

Riley Purgatory Bluff Creek Watershed District Permit Application Review

Permit No: 2021-079

Considered at Board of Managers Meeting: May 4, 2022

Received complete: March 14, 2022

Applicant: City of Minnetonka

Representative: Bolton & Menk – Lanol Leichty

Project: The applicant proposes a combination of street reconstruction and rehabilitation for the roadways in the Tonka-Woodcroft neighborhoods. Stormwater management will be provided by 12 infiltration pipes, 15 infiltration manholes, four underground stormwater chamber facilities, one infiltration pond, one wet stormwater pond, three Kraken filtration units, two biofiltration swales with underdrains and check dams, and wetland buffer areas with overland flow impervious disconnections to provide volume control, water quality, and rate control.

Location: South of Minnetonka Boulevard between Steele Street and Larchwood Drive in Minnetonka, Minnesota 55344

Reviewer: Scott Sobiech, P.E., Barr Engineering Co.

Potential Board Variance Action

Manager _____ moved and Manager _____ seconded adoption of the following resolution based on the permit report that follows, the presentation of the matter at the May 4, 2022, meeting of the managers and the managers' findings, as well as the factual findings in the permit report that follows:

Resolved that the variance for Permit 2021-079 is approved, subject to the following conditions:

1. [CONDITION(S)]

Proposed Board Action

Manager _____ moved and Manager _____ seconded adoption of the following resolutions based on the permit report that follows and the presentation of the matter at the May 4, 2022 meeting of the managers:

Resolved that the application for Permit 2021-079 is approved, subject to the conditions and stipulations set forth in the Recommendations section of the attached report;

Resolved that on determination by the RPBCWD administrator that the conditions of approval of the permit have been affirmatively resolved, the RPBCWD president or administrator is authorized and directed to sign and deliver to the applicant, Permit 2021-079 on behalf of RPBCWD.

Upon vote, the resolutions were adopted, _____ [VOTE TALLY].

Applicable Rule Conformance Summary

Rule	Issue		Conforms to Rule?	Comments
B	Floodplain Management and Drainage Alterations		Yes	
C	Erosion Control Plan		See comment.	See rule-specific permit condition C1 related to providing name and contact information for the individual responsible for erosion control.
D	Wetland and Creek Buffers		No	See rule-specific permit condition D1 related to maintenance agreement execution and variance request for imperviousness within buffer minimum width.
G	Waterbody Crossings and Structures		See comment	See rule-specific permit condition G1 related maintenance agreement execution.
J	Stormwater Management	Rate	Yes	
		Volume	See Comment	See stipulation #6 related in infiltration testing during construction.
		Water Quality	Yes	
		Low Floor Elev.	Yes	
		Maintenance	See Comment	See Rule Specific Permit Condition J1 related to maintenance agreement execution
		Chloride Management	Yes	
		Wetland Protection	Yes	
K	Variances and Exceptions		See comment.	See variance request related to impervious surface within buffer minimum.
L	Permit Fee		N/A	Governmental Entity
M	Financial Assurance		N/A	Governmental Entity

Background

The applicant proposes a combination of street reconstruction and rehabilitation for the roadways in the Tonka-Woodcroft neighborhoods. Stormwater management will be provided 12 infiltration pipes, 15 infiltration manholes, four underground stormwater chamber facilities, one infiltration pond, one wet stormwater pond, three Kraken filtration unit, two biofiltration swales with underdrains and check dams, and wetland buffer areas to provide volume control, water quality, and rate control. In addition, the applicant proposes improvements along Minnetonka Boulevard and to provide an outlet for the landlocked basin located north of Moorland Circle. The project site is outlined in red on the below figure.

The water resources within the project site or downgradient of the proposed activities are summarized in Table 1. The table also provides a brief explanation of how each resource is implicated in the permit application review process. The City of Minnetonka is the Local Government Unit (LGU) implementing the Wetland Conservation Act in the city. The Technical Evaluation



Panel (TEP) met June 16, 2021, to discuss the hydrologic connectivity between the Wetland 1 complex (W1a-W1k). The Findings and Recommendation of the TEP indicate “Members of the Technical Evaluation Panel agreed that historic aerial photos indicate the wetland areas in question (Wetland 1a-1j) are hydrologically linked, and the north wetland drains into the south wetland.” For purposes of administering the RPBCWD regulatory requirements, the various areas (Wetland 1a-1k) are considered a single wetland complex.

Table 1 Water resource impacted by project

Water Resource	Projected resource impacts
Wetland 1	An onsite Wetland Conservation Act (WCA) protected wetland complex (W1a-W1k) downgradient from proposed land-disturbing activities. The southern portion of this wetland complex is identified as PW 27-746W and the basin in the northern portion of the complex is PW 27-760P. In addition, there are several waterbody crossings within the wetland that will be modified.
Wetland 3	An onsite Wetland Conservation Act (WCA) protected wetland complex (W3a-W3d) connected hydraulically by culverts. The wetland complex has been previously ditched. The applicant proposes 0.07 acres of permanent impacts, which the LGU determined to be exempt under WCA, associated with proposed conversion of ditched wetlands (W3b-W3d) into a biofiltration system.
Wetland 4	An off-site Wetland Conservation Act (WCA) protected wetland downgradient from proposed land-disturbing activities. A high-level outlet is proposed for this landlocked basin.

Most of the project site is within RPBCWD’s jurisdiction; the rest is within Minnehaha Creek Watershed District (MCWD), as summarized in the following table. Relevant project site information is provided in Table 2.

Table 2 Relevant Project Information

	Total Project	MCWD Area	RPBCWD Area
Total Site Area (acres)	32.9	7.63	25.27
Existing Site Impervious (acres)	17.52	2.23	15.29
Post Construction Site Impervious (acres)	18.91	2.23	16.68
New (Increase) in Site Impervious Area (acres)	1.39	0	1.39
Disturbed impervious surface (acres)	17.15	2.21	14.94
Exempt Rehabilitated Impervious Surface (acres)	1.76	0.02	1.74
Regulated Impervious Surface (acres)	17.15	2.21	14.94
Total Disturbed Area (acres)	26.7	1.43	25.27

The remainder of this report pertains only to application of RPBCWD's regulatory requirements to that portion of the project within RPBCWD's jurisdiction. Permit 2021-079, if issued, will authorize only activity within RPBCWD's geographic jurisdiction. The following materials were reviewed in support of the permit request:

1. Permit application dated October 5, 2021 (Notified applicant on October 18, 2021 that submittal was incomplete, materials completing the application received March 14, 2022)
2. 60% Construction Drawings dated September 23, 2021
3. 90% Construction Drawings dated December 27, 2021
4. 100% Construction Drawings dated February 22, 2022 (Revisions dated April 8, 2022 and received April 12, 2022)
5. Project Permit Application Report dated September 28, 2021 (revised December 28, 2021, March 14, 2022, April 8, 2022, April 12, 2022)
6. Geotechnical Exploration and Review Report by America Engineering Testing Inc. (AET) (attached to Project Permit Application Report) dated June 27, 2021
7. Type and Boundary Application Tonka-Woodcroft Wetland Delineation Wetland Delineation Report by Bolton & Menk dated April 19, 2021
8. Proprietary BMP testing documentation received December 30, 2021 (attached to Project Permit Application Report)
9. MnRAM Site Assessment Reports received December 30, 2021 (attached to the Project Permit Application Report)
10. Minnesota Wetland Conservation Act Technical Evaluation Panel Form to document findings and TEP recommendations for June 16, 2021 meeting
11. Minnesota Wetland Conservation Act Notice of Decision dated March 2, 2022
12. Electronic SSA models for existing and proposed conditions received October 11, 2021 (revised December 30, 2021, March 14, 2022, April 8, 2022, and April 12, 2022)
13. Electronic MIDS modeling received November 10, 2021 (revised December 30, 2021 March 14, 2022, and April 8, 2022)
14. Electronic P8 modeling received March 14, 2022 (revised April 8, 2022)
15. Electronic SHSAM modeling received March 14, 2022
16. Variance request dated March 14, 2022

17. Response to Comments from Bolton & Menk dated December 29, 2021
18. Response to Comments from Bolton & Menk dated March 14, 2022
19. Response to Comments from Bolton & Menk dated April 8, 2022

Rule Specific Permit Conditions

Rule B: Floodplain Management and Drainage Alterations

Because the project will involve the alteration of surface flows and fill in the floodplain below the 100-year flood elevation of Wetlands 1, 3 and 4 the project must conform to the requirements set forth by the RPBCWD Floodplain Management and Drainage Alterations rule (Rule B, Subsection 2.1). Because the applicant proposes to create an outlet from a landlocked area containing Wetland 4 which will alter surface flows, the project must conform to the requirements set forth by the RPBCWD Floodplain Management and Drainage Alterations rule (Rule B, Subsection 2.2).

Because the project does not propose new or reconstructed structures with low floors, the low floor elevation requirements set forth by Rule B, Subsection 3.1 do not impose requirements on the project.

The summary of the changes to the floodplain storage capacity is provided in Table 3. The project plans show that compensatory flood storage will be created at or below the same elevation of areas where fill will be placed below the 100-year flood elevations of Wetlands 1, 3 and 4. The plans provide for a net increase in flood storage for each waterbody, thus conforming with Rule B, Subsection 3.2.

Table 3 Fill and Cut computation below existing 100-year flood elevation at Wetland 1.

Waterbody	Subcomplex	100-Year Elevation	Proposed Fill (CY)	Proposed Cut (CY)	Increase in Storage (CY)
Wetland 1	W1a	909.4	0.2	6.6	6.4
	W1b	912.4	12.5	18.3	5.8
	W1c	919.4	16.8	44.2	27.4
	W1k	931.4	22.6	31.9	9.3
	Total		52.1	101.0	48.9
Wetland 3	NA	945.9	0.9	24.9	24.0
Wetland 4	NA	938.3	7.9	17.0	9.1

The applicant provided pre- and post-project water quality modeling to demonstrate the project is not reasonably likely to have an adverse impact to water quality. The modeling results show the total suspended solids and total phosphorus load leaving the site after the street reconstruction will be less than the existing load leaving the site (see Rule J Water Quality analysis). The water quality modeling also shows the proposed project will meet the water quality treatment criteria for areas tributary to the onsite wetlands (see Rule J Wetland Protection analysis). In addition, consistent with the rate-control requirement in Rule J, the proposed peak discharge rates leaving the site are less than existing for the 2, 10, and 100-year event as summarized in Table 4. Because implementation of the project will provide a reduction in

pollutant loading, the proposed alterations are not likely to cause adverse impacts to water quality. The proposed land-disturbing activity conforms to Rule B, Subsection 3.3.

Table 4 Discharge leaving the site for 2, 10, and 100-year, 24-hour event

Modeled Location	2-Year Discharge (cfs)		10-Year Discharge (cfs)		100-Year Discharge (cfs)	
	Ex	Prop	Ex	Prop	Ex	Prop
Wetland 1a	117.2	109.5	215.1	201.7	447.4	411.3
Wetland 1b	23.6	21.7	55.1	53.4	152.8	139.9
Wetland 4	14.9	6.7	34.2	17.9	84.2	47.9
Southeast	10.0	6.4	21.4	15.4	55.1	38.6

Rule B, Subsections 3.4 is not relevant because there are no on-site watercourses. An erosion prevention and sediment control plan has been provided, per Criteria 3.5, along with the plans that include notes for controlling aquatic invasive species entering and leaving the site, per Criteria 3.6.

The proposed project conforms to the floodplain management and drainage alteration requirements of Rule B.

Rule C: Erosion Prevention and Sediment Control

Because the project will involve 25.27 acres of land-disturbing activity, the project must conform to the requirements set forth by the RPBCWD Erosion Prevention and Sediment Control rule (Rule C, Subsection 2.1a).

The erosion control plans prepared by Bolton & Menk includes installation of silt fence, sediment control logs, stabilized construction entrances, inspection, staging areas, riprap at flared ends, placement of a minimum of 6 inches of topsoil, decompaction of areas compacted during construction, and retention of native topsoil onsite to the greatest extent possible. To conform to RPBCWD Rule C requirements, the following revisions are needed:

- C1. The Applicant must provide the name, address and phone number of the individual who will remain liable to the District for performance under this rule and maintenance of erosion and sediment-control measures from the time the permitted activities commence until vegetative cover is established.

Rule D: Wetland and Creek Buffers

Because the proposed work triggers RPBCWD Rules B, G, and J and there are wetlands downgradient from the work for the proposed project, as well as a WCA wetland that will be disturbed, Rule D, Subsection 2.1a requires the applicant to establish buffer areas. Subsection 3.1b requires buffer on the edges of Wetland 4 downgradient from the land-disturbing activities. The City of Minnetonka is the LGU administering WCA requirements and in that capacity approved the temporary disturbance of Wetland 1 and grading a portion of Wetland 3 to create a stormwater facility for the project. Because the activities constitute a disturbance

of Wetland 1 and 3, wetland buffer must be provided around the entire (remaining) wetland on the property owned by the applicant (Rule D, subsection 3.1a)

The MnRAM analyses submitted indicate that Wetland 1 is high value while Wetland 3 and 4 are medium value wetlands. Rule D, Subsection 3.2.a.ii requires wetland buffer with an average of 60 feet from the delineated edge of the wetland, minimum 40 feet for high value wetlands. Rule D, Subsection 3.2.a.iii requires wetland buffer with an average of 40 feet from the delineated edge of the wetland, minimum 20 feet for medium value wetlands. No buffer over 120 feet for high value wetlands or 80 feet in width for medium value wetlands count towards compliance and buffer averaging is used to achieve the required average buffer widths. Because Subsection 3.2f only requires buffer on property owned by the applicant and the city only has property rights to install buffer within the linear project right of way (ROW) and plans for the project provide for establishment and maintenance of buffer vegetation within the ROW area, the project conforms to the requirements. The buffer widths are summarized in Table 5 and shown on the applicant's Exhibit K attached to this report for reference. The applicant has requested a variance from subsection 3.3d because a portion of the proposed roadway reconstruction (i.e., impervious surface) is within the minimum buffer width (see Rule K variance analysis).

Table 5 Wetland buffer summary

Wetland ID	RPBCWD Wetland Value	Required Minimum Width (ft)	Required Average Width (ft)	Provided Minimum Width (ft)	Provided Average Width (ft)
Wetland 1	High	30	60	2 ²	22.7 ²
Wetland 3	Medium	20	40	5 ²	22.7 ²
Wetland 4	Medium	20	40	9 ²	12.3 ²

¹ Average and minimum required buffer width under Rule D, Subsection 3.2.b.

² The wetland buffer areas are constrained to the ROW and the proximity of the wetland boundary to the edge of the road, the applicant is only required to buffer to the edge of the ROW and thus the buffers are less than required average.

The plans require revegetating disturbed areas within the proposed buffer with native vegetation, thus conforming with Rule D, Subsection 3.3. A note is included on the plan sheet indicating the project will be constructed so as to minimize the potential transfer of aquatic invasive species (e.g., zebra mussels, Eurasian watermilfoil, etc.) to the maximum extent possible conforming to Rule D, Subsection 3.6.

The applicant submitted a draft maintenance agreement per Subsection 3.5 of Rule D for review by RPBCWD. The following revisions are needed to conform to the RPBCWD Rule D:

- D1. Buffer areas and maintenance requirements must be documented in an agreement approved by RPBCWD. As a public entity, the city of Minnetonka may comply with this requirement by entering into a maintenance agreement with the RPBCWD (Rule D, Subsection 3.5). The maintenance agreement must also include an exhibit clearly showing the buffer area and monument locations. the draft agreement must be submitted for approval by RPBCWD.

Rule G: Waterbody Crossings and Structures

Because the project proposes to rehabilitate eight waterbody crossings in contact with the bed and bank of Wetland 1, the proposed project must meet the criteria of RPBCWD's Waterbody Crossings and Structures Rule (Rule G, Subsection 3). The waterbody crossings proposed for reconstruction connect various portions of Wetland 1 across driveways and Larchwood Avenue. Only the criteria in Subsections 3.1, 3.2 and 3.7 impose requirements on the work.

This work will provide a public benefit by rehabilitating the crossings to reduce roadway overtopping for the 100-year event (Rule G, Subsection 3.1b).

Rule G, Subsection 3.2.a requires that the construction of a waterbody crossing in contact with the bed or bank of a waterbody retain adequate hydraulic capacity and assure no net increase in the flood stage of the pertinent waterbody. Stormwater modeling provided by the applicant indicates that the 100-year flood elevation upstream and downstream of each crossing is slightly lower under proposed conditions than existing conditions as summarized in Table 6, thus the project conforms to Rule G, Subsection 3.2a

Table 6 Waterbody crossing 100-year high water level (HWL) comparison

Culvert	Existing Upstream HWL (ft)	Proposed Upstream HWL (ft)	Existing Downstream HWL (ft)	Proposed Downstream HWL (ft)	Change in Upstream HWL (ft)	Change in Downstream HWL (ft)
FES 9 - FES 953	930.98	930.58	922.90	922.69	-0.40	-0.21
FES 954 - FES 954A	922.90	922.69	923.07	922.57	-0.21	-0.50
FES 955 - FES 955A	923.02	922.57	919.43	919.28	-0.45	-0.15
FES 959 - FES 959A	919.43	919.28	912.52	912.40	-0.15	-0.08
CB 960A - FES 960	917.28	916.69	912.52	912.40	-0.59	-0.08
CB 961A - FES 961	917.56	917.56	912.52	912.40	0.00	-0.08
CB 962A - FES 962	917.36	917.12	912.52	912.40	-0.24	-0.08
CB 501 - FES 501A	912.44	912.39	909.39	909.13	-0.05	-0.23

Because the existing crossings do not provide navigational capacity, the requirement set forth by Rule G, subsection 3.2.b does not impose a requirement on the project. Because the waterbody crossing improvements have been designed with nearly identical inverts and pipe sizes as summarized in Table 7, the project will maintain existing wildlife passage, is not reasonably likely to change flow gradient, increase scour, or affect water quality. As part of the design process, the applicant dismissed the do nothing alternative because these eight crossings consist of existing culverts that have deteriorated with age and

need replacement. By using the design alternative with nearly identical pipe diameters and inverts along the identical alignments, the proposed crossing rehabilitations will minimize impacts to Wetland 1 (Rule G, subsections 3.2c-e).

Table 7 Waterbody crossing information summary

Culvert	Existing Pipe Size/ Material	Proposed Pipe Size/ Material	Existing Inverts (Upstream - Downstream)	Proposed Inverts (Upstream - Downstream)	Existing Pipe Length (ft)	Proposed Pipe Length (ft)
FES 9 - FES 953	18" CMP	24" to 18"x28" RCP ¹	927.16 – 924.11	927.00 – 924.11	203'	205'
FES 954 – FES 954A	12" CMP	12" RCP	916.66 – 916.23	919.66 – 919.23	23'	28'
FES 955 – FES 955A	12" CMP	12" RCP	919.25 – 919.09	919.25 – 919.09	31'	28'
FES 959 – FES 959A	18" RCP	36"x 22" RCP ²	916.07 – 915.38	916.07 – 915.38	49'	49'
CB 960A – FES 960	12" RCP	12" RCP	913.46 – 912.84	913.46 – 912.84	42'	42'
CB 961A – FES 961	12" RCP	12" RCP	915.08 – 914.79	915.08 – 914.79	39'	41'
CB 962A – FES 962	12" RCP	12" RCP	915.08 – 914.90	915.08 – 914.90	30'	30'
CB 501 – FES 501A	15" CMP	43" x 26" RCP ¹	909.23 – 908.83	909.23 -908.83	20'	24'

¹ A 15" orifice plate will be installed in this storm sewer pipe to simulate existing conditions. At some future date the City plans to remove the orifice plate to provide improved flood protection for upstream properties. *The removal of this orifice will not be approved by this permit, if issued, and plans for removal need to be submitted to RPBCWD for review and approval to confirm (continued) compliance with applicable regulatory provisions.*

²An 18" orifice plate will be installed in this culvert to simulate existing conditions. At some future date the City plans to remove the orifice plate to provide improved flood protection for upstream properties. *The removal of this orifice is not approved by this permit, if approved, and plans for removal need to be submitted to RPBCWD for review and approval to confirm (continued) compliance with applicable regulatory provisions.*

The project plans include a note requiring no activity affecting the bed/banks of a protected water be conducted between March 15 and June 15 (Rule G, Subsection 3.7a) and indicate the banks will be immediately stabilized after completion of permitted work and revegetated as soon as growing conditions allow (Rule G, Subsection 3.7b). A note is included on the plan sheet indicating the project will be constructed so as to minimize the potential transfer of aquatic invasive species (e.g., zebra mussels, Eurasian watermilfoil, etc.) to the maximum extent possible (Rule G, Subsection 3.7c).

Rule G, Subsection 3.7d requires compliance with the applicable criteria in subsection 3.3 of Rule F. The proposed riprap placement extends the minimum distance needed to provide a stilling pool and, thus representing the minimal encroachment to prevent erosion (Rule F, subsection 3.3a). Based on MNDOT's standard riprap drawing included in the plan set, the project proposes the use stone riprap having an average size of 9 inches, with a geotextile and transition layer of granular bedding sized consistent with the

erosion intensity at the waterbody crossing locations. The purpose of the riprap is to dissipate flow energy and minimize the potential for erosion consistent with Subsection 3.3b.vi., thus conforming to Rule F, Subsections 3.3b.

To conform to the RPBCWD Rule G the following revisions are needed:

- G1. A maintenance agreement must be executed by the city after review and approval by RPBCWD and prior to release of the permit to undertake the proposed land-disturbing activities.

Rule J: Stormwater Management

Because the project will alter more than 25.27 acres of surface area, conformance with RPBCWD's Stormwater Management Rule (Rule J) is required.

The project entails construction and reconstruction that altogether amounts to 16.68 acres of linear impervious surface; therefore, stormwater management for this linear project must be provided in accordance with the criteria of Subsection 3.2 (Rule J, Subsection 2.4). The 16.68 acres of impervious surface includes 1.74 acres of pavement rehabilitation which is exempt from RPBCWD's stormwater management rule (Rule J, Subsection 2.2d). Therefore, the requirements of Rule J apply to 14.94 acres of proposed new and reconstructed impervious surface within the site.

Rate Control

In order to meet the rate control criteria listed in Subsection 3.1.a, the 2-, 10-, and 100-year post development peak runoff rates must be equal to or less than the existing discharge rates at all locations where stormwater leaves the site.

The Applicant used SSA hydrologic model to simulate runoff rates for pre- and post-development conditions for the 2-, 10-, and 100-year frequency storm events using a nested rainfall distribution, and a 100-year frequency, 10-day snowmelt event. The existing and proposed 2-, 10-, and 100-year frequency discharges from the site are summarized in Table 8. The proposed project is in conformance with RPBCWD Rule J, Subsection 3.1.a.

Table 8. Rate control summary:

Modeled Discharge Location	2-Year Discharge (cfs)		10-Year Discharge (cfs)		100-Year Discharge (cfs)		10-Day Snowmelt (cfs)	
	Ex	Prop	Ex	Prop	Ex	Prop	Ex	Prop
Wetland 1a	117.2	109.5	215.1	201.7	447.4	411.3	59.7	56.7
Wetland 1b	23.6	21.7	55.1	53.4	152.8	139.9	25.5	24.6
Wetland 4	14.9	6.7	34.2	17.9	84.2	47.9	9.1	6.9
Southeast	10.0	6.4	21.4	15.4	55.1	38.6	5.9	5.6

Volume Abstraction

Subsection 3.2c of Rule J requires the abstraction onsite of the larger of 0.55 inches of runoff from the new and fully reconstructed linear impervious surfaces or 1.1 inches from the net increase in linear impervious area. In this case 0.55 inches of runoff from the new and fully reconstructed impervious surfaces is the larger volume. An abstraction volume of 29,826 cubic feet is required from the 14.94 acres of new and reconstructed linear impervious surface on the site. The following three types of infiltration best management practices (BMPs) are proposed for the Tonka-Woodcroft project. All infiltration BMPs will include pretreatment with either an isolator row for the ADS structures or use of a sump manhole with a Snout® skimmer.

1. Four underground infiltration areas utilizing ADS arch pipe structures with rock backfill to provide storage and infiltration of stormwater.
2. Twelve infiltration pipes consisting of a 48" perforated HDPE pipe bedded in coarse aggregate to facilitate infiltration of stormwater flows.
3. Fifteen infiltration manholes consisting of a 6-foot diameter bottomless manhole on a foot of 2"-4" washed coarse aggregate to promote infiltration.

Soil boring information collected by AET at 42 locations across the site indicate the variable soils include sand, clay, peat, silt, and various combination of these soils. Soil borings collected for the project encountered groundwater in 31 of the 42 borings ranging in depth from 3 feet to 20 feet. The greater depths to groundwater occurred at the boring locations at higher topographic elevations. The shallowest groundwater depths of 3 feet to 4½ feet occurred in borings drilled on Larchwood Drive and Hillside Terrace, adjacent to the Wetland 1. These shallow groundwater depths illustrate a portion of the site is not suitable for infiltration because the required 3-foot separation between the groundwater elevation and bottom of any infiltration practice could not be met. Because the engineer concurs that the soil boring information showing low permeable soils (i.e., clay), high groundwater, and site topography support that the abstraction standard in subsection 3.2 of Rule J cannot practicably be met for runoff from all regulated impervious surface, the site is considered a restricted site and stormwater runoff volume must be managed in accordance with subsection 3.3 of Rule J.

For restricted sites, subsection 3.3 of Rule J requires rate control in accordance with subsection 3.1.a and that abstraction and water-quality protection be provided in accordance with the following sequence: (a) Abstraction of 0.55 inches of runoff from sites regulated impervious surface determined in accordance with paragraph 3.2, and treatment of all runoff to the standard in paragraph 3.1c; or (b) Abstraction of runoff onsite to the maximum extent practicable and treatment of all runoff to the standard in paragraph 3.1c; or (c) Off-site abstraction and treatment in the watershed to the standards in paragraph 3.1b and 3.1c. Because of high groundwater, topography, and utilities, the abstraction standard in Subsection 3.3a of Rule J cannot practicably be achieved from runoff from all regulated impervious surface. Because the infiltration BMPs are located at higher elevations on the site than the roadways adjacent to Wetland 1, it is

infeasible to route the runoff from the lower areas with low permeable soil to locations where the soils are conducive to infiltration.

Because of the infiltration BMP locations within the boulevard or under portions of the active roadways, the applicant was unable to excavate to the required depths to conduct on site infiltration tests prior to construction. The applicant's geotechnical engineer performed calculations of infiltration rate based upon the Kozeny-Carman Equation using grain size analysis tests from borings B-13 and B-33. The results indicate much faster infiltration (34 and 42 inches per hour) than recommended by the MN Stormwater Manual for the soils. The engineer concurs with the applicant's design infiltration rates of between 0.25 – 1.6 inches per hour based on the calculations provided by the geotechnical engineer and the guidelines provided in the Mn Stormwater Manual. Based on the design infiltration rate, the engineer concurs that the proposed infiltration systems will draw down within 48 hours (Rule J, subsection 3.1b.3). Per Rule J, Subsection 3.1.b.2.c measured infiltration capacity of the soils at the bottom of the infiltration systems must be provided. The applicant must submit documentation verifying the infiltration capacity of the soils and that the volume control capacity is calculated using the measured infiltration rate. If infiltration capacity is less than needed to conform with the volume abstraction requirement in subsection 3.3a or there is inadequate separation to groundwater, design modifications to achieve compliance with RPBCWD requirements will need to be submitted (in the form of an application for a permit modification or new permit).

The Engineer concurs that because there is insufficient separation to the groundwater table and topography restrictions, the Applicant is providing abstraction of runoff from the regulated impervious surface to the maximum extent practicable (see Table 9) on the project site and the proposed activity conforms to Rule J, Subsection 3.3b. In addition, the applicant oversized some of the infiltration BMPs to provide 10,301 cubic feet of additional abstraction of run-on from impervious surfaces outside the site ROW (i.e., residential areas that currently discharge untreated to the water resources) to enhance regional stormwater management.

Table 9. Volume abstraction summary

Required Abstraction Depth (inches)	Required Abstraction Volume (cubic feet)	Provided Abstraction Depth (cubic feet)	Provided Abstraction Volume (cubic feet)
0.55	29,826	0.51	27,651

Water Quality Management

Subsection 3.1.c of Rule J requires the Applicant to provide for at least 60 percent annual removal efficiency for total phosphorus (TP), and at least 90 percent annual removal efficiency for total suspended solids (TSS), as well as no net increase in pollutant loading from existing conditions. The applicant demonstrated and the engineer concurs that the site is restricted. Rule J, subsection 3.1c(ii) (made applicable by 3.2c) requires water-quality treatment of at least 60 percent annual removal efficiency for total phosphorus, at least 90 percent annual removal efficiency for total suspended solids and no net increase in TP or TSS from the site

from existing conditions. The Applicant is proposing the following stormwater management facilities to treat runoff from the site

1. Four underground infiltration areas utilizing ADS arch pipe structures with rock backfill
2. Twelve infiltration pipes
3. Fifteen infiltration manholes
4. Two biofiltration swales
5. Three Kraken proprietary filtration units
6. One wet stormwater pond
7. One infiltration pond
8. Two sump manholes
9. Wetland buffers

MIDS water quality models, a P8 models, and a SHSAM models were developed to estimate the TP and TSS loading from the watersheds and the removal capacity of the proposed BMPs. The results of this modeling are summarized in Table 10 and Table 11 below. The results show the proposed project will remove sufficient TSS and TP to achieve an overall pollutant reduction in accordance with the required annual removals (Rule J, Subsection 3.2c).

Table 10. Annual TSS and TP removal summary:

Pollutant of Interest	Regulated Site Loading (lbs/yr)	Required Load Removal (lbs/yr) ¹	Provided Load Reduction (lbs/yr)
Total Suspended Solids (TSS)	5,366	4,829 (90%)	4,890 (91.1%)
Total Phosphorus (TP)	29.5	17.7 (60%)	23.7 (80.3%)

¹Required load reduction is calculated based on the criteria in Rule J, Subsection 3.1c and the new and reconstructed impervious area site loading

Table 11. Summary of net change in TSS and TP leaving the site

Pollutant of Interest	Existing Site Loading (lbs/yr)	Proposed Site Load after Treatment (lbs/yr) ¹	Change (lbs/yr)
Total Suspended Solids (TSS)	5,922	1,031	-4,891
Total Phosphorus (TP)	32.6	8.9	-23.7

Low floor Elevation

No structure may be constructed or reconstructed such that its lowest floor elevation is less than 2 feet above the 100-year event flood elevation according to Rule J, Subsection 3.6. In addition, a stormwater-management facility must be constructed at an elevation that ensures that no adjacent habitable building will be brought into noncompliance with a standard in this subsection 3.6. The project does not propose to construct or reconstruct structures that have low-floor elevations. However, the project will construct stormwater management facilities in proximity to existing habitable structures. The RPBCWD Engineer

concurs with the attached low floor analysis provided by the applicant, which utilized Appendix J1, that demonstrates the proposed project is in conformance with Rule J, Subsection 3.6.

Maintenance

Subsection 3.7 of Rule J requires the submission of maintenance plan. All stormwater management structures and facilities must be designed for maintenance access and properly maintained in perpetuity to assure that they continue to function as designed.

- J1. Permit applicant must provide a draft maintenance and inspection plan for review and approval by RPBCWD. As a public entity, the city of Minnetonka may comply with this requirement by entering into a maintenance agreement with the RPBCWD.

Chloride Management

Subsection 3.8 of Rule J requires the submission of chloride management plan that designates the individual authorized to implement the chloride management plan and the MPCA-certified salt applicator engaged in implementing the plan. The City of Minnetonka's chloride management plan designates three Smart Salting Level 1 state-certified holders: Carl Locker, Steven Siewert, and Brad Hoes as the city employees authorized to implement the city's chloride management plan, thus conforming with Rule J, subsection 3.8.

Wetland Protection

Because the proposed activities discharge to on-site protected Wetland 1 and off-site Wetland 4 as well as alters the discharge Wetland 3 receives from the site, the proposed activities must conform to RPBCWD wetland protection criteria (Rule J, subsection 3.10). Wetland 1 is high value while Wetlands 3 and 4 are medium value. Table 12 summarizes the allowable change in bounce and inundation duration from Table J1 of RPBCWD Rule J. The information summarized in Table 13 summarizes the applicant's analysis for wetland protection and the potential impacts on the wetlands.

Table 12: Summary of allowable impacts on onsite wetland from Rule J, Table J1

Wetland Value/ Waterbody	Permitted Bounce for, 10-Year Event	Inundation Period for 1- and 2-Year Event	Inundation Period for 10-Year Event	Runout Control Elevation
High	Existing +/- 0.5 feet	Existing+1 days	Existing +7 days	No change
Medium	Existing +/- 1.0 feet	Existing+2 days	Existing +14 days	0 to 1.0 ft above existing runout

Table 13: Impacts of Project on Wetlands

Wetland	RPBCWD Wetland Value	Change in Bounce for, 10-Year Event (feet)	1-year Increase in Inundation Period (days)	2-year Increase in Inundation Period (days)	10-year Increase in Inundation Period (days)	Runout Control Elevation ¹
Wetland 1	High	-0.1	0	0	0	No change
Wetland 3	Medium	-0.9	0	0	0	No change
Wetland 4	Medium	-0.8	0	0	0	Proposed outlet set approximately 5 feet above wetland elevation but 3 feet below landlocked overflow

The analysis shows the bounce for the 10-year event will be within the allowable change for each wetland. In addition, the engineer concurs with the applicant's modeling and analysis showing that the proposed street reconstruction will not increase the inundation periods for the wetland, thus conforming with Rule J, Subsection 3.10.a.

The applicant provided MIDs and P8 modeling as summarized in the Table 14 demonstrating the runoff from the disturbed areas tributary to Wetland A and Wetland D will be treated in conformance with Rule J, Subsection 3.10b.

Table 14: Water quality treatment prior to site discharge to protected wetlands

Wetland	Wetland Value	Required TSS Removal	Required TP Removal	Provided TSS Removal	Provided TP Removal
Wetland 1	High	90%	75%	91.2%	80.7%
Wetland 4	Medium	90%	60%	90.0%	76.1%

Rule K: Variances and Exceptions

The applicant requested a variance from the Rule D, Subsection 3.3d requirement to allow reconstructed impervious surface within the minimum buffer width of 30 feet for Wetland 1, a high value wetland, and 20 feet for Wetlands 3 and 4, medium value wetlands.

The attached variance request letter submitted on behalf of the applicant cites several facts related to the development in support of the request. Rule K requires the Board of Managers to find that because of unique conditions inherent to the subject property the application of rule provisions will impose a practical difficulty on the Applicant. Assessment of practical difficulty is conducted against the following criteria:

1. how substantial the variation is from the rule provision;

2. the effect of the variance on government services;
3. whether the variance will substantially change the character of or cause material adverse effect to water resources, flood levels, drainage or the general welfare in the District, or be a substantial detriment to neighboring properties;
4. whether the practical difficulty can be alleviated by a technically and economically feasible method other than a variance. Economic hardship alone may not serve as grounds for issuing a variance if any reasonable use of the property exists under the terms of the District rules;
5. how the practical difficulty occurred, including whether the landowner, the landowner's agent or representative, or a contractor, created the need for the variance; and
6. in light of all of the above factors, whether allowing the variance will serve the interests of justice.

It is the applicant's obligation to address these criteria to support a variance request (see attached variance memo). Following is the RPBCWD engineer's assessment of information received relevant to the applicant's request for a variance

- Related to variance criterion 1 – The required minimum buffer width for Wetland 1, a high value wetland, is 30 feet. The minimum buffer width provided is 2 feet which represents a 93% shortfall from the requirement. The buffer width along the wetland varies between 2 and 77 feet because of the reconstructed roadway's location within the existing right-of-way.
- Regarding variance criteria 2 and 3 –The information submitted demonstrates that the proposed buffer minimum widths of 2 feet, 5 feet, and 9 feet for Wetlands 1, 3 and 4 respectively will not change the character of the resource because the widths provided match the existing conditions. In addition, the project design will capture roadway runoff and route it away from Wetland 3. As a result, the variance will not change the character of the water resources, flood levels, or drainage. The location of the roadways (Larchwood Drive and Hillside Terrace) within the right of way is needed to maintain the existing transportation services to existing homes. Requiring the roadway be removed to provide the minimum buffer with would eliminate the only access route to more than twenty homes.
- Technical measures considered to alleviate the practical difficulty (variance criterion 4) include realigning the roadway within the existing right-of-way, and removal of the roadway. The applicant dismissed the alternative the roadway realignment and removal because of the impacts to government transportation service, the lack of space due to the presence of wetland on both sides of the roadway in many locations, and no feasible alternative access routes for more than twenty homes.
- Regarding variance criterion 5, the applicant has created the circumstances leading to the variances but did so to reconstruct existing roadways within the same footprint (i.e., maintaining the same roadway width). These roadways bisect various portions of Wetland 1 and were originally constructed decades ago, before the Wetland Conservation Act .
- Regarding variance criterion 6 – Allowing the roadways to be reconstructed on the same footprint as the existing roadways will maintain the existing level of transportation service and only access route to more the twenty homes.

The engineer finds there is adequate technical basis for the managers to rely on to grant the requested variance to allow the roadways to be reconstructed within the minimum buffer widths.

Applicable General Requirements:

1. The RPBCWD Administrator and Engineer shall be notified at least three days prior to commencement of work.
2. Construction shall be consistent with the plans and specifications approved by the District as a part of the permitting process. The date of the approved plans and specifications is listed on the permit.
3. Construction must be consistent with the plans, specifications, and models that were submitted by the applicant that were the basis of permit approval. The date(s) of the approved plans, specifications, and modeling are listed on the permit. The grant of the permit does not in any way relieve the permittee, its engineer, or other professional consultants of responsibility for the permitted work.
4. The grant of the permit does not relieve the permittee of any responsibility to obtain approval of any other regulatory body with authority.
5. The issuance of this permit does not convey any rights to either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.
6. In all cases where the doing by the permittee of anything authorized by this permit involves the taking, using or damaging of any property, rights or interests of any other person or persons, or of any publicly owned lands or improvements or interests, the permittee, before proceeding therewith, must acquire all necessary property rights and interest.
7. RPBCWD's determination to issue this permit was made in reliance on the information provided by the applicant. Any substantive change in the work affecting the nature and extent of applicability of RPBCWD regulatory requirements or substantive changes in the methods or means of compliance with RPBCWD regulatory requirements must be the subject of an application for a permit modification to the RPBCWD.
8. If the conditions herein are met and the permit is issued by RPBCWD, the applicant, by accepting the permit, grants access to the site of the work at all reasonable times during and after construction to authorized representatives of the RPBCWD for inspection of the work.

Findings

1. The proposed project includes the information necessary, plan sheets and erosion control plan for review.
2. The Applicant has requested a variance from compliance with the Rule D criteria related to reconstructed impervious surface within the minimum buffer width for high value Wetland 1.
3. The proposed project conforms with Rule B.
4. If the variance from Rule D is approved, the proposed project will conform to Rules C, D, G and J if the Rule Specific Permit Conditions listed above are met.

5. Under Minnesota Department of Natural Resources General Permit 2015-1192 (attached to this report), approval of work under RPBCWD rule G constitutes approval under applicable DNR work in waters rules. Compliance with conditions on approval and payment of applicable fees, if any, are necessary to benefit from general permit approval and the responsibility of the applicants.

Recommendation:

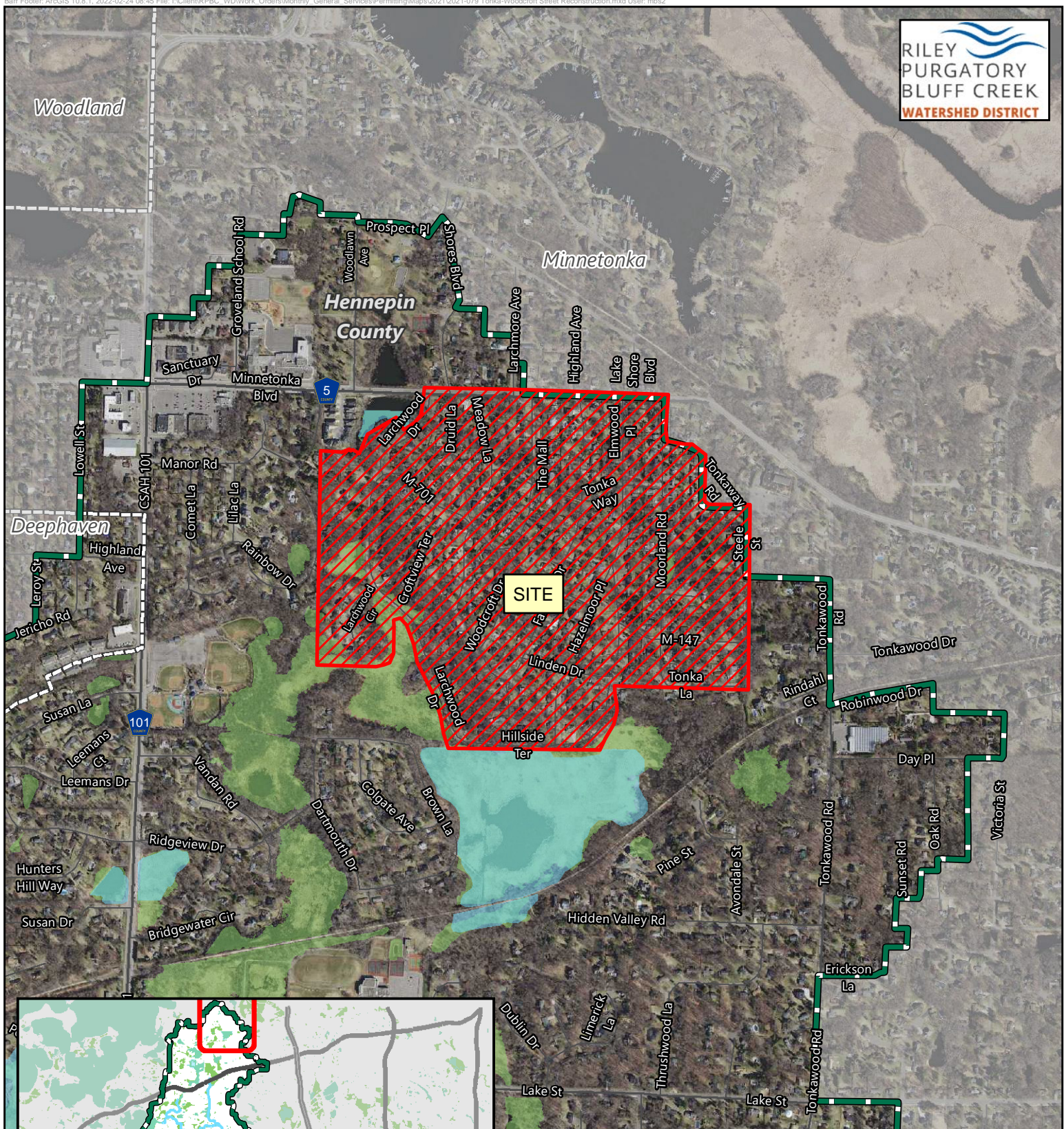
If the managers grant the variance (with such conditions as the managers may impose), the engineer recommends approval of the permit for a 2-year term, contingent upon:

1. The applicant providing the name and contact information of the general contractor responsible for the site.
- 2.
3. Stormwater management facilities, buffer areas and waterbody crossing structure maintenance requirements must be documented in an agreement with RPBCWD. A draft of the agreement and associated exhibits must be provided for RPBCWD review and approval prior to execution.

By accepting the permit, when issued, the applicant agrees to the following stipulations:

1. Continued compliance with General Requirements.
2. Under Minnesota Department of Natural Resources General Permit 2015-1192 (attached to this report), approval of work under RPBCWD rule G constitutes approval under applicable DNR work in waters rules. Compliance with conditions on approval and payment of applicable fees, if any, are necessary to benefit from general permit approval and the responsibility of the applicants. Further, any modification of the project plans material to compliance with RPBCWD rules or this permit – whether undertaken to comply with requirements imposed or actions undertaken by DNR – must be submitted to RPBCWD in the form a request for a permit modification.
3. Per Rule C, Subsection 3.3 the permit holder will be responsible for the inspection, maintenance and effectiveness of all erosion prevention and sediment control facilities, features and techniques. The permittee must inspect all erosion prevention and sediment control facilities and soil stabilization measures to ensure integrity and effectiveness until final site stabilization.
4. Per Rule J Subsection 5.6, upon completion of the site work, the permittee must submit as-built drawings demonstrating that at the time of final stabilization the stormwater management facilities conform to design specifications and functions as intended and approved by the District. As-built/record drawings must be signed by a professional engineer licensed in Minnesota and include, but not limited to:
 - a) the surveyed bottom elevations, water levels, and general topography of all facilities;
 - b) the size, type, and surveyed invert elevations of all stormwater facility inlets and outlets;
 - c) the surveyed elevations of all emergency overflows including stormwater facility, street, and other;
 - d) other important features to show that the project was constructed as approved by the Managers and protects the public health, welfare, and safety.
5. Providing the following additional close-out materials:

- a) Documentation that constructed stormwater facilities perform as designed. This may include infiltration testing, flood testing, or other with prior approval from RPBCWD
 - b) Documentation that disturbed pervious areas remaining pervious have been decompacted per Rule C Subsection 3.2c criteria
- 6. Per Rule J, Subsection 3.1.b.ii measured infiltration capacity of the soils at the bottom of the infiltration BMPs must be provided. The applicant must submit documentation verifying the infiltration capacity of the soils and that the volume control capacity is calculated using the measured infiltration rate. In addition, subsurface soil investigation is needed to verify adequate separation to groundwater (Rule J subsection 3.1.b.2). If infiltration capacity is less than needed to conform with the volume abstraction requirement in subsection 3.3b or there is inadequate separation to groundwater, design modifications to achieve compliance with RPBCWD requirements will need to be submitted (in the form of an application for a permit modification or new permit).
- 7. Plans for removal of plates from orifices in culverts analyzed above under Rule G above, if proposed, must be submitted to RPBCWD for review and approval to confirm compliance with applicable regulatory provisions.



Permit Location Map

TONKA-WOODCROFT STREET
RECONSTRUCTION
Permit 2021-079
Riley Purgatory Bluff Creek
Watershed District



Feet





Real People. Real Solutions.

12224 Nicollet Avenue
Burnsville, MN 55337-1649

Ph: (952) 890-0509
Fax: (952) 890-8065
Bolton-Menk.com

Date: March 14, 2022
To: Terry Jeffrey, Riley Purgatory Bluff Creek Watershed District (RPBCWD)
Scott Sobiech, Barr Engineering
From: Lani Leichty, Bolton & Menk
Subject: Permit Application 2021-079
Tonka Woodcroft Improvements Project
City of Minnetonka
BMI Project No.: T19.121439

As suggested by the RPBCWD, the City of Minnetonka is requesting a variance for Rule D.3.2. regarding the wetland buffer widths for the Tonka Woodcroft Improvements project. The distance between the existing roadways and wetland edges do not allow for the desired average or minimum buffer widths. The buffer requirements and proposed buffer widths are shown in Table A.

Table A: Wetland Buffer Width							
Wetland ID	Wetland Value	Required Avg. Buffer (ft)	Buffer Area (ft ²)	Length of Adjacent Wetland Boundary (ft)	Existing & Proposed Avg. Buffer Width (ft)	Required Min. Width (ft)	Existing & Proposed Min Buffer Width (ft)
W1a	High	60	37,831	1,345	28	30	10
W1b	High	60	16,392	1,262	13	30	2
W1c	High	60	9,658	676	14	30	8
W1d	High	60	5,904	270	22	30	3
W1e	High	60	4,337	302	14	30	2
W1f	High	60	2,191	96	23	30	3
W1g	High	60	1,701	96	18	30	7
W1h	High	60	4,205	112	38	30	5
W1i	High	60	946	24	39	30	3
W1j	High	60	26,739	739	36	30	15
W1k	High	60	9,684	355	27	30	2
W3a	Medium	40	4,156	183	23	20	5
W4	Medium	40	4,117	335	12	20	9

Rule K – Variances and Exceptions reviews six factors. Those factors are addressed below.

1.1 How substantial the variation is from the rule provision;

Larchwood Drive is proposed to be rehabilitated via reclamation and repaved and the watermain is proposed to be replaced via trenchless construction. The proposed road will remain in the same location as the existing and the proposed width matching the existing. Ribbon curb and in some locations traditional curb and gutter will be installed to support the edge of the road and prolong the life of the pavement. The use of curb will also serve as a barrier to keep vehicles and snowplows within the roadway and better protect the wetland buffers from traffic. Replacement of the watermain via trenchless methods will reduce impacts and protect the existing buffer.

The district rules would require average buffer widths of 40 or 60 feet for the wetlands within the Tonka Woodcroft project, and minimum buffer widths of 20 or 30 feet. Due to the location of the existing roadways relative to the existing wetlands, and right-of way limits, the average buffer widths available range from 12 to 29 feet. The minimum buffer widths range from 2 to 15 feet.

The existing wetland buffers are constrained by the existing roadway footprint, and therefore the existing average buffer width is 22% to 60% of the desired average dimension. Similarly, given the proximity of the existing roadway, the existing and proposed minimum buffer width is 7% to 50% of the desired minimum dimension.

1.2 The effect of the variance on government services;

The variance is necessary to enable appropriate roadway rehabilitation by the City of Minnetonka, which is necessary for the safe and reliable access to adjacent properties. The roadways are showing signs of failure, and rehabilitation at this time will head off more intrusive and impactful reconstruction. The aging watermain is near the end of its useful life and requires replacement to provide residents with a reliable drinking water service.

Larchwood Drive and Hillside Terrace act as an emergency access route for Larchwood Circle, Croftview Terrace, Druid Lane, Woodcroft Drive, Fairlawn Ave, Hazelmoore Place, and Elmwood Place. Eliminating the road would prevent emergency services from accessing these streets should an emergency situation arise and inhibit the safety of the 28 existing residences directly on Larchwood Drive and 77 other properties (105 total) that need it for emergency access.

The existing wetland's close proximity to the existing roadways renders proper rehabilitation of the roadway and utility improvements infeasible without the requested buffer variance. The variance is therefore necessary to carry forward basic local government services including safe and reliable access and drinking water distribution.

1.3 Whether the variance will substantially change the character of or cause material adverse effect to water resources, flood levels, drainage or the general welfare in the District, or be substantial detriment to neighboring properties;

The project will not adversely affect water resources, as the project seeks to maintain existing roadways and utilities in their existing locations. The project is meeting the requirements of Rule J – Stormwater Management; Runoff rate, volume, and quality are being met, as well as wetland protection. A number of best management practices, including infiltration manholes, infiltration pipes, water quality filters, a wet pond, an infiltration pond, and biofiltration swales are proposed.

The retrofit of these BMPs will achieve significant water resource benefits over the existing conditions which provide little protection to receiving wetland areas. The proposed buffer widths match the existing site conditions due to the stated constraints and will not cause adverse effects.

- 1.4 Whether the practical difficulty can be alleviated by a technically and economically feasible method other than a variance. Economic hardship alone may not serve as grounds for issuing a variance if any reasonable use of the property exists under the terms of the District rules;*

The wetlands are very close to the existing roadway edge. To create buffer widths consistent with Rule D.3.2., the road would need to be relocated or eliminated. There are wetlands on both sides of the road in some places, so relocating the road in either direction would be a hindrance to the wetland buffer and would instead cause permanent impact to the existing wetlands on the opposite side of the road. Most required buffers widths and avoidance of the existing wetlands would require the road to move into private property and outside of the right-of-way to create enough room, potentially the removal of an existing home, and significant impacts to trees and existing natural areas, none of which are not feasible. Impacting wetland to create buffer would defeat the purpose of the buffer's role to protect the wetlands. The project is being designed to maintain the existing roadway alignment and is proposing pavement rehabilitation and trenchless watermain construction in lieu of full reconstruction in areas adjacent to the wetlands to minimize impacts. A variance would allow for the road to stay within the right-of-way and prevent the need for additional wetland fill.

- 1.5 How the practical difficulty occurred, including whether the landowner, the landowner's agent or representative, or a contractor, created the need for the variance*

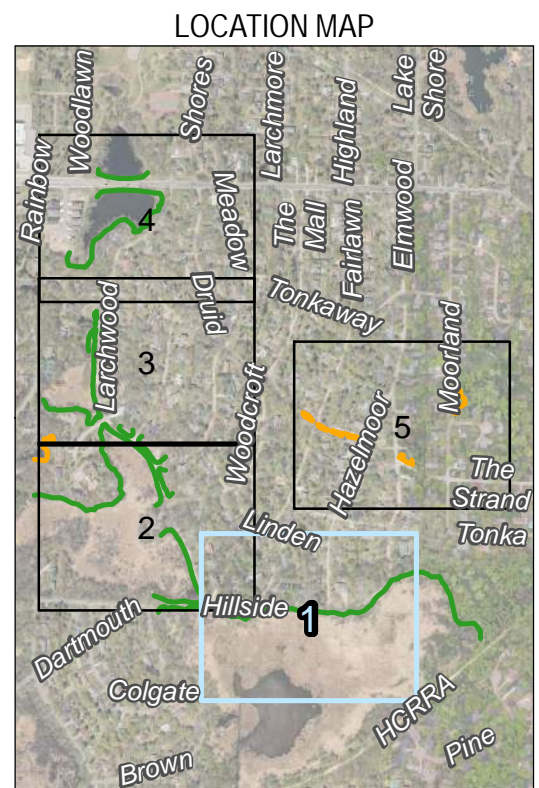
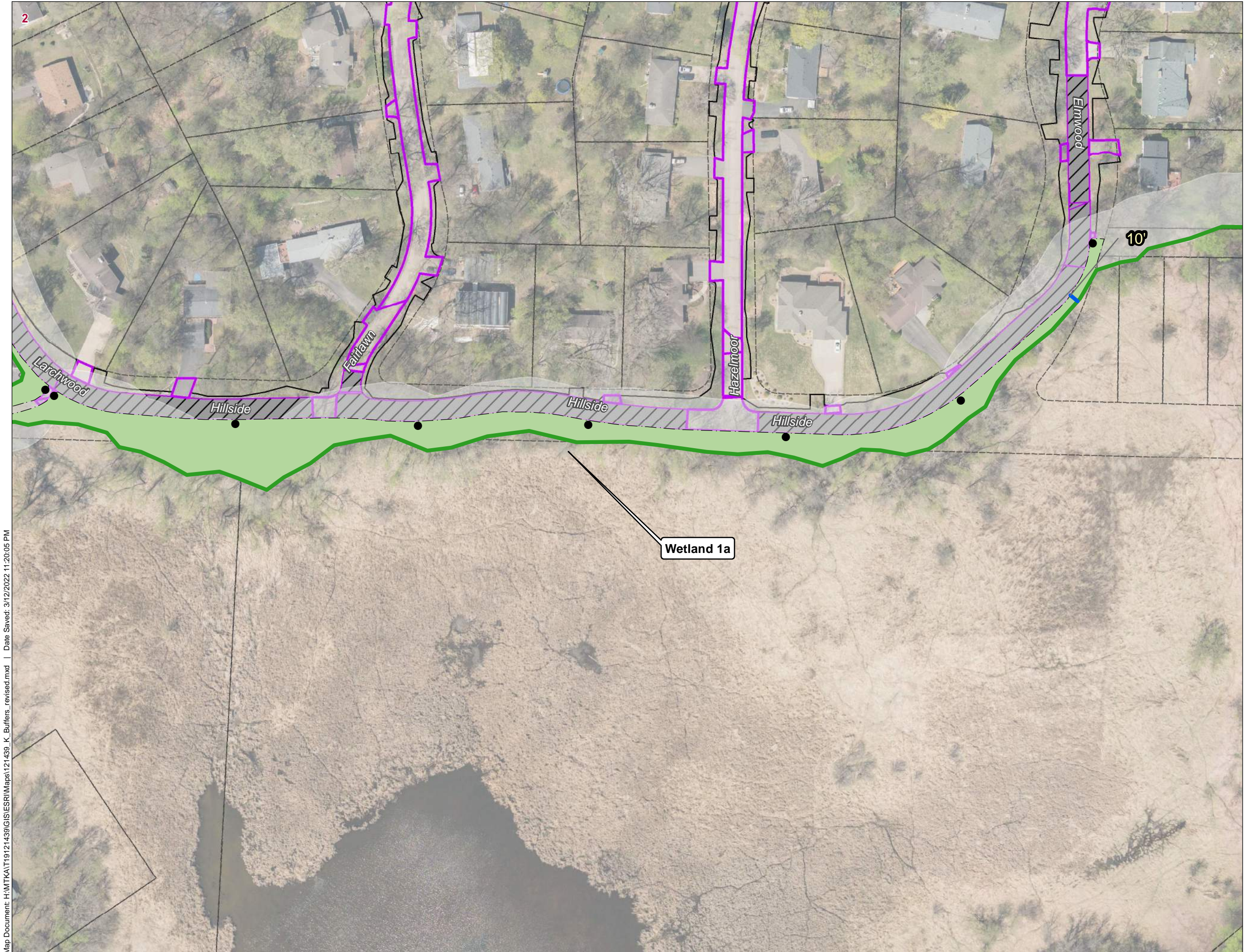
The residential development and associated roadways were constructed along these existing alignments around the 1940s and 1950s, before wetland conservation was considered.

- 1.6 In light of all the above factors, whether allowing the variance will serve the interests of justice.*

As mentioned above, the existing roadway width, and thus buffer width, are proposed to remain unchanged in the existing versus proposed condition. The proposed rehabilitation is proposed little to no impact to the buffer and surrounding wetlands while still achieving the goal of street and watermain rehabilitation. Elimination or relocation of Larchwood Drive and Hillside Terrace would greatly increase those impacts.

As recommended by City of Minnetonka staff, and given that there are 28 residents needing direct access to Larchwood Drive, 105 residents the rely on it to provide access for emergency vehicles, and an even greater number that depend on the watermain connection under it, it would seem prudent that the road rehabilitation and resurfacing be allowed to be performed with the existing and proposed wetland buffers such that those residents are able to get the basic services they need. Without this variance, the proposed project cannot continue to provide those services.

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Legend

- Minimum Buffer Widths
- Wetland Buffer
- Required Buffer Widths
- Surface Reconstruct
- Surface Rehab/Exempt*
- Construction Footprint
- Minnetonka Parcels
- Buffer Signs

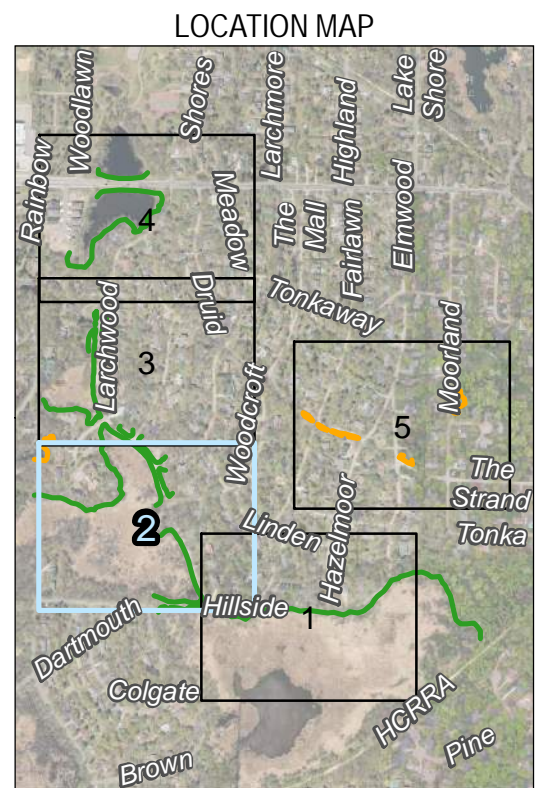
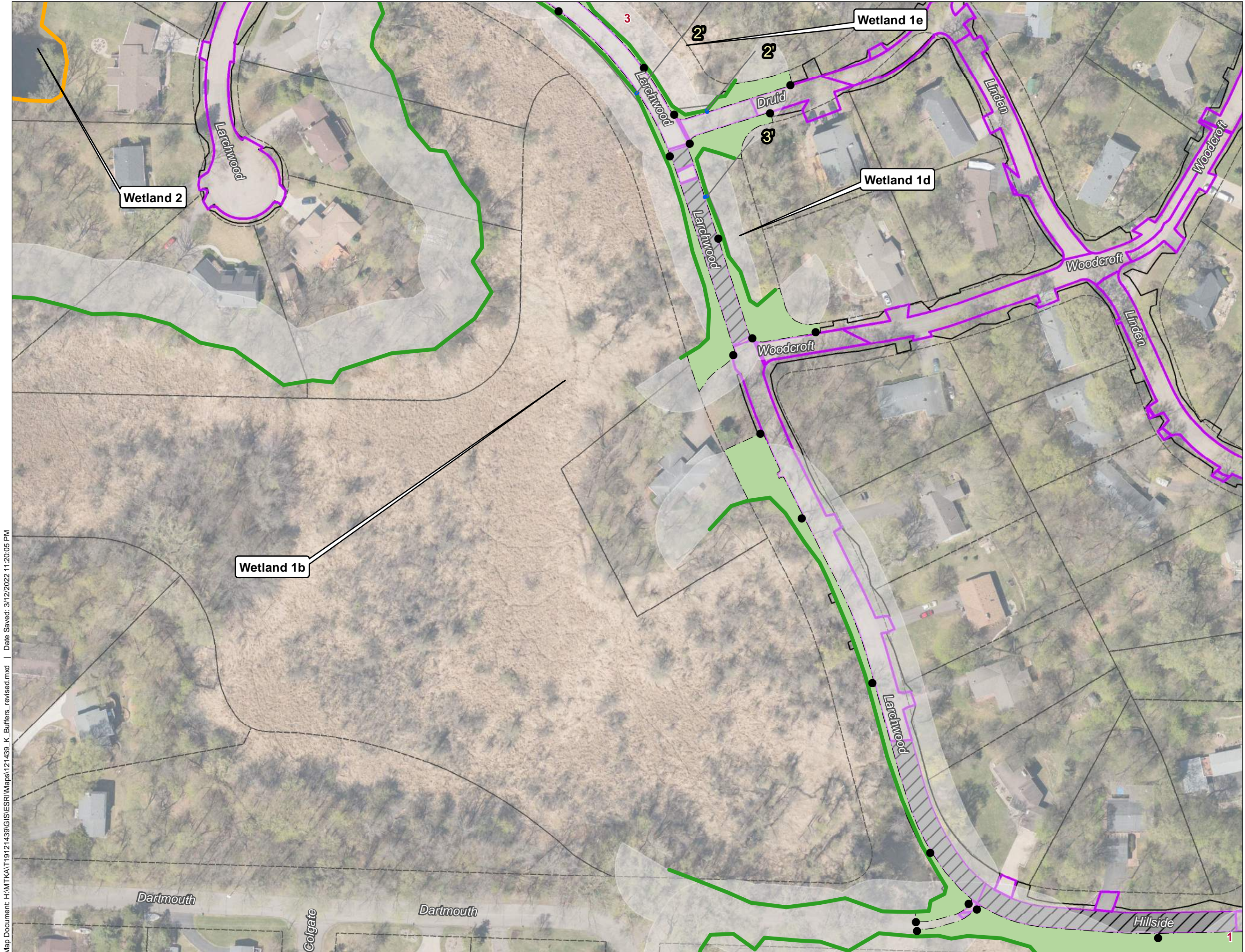
Wetland Classification

- High
- Medium
- Low

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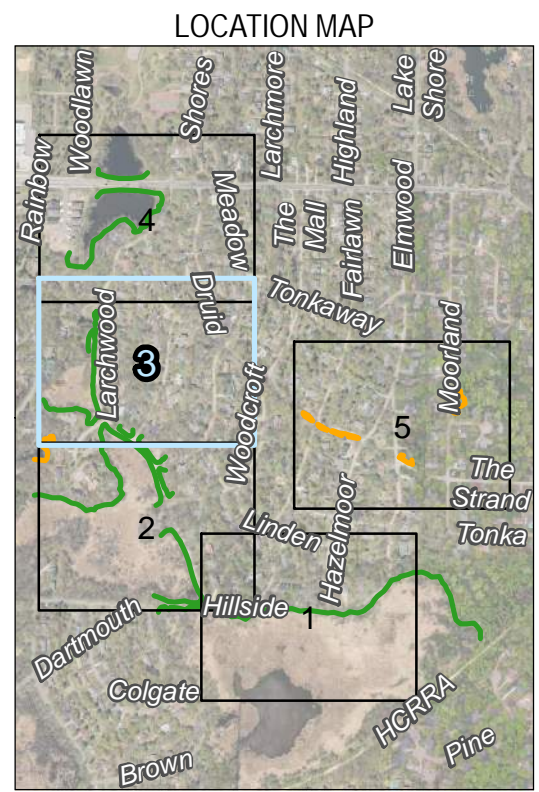
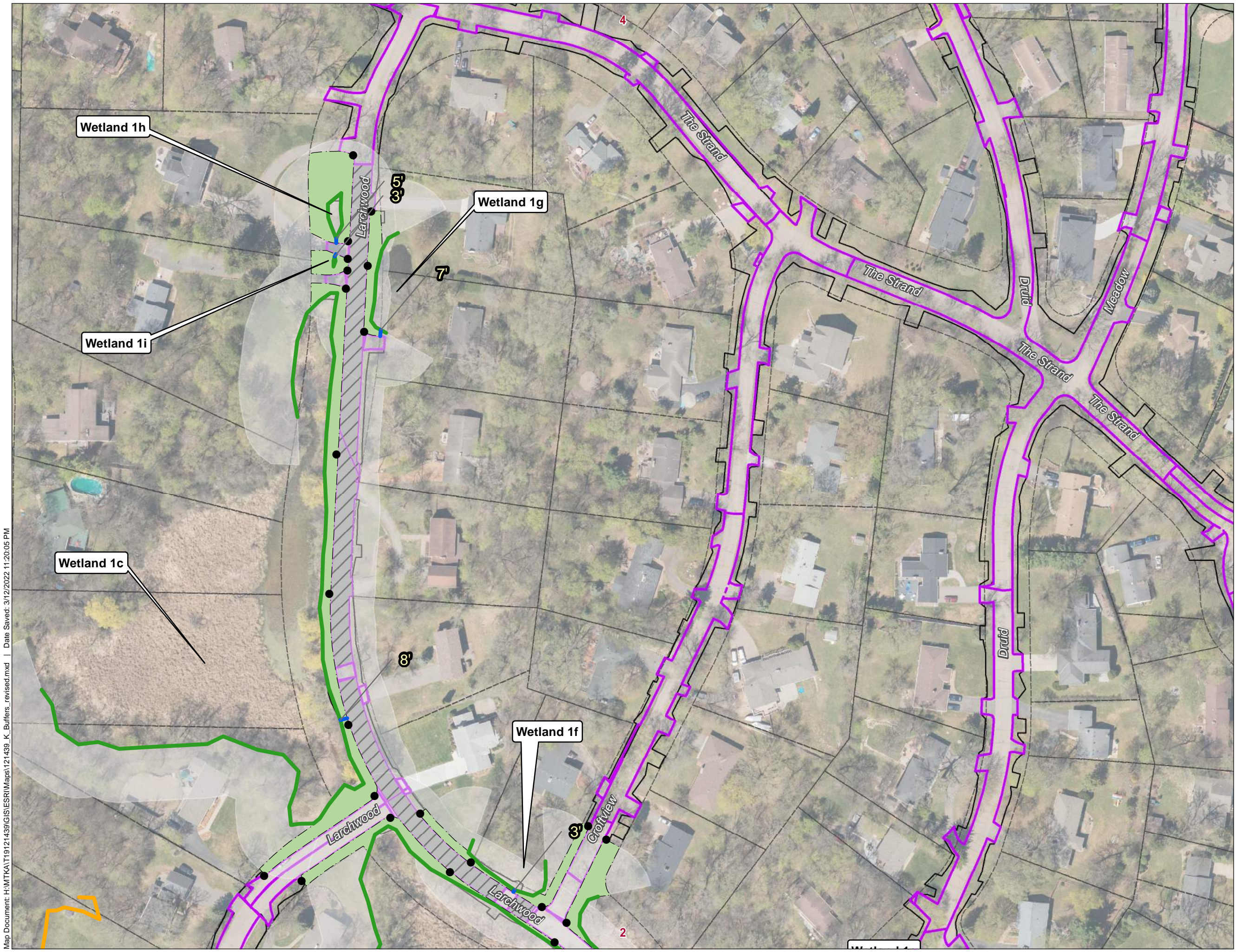
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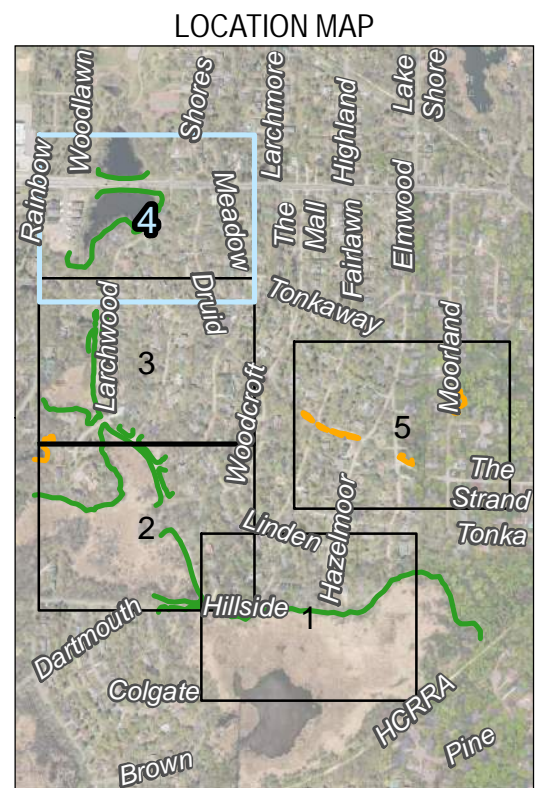
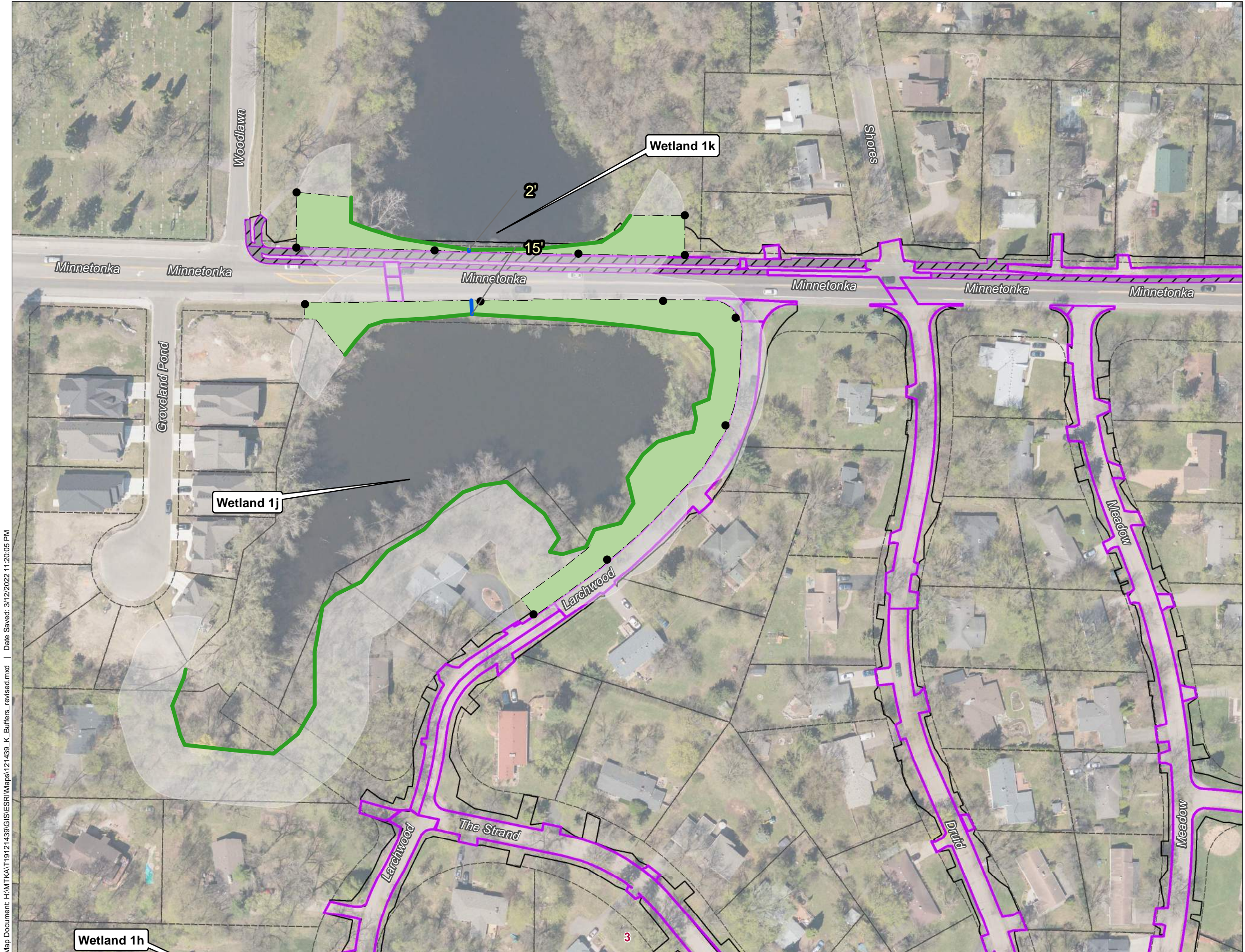
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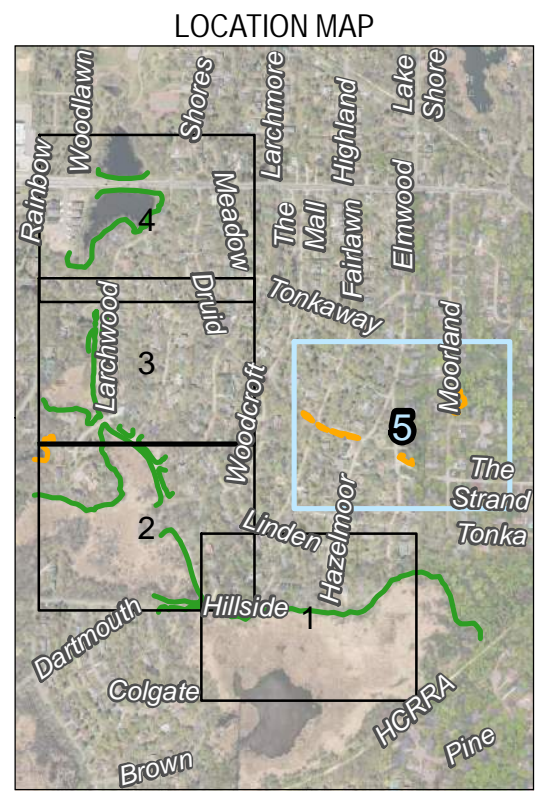
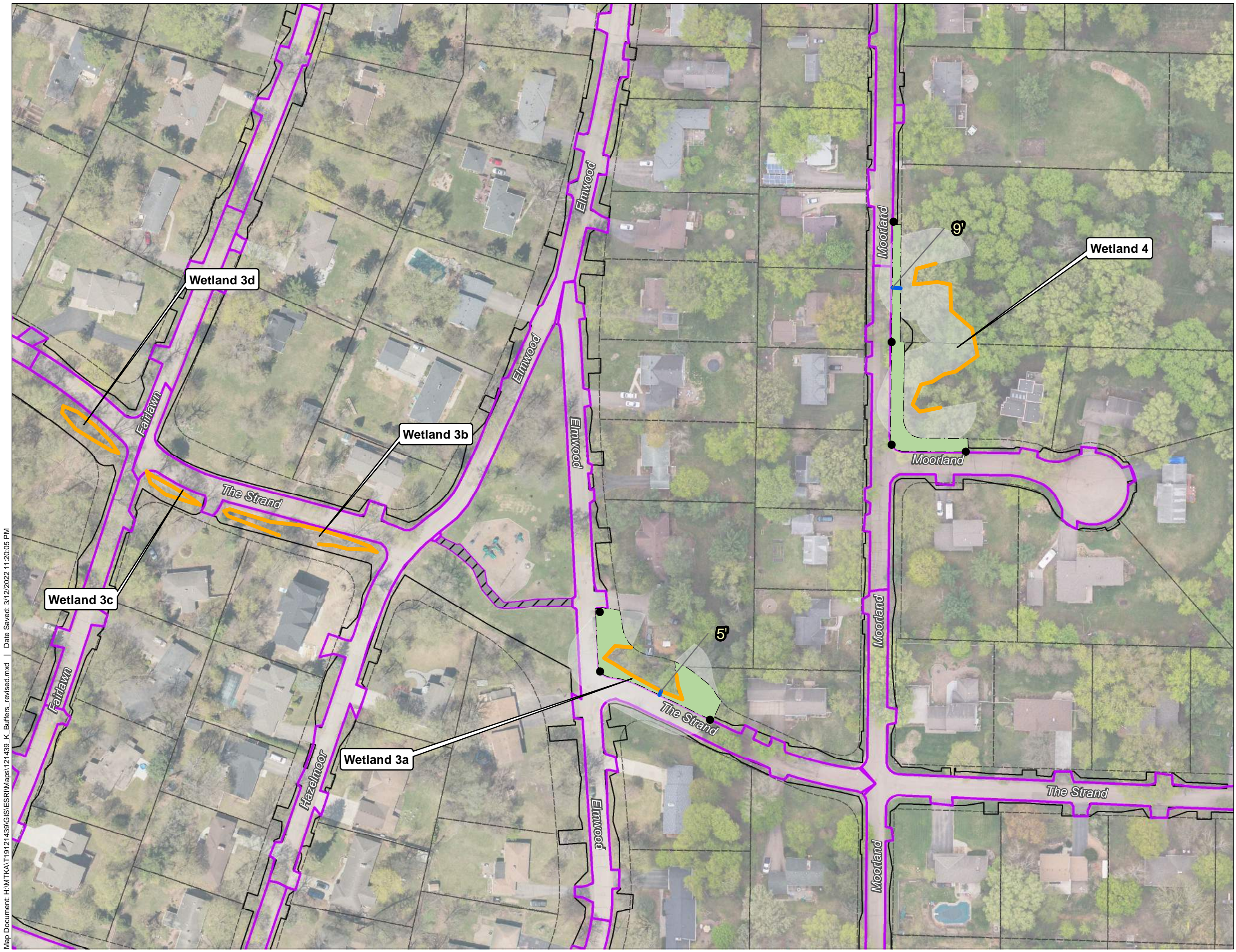
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- Wetland Buffer
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Wetland Classification

- High
- Medium
- Low

0 100 Feet

Appendix L: Low-Floor Elevation Analysis

Table 11: Stormwater Management Facilities Low Floor Elevation Assessment												
BMP Name	Street	Station	Description	100-Yr HWL	EOF Elevation	Building Low Floor Elevation	Ground Water Elevation at Bldg	Depth to Water Table at Bldg	Aquifer Condition	Distance From Building	Minimum Depth to Water Table	Comments
ADS Structures												
ADS-North	The Mall	230+00	MC-3500	953.12	952.08	949	943	6'	Sand	73'	5'	Exempt, GW elevation from GIS minimum spline, Floor elevation from LiDAR minus 8'
ADS-Middle	The Mall	227+00	SC-740	949.83	945.24	945	942	7'	Sand	82'	4'	Exempt, GW elevation from GIS minimum spline, Floor elevation from LiDAR minus 8'
ADS-South	The Mall	226+00	SC-740	949.43	944.72	947	941	6'	Sand	78'	4.5'	Exempt, GW elevation from GIS minimum spline, Floor elevation from LiDAR minus 8'
ADS-West	The Strand/Druid	44+00	MC-3500	944.17	934.2	946	939	9'	Silt	47'	7.5'	Exempt, GW elevation from GIS minimum spline, Floor elevation from LiDAR minus 8'
Infiltration Pipes												
IP-1	Croftview/The Strand	40+93	96 ft - 48" Pipe	943.99	942.11	941	935	6'	Sand	50'	7'	Not exempt. Min depth to water level for sand is 0.37'. GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IP-2	Meadow Ln	71+80	161 ft - 48" Pipe	943.29	940.40	942	940	2'	Sand	49'	7'	Not exempt. Min depth to water level for sand is 0.37'. GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IP-3	Woodcroft Drive	244+50	117 ft - 48" Pipe	954.90	954.21	949	939	10'	Sand	35'	9.5'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IP-4	Fairlawn Dr	138+87	98 ft - 48" Pipe	955.00	952.00	949	940	9'	Sand	38'	9'	Not exempt. Min depth to water level for sand is 0.37'. GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IP-5	Fairlawn Dr	147+06	74 ft - 48" Pipe	950.65	950.12	947	943	4'	Sand	58'	6'	Not exempt. Min depth to water level for sand is 0.35'. GW elevation from GIS minmum spline, floor elevation from LiDAR minus 8'
IP-6	Elmwood Place	9+51	101 ft - 48" Pipe	956.03	952.00	951	943	8'	Sand	44'	7.5'	Exempt, GW elevation from nearest soil boring, floor elevation from LiDAR minus 8'
IP-7	The Strand/Steele St	66+00	60 ft - 48" Pipe	942.36	937.39	940	921	19'	Silt	54'	6.5'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IP-8	The Strand/Steele St	67+00	72 ft - 48" Pipe	941.95	936.06	940	921	19'	Silt	51'	7'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IP-9	Larchwood/The Strand	36+28	40 ft - 48" Pipe	928.06	937.28	926	924	2'	Sand	92'	3.5'	Not exempt. Min depth to water level for sand is 0.33'. GW elevation from closest soil boring, floor elevation from LiDAR minus 8'
IP-10	Larchwood/The Strand	36+22	40 ft - 48" Pipe	931.18	928.03	926	924	2'	Sand	188'	0.5'	Not exempt. Min depth to water level for sand is 0.22'. GW elevation from closest soil boring, floor elevation from LiDAR minus 8'
IP-11	Moorland Road	97+00	45 ft - 48" Pipe	942.16	942.16	938	932	6'	Sand	35'	9.5'	Not exempt. Min depth to water level for sand is 0.38'. GW elevation from GIS minimum spline, floor elevation from back yard LiDAR (Hennepin County olique imagery shows walkout basement)
IP-12	Larchwood/Minnetonka Blvd	236+50	20' - 48" Pipe	937.31	937.31	939	924	15'	Sand	99'	3'	Exempt, GW elevation from nearest soil boring, floor elevation from LiDAR minus 8'
Ponds/Filters												
Pond-1	The Strand	49+00	Wet Pond	945.46	945.94	948	943	5'	Silt	95'	3'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR (basement unlikely to be below garage - screen shot from Hennepin County Oblique Imagery attached)
Pond-2	Minnetonka Blvd	5+00	Infiltration Pond	931.56	932.00	940	924	16'	Sand	95'	3'	Exempt, GW elevation from nearest soil boring, floor elevation from LiDAR minus 8'
Swale-1	The Strand	51+00	Biofiltration	945.46	945.94	948	943	5'	Silt	48'	7.5'	Not exempt. Min depth to water level for silt is 1.6'. GW elevation from GIS minimum spline, floor elevation from LiDAR (walkout basement, picture from Hennepin County olique imaginery at
Swale-2	The Strand	54+00	Biofiltration	945.62	945.03	940	944	4'	Sand	115'	3'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
KR-1	Moorland Road	96+50	Kraken Filter	939.80	939.2	936	925	11'	Sand	78'	4'	Exempt. The curb is the EOF that will discharge into the wetland in a 100-year event. GW elevation estimated from GIS minimum spline, floor elevation from LiDAR minus 8'
KR-2	Druid Lane	200+25	Kraken Filter	922.12	922.12	917	914	3'	Sand	59'	6'	Not exempt. Min depth to water level for sand is 0.35'. GW elevation from nearest soil boring, floor elevation from LiDAR minus 8'. BMP. Station is estimated.
KR-3	Hazelmoor	262+20	Kraken Filter	948.18	948.18	940	937	3'	Silt	90'	3.5'	Not exempt, Min depth to water level for silt is 1.0'. GW elevation from nearest soil boring
Infiltration Manholes												
IM-1/1A	Croftview	170+44.5	6' Diam MH	929.06	929.06	921	913	8'	Sand	38'	9'	Not exempt. Min depth to water level for sand is 0.38'. GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'.
IM-2/2A	Croftview	170+44.55	6' Diam MH	928.82	928.82	921	913	8'	Sand	58'	6'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-3/3A	Woodcroft Drive	237+74	6' Diam MH	924.60	924.60	923	913	10'	Sand	74'	5'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-4/4A	Woodcroft Drive	238+08	6' Diam MH	925.23	925.23	923	913	10'	Sand	51'	7'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-5/5A	Fairlawn Dr	132+83	6' Diam MH	924.55	924.55	923	913	10'	Sand	86'	4'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-6/6A	Fairlawn Dr	135+00	6' Diam MH	949.94	949.94	946	922	24'	Sand	73'	5'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-7/7A	Fairlawn Dr	135+00	6' Diam MH	950.03	950.03	946	922	24'	Sand	56'	6.5'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-8/8A	Hazelmoor Place	251+92	6' Diam MH	915.92	915.92	909	905	4'	Sand	44'	8'	Not exempt. Min depth to water level for sand is 0.4'. GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'.
IM-9/9A	Hazelmoor Place	252+79	6' Diam MH	929.48	929.48	926	915	11'	Sand	62'	5.5'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-10/10A	Hazelmoor Place	254+28	6' Diam MH	941.71	941.71	934	922	12'	Sand	42'	9'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-11	Hazelmoor Place	256+00	6' Diam MH	954.69	954.69	950	932	18'	Sand	50'	5'	Exempt, GW elevation from GIS minimum spline, floor elevation from LiDAR minus 8'
IM-12/12A	Elmwood Place	311+00	6' Diam MH	916.75	916.75	917	915	2'	Sand	82'	4'	Not exempt. Min depth to water level for sand is 0.35'.
IM-13/13A	Elmwood Place	311+00	6' Diam MH	916.56	916.56	917	915	2'	Sand	60'	6'	Not exempt. Min depth to water level for sand is 0.38'.
IM-14/14A	Elmwood Place	313+35	6' Diam MH	946.07	946.07	939	929	10'	Sand	107'	3'	Exempt
IM-15/15A	Elmwood Place	313+35	6' Diam MH	946.65	946.65	939	929	10'	Sand	83'	4'	Exempt

Low Floor Elevation Assessment

Tonka Woodcroft Improvement Project

RPBCWD's J.3.6.b. Low-floor elevation rule requires that stormwater-management facilities:

1. Be constructed at an elevation that ensures that no adjacent habitable building will be brought into noncompliance with a standard in section J.3.6.

- OR -

2. Be constructed at a location and elevation set according to Appendix J-1. If Appendix J-1 is used, the lowest opening must be a minimum of 2 feet above the 100-year HW elevation or one foot above the emergency overflow.

The following summarizes the results of the assessment using Appendix J-1.

The groundwater elevation and lowest floor of adjacent buildings were reviewed for each of the best management practices (BMPs), including advanced drainage system (ADS) pipes, infiltration pipes (IP), infiltration manholes (IM), biofiltration swales, wet pond, infiltration pond, and Kraken filters. The data is summarized in Table 11.

The adjacent building for each BMP was determined by measuring the closest building to the BMP that also had the most similar elevation plane as the BMP. Exhibit L depicts the location of each of the buildings and the distance from the BMP. The floor elevation was estimated by using the LiDAR elevation data on the building minus eight feet to account for a basement. However, there were three exceptions. The buildings adjacent to Swale-1 and IP-11 have a walkout basement (Figure 1, Figure 2), so the LiDAR elevation was taken as the floor elevation. Another building adjacent to Pond-1 had a front garage (Figure 2), so the floor elevation was taken as the LiDAR elevation at the garage as it was unlikely a basement would be beneath it.

Soil borings were documented throughout the project area. The groundwater elevations from the soil borings were linearly interpolated from the closest nearby soil borings. For each BMP, the groundwater elevation used was either from an adjacent soil boring or an interpolated estimation.

The depth to the groundwater elevation was the difference between the low floor elevation and the groundwater elevation. The distance between the building and BMP and the depth to water table was used to determine if further evaluation was needed by evaluating Plot 1 in Appendix J.1 within the rules. If no further evaluation was needed, it was marked as Exempt in Table 11. If further evaluation was needed, then Plot 3 was used for areas with silt soils, and Plot 4 was used for areas with sand soils. The minimum permissible depth to water table was determined by comparing the distance between the BMP and building and the 4-6 feet pond increase line. All BMPs met the low floor elevation requirements.

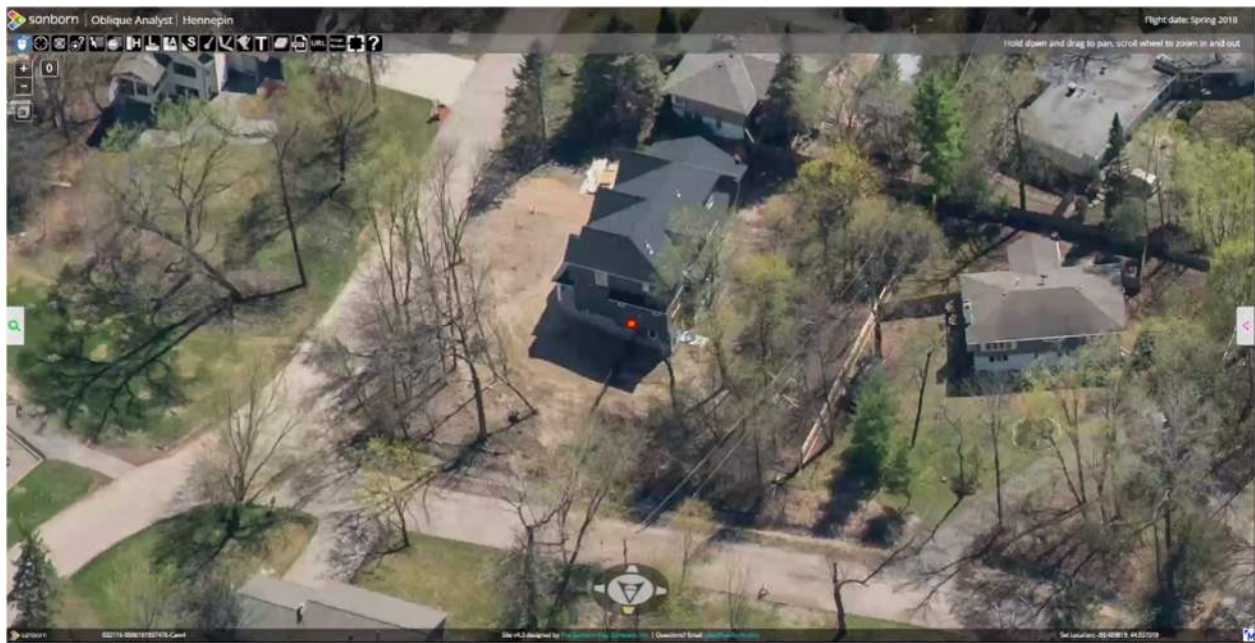


Figure 1. Building nearest Swale-1 with a walkout basement. Source: Hennepin County oblique imagery

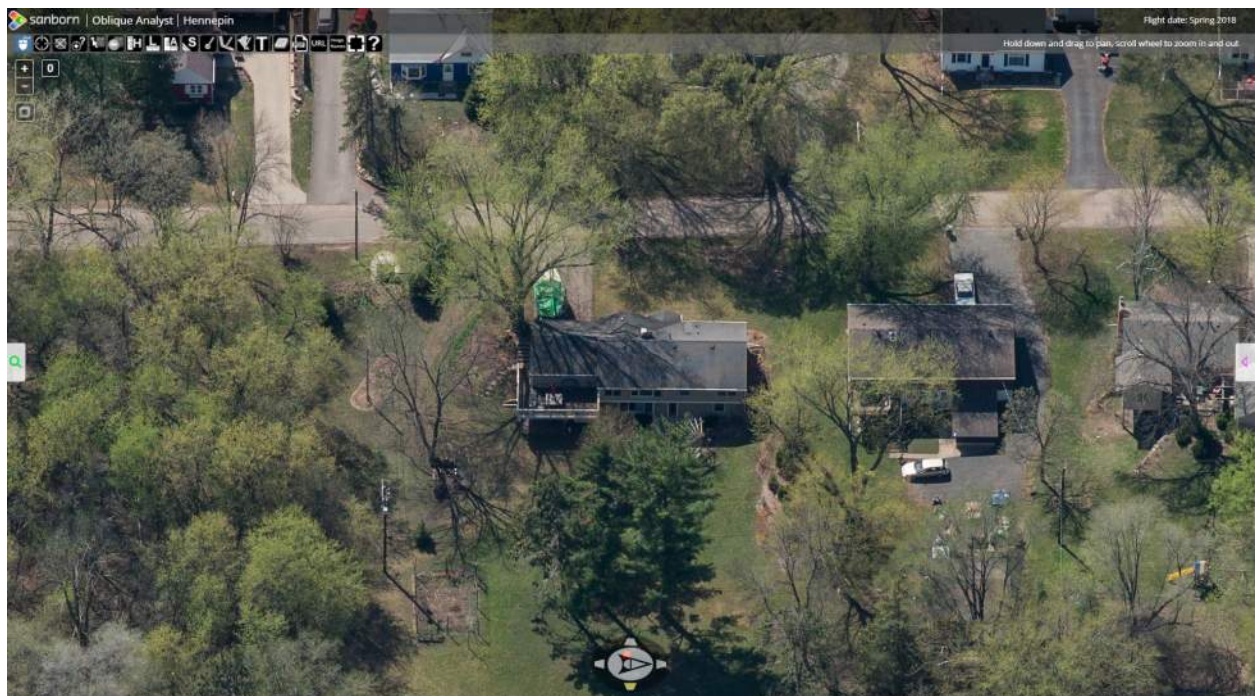


Figure 2. Building nearest IP-11 with a walkout basement. Source: Hennepin County oblique imagery

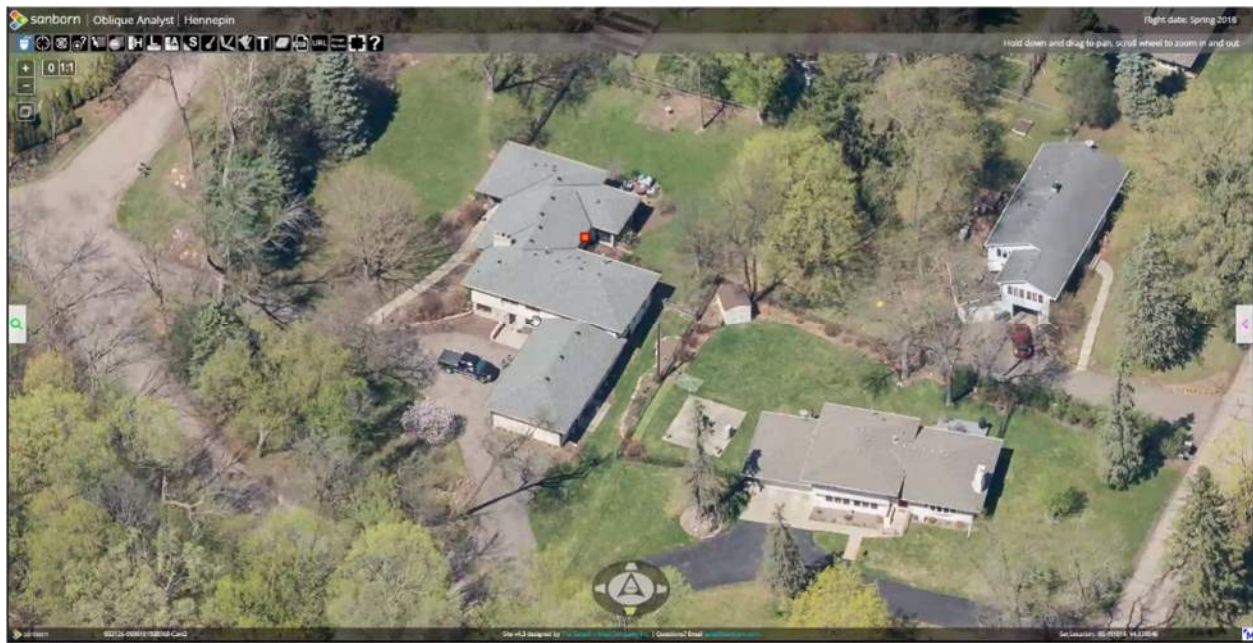
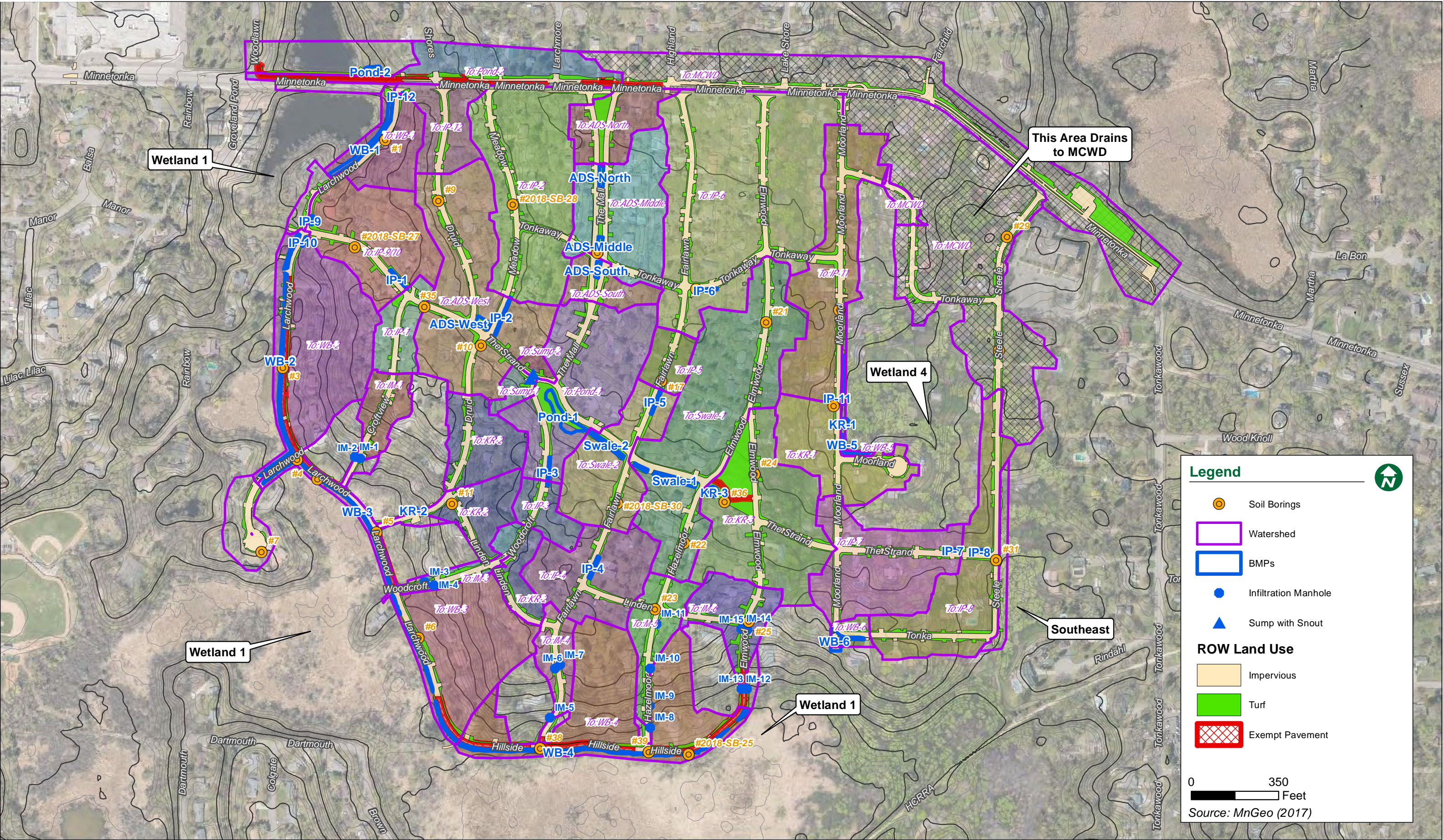


Figure 3. Building nearest to Pond-1 with a front garage. Source: Hennepin County oblique imagery



TONKA-WOODCROFT IMPROVEMENTS PROJECT

SANITARY SEWER, WATERMAIN, STORM SEWER, STORMWATER MANAGEMENT, TRAIL, AND STREET RECONSTRUCTION

JANUARY, 2022



MAP OF THE
CITY OF MINNETONKA
HENNEPIN COUNTY, MN

NOTE: EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY GOPHER STATE ONE CALL, 1-800-252-1166 OR 651-454-0002.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL C UNLESS OTHERWISE NOTED. THIS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."




MAP LEGEND

PROJECT LIMITS

<u>SHEET NUMBER</u>	<u>SHEET TITLE</u>
GENERAL	
G0.01 - G0.03	TITLE SHEET, LEGEND, GENERAL NOTES
G0.04	STAGING PLAN
G1.01 - G1.10	STATEMENT OF ESTIMATED QUANTITIES
CIVIL	
C0.00 - C0.30	EXISTING CONDITIONS, REMOVALS PLAN
C1.01 - C1.67	TABLES, DETAILS, TYPICAL SECTIONS, PHASING PLAN, STANDARD DETAIL PLATES, STANDARD PLANS
C2.00 - C2.33	SWPPP
C3.01 - C3.02	POND & DITCH GRADING PLAN
C4.01 - C4.58	SANITARY SEWER & WATER PLAN & PROFILE
C5.01 - C5.34	STORM SEWER PLAN & PROFILE
C6.00 - C6.117	STREET PLAN & PROFILE, INTERSECTION DETAILS
C7.01 - C7.06	SIGNING & STRIPING
C8.01 - C8.14	TRAFFIC CONTROL
C9.01 - C9.130	CROSS SECTIONS
LANDSCAPE	
L1.01 - L1.05	DITCH TREATMENT LAYOUT PLAN, DITCH PLANTING PLAN
THIS PLAN SET CONTAINS 515 SHEETS.	

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

 LIC. NO. 56110 DATE: 2/18/2022
MATTHEW A. BLAZER, P.E.

REVIEWED BY: *Mike Walter* LIC. NO. 48696 DATE: 2/18/2022
MICHAEL J. WALTMAN, P.E.

He. Olson DATE: 2/18/22
CITY OF MINNETONKA

Cara Stueve DATE: 2/22/2022
HENNEPIN COUNTY: COUNTY ENGINEER

Jessica J. Inouyewich DATE: 2/22/2022
HEMPDEN COUNTY: DESIGN DIVISION ENGINEER
(RECOMMENDED FOR APPROVAL)

✦ BM=938.97
TOP NUT HYDRANT
EA OF PARKING LOT @
3760 WILLISTON RD

PROJECT DATUM: HENNEPIN CO. COORD. SYSTEM
HORIZONTAL: NAD 83 (1986 ADJ.)
VERTICAL: NGVD 29

RECORD DRAWING
INFORMATION

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT

TITLE SHEET

GO.01



12224 NICOLLET AVENUE
BURNSVILLE, MINNESOTA 55337
Phone: (952) 890-0509
Email: Burnsville@bolton-menk.com
www.bolton-menk.com



DESIGNED	BS, AC, LW, J
DRAWN	BS, AC, LW, J
CHECKED	MRB
CLIENT PROJ. NO.	2022-003-EN

	NO.	ISSUED FOR	DATE
B			
B			
IG			

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P:\WORK\19121439\CD\CD\BOLMENK-121439-SWPPP INDEX.dwg 3/14/2022 10:25:14 AM



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MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2022



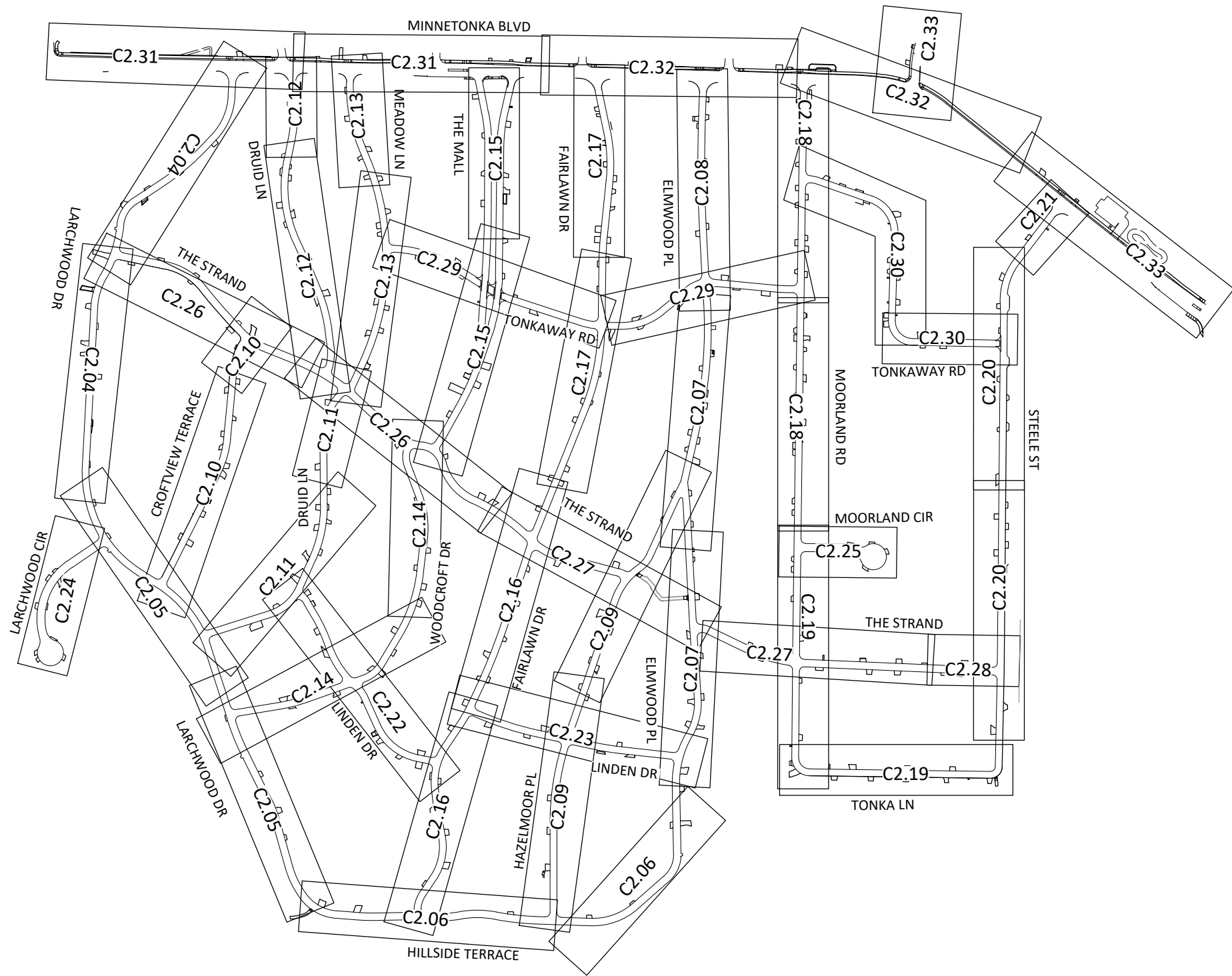
12224 NICOLLET AVENUE
BURNSVILLE, MINNESOTA 55337
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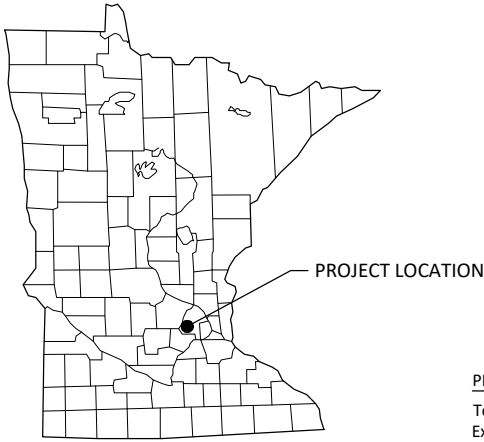
DESIGNED	NO.	ISSUED FOR	DATE
BS, AC, LW, JB	1	BID SET	2/23/2022
DRAWN		REV A	04/08/2022
BS, AC, LW, JB			
CHECKED			
MRB			
CLIENT PROJ. NO.			
2022-003-ENG			

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
STORMWATER POLLUTION PREVENTION PLAN
EROSION CONTROL PLAN SHEET INDEX

SHEET
C2.00



STORMWATER
POLLUTION PREVENTION
PLAN (SWPPP)
TONKA-WOODCROFT
IMPROVEMENTS
CITY OF MINNETONKA
HENNEPIN COUNTY, MINNESOTA



LEGEND

1-MILE BOUNDARY

IMPAIRED, SPECIAL OR PROTECTED WATERS

NATIONAL WETLANDS INVENTORY

RECEIVING WATERS

PROJECT AREAS:

Total Project Size (disturbed area) =	32.9	ACRES
Existing area of impervious surface =	18.3	ACRES
Post construction area of impervious surface =	19.0	ACRES
Total new impervious surface area created =	0.7	ACRES

Planned Construction Start Date:	5/1/2022
Estimated Construction Completion Date:	6/1/2024

PERMANENT STORMWATER MANAGEMENT SYSTEM:
Type of storm water management used if more than 1 acre of new impervious surface is created:

X	Wet Sedimentation Basin
X	Infiltration/Filtration
	Regional Pond
	Permanent Stormwater Management Not Required
Less than 1 acre of Impervious surface created	

PROJECT LOCATION:

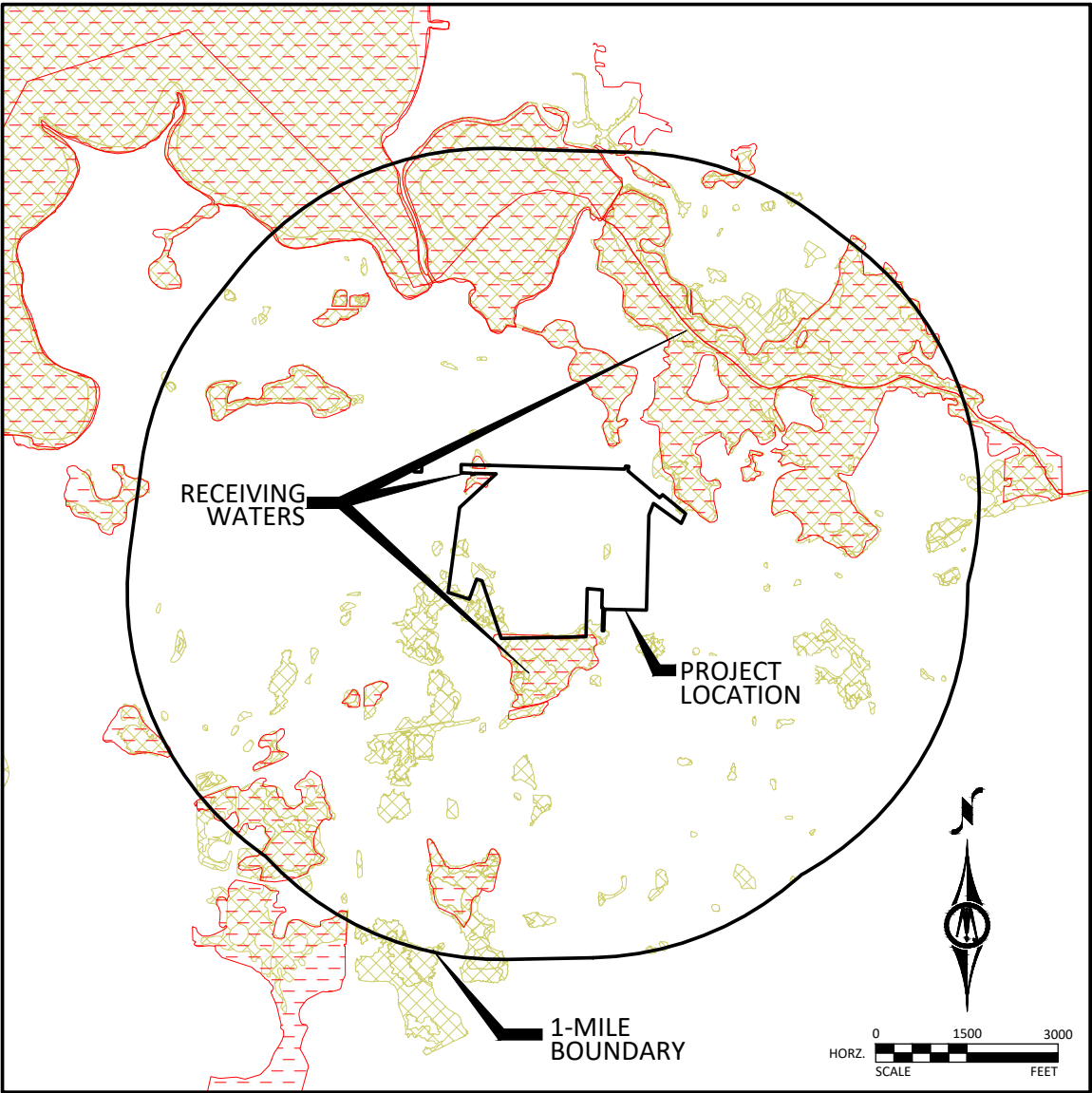
COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
Hennepin	117	22	17	44.93854°	-93.49129°

BMP SUMMARY	QUANTITY	UNIT
INSTALLED SILT FENCE, TYPE MS	17581	LF
SILT CURTAIN	334	LF
STORM DRAIN INLET PROTECTION	242	EACH
STABILIZED CONSTRUCTION ENTRANCE	23	EACH
RIP RAP, TYPE 3	313	CY
DITCH CHECK	33	EACH
SOD	57434	SY
EROSION CONTROL - BLANKET, TYPE 3N	3365	SY
HYDRO MULCH & SEED	10153	SY
STREET SWEEPER WITH PICKUP BROOM	548	HOURL

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Water main, sanitary sewer, storm sewer addition/replacement, bituminous trail construction, concrete curb & gutter, bituminous pavement reclamation, temporary erosion and sediment control, and permanent stabilization.

This project is located in both the Riley Purgatory-Bluff Creek Watershed District (RPBCWD) and the Minnehaha Creek Watershed District (MCWD). The new impervious area is less than 1 acre and therefore does not exceed the stormwater management criteria for the NPDES construction permit. The linear project creates more than 10,000 sq. ft. of impervious surface and thus triggers requirement of stormwater management based on the RPBCWD stormwater management rules. Stormwater BMP's to be installed with this project to meet rate, volume and water quality standards include: Underground infiltration basins; biofiltration swales; manufactured treatment devices; sump manholes, and wetland buffers.

Runoff from the RPBCWD portion of the site discharges to the west and south into a series of wetlands that ultimately ends up in Purgatory Creek. Runoff from the MCWD portion of the site flows to the north into a large wetland prior to entering Minnehaha Creek.



RECEIVING WATERS:
Receiving waters, including surface water, wetlands, Public Waters, and stormwater ponds, within 1-mile of the project boundary are identified on the USGS 7.5 min quad map above. Receiving waters that are impaired, the impairment, and WLA are listed as follows. All specific BMPs relative to construction activities listed in the permit for special, prohibited, restricted, or impaired have been incorporated into this plan. All specific BMPs listed in approved TMDLs and those BMPs listed for construction related waste load allocations have also been incorporated.

NAME OF WATER BODY	TYPE (ditch, pond, wetland, lake, etc.)	Special, Prohibited, Restricted Water ¹	Flows to Impaired Water Within 1-Mile ²	USEPA Approved Construction Related TMDL ³
MINNEHAHA CREEK	CREEK	YES	YES	YES
27-760 P	WETLAND	NO	NO	NO
27-764 W	WETLAND	NO	NO	NO
Impairments: Benthic macroinvertebrate bioassessments; Chloride; Dissolved oxygen; Fecal Coliform; Fishes bioassessments				

¹ Special, prohibited, and restricted waters are listed in Section 23 of the MN Construction Stormwater General Permit (MNR100001).
² Identified as impaired under section 303 (d) of the federal Clean Water Act for phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.
³ Construction Related TMDLs include those related to: phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.

IMPLEMENTATION SCHEDULE AND PHASING: The Contractor is required to provide an updated schedule and site management plan meeting the minimum requirements of Section 1717 of the Minnesota Standard Specifications for Construction.

- 1) Submit SWPPP Updates to Engineer. Submittal shall include any requested changes to the SWPPP, including but not limited to: Trained Personnel, Locations for Stockpiles, Concrete Washout, Sanitation Facilities, Types and Locations of Erosion & Sediment Control. Failure to submit updates shall be considered acceptance of the SWPPP as designed with no changes.
- 2) Install perimeter sediment control, inlet protection, and construction exit.
- 3) Perform utility installation, grading operations and install/adjust storm sewer and bituminous street reclamation.
- 4) Add additional temporary BMPs as necessary during construction based on inspection reports.
- 5) Install curb and gutter.
- 6) Install bituminous surfaces.
- 7) Remove inlet protection.
- 8) Ensure final stabilization measures are complete.
- 9) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
- 10) Submit Notice of Termination (NOT) to MPCA. NOTE: The NOT must be submitted to MPCA before Final Stabilization is considered complete.

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

MATTHEW R. BLAZER
56110
DATE 1/20/2022



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DESIGNED BS, AC, LW, JB	NO.	ISSUED FOR BID SET	DATE 2/23/2022
DRAWN BS, AC, LW, JB	1	REV A	04/08/2022
CHECKED MRB			
CLIENT PROJ. NO. 2022-003-ENG			

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
STORMWATER POLLUTION PREVENTION PLAN
COVERSHEET

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Information contained in this SWPPP narrative sheet summarizes requirements of the GENERAL PERMIT AUTHORIZATION TO DISCHARGE STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM PROGRAM - Permit No: MN RI00001 (Permit) as they apply to this project. All provisions of the Permit including those not specifically cited herein shall apply to this project. The Contractor is responsible to be familiar with and comply with all conditions of the permit. The full text of the Permit is available at: <https://www.pca.state.mn.us/sites/default/files/wq-strm2-80a.pdf>

SWPPP AMENDMENTS AND SUBMITTALS

Contractor must prepare and submit to the Engineer a SWPPP amendment as necessary to include additional Best Management Practices (BMPs) to correct problems identified or address the following situations.

- Contact information and training documentation for Construction SWPPP Manager and BMP Installer,
- There is a change in construction method of phasing, operation, maintenance, weather or seasonal conditions not anticipated during the design of the SWPPP including but not limited to:
 - Types and/or Locations of BMPs
 - Material Storage and Spill Response
 - Fueling Plans
 - Locations for Stockpiles, Concrete Washout, and Sanitation Facilities and
 - Project Phasing
- It is determined that the SWPPP is not achieving objectives of minimizing pollutants in stormwater discharges associated with construction activity, or
- The SWPPP is not consistent with the terms and conditions of the permit.

The Contractor may implement SWPPP amendments immediately and is not required to wait for Engineer review of the submittal. The responsibility for completeness of SWPPP amendments and compliance with the Permit lies with the Contractor. Review, comment, or lack of comment by the Engineer on a SWPPP amendment shall not absolve the responsibilities of the Contractor in any way.

If a change order is issued for a design change the SWPPP amendment will be prepared by the Engineer and included in the change order.

In addition to SWPPP amendments, the Contractor shall submit to the Engineer Weekly Erosion and Sediment Control Schedule meeting the requirements of MnDOT 1717.

The Contractor shall keep copies of all SWPPP amendments, Weekly Erosion and Sediment Control Schedules, inspection logs, and maintenance logs with the field copy of the SWPPP. A PDF copy of these documents will be provided along with a copy of the final Field Copy of the SWPPP to the Engineer along with the signed Notice of Termination when final stabilization is complete.

EROSION PREVENTION PRACTICES

Stormwater conveyance channels shall be routed around unstabilized areas. Erosion controls and velocity dissipation devices shall be used at outlets within and along the length of any constructed conveyance channel.

The normal wetted perimeter of all ditches or swales, including storm water management pond slopes, that drain waters from the site must be stabilized within 200' of any property edge or discharge point, including storm sewer inlets, within 24 hours of connection.

Temporary or permanent ditches or swales used as sediment containment during construction do not need to be stabilized during temporary period of use and shall be stabilized within 24 hours after no longer used as sediment containment.

Mulch, hydromulch, tackifier, or similar practice shall not be used in any portion of the wetted perimeter of a temporary or permanent drainage ditch or swale section with a continuous slope of greater than 2 percent.

Energy dissipation shall be installed at all temporary or permanent pipe outlets within 24 hours of connection to a surface water or permanent stormwater treatment system.

The Contractor shall phase construction and use construction methods to the extent practical to minimize exposed soils. The project phasing shall be documented in the Weekly Erosion and Sediment Control Schedule.

SEDIMENT CONTROL PRACTICES

Down gradient BMPs including perimeter BMPs must be in place before up gradient land- disturbing activities begin and shall remain in place until final stabilization.

All BMPs that have been adjusted or removed to accommodate short-term activities shall be re-installed or replaced the earlier of the end of the work day or before the next precipitation event even if the activity is not complete.

Inlet BMPs may be removed for specific safety concerns. The BMPs shall be replaced as soon as the safety concern is resolved. The removal shall be documented in the SWPPP as a SWPPP amendment.

Temporary stockpiles must have sediment control BMPs. The Contractor shall prepare and submit to the Engineer a SWPPP amendment showing the location of temporary stockpiles and the BMPs for each stockpile. The SWPPP amendment must meet the minimum requirements of Section 9 of the Permit.

Soil compaction shall be minimized and topsoil shall be preserved, unless infeasible or if construction activities dictate soil compaction or topsoil stripping.

The use of polymers, flocculants, or other sedimentation treatment chemicals are not proposed as part of this SWPPP as designed by the Engineer. If methods or phasing of construction require the use of any of these chemicals, the Contractor shall prepare and submit to the Engineer a SWPPP amendment that meets the minimum requirements of Section 9 of the Permit.

TEMPORARY SEDIMENTATION BASINS

A temporary sedimentation basin has not been included in this SWPPP as designed by the Engineer. If a basin is later determined to be desirable or necessary the Contractor shall prepare and submit to the Engineer a SWPPP amendment. Temporary sedimentation basins shall meet or exceed the minimum requirements of Section 14 of the Permit and shall include a basin draining plan meeting or exceeding the minimum requirements of Section 10 of the Permit. Where the site discharges to Special and/or Impaired Waters the SWPPP amendment shall also meet or exceed the minimum requirements of Section 23 of the permit.

DEWATERING

A dewatering plan has not been included in this SWPPP as designed by the Engineer. If dewatering is required for this project, the Contractor shall prepare and submit to the Engineer a SWPPP amendment. All dewatering shall meet or exceed the minimum requirements of Section 10 of the Permit.

POLLUTION PREVENTION

Products and materials that have the potential to leach pollutants that are stored on the site must be stored in a manner designed to minimize contact with stormwater. Materials that are not a source of potential contamination to stormwater or that are designed for exposure to stormwater are not required to be covered.

Hazardous materials including but not limited to pesticides, fertilizer, petroleum products, curing compounds and toxic waste must be properly stored and protected from stormwater exposure as recommended by the manufacturer in an access restricted area.

Solid waste must be stored, collected and disposed of in compliance with Minnesota Administrative Rules Chapter 7035.

Portable toilets must be positioned so that they are secure and will not be tipped or knocked over. Sanitary waste must be disposed of properly in accordance with Minn. R. CH 7041.

Exterior vehicle or equipment washing on the project site shall be limited to a defined area of the site. No engine degreasing is allowed on site. A sign must be installed adjacent to each washout facility that requires site personnel to utilize the proper facilities for disposal of concrete and other washout wastes.

The Contractor shall prepare and submit a SWPPP amendment detailing the location and BMPs proposed for storage of materials, solid waste, portable toilets, and exterior vehicle or equipment washing on the site. The SWPPP amendment shall include shall include a spill prevention and response plan that is appropriate for the materials proposed to be on the site. The SWPPP amendment sheet meet or exceed the minimum requirements of Section 12 of the Permit.

INSPECTION & MAINTENANCE

A trained person shall routinely inspect the entire construction site at the time interval indicated on this sheet of the SWPPP during active construction and within 24-hours after a rainfall event greater than 0.5 inches in 24 hours. Following an inspection that occurs within 24-hours after a rainfall event, the next inspection must be conducted at the time interval indicated in the Receiving Waters Table found on the SITE PLAN AND INFORMATION SHEET of the SWPPP.

All inspections and maintenance conducted during construction must be recorded on the day it is completed and must be retained with the SWPPP. Inspection report forms are available in the Project Specifications. Inspection report forms other than those provided shall be approved by the engineer.

The Contractor may request a change in inspection schedule for the following conditions:

- Inspections of areas with permanent cover to be reduced to once per month,
- Inspections of areas that have permanent cover and have had no construction activity for 12 months to be suspended until construction resumes,
- Inspections of areas where construction is suspended due to frozen ground conditions, inspections to be suspended until the earlier of within 24 hours of runoff occurring, or upon resuming construction.

No change in inspection schedule shall occur until authorized by the Engineer.

Inspections must include:

- All erosion prevention and sediment control BMPs and Pollution Prevention Management Measures to ensure integrity and effectiveness.
- Surface waters, including drainage ditches and conveyance systems for evidence of erosion and sediment deposition.
- Construction site vehicle exit locations, streets and curb and gutter systems within and adjacent to the project for sedimentation from erosion or tracked sediment from vehicles.
- Infiltration areas to ensure that no sediment from ongoing construction activity is reaching the infiltration area and that equipment is not being driven across the infiltration area.

All non-functioning BMPs and those BMPs where sediment reaches one-half (1/2) of the depth of the BMP, or in the case of sediment basins one-half (1/2) of the storage volume, must be repaired, replaced, or supplemented by the end of the next business day after discovery, or as soon as field conditions allow.

Permittees must repair, replace or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery, or as soon as field conditions allow.

Any sediment that escapes the site must be removed and the area stabilized within 7 calendar days of discovery unless precluded by legal, regulatory, or physical access in which case the work shall be completed within 7 calendar days of authorization. Paved surfaces such as streets shall have any escaped or tracked sediment removed by the end of the day that it is discovered. Sediment release, other than paved surfaces that can be cleaned up with street sweeping shall be reported immediately upon discovery to the Engineer.

PUBLIC WATER RESTRICTIONS:

For public waters that have been promulgated "work in water restrictions" during fish spawning time frames, all exposed soil areas that are within 200 feet of the water's edge, and drain to these waters must complete stabilization within 24-hours during the time period. MN DNR permits are not valid for work in waters that are designated as infested waters unless accompanied by an Infested Waters Permit or written notification has been obtained from MN DNR stating that such permit is not required. There is no exception for pre-existing permits. If a MN DNR Permit has been issued for the project and the water is later designated as infested, the Contractor shall halt all work covered by the MN DNR Permit until an Infested Waters Permit is obtained or that written notification is obtained stating that such permit is not required.

FINAL STABILIZATION

Final Stabilization is not complete until all the following requirements have been met:

- Substantial Completion has been reached and no ground disturbing activities are anticipated.
- Permanent cover has been installed with an established minimum uniform perennial vegetation density of 70 percent of its expected final growth. Vegetation is not required in areas where no vegetation is proposed by this project such as impervious surfaces or the base of a sand filter.

- Accumulated sediment has been removed from all permanent stormwater treatment systems as necessary to ensure the system is operating as designed.
- All sediment has been removed from conveyance systems
- All temporary synthetic erosion prevention and sediment control BMPs have been removed. BMPs designated on the SWPPP to remain to decompose on-site may remain.
- For residential construction only, permit coverage terminates on individual lots if the structures are finished and temporary erosion prevention and downgradient perimeter control is complete, the residence sells to the homeowner, and the permittee distributes the MPCA's "Homeowner Fact Sheet" to the homeowner.
- For agricultural land only (e.g., pipelines across cropland), the disturbed land must be returned to its preconstruction agricultural use prior to submitting the NOT.

SITE STABILIZATION COMPLETION:

Stabilization of exposed soils shall begin immediately and shall be completed after the construction activity has temporarily or permanently ceased no later than:	7 calendar days
--	-----------------

SITE INSPECTION INTERVAL:

A trained person shall routinely inspect the entire construction site during active construction at an interval of no less than:	7 calendar days
--	-----------------

SPECIAL ENVIRONMENTAL CONSIDERATIONS AND PERMITS:

1)	Was an environmental review required for this project or any part of a common plan of development or sale that includes all or any portion of this project?	NO
2)	Does any portion of the site have the potential to affect threatened or endangered species or their critical habitat?	NO
3)	Does any portion of this site discharge to a Calcareous fen.	NO
4)	Will any portion of the site potentially affect properties listed on the National Register of Historic Places or a known or discovered archeological site?	NO
5)	Have any Karst features have been identified in the project vicinity?	NO
6)	Is compliance with temporary or permanent stormwater management design requirements infeasible for this project?	NO
7)	Has the MN DNR promulgated "work in water restrictions" for any Public Water this site discharges to during fish spawning?	NO

TYPE OF PERMIT	PERMITTING AGENCY	PERMIT STATUS AND CONDITIONS
Construction Stormwater NPDES	MPCA	To Be Obtained
Watershed Permit	MCWD	To Be Obtained
Watershed Permit	RPBCWD	To Be Obtained

X:_Signatures-Seals\SWPPP Cards\Brady Nahkala2.jpg

SWPPP DESIGNER TRAINING DOCUMENTATION:

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<hr/>		
MATTHEW R. BLAZER		
LIC. NO. 56110	DATE	1/20/2022



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Email: Burnsville@bolton-menk.com
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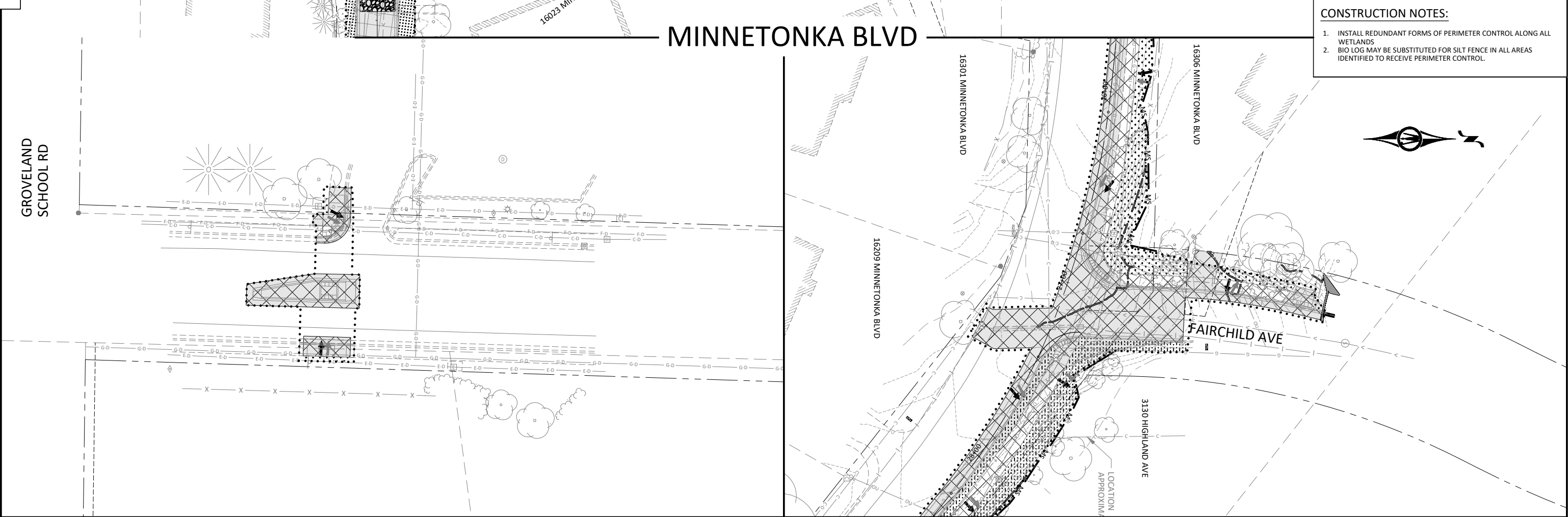
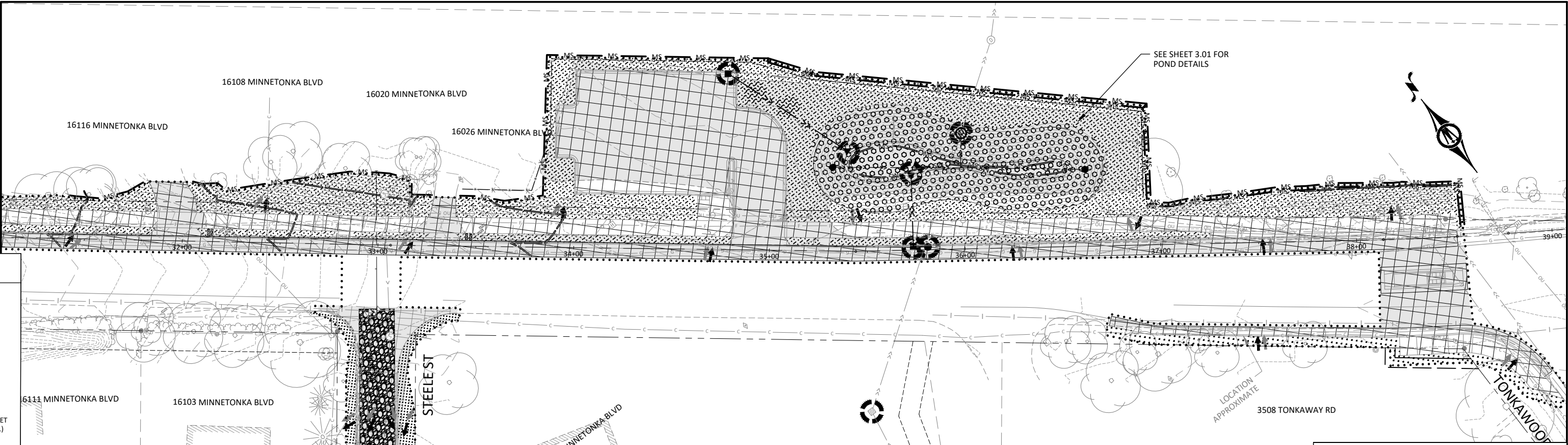


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CHECKED MRB			
CLIENT PROJ. NO.			
2022-003-ENG			

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
STORMWATER POLLUTION PREVENTION PLAN
NARRATIVE

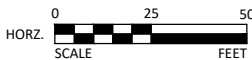
SHEET

C2.02



- CONSTRUCTION NOTES:**
1. INSTALL REDUNDANT FORMS OF PERIMETER CONTROL ALONG ALL WETLANDS
 2. BIO LOG MAY BE SUBSTITUTED FOR SILT FENCE IN ALL AREAS IDENTIFIED TO RECEIVE PERIMETER CONTROL.

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MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2021



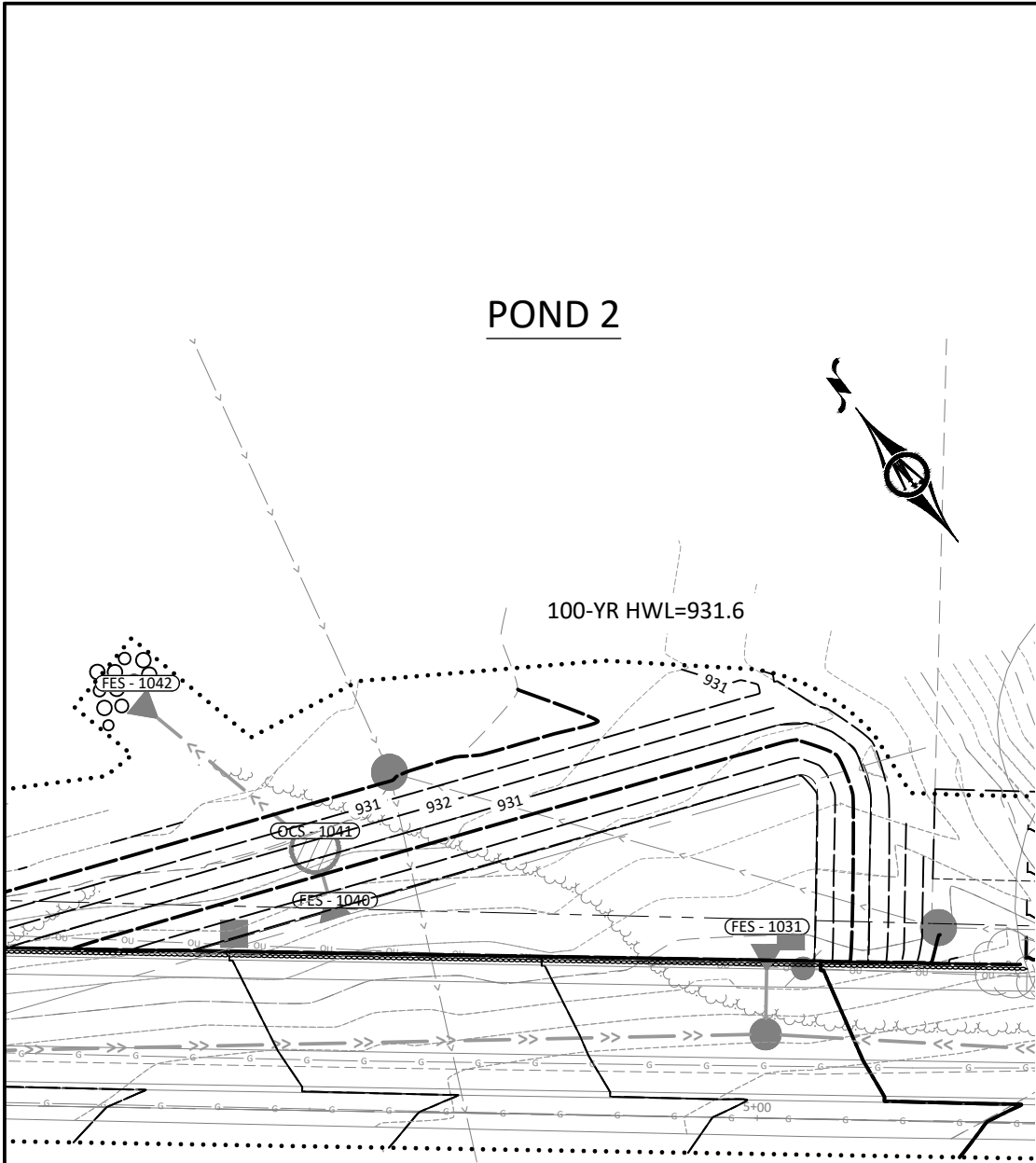
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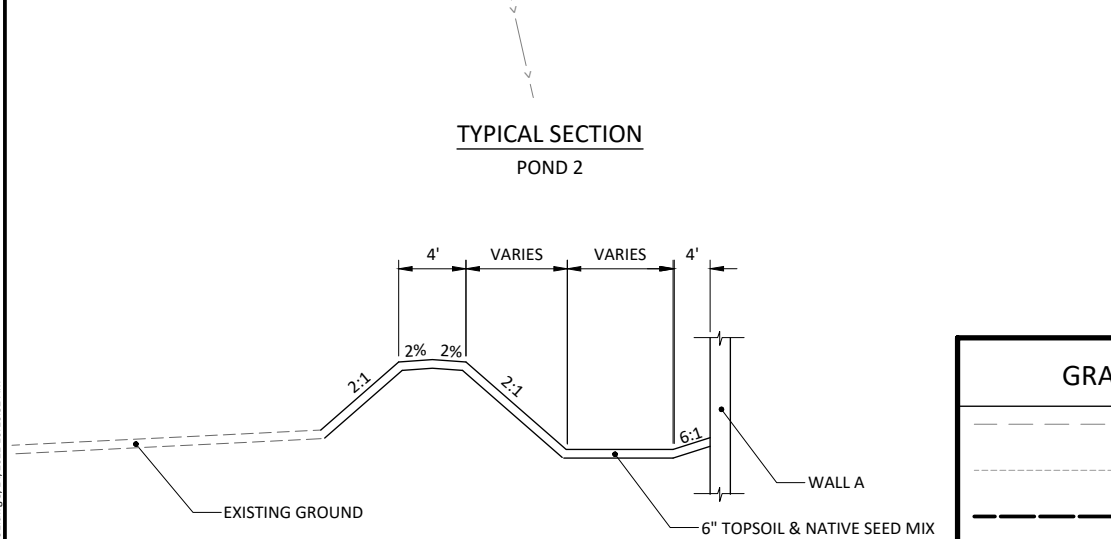
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CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
STORMWATER POLLUTION PREVENTION PLAN
MINNETONKA BLVD TRAIL

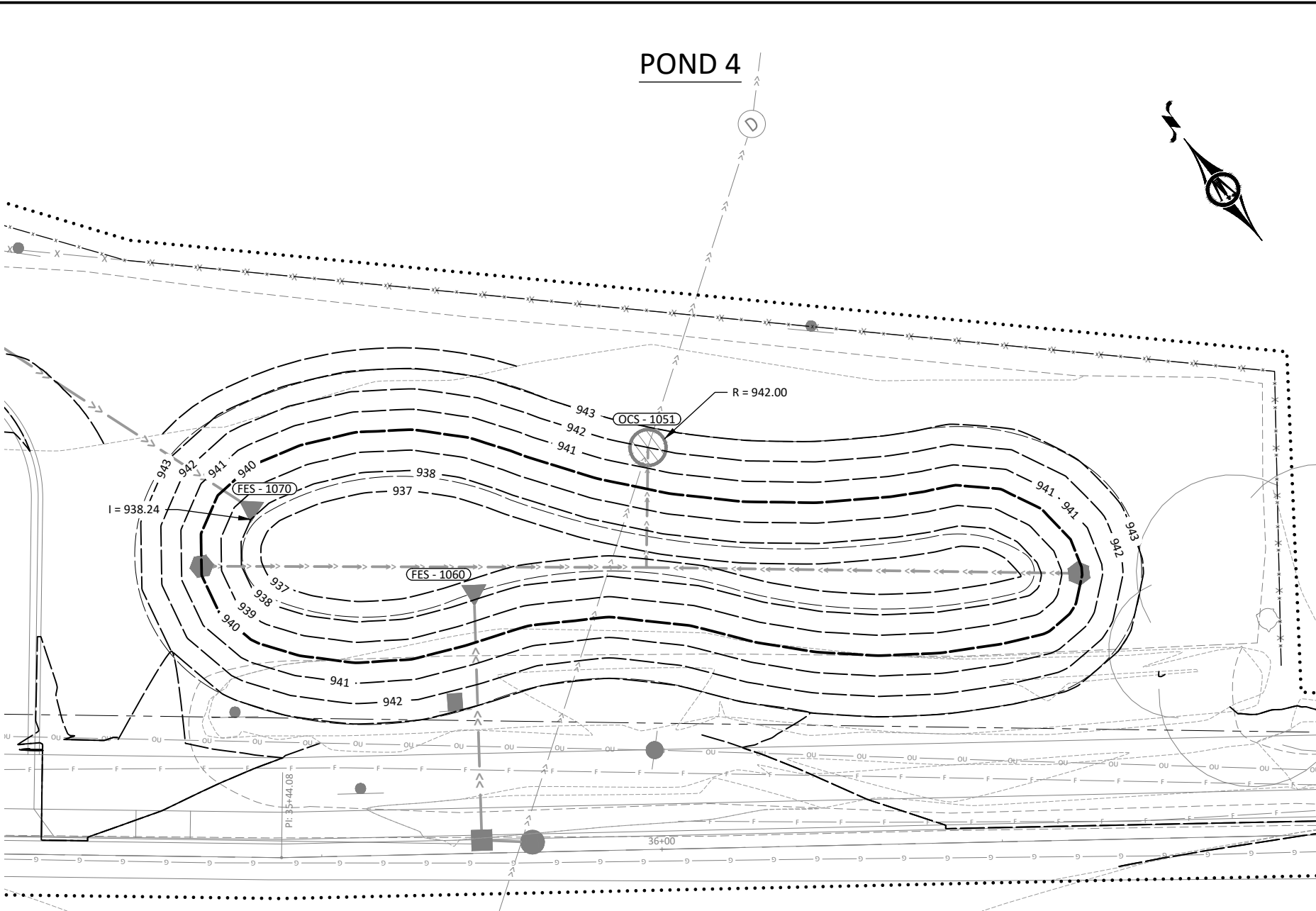
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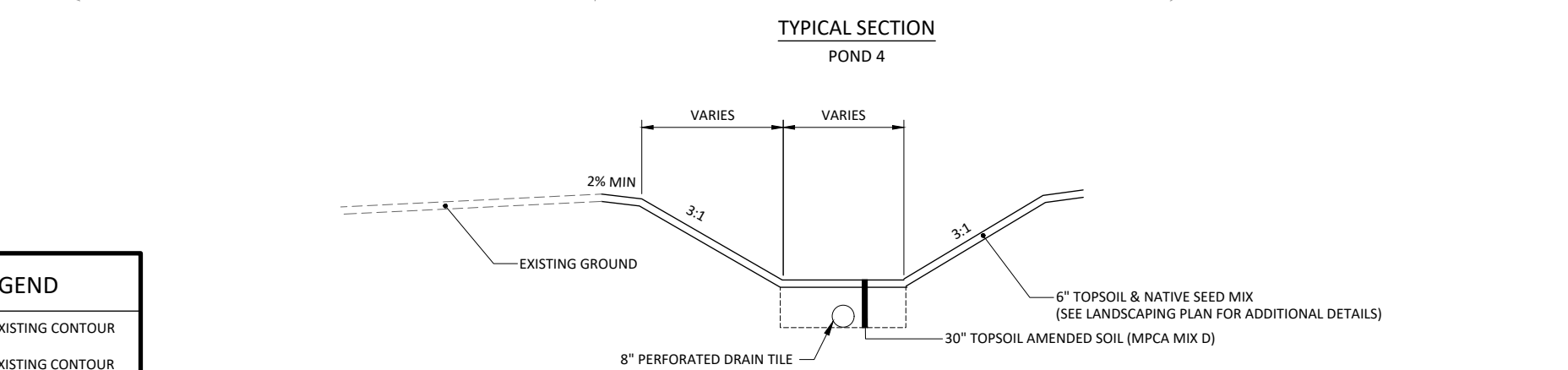
POND 2



TYPICAL SECTION
POND 2



POND 4

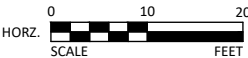


TYPICAL SECTION
POND 4

GRADING LEGEND	
	MAJOR EXISTING CONTOUR
	MINOR EXISTING CONTOUR
	MAJOR PROPOSED CONTOUR
	MINOR PROPOSED CONTOUR
	PROPOSED RETAINING WALL

- CONSTRUCTION NOTES
- MPCA MIX D SOIL RATIO RANGES, BY VOLUME, ARE:
 - COURSE SAND: 50% - 65%
 - TOPSOIL: 25% - 30%
 - COMPOST (ASSUMING MNDOT GRADE 2): 10%- 15%

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MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2022



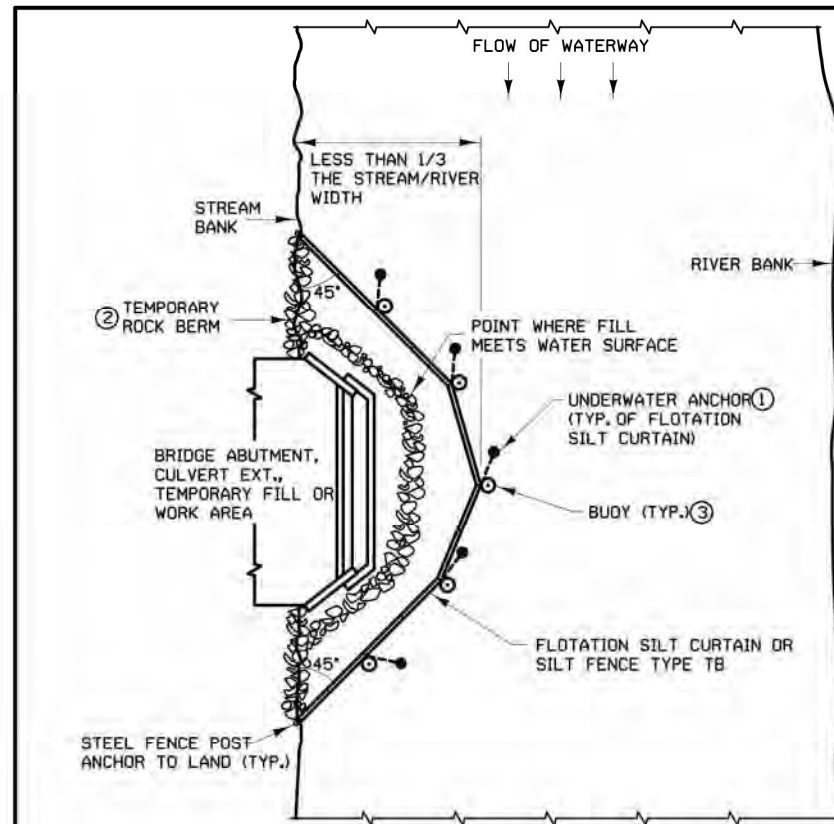
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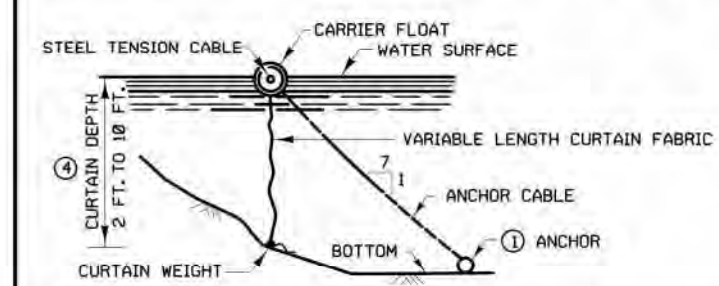
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CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
POND AND DITCH GRADING PLAN
MINNETONKA BLVD TRAIL PONDS

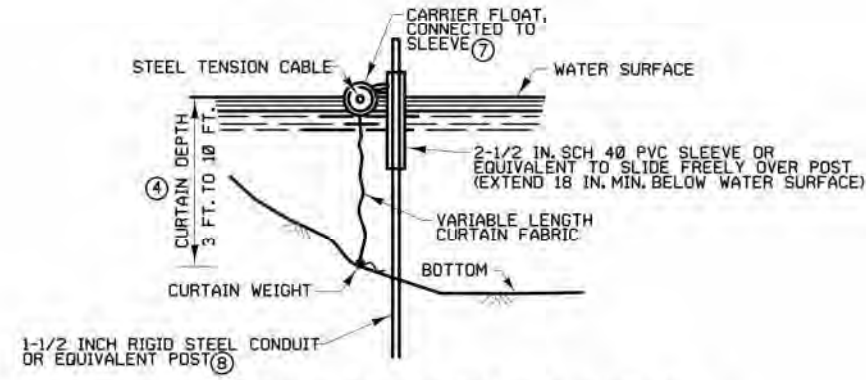
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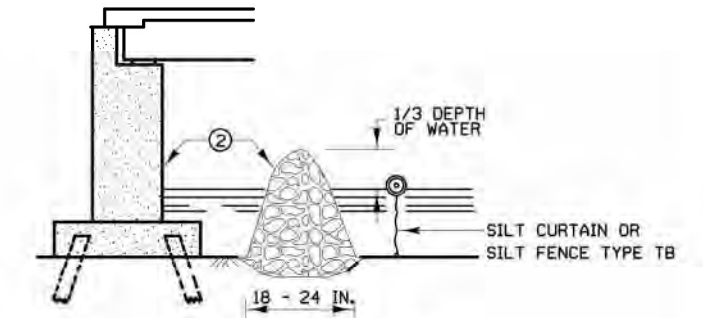
PLAN VIEW FOR STREAM⁵



PLAN VIEW FOR LAKE OR MARSH⁵



ALTERNATE FLOTATION SILT CURTAIN

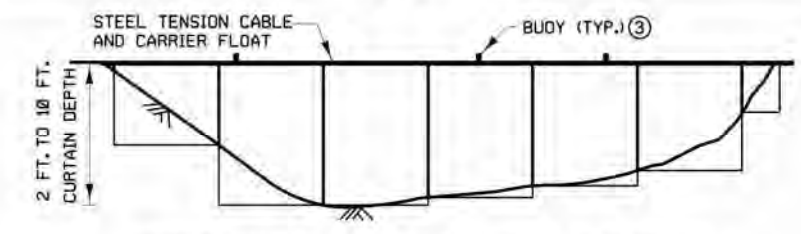


TEMPORARY ROCK BERM FOR SEDIMENT CONTROL

INSTALLATION GUIDELINES
SILT FENCE TYPE TB
MINIMUM WATER DEPTH: 1 FT.
MAXIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER VELOCITY: 5 FT./SEC.

INSTALLATION GUIDELINES⁴
FLOTATION SILT CURTAIN
TYPE: STILL WATER
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER DEPTH: 10 FT.
MAXIMUM WATER VELOCITY: 2 FT./SEC.
MAXIMUM WAVE HEIGHT: 1 FT.

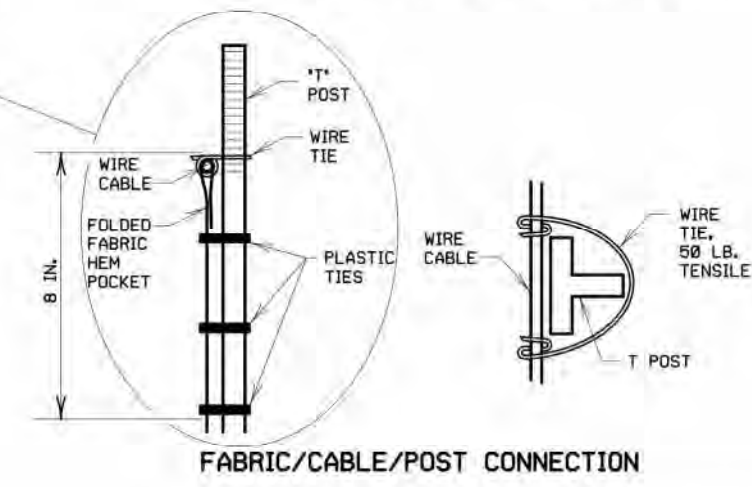
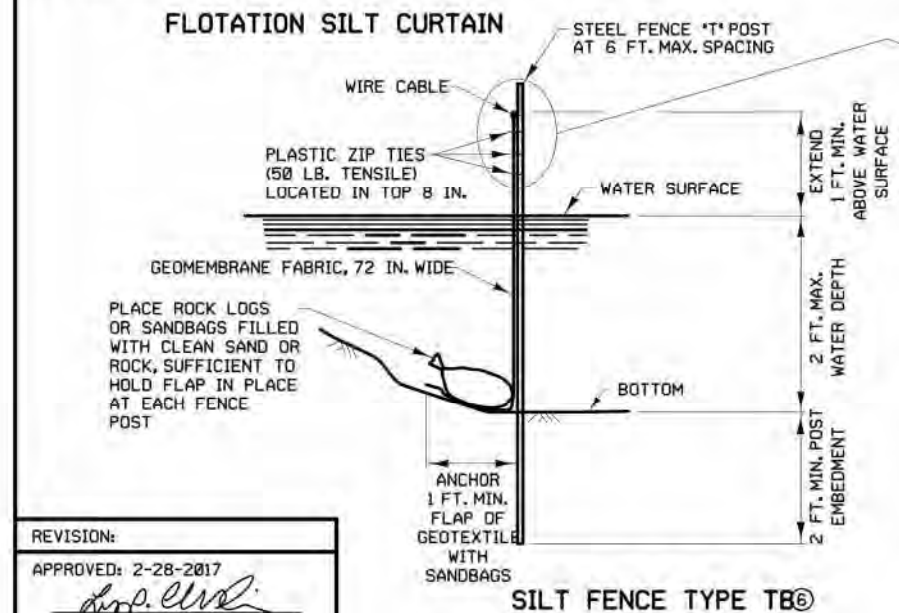
INSTALLATION GUIDELINES⁴
FLOTATION SILT CURTAIN
TYPE: MOVING WATER
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER DEPTH: 10 FT.
MAXIMUM WATER VELOCITY: 5 FT./SEC.
MAXIMUM WAVE HEIGHT: 2 FT.



FRONT VIEW FOR FLOTATION SILT CURTAIN

NOTES:

- SEE SPECS. 2573, 3886, 3887 & 3893.
- (1) FOR ANCHOR SPACING AND WEIGHT REQUIREMENTS, SEE SPEC. 2573.
- (2) IN AREAS WHERE THE PLAN CALLS FOR RIPRAP AT A BRIDGE, CULVERT, OR SLOPE, A TEMPORARY ROCK BERM CONSTRUCTED FROM THE RIPRAP CAN BE USED TO PROVIDE ADDITIONAL PROTECTION. WHEN THE WORK IS COMPLETE THE RIPRAP CAN THEN BE MOVED TO THE PERMANENT LOCATION INDICATED IN THE PLANS. THE TEMPORARY ROCK BERM IS INCIDENTAL.
- (3) ON U.S. COAST GUARD OR OTHER MOTORIZED WATERWAYS, BUOYS ARE REQUIRED TO MARK THE ENDS AND SPECIAL AREAS FOR VISIBILITY. PLACE BUOYS AS REQUIRED FOR NAVIGATIONAL PURPOSES.
- (4) MINIMUM WATER DEPTH APPLIES TO THE DEEPEST POINT ALONG THE FLOTATION SILT CURTAIN OR SILT FENCE TYPE TB FOR DETERMINING APPLICABILITY OF FLOTATION SILT CURTAIN OR SILT FENCE TYPE TB.
- (5) SILT CURTAIN SHOULD BE REMOVED WHEN THE AREA CONTRIBUTING DIRECT RUNOFF HAS BEEN TEMPORARILY OR PERMANENTLY STABILIZED. SILT CURTAIN SHOULD ALSO BE REMOVED BEFORE WINTER IF ICE UP OR ICE FLOW IS ANTICIPATED.
- (6) EMBED POST INTO BOTTOM A MINIMUM OF 40% OF THE WATER DEPTH (INCLUDING WAVE HEIGHT), BUT IN NO CASE SHALL EMBEDMENT BE LESS THAN 2 FEET.
- (7) ANCHOR FLOAT MUST BE CONNECTED SECURELY TO SLEEVE WITH A MINIMUM TENSILE STRENGTH OF 100 LBS. CONNECTION METHOD MUST ALLOW FOR SLEEVE TO MOVE FREELY ON POST.
- (8) PROVIDE SUFFICIENT NUMBER OF POST ANCHORS TO MAINTAIN SILT CURTAIN POSITION.



FABRIC/CABLE/POST CONNECTION

REVISION:
APPROVED: 2-28-2017
Chief Environmental Officer
CHIEF ENVIRONMENTAL OFFICER

m
MINNESOTA
DEPARTMENT OF
TRANSPORTATION

REVISED:
Tom Sh
APPROVED:
2-28-2017
STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL
SILT CURTAIN OR SILT FENCE TYPE TB
STANDARD PLAN 5-297.405
1 OF 8

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Matthew R. Blazer
MATTHEW R. BLAZER
56110
DATE: 1/20/2022

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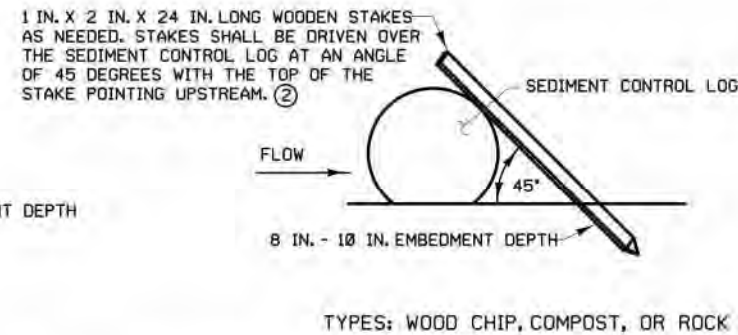
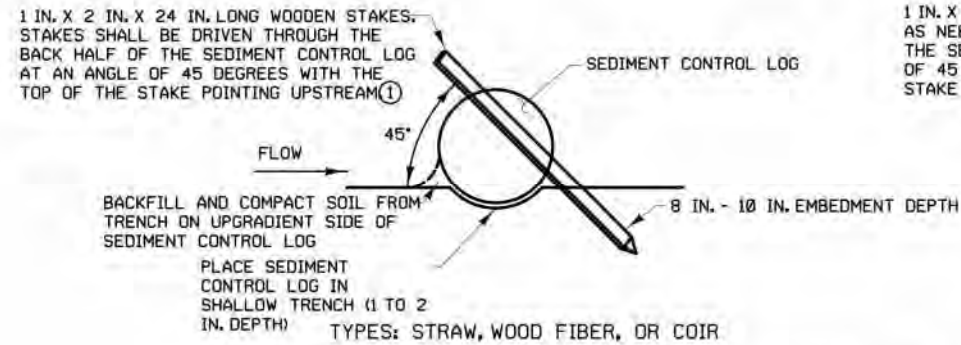
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CITY OF MINNETONKA

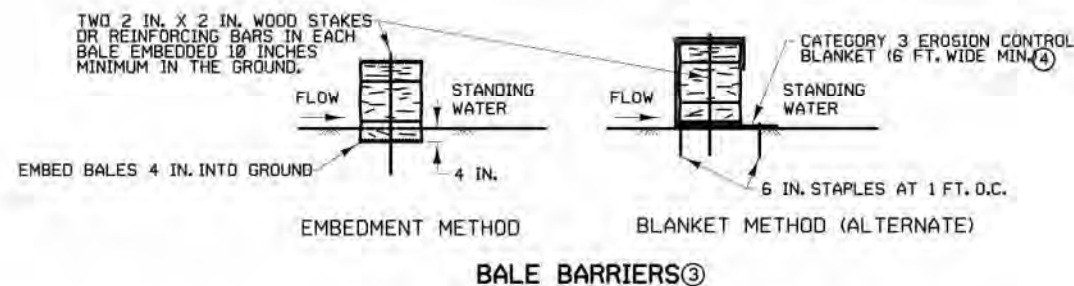
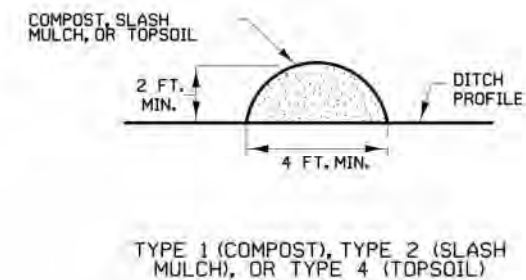
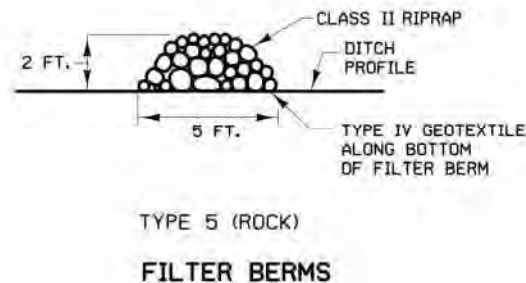
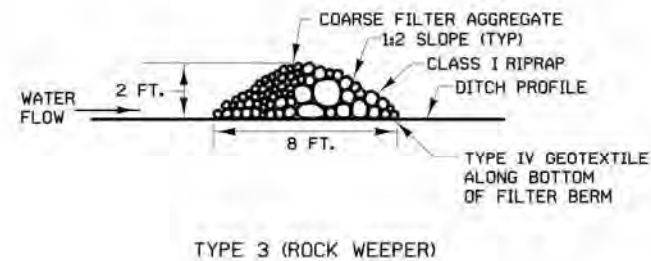
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2022-003-ENG

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
STANDARD PLATES & PLANS
TEMPORARY SEDIMENT CONTROL DETAILS

SHEET
C1.51



SEDIMENT CONTROL LOGS



NOTES:

SEE SPECS. 2573, 3149, 3874, 3882, 3886, & 3897.

- ① SPACE BETWEEN STAKES SHALL BE A MAXIMUM OF 1 FOOT FOR DITCH CHECKS OR 2 FEET FOR OTHER APPLICATIONS.
- ② PLACE STAKES AS NEEDED TO PREVENT MOVEMENT OF SEDIMENT CONTROL LOGS PLACED ON SLOPES OR AS NEEDED DUE TO OTHER FACTORS. STAKES SHALL BE INCIDENTAL.
- ③ TO BE USED FOR CRITICAL PERIMETER CONTROL AREAS WHERE STANDING WATER OCCURS (6 INCH MAX. DEPTH). BALES SHALL CONSIST OF TYPE 1 MULCH OF APPROXIMATELY 14 IN. X 18 IN. X 36 IN. LONG. BALES SHALL BE PLACED ON EDGE AND BUTTED TIGHT TO ADJACENT BALES.
- ④ INSTEAD OF TRENCHING, PLACE BALE ON THE BLANKET AND WRAP BLANKET AROUND THE BALE. PLACE STAKE THROUGH BALE AND BLANKET.

REVISION:

APPROVED: 2-28-2017

Matthew R. Blazer

CHIEF ENVIRONMENTAL OFFICER



REVISION:

APPROVED:

2-28-2017

STATE DESIGN ENGINEER

DESIGNED: BS, AC, LW, JB

DRAWN: BS, AC, LW, JB

CHECKED: MRB

CLIENT PROJ. NO. 2022-003-ENG

TEMPORARY SEDIMENT CONTROL

FILTER BERMS, SEDIMENT CONTROL LOGS, AND BALE BARRIERS

STANDARD PLAN 5-297.405

2 OF 8

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Matthew R. Blazer

MATTHEW R. BLAZER

56110

DATE 1/20/2022



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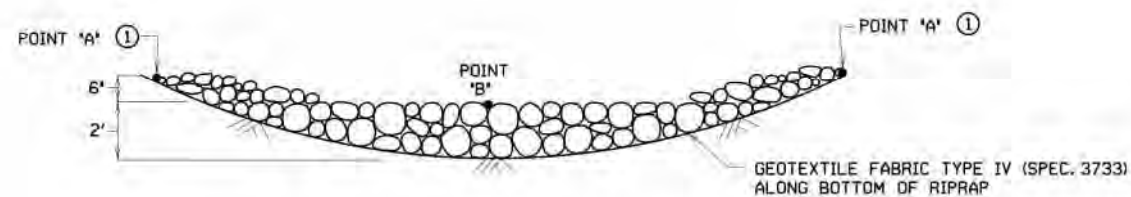
TONKA - WOODCROFT IMPROVEMENTS PROJECT

STANDARD PLATES & PLANS

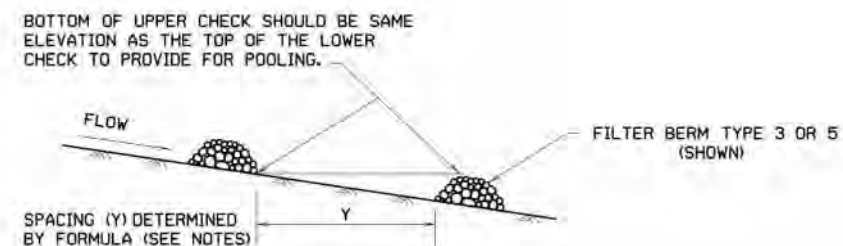
TEMPORARY SEDIMENT CONTROL DETAILS

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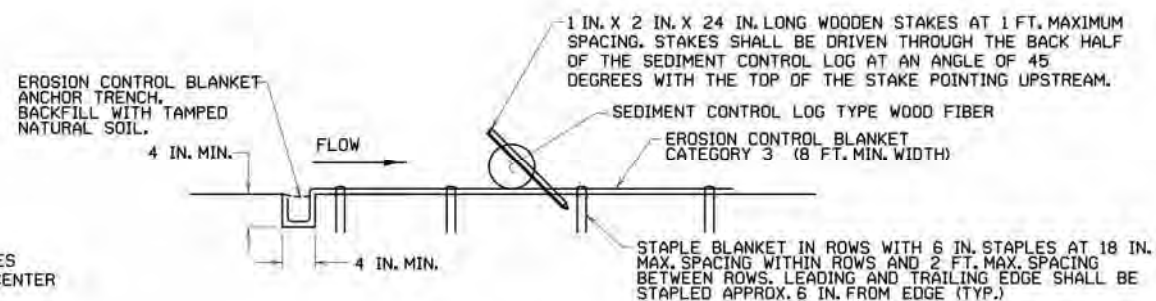
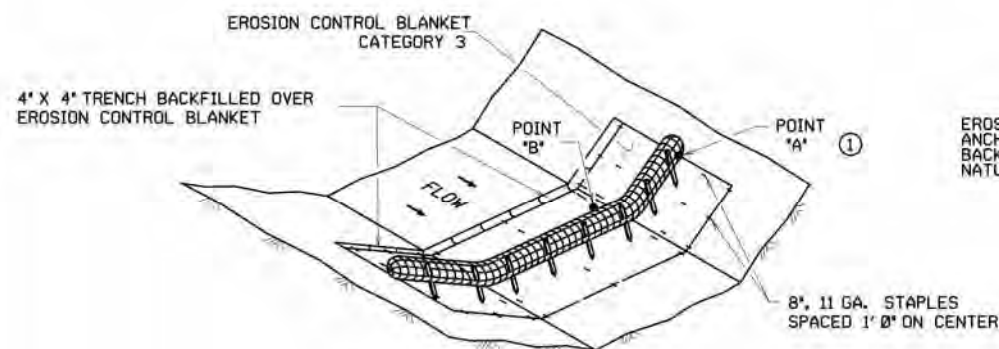
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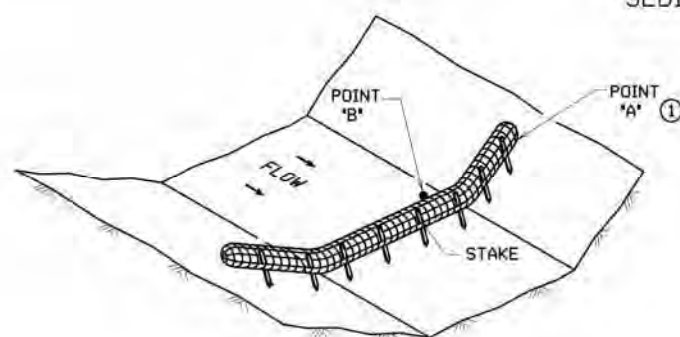
ROCK DITCH CHECKS
FILTER BERMS TYPE 3 (ROCK WEEPER) OR FILTER TYPE 5 (ROCK) ③
(FOR USE ON ROUGH GRADED AREAS)



DITCH CHECK SPACING
(FOR ALL FILTER BERM TYPES)



SEDIMENT CONTROL LOG TYPE BLANKET SYSTEM ④



SEDIMENT CONTROL LOG TYPE WOOD FIBER, OR TYPE COMPOSITE ⑤
(FOR USE ON ROUGH GRADED AREAS)

NOTES:

SEE SPECS. 2573, 3601, 3733, 3885, 3886 & 3889.

FOR DITCH CHECKS, PLACE SEDIMENT CONTROL LOG PERPENDICULAR TO FLOW AND IN A CRESCENT SHAPE WITH THE ENDS FACING UPSTREAM.

APPROXIMATE SPACING BETWEEN EACH DITCH CHECK SHOULD BE DETERMINED FROM THE FOLLOWING SPACING FORMULA:

$$\text{APPROXIMATE SPACING OF DITCH CHECKS (FT.)} = Y = \frac{\text{DITCH CHECK HEIGHT (FT)}}{\frac{1}{2} \text{ CHANNEL SLOPE}} \times 100$$

- ① POINT 'A' MUST BE A MINIMUM OF 6 INCHES HIGHER THAN POINT 'B' TO ENSURE THAT WATER FLOWS OVER THE DIKE AND NOT AROUND THE ENDS.
- ② PERMANENT ROCK DITCH CHECKS PLACED WITHIN THE CLEAR ZONE ARE TO BE 18' OR LESS IN HEIGHT. A 1:6 APPROACH AND DEPARTURE SLOPE SHALL BE PROVIDED.
- ③ DITCH GRADE 3% - 5%, MAX. FLOW VELOCITY 12 FT./SEC..
- ④ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 4.5 FT./SEC..
- ⑤ DITCH GRADE 1.5% - 3%, MAX. FLOW VELOCITY 1.5 FT./SEC..

REVISION:
APPROVED: 2-28-2017 <i>Matthew R. Blazer</i> CHIEF ENVIRONMENTAL OFFICER



REVISOR:
Tom Glick
APPROVED:
2-28-2017
STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL
DITCH CHECK

STANDARD PLAN 5-297.405

3 OF 8

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MATTHEW R. BLAZER
56110
DATE 1/20/2022



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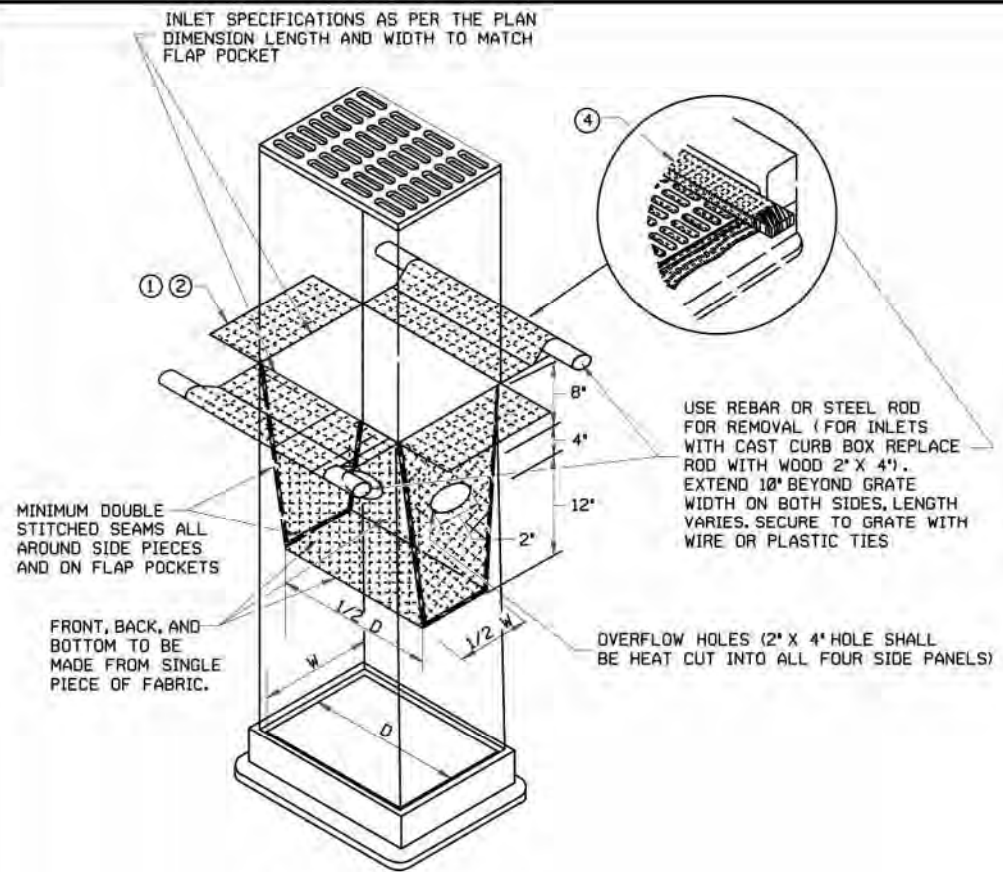


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CLIENT PROJ. NO. 2022-003-ENG			

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
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TEMPORARY SEDIMENT CONTROL DETAILS

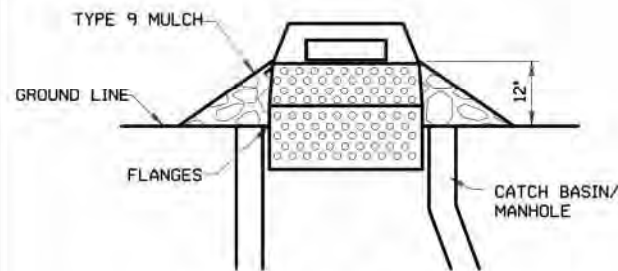
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C1.53



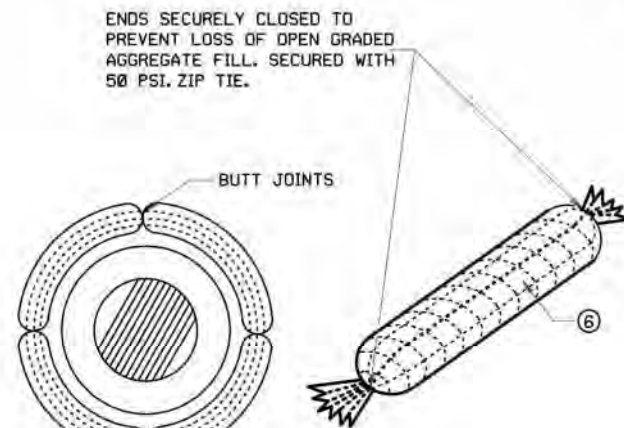
FILTER BAG INSERT ③

(CAN BE INSTALLED IN ANY INLET TYPE WITH OR WITHOUT A CURB BOX)

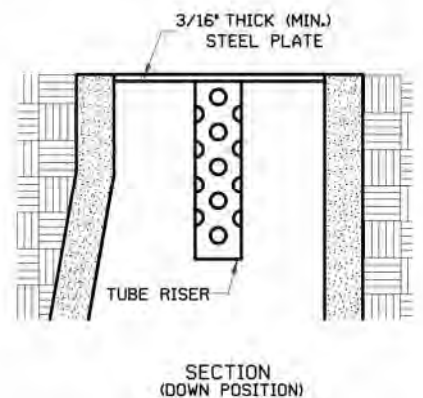
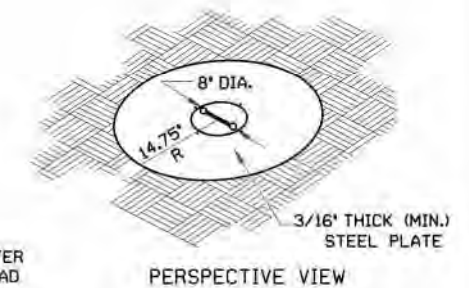
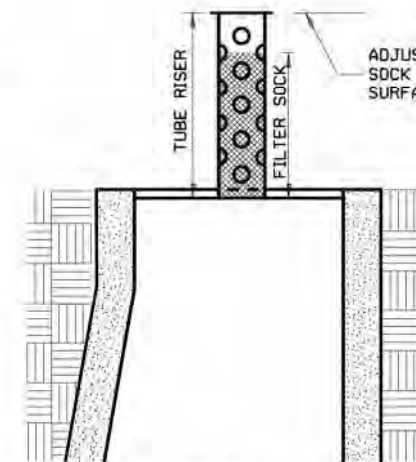
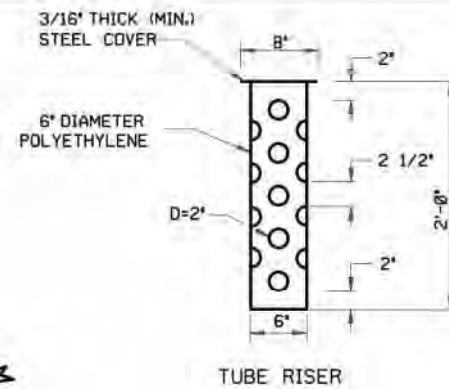


SEDIMENT CONTROL INLET HAT

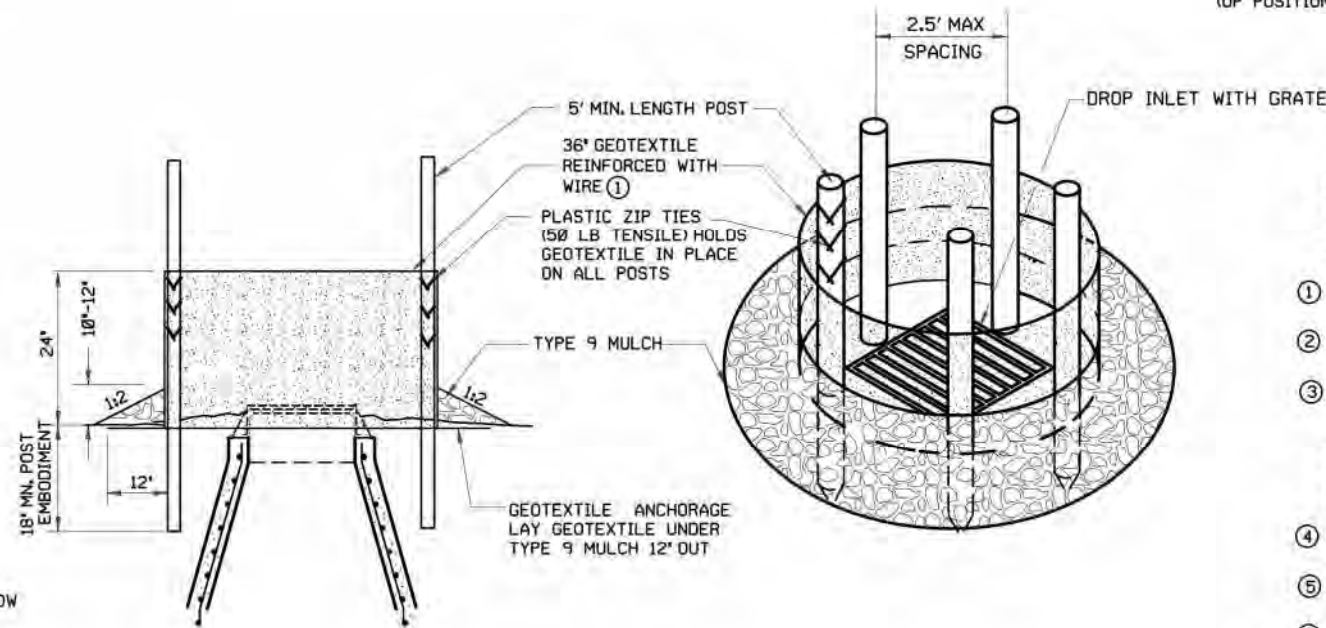
NOTE:
THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC/POLYETHYLENE RISER SIZED TO FIT INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AN OVERFLOW OPENING, FLANGES AND A LID/COVER.



ROCK LOG/COMPOST LOG



POP-UP HEAD



SILT FENCE RING AND ROCK FILTER BERM
USE WHERE INLET DRAINS IN AN AREA WITH SLOPES AT 1:3 OR LESS

NOTES:

SEE SPECS. 2573, 3137, & 3886.

DEVICES MUST BE ADJUSTED ACCORDINGLY AS TO NOT CAUSE FLOODING ON ROADWAY THAT WOULD IMPEDE TRAFFIC FLOW.

- ① ALL GEOTEXTILE USED FOR INLET PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886.
- ② FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED SHALL EXTEND A MINIMUM OF 10 INCHES AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.
- ③ INSTALLATION NOTES:
DO NOT PLACE FILTER BAG INSERT IN INLETS SHALLOWER THAN 30 INCHES, MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. THE PLACED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE OF 3 INCHES BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES. WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3 INCH SIDE CLEARANCE.
- ④ FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2 INCH X 4 INCH OR USE A ROCK SOCK OR SAND BAGS IN PLACE OF THE FLAP POCKETS.
- ⑤ SOCK HEIGHT MUST NOT BE SO HIGH AS TO SLOW DOWN WATER FILTRATION TO CAUSE FLOODING OF THE ROADWAY.
- ⑥ GEOTEXTILE SOCK BETWEEN 4-10 FEET LONG AND 4-6 INCH DIAMETER. SEAM TO BE JOINED BY TWO ROWS OF STITCHING WITH A PLASTIC MESH BACKING OR PROVIDE A HEAT BONDED SEAM (OR APPROVED EQUIVALENT). FILL ROCK LOG WITH OPEN GRADED AGGREGATE CONSISTING OF SOUND DURABLE PARTICLES OF COARSE AGGREGATE CONFORMING TO SPEC. 3137 TABLE 3137-1; CA-3 GRADATION.

REVISION:

APPROVED: 2-28-2017

Matthew R. Blazer
CHIEF ENVIRONMENTAL OFFICER



Tom J. [Signature]
STATE DESIGN ENGINEER

REVISED:

APPROVED:

2-28-2017

TEMPORARY SEDIMENT CONTROL
STORM DRAIN INLET PROTECTION

STANDARD PLAN 5-297.405

4 OF 8

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Matthew R. Blazer
MATTHEW R. BLAZER
56110
DATE: 1/20/2022



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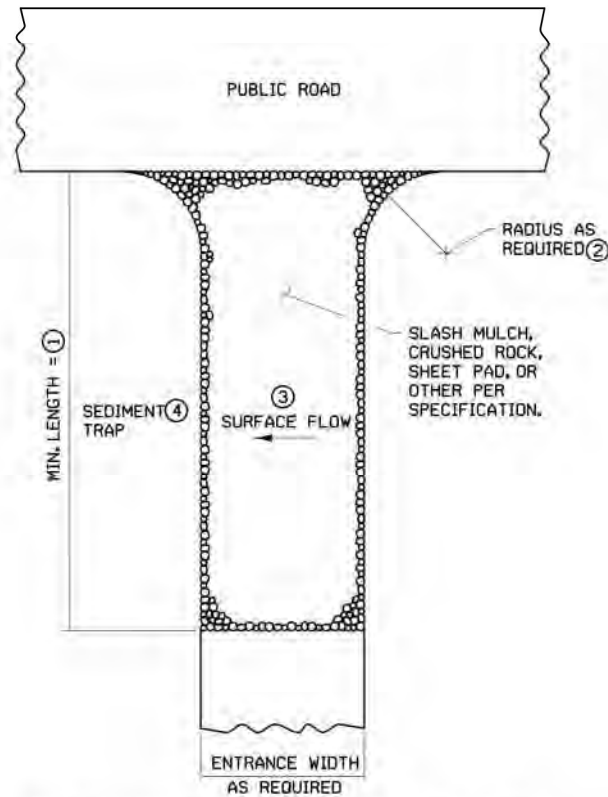


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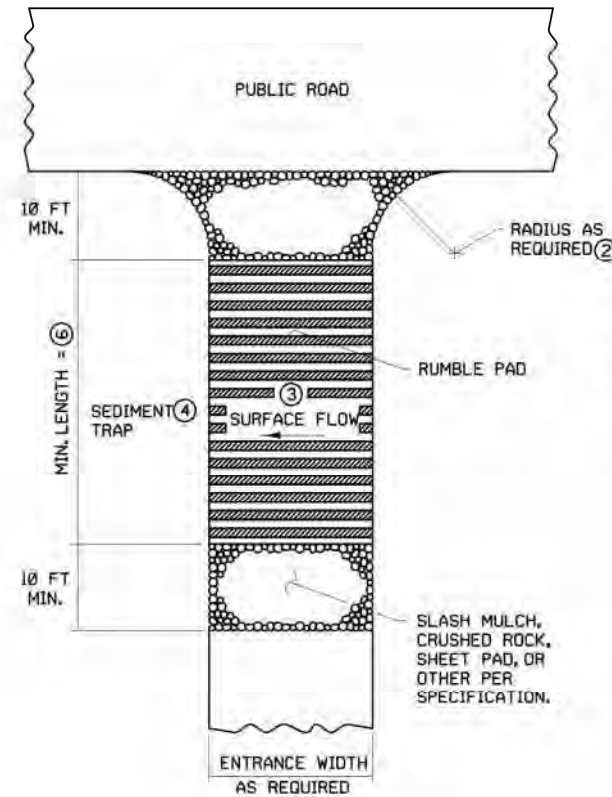
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TONKA - WOODCROFT IMPROVEMENTS PROJECT
STANDARD PLATES & PLANS
TEMPORARY SEDIMENT CONTROL DETAILS

SHEET

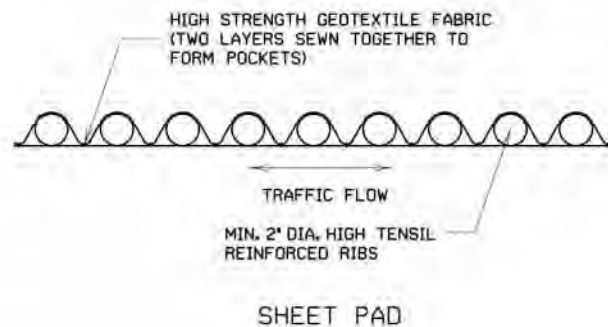
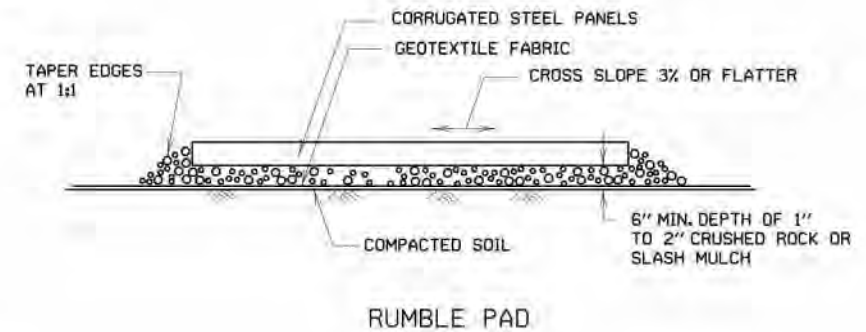
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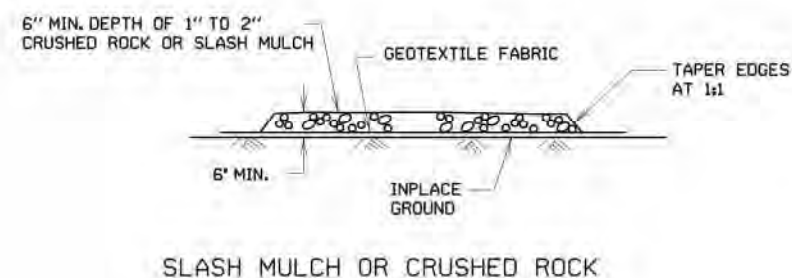
SLASH MULCH, CRUSHED ROCK, OR SHEET PAD CONSTRUCTION EXIT (1)(3)(2)



RUMBLE PAD CONSTRUCTION EXIT (1)(3)(2)



SHEET PAD



SLASH MULCH OR CRUSHED ROCK

NOTES:

SEE SPECS. 2573 & 3882.

- MINIMUM LENGTH SHALL BE THE GREATER OF 50 FEET OR A LENGTH SUFFICIENT TO ALLOW A MINIMUM OF 5 TIRE ROTATIONS ON THE PROVIDED PAD. MINIMUM LENGTH SHALL BE CALCULATED USING THE LARGEST TIRE WHICH WILL BE USED IN TYPICAL OPERATIONS.
- PROVIDE RADIUS OR WIDEN PAD SUFFICIENTLY TO PREVENT VEHICLE TIRES FROM TRACKING OFF OF PAD WHEN LEAVING SITE.
- IF RUNOFF FROM DISTURBED AREAS FLOWS TOWARD CONSTRUCTION EXITS, PREVENT RUNOFF FROM DRAINING DIRECTLY TO PUBLIC ROAD OVER CONSTRUCTION EXIT BY CROWNING THE EXIT OR SLOPING TO ONE SIDE. IF SURFACE GRADING IS INSUFFICIENT, PROVIDE OTHER MEANS OF INTERCEPTING RUNOFF.
- IF RUNOFF FROM CONSTRUCTION EXITS WILL DRAIN OFF OF PROJECT SITE, PROVIDE SEDIMENT TRAP WITH STABILIZED OVERFLOW.
- IF A TIRE WASH OFF IS REQUIRED THE CONSTRUCTION EXITS SHALL BE GRADED TO DRAIN THE WASH WATER TO A SEDIMENT TRAP.
- MINIMUM LENGTH OF RUMBLE PAD SHALL BE 20 FEET, OR AS REQUIRED TO REMOVE SEDIMENT FROM TIRES. IF SIGNIFICANT SEDIMENT IS TRACKED FROM THE SITE, THE RUMBLE PAD SHALL BE LENGTHENED OR THE DESIGN MODIFIED TO PROVIDE ADDITIONAL VIBRATION. WASH-OFF LENGTH SHALL BE AS REQUIRED TO EFFECTIVELY REMOVE CONSTRUCTION SEDIMENT FROM VEHICLE TIRES.
- MAINTENANCE OF CONSTRUCTION EXITS SHALL OCCUR WHEN THE EFFECTIVENESS OF SEDIMENT REMOVAL HAS BEEN REDUCED. MAINTENANCE SHALL CONSIST OF REMOVING SEDIMENT AND CLEANING THE MATERIALS OR PLACING ADDITIONAL MATERIAL (SLASH MULCH OR CRUSHED ROCK) OVER SEDIMENT FILLED MATERIAL TO RESTORE EFFECTIVENESS.

REVISION:

APPROVED: 2-28-2017

Matthew R. Blazer
CHIEF ENVIRONMENTAL OFFICER



REVISOR: *Tom Glick*
APPROVED: 2-28-2017
STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL
STABILIZED CONSTRUCTION EXIT

STANDARD PLAN 5-297.405

5 OF 8

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Matthew R. Blazer
MATTHEW R. BLAZER
56110
DATE: 1/20/2022



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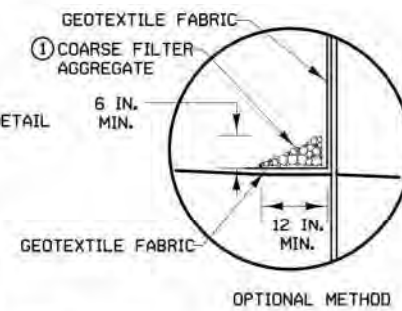
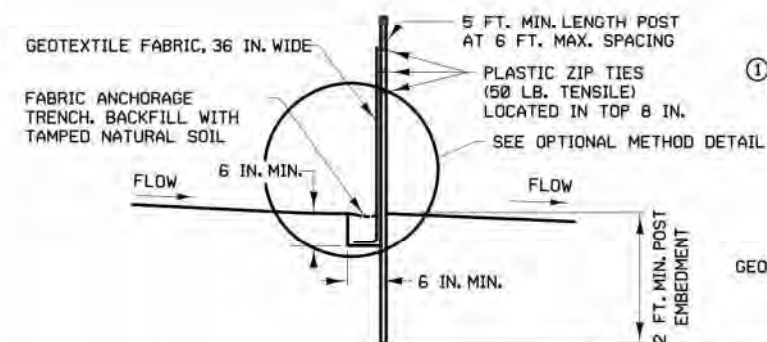


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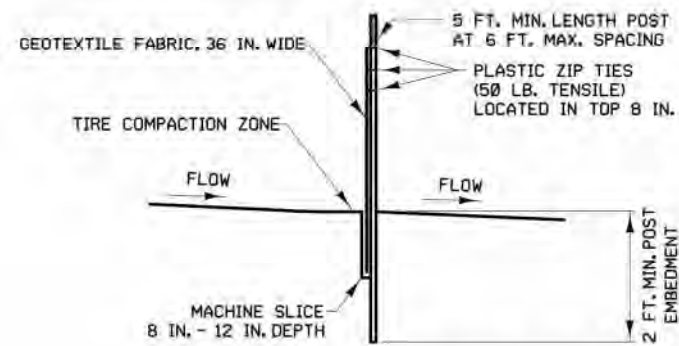
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TEMPORARY SEDIMENT CONTROL DETAILS

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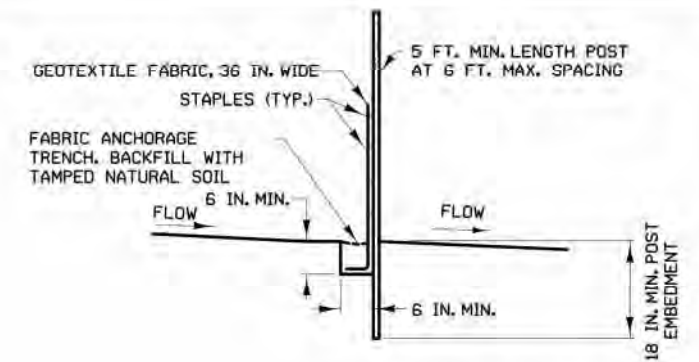
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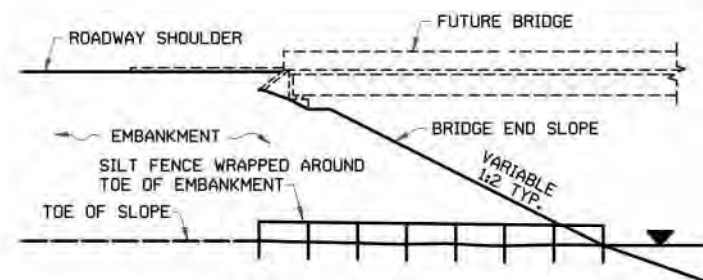
SILT FENCE TYPE HI²
(HAND INSTALLED)



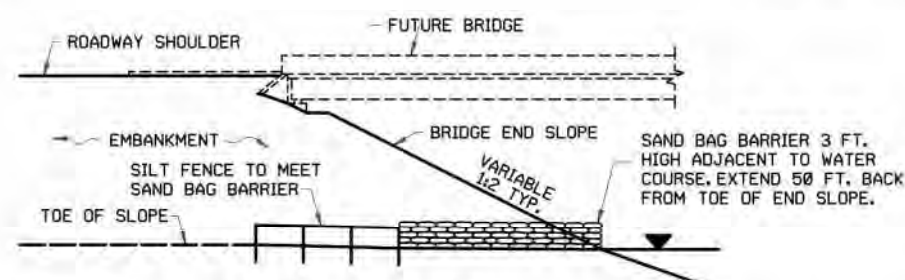
SILT FENCE TYPE MS^②
(MACHINE SLICED)



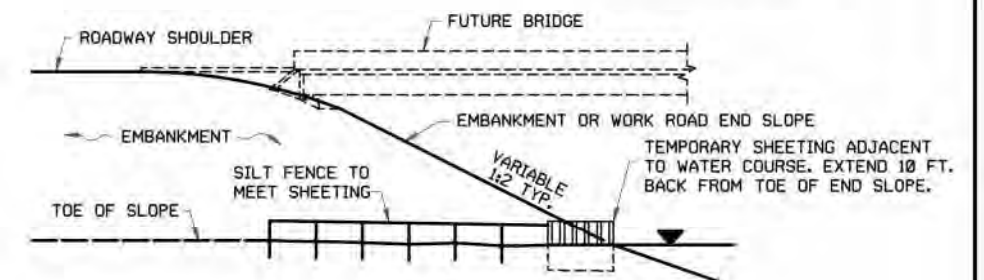
SILT FENCE TYPE PA^③
(PREASSEMBLED)



SILT FENCE ONLY④

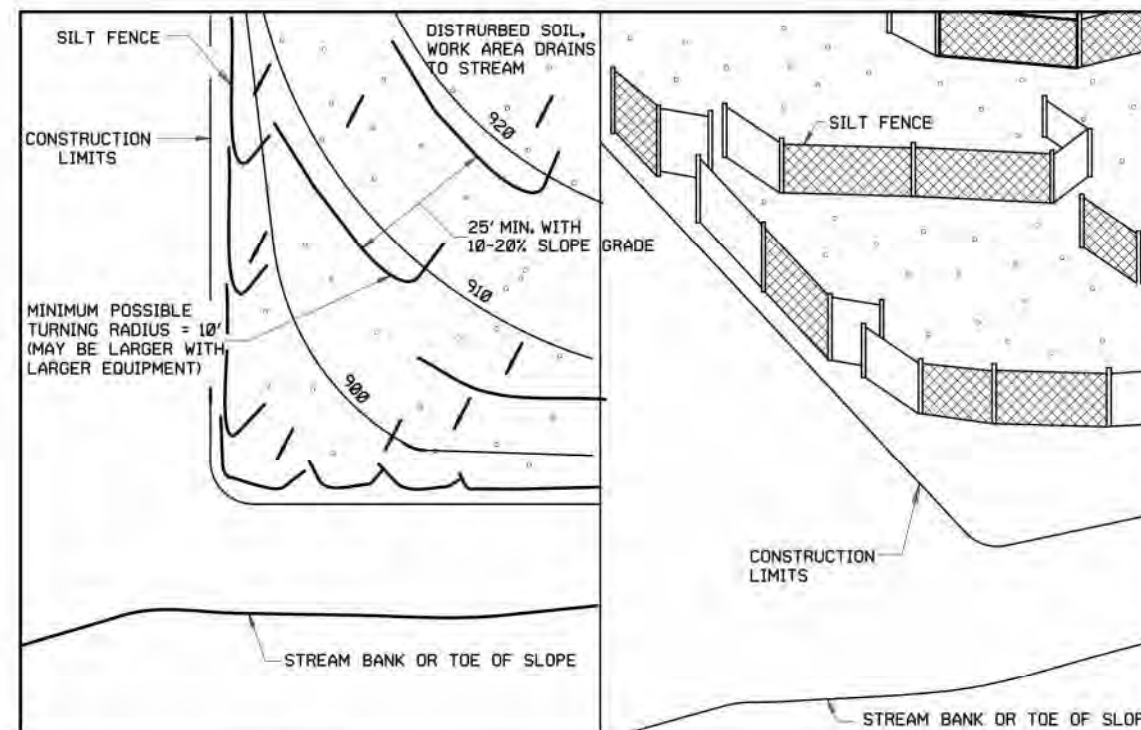


SILT FENCE WITH SAND BAGS⑤



SILT FENCE WITH SHEETING(6)

INSTALLATION AT BRIDGE EMBANKMENT ADJACENT TO WATER



PLAN VIEW

PERSPECTIVE VIEW

J-HOOK INSTALLATION

REVISION:

APPROVED: 2-28-2017

[Signature]

CHIEF, ENVIRONMENTAL OFFICER



Tom Sln
STATE DESIGN ENGINEER

REVISED:

APPROVED:

2-28-2017

TEMPORARY SEDIMENT CONTROL
SILT FENCE

STANDARD PLAN 5-297.405 6 OF 8

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 MATTHEW R. BLAZER
 LIC NO. 56110 DATE 1/20/2022



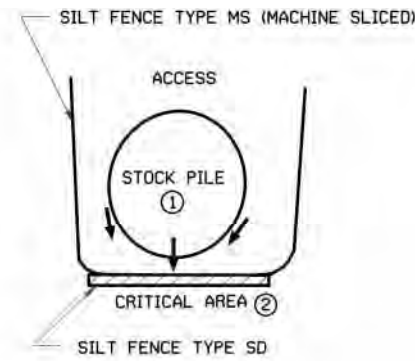
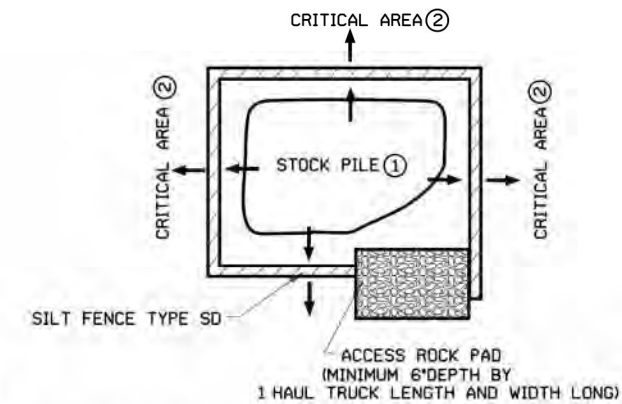
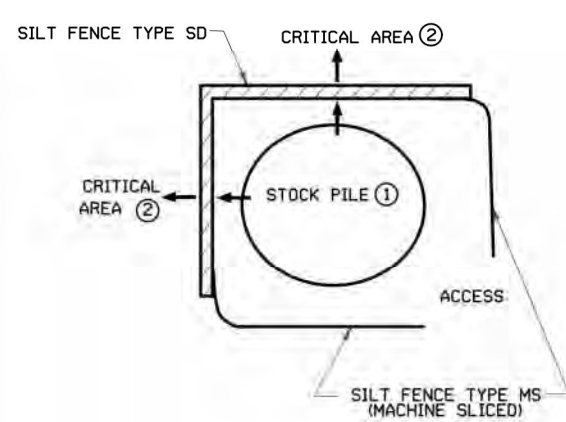
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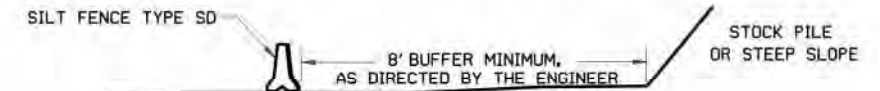
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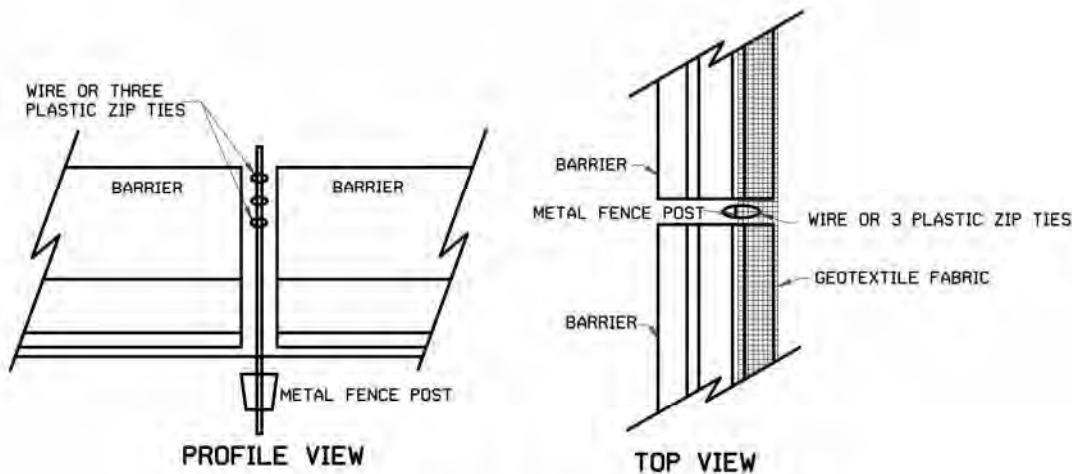
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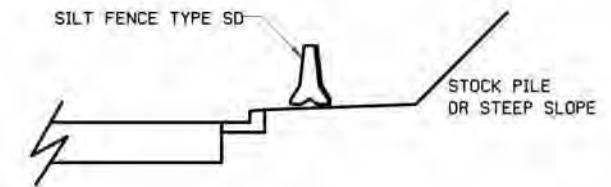
STOCK PILE CONTAINMENT



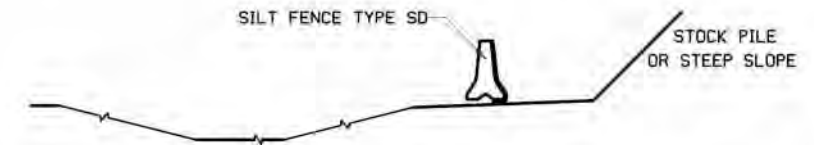
STOCKPILE SEDIMENT CONTROL



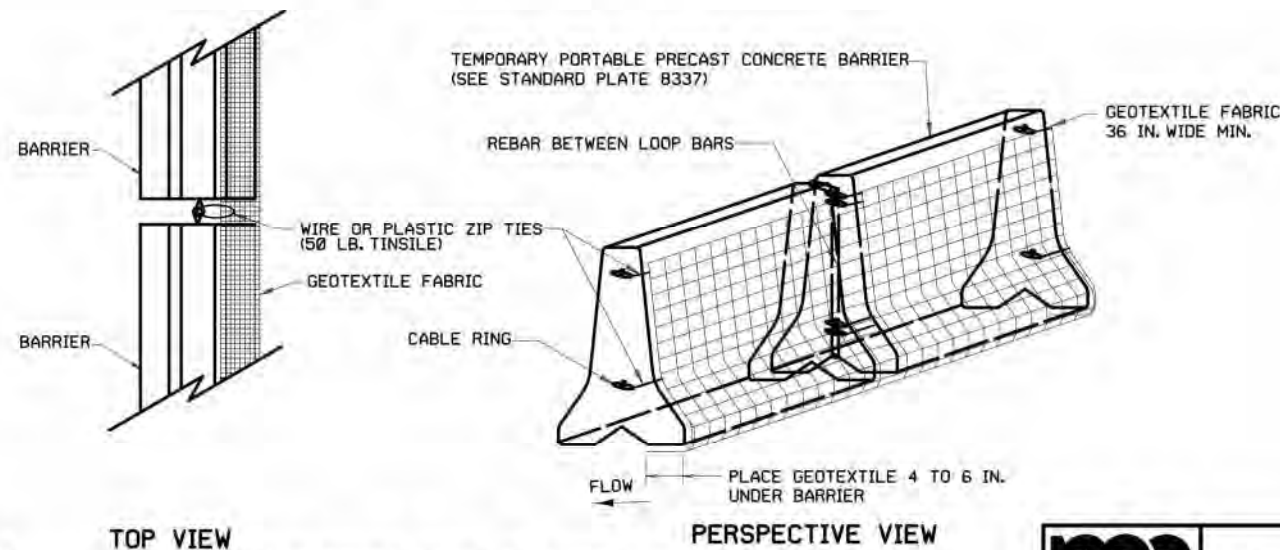
SILT FENCE TYPE SD (SUPER DUTY) BARRIER WITHOUT LOOP BARS



CURB AND GUTTER PROTECTION SYSTEM



DITCH PROTECTION SYSTEM



SILT FENCE TYPE SD (SUPER DUTY) BARRIER WITH LOOP BARS

NOTES:

SEE SPECS. 2533, 2573 & 3886.

SILT FENCE TYPE SD USED TO PROTECT CRITICAL AREAS FROM SHEET FLOW, AND AREAS WHERE OTHER SILT FENCES CANNOT BE PLACED. MAXIMUM CONTRIBUTING AREA: 1 ACRE.

PLACE SILT FENCE TYPE SD ALONG A CONSTANT ELEVATION.

SILT FENCE TYPE SD CAN UTILIZE EITHER A CONCRETE, OR WATER FILLED, TEMPORARY MEDIAN BARRIER.

- ① PLACING STOCK PILES NEXT TO AN ENVIRONMENTALLY SENSITIVE AREA IS NOT RECOMMENDED. WHEN THERE ARE NO FEASIBLE ALTERNATIVES, PLACE SILT FENCE SD AS SHOWN OR AS DIRECTED BY THE ENGINEER.
- ② CRITICAL AREAS INCLUDE WETLANDS, JUDICIAL DITCHES, STREAMS, WATER BODIES, AND OTHER AREAS REQUIRING PROTECTION.

REVISION:
APPROVED: 2-28-2017
<i>Matthew R. Blazer</i>
CHIEF ENVIRONMENTAL OFFICER



REVISOR: *Tom Glick*

APPROVED: 2-28-2017

STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL SUPER DUTY SILT FENCE
STANDARD PLAN 5-297.405
7 OF 8

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Matthew R. Blazer

MATTHEW R. BLAZER

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1/20/2022



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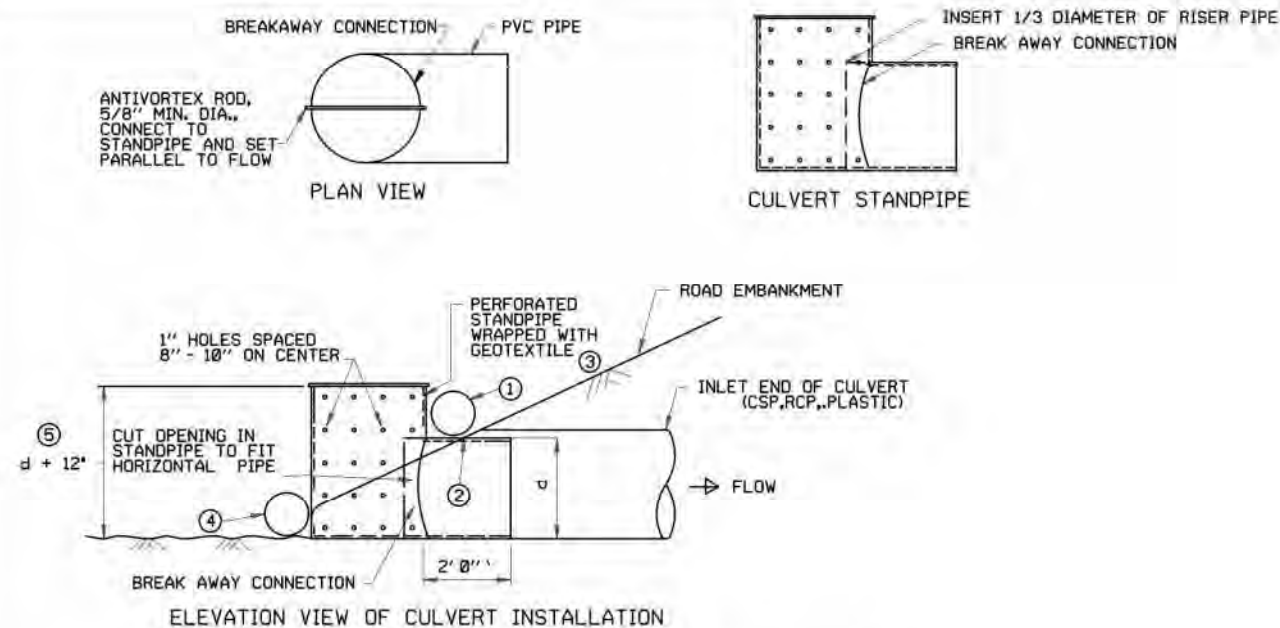


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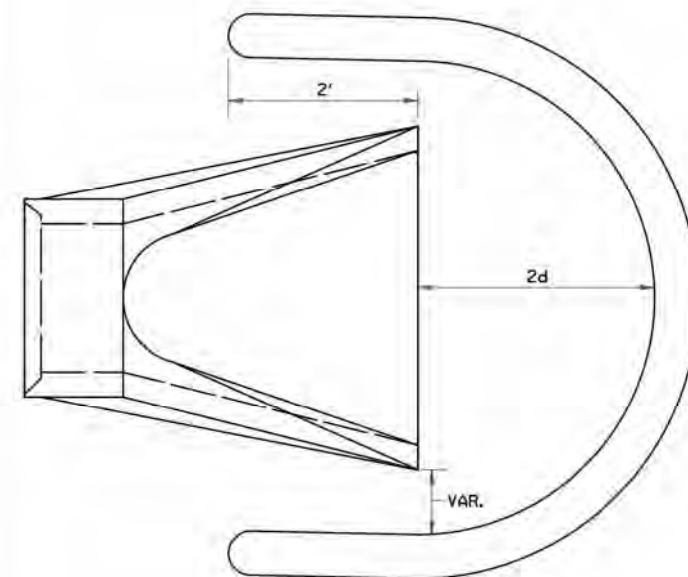
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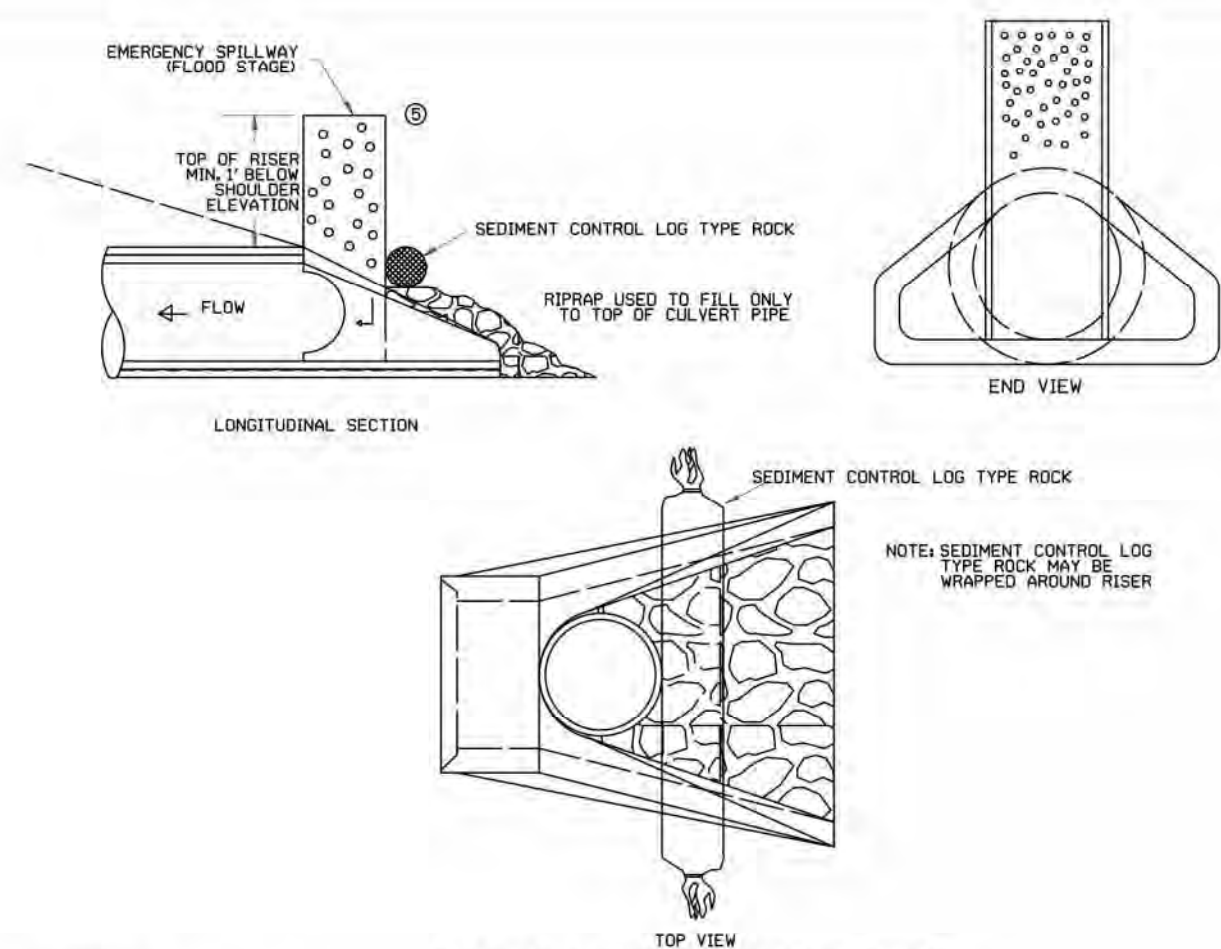
CULVERT STANDPIPE INSERT (D-RISER)

d = CULVERT SIZE: 12" - 36"

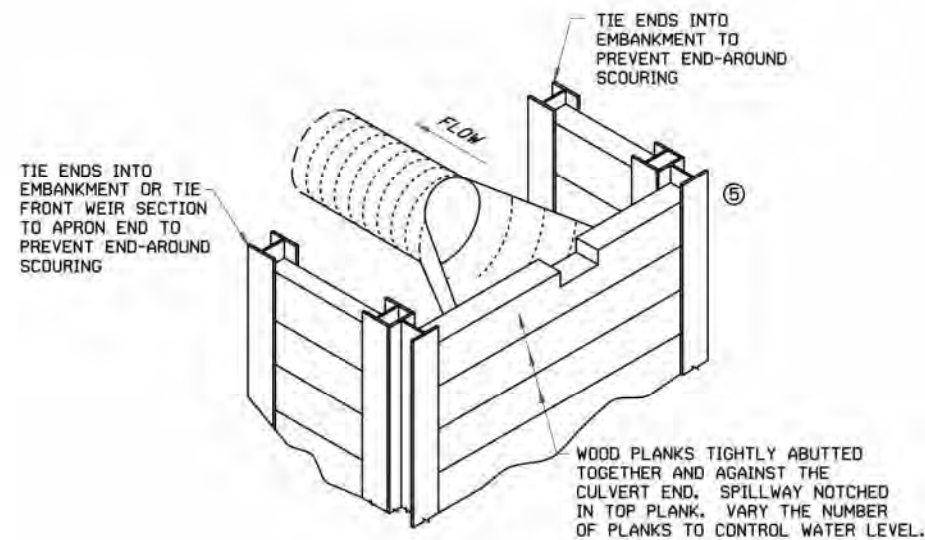


SEDIMENT CONTROL LOG WEIR (COMPOST, WOOD CHIP, OR ROCK)

d = CULVERT SIZE: 12"-36"



CULVERT STANDPIPE INSERT (D-RISER)



WOOD PLANK WEIR

NOTES:

SEE SPECS. 2573, 3891 & 3893.

FOR USE WHEN TEMPORARY PONDING IS NEEDED IN DITCH SECTIONS FOR SEDIMENT CONTROL.

MANUFACTURED ALTERNATIVES LISTED ON MnDOT'S APPROVED PRODUCTS LIST MAY BE SUBSTITUTED AT NO ADDITIONAL COST.

- 1 ROCK LOG OR SANDBAG TO HOLD STANDPIPE AND ACT AS A SEAL BETWEEN RISER PIPE AND CULVERT.
- 2 PLACE CULVERT APRON AND SLIDE TEMPORARY STANDPIPE INTO CSP OR RCP CULVERT.
- 3 ALL GEOTEXTILE USED FOR CULVERT PROTECTION SHALL BE MONOFILAMENT IN BOTH DIRECTIONS, MEETING SPEC. 3886 FOR MACHINE SLICED.
- 4 ROCK LOG OR RIP RAP TO HOLD STANDPIPE AND ACT AS A FILTER BETWEEN RISER PIPE AND CULVERT.
- 5 HEIGHT OVERFLOW NOT TO CAUSE FLOODING OF ROAD OR ADJACENT PROPERTIES.

REVISION:
APPROVED: 2-28-2017
<i>Matthew R. Blazer</i>
CHIEF ENVIRONMENTAL OFFICER



REVISOR: *Tom Glick*

APPROVED: 2-28-2017

STATE DESIGN ENGINEER

TEMPORARY SEDIMENT CONTROL CULVERT END CONTROLS

STANDARD PLAN 5-297.405

8 OF 8

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C1.58

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



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INSTRUCTIONS,
DOWNLOAD THE
INSTALLATION APP



NORTH - TONKA WOODCROFT IMPROVEMENTS

MINNETONKA, MN

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-3500.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

- STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

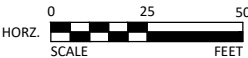
- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

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

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

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Matthew R. Blazer
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LIC. NO. 56110 DATE 1/20/2022



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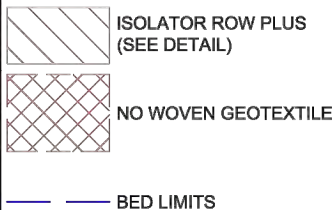
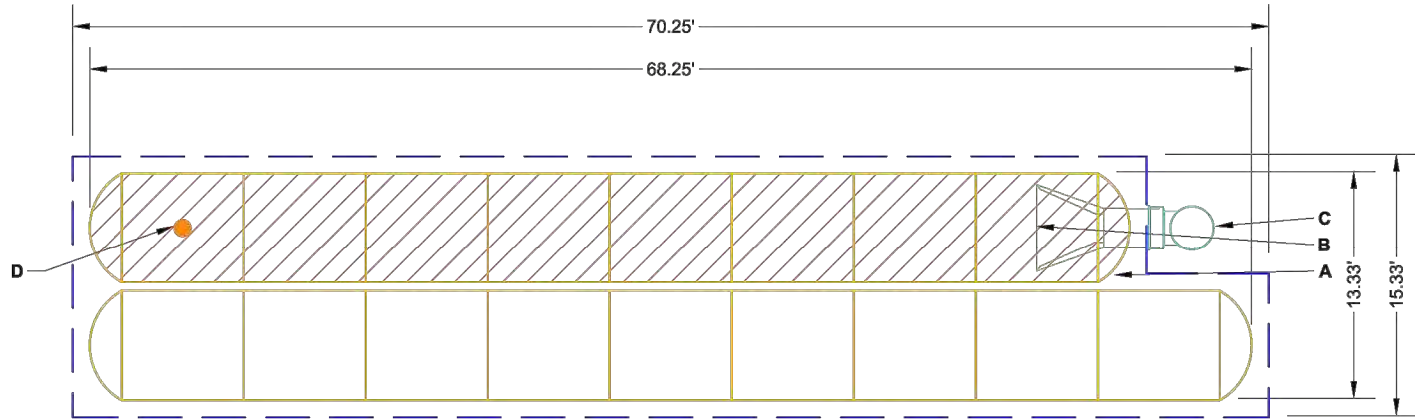
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PROPOSED LAYOUT		PROPOSED ELEVATIONS	
17	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	959.08
4	STORMTECH MC-3500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	953.08
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	952.58
9	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	952.58
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	952.58
3418	INSTALLED SYSTEM VOLUME (CF)	TOP OF STONE:	952.08
	(PERIMETER STONE INCLUDED)	TOP OF MC-3500 CHAMBER:	951.08
	(COVER STONE INCLUDED)	24" ISOLATOR ROW PLUS INVERT:	947.50
	(BASE STONE INCLUDED)	BOTTOM OF MC-3500 CHAMBER:	947.33
1028	SYSTEM AREA (SF)	BOTTOM OF STONE:	946.58
171.2	SYSTEM PERIMETER (ft)		

		*INVERT ABOVE BASE OF CHAMBER	
PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT
PREFABRICATED END CAP	A	24" BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	2.06"
FLAMP	B	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC350024RAMP	
NYLOPLAST (INLET W/ ISO PLUS ROW)	C	30" DIAMETER (24.00" SUMP MIN)	
INSPECTION PORT	D	4" SEE DETAIL	



NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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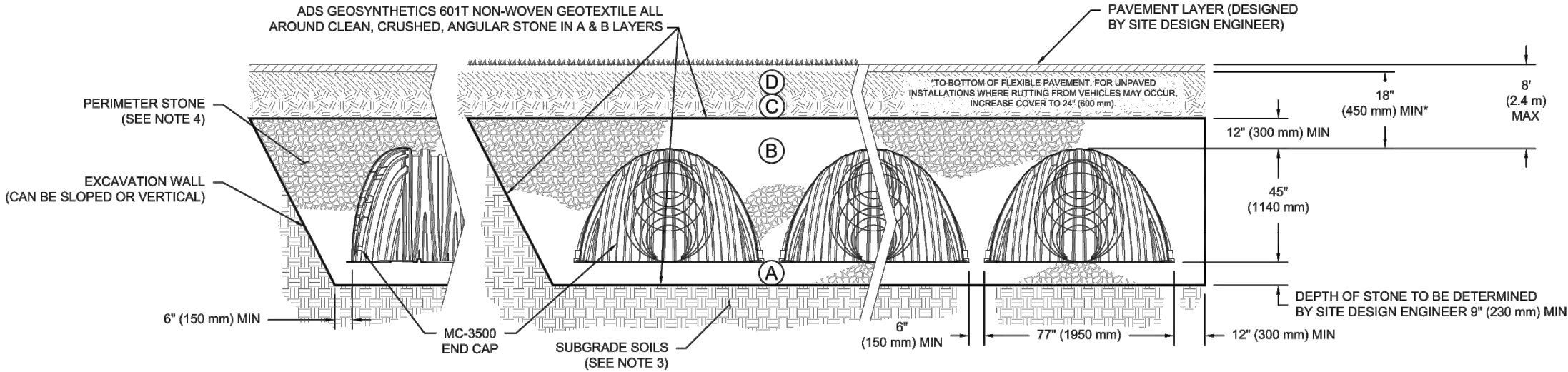
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ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

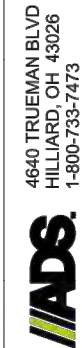
MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ¹ 3, 4	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ¹ 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

- PLEASE NOTE:
- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
 - STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
 - WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
 - ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



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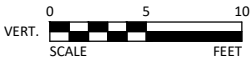
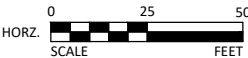
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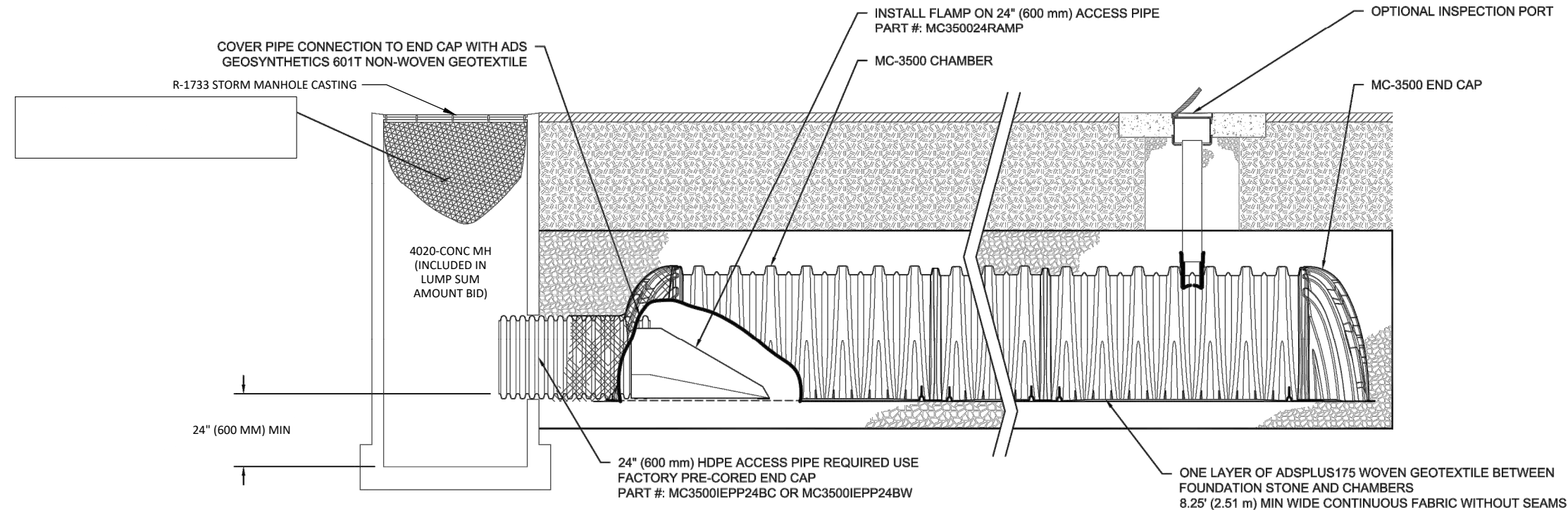
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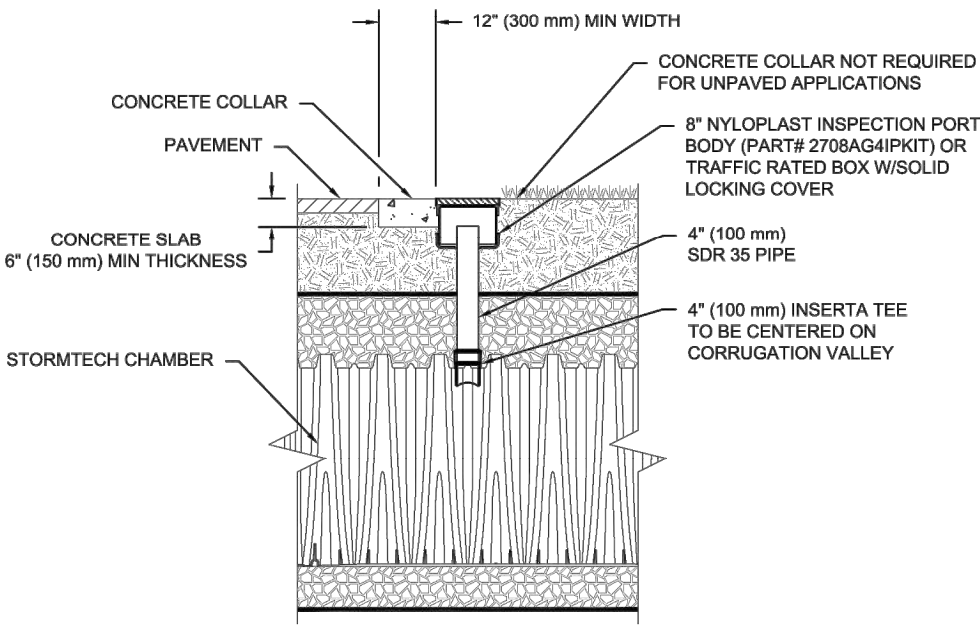
MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.


NOTES

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



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

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

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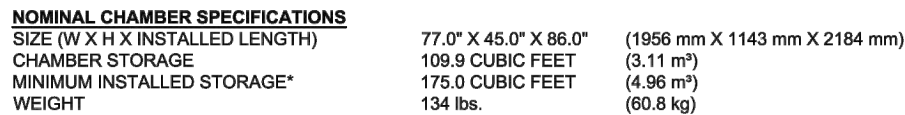


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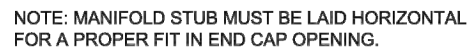
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TONKA - WOODCROFT IMPROVEMENTS PROJECT

DETAILS

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SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW		---	1.77" (45 mm)
MC3500IEPP18BC			
MC3500IEPP18BW		---	
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW		---	2.06" (52 mm)
MC3500IEPP24BC			
MC3500IEPP24BW		---	
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

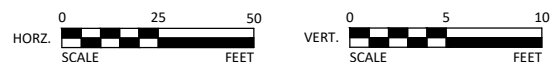
CUSTOM PRECURED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

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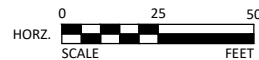
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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

Matthew R. Blazer
MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2022



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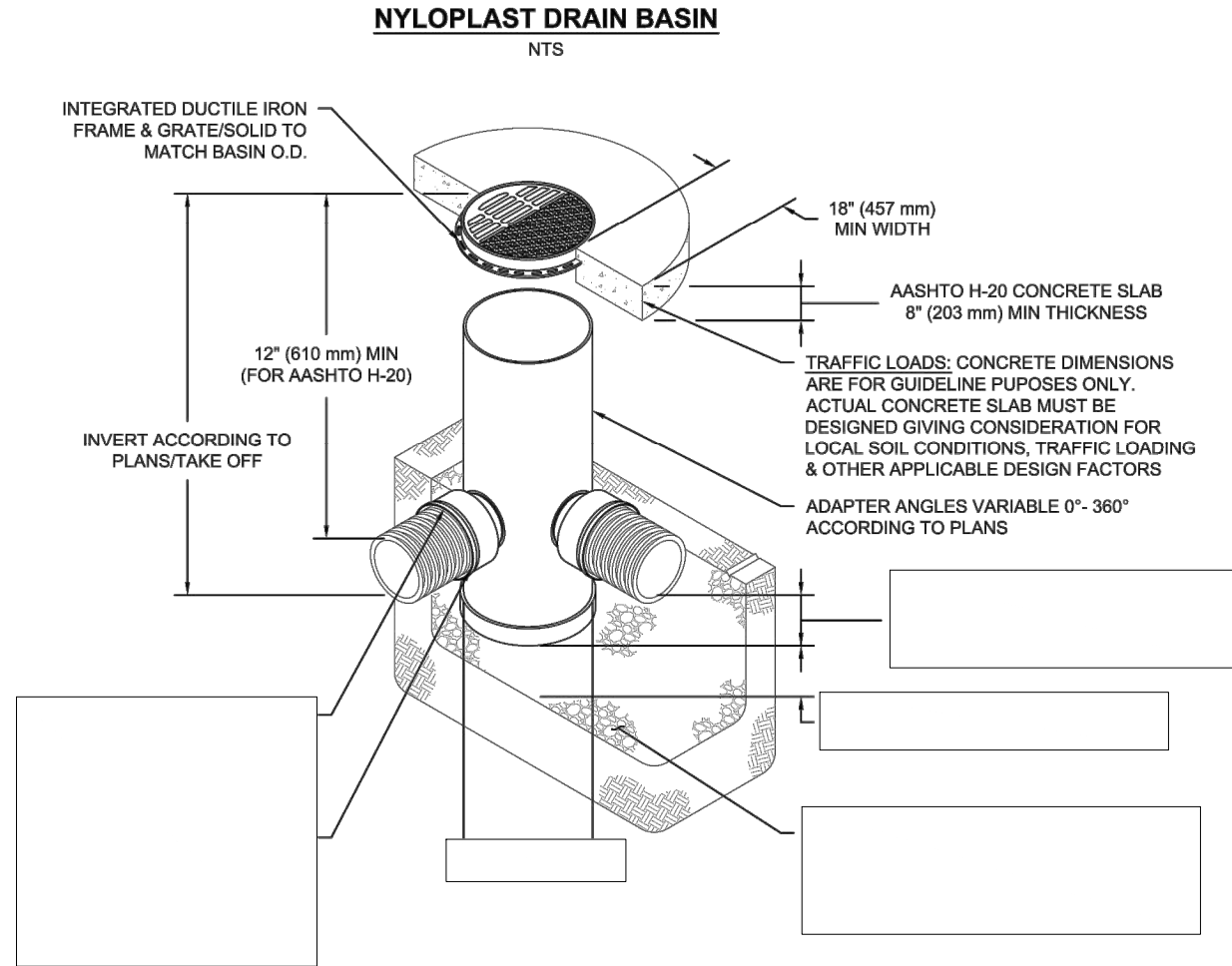


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CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT

DETAILS

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NOTES

- 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
- DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
- TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

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PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



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MIDDLE - TONKA WOODCROFT IMPROVEMENTS

MINNETONKA, MN

SC-740 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH SC-740.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

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

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

NOTES FOR CONSTRUCTION EQUIPMENT

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

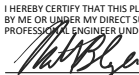
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

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

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MATTHEW R. BLAZER
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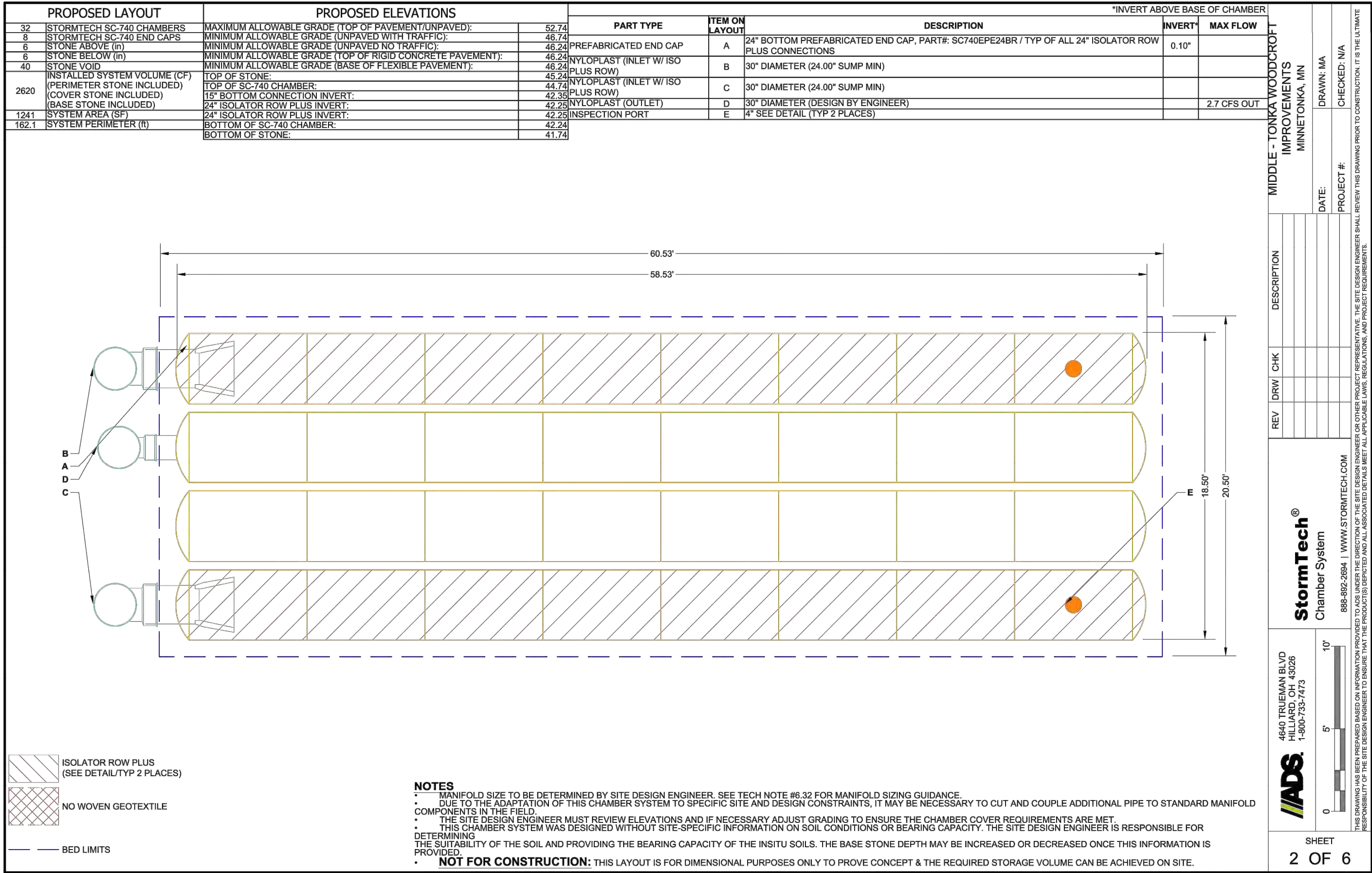
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TONKA - WOODCROFT IMPROVEMENTS PROJECT

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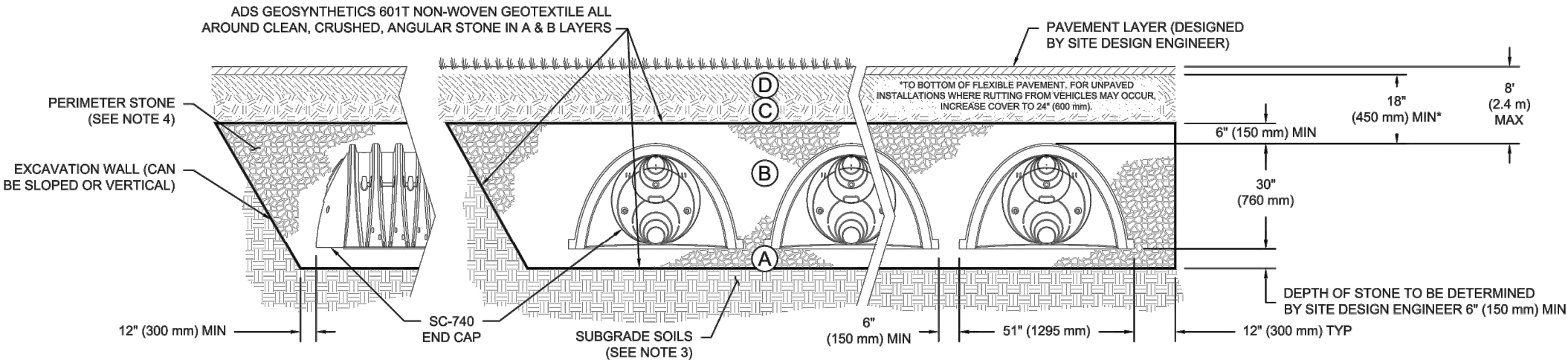
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ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145¹ A-1, A-2-4, A-3 OR AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.²,³

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



NOTES:

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

MIDDLE - TONKA WOODCROFT IMPROVEMENTS MINNETONKA, MN

DESCRIPTION

CHK

DRW

REV

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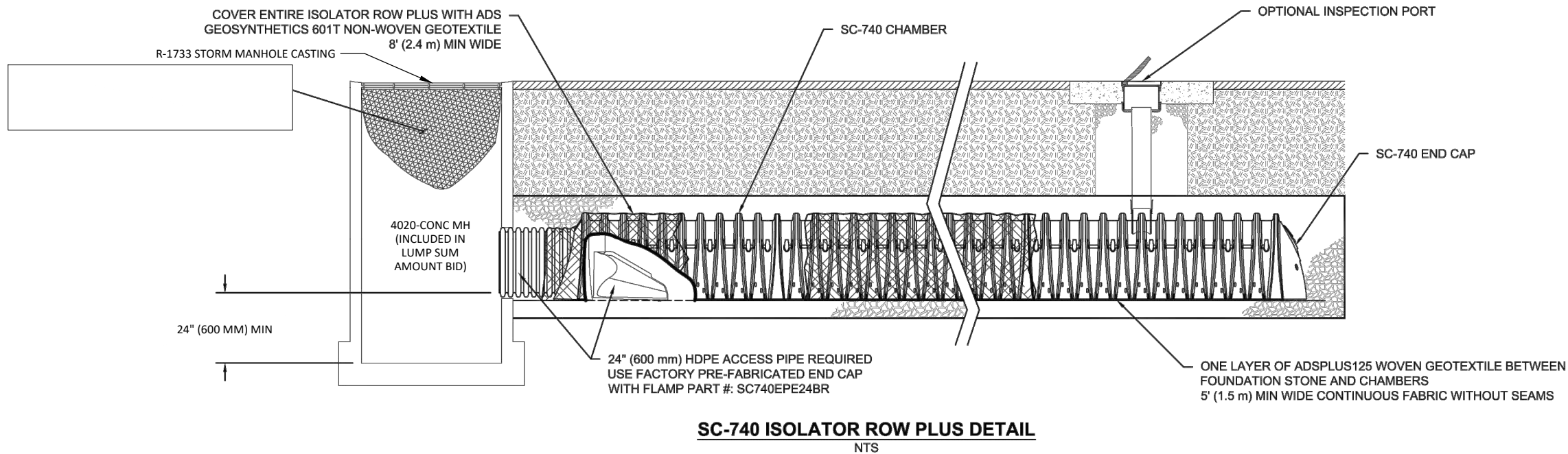
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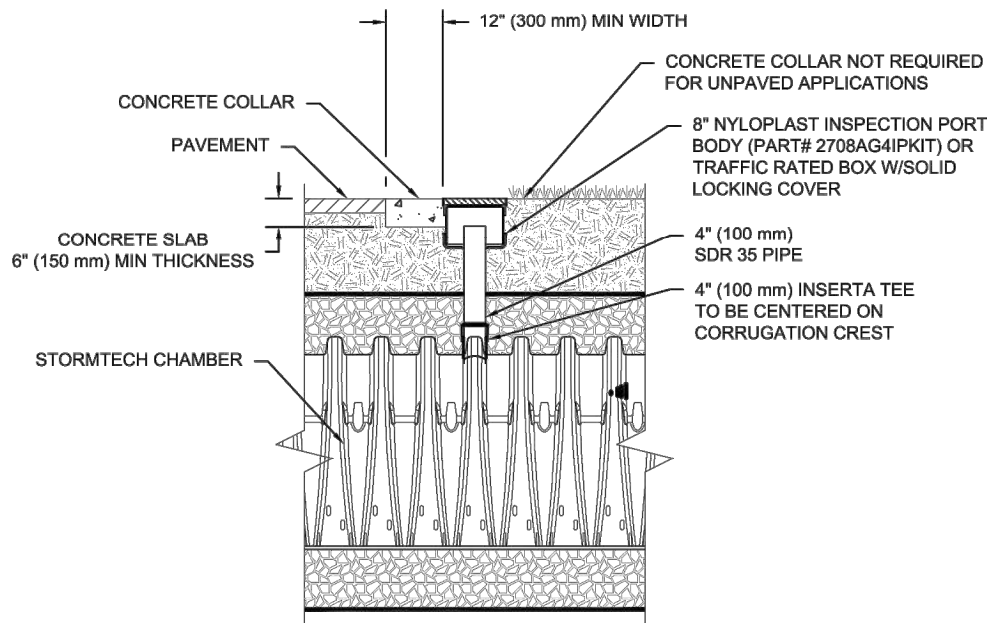


INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.


NOTES

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



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

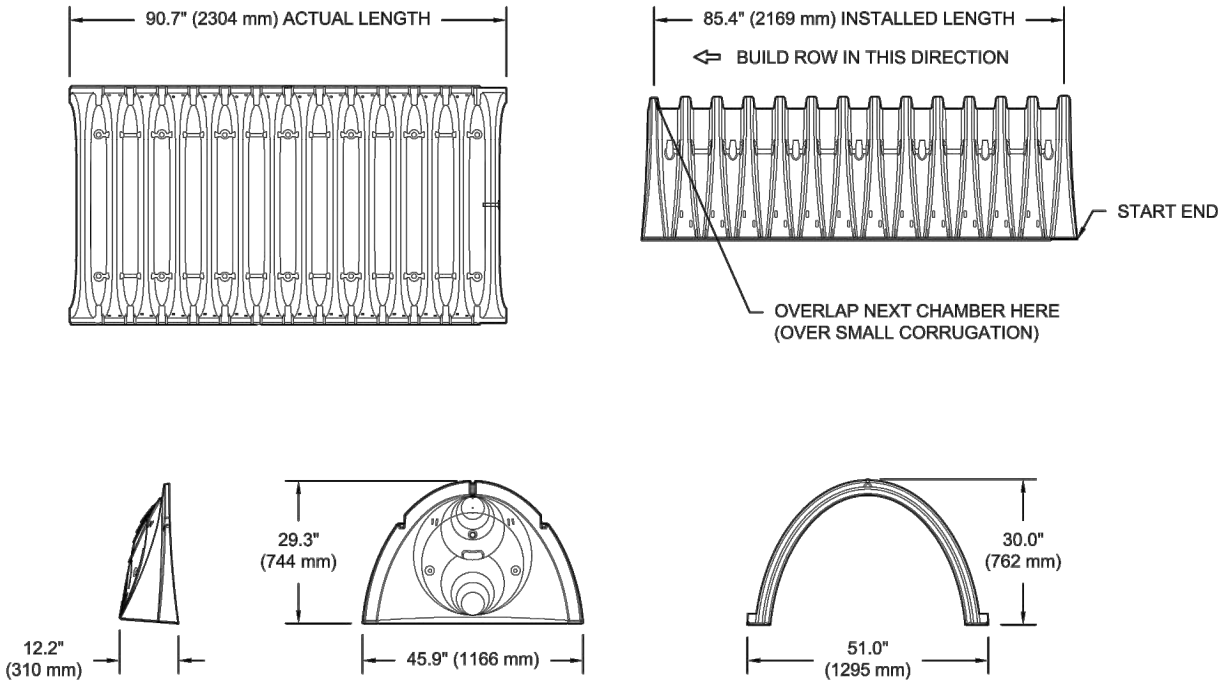
4" PVC INSPECTION PORT DETAIL
(SC SERIES CHAMBER)
NTS

<div><div>4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473</div></div>		<div><div>StormTech[®]</div><div>Chamber System</div><div>888-892-2694 WWW.STORMTECH.COM</div></div>				REV	DRW	CHK	DESCRIPTION
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SC-740 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

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

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

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

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)
SC740EPE24BR*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B/SC740EPE24BR ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B/SC740EPE24BR THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2022



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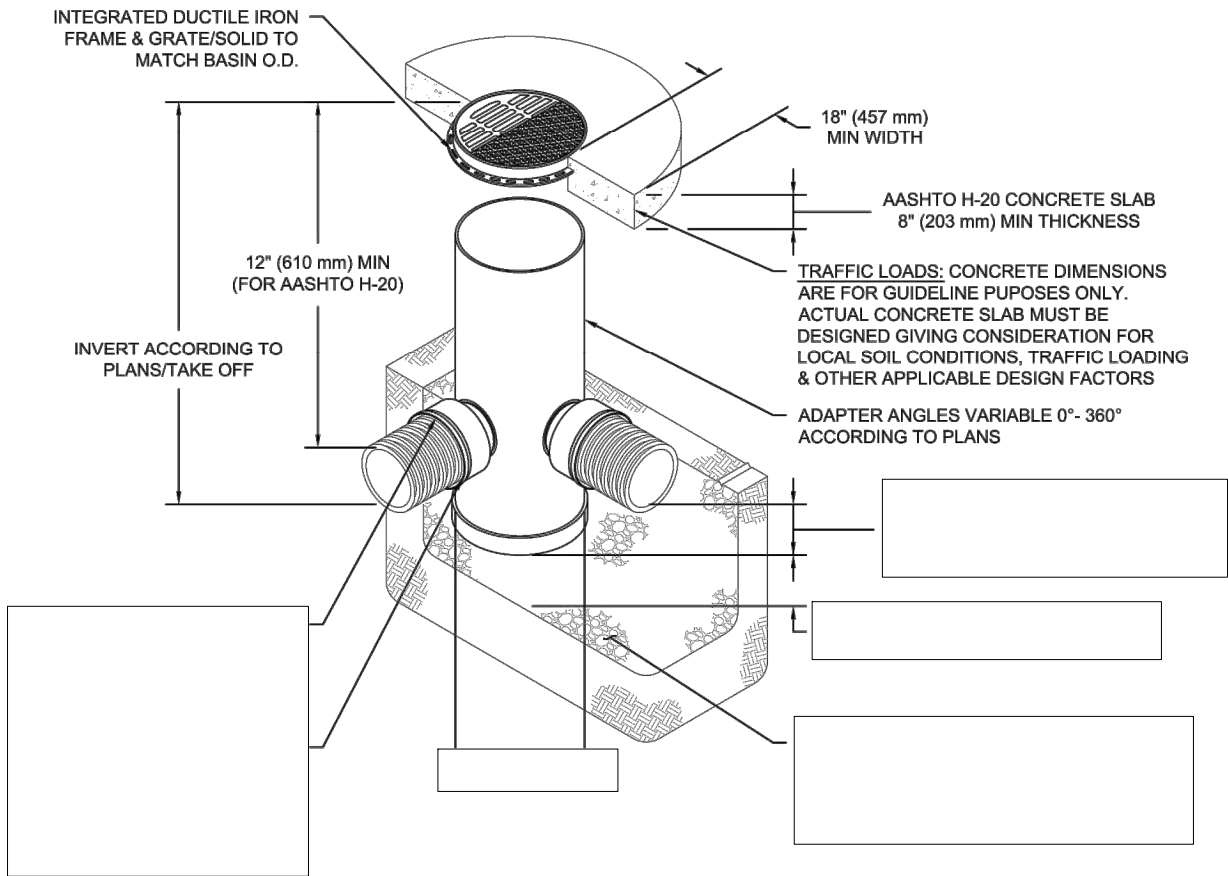
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NYLOPLAST DRAIN BASIN

NTS



NOTES

- 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
- DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
- TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

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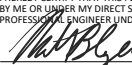
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ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



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SOUTH - TONKA WOODCROFT

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SC-740 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH SC-740.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

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

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

NOTES FOR CONSTRUCTION EQUIPMENT

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

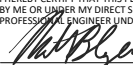
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

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

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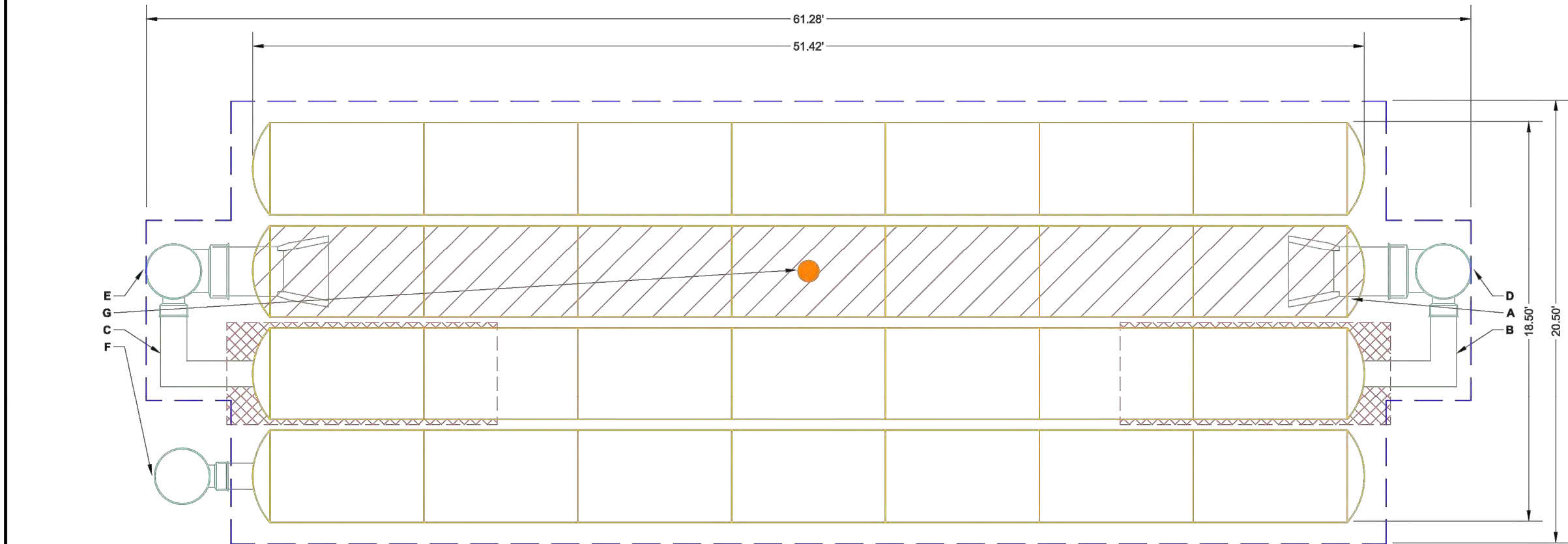
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PROPOSED LAYOUT		PROPOSED ELEVATIONS		*INVERT ABOVE BASE OF CHAMBER				
				PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
28	STORMTECH SC-740 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	952.73	PREFABRICATED END CAP	A	24" BOTTOM PREFABRICATED END CAP, PART#: SC740EPE24BR / TYP OF ALL 24" ISOLATOR ROW PLUS CONNECTIONS	0.10"	
8	STORMTECH SC-740 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	946.73					
6	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	946.23					
6	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	946.23					
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	946.23	MANIFOLD	B	12" x 12" TOP MANIFOLD, ADS N-12	12.50"	
2397	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	945.23	MANIFOLD	C	12" x 12" TOP MANIFOLD, ADS N-12	12.50"	
		TOP OF SC-740 CHAMBER:	944.73	NYLOPLAST (INLET W/ ISO PLUS ROW)	D	30" DIAMETER (24.00" SUMP MIN)		2.3 CFS IN
		12" x 12" TOP MANIFOLD INVERT:	943.27	NYLOPLAST (INLET W/ ISO PLUS ROW)	E	30" DIAMETER (24.00" SUMP MIN)		2.3 CFS IN
		12" x 12" TOP MANIFOLD INVERT:	943.27	NYLOPLAST (OUTLET)	F	30" DIAMETER (DESIGN BY ENGINEER)		2.0 CFS OUT
		12" BOTTOM CONNECTION INVERT:	942.33	INSPECTION PORT	G	4" SEE DETAIL		
1161	SYSTEM AREA (SF)	24" ISOLATOR ROW PLUS INVERT:	942.24					
163.6	SYSTEM PERIMETER (ft)	24" ISOLATOR ROW PLUS INVERT:	942.24					
		BOTTOM OF SC-740 CHAMBER:	942.23					
		BOTTOM OF STONE:	941.73					



-  ISOLATOR ROW PLUS (SEE DETAIL)
-  PLACE MINIMUM 12.50' OF ADSP125 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS
-  BED LIMITS

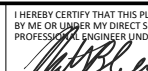
NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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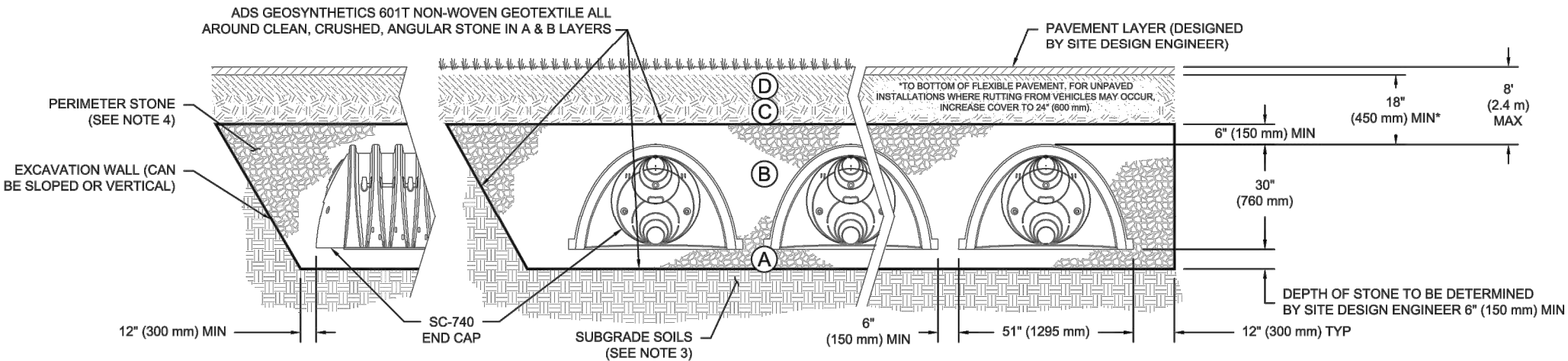
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ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

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

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



NOTES:

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

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4640 TRUEMAN BLVD

HILLIARD, OH 43026

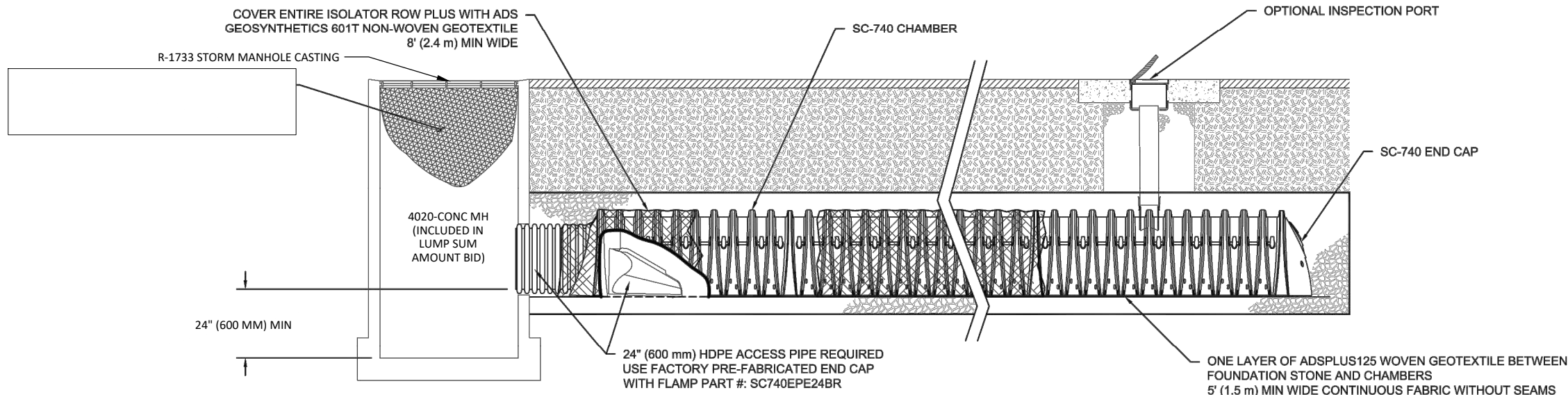
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ADS

SHEET

3 OF 6

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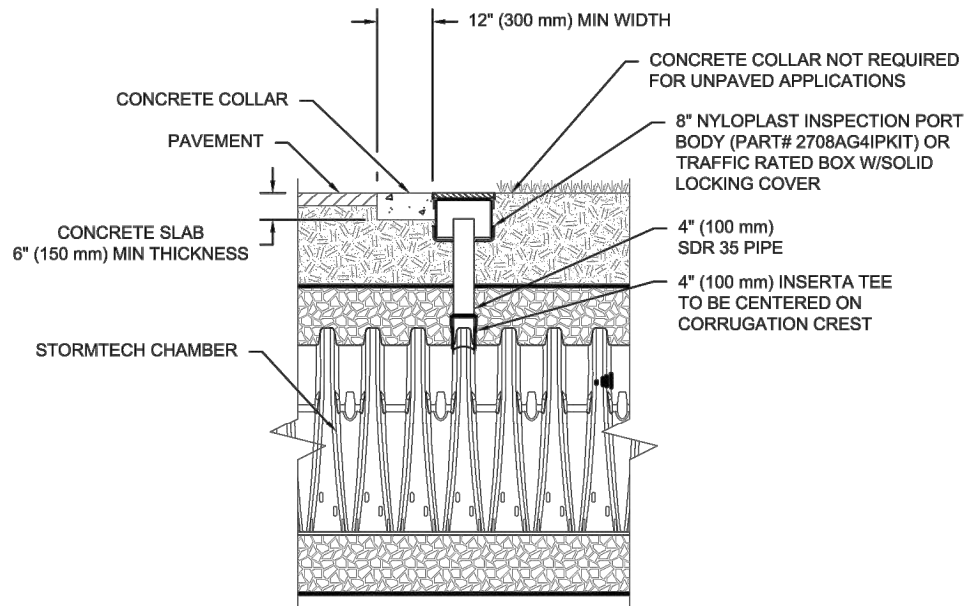
SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
- A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
- A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
- A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
- A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
- A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
- B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
- B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
- i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
- ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
- B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

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



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

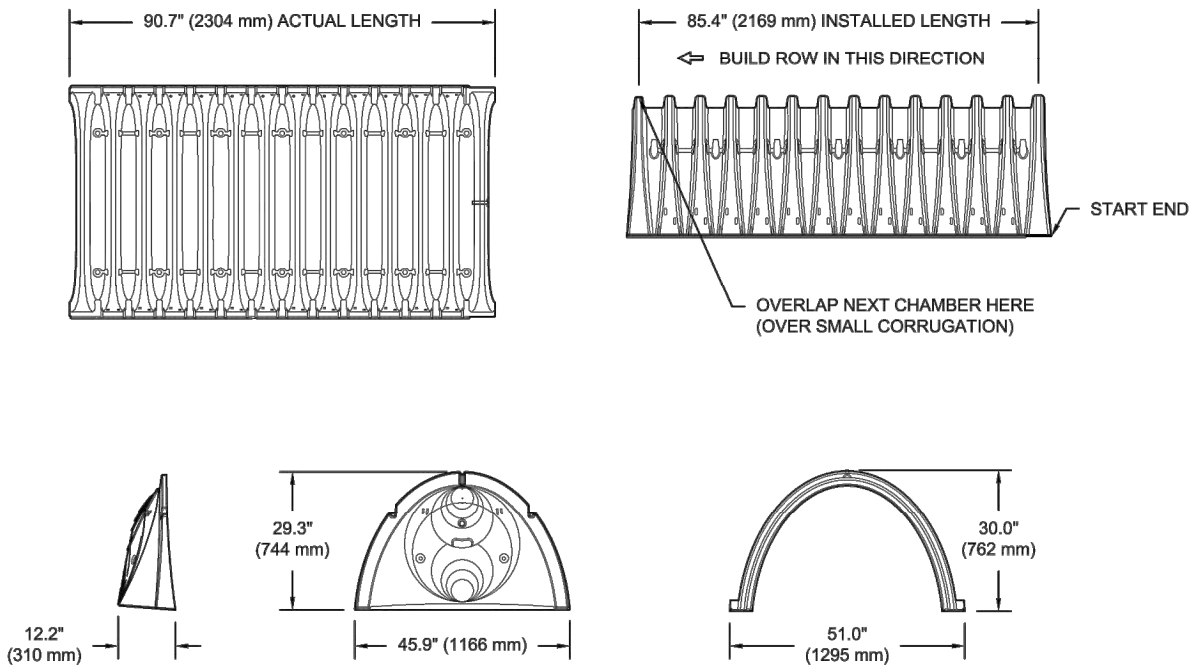
4" PVC INSPECTION PORT DETAIL
(SC SERIES CHAMBER)
NTS

SOUTH - TONKA WOODCROFT		MINNETONKA, MN	DATE:	DRAWN: TR	CHECKED: N/A
PROJECT #:		DESCRIPTION	CHK	DATE	DRW
StormTech® Chamber System		888-892-2694 WWW.STORMTECH.COM			
4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473					
SHEET 4 OF 6					

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SC-740 TECHNICAL SPECIFICATION

NTS

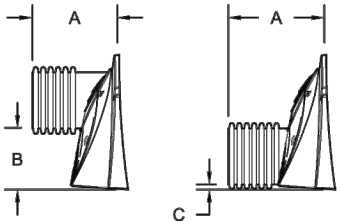


NOMINAL CHAMBER SPECIFICATIONS

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

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

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



PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T / SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)
SC740EPE24BR*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B/SC740EPE24BR ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B/SC740EPE24BR THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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SOUTH - TONKA WOODCROFT	
MINNETONKA, MN	
DATE:	DRAWN: TR
PROJECT #:	CHECKED: N/A

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5 OF 6

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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

MATTHEW R. BLAZER
56110
DATE 1/20/2022



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DESIGNED BS, AC, LW, JB	NO.	ISSUED FOR BID SET	DATE 2/23/2022
DRAWN BS, AC, LW, JB			
CHECKED MRB			
CLIENT PROJ. NO. 2022-003-ENG			

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
DETAILS

SHEET
C1.31

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



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WEST - TONKA WOODCROFT IMPROVEMENTS

MINNETONKA, MN

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH MC-3500.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
 - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
 - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
 - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

- STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
 - STONESHOOTER LOCATED OFF THE CHAMBER BED.
 - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
 - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
- INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 12" (300 mm) INTO CHAMBER END CAPS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE MEETING THE AASHTO M43 DESIGNATION OF #3 OR #4.
- STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
 - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
 - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
 - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
- FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.


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

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

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MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2022



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DESIGNED BS, AC, LW, JB	NO.	ISSUED FOR BID SET	DATE 2/23/2022
DRAWN BS, AC, LW, JB			
CHECKED MRB			
CLIENT PROJ. NO. 2022-003-ENG			

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT
DETAILS

SHEET

C1.33

17

STORMTECH MC-3500 CHAMBERS

6

STORMTECH MC-3500 END CAPS

12

STONE ABOVE (in)

9

STONE BELOW (in)

40

STONE VOID

3560

INSTALLED SYSTEM VOLUME (CF)
(PERIMETER STONE INCLUDED)
(COVER STONE INCLUDED)
(BASE STONE INCLUDED)

1084

SYSTEM AREA (SF)

149.9

SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	946.70
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	940.70
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	940.20
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	940.20
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	940.20
TOP OF STONE:	939.70
TOP OF MC-3500 CHAMBER:	938.70
12" x 12" TOP MANIFOLD INVERT:	937.15
4" INSERTA TEE INVERT:	935.45
24" ISOLATOR ROW PLUS INVERT:	935.12
24" ISOLATOR ROW PLUS INVERT:	935.12
15" BOTTOM CONNECTION INVERT:	935.08
BOTTOM OF MC-3500 CHAMBER:	934.95
BOTTOM OF STONE:	934.20

PART TYPE

ITEM ON LAYOUT

DESCRIPTION

INVERT

MAX FLOW

PREFABRICATED END CAP

A

24" BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS

2.06"

PREFABRICATED END CAP

B

12" TOP CORED END CAP, PART#: MC3500IEPP12T / TYP OF ALL 12" TOP CONNECTIONS

26.40"

PREFABRICATED END CAP

C

15" BOTTOM CORED END CAP, PART#: MC3500IEPP15B / TYP OF ALL 15" BOTTOM CONNECTIONS

1.50"

FLAMP

D

INSTALL FLAMP ON 24" ACCESS PIPE / PART#: MC350024RAMP (TYP 2 PLACES)

MANIFOLD

E

12" x 12" TOP MANIFOLD, ADS N-12

26.36"

INSERTA TEE

F

4" DIAMETER

6.00"

NYLOPLAST (INLET W/ ISO PLUS ROW)

G

30" DIAMETER (24.00" SUMP MIN)

2.5 CFS IN

NYLOPLAST (INLET W/ ISO PLUS ROW)

H

30" DIAMETER (24.00" SUMP MIN)

NYLOPLAST (OUTLET)

I

30" DIAMETER (DESIGN BY ENGINEER)

2.7 CFS OUT

INSPECTION PORT

J

4" SEE DETAIL (TYP 2 PLACES)

PROPOSED LAYOUT

PROPOSED ELEVATIONS

WEST - TONKA WOODCROFT IMPROVEMENTS MINNETONKA, MN

DATE: DRAWN: MA CHECKED: N/A

PROJECT #:

52.68'

46.75'

20.25'

22.25'

H

C

I

J

F

B

E

D

A

G

ISOLATOR ROW PLUS (SEE DETAIL/TYP 2 PLACES)

PLACE MINIMUM 17.50' OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.

DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.

THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.

THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.

NOT FOR CONSTRUCTION: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

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10'

05'10'

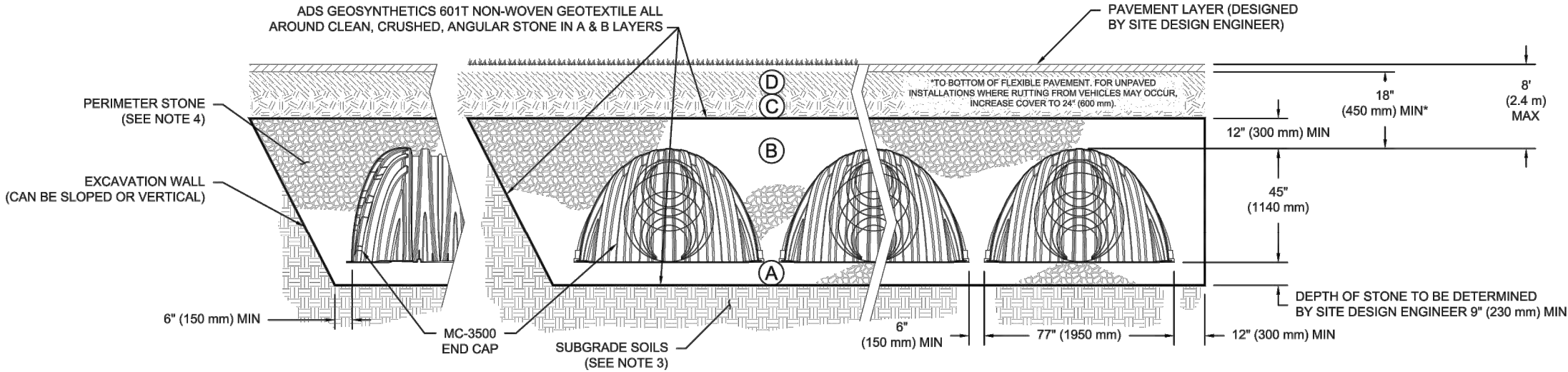
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ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ¹ 3, 4	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 ¹ 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{2,3}

- PLEASE NOTE:
- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
 - STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
 - WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
 - ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418-16a, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
- MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
 - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
 - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
 - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 500 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

WEST - TONKA WOODCROFT IMPROVEMENTS MINNETONKA, MN

DESCRIPTION

CHK

DRW

REV

StormTech® Chamber System

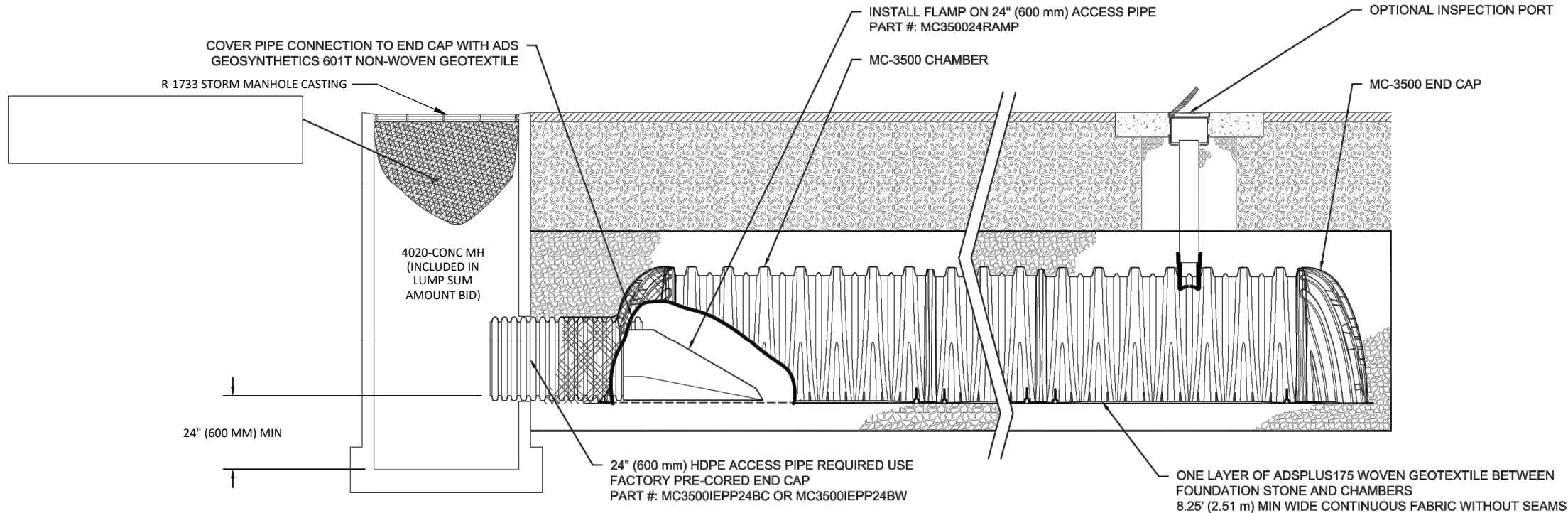
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

888-882-2694 | WWW.STORMTECH.COM

888-882-2694 | WWW.STORMTECH.COM

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SHEET 3 OF 6



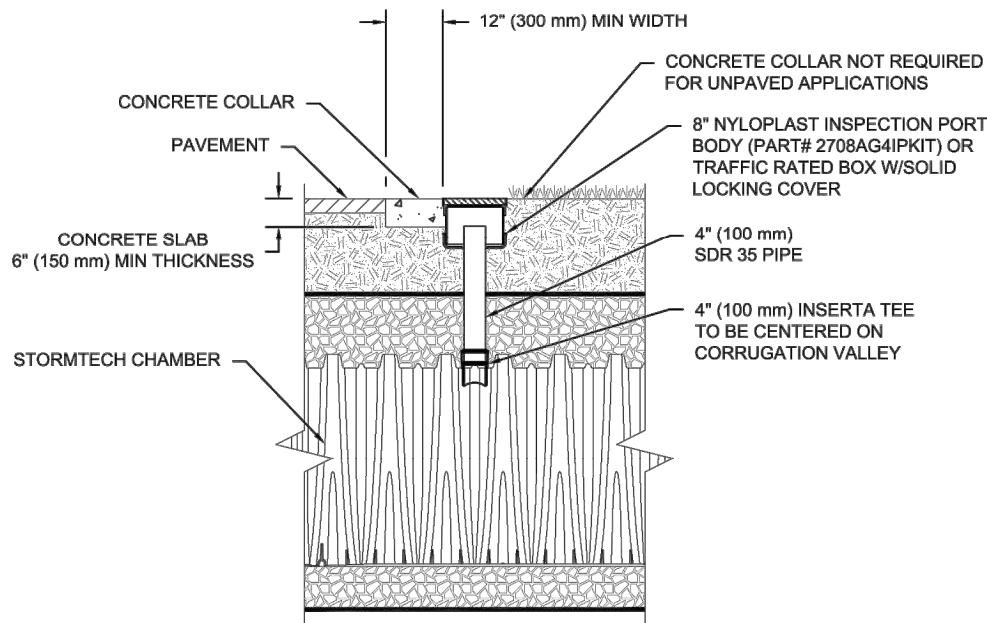
MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

- STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
 - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
 - B. ALL ISOLATOR PLUS ROWS
 - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
 - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
 - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
 - B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - C. VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.


NOTES

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



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

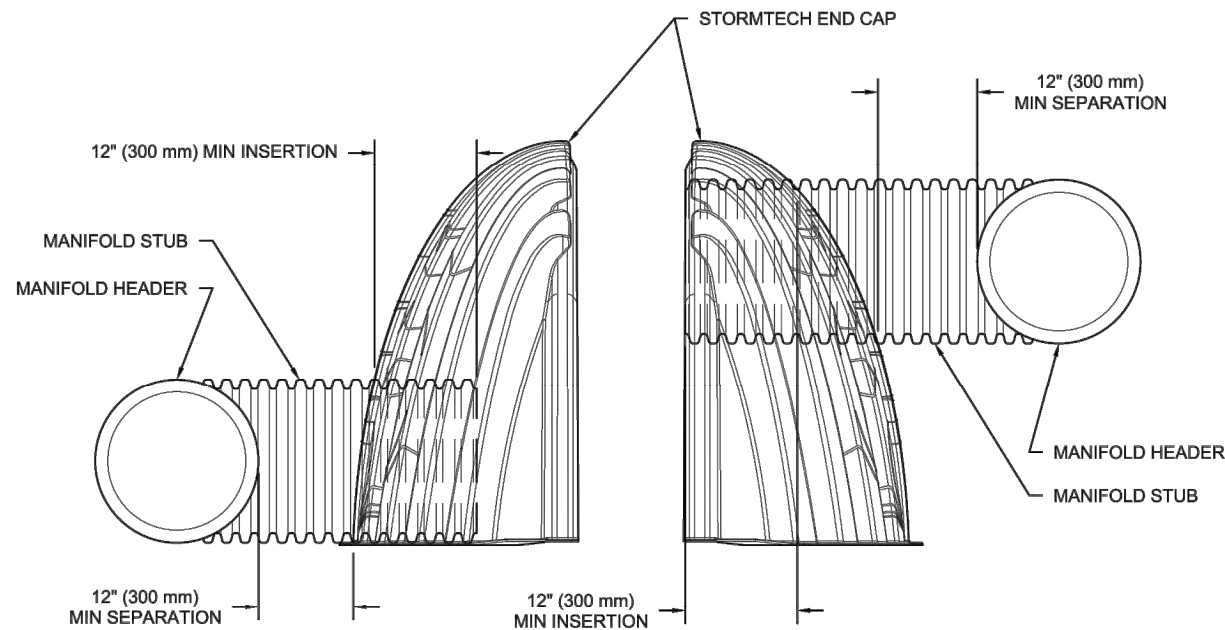
4" PVC INSPECTION PORT DETAIL
(MC SERIES CHAMBER)
NTS

<div><div>4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473</div></div>		<div><div>StormTech[®]</div><div>Chamber System</div><div>888-892-2694 WWW.STORMTECH.COM</div></div>				REV	DRW	CHK	DESCRIPTION
SHEET 4 OF 6		DATE:		DRAWN: MA		PROJECT #:		CHECKED: N/A	
THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.									

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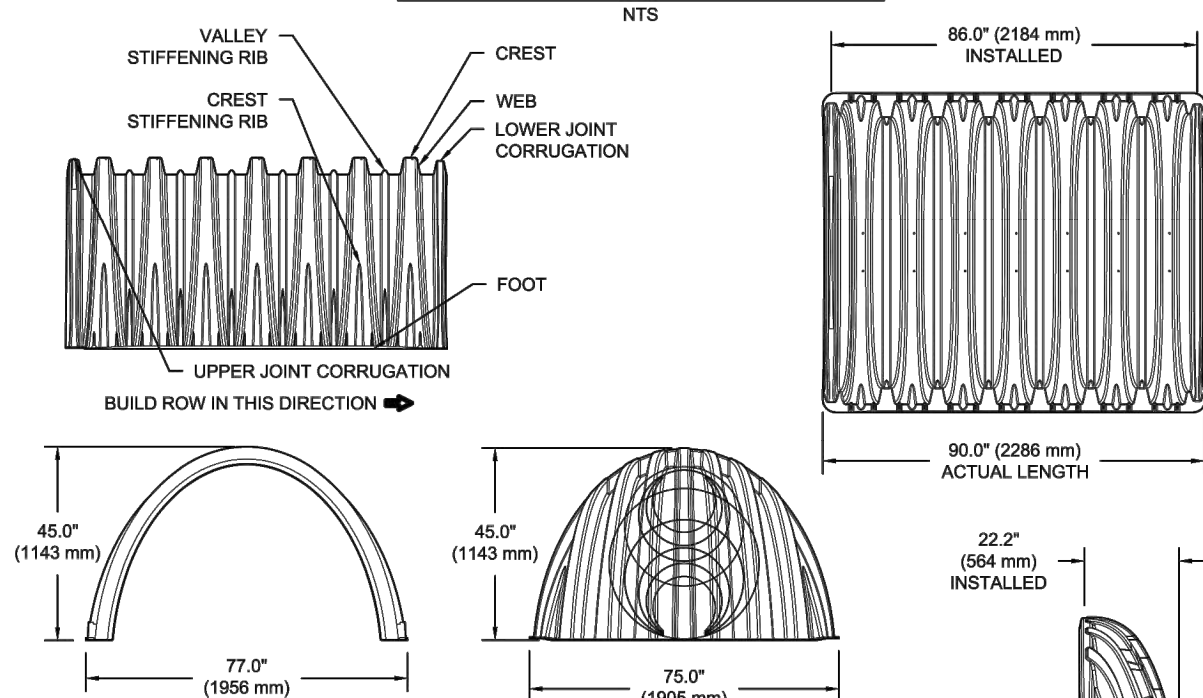
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MC-SERIES END CAP INSERTION DETAIL



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

MC-3500 TECHNICAL SPECIFICATION



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	—
MC3500IEPP06B	—	—	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	—
MC3500IEPP08B	—	—	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	—
MC3500IEPP10B	—	—	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	—
MC3500IEPP12B	—	—	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	—
MC3500IEPP15B	—	—	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	—
MC3500IEPP18TW		—	—
MC3500IEPP18BC		—	1.77" (45 mm)
MC3500IEPP18BW	24" (600 mm)	14.48" (368 mm)	—
MC3500IEPP24TC		—	—
MC3500IEPP24TW		—	—
MC3500IEPP24BC		—	2.06" (52 mm)
MC3500IEPP24BW	30" (750 mm)	—	—
MC3500IEPP30BC		—	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

CUSTOM PRECURED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

WEST - TONKA WOODCROFT IMPROVEMENTS MINNETONKA, MN	DESCRIPTION	CHK	REV	DRW	DATE	PROJECT #	DRAWN: MA	CHECKED: N/A
StormTech® Chamber System								
4640 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473								
888-882-2694 WWW.STORMTECH.COM								
SHEET 5 OF 6								

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Matthew R. Blazer
MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2022



12224 NICOLLET AVENUE
BURNSVILLE, MINNESOTA 55337
Phone: (952) 890-0509
Email: BurnsVille@bolton-menk.com
www.bolton-menk.com



DESIGNED
BS, AC, LW, JB
DRAWN
BS, AC, LW, JB
CHECKED
MRB
CLIENT PROJ. NO.
2022-003-ENG

NO. 1
TITLED FOR
BID SET
DATE 2/23/2022

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT

DETAILS

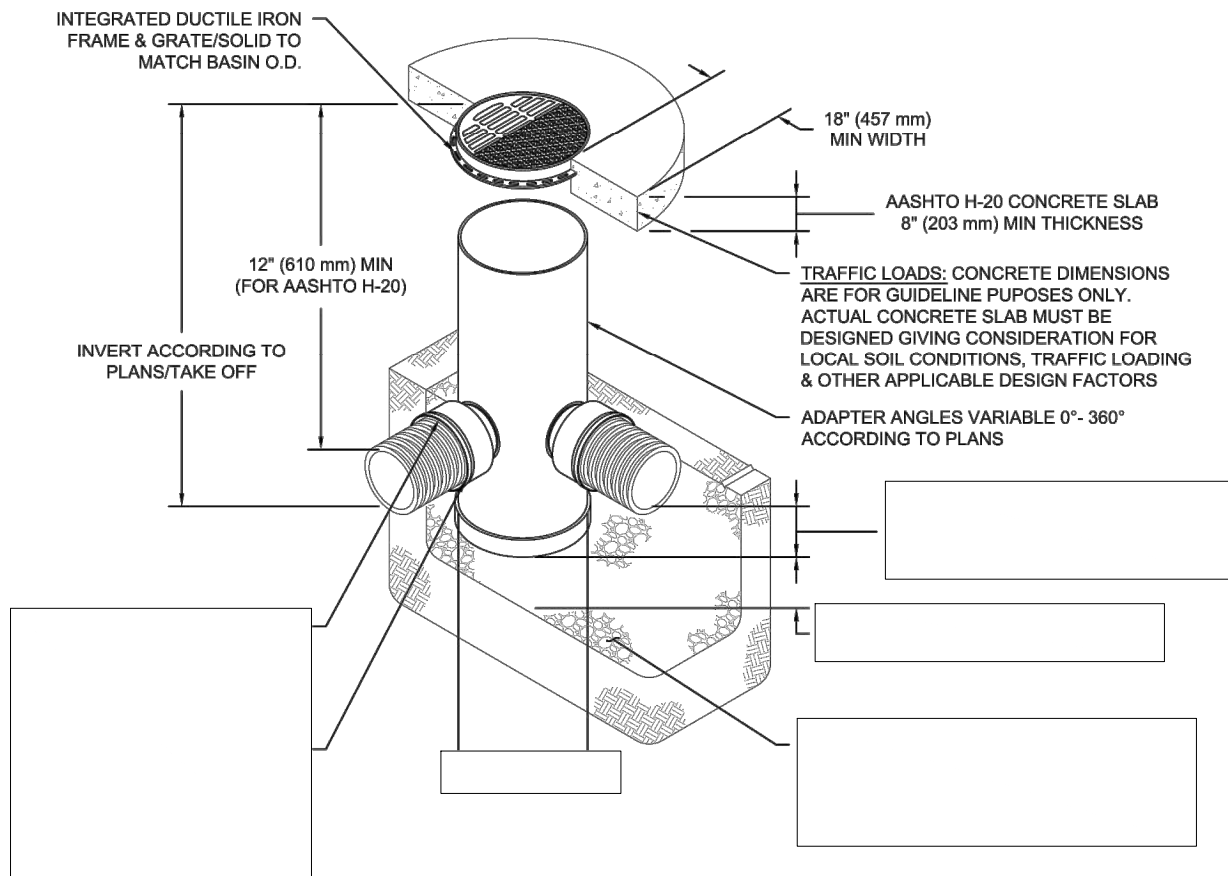
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NYLOPLAST DRAIN BASIN

NTS



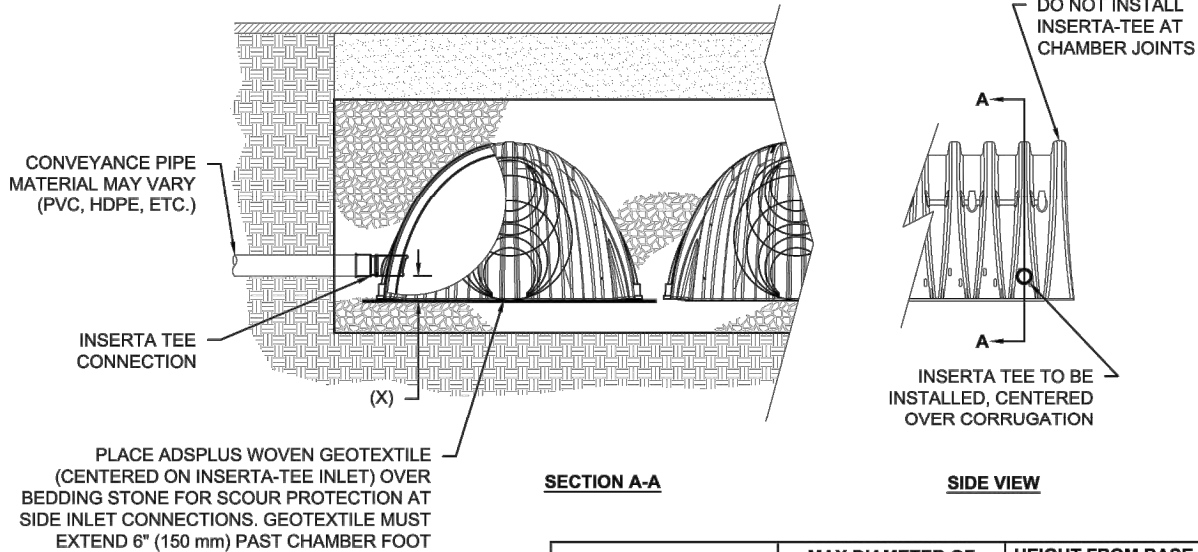
NOTES

- 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
- DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION: WWW.NYLOPLAST-US.COM
- TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

INSERTA TEE DETAIL

NTS



SECTION A-A

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

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

SIDE VIEW

WEST - TONKA WOODCROFT
IMPROVEMENTS
MINNETONKA, MN

DESCRIPTION

CHK

DRW

REV

Nyloplast®

ADS.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SHEET
6 OF 6

DRAWN: MA

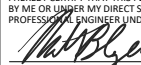
DATE:

PROJECT #:

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MATTHEW R. BLAZER
LIC. NO. 56110 DATE 1/20/2022



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BURNSVILLE, MINNESOTA 55337
Phone: (952) 890-0509
Email: Burnsville@bolton-menk.com
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DESIGNED BS, AC, LW, JB	NO.	ISSUED FOR BID SET	DATE 2/23/2022
DRAWN BS, AC, LW, JB			
CHECKED MRB			
CLIENT PROJ. NO. 2022-003-ENG			

CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT

DETAILS

SHEET

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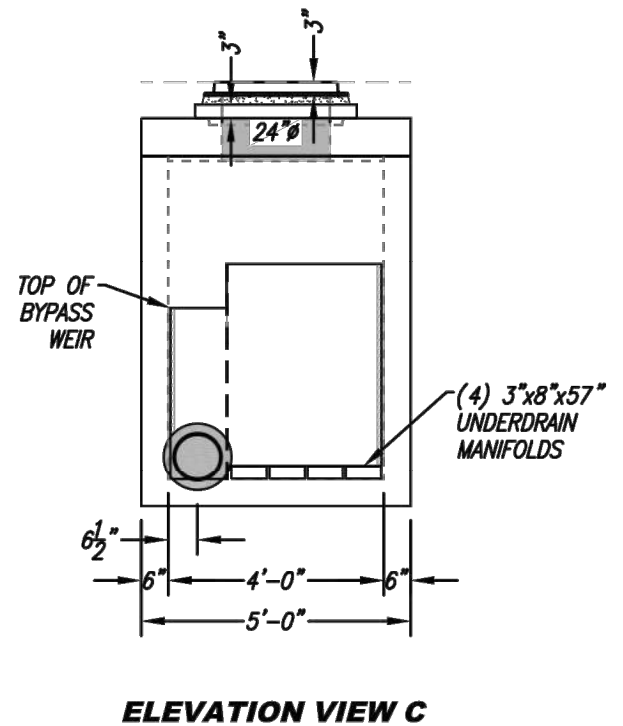
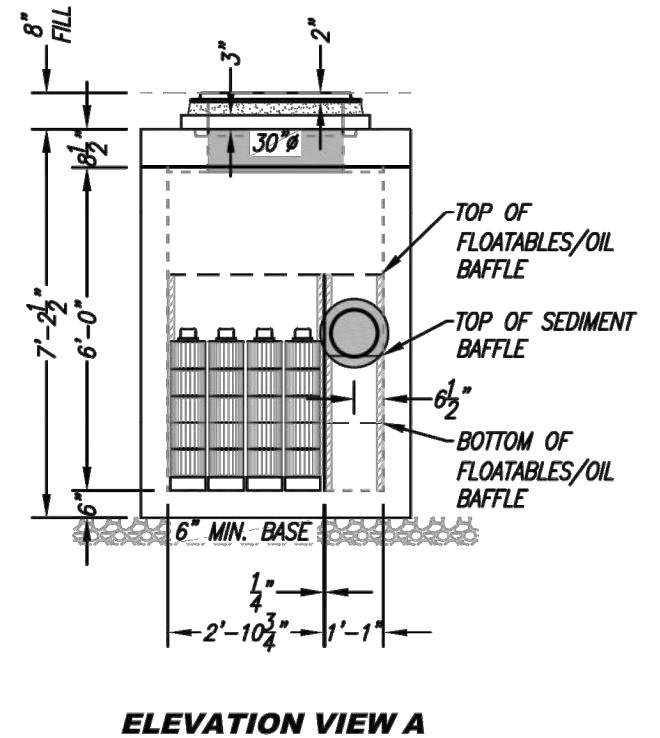
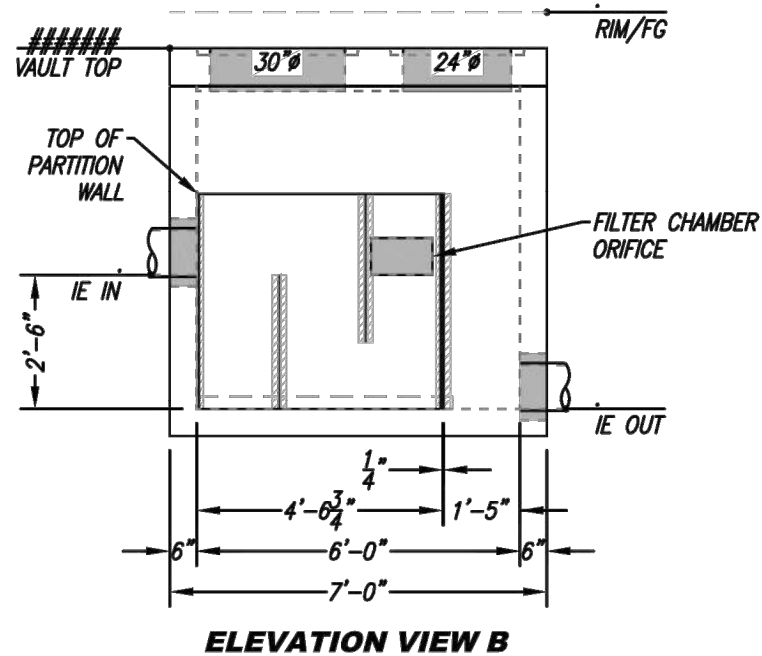
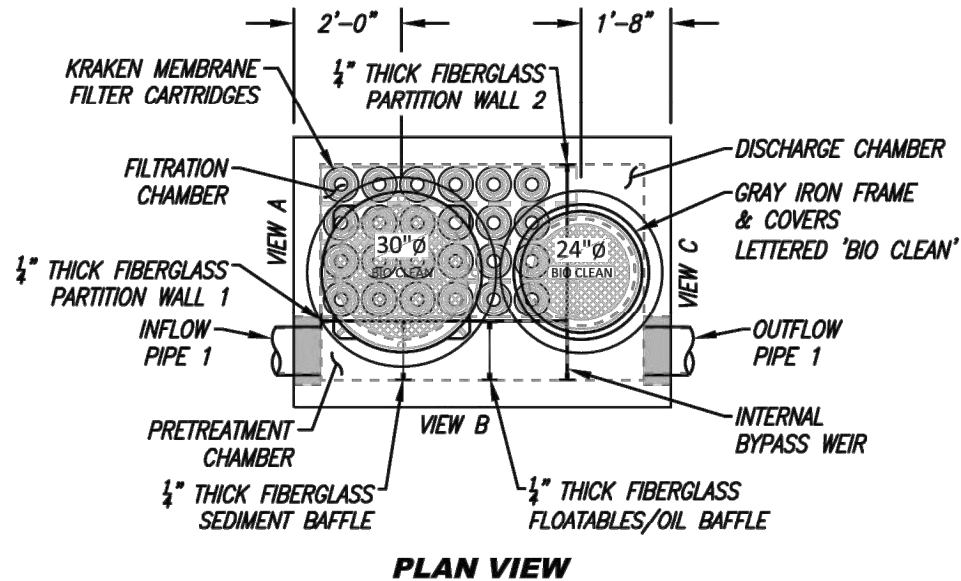
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1/12/22 MELLINGS

SITE SPECIFIC DATA*			
PROJECT NUMBER	.		
PROJECT NAME	.		
PROJECT LOCATION	.		
STRUCTURE ID	KF-4-6		
WATER QUALITY FLOW RATE (CFS)			
PEAK FLOW RATE (CFS)			
PEAK STORM DURATION (YEARS)			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INFLOW PIPE 1	.	TBD	10
OUTFLOW PIPE 1	.	TBD	10
RIM ELEVATION	.		
SURFACE LOADING REQUIREMENT			HS20
FRAME AND COVER		(1) Ø24"; (1) Ø30"	
CORROSIVE SOIL CONDITIONS			NA
KNOWN GROUNDWATER ELEVATION			NA
NOTES:			
*PER ENGINEER OF RECORD			
KRAKEN FILTER PERFORMANCE DATA			
CARTRIDGE HEIGHT (IN)			30.75
CARTRIDGE FLOW RATE (GPM)			8.50
NUMBER OF CARTRIDGES			24
TOTAL TREATMENT FLOW RATE (CFS)			0.45
SEDIMENT STORAGE CAPACITY (CF)			6.75

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE KRAKEN FILTER UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. MANUFACTURER RECOMMENDS A 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH).
4. ALL GAPS AROUND PIPES SHALL BE SEALED WATERTIGHT WITH A NON-SHRINK GROUT PER MANUFACTURER'S STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, AND MANHOLES. ALL COVERS SHALL BE SHIPPED LOOSE. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.

1:40 SCALE



GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS, AND ACCESSORIES PLEASE CONTACT BIO CLEAN.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 10,369,496; 9,604,160; 10,145,765; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING

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KRAKEN KF-4-6-72
MEMBRANE FILTRATION SYSTEM WITH PRETREATMENT
STANDARD DETAIL

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MATTHEW R. BLAZER
55110
DATE 1/20/2022



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Email: BurnsVille@bolton-menk.com
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DESIGNED	BS, AC, LW, JB	NO. 1	ISSUED FOR	ADD 1	DATE	2/16/2022
DRAWN	BS, AC, LW, JB			BID SET		2/23/2022
CHECKED	MRB					
CLIENT PROJ. NO.	2022-003-ENG					

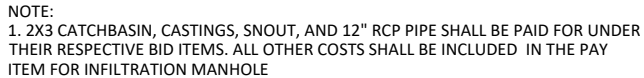
CITY OF MINNETONKA, MN
TONKA - WOODCROFT IMPROVEMENTS PROJECT

DETAILS

SHEET

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PROFILE



PLAN


**BOLTON
& MENK**

CITY OF
MINNETONKA

DETAILS

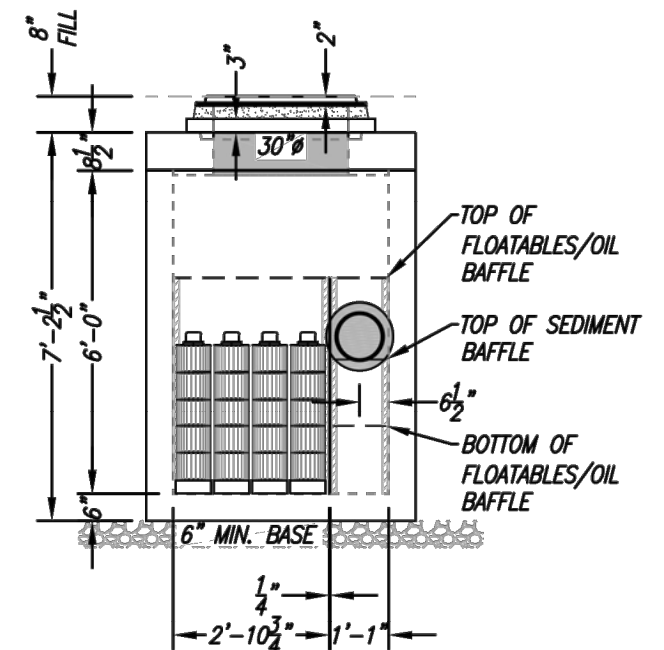
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A

INSTALLATION NOTES

- 1:40 SCALE



ELEVATION VIEW A

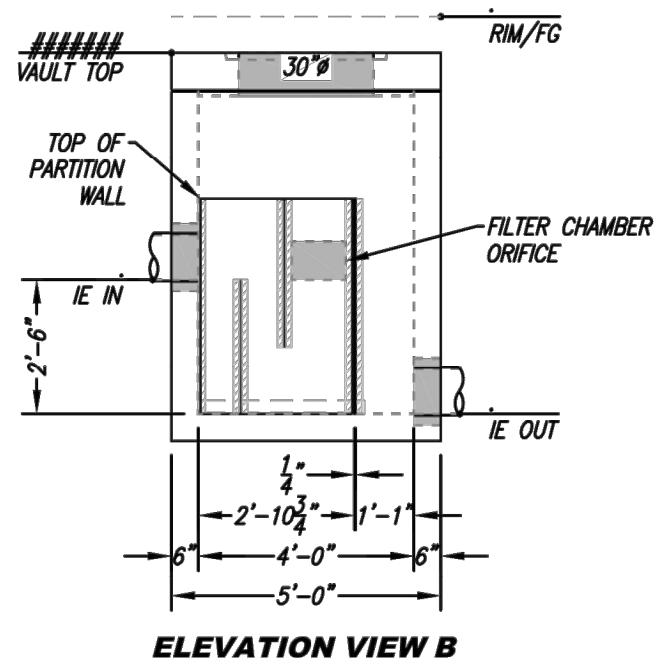


Diagram illustrating the dimensions and components of a rectangular manhole structure:

- Top Opening:** 30" diameter.
- Top of Bypass Weir:** Indicated by a dashed line.
- Underdrain Manifolds:** (4) 3"x8"x37" manifolds located at the bottom.
- Dimensions:**
 - Overall width: 5'-0"
 - Overall height: 4'-0"
 - Side offset from wall to centerline: 6"
 - Offset from centerline to weir: 6 1/2"

ELEVATION VIEW C

GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS, AND ACCESSORIES PLEASE CONTACT BIO CLEAN.

PROPRIETARY AND CONFIDENTIAL:

Bio Clean
A Forterra Company

KRAKEN KF-4-4-72
MEMBRANE FILTRATION SYSTEM WITH PRETREATMENT
STANDARD DETAIL

CITY OF MINNETONKA, MN

TONKA - WOODCROFT IMPROVEMENTS PROJECT

DETAILS

SHEET

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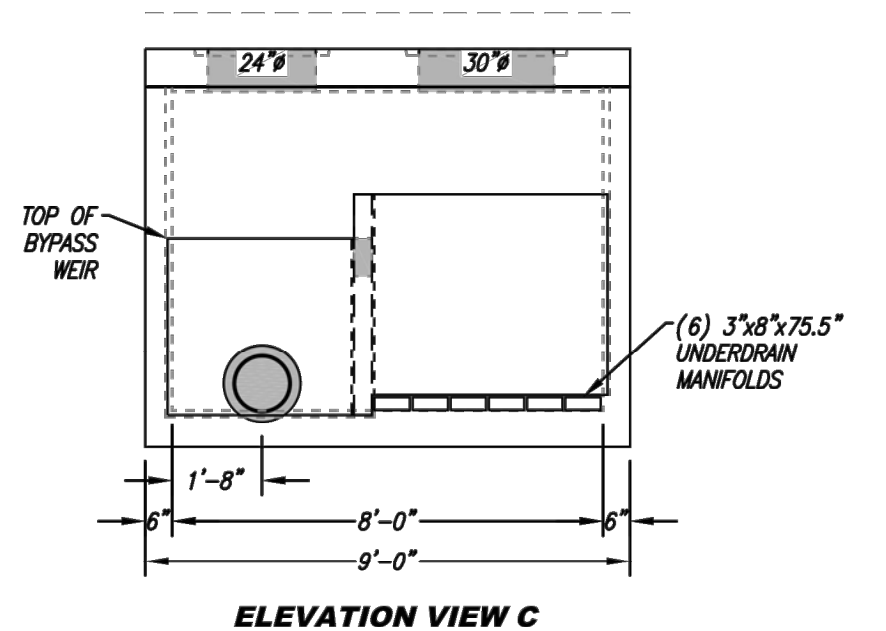
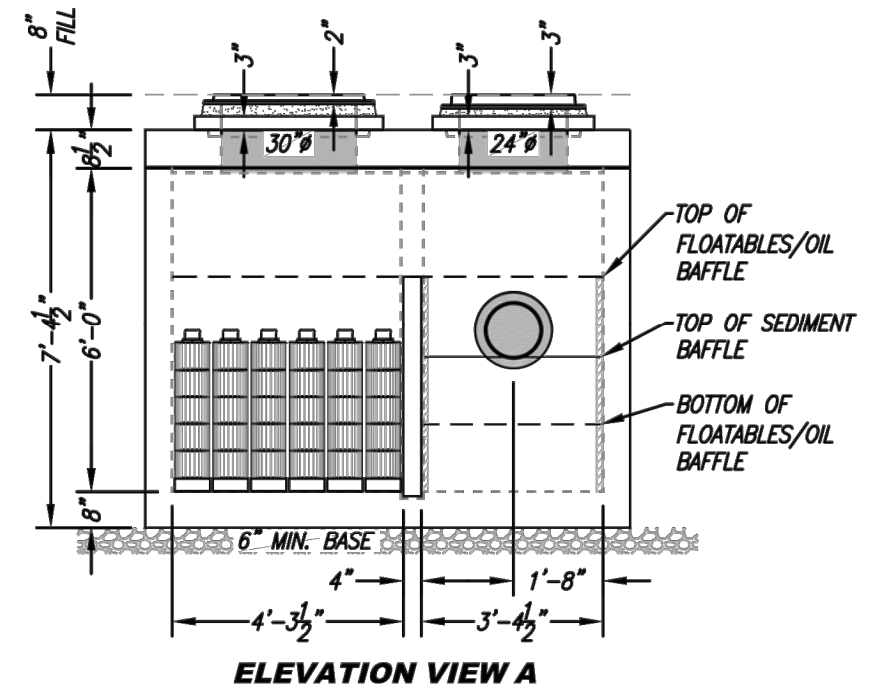
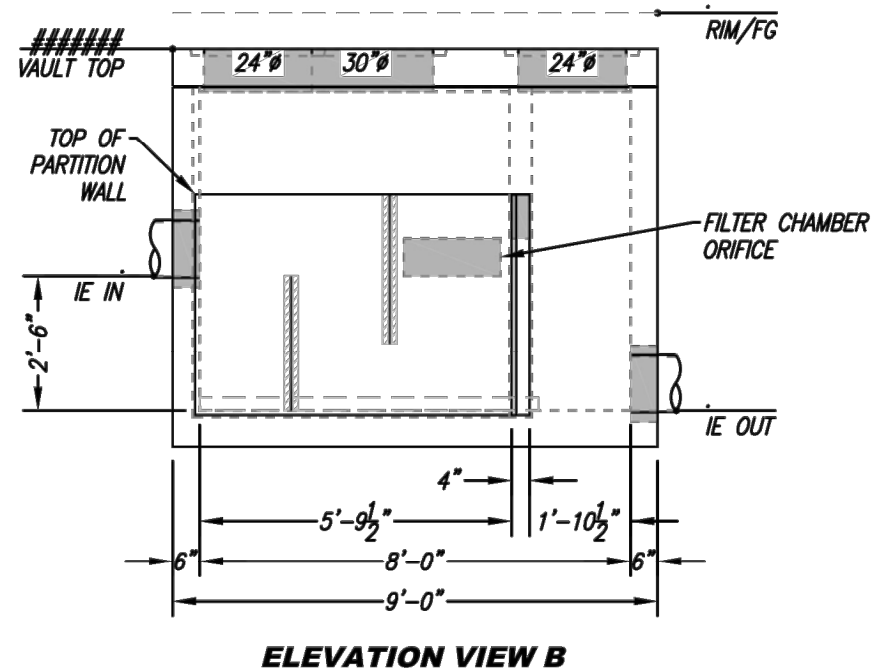
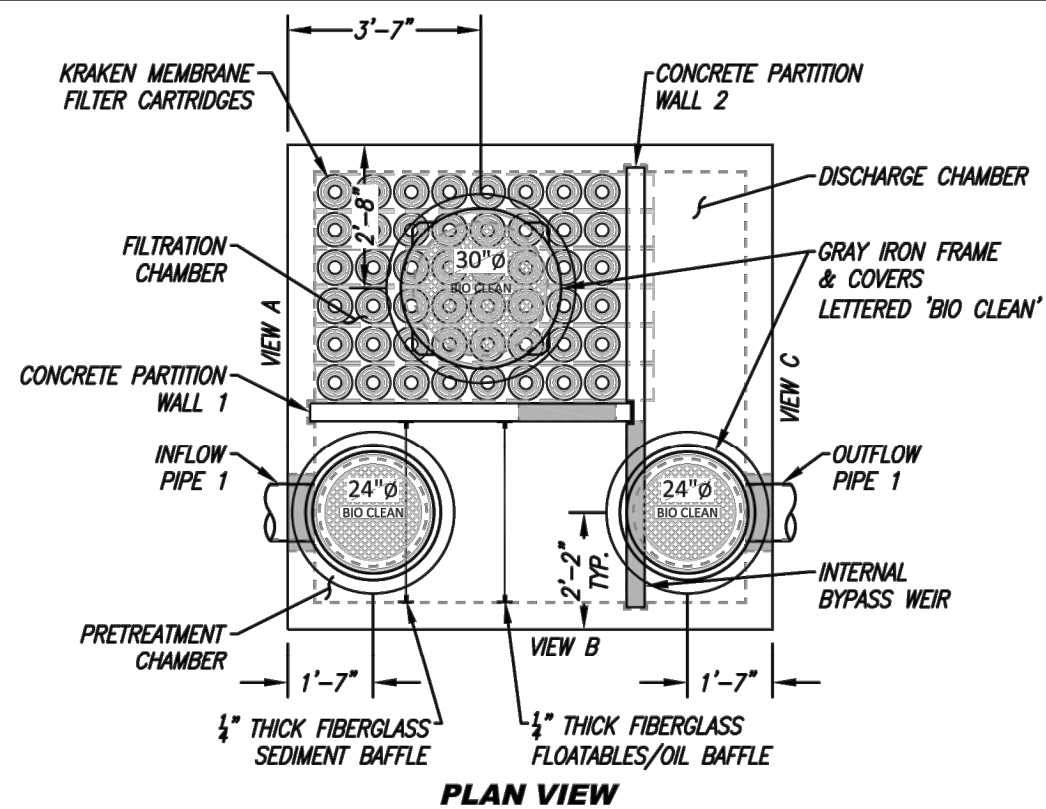
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SITE SPECIFIC DATA*			
PROJECT NUMBER	.		
PROJECT NAME	.		
PROJECT LOCATION	.		
STRUCTURE ID	KF-8-8		
WATER QUALITY FLOW RATE (CFS)			
PEAK FLOW RATE (CFS)			
PEAK STORM DURATION (YEARS)			
PIPE DATA	I.E.	MATERIAL	DIAMETER
INFLOW PIPE 1	.	TBD	12
OUTFLOW PIPE 1	.	TBD	12
RIM ELEVATION	.		
SURFACE LOADING REQUIREMENT			HS20
FRAME AND COVER		(2) Ø24"; (1) Ø30"	
CORROSIVE SOIL CONDITIONS			NA
KNOWN GROUNDWATER ELEVATION			NA
NOTES:			
*PER ENGINEER OF RECORD			
KRAKEN FILTER PERFORMANCE DATA			
CARTRIDGE HEIGHT (IN)			30.75
CARTRIDGE FLOW RATE (GPM)			8.50
NUMBER OF CARTRIDGES			48
TOTAL TREATMENT FLOW RATE (CFS)			0.91
SEDIMENT STORAGE CAPACITY (CF)			18.48

INSTALLATION NOTES

1. CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS, AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE KRAKEN FILTER UNIT AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
2. MANUFACTURER RECOMMENDS A 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
3. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH).
4. ALL GAPS AROUND PIPES SHALL BE SEALED WATERTIGHT WITH A NON-SHRINK GROUT PER MANUFACTURER'S STANDARD CONNECTION DETAIL AND SHALL MEET OR EXCEED REGIONAL PIPE CONNECTION STANDARDS.
5. CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, AND MANHOLES. ALL COVERS SHALL BE SHIPPED LOOSE. CONTRACTOR TO USE GROUT AND/OR BRICKS TO MATCH COVERS WITH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.

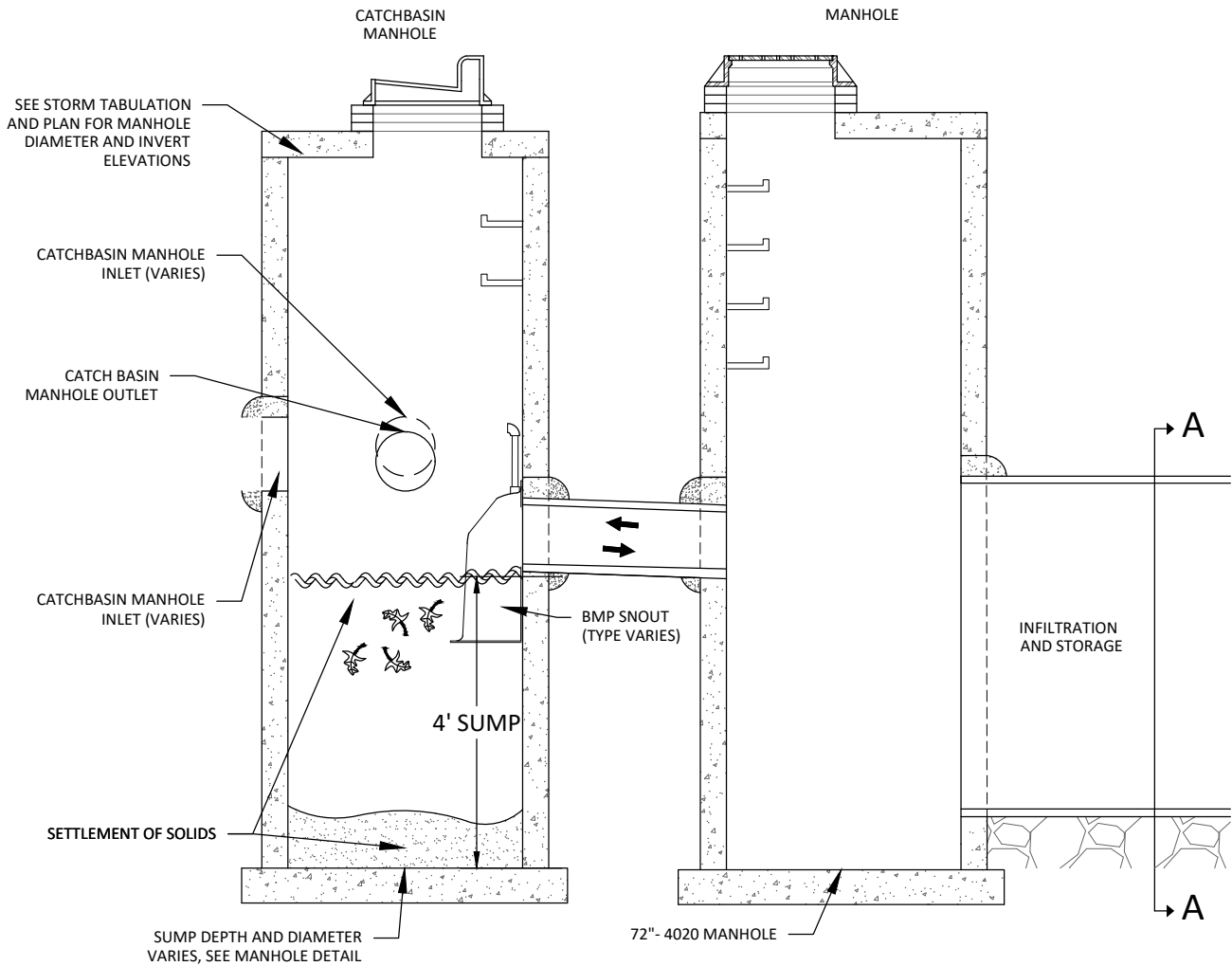
1:40 SCALE



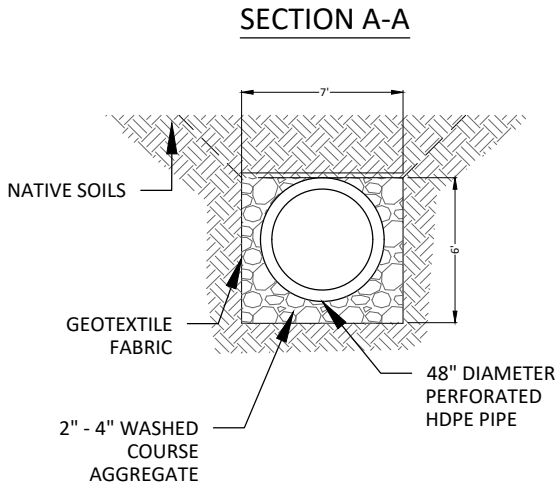
GENERAL NOTES

1. BIO CLEAN TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
2. ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS, AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS, AND ACCESSORIES PLEASE CONTACT BIO CLEAN.

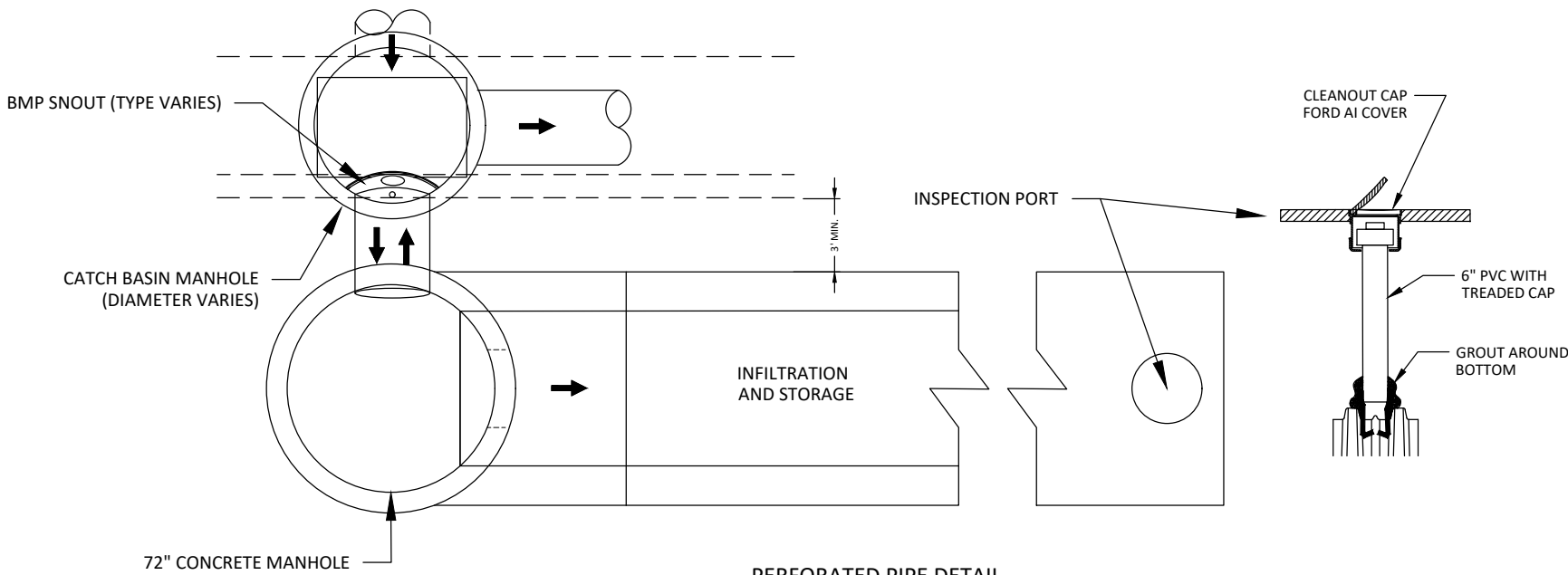
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING US PATENTS: 10,369,496; 9,604,160; 10,145,765; RELATED FOREIGN PATENTS OR OTHER PATENTS PENDING		PROPRIETARY AND CONFIDENTIAL: THE INFORMATION CONTAINED IN THIS DOCUMENT IS THE SOLE PROPERTY OF FORTERRA AND ITS COMPANIES. THIS DOCUMENT, NOR ANY PART THEREOF, MAY BE USED, REPRODUCED OR MODIFIED IN ANY MANNER WITHOUT THE WRITTEN CONSENT OF FORTERRA.		Bio Clean A Forterra Company		KRAKEN KF-8-8-72 MEMBRANE FILTRATION SYSTEM WITH PRETREATMENT STANDARD DETAIL	
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY CLOSE PERSONAL SUPERVISION AND THAT I AM A PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.		BOLTON & MENK		12224 WICOMET AVENUE BURNSVILLE, MINNESOTA 55337 Phone: (952) 890-0509 Email: BurnsVille@bolton-menk.com www.bolton-menk.com		CITY OF MINNETONKA, MN TONKA - WOODCROFT IMPROVEMENTS PROJECT	
MATTHEW R. BLAZER LIC. NO. 56110 DATE 1/20/2022				DESIGNED BY: AC, LW, JB DRAWN BY: BS, AC, LW, JB CHECKED BY: MRB CLIENT PROJ. NO.: 2022-003-ENG		SHEET C1.42	



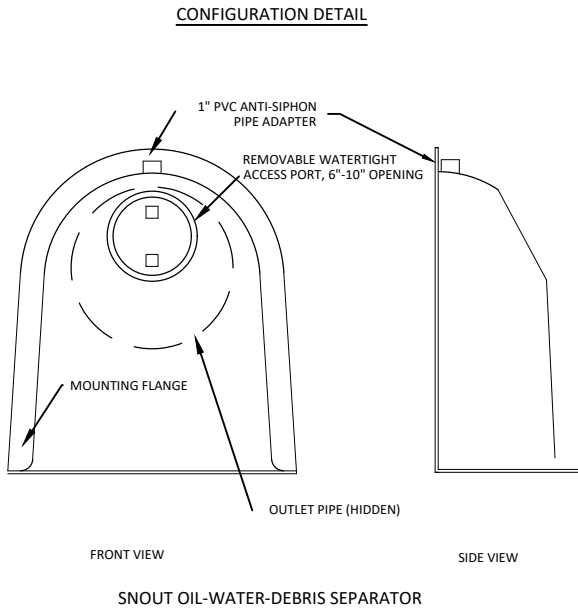
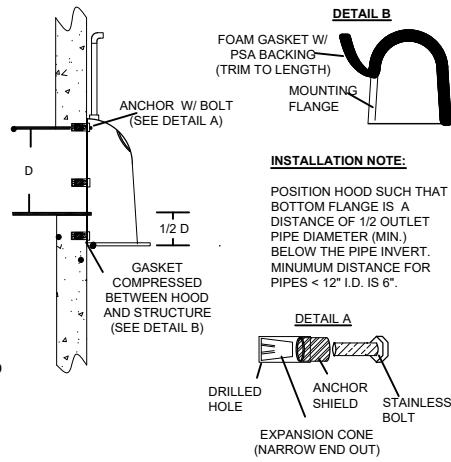
PLAN



INSTALLATION DETAIL



PERFORATED PIPE DETAIL
NOT TO SCALE



SNOUT OIL-WATER-DEBRIS SEPARATOR

NOTES:

1. ALL HOODS AND TRAPS FOR CATCH BASINS AND WATER QUALITY STRUCTURES SHALL BE AS MANUFACTURED BY:
BEST MANAGEMENT PRODUCTS, INC.
9 MATHEWS DRIVE, UNIT A1-A2.
EAST HADDAM, CT 06423
TOLL FREE: (800) 504-8008 OR (888) 434-0277, FAX: (877) 434-3197
WEB SITE: www.bmpinc.com
OR PRE-APPROVED EQUAL
2. ALL HOODS SHALL BE CONSTRUCTED OF A GLASS REINFORCED RESIN COMPOSITE WITH ISO GEL COAT EXTERIOR FINISH WITH A MINIMUM 0.125" LAMINATE THICKNESS.
3. ALL HOODS SHALL BE EQUIPPED WITH A WATERTIGHT ACCESS PORT, A MOUNTING FLANGE, AND AN ANTI-SIPHON VENT PIPE AND ELBOW AS DRAWN. (SEE CONFIGURATION DETAIL)
4. THE SIZE AND POSITION OF THE HOOD SHALL BE DETERMINED BY OUTLET PIPE SIZE AS PER MANUFACTURER'S RECOMMENDATION (SNOOT SIZE ALWAYS LARGER THAN PIPE SIZE).
5. THE BOTTOM OF THE HOOD SHALL EXTEND DOWNWARD A MINIMUM DISTANCE EQUAL TO 1/2 THE OUTLET PIPE DIAMETER WITH A MINIMUM DISTANCE OF 6" FOR PIPES <12" I.D.
6. THE ANTI-SIPHON VENT SHALL EXTEND ABOVE HOOD BY MINIMUM OF 3" AND A MAXIMUM OF 12" ACCORDING TO STRUCTURE CONFIGURATION.
7. THE SURFACE OF THE STRUCTURE WHERE THE HOOD IS MOUNTED SHALL BE FINISHED SMOOTH AND FREE OF LOOSE MATERIAL AND PIPE SHALL BE FINISHED FLUSH TO WALL.
8. ALL STRUCTURE JOINTS SHALL BE WATERTIGHT.
9. THE HOOD SHALL BE SECURELY ATTACHED TO STRUCTURE WALL WITH 3/8" STAINLESS STEEL BOLTS AND OIL-RESISTANT GASKET AS SUPPLIED BY MANUFACTURER. (SEE INSTALLATION DETAIL)
10. INSTALLATION INSTRUCTIONS SHALL BE FURNISHED WITH MANUFACTURER SUPPLIED INSTALLATION KIT.
INSTALLATION KIT SHALL INCLUDE:
A. INSTALLATION INSTRUCTIONS
B. PVC ANTI-SIPHON VENT PIPE AND ADAPTER
C. OIL-RESISTANT CRUSHED CELL FOAM GASKET WITH PSA BACKING
D. 3/8" STAINLESS STEEL BOLTS
E. ANCHOR SHIELDS

US Patent # 6126817, 7951294, 7857966, 8512556
Canada Patent # 2285146, 2690156, 2690156 others pending

***NOTE-** SUMP DEPTH OF 36" MIN. FOR UP TO 12" ID PIPE.
OUTLET. FOR PIPES 15" ID AND ABOVE SUMP DEPTH OF 2.5 TO 3 TIMES PIPE ID RECOMMENDED (E.G. 5' DEEP for 24" PIPE)