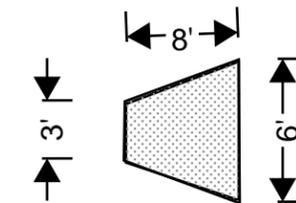
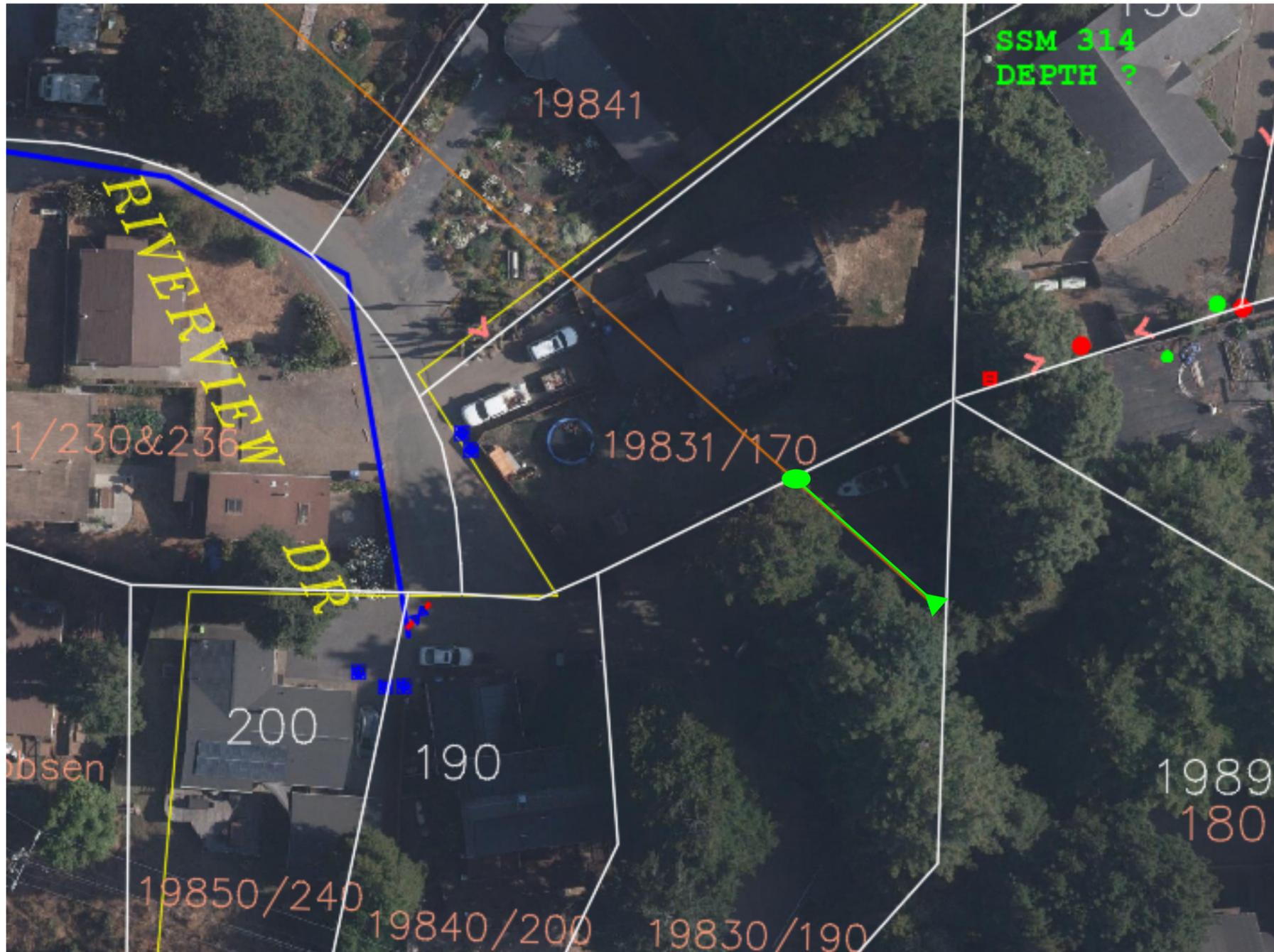


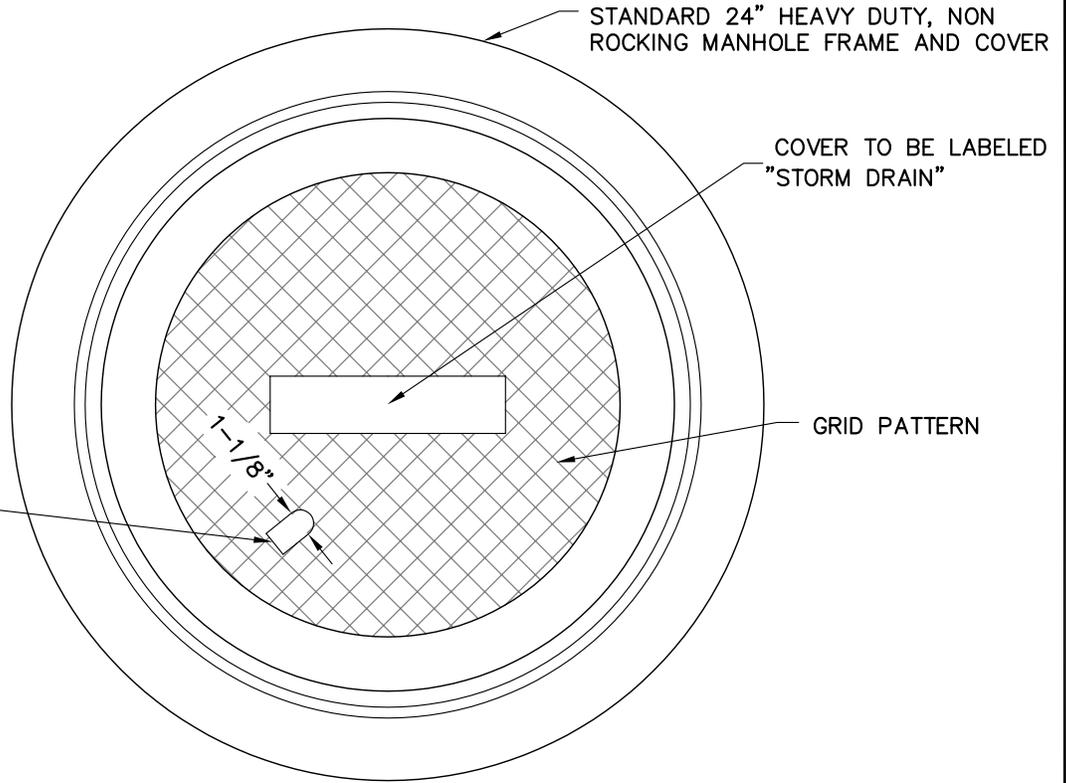
Minnesota / Riverview Storm Drain Repair Project

- 1 EA - Proposed Storm Drain Manhole - City Standard 400 Depth ~ XXft
- 60 lf - Remove (e) 18" CMP (Contractor to VERIFY diameter) and replace with 18" Dual Wall CHDPE Pipe. 1% Maximum pipe slope. Trench to be constructed consistent with Detail City Standard 412
- ▲ 36 SF - Rip-Rap Outlet Protection

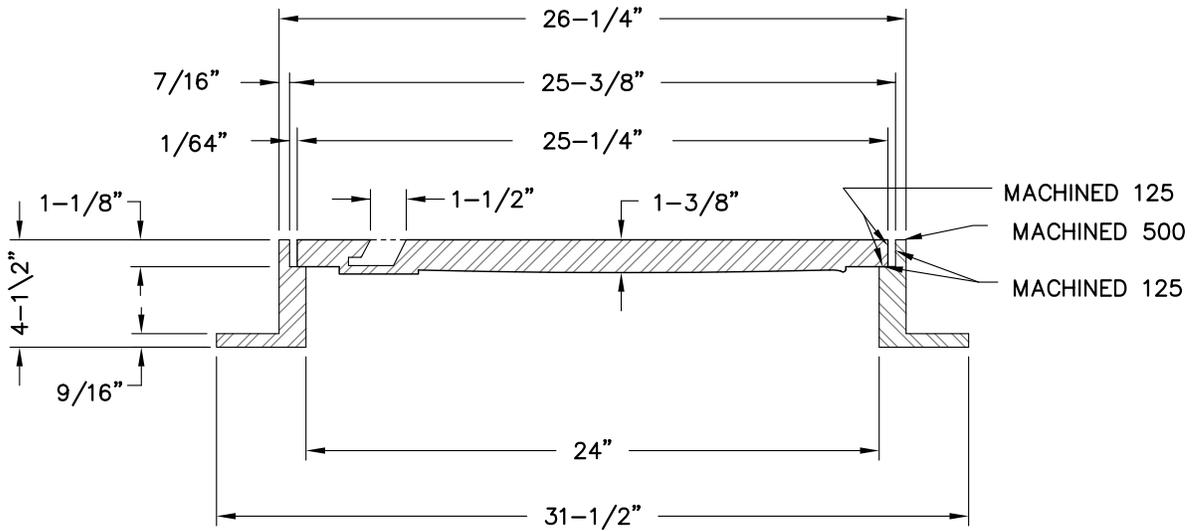


Culvert Outlet - Class II Rock Stone Protection (RSP). Minimum 12" layer of RSP over Class 8 RSP Fabric

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ONE CLOSED PICK HOLE PER COVER



NOTES:

1. ALL CASTINGS SHALL BE DIPPED IN APPROVED ASPHALT PAINT.
2. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO A.S.T.M. DESIGNATION 48-30, OR TO UNITED STATES GOVERNMENT SPECIFICATIONS QQI-652B.
3. MINIMUM WEIGHT COMPONENTS: COVER - 130 POUNDS
FRAME - 135 POUNDS



**STANDARD MANHOLE
FRAME AND COVER**

**STD. NO.
401**

SCALE: NONE

DRAWN: LMM

CHK: OAB

APPVD:

DATE: APR 2008

NOTES:

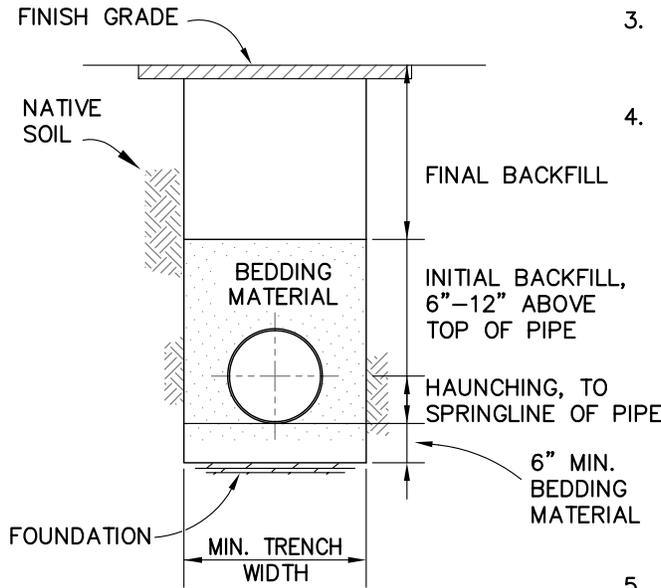
1. **FOUNDATION:** WHERE THE TRENCH BOTTOM IS UNSTABLE, THE CONTRACTOR SHALL EXCAVATE TO A DEPTH REQUIRED BY THE ENGINEER AND REPLACE WITH A FOUNDATION OF CLASS I OR II MATERIAL AS DEFINED IN ASTM D2321, "STANDARD PRACTICE FOR INSTALLATION OF THERMOPLASTIC PIPE FOR SEWERS AND OTHER GRAVITY-FLOW APPLICATIONS," LATEST EDITION; AS AN ALTERNATIVE AND AT THE DISCRETION OF THE ENGINEER, THE TRENCH BOTTOM MAY BE STABILIZED USING A WOVEN GEOTEXTILE FABRIC.
2. **BEDDING:** SUITABLE MATERIAL SHALL BE CLASS I, II, OR III, AND INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
3. **HAULING AND INITIAL BACKFILL:** SUITABLE MATERIAL SHALL BE CLASS I, II, OR III, AND INSTALLED AS REQUIRED IN ASTM D2321, LATEST EDITION.
4. UNLESS OTHERWISE SPECIFIED BY THE ENGINEER, MINIMUM TRENCH WIDTHS SHALL BE AS FOLLOWS:

NOMINAL ϕ IN INCHES	MIN. RECOMMENDED TRENCH WIDTH
4"	21"
6"	23"
8"	25"
10"	28"
12"	31"
15"	34"
18"	39"
24"	48"
30"	66"
36"	78"
42"	83"
48"	89"
60"	102"

5. **MINIMUM COVER:** MINIMUM RECOMMENDED DEPTHS OF COVER FOR VARIOUS LIVE LOADING CONDITIONS ARE SUMMARIZED IN THE FOLLOWING TABLE. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE TAKEN FROM THE TOP OF PIPE TO THE GROUND SURFACE.

SURFACE LIVE LOADING CONDITION	MINIMUM RECOMMENDED COVER IN INCHES
H25 (FLEXIBLE PAVEMENT)	24"
H25 (RIGID PAVEMENT)	24"
E80 RAILWAY	24"
HEAVY CONSTRUCTION	48"

*TOP OF PIPE TO BOTTOM OF BITUMINUS PAVEMENT SECTION.



TYPICAL TRENCH CROSS-SECTION

(N.T.S.)

Images: Xrefs: Path: C:\DOCUME~1\Krautner\LOCALS~1\Temp\AcPublish_6624\FortBragg400-412.dwg Layout Name: 412 Plot Date: Feb 02, 2009 at 17:42



HDPE TRENCH INSTALLATION DETAIL

**STD. NO.
412**

SCALE: NONE

DRAWN: LMM

CHK: OAB

APPVD:

DATE: APR 2008

May 20, 2022

Table 873.3A

RSP Class by Median Particle Size⁽³⁾

Nominal RSP Class by Median Particle Size ⁽³⁾		d ₁₅ (in)		d ₅₀ (in)		d ₁₀₀ (in)	Placement Method
Class ⁽¹⁾ , (2)	Size (in)	Min	Max	Min	Max	Max	
I	6	3.7	5.2	5.7	6.9	12.0	B
II	9	5.5	7.8	8.5	10.5	18.0	B
III	12	7.3	10.5	11.5	14.0	24.0	B
IV	15	9.2	13.0	14.5	17.5	30.0	B
V	18	11.0	15.5	17.0	20.5	36.0	B
VI	21	13.0	18.5	20.0	24.0	42.0	A or B
VII	24	14.5	21.0	23.0	27.5	48.0	A or B
VIII	30	18.5	26.0	28.5	34.5	48.0	A or B
IX	36	22.0	31.5	34.0	41.5	52.8	A
X	42	25.5	36.5	40.0	48.5	60.5	A
XI	46	28.0	39.4	43.7	53.1	66.6	A

NOTES:

⁽¹⁾Rock grading and quality requirements per Standard Specifications.

⁽²⁾RSP-fabric Type of geotextile and quality requirements per Section 96 Rock Slope Protection Fabric of the Standard Specifications. For RSP Classes I thru VIII, use Class 8 RSP-fabric which has lower weight per unit area and it also has lower toughness (tensile x elongation, both at break) than Class 10 RSP-fabric. For RSP Classes IX thru XI, use Class 10 RSP-fabric.

RSP Fabric - US Fabrics Incorporated product No. US 225NWE or equal.

⁽³⁾Intermediate, or B dimension (i.e., width) where A dimension is length, and C dimension is thickness.

96-1.02I Rock Slope Protection Fabric

RSP fabric must be a permeable, nonwoven, needle-punched geotextile. The fabric must be manufactured from one of the following:

1. Polyester
2. Polypropylene
3. Combined polyester and polypropylene

Polymers must be either virgin compounds or clean reworked material. Do not subject virgin compounds to use or processing other than required for initial manufacture. Clean reworked material must be previously processed material from the processor's own production that has been reground, pelletized, or solvated. The fabric must not contain more than 20 percent of clean reworked material by weight. Do not use recycled materials from either post-consumer or post-industrial sources.

RSP fabric must comply with the requirements shown in the following table:

RSP Fabric

Quality characteristic	Test method	Requirement	
		Class 8	Class 10
Mass (min, oz/sq yd)	ASTM D5261	7.5	9.5
Grab breaking load, 1 inch grip in each direction (min, lb)	ASTM D4632	200	250
Apparent elongation in each direction (min, %)	ASTM D4632	50	50
Permittivity (min, sec ⁻¹)	ASTM D4491	1.0	0.70
Apparent opening size (µm (US Sieve))	ASTM D4751	150(100)– 212(70)	150(100)– 212(70)
UV resistance, retained grab breaking load, 500 hours (min, %)	ASTM D4355	70	70