.33	2.60	3.00	1.50	3.00	2.50
16	90	2.60	1.00	1.60	6.00	3.00	5.00	2.50	3.00	2.60

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS > 4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTURBED SOIL OR EARTH COMPACTED TO 95% MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

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1	UPDATED	5/2020
REV	DESCRIPTION	DATE
REVISIONS		

**THRUST BLOCK,
HORIZONTAL BEND
(TRADITIONAL
DWSD SIZING)**



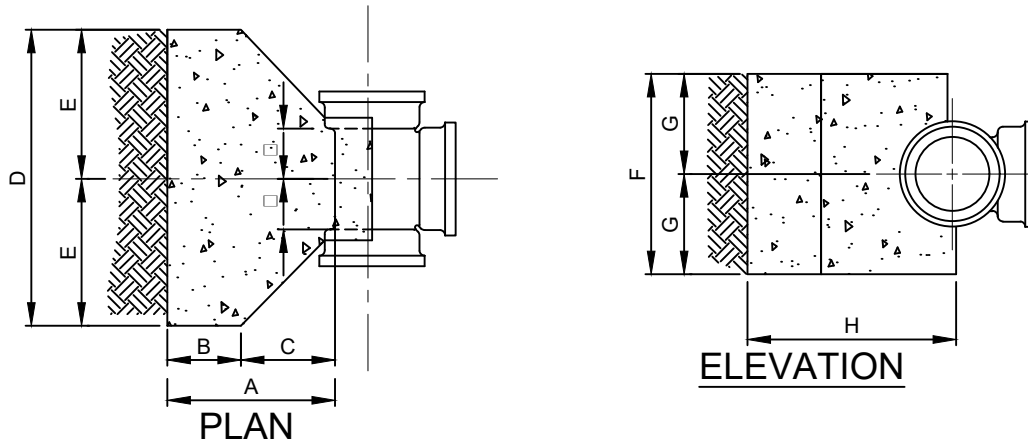
**CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION**

SCALE
NONE

1 OF 1
SHEET

DATE
9/2018

331413-01
DWG. No.



SIZE OF PIPE (IN)	A (FT)	B MIN. (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H MIN (FT)	□ (FT)
6X6	1.□5	0.□5	1.00	2.50	1.25	1.50	0.□5	2.25	0.50
8X8	1.□5	0.□5	1.00	3.00	1.50	2.00	1.00	2.25	0.50
12X8	1.□5	0.□5	1.00	3.00	1.50	2.00	1.00	2.42	0.50
12X12	2.08	0.□5	1.33	4.00	2.00	3.00	1.50	2.□5	0.6□
16X8	1.□5	0.□5	1.00	3.00	1.50	2.00	1.00	2.□5	0.50
16X12	2.08	0.□5	1.33	4.00	2.00	3.00	1.50	3.08	0.6□
16X16	2.6□	1.00	1.6□	5.00	2.50	4.00	2.00	3.6□	0.92

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □ 4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95□ MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

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1	UPDATED	5/2020
REV	DESCRIPTION	DATE
REVISIONS		

**THRUST BLOCK,
TEES
(TRADITIONAL
DWSD S□ING)**



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

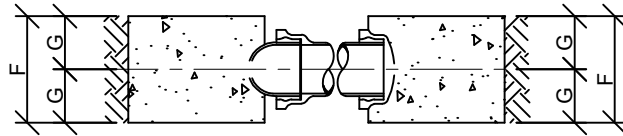
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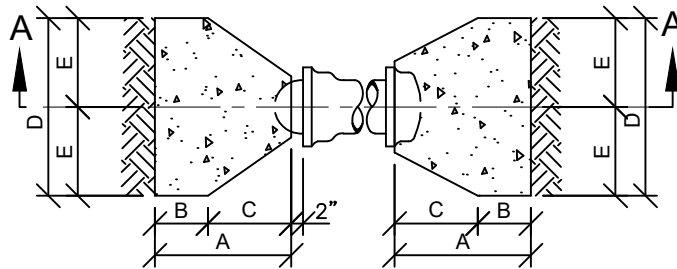
1 OF 1

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SECTION A-A




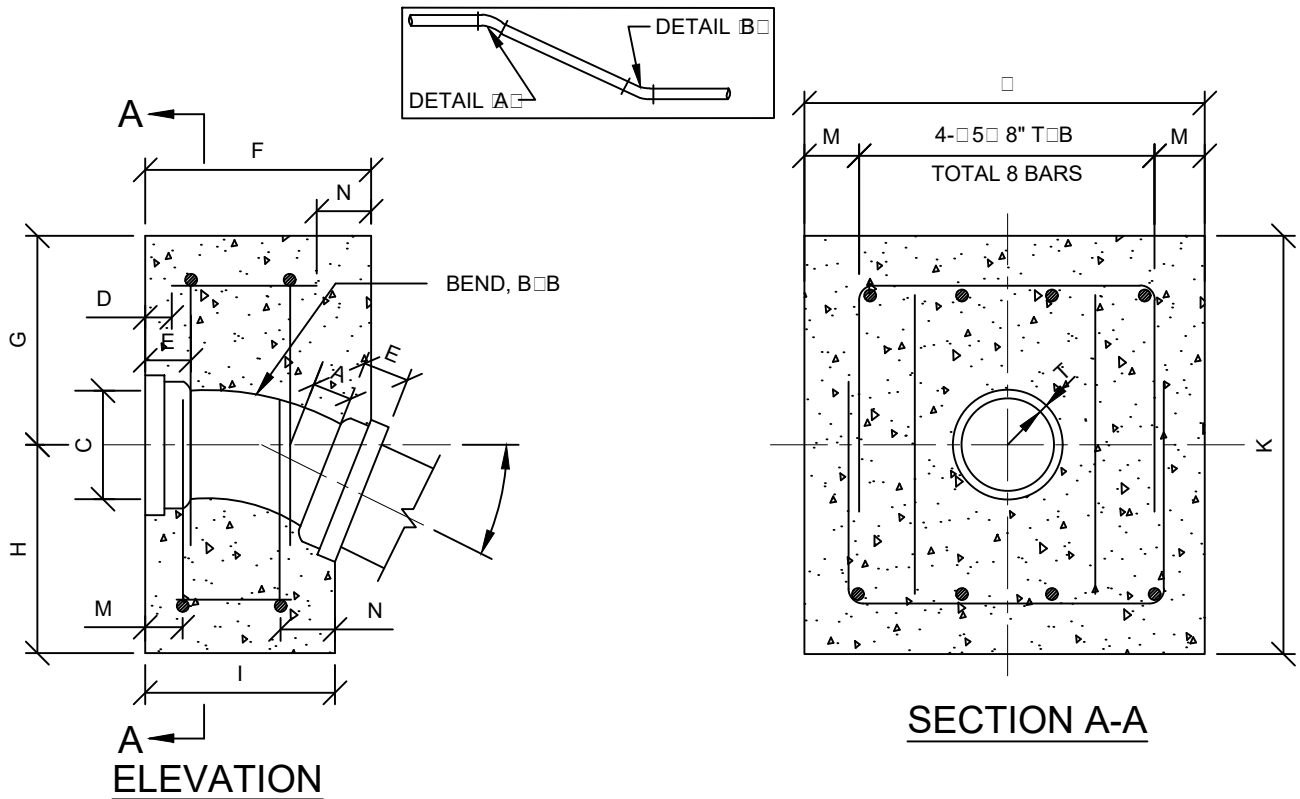
PLAN

SIZE OF PIPE (IN)	A MIN. (FT)	B MIN. (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)
6	1.92	0.5	1.1	2.50	1.25	1.50	0.5
8	1.92	0.5	1.1	3.00	1.50	2.00	1.00
12	2.08	0.5	1.33	4.00	2.00	3.00	1.50
16	2.6	1.00	1.6	5.00	2.50	4.00	2.00

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS \geq 4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95% MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

-	-	-	THRUST BLOCK, PLUGS AND CAPS (TRADITIONAL DWSD SIZING)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
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1	UPDATED	5/2020		
REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>1 OF 1 SHEET</div> <div>DATE 9/2018</div> <div>331413-03 DWG. No.</div>
REVISIONS				



SCHEDULE OF THRUST BLOCK DIMENSIONS												DIMENSIONS - INCHES					
SIZE OF PIPE (IN)	BEND IN DEGREE	F (FT)	G (FT)	H (FT)	I (FT)	□ (FT)	K (FT)	L (FT)	M (FT)	N (FT)	□	A	C	E	R	D	T
6	22.5	1.583	1.33	1.6□	1.33	2.6□	3.00	0.00	0.33	0.25	3□ 8"	5.0	10.6	4.0	15.06	1.50	0.55
6	45	1.583	1.33	1.6□	1.00	2.6□	3.00	0.00	0.33	0.25	3□ 8"	5.0	10.6	4.0	0□25	1.50	0.55
8	22.5	1.583	1.33	1.6□	1.33	2.6□	3.00	0.33	0.33	0.25	4□ 8"	5.5	13.0	4.0	1□62	1.50	0.60
8	45	1.6□	1.50	2.50	1.00	4.00	4.00	0.50	0.50	0.25	4□ 12"	5.5	13.0	4.0	08.44	1.50	0.60
10	22.5	1.83	1.50	2.50	1.42	3.50	4.00	0.50	0.50	0.25	4□ 10"	6.5	15.3	4.0	22.62	1.50	0.68
10	45	1.92	1.6□	2.83	1.00	4.00	4.50	0.6□	0.6□	0.25	4□ 12"	6.5	15.3	4.0	10.88	1.50	0.68
12	22.5	2.00	1.50	2.50	1.583	4.00	4.00	0.6□	0.50	0.33	4□ 12"	□5	1□6	4.0	2□62	1.50	0.□5
12	45	2.08	1.50	3.00	1.1□	5.00	4.50	0.92	0.□5	0.25	4□ 14"	□5	1□6	4.0	13.25	1.50	0.□5
16	22.5	2.1□	1.6□	2.83	1.583	5.00	4.50	0.83	0.□5	0.33	4□ 14"	8.0	22.2	4.0	2□62	1.□5	0.89

DETAIL "A"

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □ 4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95□ MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

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1	UPDATED	5/2020
REV	DESCRIPTION	DATE
REVISIONS		

**THRUST BLOCK,
VERTICAL BEND
(TRADITIONAL
DWSD SI□ING)**



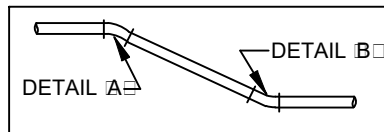
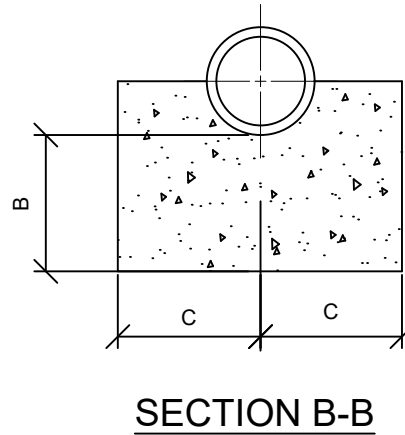
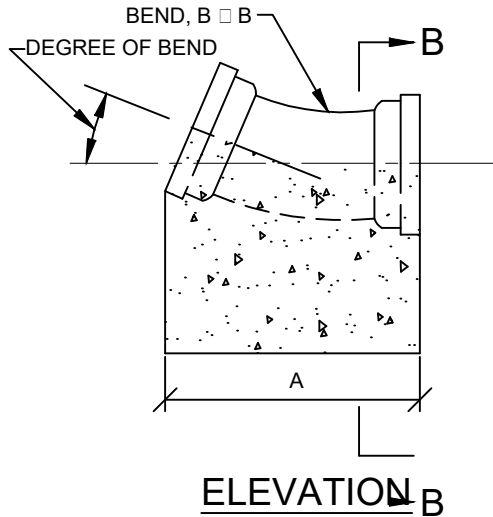
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

1 OF 2
SHEET

DATE
9/2018

331413-04
DWG. No.



NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS \geq 4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTURBED SOIL OR EARTH COMPACTED TO 95% MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

SIZE OF PIPE (IN)	BEND IN DEGREE	A (FT)	B (FT)	C (FT)
6	22.5	1.6	1.00	1.00
6	45	1.6	1.00	1.00
8	22.5	1.5	1.00	1.00
8	45	1.5	1.00	1.00
10	22.5	1.92	1.00	1.00
10	45	1.92	1.00	1.00
12	22.5	2.1	1.00	1.00
12	45	2.1	1.00	1.00
16	22.5	2.25	1.00	1.25
16	45	2.25	1.00	1.25

DETAIL "B"

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-	-	-
1	UPDATED	5/2020
REV	DESCRIPTION	DATE
REVISIONS		

**THRUST BLOCK,
VERTICAL BEND
(TRADITIONAL
DWSD SIZING)**



**CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION**

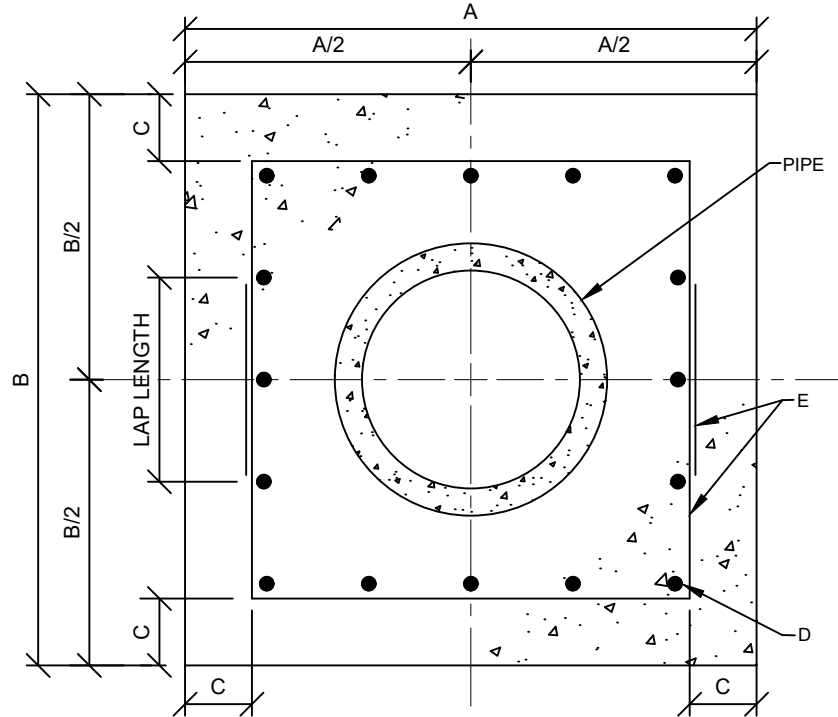
SCALE
NONE

SHEET

2 OF 2

DATE
9/2018

331413-05
DWG. No.



PIPE SIZE	A	B	C	D	E
8 INCH PIPE	2'-6"	2'-6"	6"	6 BARS @ 1'-6" O.C.	4 TIE BARS @ 2'-0" O.C.
12 INCH PIPE	3'-0"	3'-0"	6"	6 BARS @ 1'-0" O.C.	4 TIE BARS @ 2'-0" O.C.
16 INCH PIPE	3'-6"	3'-6"	6"	6 BARS @ 1'-2" O.C.	4 TIE BARS @ 2'-0" O.C.

NOTES:

1. TIE BARS MAY BE PLACED AS 2-PIECE U-BARS WITH MINIMUM LAP LENGTH OF 20 INCHES.
 2. PROVIDE CORNER BARS AT ALL PIPE ENCASEMENT CORNERS/BENDS TO MATCH SIZE OF TYPICAL LONGITUDINAL REINFORCING BARS. CORNER BARS TO BE LAP SPLICED WITH TYPICAL LONGITUDINAL REINFORCING BARS ON EACH SIDE OF THE CORNER/BEND.
 3. LAP SPLICE 6 REINFORCING BARS 39" AT SPLICES. LAP SPLICE 4 REINFORCING BARS 44" AT SPLICES.
 4. REFER TO TABLES OF ENCASEMENT LENGTHS FOR REQUIRED MINIMUM ENCASEMENT LENGTHS.
 5. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS @ 4,000 PSI.
 6. ALL REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60 AND MUST CONFORM TO THE LATEST BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE OF THE AMERICAN CONCRETE INSTITUTE (ACI) AND THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).
- DESIGN SOIL BEARING PRESSURE IS 1,500 PSF. VERIFY IN FIELD.

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1	UPDATED	5/2020
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**ENCASEMENT,
WATER
DISTRIBUTION
PIPE IN
CONCRETE**



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

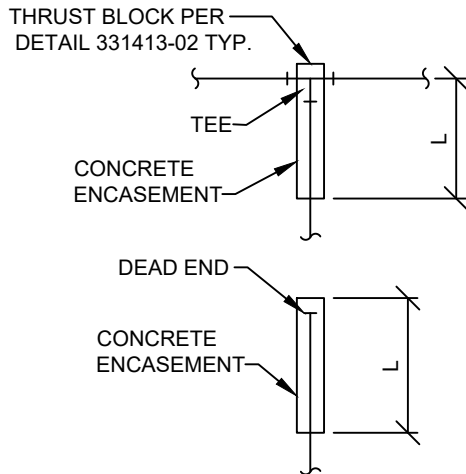
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1 OF 2

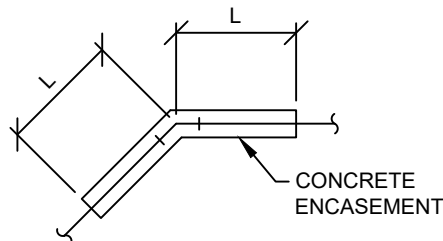
DATE
10/2018

331413-06
DWG. No.



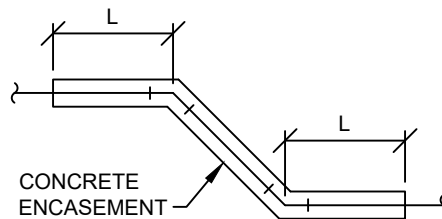
TEE OR DEAD END SIZE	LENGTH L
8" X 8" TEE	13'
8" X 12" TEE	22'
8" X 16" TEE	32'
12" X 16" TEE	32'
16" X 16" TEE	32'
8" DEAD END	13'
12" DEAD END	22'
16" DEAD END	32'

HORIZONTAL TEES AND DEAD ENDS



PIPE SIZE	LENGTH L
8"	10'
12"	16'
16"	23'

HORIZONTAL BENDS



PIPE SIZE	LENGTH L
8"	13'
12"	22'
16"	32'

VERTICAL BENDS

NOTE:

1. MINIMUM ENCASEMENT LENGTHS "L" AT BENDS, TEES AND DEAD ENDS.

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1	UPDATED	5/2020
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REVISIONS		

ENCASEMENT, WATER DISTRIBUTION PIPE IN CONCRETE



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

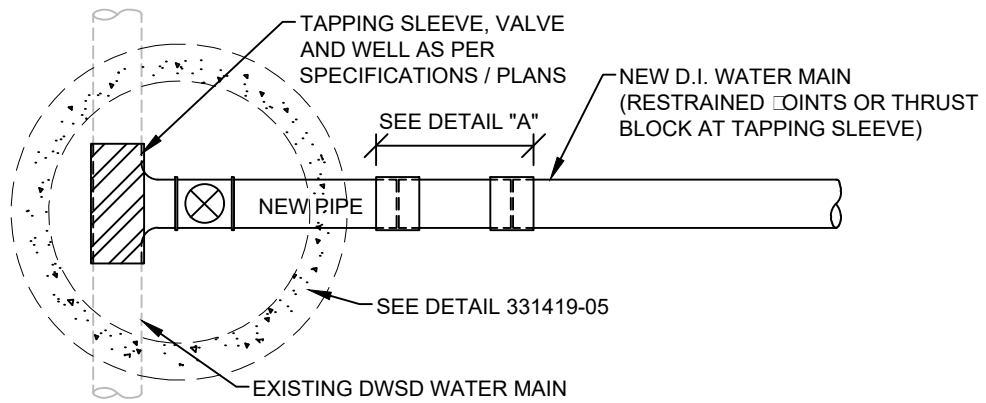
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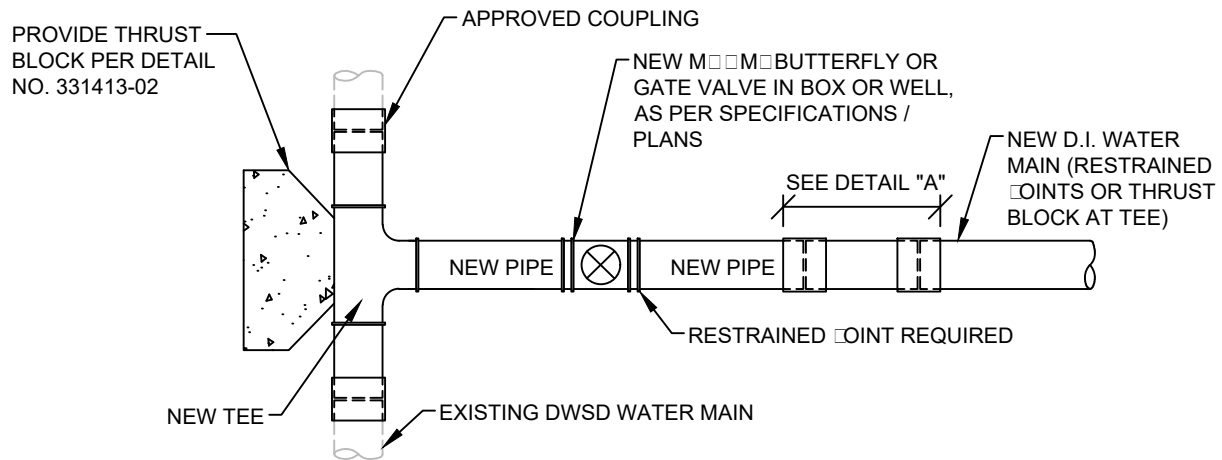
2 OF 2

DATE
10/2018

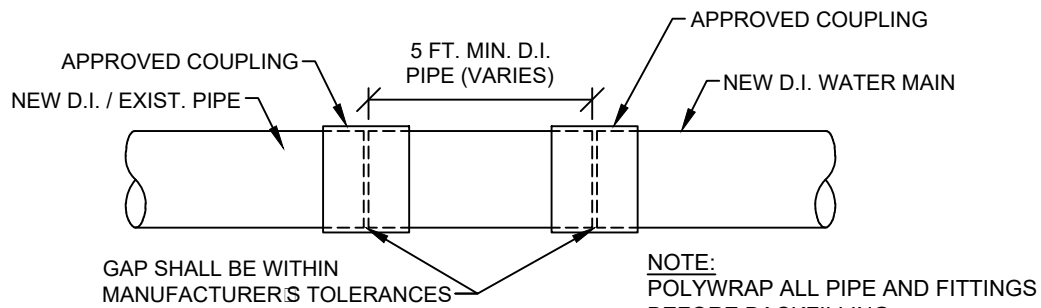
331413-01
DWG. No.



CONNECTION WITH EXISTING DWSD MAIN WITH TAPPING SLEEVE AND VALVE



CONNECTION AT EXISTING DWSD MAIN WITH TEE / VALVE



DETAIL "A"

NOTE:
POLYWRAP ALL PIPE AND FITTINGS
BEFORE BACKFILLING.

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CONNECTION WITH EXISTING WATER MAIN



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

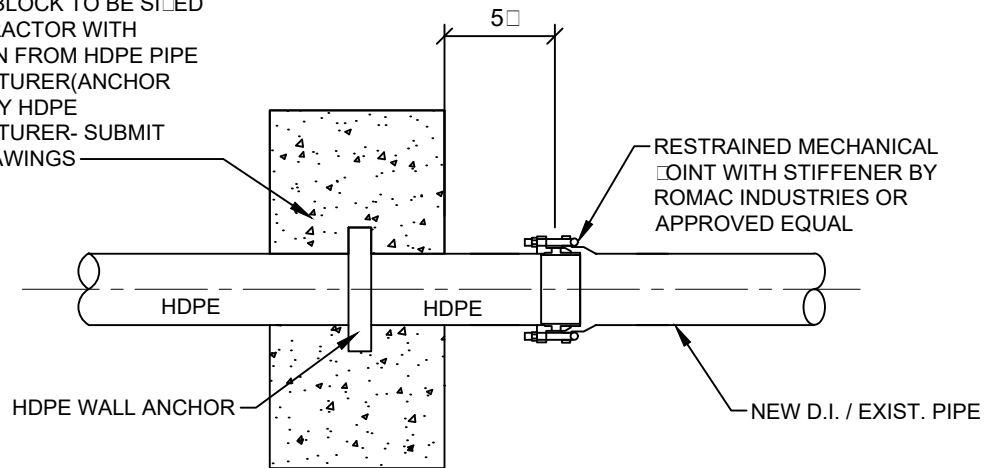
SHEET

1 OF 1

DATE
10/2018


331413-08
DWG. No.

REINFORCED CONCRETE
ANCHOR BLOCK TO BE SIZED
BY CONTRACTOR WITH
DIRECTION FROM HDPE PIPE
MANUFACTURER(ANCHOR
BLOCKS BY HDPE
MANUFACTURER- SUBMIT
SHOP DRAWINGS

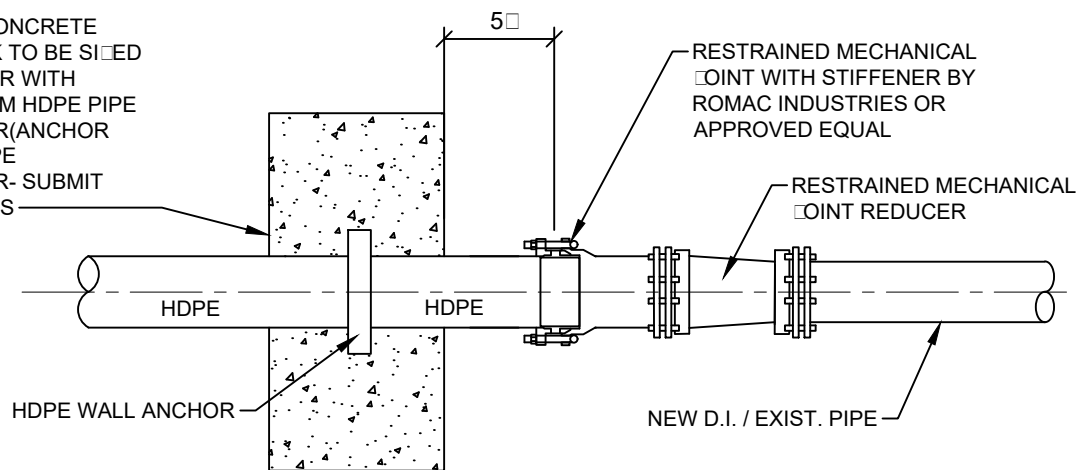


NOTES:

1. USE RESTRAINED MECHANICAL JOINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE EXISTING PIPE MATERIAL OR NEW D.I. PIPE.
2. USE PIPE WRAPPING, PIPE COUPLINGS/ SLEEVES AS NECESSARY TO FACILITATE INSTALLATION AS REQUIRED.


			HDPE TO EXISTING PIPE TRANSITION (NO REDUCER)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>		
					SCALE NONE	1 OF 1
					DATE 5/2020	331413-09
						DWG. No.
REV	DESCRIPTION	DATE				
REVISIONS						

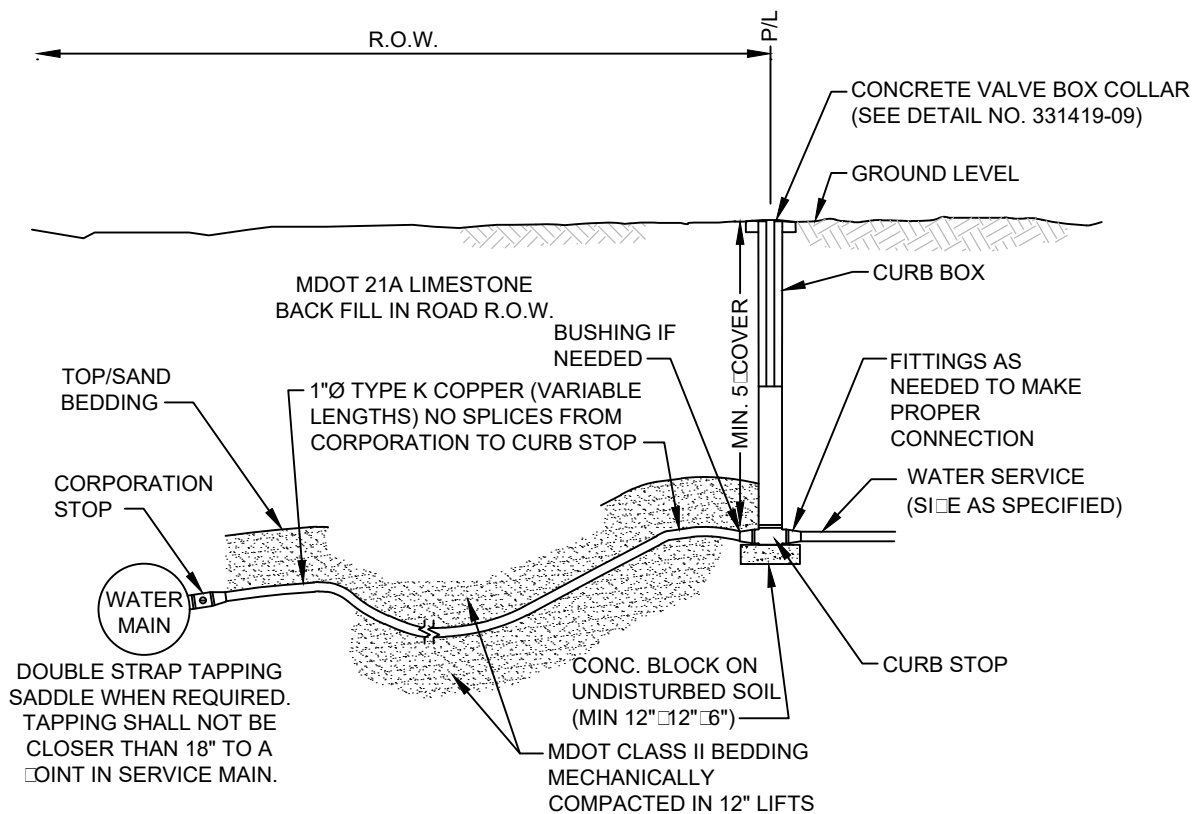
REINFORCED CONCRETE
ANCHOR BLOCK TO BE SIZED
BY CONTRACTOR WITH
DIRECTION FROM HDPE PIPE
MANUFACTURER(ANCHOR
BLOCKS BY HDPE
MANUFACTURER- SUBMIT
SHOP DRAWINGS



NOTES:

1. USE RESTRAINED MECHANICAL JOINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE EXISTING PIPE MATERIAL OR NEW D.I. PIPE.
2. USE PIPE WRAPPING, PIPE COUPLINGS/ SLEEVES AS NECESSARY TO FACILITATE INSTALLATION AS REQUIRED.

			HDPE TO EXISTING PIPE TRANSITION (REDUCER)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>			
					SCALE	1 OF 1	
					NONE	SHEET	
					DATE	331413-10	
					5/2020	DWG. No.	
REV	DESCRIPTION	DATE					
REVISIONS							



NOTES:

1. CURB BOX SHALL BE INSTALLED ON PROPERTY LINE.
2. TRENCH CONSTRUCTION / BACK FILL SHALL BE DONE IN SAME MANNER AS WATER MAIN TRENCH DETAIL.
3. IF EXISTING SERVICE RUN IS LEAD PIPE (P), THEN REPLACE PER SPECIFICATIONS SECTION 33141-81.
4. WRAP CORPORATION AND SERVICE SADDLE WITH WAX TAPE CONFORMING WITH AWWA C21

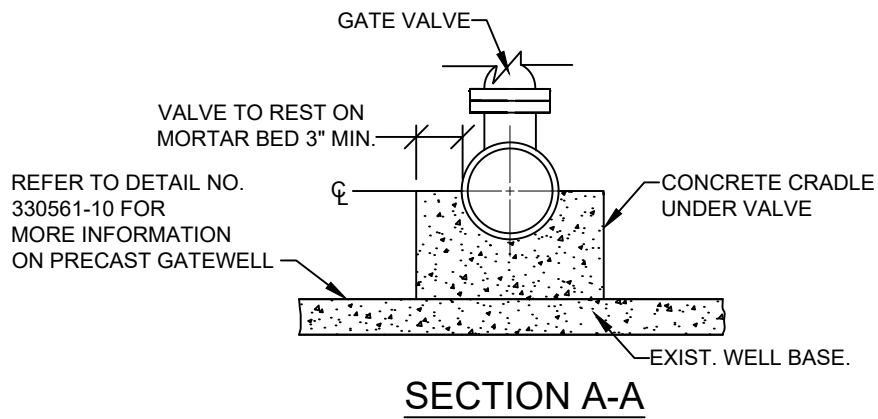
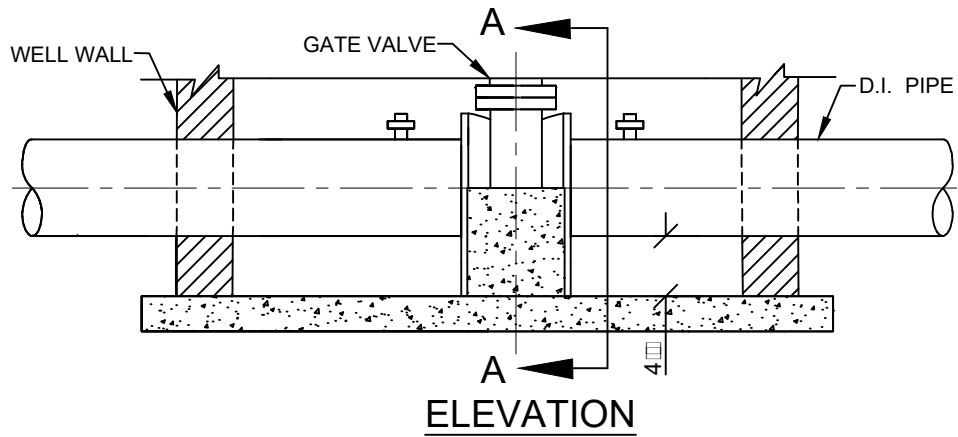
REV	DESCRIPTION	DATE

CONNECTION, RESIDENTIAL SERVICE




CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

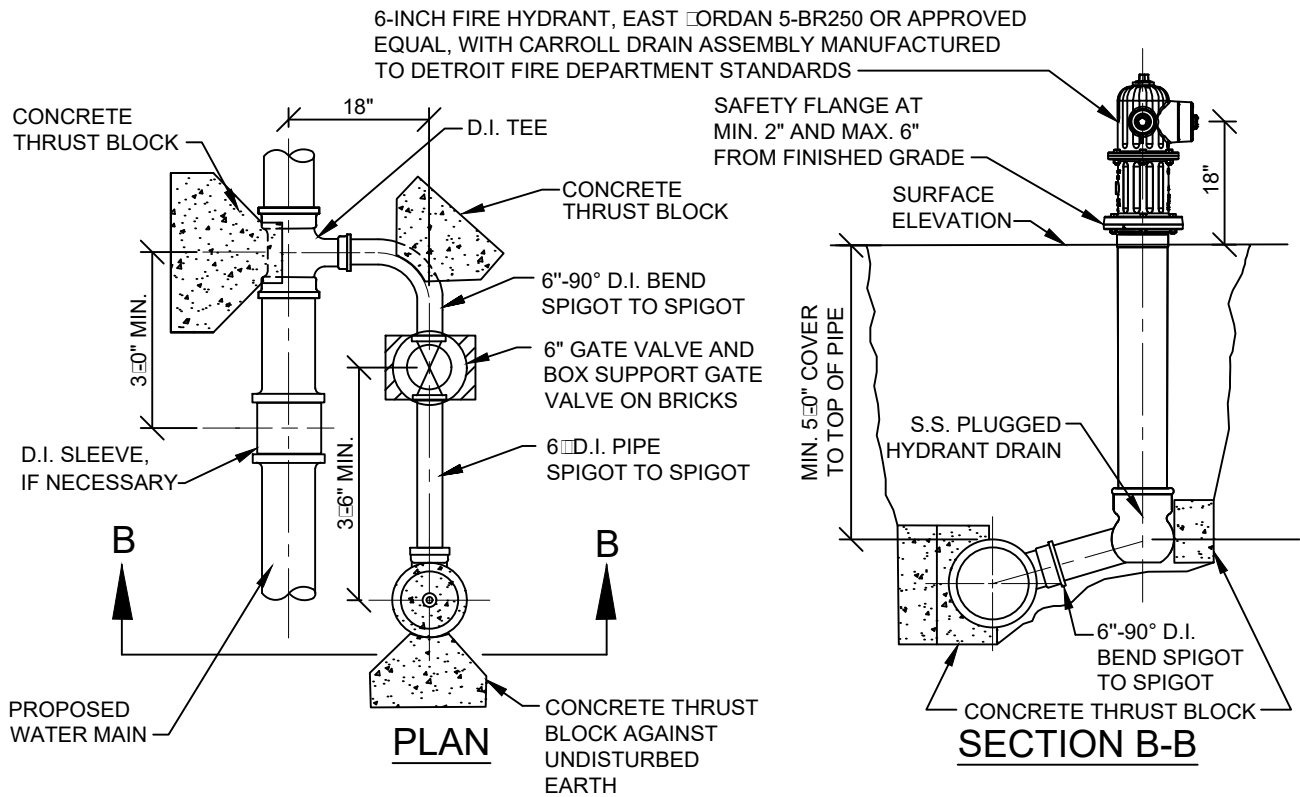
SCALE NONE	1 OF 1 SHEET
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NOTE:

1. SIZE AND REINFORCEMENT REQUIREMENTS TO BE PER MANUFACTURERS RECOMMENDATIONS.

-	-	-	VALVE, GATE, CRADLE SUPPORT, CONCRETE	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
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1	UPDATED	5/2020			
REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 9/2018</div>	<div>1 OF 1 SHEET</div> <div>331419-01 DWG. No.</div>
REVISIONS					



NOTES:

1. ALL INSTALLATION OR REPLACEMENT WORK FROM PROPOSED WATER MAIN AND TO HYDRANT SHALL BE A COMPLETE ASSEMBLY.
2. HYDRANT TO BE A MINIMUM OF 3 FEET BEHIND CURB.
3. THRUST BLOCKS TO BE SIZED ACCORDING TO THRUST BLOCK STANDARD DETAIL DRAWING.
4. SEE TRENCH DETAIL FOR BACKFILL AND COMPACTION.
5. PROVIDE COLLAR AT HYDRANT VALVE.
6. SEE DETAIL 331419-06 FOR TRACER WIRE INSTALLATION.
7. PUMPER NOZZLE SHALL FACE STREET.
8. TAPPING SLEEVE VALVE SHALL NOT BE USED TO ESTABLISH A HYDRANT CONNECTION TO THE WATER MAIN.
9. UNDER NO CIRCUMSTANCES SHALL A WATER SERVICE BE TAPPED OFF OF THE 6-INCH DI HYDRANT SERVICE PIPE.

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HYDRANT, 6 INCH INSTALLATION OFFSET



CITY OF DETROIT
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ENGINEERING
DIVISION

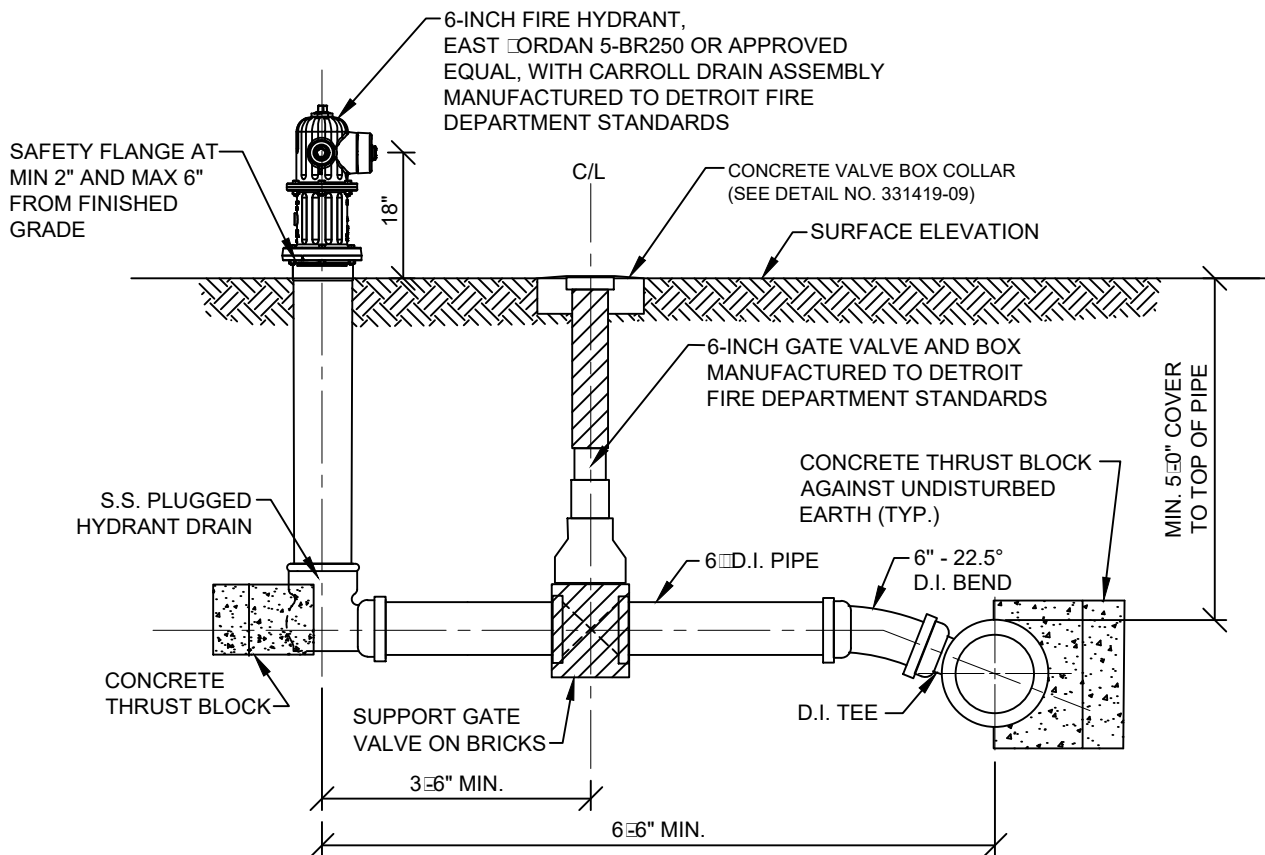
SCALE
NONE

SHEET

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DATE
9/2018

331419-02
DWG. No.



NOTES:

1. ALL INSTALLATION OR REPLACEMENT WORK FROM PROPOSED WATER MAIN AND TO HYDRANT SHALL BE CONSIDERED A COMPLETE ASSEMBLY.
2. HYDRANT TO BE A MINIMUM OF 3 FEET BEHIND CURB.
3. THRUST BLOCKS TO BE SIZED ACCORDING TO THRUST BLOCK STANDARD DETAIL DRAWING.
4. SEE TRENCH DETAIL FOR BACKFILL AND COMPACTION.
6. SEE DETAIL 331419-06 FOR TRACER WIRE INSTALLATION.
- PUMPER NOZZLE SHALL FACE STREET.
8. TAPPING SLEEVE □ VALVE SHALL NOT BE USED TO ESTABLISH A HYDRANT CONNECTION TO THE WATER MAIN.
9. UNDER NO CIRCUMSTANCES SHALL A WATER SERVICE BE TAPPED OFF OF THE 6-INCH DI HYDRANT SERVICE PIPE.

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HYDRANT, 6 INCH INSTALLATION STRAIGHT AWAY



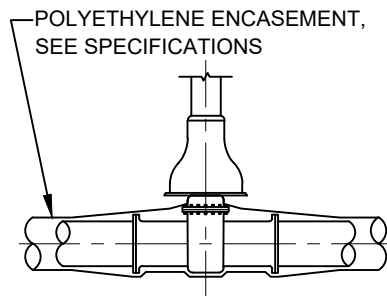
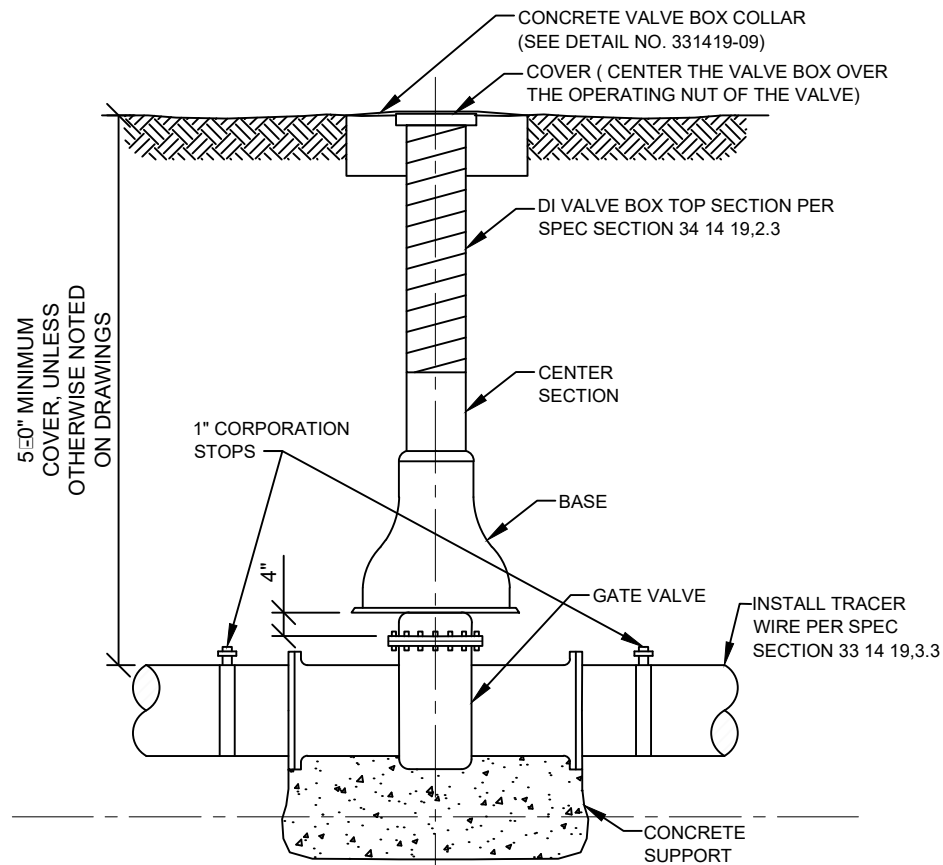
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

1 OF 1
SHEET

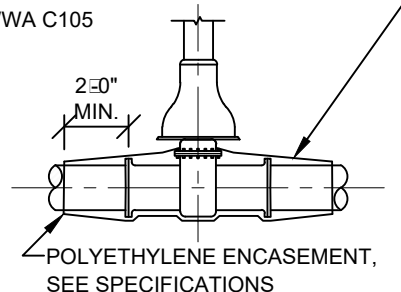
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9/2018

331419-03
DWG. No.



GATE VALVE ON D.I. PIPE

OVERLAP PE WRAP ONTO PE PIPE MIN.
2'-0". SEAL END OF PE WRAP WITH
ADHESIVE TAPE IN ACCORDANCE WITH
AWWA C105



GATE VALVE ON PE PIPE

NOTES:

1. ALL MECHANICAL JOINTS REQUIRE RETAINER GLAND.
2. 12 INCH DIAMETER VALVES AND SMALLER SHALL BE TWO PIECE TYPE.
3. VALVES LARGER THAN 12 INCH DIAMETER SHALL BE THREE PIECE TYPE.
4. WRAP ALL BURIED VALVES, MECHANICAL JOINTS, AND JOINT RESTRAINT DEVICES WITH WAX TAPE IN ACCORDANCE WITH AWWA C210. OVERWRAP WAX TAPE WITH ONE WRAP OF PE ENCASEMENT IN ACCORDANCE WITH AWWA C105. TIGHTLY TAPE THE PE WRAP TO SEAL ALL JOINTS AND FOLDS.

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VALVE BOX INSTALLATION



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

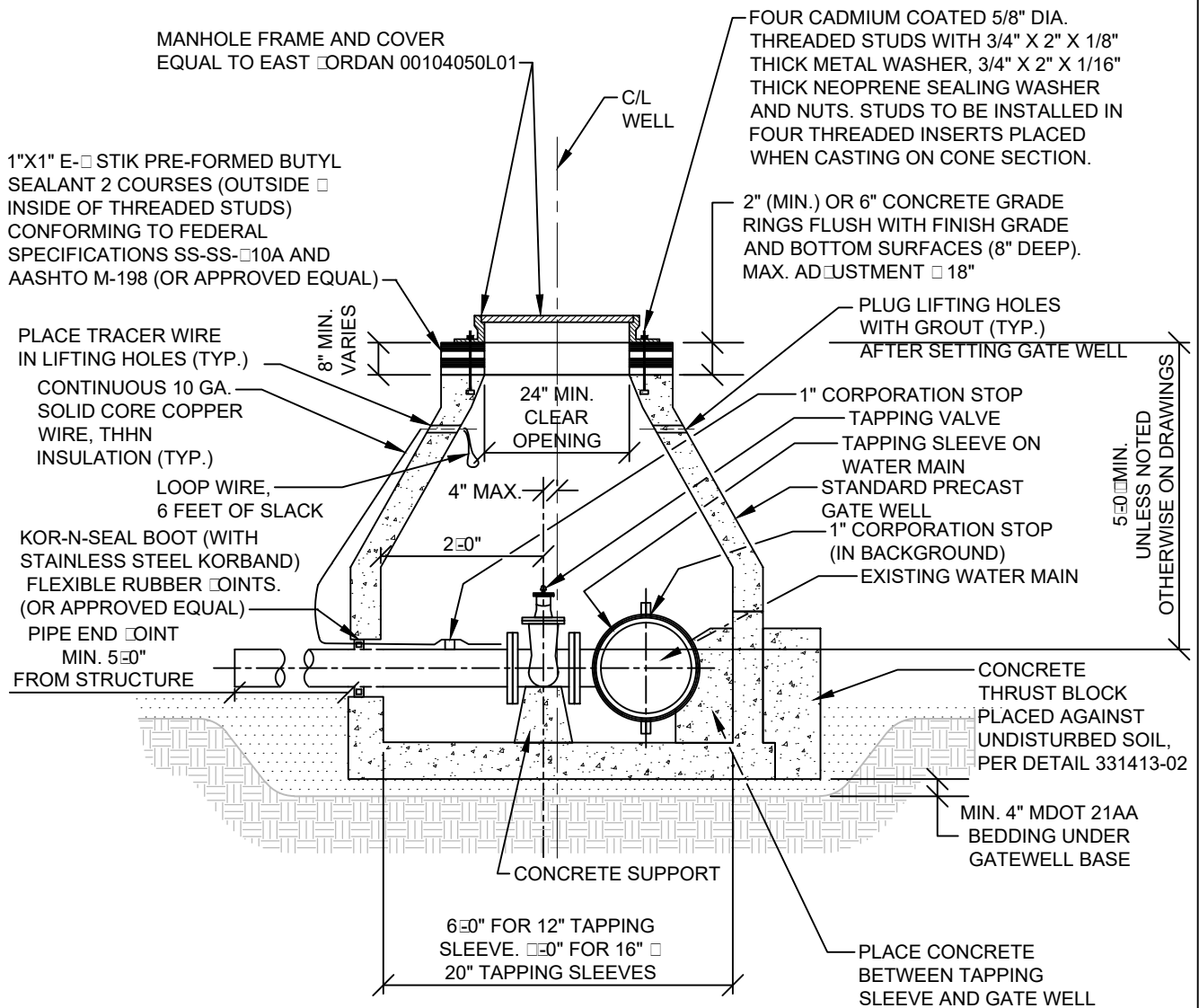
SCALE
NONE

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9/2018

331419-04
DWG. No.



NOTES:

1. RUBBER "O" RINGS FOR ADJUSTING RINGS NOT USED IN PAVEMENT AREAS.
2. MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5'-0". TOP STEP SHALL NOT BE MORE THAN 16" BELOW MH COVER OR AS DIRECTED. BOTTOM STEP SHALL NOT BE MORE THAN 18" ABOVE THE BENCH OR FLOOR LEVEL..
3. TRACING WIRE ON HDPE PIPE ONLY.

REV	DESCRIPTION	DATE
	REVISIONS	

**CONNECTION,
NEW MAIN TO
EXISTING MAIN
USING TAPPING
VALVE AND WELL**



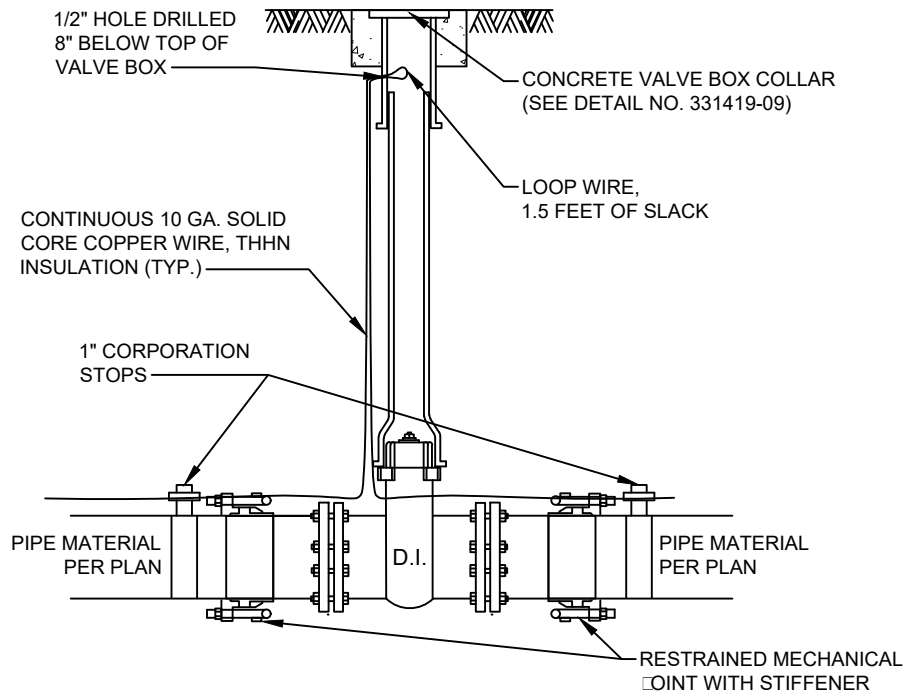
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

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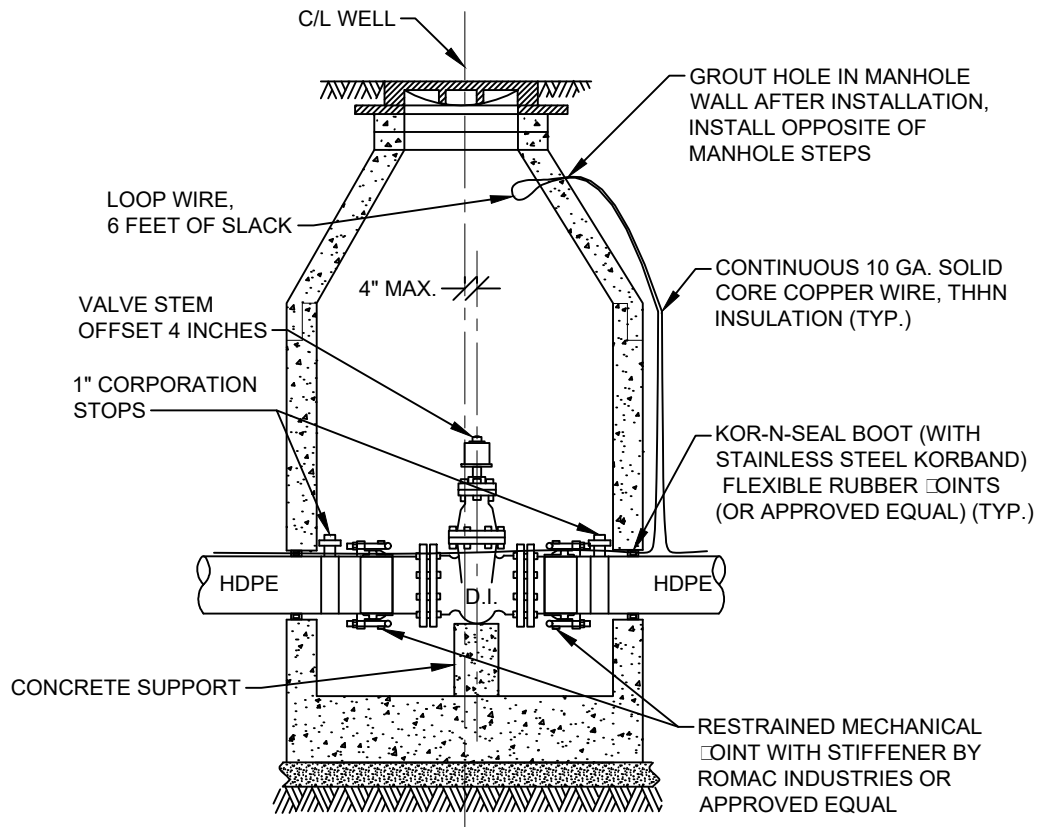
331419-05
DWG. No.



NOTES:

1. USE RESTRAINED MECHANICAL JOINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE PIPE MATERIAL. STIFFENERS SHALL BE BY ROMAC INDUSTRIES OR APPROVED EQUAL.
2. POLYWRAP VALVE PER DETAIL 331419-04.
3. 12 INCH DIAMETER VALVES AND SMALLER SHALL BE TWO PIECE TYPE.
4. VALVES LARGER THAN 12 INCH DIAMETER SHALL BE THREE PIECE TYPE.

			<div>VALVE BOX DETAIL (HDPE PIPE)</div>	<div><div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div><div>SCALE NONE</div><div>DATE 5/2020</div></div>	<div>1 OF 1 SHEET</div> <div>331419-01</div> <div>DWG. No.</div>
REV	DESCRIPTION	DATE			
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NOTES:

1. USE RESTRAINED MECHANICAL JOINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE EXISTING PIPE MATERIAL.
2. REINFORCED CONCRETE ANCHOR BLOCK TO BE SIZED BY CONTRACTOR WITH DIRECTION FROM HDPE PIPE MANUFACTURER.
3. MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5'-0". TOP STEP SHALL NOT BE MORE THAN 16" BELOW MH COVER OR AS DIRECTED. BOTTOM STEP SHALL NOT BE MORE THAN 18" ABOVE THE BENCH OR FLOOR LEVEL.

REV	DESCRIPTION	DATE

**VALVE WELL
DETAIL
(HDPE PIPE)**



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	1 OF 1 SHEET
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LEAD OPENING IN PIPE SHALL BE CUT CLEAN NOT CHISELED AND BROKE.
ALL DEBRIS MUST BE CLEANED FROM THE INTERIOR OF THE PIPE.

GRADE "C"
CONCRETE
ENCASEMENT
TO SPRINGLINE

SAND
CUSHION

"Y" SADDLE
(FERNCO FLEXIBLE
TAP SADDLE OR
APPROVED EQUAL)

6"
MIN.

6"
MIN.

EX. SEWER PIPE

SECTION

DO NOT CHIP BELL
OF "Y" SADDLE TO
FACILITATE INSTALLATION
OF CONNECTION

6" CONC. ENCASEMENT

"Y" SADDLE

EXTENT OF
GASKET

12"

12"

24" □ WIDTH OF PIPE

STAINLESS
STEEL STRAPS

EX. SEWER PIPE

ELEVATION

NOTES:

1. FOR SEWERS 18" OR LESS A "Y" SADDLE MAY BE USED IF THE OUTSIDE DIA. OF THE TAP IS LESS THAN ONE HALF THE DIA. OF THE SEWER BEING TAPPED.
2. PROVIDE EXTENSION CLAMPS FOR 15" SEWERS AND LARGER.
3. CONCRETE BELOW PIPE IS ONLY REQUIRED FOR 15" SEWERS AND LARGER WITH STRAPS.

1	UPDATED	06/2020
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REVISIONS		

CONNECTION, SADDLE TO LATERAL SEWER



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

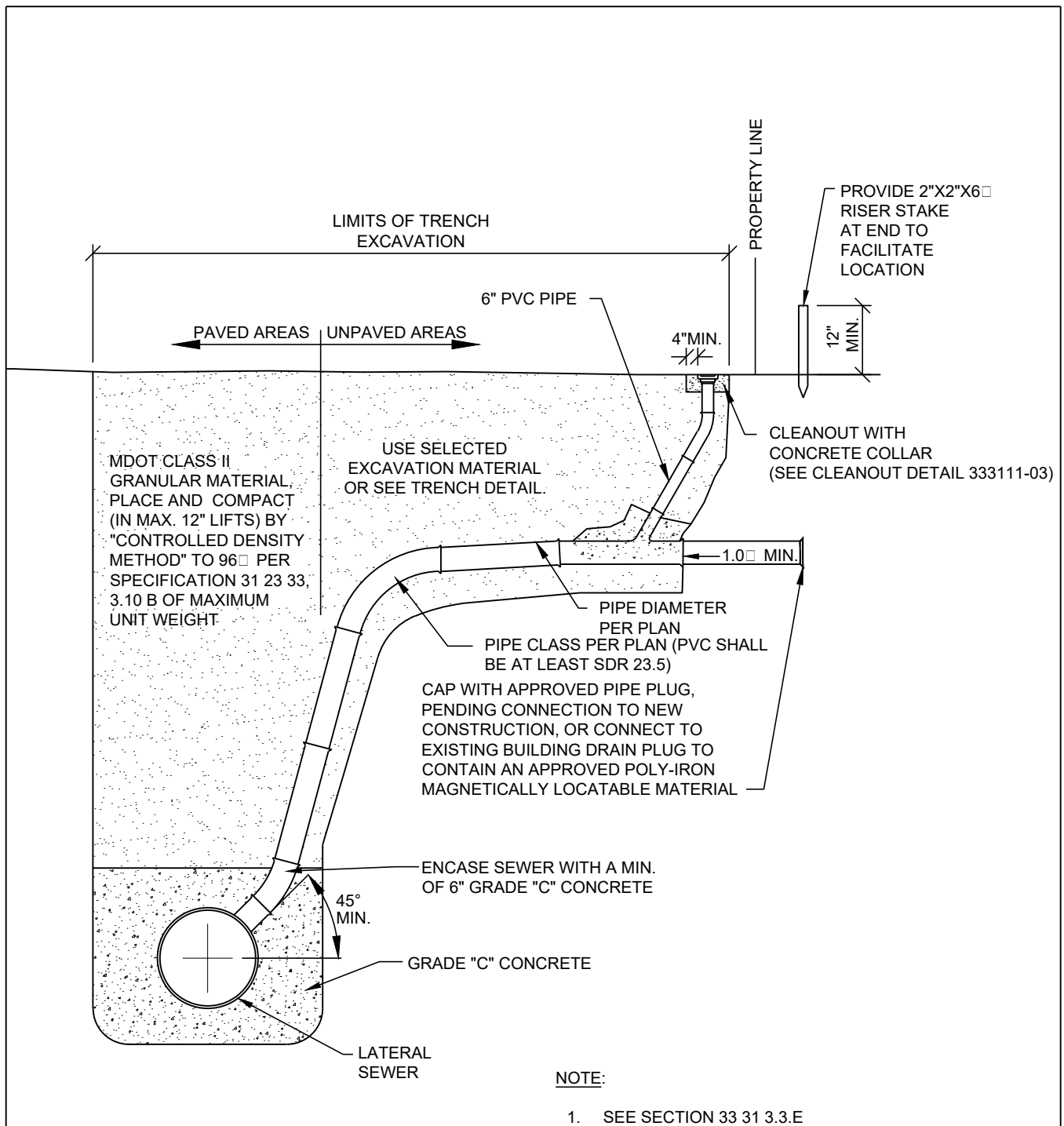
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DATE
09/2018

333111-01
DWG. No.



REV	DESCRIPTION	DATE
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WYE, CONNECTION AND EXTENSION



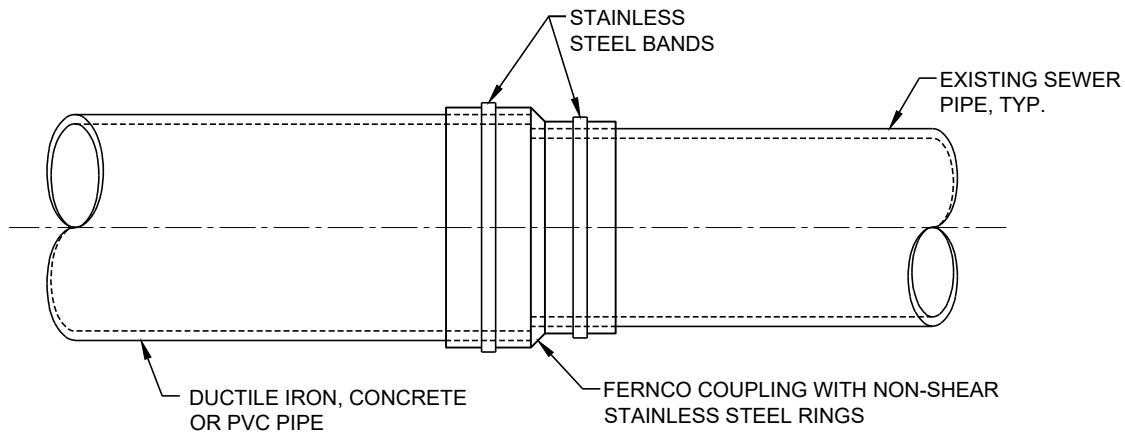
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

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SHEET

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DWG. No.



DISSIMILAR SEWER PIPE JOINT DETAIL

NOTES:

1. DUCTILE IRON OR CAST IRON PIPE

WHERE EXISTING BELL SIZE IS DISSIMILAR AND CAN NOT BE CONNECTED BY STANDARD FITTINGS, A FERNCO COUPLING WITH NON-SHEAR STAINLESS STEEL RINGS SHALL BE USED.


2. PVC PIPE

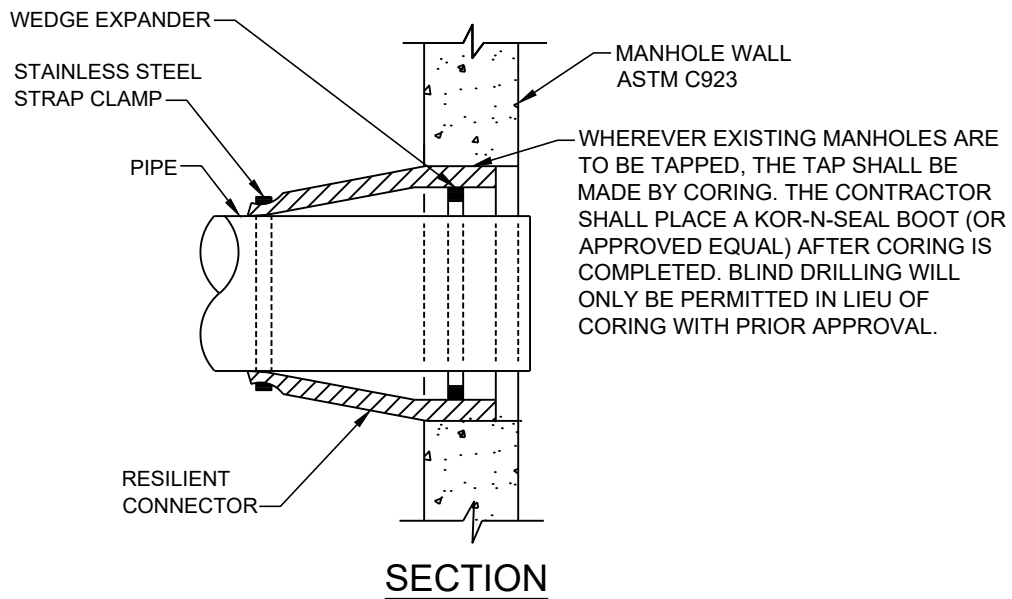
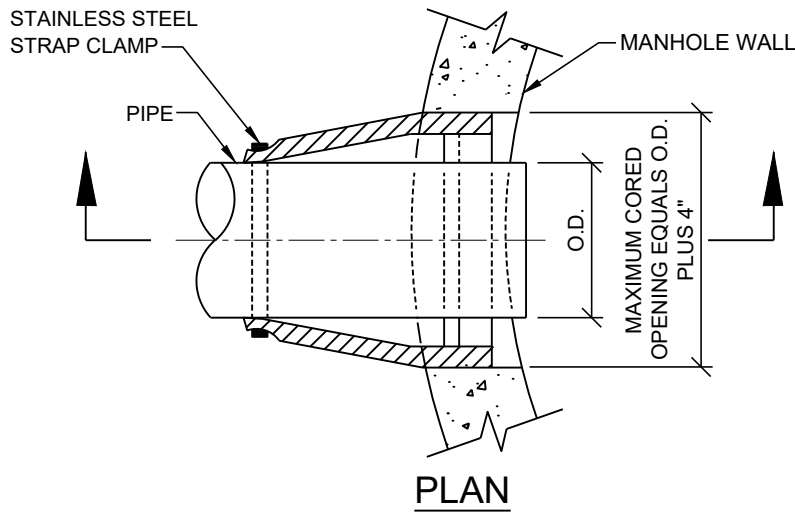
WHERE PVC PIPE SIZE IS DISSIMILAR AND PVC COUPLINGS ARE NOT SUITABLE, A FERNCO COUPLING WITH NON-SHEAR STAINLESS STEEL RINGS SHALL BE USED.

3. CONCRETE PIPE

WHERE PIPE SIZE IS DISSIMILAR AND A NORMAL BELL AND SPIGOT GASKETED JOINT IS NOT PRACTICAL, A FERNCO COUPLING WITH NON-SHEAR STAINLESS STEEL RINGS SHALL BE USED TO COMPLETE THE JOINT.

SIMILAR SEWER PIPE JOINT NOTES


			<h3>SEWER PIPE JOINT DETAIL</h3>	 <p>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</p>
1	UPDATED	06/2020		SCALE NONE
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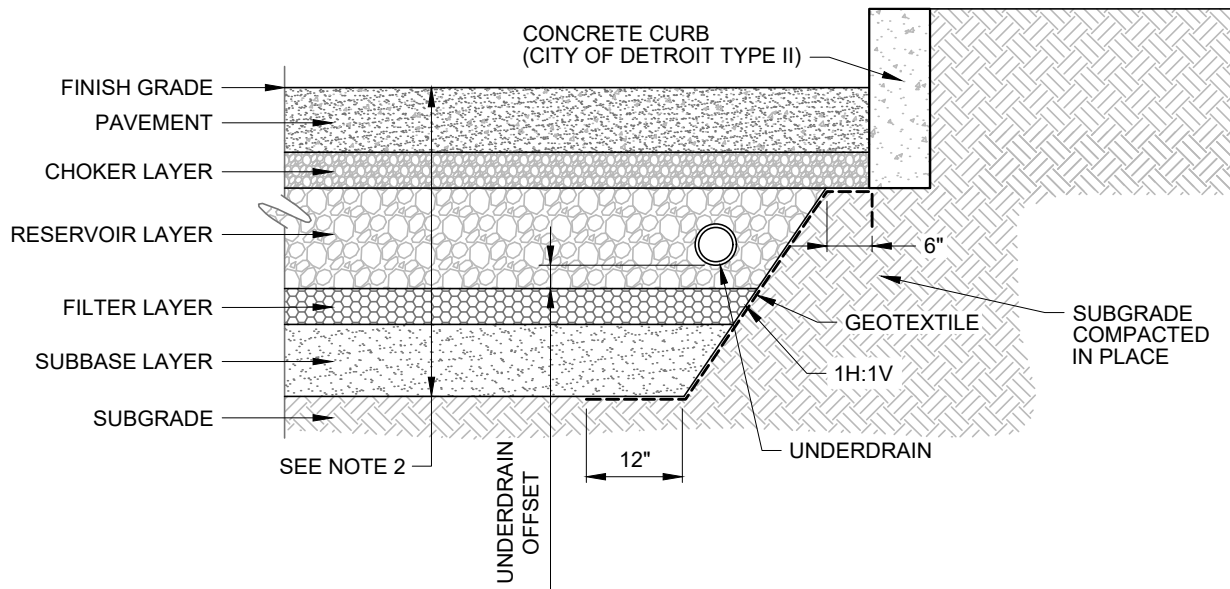
NOTE:

1. ALL NEW PIPE OPENINGS FOR PROPOSED MANHOLES SHALL BE MADE BY MANHOLE MANUFACTURER.

WATERTIGHT RESILIENT CONNECTOR
FOR CONNECTING PROPOSED PIPES TO EXISTING MANHOLES
AND EXISTING PIPES TO PROPOSED MANHOLES

			SEWER PIPE CONNECTION WITH MANHOLE	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
1	UPDATED	06/2020		
REV	DESCRIPTION	DATE		
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SCALE NONE	1 OF 1
DATE 9/2018	333111-05 DWG. No.

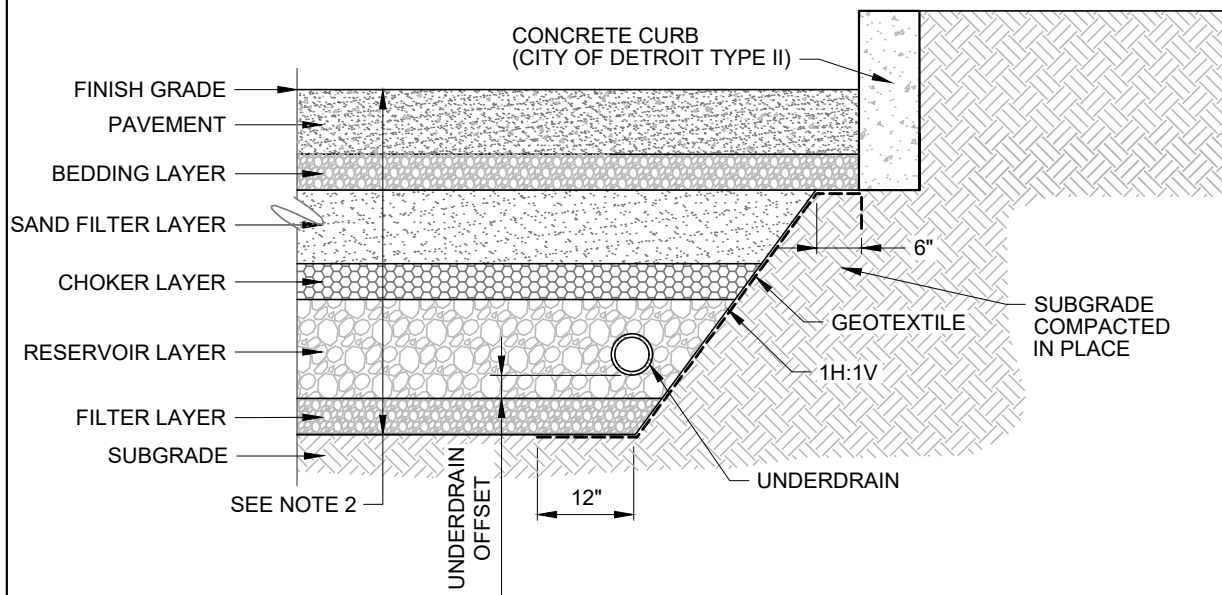


ITEM	MATERIAL	CLASS A ALLEY, PARKING LANE, LOCAL STREETS	CLASS B COLLECTOR OR ARTERIAL (NOT CURRENTLY ALLOWED)
PAVEMENT	PERMEABLE PORTLAND CEMENT CONCRETE.	6 INCH	8 INCH
CHOKER LAYER	MDOT 6AA, AASHTO #57, OR APPROVED EQUIVALENT.	4 INCH	4 INCH
RESERVOIR LAYER	MDOT 4AA OR, 6AA, OR AASHTO #3, #5, #57 OR APPROVED EQUIVALENT.	__ INCH	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH	4 INCH
SUBBASE LAYER	MDOT CLASS II	8 INCH	8 INCH
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.		
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. SPACING FOR UNDERDRAINS TO BE 25' MAX. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" MIN, 8" MAX.	__ INCH	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.		

NOTES:

- SEE DWG NO. G/10 FOR LONGITUDINAL AND CROSS SLOPE REQUIREMENTS.
- THE TOTAL DEPTH OF THE PAVEMENT SECTION (FROM FINISH GRADE OF PAVEMENT TO BOTTOM OF SUBBASE LAYER) SHALL BE A MINIMUM OF 30" (0. ☐ X FROST DEPTH).


-	-	-	PERMEABLE CONCRETE PAVEMENT (ROADWAY, PARKING LOT, AND ALLEY)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE		
-	-	-			NONE	1 OF 1	
-	-	-			DATE	G/01	
-	-	-			12/2018	DWG. No.	
REV	DESCRIPTION	DATE					
REVISIONS							

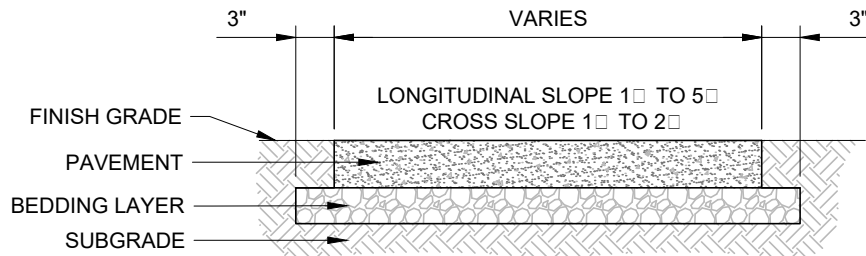


ITEM	MATERIAL	CLASS A ALLEY, PARKING LANE, LOCAL STREETS	CLASS B COLLECTOR OR ARTERIAL (NOT CURRENTLY ALLOWED)
PAVEMENT	PERMEABLE PORTLAND CEMENT CONCRETE.	6 INCH	8 INCH
BEDDING LAYER	MDOT 6AA, AASHTO #57, OR APPROVED EQUIVALENT.	4 INCH	4 INCH
SAND FILTER LAYER	MDOT CLASS II	__ INCH	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH	4 INCH
RESERVOIR LAYER	MDOT 4AA OR, 6AA, OR AASHTO #3, #5, #57 OR APPROVED EQUIVALENT.	__ INCH	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH	4 INCH
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.		
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. SPACING FOR UNDERDRAINS TO BE 25' MAX. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" MIN, 8" MAX.	__ INCH	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.		

NOTES:

- SEE DWG NO. G/10 FOR LONGITUDINAL AND CROSS SLOPE REQUIREMENTS.
- THE TOTAL DEPTH OF THE PAVEMENT SECTION (FROM FINISH GRADE OF PAVEMENT TO BOTTOM OF SUBBASE LAYER) SHALL BE A MINIMUM OF 30" (0. ☐ X FROST DEPTH).

-	-	-	PERMEABLE CONCRETE PAVEMENT (ROADWAY, PARKING LOT, AND ALLEY)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>		
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REV	DESCRIPTION	DATE		SCALE NONE	SHEET 1 OF 1	
REVISIONS				DATE 12/2018	DWG. No. G/01-a	




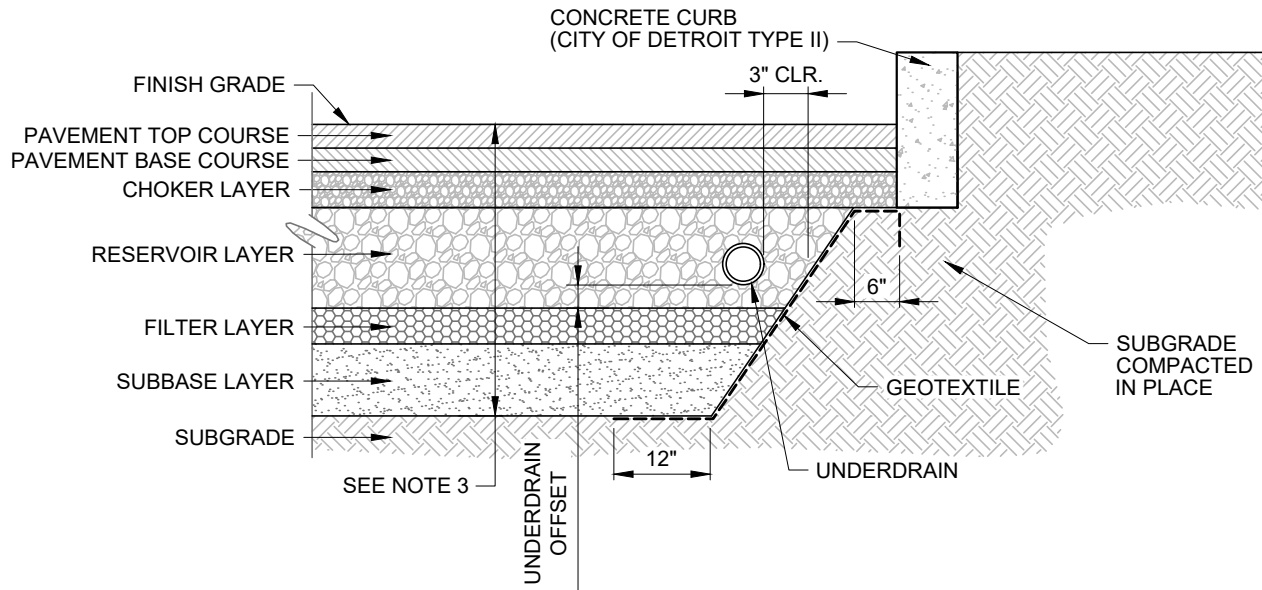
SIDEWALK SECTION

ITEM	MATERIAL	
PAVEMENT	PERMEABLE PORTLAND CEMENT CONCRETE.	4 INCH
BEDDING LAYER	MDOT 6AA, AASHTO #57, MDOT CLASS II, OR APPROVED EQUIVALENT. 4" MIN, 6" MAX.	___ INCH
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.	

NOTE:

- FOR SIDEWALK POINT LAYOUT, REFER TO DIVISION 10 OF THE CURRENT CITY STANDARD CONSTRUCTION SPECIFICATIONS.


-	-	-	PERMEABLE CONCRETE SIDEWALK	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
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REV	DESCRIPTION	DATE	SCALE NONE	1 OF 1 SHEET
REVISIONS			DATE 12/2018	G/02 DWG. No.

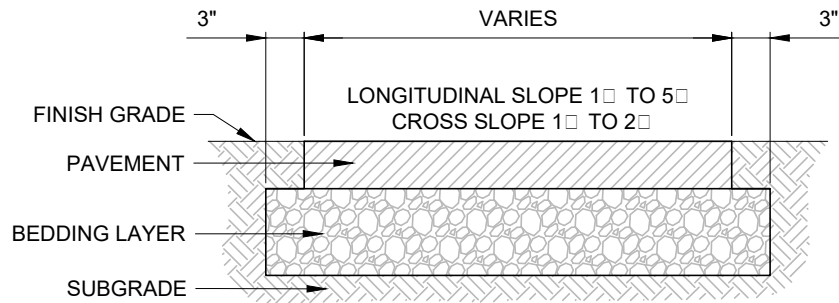


ITEM	MATERIAL	CLASS A ALLEY, PARKING LANE, LOCAL STREETS	CLASS B COLLECTOR OR ARTERIAL (NOT CURRENTLY ALLOWED)
PAVEMENT, TOP COURSE	HMA, PERMEABLE	__ INCH	__ INCH
PAVEMENT, BASE COURSE	HMA, PERMEABLE	__ INCH	__ INCH
CHOKER LAYER	MDOT 34G, OR AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5, #57, OR APPROVED EQUIVALENT.	__ INCH	__ INCH
FILTER LAYER	MDOT 34G, 4G, AASHTO #8 OR APPROVED EQUIVALENT. WHEN FILTER LAYER IS OMITTED, PROVIDE GEOTEXTILE CLASS 2 MATERIAL BENEATH RESERVOIR LAYER.	4 INCH	4 INCH
SUBBASE LAYER	MDOT CLASS 2	4 INCH	4 INCH
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.		
UNDERDRAIN	PERFORATED HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52.	4-8 INCH	4 INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.		

NOTES:

- SEE DWG NO. G/10 FOR LONGITUDINAL AND CROSS SLOPE REQUIREMENTS.
- GEOMEMBRANE TO BE USED, ON SIDES ONLY, WHEN FACILITY IS WITHIN 10' OF ADJACENT BUILDING AND TO AVOID INFILTRATION AROUND UTILITIES. SEE DESIGN PLANS.
- THE TOTAL DEPTH OF THE PAVEMENT SECTION (FROM FINISH GRADE OF PAVEMENT TO BOTTOM OF SUBBASE LAYER) SHALL BE A MINIMUM OF 30" (0.5'X FROST DEPTH).

-	-	-	PERMEABLE CONCRETE PAVEMENT (ROADWAY, PARKING LOT, AND ALLEY)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE		1 OF 1			
-	-	-			NONE	SHEET				
-	-	-			DATE	G/03				
-	-	-			12/2018	DWG. No.				
REV	DESCRIPTION	DATE								
REVISIONS										




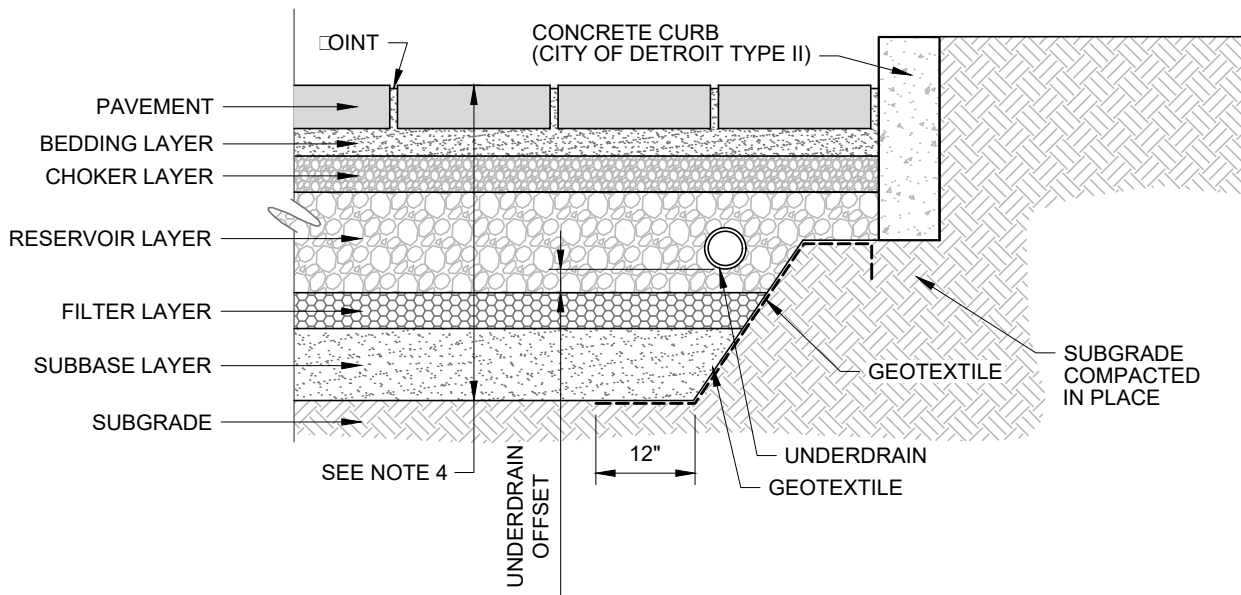
TRAIL/SIDEWALK SECTION

ITEM	MATERIAL	LAYER THICKNESS
PAVEMENT	HMA, PERMEABLE.	3 INCH
BEDDING LAYER	MDOT 6AA, OR AASHTO #57, OR APPROVED EQUIVALENT.	6 INCH
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.	

NOTE:

- BEDDING LAYER AGGREGATE DEPTH MAY BE GREATER THAN THE MINIMUM SHOWN TO ACHIEVE ADDITIONAL STORMWATER STORAGE.


-	-	-	PERMEABLE ASPHALT SIDEWALK	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>		
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-	-	-				
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-	-	-				
REV	DESCRIPTION	DATE			SCALE NONE	1 OF 1 SHEET
REVISIONS					DATE 12/2018	G/04 DWG. No.

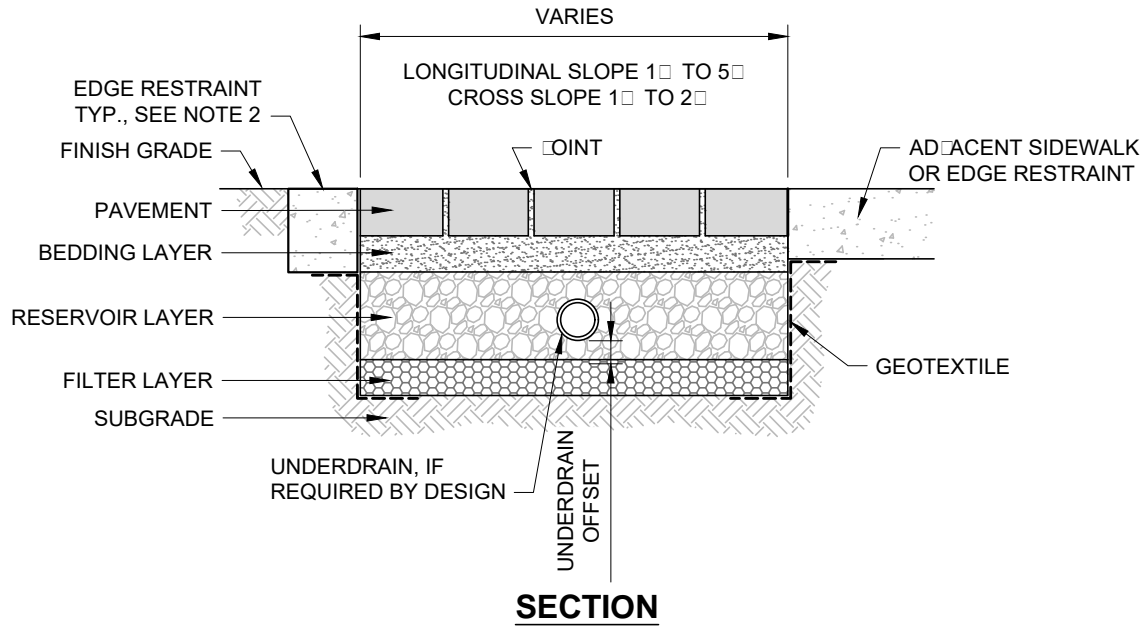


ITEM	MATERIAL	LAYER THICKNESS
PAVEMENT	PERMEABLE INTERLOCKING UNIT PAVERS.	3 INCH MIN.
BEDDING LAYER	MDOT 34G, OR AASHTO #8, OR APPROVED EQUIVALENT.	2 INCH
CHOKER LAYER	MDOT 6AA, OR AASHTO #57, OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, OR AASHTO #3, #5, #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, OR AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH
SUBBASE LAYER	MDOT CLASS 2.	4 INCH
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.	
UNDERDRAIN	PERFORATED HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS, SEE DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION, SEE DWG NO. G/52.	6-8 INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
JOINT	JOINT TO HAVE 1/2 INCH MAXIMUM GAP IN ACCORDANCE WITH THE LATEST ADA REQUIREMENTS AND TO BE FILLED WITH MDOT 34G, 4G, AASHTO #8 OR APPROVED EQUIVALENT. MINIMUM GAP SHALL BE 1/4 INCH OR PER MANUFACTURERS RECOMMENDATIONS.	

NOTES:

1. SEE DWG NO. G/10 FOR LONGITUDINAL AND CROSS SLOPE REQUIREMENTS.
2. GEOMEMBRANE TO BE USED, ON SIDES ONLY, WHEN FACILITY IS WITHIN 10' OF ADJACENT BUILDING AND TO AVOID INFILTRATION AROUND UTILITIES. SEE DESIGN PLANS.
3. CONCRETE CURB EDGE CONDITION IS SHOWN. SEE DWG NO. G/13 FOR FLUSH CONCRETE EDGE RESTRAINT OPTION. ALUMINUM AND PLASTIC EDGE RESTRAINTS ARE NOT ALLOWED FOR VEHICULAR PAVEMENTS.
4. THE TOTAL DEPTH OF THE PAVEMENT SECTION (FROM FINISH GRADE OF PAVEMENT TO BOTTOM OF SUBBASE LAYER) SHALL BE A MINIMUM OF 30" (0.5'X FROST DEPTH).


-	-	-	PERMEABLE INTERLOCKING UNIT PAVERS (ROADWAY, PARKING LOTS, AND ALLEY)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE		1 OF 1	
-	-	-			NONE	SHEET		
-	-	-			DATE	G/05		
-	-	-			12/2018	DWG. No.		
REV	DESCRIPTION	DATE						
REVISIONS								

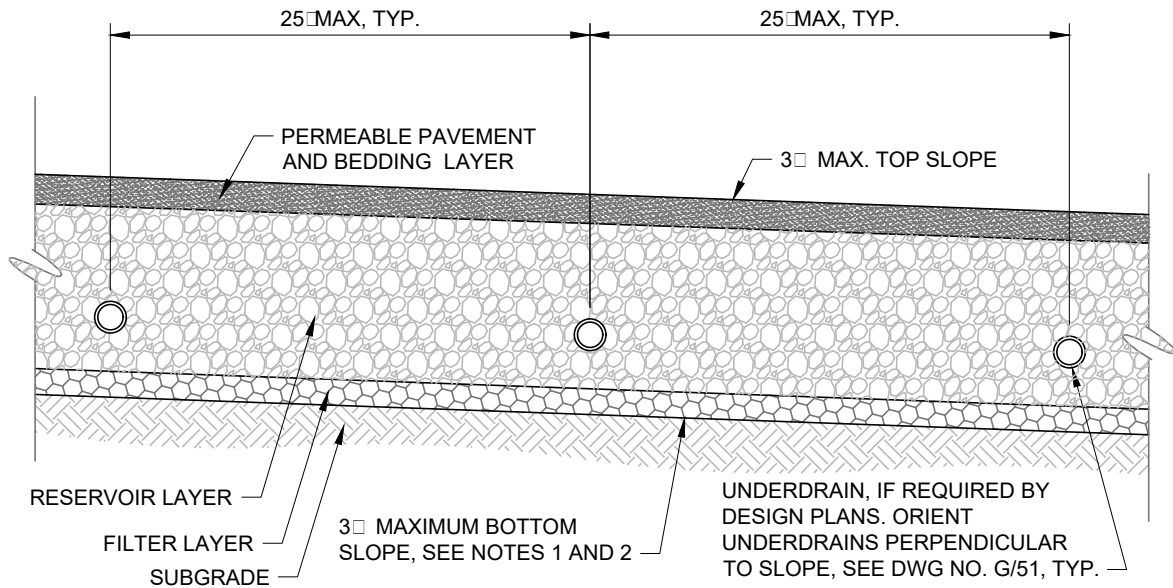


ITEM	MATERIAL	LAYER THICKNESS
PAVEMENT	PERMEABLE UNIT PAVERS.	2-3/8 INCH MIN.
BEDDING LAYER	MDOT 34G, AASHTO #8, OR APPROVED EQUIVALENT.	1-1/2 INCH
RESERVOIR LAYER	MDOT 6AA, OR AASHTO #3, #5, #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, OR AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52.	4 INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.	
JOINT	JOINT TO HAVE 1/2 INCH MAXIMUM GAP IN ACCORDANCE WITH THE LATEST ADA REQUIREMENTS AND TO BE FILLED WITH MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT. MINIMUM GAP SHALL BE 1/4 INCH OR PER MANUFACTURERS RECOMMENDATIONS.	

NOTES:

1. GEOMEMBRANE TO BE USED WHEN FACILITY IS WITHIN 10' OF ADJACENT BUILDING AND TO AVOID INFILTRATION AROUND UTILITIES, SEE DESIGN PLANS.
2. SEE DWG NO. G/13 FOR PAVER EDGE RESTRAINT OPTIONS.


-	-	-	PERMEABLE UNIT PAVERS (SIDEWALK)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE		1 OF 1	
-	-	-			NONE	SHEET		
-	-	-			DATE	G/07		
-	-	-			12/2018	DWG. No.		
REV	DESCRIPTION	DATE						
REVISIONS								

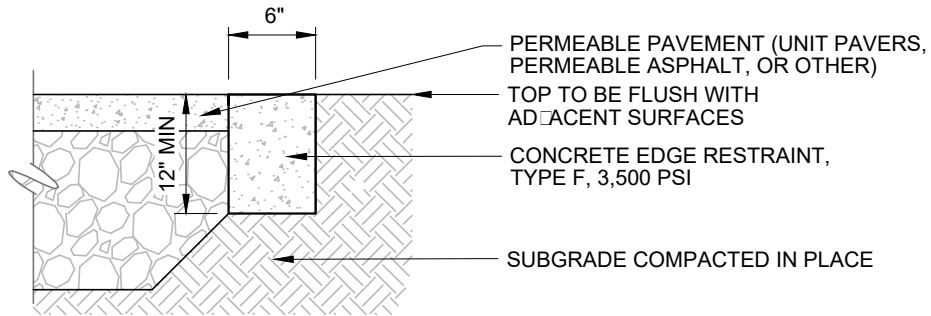


CONTINUOUS BOTTOM SLOPE LONGITUDINAL SLOPE, <2%

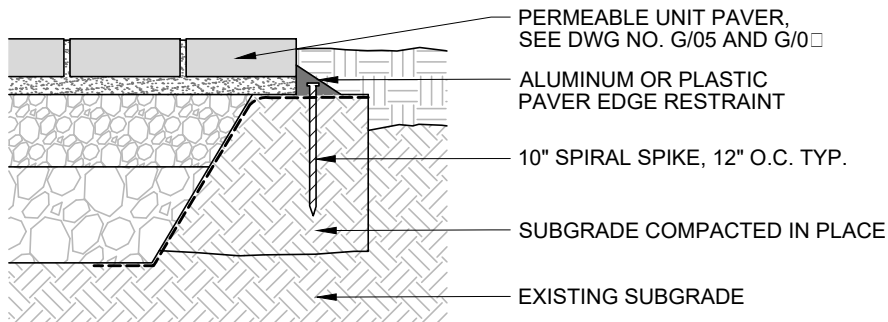
NOTES:

1. BOTTOM SLOPE SHALL BE PARALLEL TO TOP SLOPE AND SHALL NOT EXCEED 3".
2. FOR FACILITIES WITH WATERPROOF MEMBRANE, MINIMUM BOTTOM SLOPE SHALL BE 2" TO DRAIN DRY.
3. THIS DETAIL IS INTENDED TO DEMONSTRATE THE TYPICAL LONGITUDINAL SECTION OF ALL TYPES OF PERMEABLE PAVEMENT USED TO COVER A LARGE AREA. THIS DETAIL IS NOT INTENDED FOR LINEAR WALKWAYS.

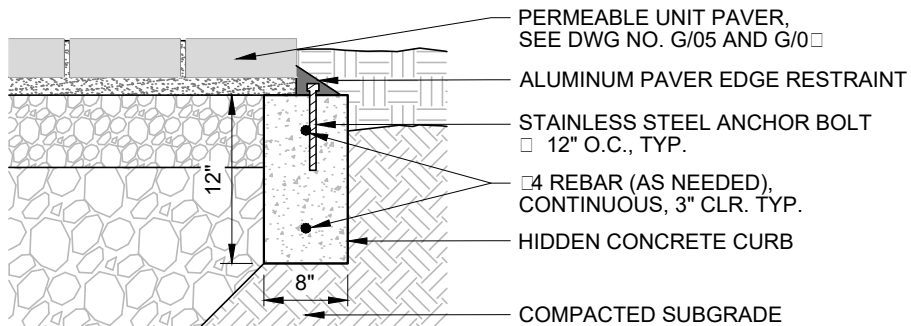
-	-	-	<div>PERMEABLE PAVEMENT WITH CONTINUOUS BOTTOM SLOPE <2%</div>	<div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div>	
-	-	-			
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REV	DESCRIPTION	DATE		<div><div>SCALE NONE</div><div>DATE 12/2018</div></div>	<div>1 OF 1 SHEET</div> <div>G/10 DWG. No.</div>
REVISIONS					



FLUSH CONCRETE EDGE RESTRAINT




PLASTIC OR METAL EDGE RESTRAINT (PEDESTRIAN USE ONLY)

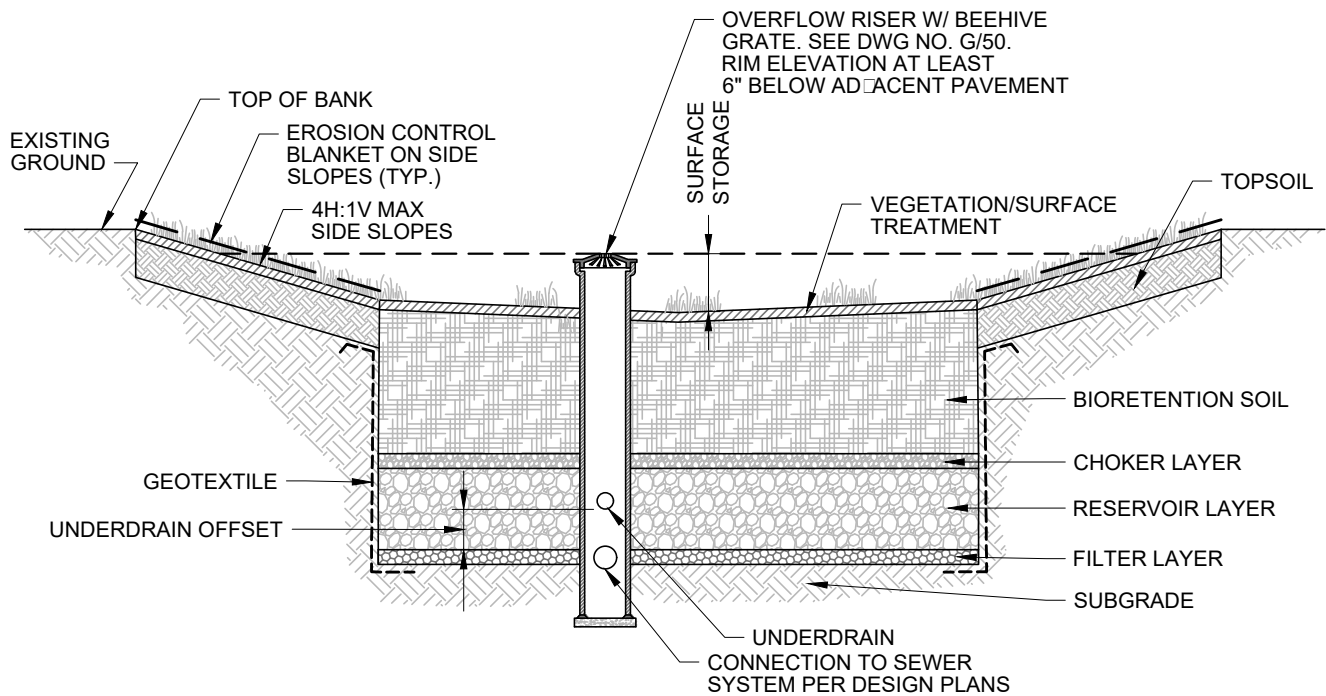


METAL EDGE RESTRAINT ON HIDDEN CONCRETE CURB (PEDESTRIAN USE ONLY)

NOTE:

- PERIMETER RESTRAINTS ARE REQUIRED FOR PERMEABLE UNIT PAVEMENT SYSTEMS. ENGINEER TO DETERMINE IF EDGE RESTRAINTS ARE NECESSARY FOR PERMEABLE ASPHALT AND OTHER TYPES OF PERMEABLE PAVEMENTS.

-	-	-	PERMEABLE PAVEMENT EDGE RESTRAINTS	 CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION	SCALE		
-	-	-			NONE	1 OF 1	
-	-	-			DATE	G/13	
-	-	-			12/2018	DWG. No.	
REV	DESCRIPTION	DATE					
REVISIONS							




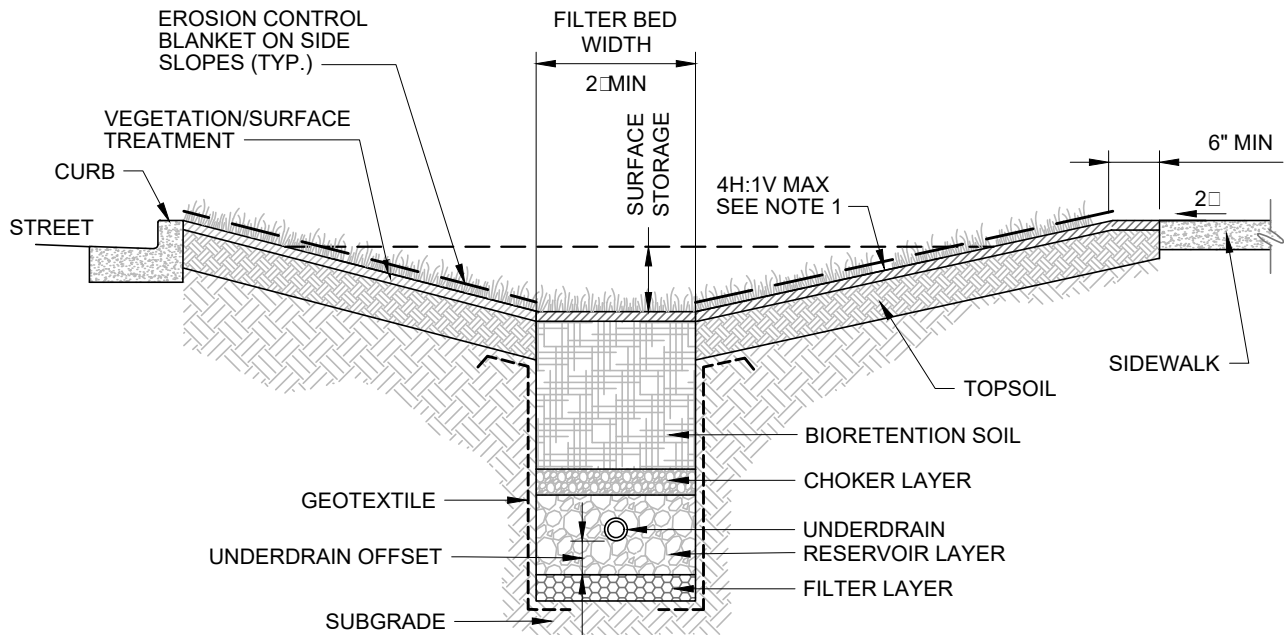
SECTION

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. FOR TURF GRASS PLANTINGS, NO MULCH.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCHES
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	

NOTE:

1. BIORETENTION FACILITY DEPICTED IS ONE WITH AN OVERFLOW STRUCTURE. OFF-LINE FACILITIES DESIGNED TO LIMIT INFLOW SO THAT OVERFLOW STRUCTURES ARE NOT REQUIRED ARE ALSO PERMISSIBLE, AS SHOWN ON DESIGN PLANS.

-	-	-	BIORETENTION IN OPEN AREA	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE		
-	-	-			NONE	1 OF 1	
-	-	-			DATE	G/20	
-	-	-			12/2018	DWG. No.	
REV	DESCRIPTION	DATE					
REVISIONS							




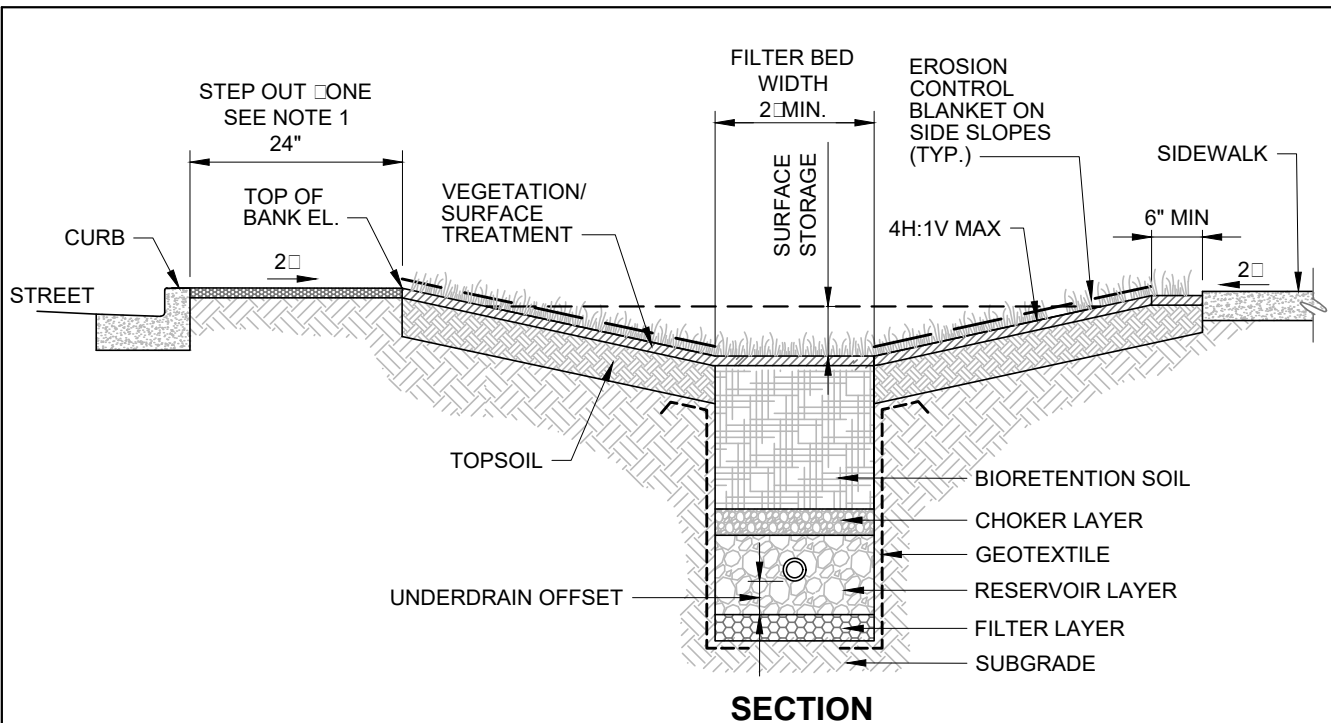
SECTION

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. FOR TURF GRASS PLANTINGS, NO MULCH.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
INLET AND OUTLET	LOCATIONS PER DESIGN PLANS. REFER TO DWG NOS. G/40 - G/42.	

NOTE:

1. BIORETENTION FACILITY DEPICTED IS ONE WITHOUT AN OVERFLOW STRUCTURE. THIS TYPE OF FACILITY REQUIRES A SURFACE OUTLET. AN OVERFLOW STRUCTURE MAY BE USED INSTEAD OF A SURFACE OUTLET.


-	-	-	LINEAR BIORETENTION ADJACENT TO ROADWAY NO STEP OUT ZONE	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
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REV	DESCRIPTION	DATE	SCALE NONE	SHEET 1 OF 1
REVISIONS			DATE 12/2018	DWG. No. G/21

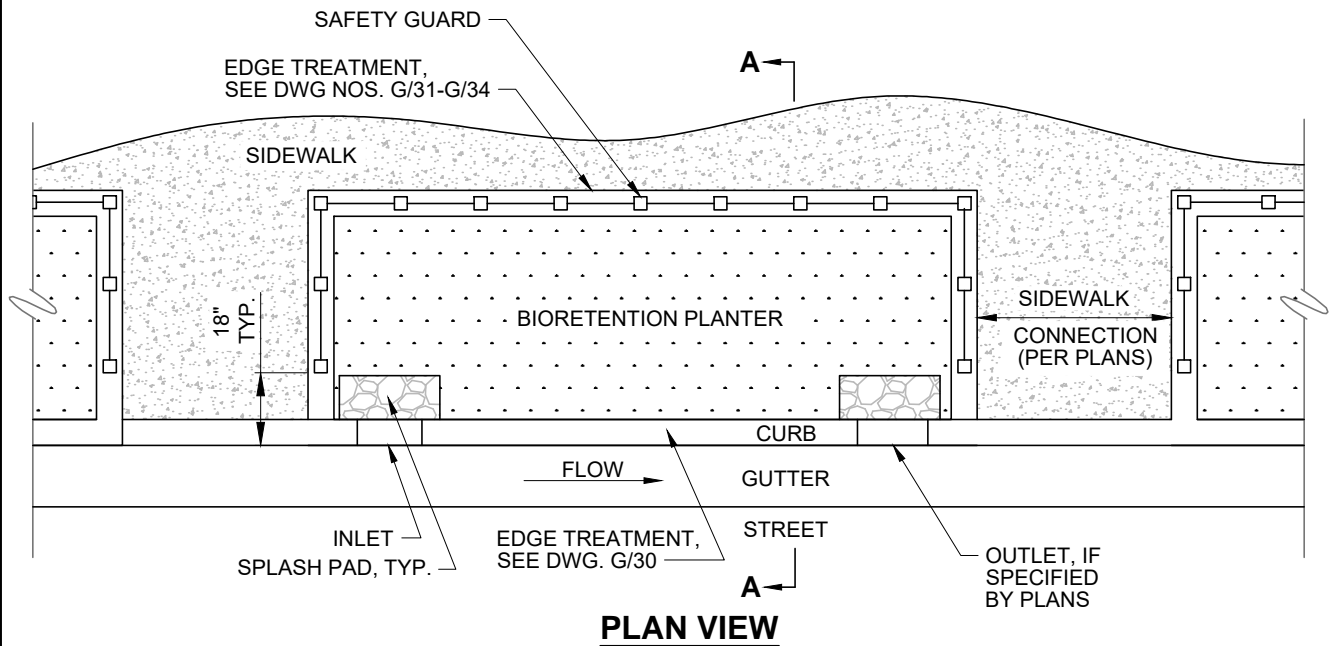


ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. FOR TURF GRASS PLANTINGS, NO MULCH.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	

NOTES:

1. STEP OUT ONE REQUIRED WHEN PARALLEL PARKING IS PROVIDED. SEE DESIGN PLANS FOR SURFACE TREATMENT.
2. BIORETENTION FACILITY DEPICTED IS ONE WITHOUT AN OVERFLOW STRUCTURE. THIS TYPE OF FACILITY REQUIRES A SURFACE OUTLET. AN OVERFLOW STRUCTURE MAY BE USED INSTEAD OF A SURFACE OUTLET.

-	-	-	<div>LINEAR BIORETENTION ADJACENT TO ROADWAY WITH STEP OUT ZONE</div>	<div><div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div><div>SCALE NONE</div><div>DATE 12/2018</div></div> <div><div>1 OF 1</div><div>G/22</div><div>DWG. No.</div></div>
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**BIORETENTION
PLANTER
ADJACENT TO
ROADWAY
(1 OF 2)**

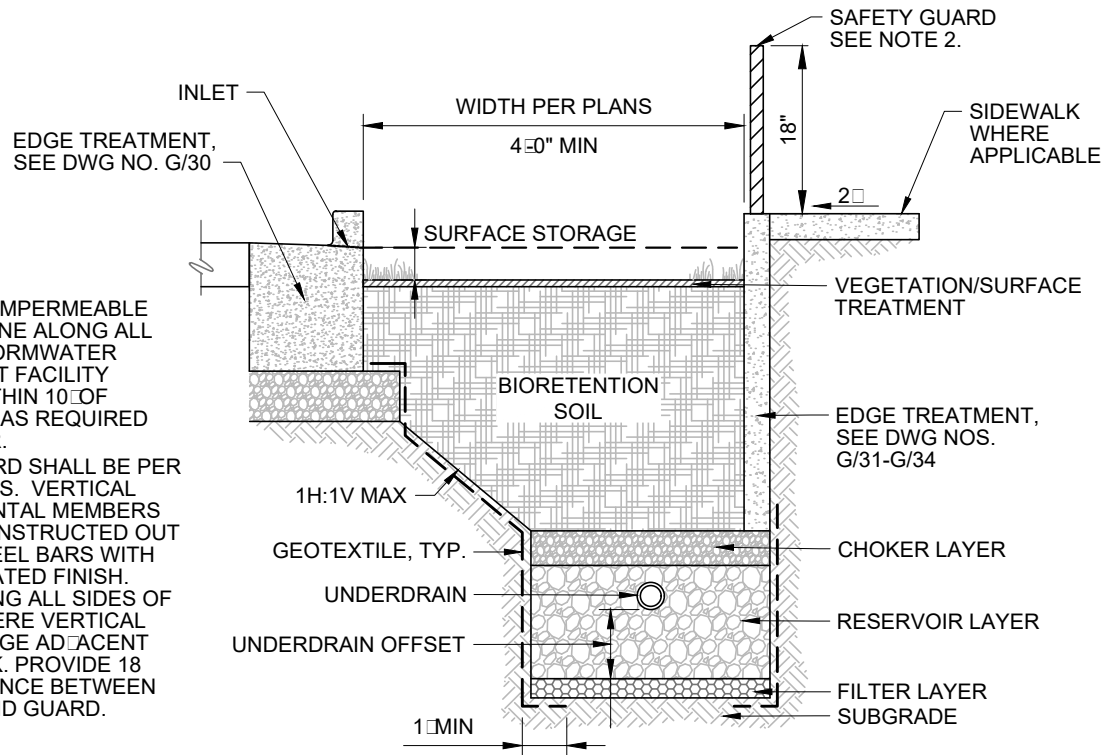


CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	1 OF 2 SHEET
DATE 12/2018	G/23 DWG. No.

NOTES:

1. PROVIDE AN IMPERMEABLE GEOMEMBRANE ALONG ALL SIDES OF STORMWATER MANAGEMENT FACILITY LOCATED WITHIN 10' OF BUILDING OR AS REQUIRED BY ENGINEER.
2. SAFETY GUARD SHALL BE PER DESIGN PLANS. VERTICAL AND HORIZONTAL MEMBERS SHALL BE CONSTRUCTED OUT OF SOLID STEEL BARS WITH POWDER COATED FINISH. LOCATE ALONG ALL SIDES OF FACILITY WHERE VERTICAL GRADE CHANGE ADJACENT TO SIDEWALK. PROVIDE 18 INCH CLEARANCE BETWEEN ROADWAY AND GUARD.



SECTION A-A

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. TURF NOT ALLOWED FOR THIS TYPE OF PLANTER.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
EDGE TREATMENT	FOR STREETSIDE EDGE TREATMENT CONDITIONS, SEE DWG NO. G/30. FOR OTHER THREE SIDES, SEE DWG NOS. G/31 - G/34.	
INLET AND OUTLET	LOCATIONS PER DESIGN PLANS. REFER TO DWG NOS. G/40 - G/42.	

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REV	DESCRIPTION	DATE
REVISIONS		

**BIORETENTION
PLANTER
ADJACENT TO
ROADWAY
(2 OF 2)**



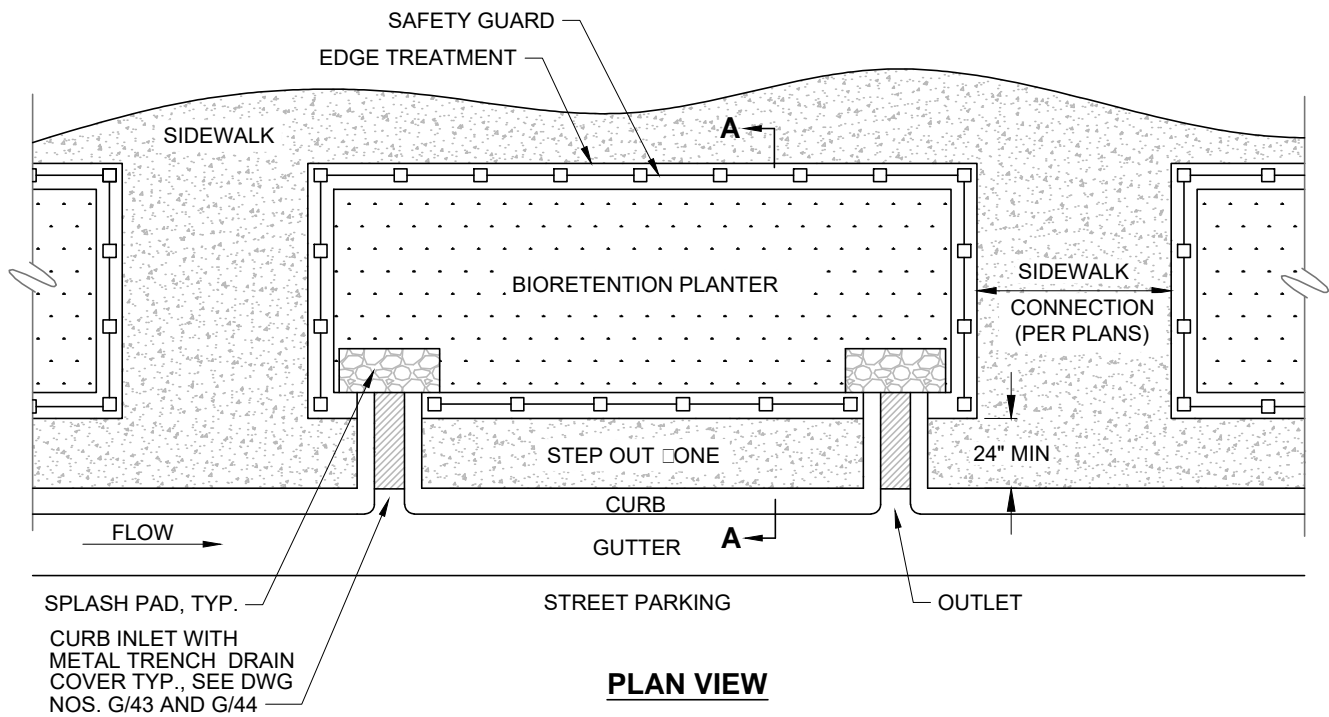
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

SHEET
2 OF 2

DATE
12/2018

DWG. No.
G/23



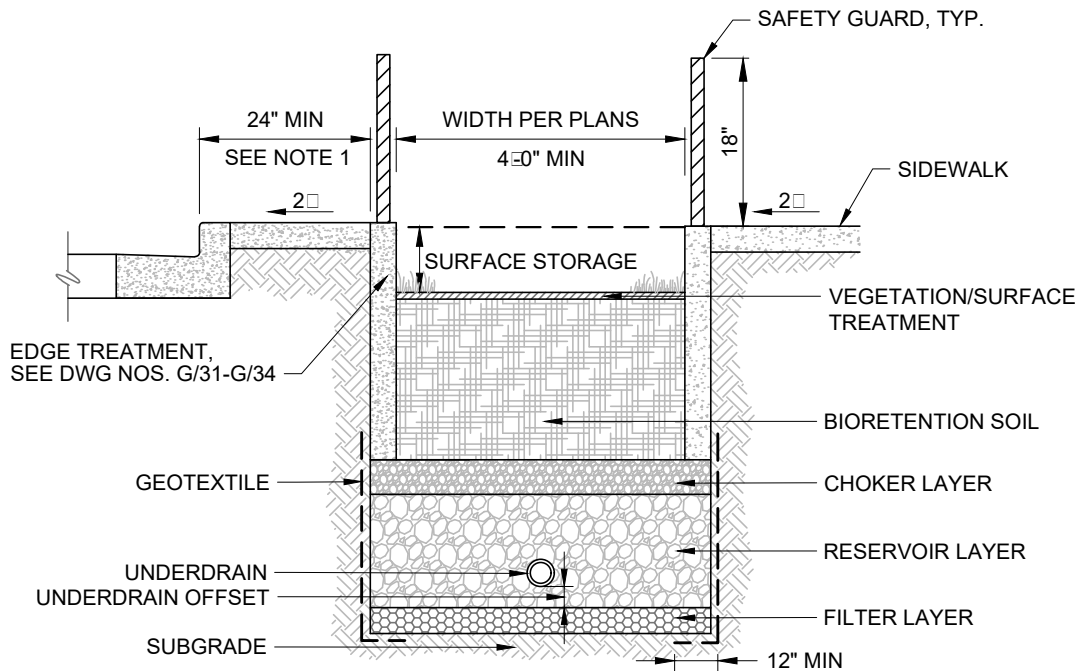
REV	DESCRIPTION	DATE
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REVISIONS		

**BIORETENTION
PLANTER ADJACENT
TO ROADWAY WITH
STEP OUT ZONE
(1 OF 2)**



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	SHEET 1 OF 2
DATE 12/2018	DWG. No. G/24



SECTION A-A

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. TURF NOT ALLOWED FOR THIS TYPE OF PLANTER.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
EDGE TREATMENT	FOR ALTERNATIVE EDGE TREATMENT CONDITIONS, SEE DWG NOS. G/31 TO G/34.	
INLET AND OUTLET	LOCATIONS PER DESIGN PLANS. REFER TO DWG NO. G/43 AND G/44.	

NOTES:

1. STEP OUT ZONE REQUIRED WHEN PARALLEL PARKING IS PROVIDED. INSTALLATION SHALL BE VEGETATION/SURFACE TREATMENT OR PAVEMENT BASED ON SURROUNDING CONDITIONS. SIDEWALK SHALL BE SLOPED TOWARD STREET.
2. OUTLET REQUIRED AS SPECIFIED BY DESIGN PLANS.
3. PROVIDE AN IMPERMEABLE GEOMEMBRANE ALONG ALL SIDES OF STORMWATER MANAGEMENT FACILITY LOCATED WITHIN 10' OF BUILDING OR AS REQUIRED BY ENGINEER.
4. SAFETY GUARD SHALL BE PER DESIGN PLANS. VERTICAL AND HORIZONTAL MEMBERS SHALL BE CONSTRUCTED OUT OF SOLID STEEL BARS WITH POWDER COATED FINISH. LOCATE ALONG ALL SIDES OF FACILITY WHERE VERTICAL GRADE CHANGE ADJACENT TO SIDEWALK. PROVIDE 18 INCH CLEARANCE BETWEEN ROADWAY AND GUARD.

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REV	DESCRIPTION	DATE
REVISIONS		

**BIORETENTION
PLANTER ADJACENT
TO ROADWAY WITH
STEP OUT ZONE
(2 OF 2)**



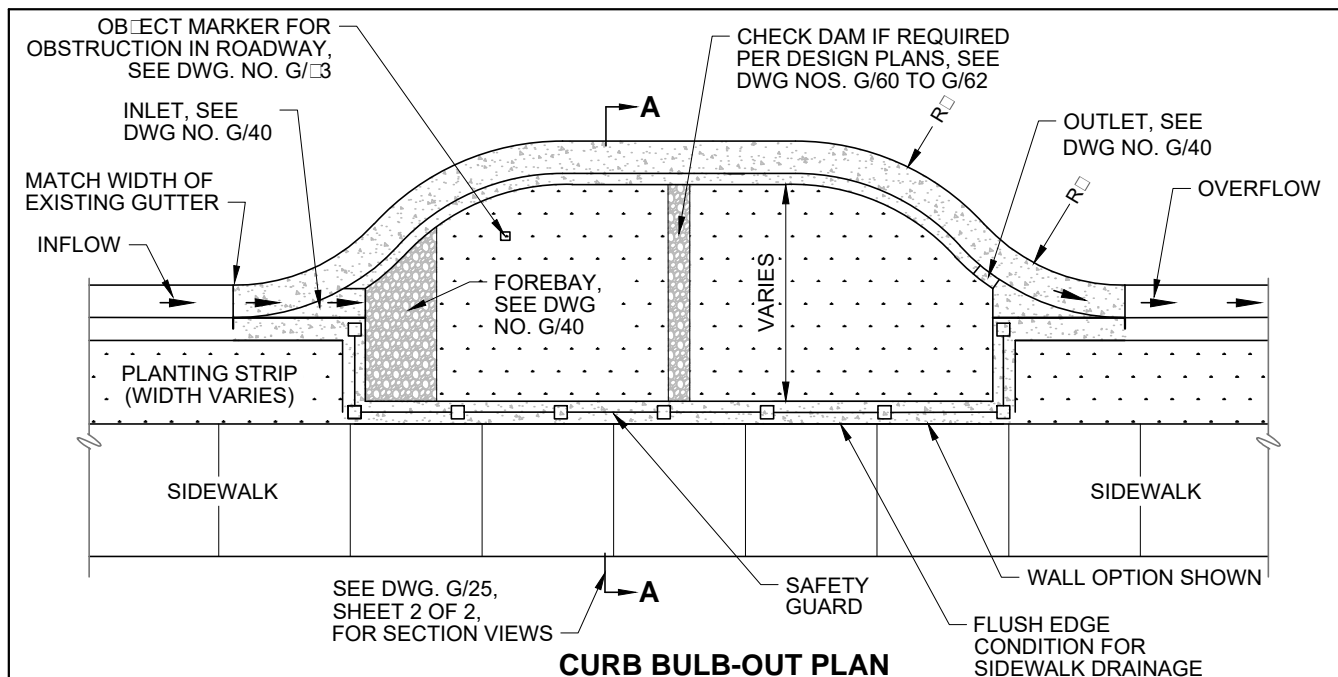
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

SHEET
2 OF 2


DATE
12/2018

DWG. No. **G/24**



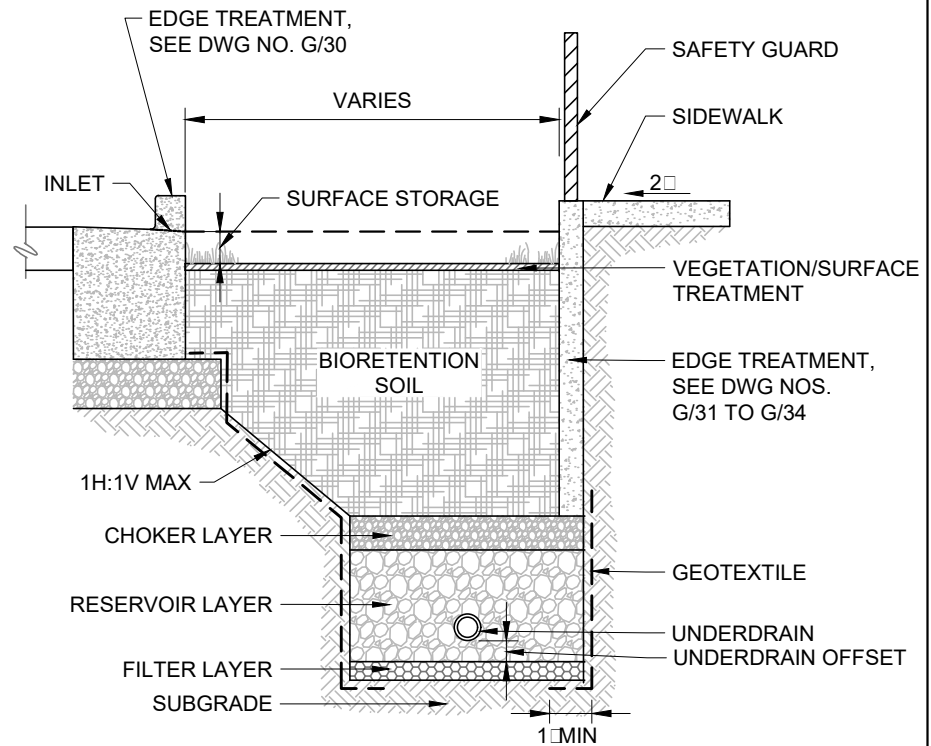
R□□ RADIUS PER DESIGN PLAN, 5□MIN.

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAC SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. TURF NOT ALLOWED FOR THIS TYPE OF PLANTER.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT. WHEN FILTER LAYER IS OMITTED, PROVIDE GEOTEXTILE CLASS 2 MATERIAL BENEATH RESERVOIR LAYER.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
EDGE TREATMENT	FOR STREETSIDE EDGE TREATMENT, SEE DWG NO. G/30. FOR OTHER THREE SIDES, SEE DWG NOS. G/31 TO G/34.	
INLET AND OUTLET	REFER TO DWG NO. G/40.	
CHECK DAMS	AS REQUIRED PER DESIGN PLANS. SEE DWG NOS. G/60 TO G/62.	

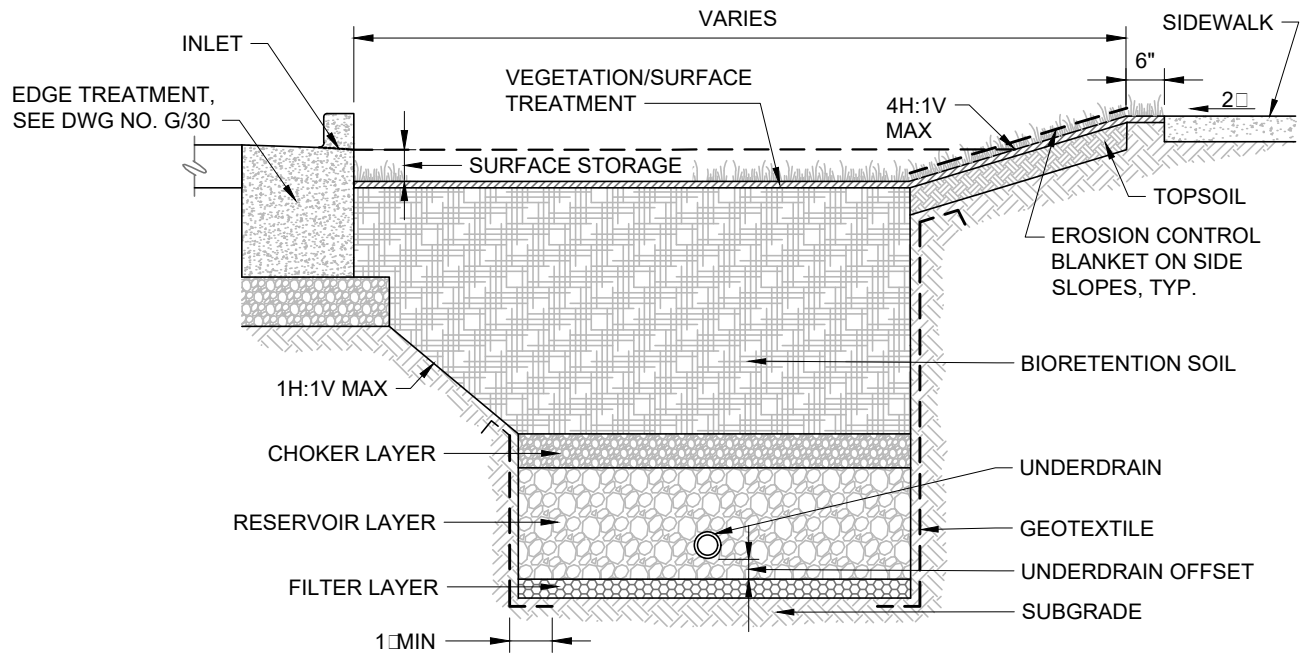
-	-	-	<div>CURB BULB-OUT IN PLANTING STRIP BIORETENTION (1 OF 2)</div>	<div><div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div></div>	SCALE		
-	-	-			NONE	1 OF 2	
-	-	-			DATE	G/25	
-	-	-			12/2018	DWG. No.	
REV	DESCRIPTION	DATE					
REVISIONS							

NOTES:

1. LONGITUDINAL SLOPE OF CURB BULB-OUT MATCHES ROAD, OR FLATTER AS REQUIRED PER DESIGN PLANS.
2. SIDEWALK ELEVATION MUST BE SET ABOVE INLET AND OUTLET ELEVATIONS TO ALLOW OVERFLOW TO DRAIN TO STREET BEFORE PONDING LEVEL REACHES SIDEWALK.
3. PROVIDE AN IMPERMEABLE GEOMEMBRANE ALONG ALL SIDES OF STORMWATER MANAGEMENT FACILITY LOCATED WITHIN 10' OF BUILDING OR AS REQUIRED BY ENGINEER.
4. SAFETY GUARD SHALL BE PER DESIGN PLANS. VERTICAL AND HORIZONTAL MEMBERS SHALL BE CONSTRUCTED OUT OF SOLID STEEL BARS WITH POWDER COATED FINISH. LOCATE ALONG ALL SIDES OF FACILITY WHERE VERTICAL GRADE CHANGE ADJACENT TO SIDEWALK. PROVIDE 18 INCH CLEARANCE BETWEEN ROADWAY AND GUARD.



**SECTION A-A
(WALL OPTION)**



**SECTION A-A
(SLOPE OPTION)**

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REV	DESCRIPTION	DATE
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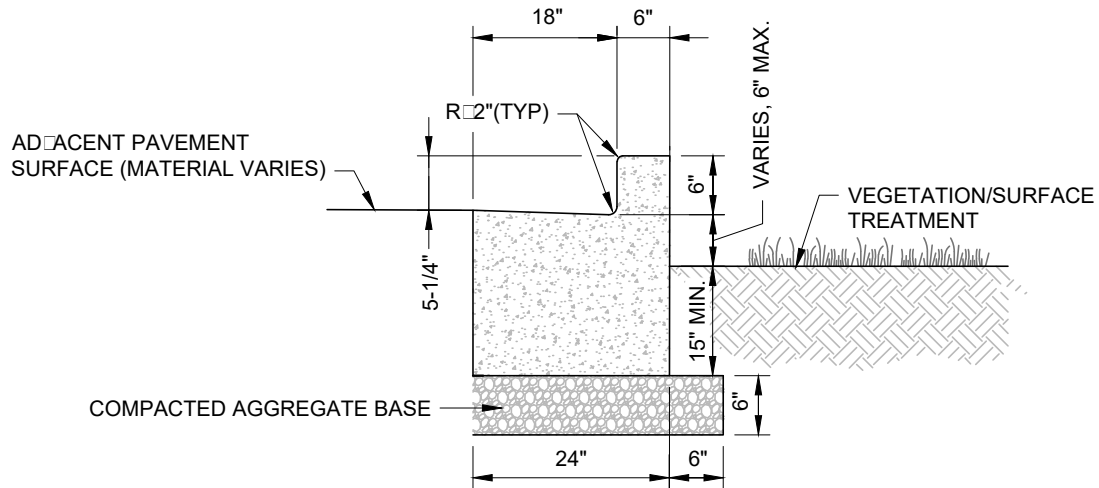
**CURB BULB-OUT
IN PLANTING STRIP
BIORETENTION
(2 OF 2)**



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE
DATE
12/2018


2 OF 2
SHEET
DWG. No. **G/25**

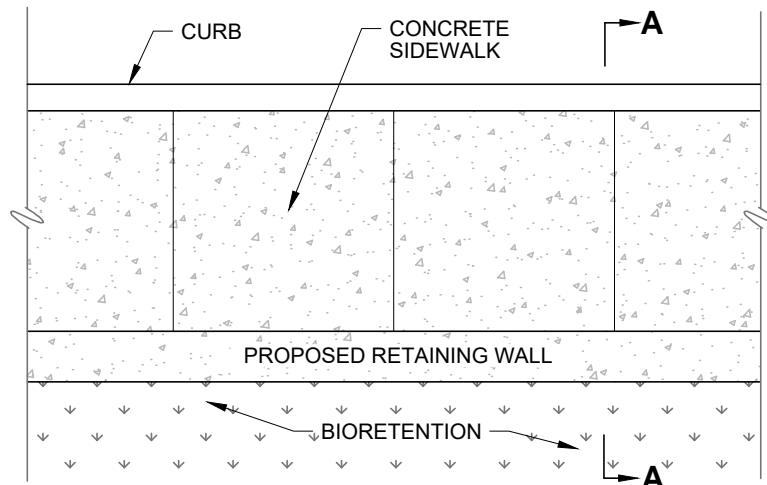


THICKENED CONCRETE CURB AND GUTTER

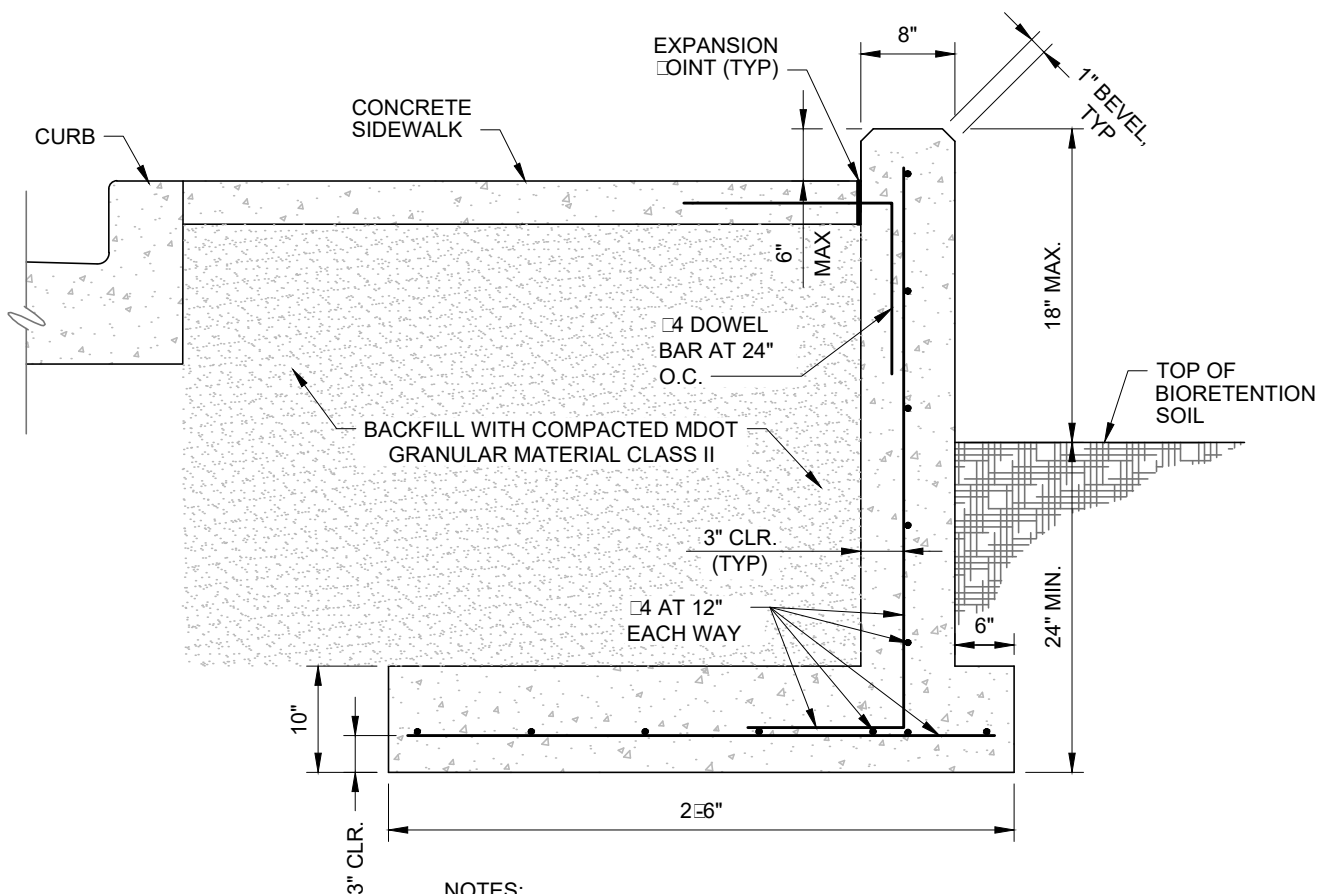
NOTES:

1. SLOPE OF GUTTER AND CURB REVEAL TO MATCH STANDARD CURB AND GUTTER.
2. INSTALL SAWN CONTRACTION JOINTS AT 25' MAX. SPACING.
3. INSTALL EXPANSION JOINTS AT 15' MAX. SPACING. CONSTRUCT USING 1/2" COMPRESSIBLE MATERIAL.

-	-	-	THICKENED CONCRETE CURB AND GUTTER EDGE TREATMENT	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE	1 OF 1
-	-	-			NONE	SHEET
-	-	-		DATE	G/30	
-	-	-		12/2018	DWG. No.	
REV	DESCRIPTION	DATE				
REVISIONS						



PLAN VIEW



NOTES:

1. CONCRETE STRENGTH $\square\square\square$ 4,000 PSI.
2. STEEL REINFORCEMENT STRENGTH $\square\square\square$ 60,000 PSI.

SECTION A-A

REV	DESCRIPTION	DATE
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REVISIONS		

**CONCRETE
RETAINING WALL
EDGE TREATMENT
WITH FOOTING**



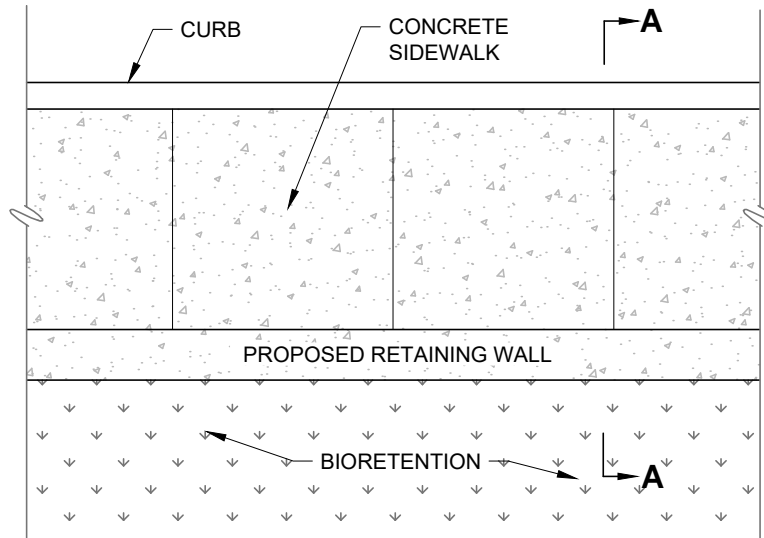
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

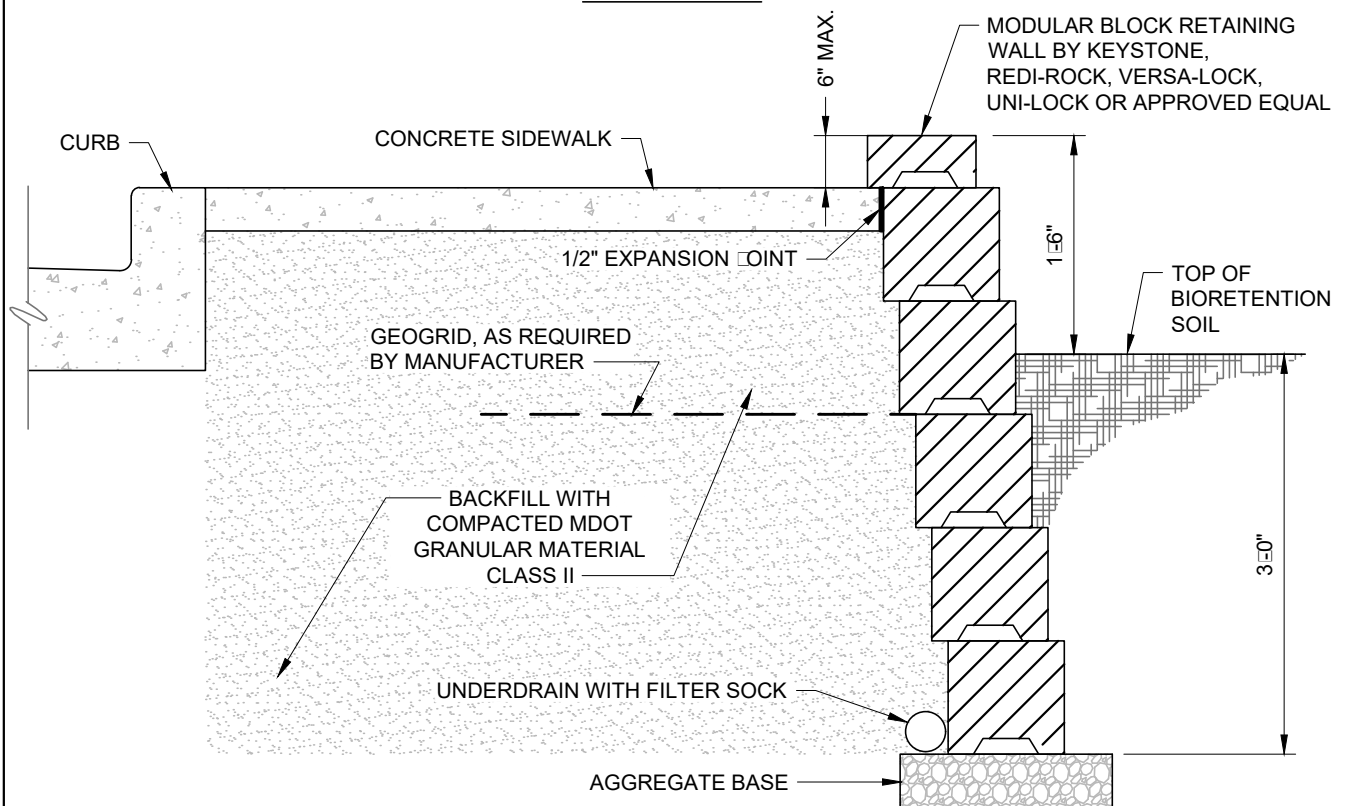
1 OF 1
SHEET

DATE
12/2018

G/32
DWG. No.



PLAN VIEW



SECTION A-A

NOTES:

1. WALL FACE PATTERN TO BE APPROVED BY THE CITY.
2. WALL TO BE GRAVITY TYPE WITH A SETBACK (BATTER).
3. WALL MANUFACTURER TO SUBMIT DESIGN CALCULATIONS SEALED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN MICHIGAN.
4. CONNECT UNDERDRAIN TO SEWER SYSTEM PER DESIGN PLANS.

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REV	DESCRIPTION	DATE
REVISIONS		

**MODULAR BLOCK
RETAINING WALL
EDGE TREATMENT**



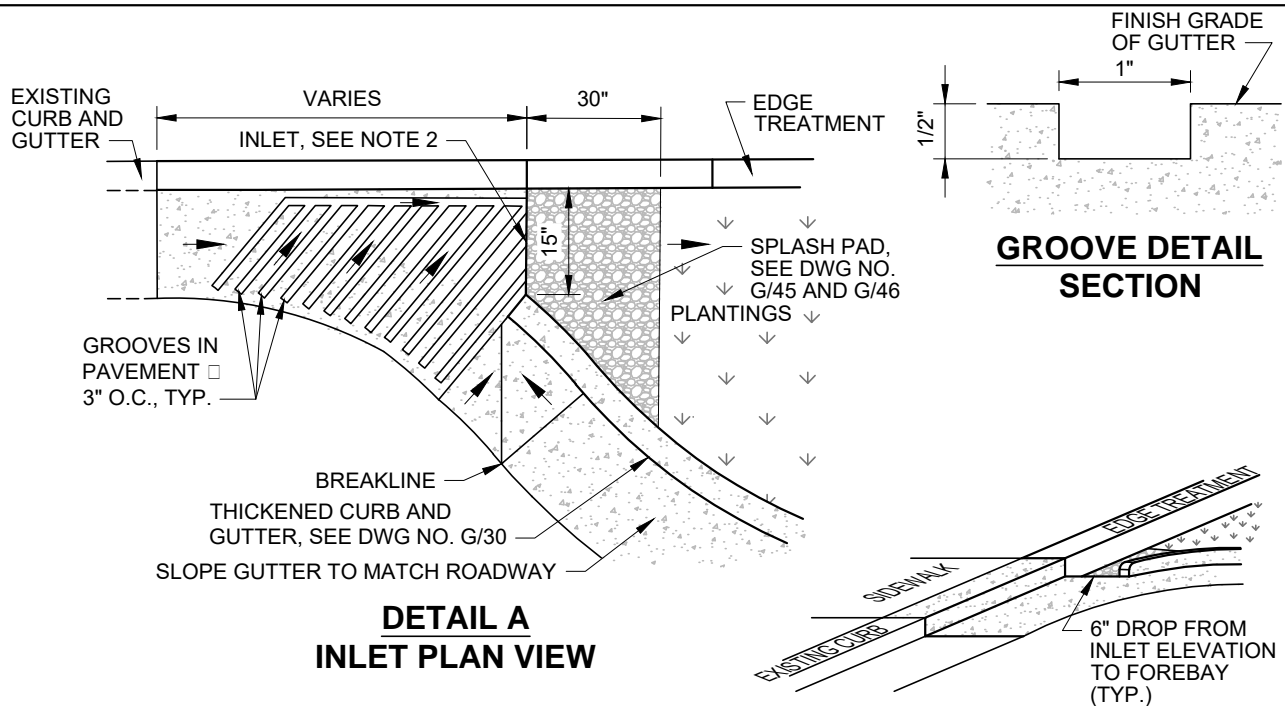
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

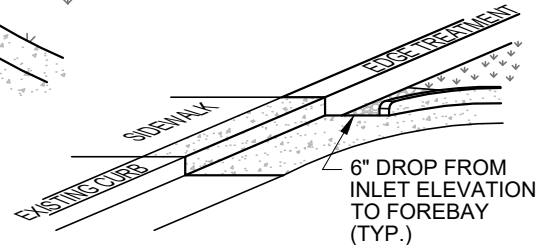
SHEET
1 OF 1

DATE
12/2018

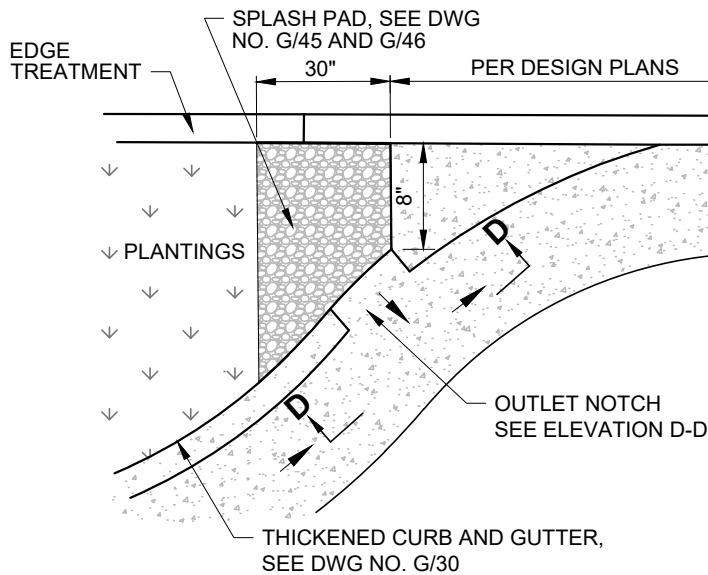
DWG. No. **G/34**



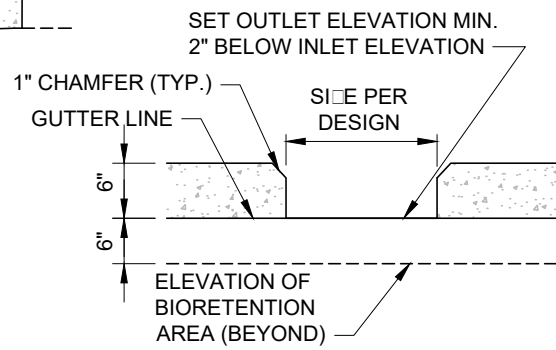
**DETAIL A
INLET PLAN VIEW**



**DETAIL C
INLET ISOMETRIC VIEW**



**DETAIL B
OUTLET PLAN VIEW**



**ELEVATION D-D
OUTLET NOTCH**

NOTES:

1. FLOW THROUGH CURB BULB-OUTS MAY ONLY BE USED WHEN EXISTING CATCH BASIN INLETS ARE LEFT IN PLACE FOR OVERFLOW SITUATIONS.
2. INLET MAY BE MODIFIED TO CONTROL THE AMOUNT OF FLOW RATE ENTERING THE STORMWATER FACILITY.

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REV	DESCRIPTION	DATE
REVISIONS		

**INLET AND OUTLET
FOR CURB BULB-OUT
BIORETENTION**



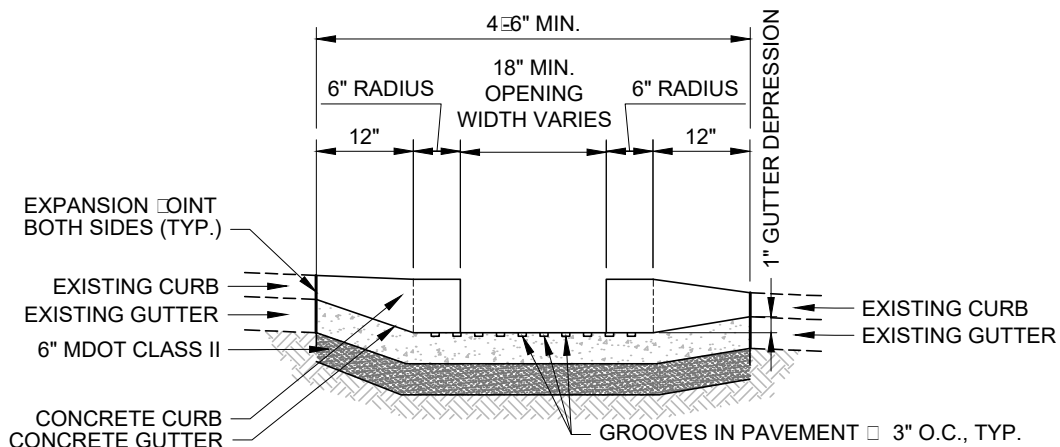
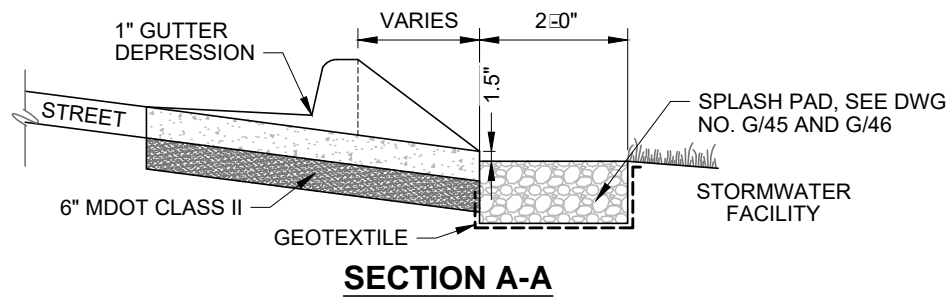
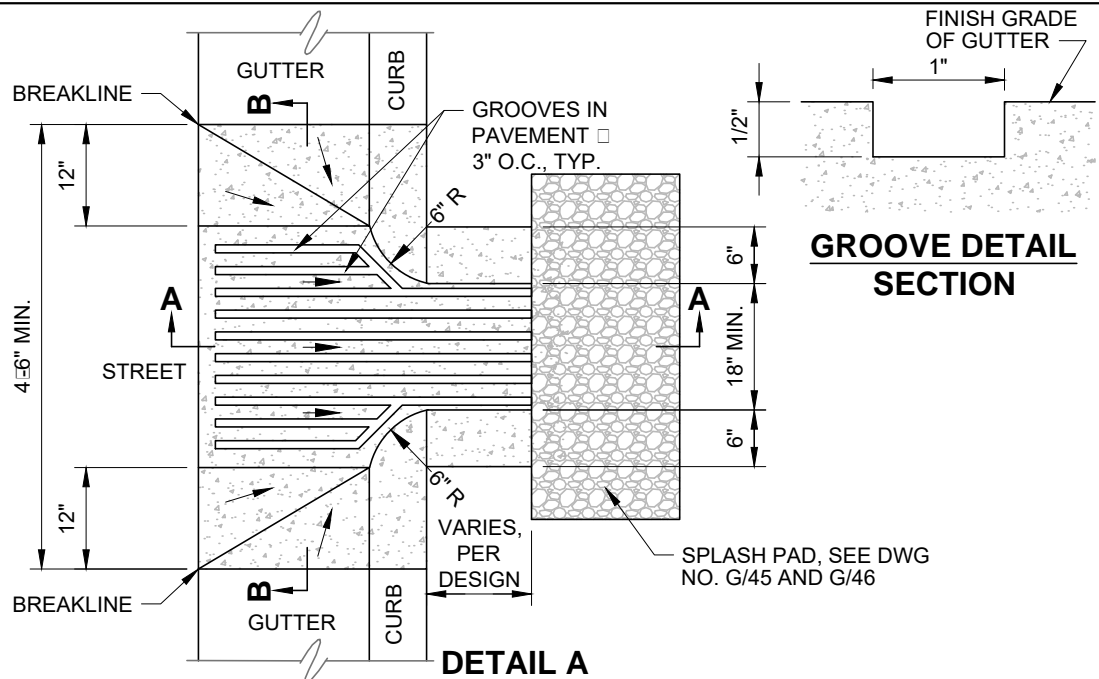
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE


1 OF 1
SHEET

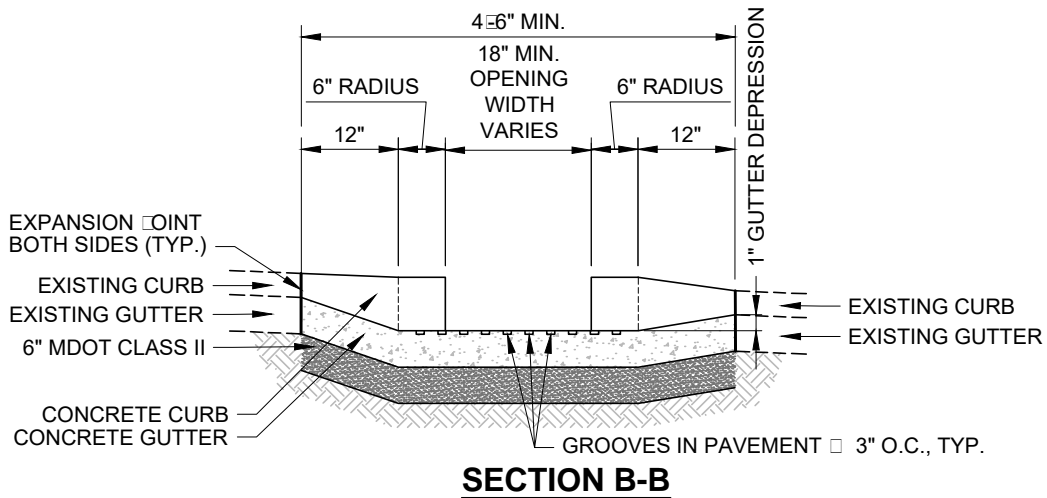
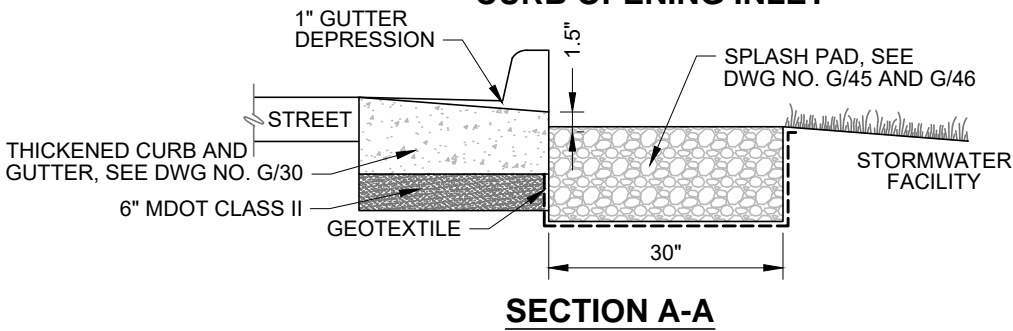
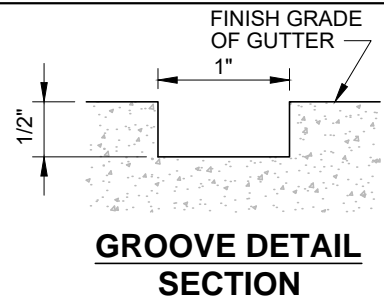
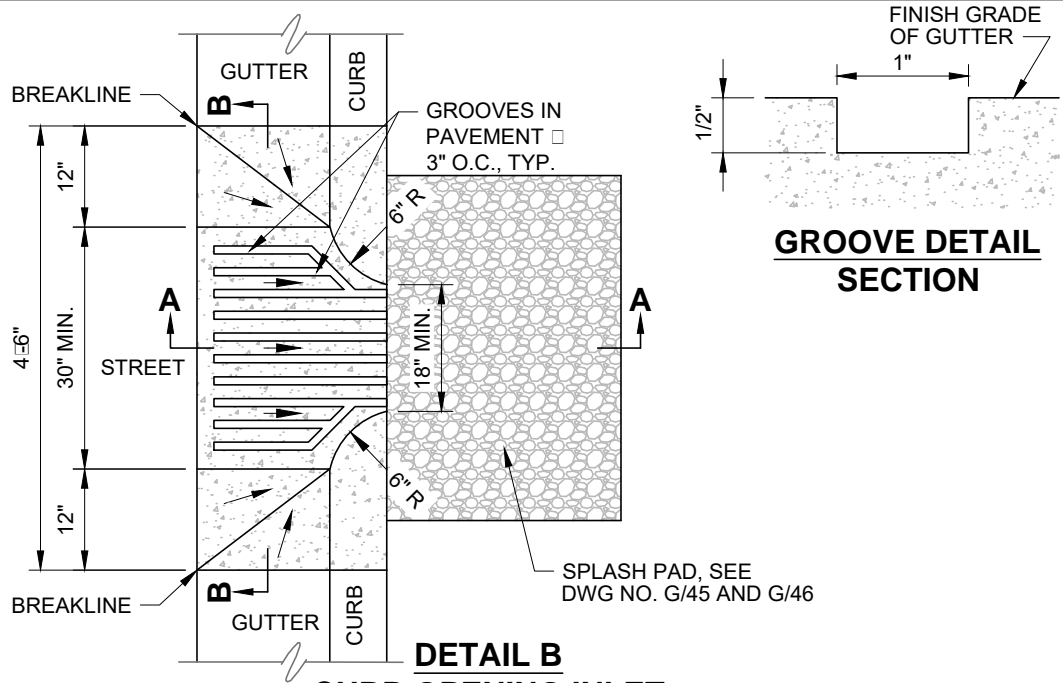
DATE
12/2018

G/40
DWG. No.




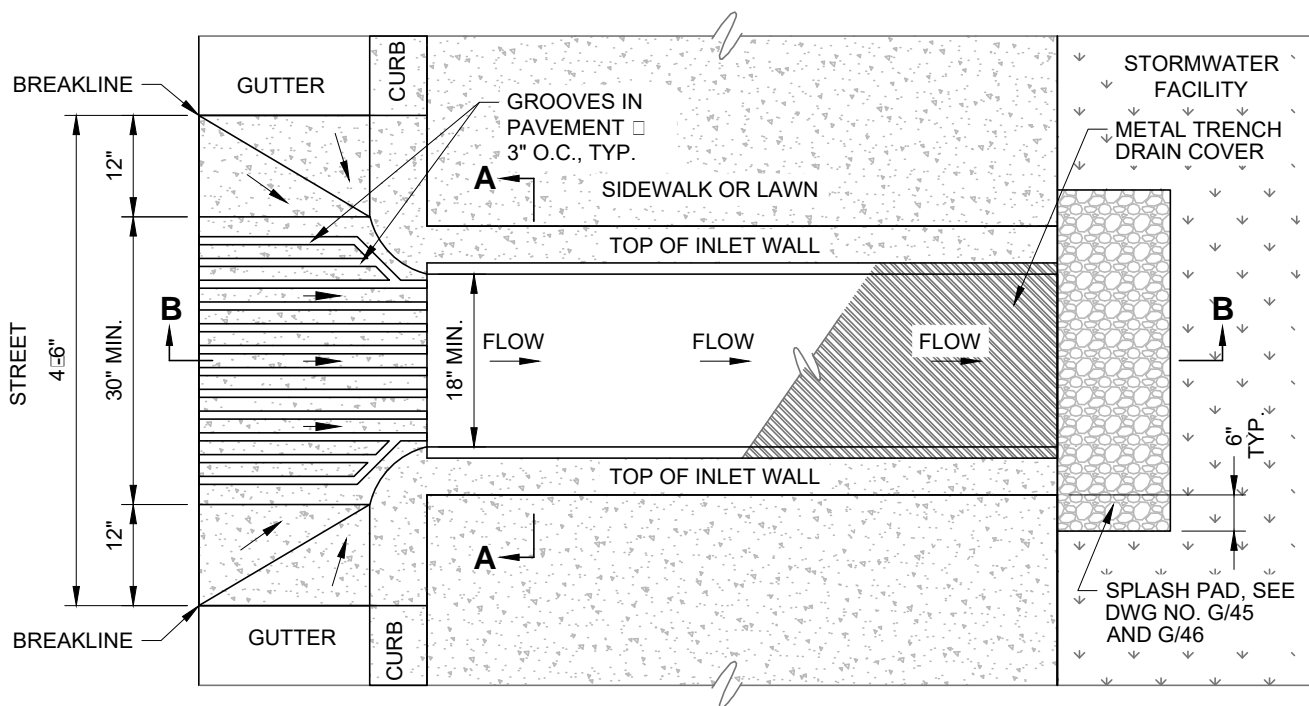
NOTE:
1. CONCRETE THICKNESS SHALL BE 6" MINIMUM.

-	-	-	CURB OPENING INLET TYPE A	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE		1 OF 1	
-	-	-			NONE	SHEET		
-	-	-			DATE	G/41		
-	-	-			12/2018	DWG. No.		
REV	DESCRIPTION	DATE						
REVISIONS								

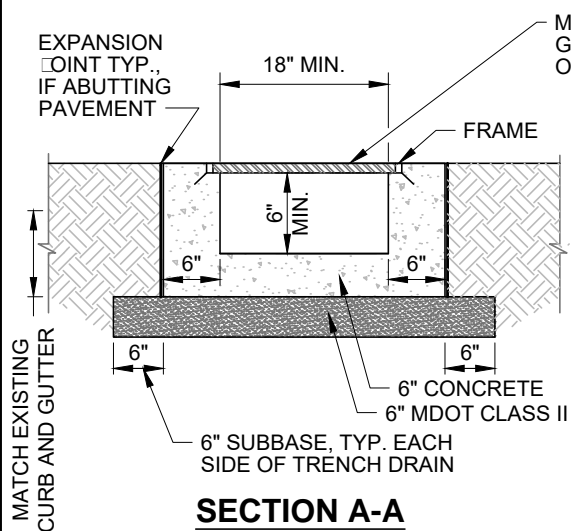


NOTE:
1. CONCRETE THICKNESS SHALL BE 6" MINIMUM.

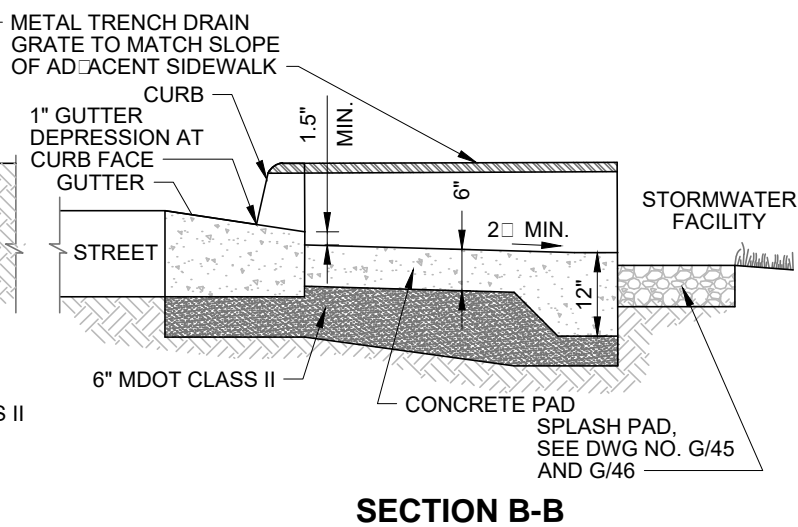
-	-	-	CURB OPENING INLET TYPE B	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE NONE	SHEET 1 OF 1
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REV	DESCRIPTION	DATE			DATE 12/2018	DWG. No. G/42
REVISIONS						



PLAN VIEW




SECTION A-A

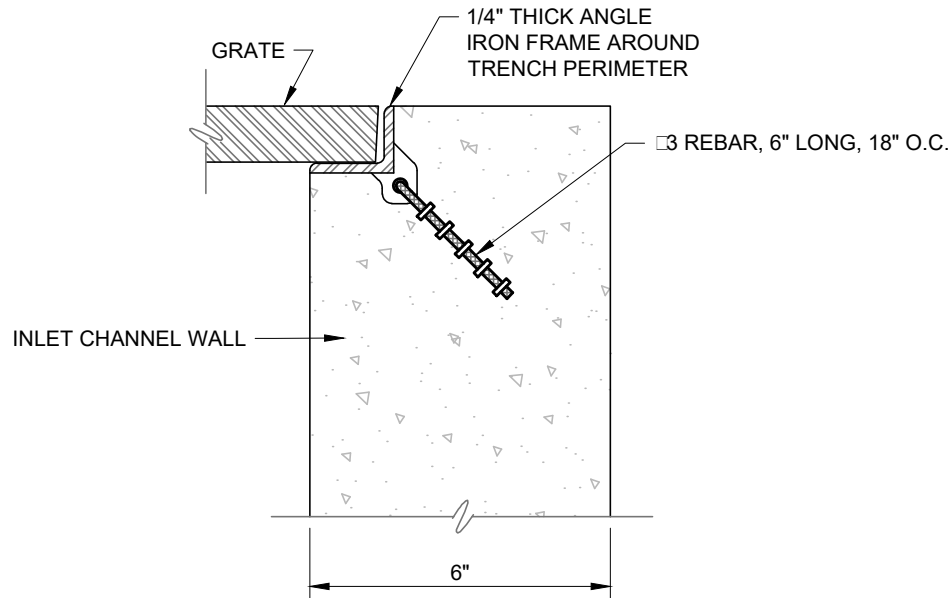


SECTION B-B

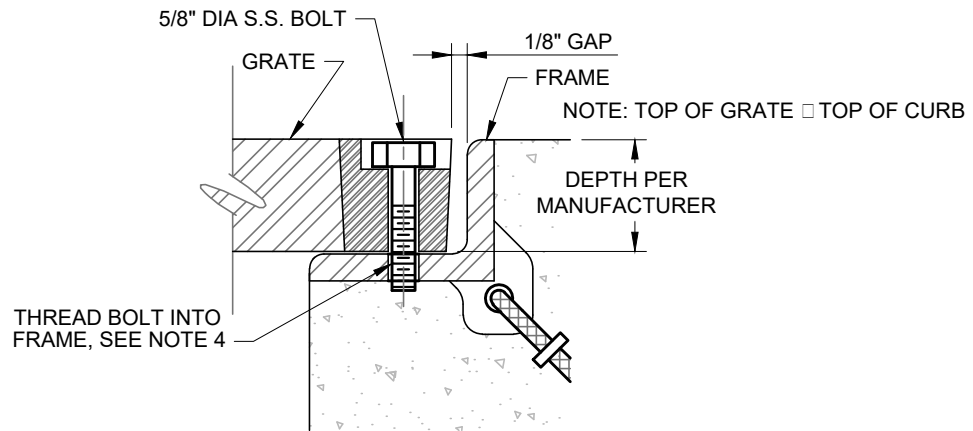
NOTES:

1. CURB OPENING DIMENSION SHOWN IS A MINIMUM.
2. REFER TO DESIGN PLANS FOR SIZE AND TYPE OF GRATE.
3. METAL TRENCH DRAIN COVER TO BE BOLTED DOWN (THEFT PROTECTED) BUT REMOVABLE.
4. REFER TO DESIGN PLANS FOR DIMENSIONS AND SLOPES.

-	-	-	CURB OPENING INLET TYPE C WITH TRENCH DRAIN COVER (1 OF 2)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
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REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>SHEET 1 OF 2</div> <div>DATE 12/2018</div> <div>DWG. No. G/43</div>
REVISIONS				




FRAME DETAIL

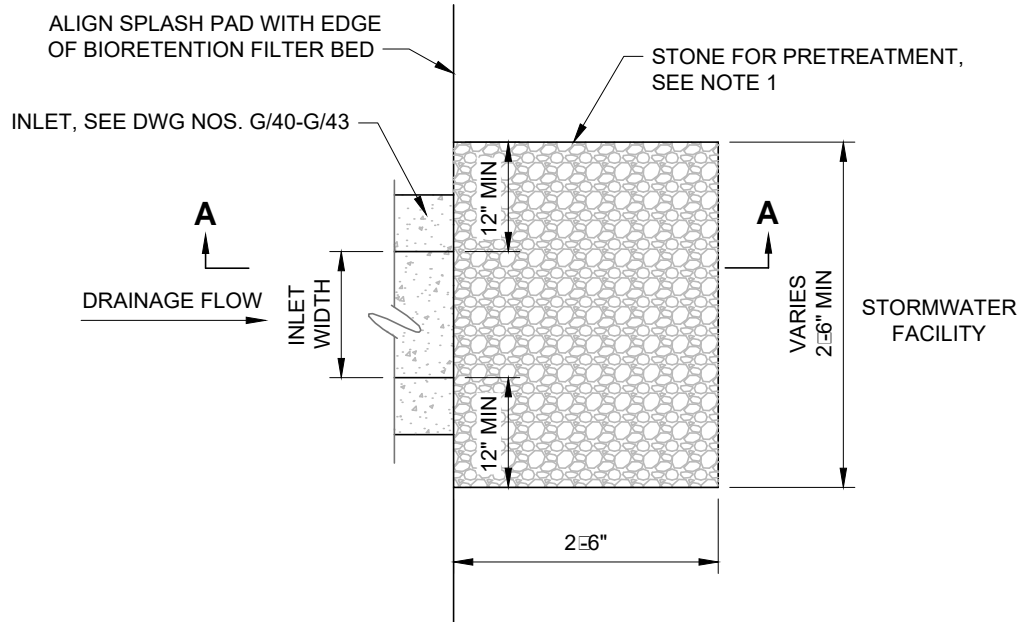


GRATE ATTACHMENT DETAIL

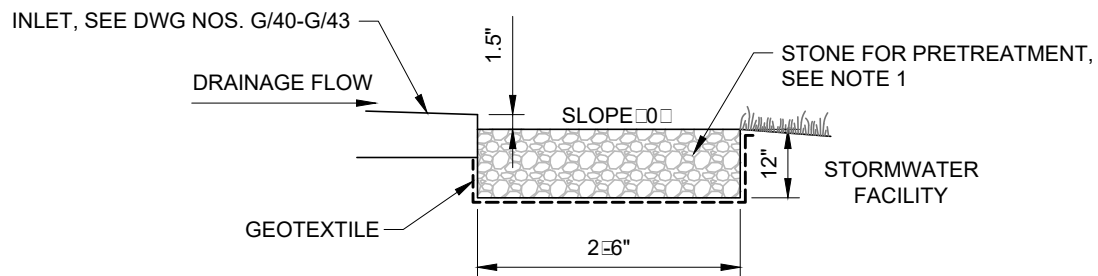
NOTES:

1. CAST IRON, NATURAL FINISH.
2. NO OPENING GREATER THAN 3/8 INCH.
3. PROTECT THREADED HOLES IN FRAME FROM CLOGGING DURING FRAME INSTALLATION.
4. TRENCH GRATE AND FRAME ASSEMBLY FOR ADA COMPLIANT NON-TRAFFIC CONDITIONS SHALL BE EAST \square ORDAN V \square 396-20, NEENAH R-4991-FX P, OR APPROVED EQUAL. TRENCH DRAINS IN TRAFFIC CONDITIONS SHALL BE EAST \square ORDAN V \square 386-20, NEENAH R-4999-FX P, OR APPROVED EQUAL.
5. GRATES SHALL BE FURNISHED WITH STAINLESS STEEL BOLTS AND A NON-SLIP SURFACE.
6. ORIENT GRATE OPENINGS PERPENDICULAR TO TRAFFIC TO PREVENT BICYCLE/WHEEL CHAIR WHEELS FROM GETTING STUCK IN GRATE.

-	-	-	CURB OPENING INLET TYPE C WITH TRENCH DRAIN COVER (2 OF 2)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
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REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 12/2018</div>	<div>2 OF 2</div> <div>G/43</div>
REVISIONS					<div>DWG. No.</div>




PLAN VIEW

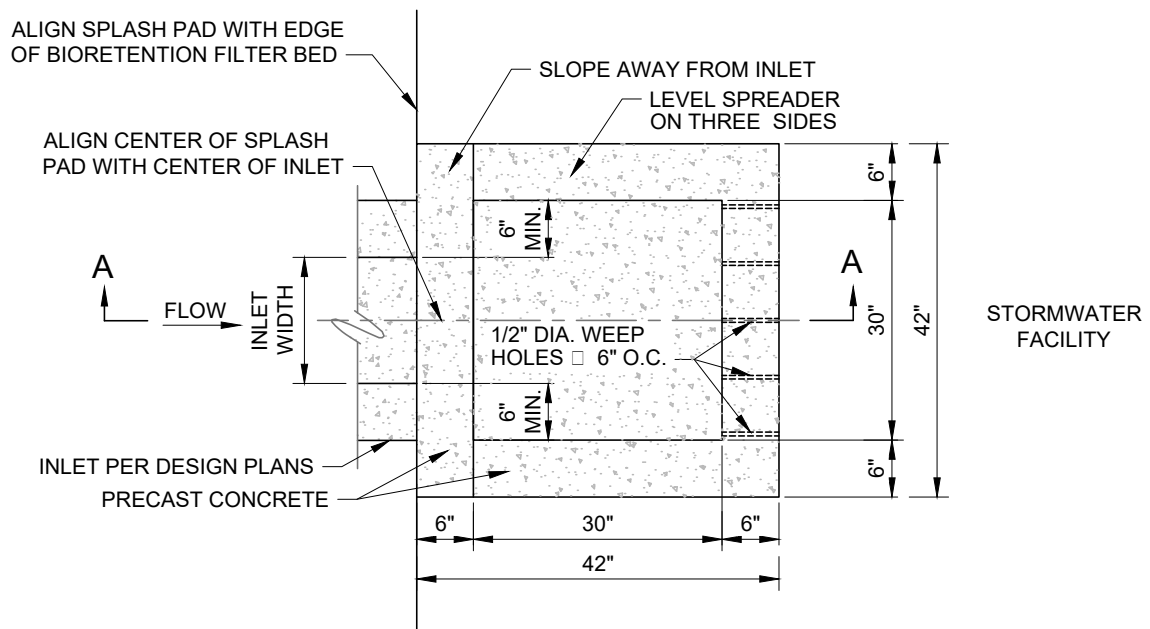


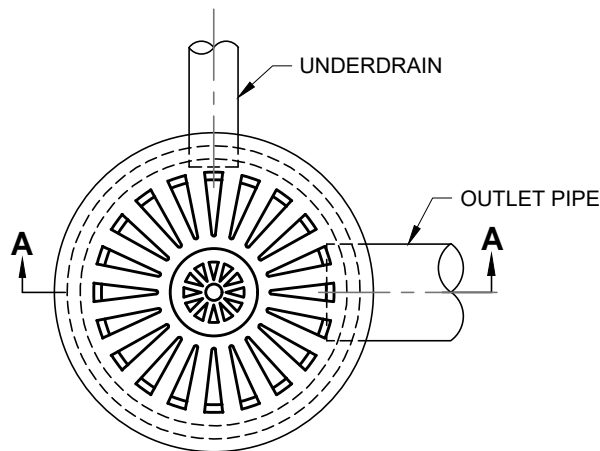
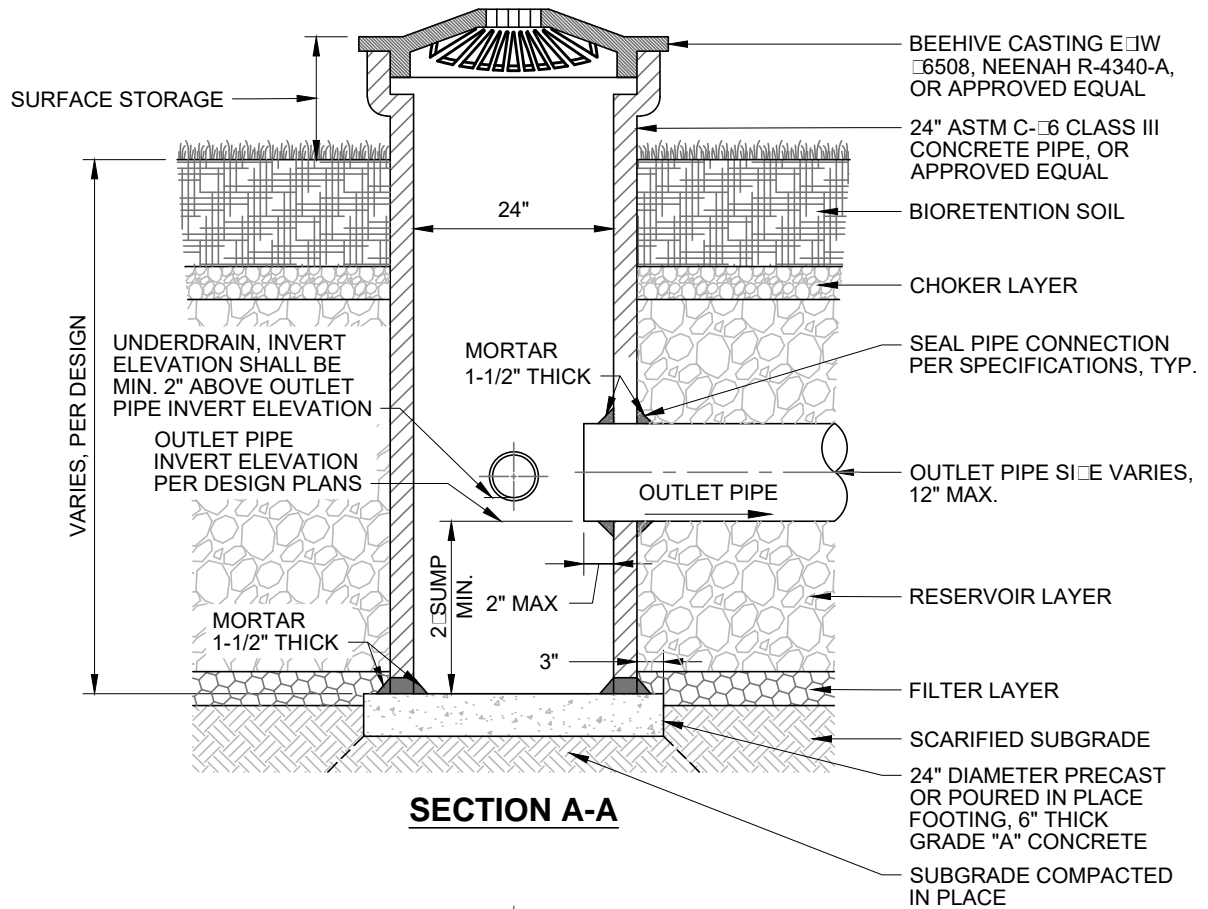
SECTION A-A

NOTE:


1. STONE SPLASH PAD SHALL BE MDOT COBBLESTONE, ROUND EDGES.

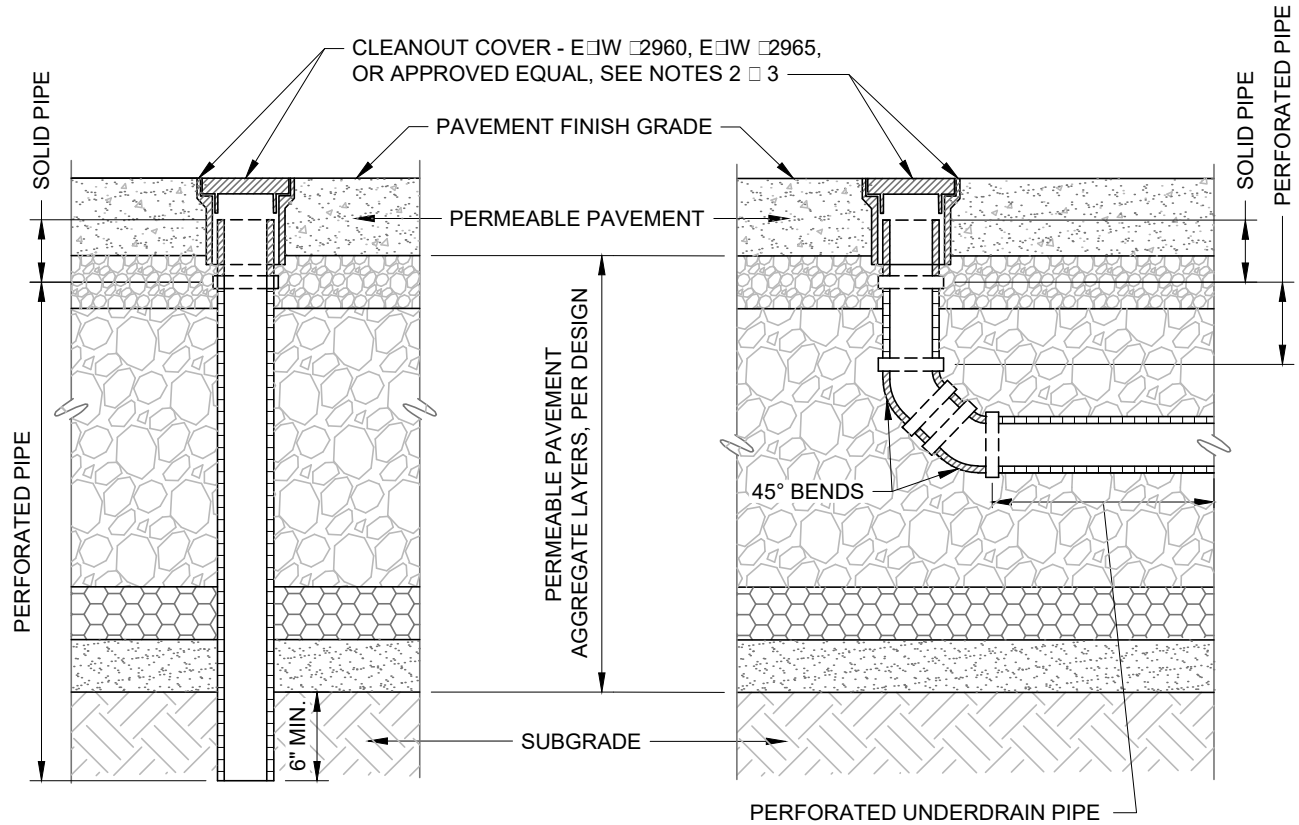
-	-	-	STONE SPLASH PAD	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
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REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 12/2018</div>	<div>1 OF 1 SHEET</div> <div>G/45 DWG. No.</div>
REVISIONS					





NOTE:
 1. ALTERNATE SIZE OVERFLOW RISER MATERIAL AND DIAMETER ARE ALLOWED AS SPECIFIED ON DESIGN PLANS AND APPROVED BY ENGINEER.

-	-	-	OVERFLOW RISER WITH BEEHIVE GRATE		CITY OF DETROIT	
-	-	-			WATER AND SEWERAGE	
-	-	-			DEPARTMENT	
-	-	-		ENGINEERING		
-	-	-		DIVISION		
REV	DESCRIPTION	DATE		SCALE NONE	1 OF 1	
REVISIONS				DATE 12/2018	G/50 DWG. No.	




DETAIL A
OBSERVATION WELL IN
PERMEABLE PAVEMENT

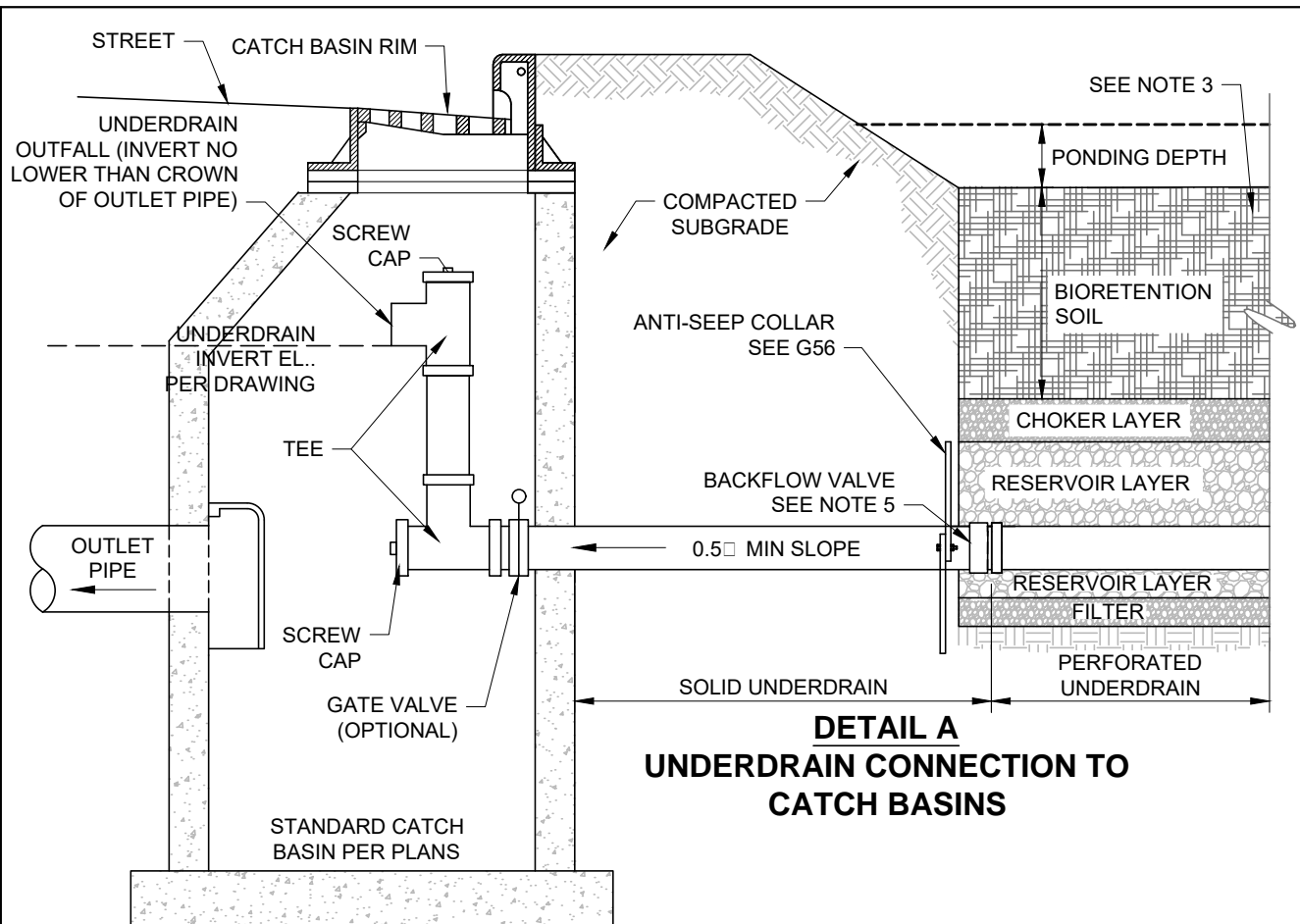
DETAIL B
UNDERDRAIN CLEANOUT FOR
PERMEABLE PAVEMENT

NOTES:

1. CLEANOUT AND OBSERVATION WELL PIPE MATERIAL SHALL BE SCHD 40 PVC PIPE, HDPE, OR APPROVED EQUAL WITH AN INSIDE DIAMETER OF 4 TO 6 INCHES. DIAMETER OF CLEANOUT AND RISER SHALL MATCH SIZE OF UNDERDRAIN. PERFORATED PIPE IS REQUIRED FOR ALL OBSERVATION WELLS, OR CLEANOUTS USED AS OBSERVATION WELLS.
2. FACTORY ATTACHED BRASS OR HIGH IMPACT PLASTIC HEAD WITH RIBS TO PREVENT ROTATION WHEN REMOVING LOCKABLE CAP.
3. LOCKABLE CAP SHALL BE BRASS AND RATED FOR HS-20 LOADING IN VEHICULAR AREAS, MOUNTED FLUSH TO GRADE. LOCKABLE CAP MAY BE HIGH IMPACT PLASTIC THAT IS UV STABLE IN NON-VEHICULAR LOADING AREA.
4. IN FACILITIES SUBJECT TO VEHICULAR TRAFFIC, CONCRETE APRONS AROUND CLEANOUTS ARE AN OPTION, AS SHOWN IN DESIGN PLANS.

-	-	-	STORMWATER FACILITY UNDERDRAIN PIPE RISERS IN PERMEABLE PAVEMENTS	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>		
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REV	DESCRIPTION	DATE			SCALE NONE	1 OF 1
REVISIONS					DATE 12/2018	G/51 DWG. No.

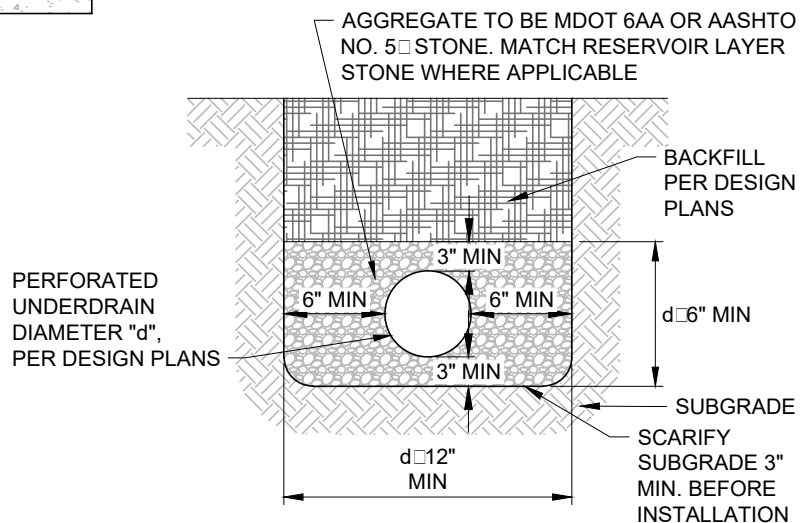
DWG. No.	G/52
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DETAIL A
UNDERDRAIN CONNECTION TO
CATCH BASINS

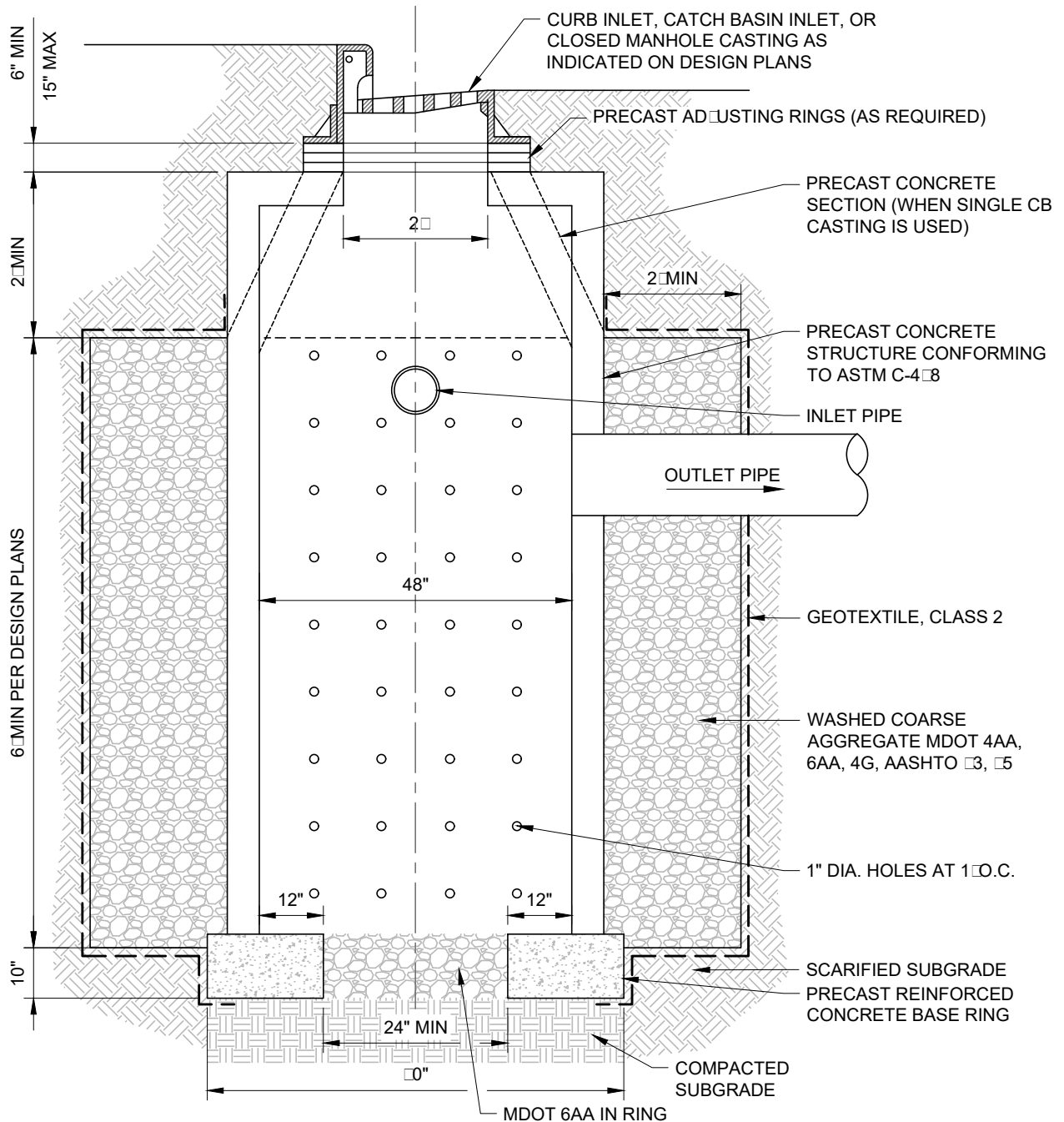
NOTES:

1. CATCH BASIN CONNECTIONS FROM UNDERDRAINS SERVICING PRIVATE PROPERTY ARE PROHIBITED.
2. WHEN STORMWATER FACILITY IS LOCATED MORE THAN 10 FEET FROM CATCH BASIN, PROVIDE ADDITIONAL CLEANOUT OUTSIDE OF STORMWATER FACILITY WITHIN 10 FEET OF CATCH BASIN.
3. STORMWATER FACILITY DEPICTED IS BIORETENTION FACILITY. CONNECTIONS TO CATCH BASIN WILL ALSO APPLY TO PERMEABLE PAVEMENTS AND LINEAR BIORETENTION SYSTEMS WITH UNDERDRAINS.
4. OPTIONAL PVC GATE VALVE OR PVC PIPE CAP TO BE USED TO REGULATE FLOW IN UNDERDRAIN PIPE AS INDICATED IN DESIGN PLANS. VALVE MAY ALSO BE USED IN OVERFLOW RISER AS DIRECTED.
5. WHEN CONNECTING TO A COMBINED SEWER SYSTEM, A BACKFLOW VALVE WITH SERVICE ACCESS EXTENSION IS REQUIRED AT CONNECTION BETWEEN PERFORATED AND NON-PERFORATED PIPE.



DETAIL B
UNDERDRAIN BEDDING

-	-	-	STORMWATER FACILITY UNDERDRAIN BEDDING AND CATCH BASIN CONNECTION	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	1 OF 1	
-	-	-			SCALE NONE	SHEET
-	-	-			DATE 12/2018	G/53
-	-	-				DWG. No.
REV	DESCRIPTION	DATE				
REVISIONS						



SECTION

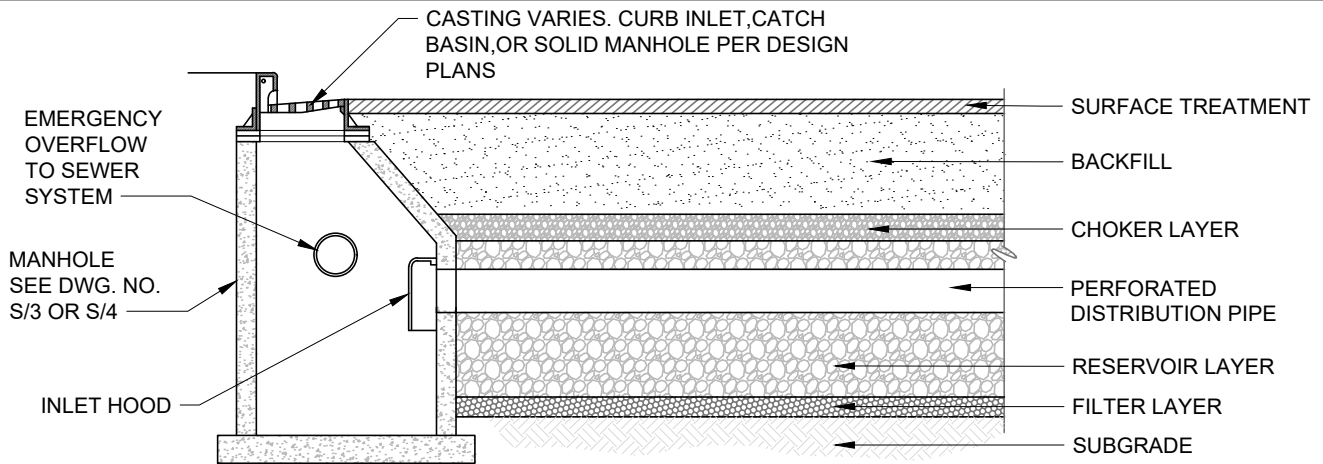
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REVISIONS		

LEACHING BASIN

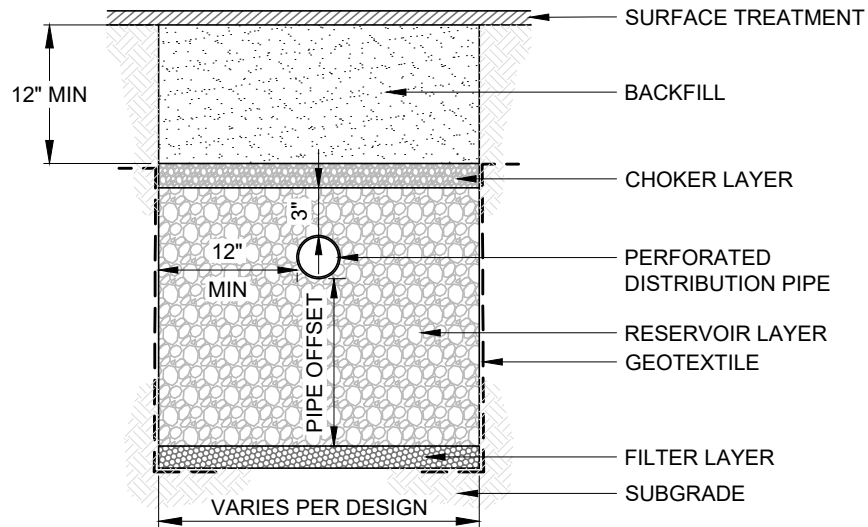


CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 12/2018	DWG. No. G/54



PROFILE



SECTION

ITEM	MATERIAL	LAYER THICKNESS
SURFACE TREATMENT	PAVEMENT OR VEGETATION AS SPECIFIED ON DESIGN PLANS.	
BACKFILL	BACKFILL MATERIAL AS SPECIFIED ON DESIGN PLANS	
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH
PERFORATED DISTRIBUTION PIPE	PERFORATED PVC OR HDPE PIPE AS SPECIFIED ON DESIGN PLANS. CLEANOUTS AT 100 FOOT MAX SPACING AND AT ALL TERMINAL ENDS PER DWG. NO. G/51.	__ INCH
PIPE OFFSET	OFFSET DISTANCE PERFORATED PIPE SET ABOVE THE FILTER LAYER. 24\" MIN.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	SCARIFY SUBGRADE TO A MINIMUM DEPTH OF 24 INCHES.	

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REV	DESCRIPTION	DATE
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INFILTRATION TRENCH



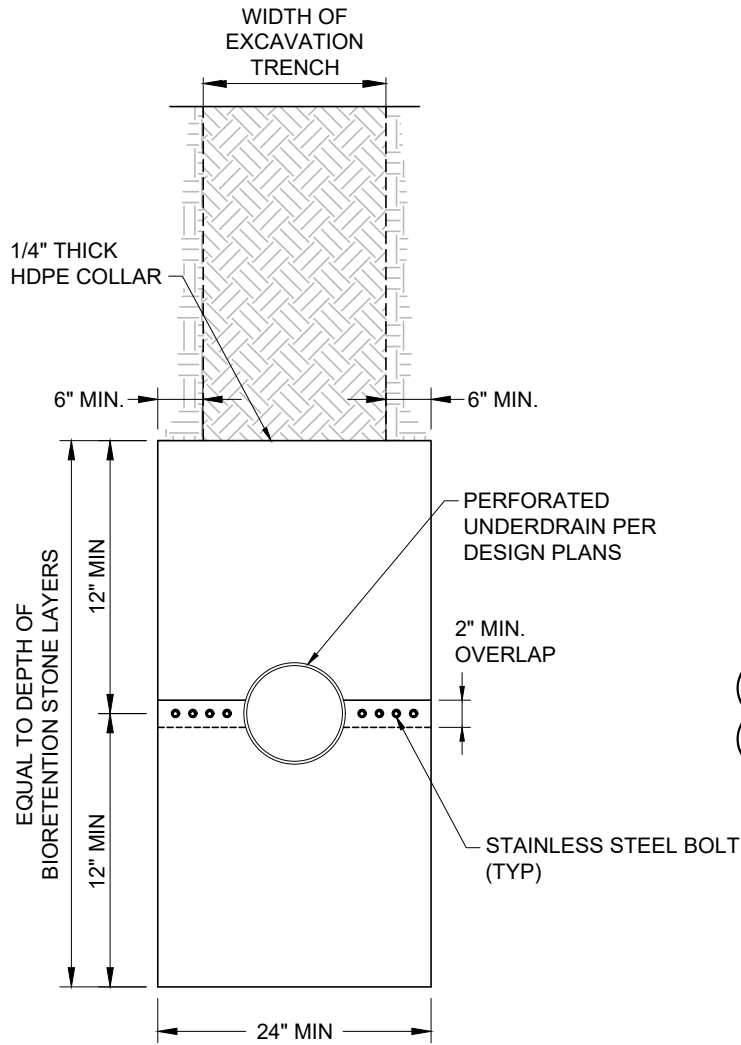
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE
NONE

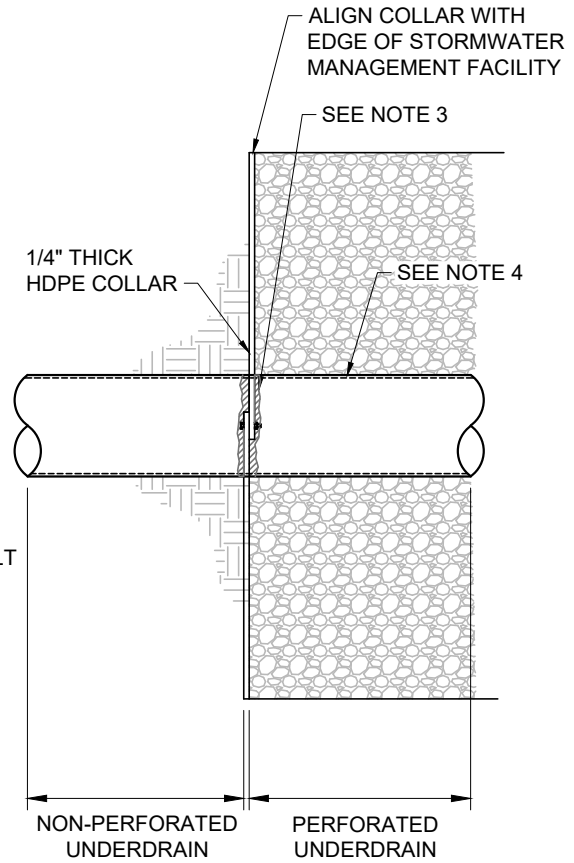
1 OF 1
SHEET

DATE
12/2018

G/55
DWG. No.



**SECTION
ANTI-SEEP COLLAR**



**DETAIL A
UNDERDRAIN CONNECTION WITH
ANTI-SEEP COLLAR**

NOTES:

1. DIMENSION "H" SHALL BE MINIMUM OF 3X THE DIAMETER OF THE INTERSECTION PIPE.
2. COLLAR SHALL BE CONSTRUCTED OF HDPE. BOLTS SHALL BE GRADE 304 STAINLESS STEEL.
3. SEAL SURFACE OF PIPE AND ANTI-SEEP COLLAR WITH NON-SHRINK FLEXIBLE SEALANT THAT WILL ADHERE TO PIPE.
4. PIPE MATERIAL AND SIZING WILL VARY BY FUNCTION.
5. THE PURPOSE OF THE ANTI-SEEP COLLAR IS TO PREVENT WATER STORED IN THE RESERVOIR LAYER FROM EXITING THE STORMWATER FACILITY THROUGH THE TRENCH BACKFILL AND RE-INFILTRATING INTO THE SEWER MAIN.

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**STORMWATER
FACILITY
ANTI-SEEP
COLLAR**



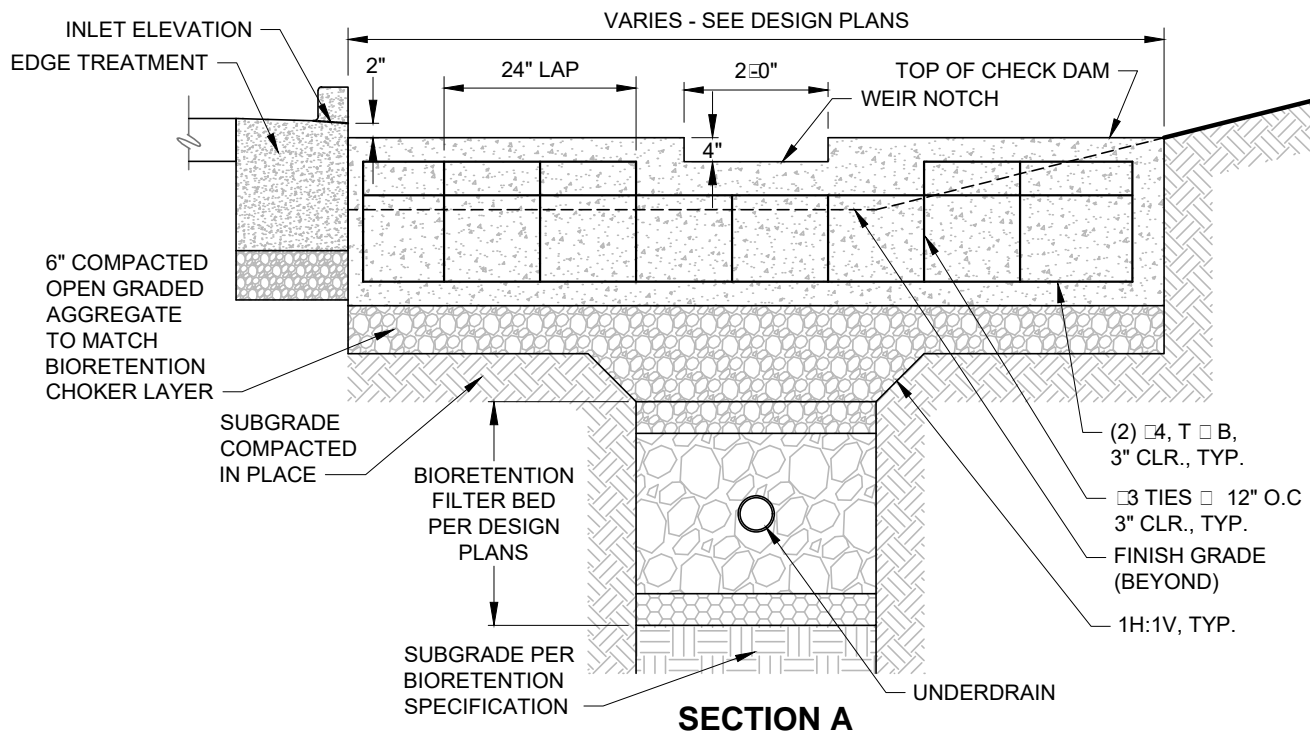
CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

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NONE

1 OF 1
SHEET

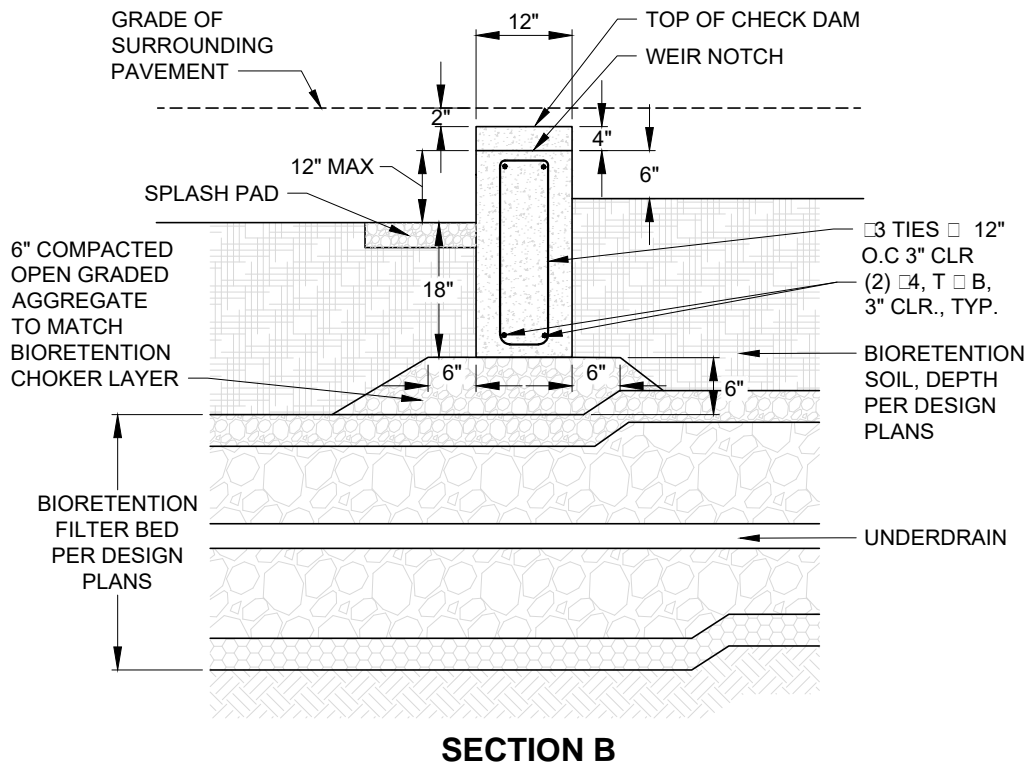
DATE
12/2018

G/56
DWG. No.



NOTES:

1. THIS CHECK DAM MAY BE USED IN PLANTERS OR CURB BULB-OUTS OR LINEAR BIORETENTION. EDGE CONDITIONS MAY VARY BY DESIGN.
2. CONCRETE SHALL BE 4000 PSI MINIMUM. CONCRETE IS TO BE AIR ENTRAINED 6% +/- 1%. PRECAST OR CAST IN PLACE AS SPECIFIED IN DESIGN PLANS.
3. LOCATIONS, HEIGHTS, AND WIDTHS OF CHECK DAMS TO BE SPECIFIED IN THE DESIGN PLANS.
4. CONCRETE CHECK DAM SHALL BE CONTINUOUS (NO JOINTS).
5. PROTECT OPEN GRADED AGGREGATES FROM CONTAMINATION DURING CHECK DAM CONSTRUCTION.
6. TOP OF CHECK DAM AND WEIR SHALL BE LEVEL SUCH THAT WATER SPILLS EVENLY OVERTOP OF STRUCTURE.



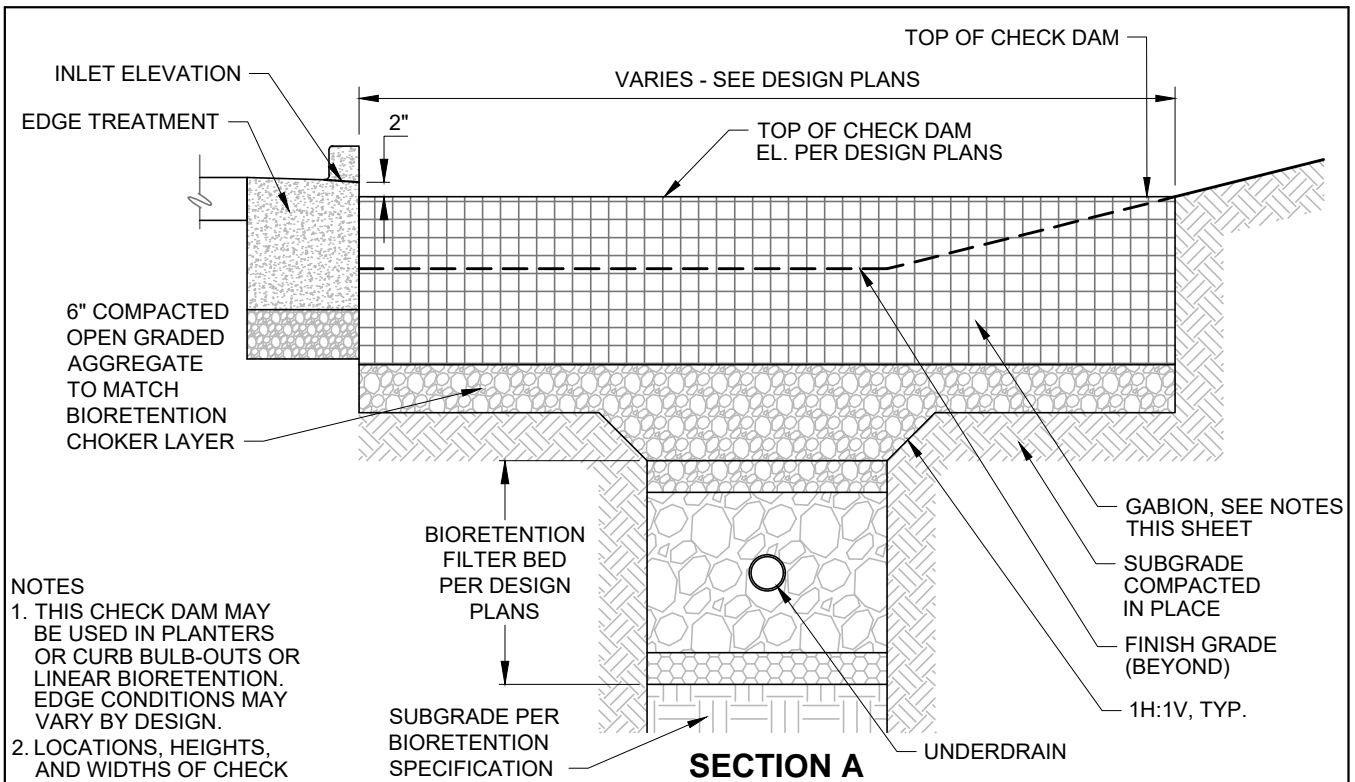
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**CONCRETE
CHECK DAM**

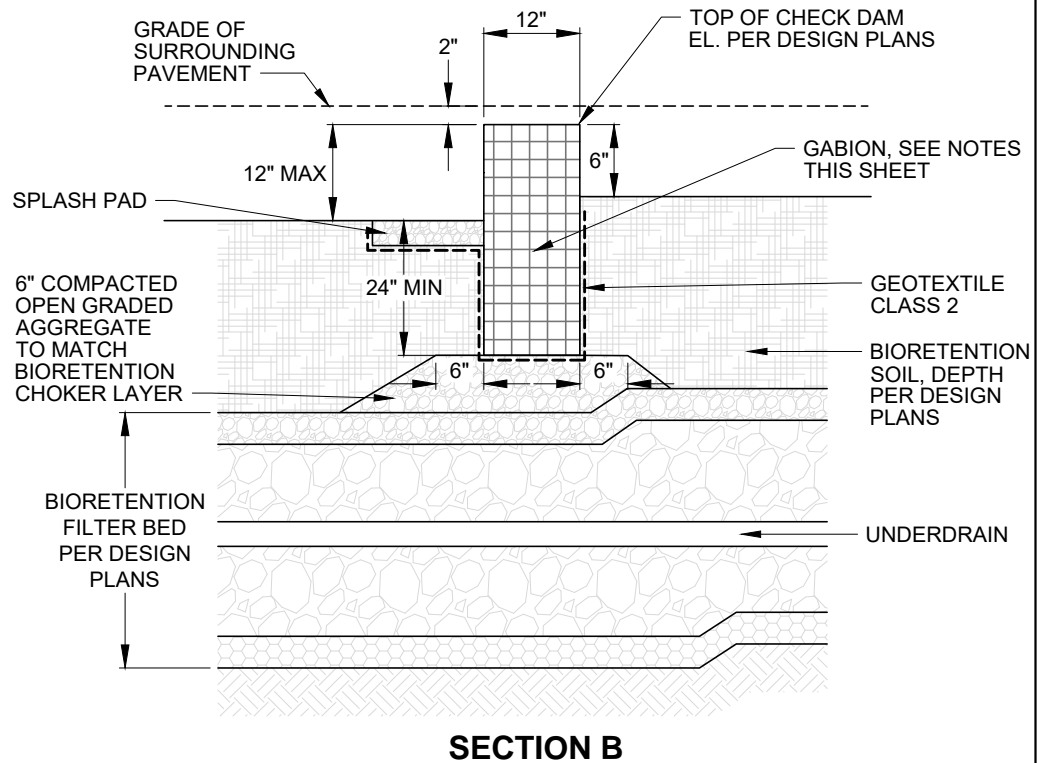


CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 12/2018	DWG. No. G/60



- NOTES**
1. THIS CHECK DAM MAY BE USED IN PLANTERS OR CURB BULB-OUTS OR LINEAR BIORETENTION. EDGE CONDITIONS MAY VARY BY DESIGN.
 2. LOCATIONS, HEIGHTS, AND WIDTHS OF CHECK DAMS TO BE SPECIFIED IN THE DESIGN PLANS.
 3. GABIONS SHALL BE CONSTRUCTED OF RIGID, 4 GAUGE, GALVANIZED AFTER WELL, WELDED WIRE MESH WITH 3" X 3" GRID SPACING. GABION SIZES SHALL BE SPECIFIED ON DESIGN PLANS.
 4. GABION INFILL MATERIALS SHALL BE SPECIFIED BY DESIGN PLANS. RIVER COBBLE, SALVAGED CONCRETE, CUT STONES, BRICK, OR APPROVED EQUAL.
 5. TOP OF CHECK DAM AND WEIR SHALL BE LEVEL..
 6. SECURELY ATTACH ADJACENT GABIONS WITH GALVANIZED HOG RINGS.



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GABION CHECK DAM



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE

NONE

DATE

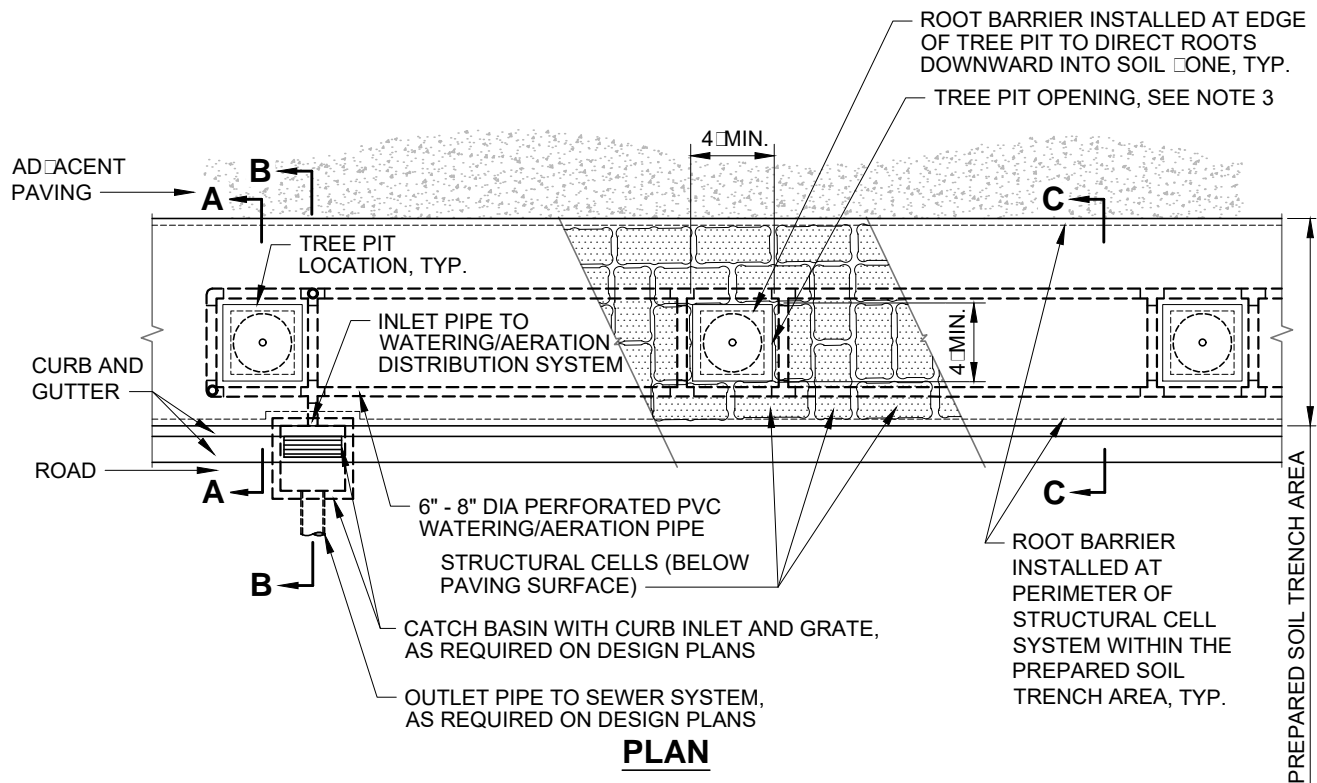
12/2018

1 OF 1

SHEET

G/62

DWG. No.



NOTES:

1. STRUCTURAL CELLS ARE A MODULAR PAVEMENT SUPPORT SYSTEM TO ALLOW FOR THE GROWTH OF THE TREE ROOTS INTO UNCOMPACTED SOILS.
2. STRUCTURAL CELLS WILL TYPICALLY BE USED TO LINK MULTIPLE TREE PITS TOGETHER.
3. MAINTAIN A 4' X 4' MINIMUM CLEAR OPENING IN STRUCTURAL CELL PLACEMENT AT EACH TREE PIT PLANTING LOCATION, WITHIN THE PREPARED SOIL TRENCH AREA, TYP.
4. INSTALL STRUCTURAL CELLS PER MANUFACTURER SPECIFICATIONS.
5. STORMWATER MANAGEMENT REQUIREMENTS SHALL BE DESIGNED AND SIZED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MICHIGAN.
6. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.

RECOMMENDED SOIL VOLUMES:

SMALL TREE (≤35' MATURE HEIGHT): 600 CF

MEDIUM TREE (35-50' MATURE HEIGHT): 1000 CF

LARGE TREE (≥50' HEIGHT): 1500 CF

NOTE: UP TO 25% OF THE REQUIRED SOIL VOLUME PER TREE CAN BE SHARED BETWEEN ADJACENT TREES.

REV	DESCRIPTION	DATE

**STRUCTURAL CELLS
FOR URBAN
TREE PLANTING
(1 OF 5)**



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE

NONE

DATE

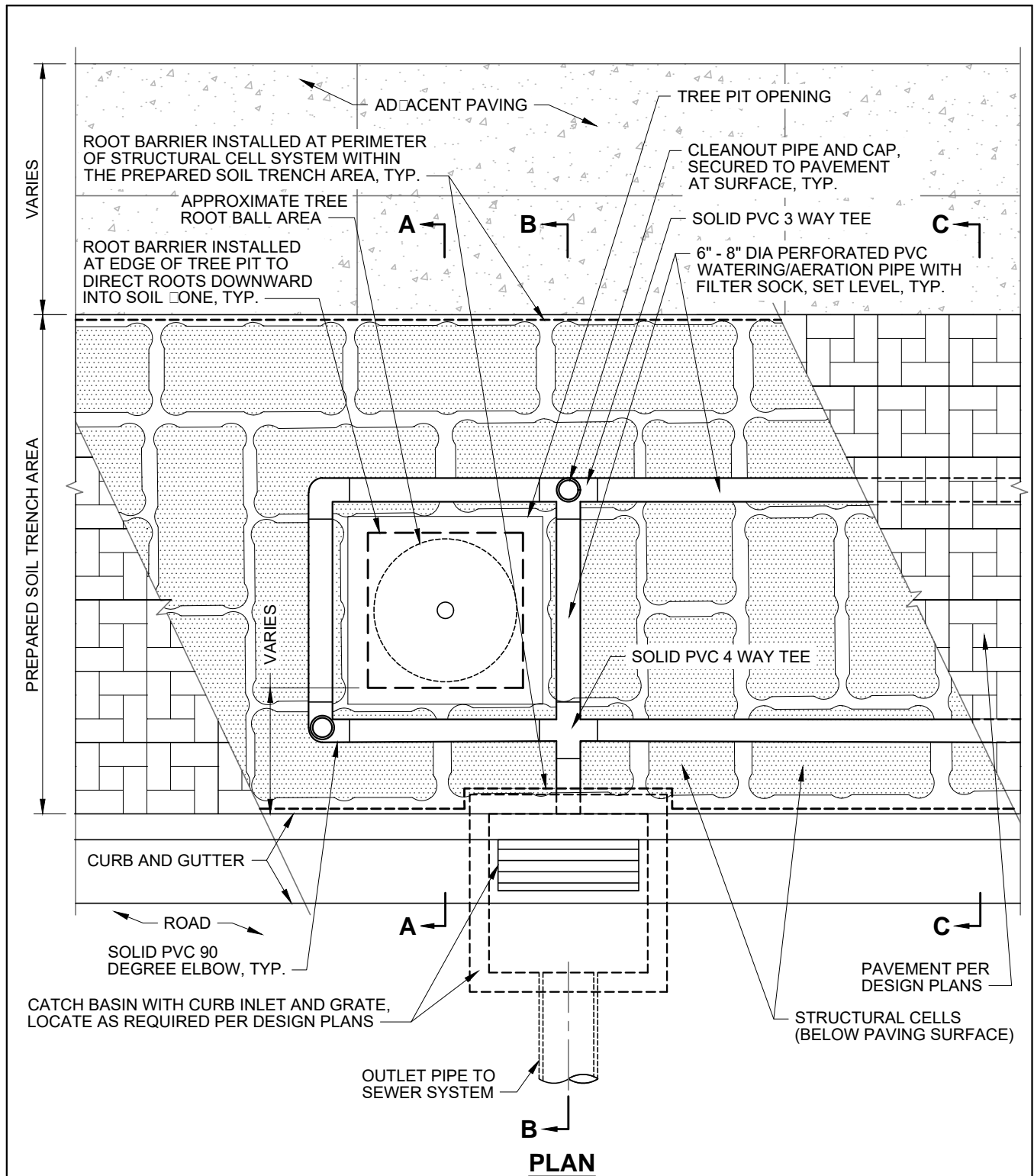
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1 OF 5

SHEET


G/65

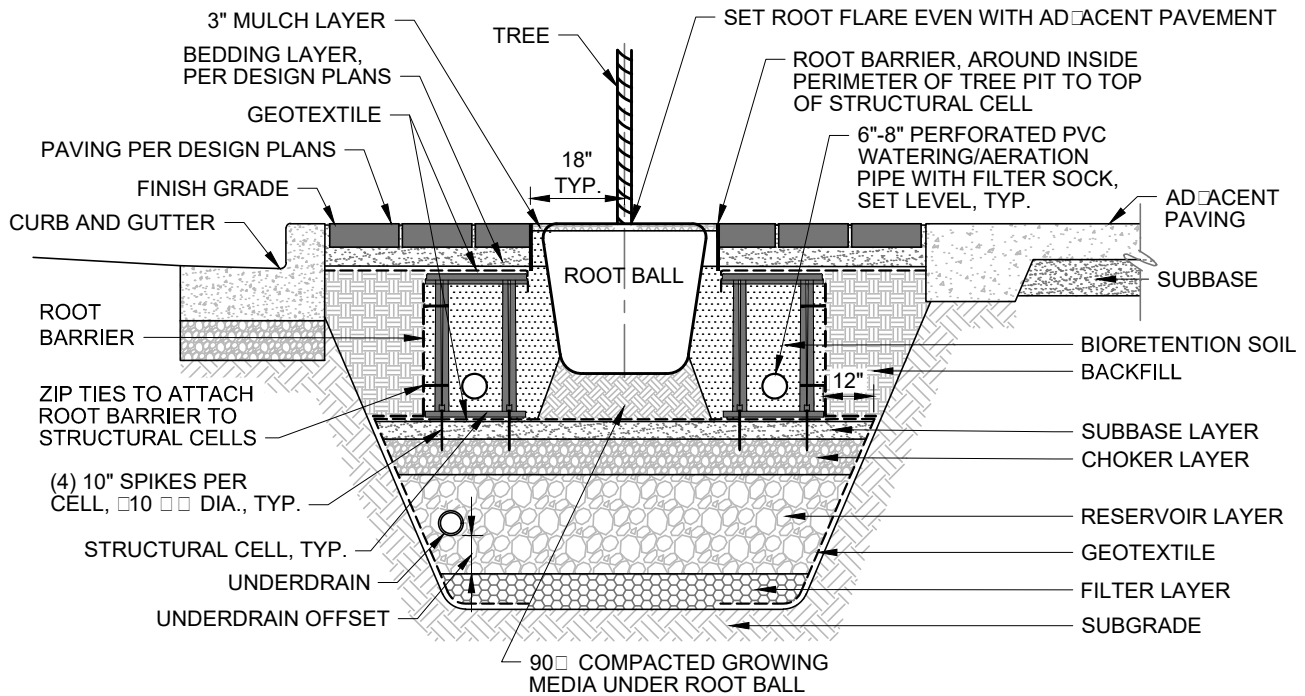
DWG. No.



NOTES:

1. INSTALL STRUCTURAL CELLS PER MANUFACTURER SPECIFICATIONS.
2. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.

-	-	-	STRUCTURAL CELLS FOR URBAN TREE PLANTING (2 OF 5)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
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REV	DESCRIPTION	DATE	SCALE NONE	SHEET 2 OF 5
REVISIONS			DATE 12/2018	DWG. No. G/65




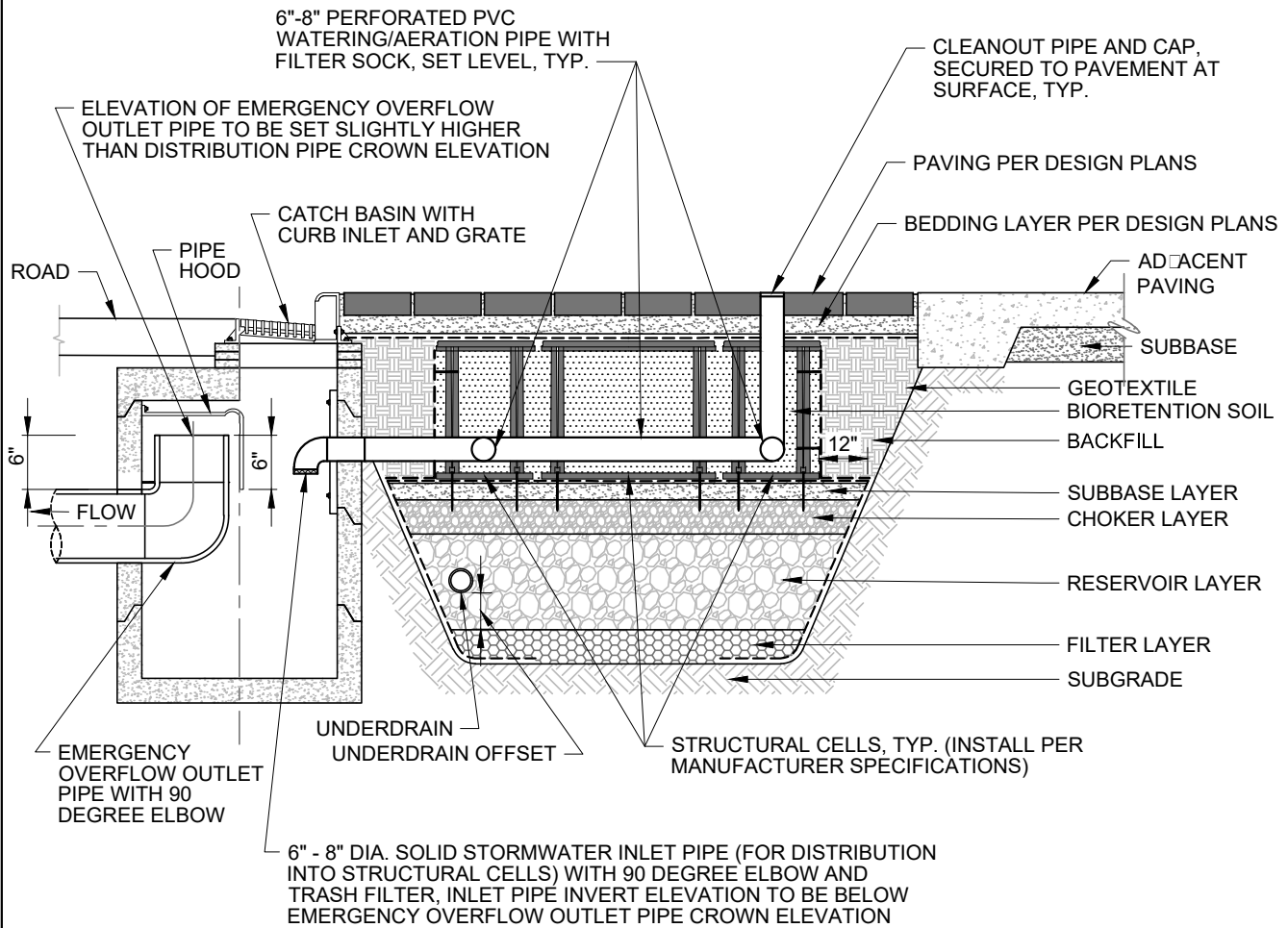
SECTION A-A

NOTE: SEE DWG NO. G/65 (1 OF 5) FOR SECTION LOCATION.

ITEM	MATERIAL	LAYER THICKNESS
PAVEMENT	PAVING PER DESIGN PLANS.	3 INCH MIN.
BEDDING LAYER	AS SPECIFIED PER DESIGN PLANS.	___ INCH
BIORETENTION SOIL IN STRUCTURAL CELLS	BIORETENTION SOIL MIX IN STRUCTURAL CELLS, INSTALLED PER MANUFACTURER SPECIFICATIONS. STRUCTURAL CELLS MAY BE STACKED ON TOP OF EACH OTHER IN 1, 2 OR 3 LAYERS, PER DESIGN PLANS.	___ INCH
WATERING/AERATION DISTRIBUTION SYSTEM	PERFORATED PVC PIPE WITH FILTER SOCK. CLEANOUTS PER DESIGN PLANS. SOLID PVC CLEANOUT WITH IRON OR STAINLESS STEEL ADA COMPLIANT SLOTTED OR PERFORATED GRATE CAP WITH REMOVABLE BOLTS OR SCREWS.	6-8 INCH
BACKFILL MATERIAL	COMPACTED MDOT GRANULAR MATERIAL CLASS II.	
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY. GEOTEXTILE REQUIRED ON TOP AND BELOW SOIL CELL SYSTEM.	
ROOT BARRIER	ROOT BARRIER INSTALLED AT PERIMETER OF STRUCTURAL CELL SYSTEM WITHIN THE PREPARED SOIL TRENCH AREA AND AT EDGE OF TREE PITS. ROOT BARRIERS TO BE MADE OF PLASTIC WITH VERTICAL RIBS TO DIRECT ROOTS DOWNWARD. ROOT BARRIERS SHALL BE SOURCED FROM THE SAME SUPPLIER AS THE STRUCTURAL CELL SYSTEM. INSTALL PER MANUFACTURER'S INSTRUCTIONS.	
SUBBASE LAYER	MDOT CLASS 2.	4 INCH
*CHOKER LAYER	MDOT 6AA, OR AASHTO #57, OR APPROVED EQUIVALENT.	4 INCH
*RESERVOIR LAYER	MDOT 4AA OR 6AA, OR AASHTO #3, #5, #57 OR APPROVED EQUIVALENT.	___ INCH
*UNDERDRAIN	PERFORATED HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS, SEE DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION, SEE DWG NO. G/52.	6-8 INCH
*UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	___ INCH
*FILTER LAYER	MDOT 34G, OR AASHTO #8, OR APPROVED EQUIVALENT.	___ INCH
*SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.	

NOTE: OPTIONAL ITEMS, TO BE INSTALLED AS REQUIRED PER DESIGN PLANS.


-	-	-	STRUCTURAL CELLS FOR URBAN TREE PLANTING (3 OF 5)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
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REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 12/2018</div>
REVISIONS				<div>SHEET 3 OF 5</div> <div>DWG. No. G/65</div>

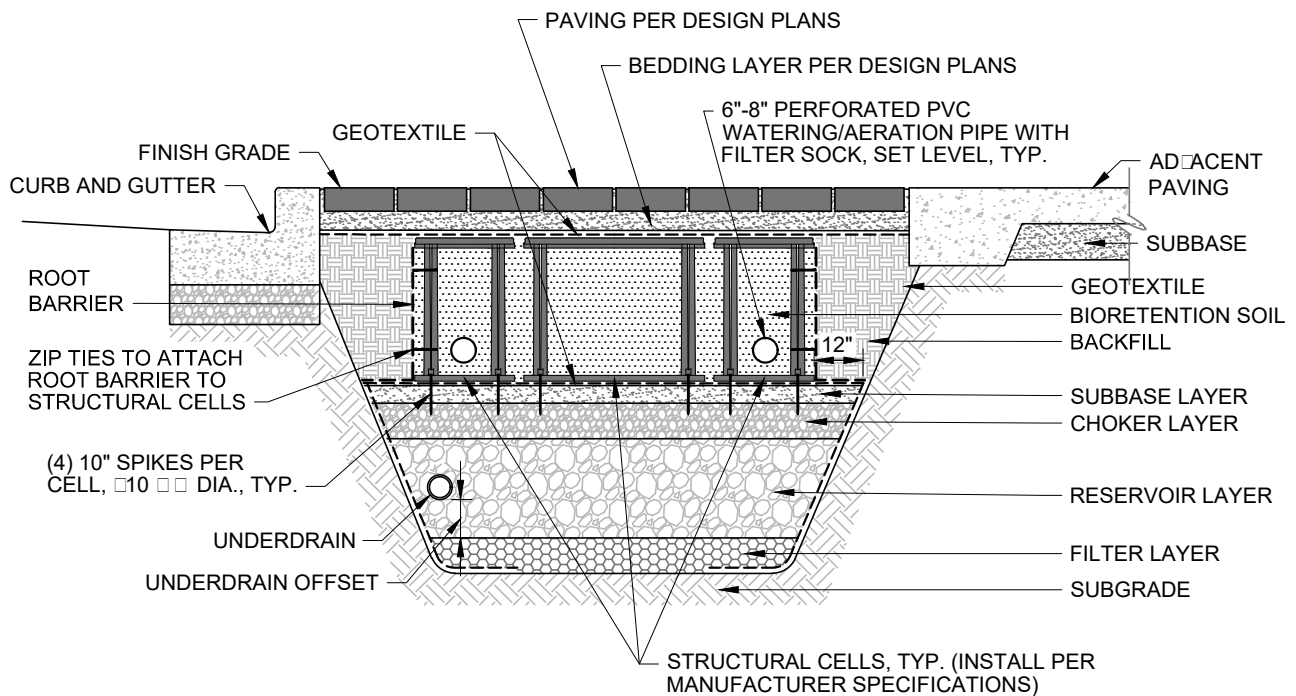


SECTION B-B

NOTES:

1. SEE DWG NO. G/65 (1 OF 5) FOR SECTION LOCATION.
2. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.


-	-	-	STRUCTURAL CELLS FOR URBAN TREE PLANTING (4 OF 5)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>
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REV	DESCRIPTION	DATE		SCALE NONE
REVISIONS			DATE 12/2018	G/65 DWG. No.

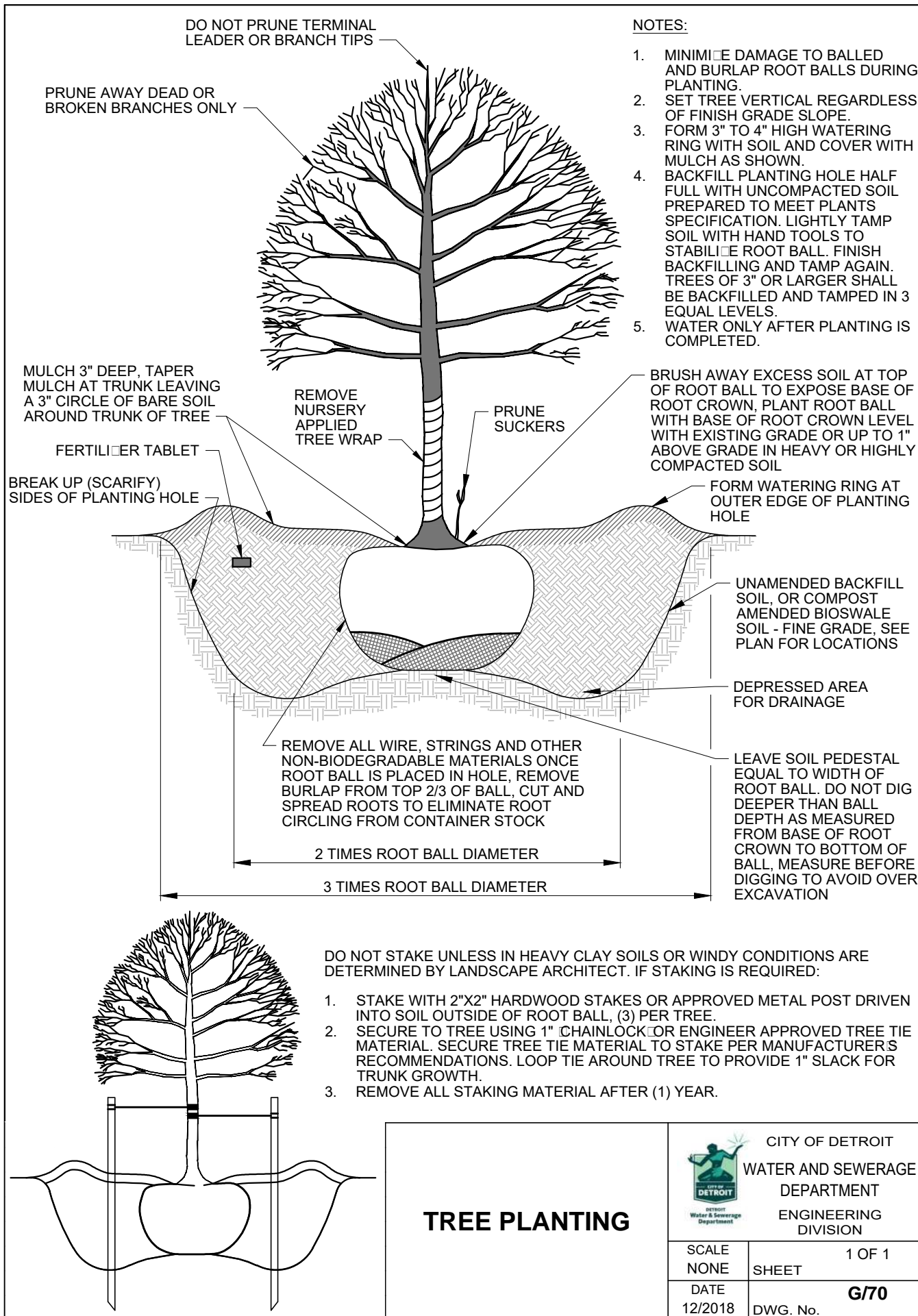


SECTION C-C

NOTES:

1. SEE DWG NO. G/65 (1 OF 5) FOR SECTION LOCATION.
2. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.

-	-	-	STRUCTURAL CELLS FOR URBAN TREE PLANTING (5 OF 5)	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	
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REV	DESCRIPTION	DATE		<div>SCALE NONE</div> <div>DATE 12/2018</div>	<div>5 OF 5 SHEET</div> <div>G/65 DWG. No.</div>
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TREE PLANTING



CITY OF DETROIT
WATER AND SEWERAGE
DEPARTMENT
ENGINEERING
DIVISION

SCALE

NONE

DATE

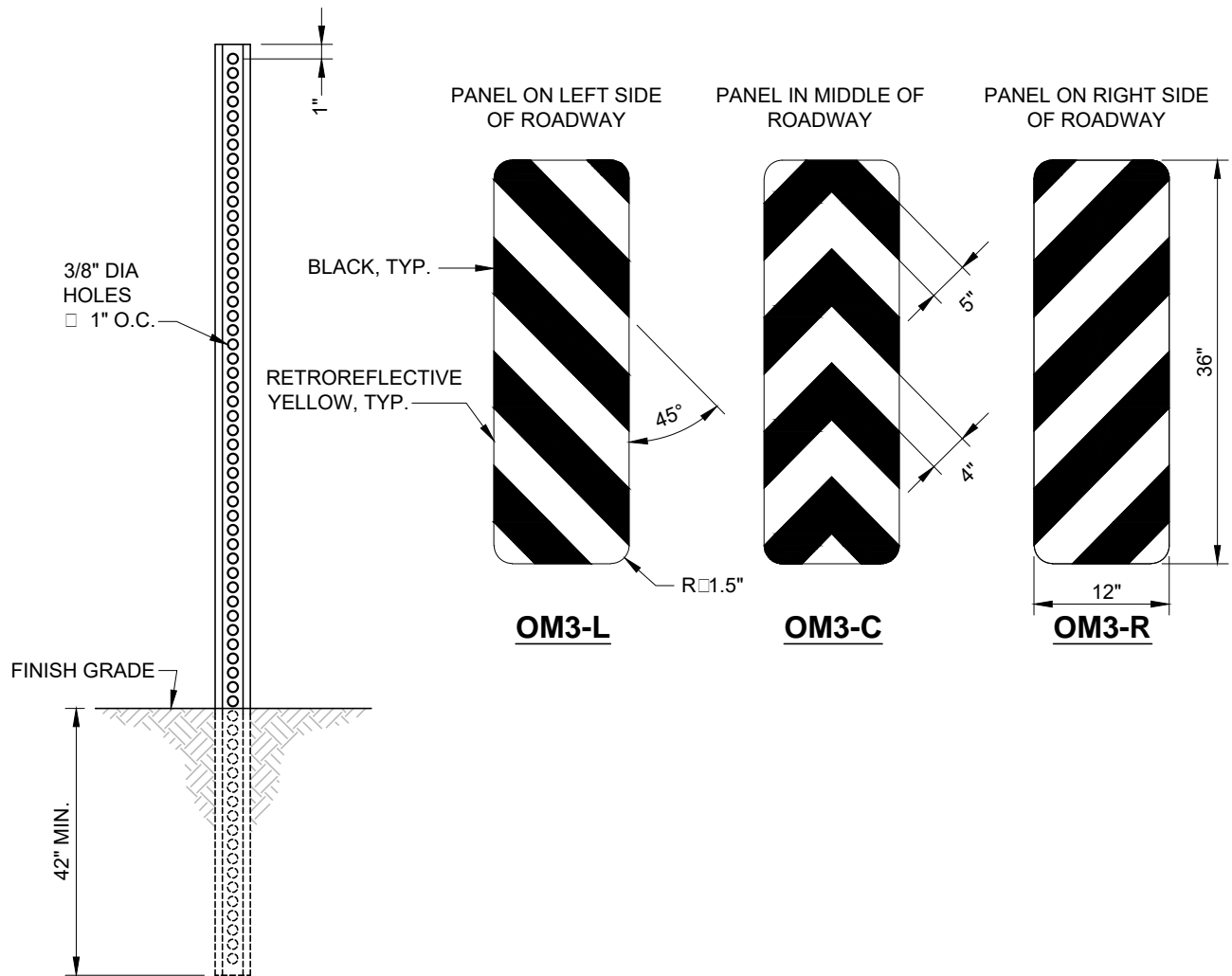
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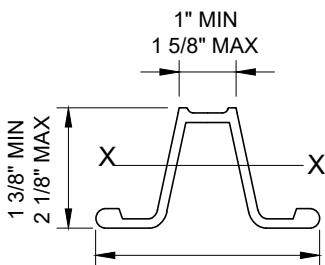
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G/70

DWG. No.



ELEVATION




SECTION

3 LBS STEEL POST

WEIGHT \square 3 LBS/FT MIN.
SECTION MODULES X-X \square 0.31 IN 3 MIN

NOTES:

1. THE ALTERNATING BLACK AND RETROREFLECTIVE YELLOW STRIPES (OM3-L, OM3-R) SHALL BE SLOPED DOWN AT AN ANGLE OF 45 DEGREES TOWARD THE SIDE WHICH TRAFFIC IS TO PASS THE OBSTRUCTION. IF TRAFFIC CAN PASS TO EITHER SIDE OF THE OBSTRUCTION, THE ALTERNATING BLACK AND RETROREFLECTIVE YELLOW STRIPES (OM3-C) SHALL FORM CHEVRONS THAT POINT UPWARDS.
2. THE MINIMUM MOUNTING HEIGHT MEASURED FROM THE BOTTOM OF THE OBJECT MARKER TO THE ELEVATION OF THE NEAR EDGE OF THE TRAVELED WAY, SHALL BE 4 FEET.
3. LOCATE IN ALL STORMWATER FACILITIES THAT PROTRUDE INTO THE ROADWAY, SUCH AS BIORETENTION BULB-OUTS, LOCATE 24" INSIDE CURB AT LOCATION SHOWN ON THE DESIGN PLANS.

-	-	-	OBJECT MARKER FOR OBSTRUCTION WITHIN ROADWAY	 <div>CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION</div>	SCALE		
-	-	-			NONE	SHEET 1 OF 1	
-	-	-			DATE	G/73	
-	-	-			12/2018	DWG. No.	
REV	DESCRIPTION	DATE					
REVISIONS							