SITE PLAN OF PROPOSED

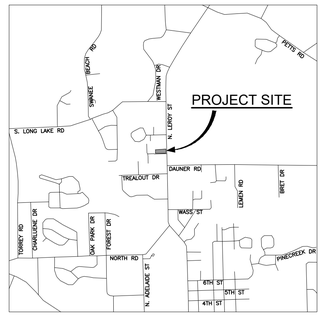
DIAMOND OPTICAL CARE OF FENTON

NORTH LEROY STREET, CITY OF FENTON, GENESEE COUNTY MICHIGAN

DATE: AUGUST 15, 2022

PROJECT RENDERING OF FENTON COMMONS STREET VIEW

RENDERING PROVIDED BY SEDWICK + FERWEDA ARCHITECTS



LOCATION MAP

NOT TO SCALE

NORTH

PROPERTY DESCRIPTION

PART OF THE SOUTHEAST 1/4 OF SECTION 23, TOWNSHIP 5 NORTH, RANGE 6 EAST, CITY OF FENTON, GENESEE COUNTY, MICHIGAN, DESCRIBED AS COMMENCING AT THE SOUTHEAST CORNER OF SECTION 23, TOWNSHIP 5 NORTH, RANGE 6 EAST; THENCE N01°35'19"W, 367.00' TO THE POINT OF BEGINNING; THENCE S87°00'11"W, 343.00'; THENCE N01°35'19"W, PARALLEL WITH THE EAST LINE OF SAID SECTION; THENCE N87°00'11"E, 343.00'; THENCE S01°35'19"E, ALONG THE EAST LINE OF SAID SECTION, TO THE POINT OF BEGINNING. CONTAINING 0.79 ACRES MORE OR LESS, AND SUBJECT TO RESERVATIONS, EASEMENTS, RIGHTS-OF-WAY AND RESTRICTIONS OF RECORD.

THE ABOVE DESCRIPTION WAS PROVIDED BY WILLIAM A KIBBE ASSOCIATES, INC.

SHEET INDEX

ATTACHMENTS TO BE INCLUDED WITH ENGINEERING PLANS:

- STANDARD GCDC SOIL EROSION AND SEDIMENTATION CONTROL SHEET
- CITY OF FENTON STANDARD PAVEMENT, SANITARY. AND WATERMAIN DETAIL SHEETS

NOTE: TOTAL NUMBER OF SHEETS IN THIS SET OF PLANS = 15

ARCHITECTURAL, MECHANICAL, SITE LIGHTING AND ELECTRICAL PLANS FOR THE PROPOSED BUILDINGS ARE NOT INCLUDED IN THIS SET OF PLANS. THIS INFORMATION HAS BEEN PREPARED BY OTHERS.

MUNICIPAL REVIEWS AND/OR APPROVALS

TYPE OF REVIEW	PLANNING COMMISSION	CITY COUNCIL
SITE PLAN APPROVAL	JULY 28, 2022	N/A

REVIEWING AGENCY / UTILITY COMPANY LIST

AGENCY/UTILITY COMPANY	DATE SUBMITTED	CONTACT PERSON	TELEPHONE NUM.
CITY OF FENTON	JUNE 29, 2022	JASON PAYNE	(810) 433-7954
* GENESEE CO. DRAIN COMMISSION-WWS (IPP)	JULY 8, 2022	THAD DOMICK	(810) 232-7662
GENESEE CO. DRAIN COMMISSION-WWS (SESC)	JULY 8, 2022	CLIFF WEBSTER	(810) 732-7870
CONSUMERS ENERGY EXISTING GAS	JULY 8, 2022	TONNA WILCOX	(810) 760-3486
EXISTING ELECTRIC	JULY 8, 2022	TRACY MAHAR	(989) 729-3250
AT&T	JULY 8, 2022	MICHAEL BAIZ	(810) 768-0109
COMCAST CABLEVISION	JULY 8, 2022	JEFF DOBIES	(248) 808-27220
CHARTER COMMUNICATIONS	JULY 8, 2022	DAN BIELACZYC	(810) 652-1420

* TO BE SUBMITTED AFTER RECEIVING SITEPLAN APPROVAL FROM PLANNING COMMISSION

OWNER/APPLICANT
DR. JOSEPH M. LEPPEK, O.D.
DIAMOND OPTICAL CARE OF FENTON
1425 N. LEROY STREET
FENTON, MICHIGAN 48430
PH: 810-629-2041

SITE ENGINEER
FLEIS & VANDENBRINK
9475 N. HOLLY ROAD
SUITE 201
GRAND BLANC, MICHIGAN 48439
PH: 810-743-9120

ARCHITECT
SEDGEWICK + FERWEDA ARCHITECTS
410 EAST COURT STREET
FLINT, MICHIGAN 48503
PH: 810-238-9647

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

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DIAMOND OPTICAL CARE OF FENTON
NORTH LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN

STATE OF MICHIGAN
MICHAEL W. WOLPETZER
No. 45511
REGISTERED PROFESSIONAL ENGINEER

JUNE 2022

F&V PROJECT NO.
8454860

C001

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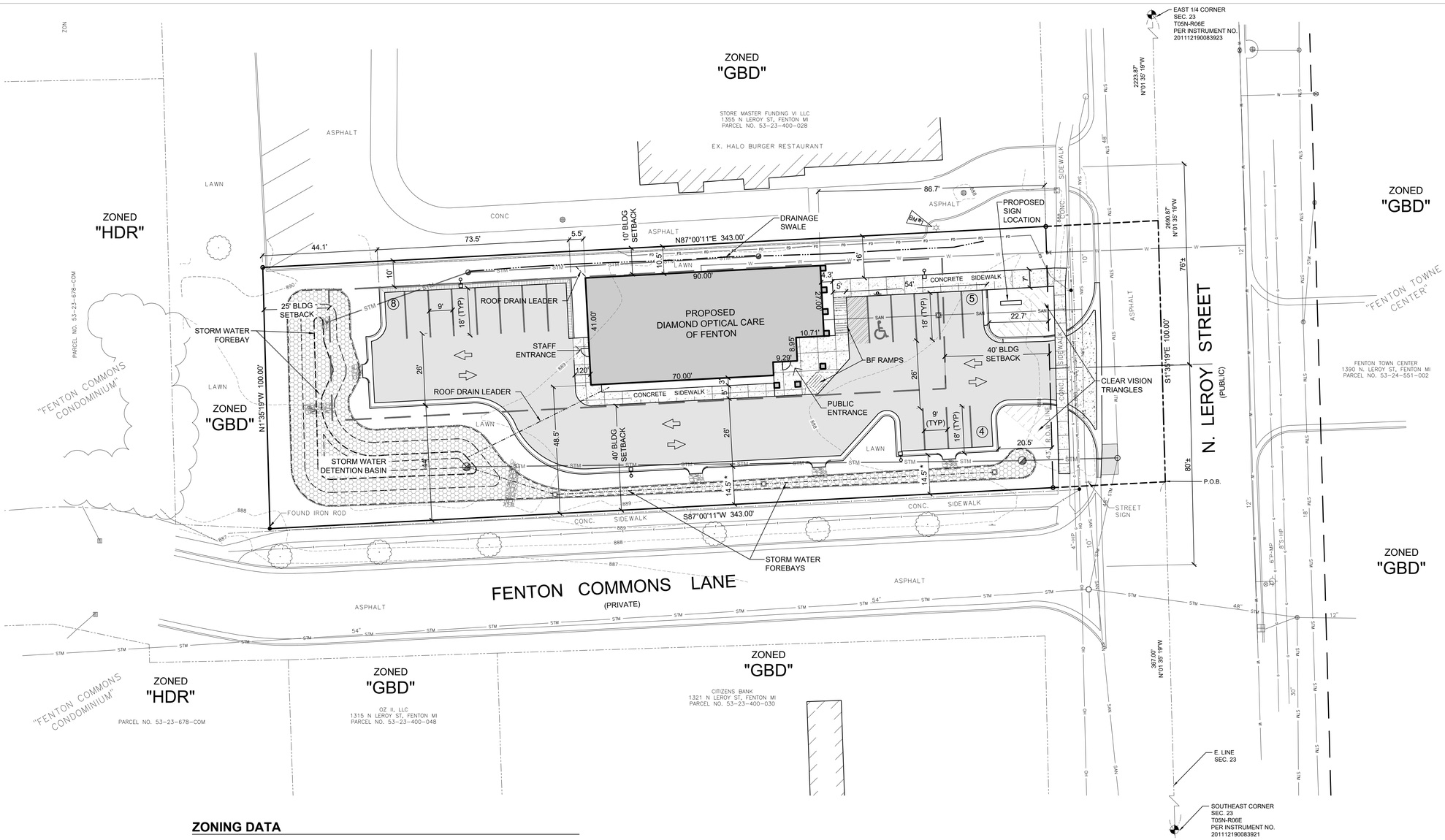

ZONING DATA

PROJECT LOCATION: PART OF SECTION 23, T5N-R6E CITY OF FENTON.
(WEST SIDE OF NORTH LEROY STREET NORTH OF FENTON COMMONS LANE)

PARCEL ID #: 53-23-400-029

ZONING/ACREAGE: ZONING: "GBD" GENERAL BUSINESS DISTRICT
ACREAGE: 0.79± GROSS ACRES

LAND USE: EXISTING LAND USE: VACANT
PROPOSED LAND USE: OPTOMETRIST OFFICE

BUILDING AREA: FIRST FLOOR = 3,493 SQ FT
SECOND FLOOR = 1432 SQ FT
TOTAL = 4,925 SQ FT

BUILDING SETBACKS: FRONT = 40'
SIDE = 10' (25' TOTAL BOTH SIDES)
REAR = 25"

LOT COVERAGE: PERCENT OF BUILDING COVERAGE SHOWN = 12% (MAX. 30% ALLOWED)
PERCENT OF PARKING COVERAGE SHOWN = 33% (MAX 45% ALLOWED)

PARKING DATA: REQUIRED PER ORDINANCE: 1 SPACE PER 150 SQ FT OF GROSS FLOOR AREA

CALCULATION: 2300 SQ FT / 150 = 15 SPACES

PROVIDED: 17 SPACES (1 IS BARRIER FREE, VAN ACCESSIBLE)

NOTE: PARKING CALCULATION IS BASED ON GROSS USABLE FLOOR AREA AS DEFINED UNDER SECTION 28.04

* NOTE: THE PARKING SETBACK FROM LEROY STREET AND FENTON COMMONS LANE IS 20'. A 5.5' VARIANCE WILL BE REQUIRED FOR THE PARKING ALONG FENTON COMMONS LANE.

LOADING / UNLOADING: DELIVERIES WILL BE MADE AT THE STAFF ENTRANCE OR SOUTH SIDE OF THE BUILDING VIA UPS TRUCKS OR LARGE VANS. VERY LIMITED BOX TRUCK DELIVERIES WILL OCCUR FOR LARGE ITEMS SUCH AS THE INITIAL FURNITURE AND DISPLAY CASE DELIVERY PRIOR TO OPENING.

ADDITIONAL PROJECT NOTES

1. ALL ON-SITE STORM WATER DRAINAGE SYSTEMS ARE TO BE PRIVATELY OWNED AND MAINTAINED BY THE PROPERTY OWNER .
2. NO PUBLIC SANITARY SEWER OR WATERMAIN IS PROPOSED FOR THIS PROJECT, ONLY PRIVATE SANITARY SEWER AND WATER SERVICES ARE PROPOSED. PER ARCHITECT, FIRE SUPPRESSION NOT REQUIRED.
3. THE TOPOGRAPHIC INFORMATION SHOWN WAS TAKEN FROM THE TOPOGRAPHIC SURVEY PROVIDED BY WILLIAM A. KIBBE ASSOCIATES, INC. ON MARCH 30, 2020. SOME OF THE INFORMATION SHOWN OUTSIDE THE PROJECT SITE BOUNDARY MAY BE SHOWN FROM AVAILABLE RECORDS AND SOME EXISTING UTILITY INFORMATION WAS ADDED PER RECORDS PROVIDED.
4. EXISTING UTILITIES HAVE NOT BEEN EXPOSED FOR VERIFICATION OF LOCATION AND ELEVATION. THE EXISTING UTILITIES DEPICTED ON THIS DRAWING WERE TAKEN FROM THE SURVEY PROVIDED AND FROM AVAILABLE RECORDS AS PROVIDED BY THE UTILITY OWNERS. FLEIS & VANDENBRINK ENGINEERING,INC. IS NOT RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION PROVIDED OR THE LOCATIONS AT WHICH SERVICE WILL BE PROVIDED.
5. FLEIS & VANDENBRINK ENGINEERING, INC. HAS NOT REVIEWED THIS PROJECT FOR SOIL CONTENT. WE SUGGEST THAT THE OWNER CONTACT A SOILS ENGINEER WITH REGARD TO THE SOIL CONDITIONS. SOIL BEARING SUPPORT FOR THE FOUNDATION AND SLAB WORK SHALL BE TESTED BY AN INDEPENDENT TESTING SERVICE, LICENSED TO PROVIDE SUCH SERVICE, PRIOR TO PLACING SUCH FOUNDATION AND SLAB WORK. TESTING IS THE RESPONSIBILITY OF THE CONTRACTOR.
6. THERE IS NO 100 YEAR FLOOD PLAIN ON THIS SITE AND THERE ARE NO WETLANDS ON THIS SITE AS INDICATED ON THE NATIONAL WETLAND INVENTORY MAP.
7. NPDES-NOTICE OF COVERAGE STATEMENT: THE TOTAL DISTURBED AREA OF THIS PROJECT IS APPROXIMATELY 0.70 ACRES. AN NPDES-NOTICE OF COVERAGE IS NOT REQUIRED FOR THIS PROJECT. ALSO SEE THE SOIL EROSION AND SEDIMENTATION CONTROL PLAN. AN SESC PERMIT FROM THE GENESEE COUNTY DRAIN COMMISSIONERS OFFICE IS REQUIRED PRIOR TO CONSTRUCTION.
8. A PROPOSED BUSINESS SIGN IS SHOWN FOR APPROXIMATE LOCATION ONLY. PLACEMENT OF ALL BUSINESS SIGNS REQUIRES A SEPARATE SIGN PERMIT APPLICATION THAT WILL BE SUBMITTED TO THE CITY OF FENTON FOR APPROVAL UPON RECEIVING SITE PLAN APPROVAL AND PRIOR TO PLACEMENT.
9. DUE TO THE LIMITED TRASH ACCUMULATION ANTICIPATED FOR THIS OFFICE A TRASH ENCLOSURE IS NOT PROPOSED. TRASH WILL BE REMOVED EITHER BY CURB SIDE PICK UP OR OWNER WILL REMOVE FROM SITE ON A WEEKLY BASIS. EXPECTED TRASH IS 1 BAG PER WEEK.

PROPOSED SITE LAYOUT LEGEND

- DRAINAGE SWALE
- CATCH BASIN
- CONCRETE SPILLWAY
- RIP RAP / STONE WEIR
- STANDARD CONCRETE CURB & GUTTER
- MODIFIED CONCRETE CURB & GUTTER
- TOP OF CURB TAPER
- HMA PAVEMENT (MEDIUM DUTY)
- CONCRETE SIDEWALK
- SIDEWALK RAMP
- BARRIER FREE SIGNS
- PAINTED BARRIER FREE SYMBOL
- PAINTED PAVEMENT STRIPING
- TRAFFIC FLOW ARROWS
- PARKING LOT LIGHTS

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REVISION:

DIAMOND OPTICAL CARE OF FENTON
N. LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN
CLIENT: Dr. Joseph M. Leppek O.D.

SITE LAYOUT AND ZONING DATA

DESIGN TEAM:	PROJ MNGR: LME
	DESIGNED BY: LME
	DRAWN BY: MHD
	CHECK BY:

DRAWING INFORMATION:
854860_C100-site
081522 michaelc

JUNE 2022

F&V PROJECT NO.
854860

C100

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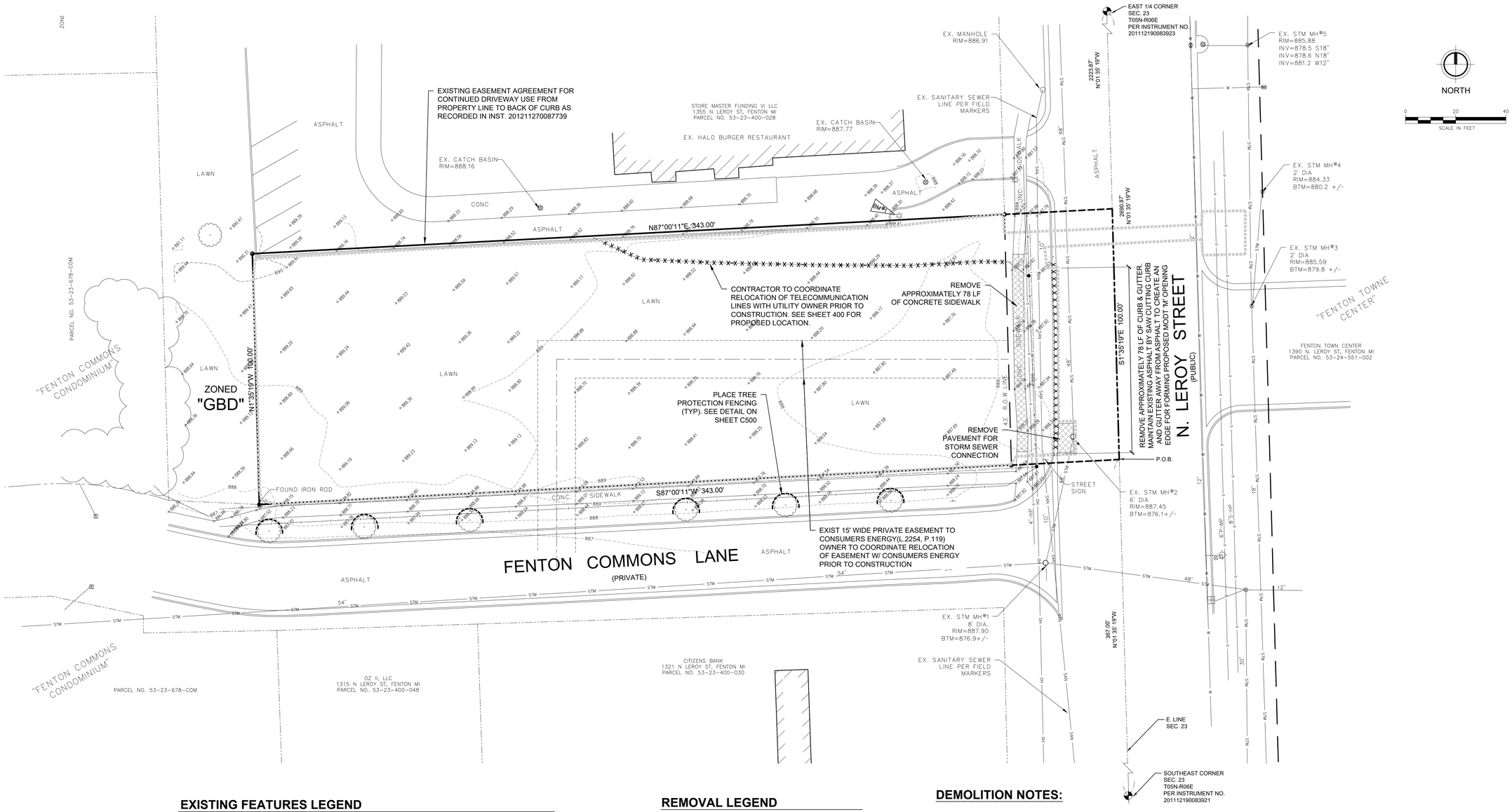

EXISTING FEATURES LEGEND

- TREE (DECIDUOUS)
- WOODS/BRUSH LINE
- TREE (CONIFEROUS)
- BUSH
- STUMP
- MANHOLE
- RD. CATCH BASIN
- SQ. CATCH BASIN
- FIRE HYDRANT
- WATER VALVE
- CURB STOP & BOX
- WATER MANHOLE
- WATER METER
- WELL
- GAS METER
- GUARD POST
- ELEC. RISER/TRANS
- CABLE BOX
- TELEPHONE RISER
- POWER POLE
- LIGHT POLE
- SPRINKLER VALVE
- GUY ANCHOR
- SIGN
- MAILBOX
- BENCHMARK
- SECTION CORNER
- FOUND IRON ROD OR PIPE
- WATERMAIN
- SANITARY SEWER
- FENCE
- STORM SEWER
- GAS
- TELEPHONE
- ELECTRIC
- TELECOMMUNICATIONS
- OVERHEAD LINES
- CABLE T.V.
- CONTOUR MAJOR
- CONTOUR MINOR

NOTE: ALL ITEMS LISTED ON THE LEGEND MAY NOT BE PRESENT ON DRAWING.

REMOVAL LEGEND

- PAVEMENT/CONCRETE REMOVAL
- X X X X X X X X · CURB & GUTTER OR UTILITY TO BE REMOVED
- X REMOVAL ITEM
- APPROXIMATE LIMITS OF DISTURBANCE

BENCHMARKS

BM #1 EL. 890.38
SOUTH BOLT OF LIGHT POLE BASE ON NORTH
PROPERTY LINE NEAR BACK OF CURB
(NAVD 88 DATUM, GPS DERIVED)

DEMOLITION NOTES:

1. PRIOR TO BEGINNING ANY OF THIS WORK THE CONTRACTOR SHALL NOTIFY THE CITY OF FENTON DPW DEPARTMENT AND FILL OUT THE NECESSARY FORMS OR PERMITS. WHEN APPLICABLE, THE CONTRACTOR SHALL DISCONNECT ANY EXISTING WATER SERVICE LEADS AT THE CURB BOX SHUT-OFF VALVE ON THE HOUSE SIDE OF THE VALVE.
2. ALL DEMOLITION WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES. ALL DEMOLITION OPERATIONS SHALL COMPLY WITH MIOSHA REGULATIONS INSOFAR AS THEY APPLY TO THE REQUIRED WORK. A SOIL EROSION CONTROL PERMIT WILL BE REQUIRED PRIOR TO DEMOLITION.
3. THE CONTRACTOR SHALL REMOVE AND CLEAR ALL TREES, BRUSH, FENCES, BUILDINGS, CURB, AND ASPHALT AS SHOWN ON THE PLANS OR AS DIRECTED BY THE CONSTRUCTION ENGINEER.
4. ALL DEMOLITION MATERIAL SHALL BE PROPERLY REMOVED FROM THE SITE AND DISPOSED OF IN A LEGALLY DESIGNATED DISPOSAL AREA. NO ON-SITE BURNING WILL BE ALLOWED WITHOUT PROPER PERMISSION. PERMITS AND FEES FOR DISPOSAL OF DEMOLITION MATERIAL SHALL BE OBTAINED AND PAID FOR BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL DEMOLISH AND REMOVE ANY ITEMS REMAINING FROM ANY PRIOR BUILDINGS IN ITS ENTIRETY INCLUDING WALLS, FOUNDATIONS AND FOOTINGS. ALL BUILDING DRAINS AND UTILITY LEADS SHALL BE LOCATED AND PROPERLY PLUGGED. UTILITY LEAD WORK SHALL BE COORDINATED WITH THE APPROPRIATE UTILITY COMPANIES.
6. BACKFILL EXCAVATED AREAS WITH CLEAN GRANULAR FILL COMPACTED TO NINETY-FIVE PERCENT (95%) OF THE MATERIAL UNIT WEIGHT BY MODIFIED PROCTOR.
7. AT THE CONCLUSION OF THE DEMOLITION OPERATIONS, THE ENTIRE WORK AREA SHALL BE LEFT IN A CLEAN CONDITION WITH ANY PROTECTIVE DEVICES AND BARRIERS REMOVED. ALL EXPOSED AREAS SHALL BE SUITABLY TOPSOILED, SEEDED AND MULCHED.

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N. LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN
CLIENT: Dr. Joseph M. Leppek O.D.

EXISTING CONDITIONS AND REMOVALS PLAN

DESIGN TEAM:	PROJ MNGR: LME DESIGNED BY: LME DRAWN BY: MHD CHECK BY:

DRAWING INFORMATION:
854860_C200-exist
081522 michaelc

JUNE 2022

F&V PROJECT NO.
854860

C200

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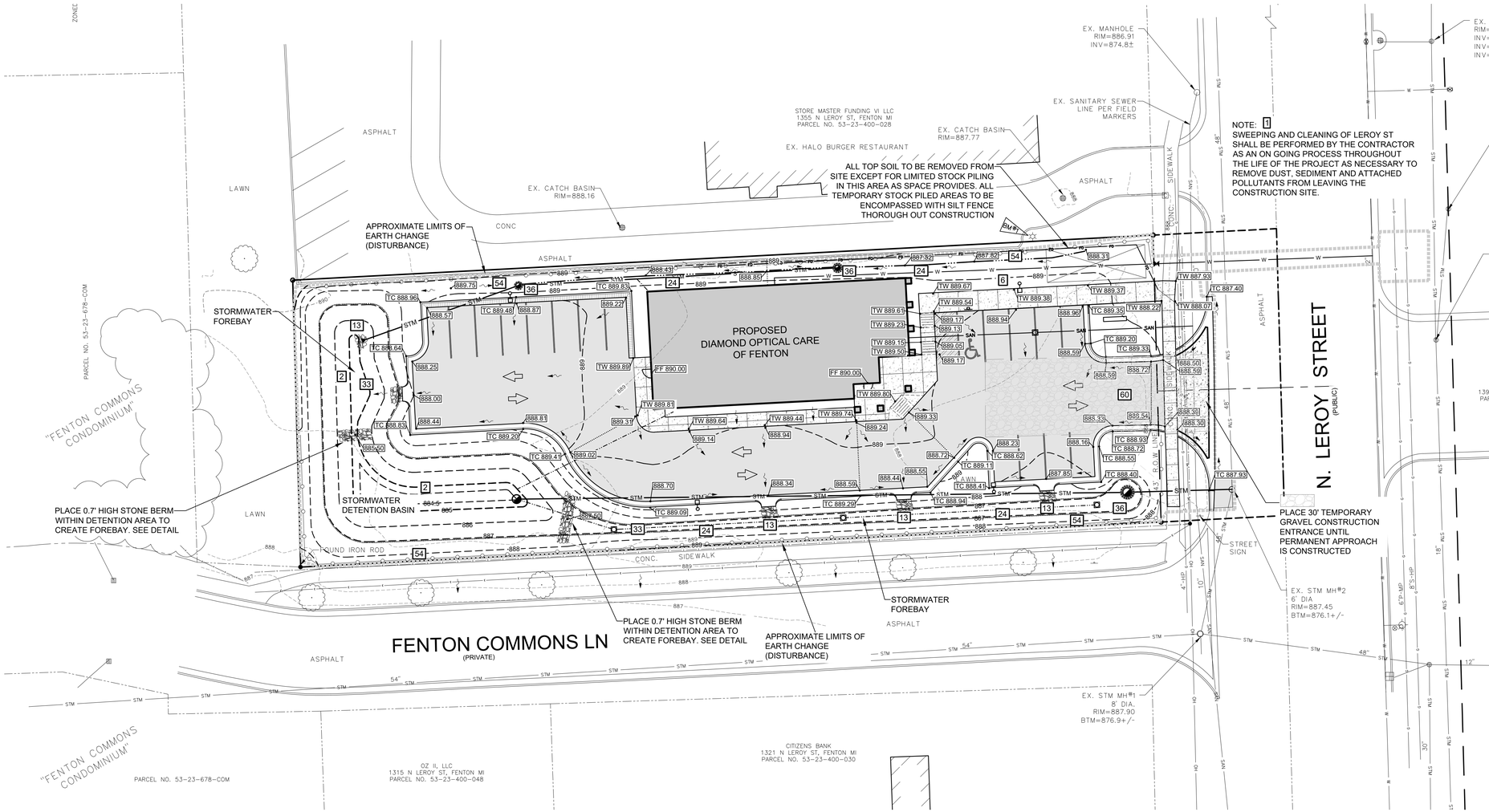

SOIL EROSION KEY DESCRIPTIONS

1	DUST CONTROL
2	SELECTIVE GRADING AND SHAPING
6	SEEDING WITH MULCH BLANKET
13	RIP RAP
24	GRASSED WATERWAY
33	SEDIMENT TRAP
36	CATCHBASIN INLET PROTECTION
54	GEOTEXTILE SILT FENCE
60	CONSTRUCTION ENTRANCE
	CATCHBASIN INLET FILTER
	SILT FENCE

OWNER/APPLICANT

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FENTON, MICHIGAN 48430
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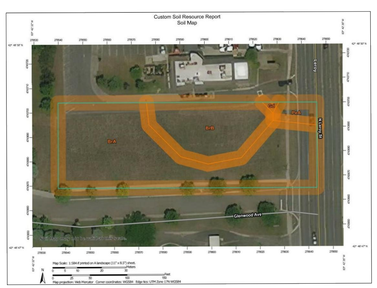

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BrA	Boyer loamy sand, 0 to 2 percent slopes	0.6	69.0%
BrB	Boyer loamy sand, 2 to 6 percent slopes	0.2	26.6%
Gd	Gilford sandy loam	0.0	0.4%
PeA	Pierin loamy sand, 0 to 2 percent slopes	0.0	3.9%
Totals for Area of Interest		**0.9**	**100.0%**

SESC LEGEND

1) [#] INDICATES SOIL EROSION KEY STANDARDS SEE SOIL EROSION CONTROL NOTES AND UNIFIED KEYING SYSTEM ON ATTACHMENT SHEET OF THESE PLANS.

2) [#] [36] PLACE GEOTEXTILE FILTER FABRIC COMPLETELY OVER THE INLET OPENING OF CATCH BASIN DRAINAGE STRUCTURE AND PLACE A SIX INCH (6") LAYER OF TWO INCH (2") CLEAN AGGREGATE ON TOP (TEMPORARY). SEE DETAILS IN THESE PLANS.

3) MAINTENANCE IS TO BE DONE REGULARLY, ESPECIALLY AFTER STORMS. WHEN CLOGGING OCCURS, REMOVE THE OLD GEOTEXTILE MATERIAL AND STONE AND REPLACE WITH NEW MATERIAL AND CLEAN STONE.

4) TEMPORARY FILTER IS TO BE REMOVED AND DRAINAGE STRUCTURE SHALL BE CLEANED OF SEDIMENT WHEN PROJECT IS COMPLETED.

5) TOTAL SITE AREA = .79 ± ACRES
TOTAL DISTURBED AREA = .70 ± ACRES (APPROX. GRADING LIMITS)

6) AN NPDES - NOTICE OF COVERAGE WILL NOT BE REQUIRED FOR THIS PROJECT.

7) THE SOIL EROSION AND SEDIMENTATION CONTROL PERMIT COVERS ONLY THE AREA BOUNDED BY THE PROJECT CUT/FILL LIMITS INCLUDING THE TOPSOIL STOCKPILE AREAS. IF THE DEVELOPER OR THE CONTRACTOR DISTURBS AREAS OUTSIDE THESE CUT/FILL LIMITS THE DEVELOPER WILL BE REQUIRED TO EITHER AMEND THE EXISTING SOIL EROSION AND SEDIMENTATION CONTROL PERMIT AND BOND OR ACQUIRE AN ADDITIONAL PERMIT TO COVER THE ADDITIONAL DISTURBED AREAS.

8) AFTER THE PROJECT IS COMPLETED AND ACCEPTED BY AGENCIES, THE OWNER OF THE DRAINAGE SYSTEM IS RESPONSIBLE FOR CLEANING AND MAINTAINING THE STORM SEWER PIPE AND DETENTION AREA TO MAINTAIN FUNCTIONALITY OF DRAINAGE SYSTEM.

9) AN SESC PERMIT APPLICATION WILL BE SUBMITTED TO THE GCDC UPON RECEIVING SITE PLAN APPROVAL. PERMIT SHALL BE OBTAINED PRIOR TO THE START OF ANY CONSTRUCTION.

10) THIS PROJECT IS APPROXIMATELY 84'± WEST OF THE DOWNER DRAIN (ENCLOSED)

PROPOSED GRADING & UTILITY LEGEND

- 888.54 — PAVEMENT OR GRADE ELEVATION
- TC 888.99 — TOP OF CURB ELEVATION
- TW 889.37 — TOP OF WALK ELEVATION
- 889 — PROPOSED CONTOUR
- GRADE BREAK
- SURFACE FLOW DIRECTION
- DRAINAGE SWALE
- STM — STORM SEWER
- CATCH BASIN
- ROOF DRAIN / UNDERDRAIN
- CONCRETE SPILLWAY
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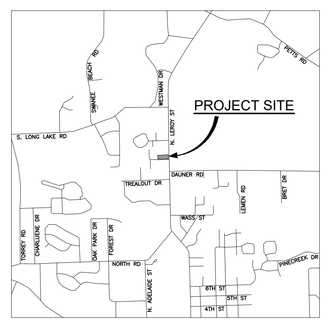
- TOP OF CURB TAPER
- HMA PAVEMENT (MEDIUM DUTY)
- CONCRETE SIDEWALK
- SIDEWALK RAMP
- SAN — SANITARY SEWER LEAD
- SANITARY SEWER CLEAN OUT
- W — WATER SERVICE
- VALVE AND BOX
- BARRIER FREE SIGNS
- PAINTED BARRIER FREE SYMBOL
- PAINTED PAVEMENT STRIPING
- PARKING LOT LIGHTS
- APPROXIMATE LIMITS OF DISTURBANCE



LOCATION MAP

NOT TO SCALE — NORTH

PROPOSAL FOR CONTINUED MAINTENANCE SCHEDULE OF PERMANENT SESC MEASURES

ITEM	DESCRIPTION	FREQUENCY
EX. STORM SEWER OUTLET	INSPECT FOR EROSION, REPLACE OR ADJUST STONES, CLEAN OUT CULVERT END, REMOVE WEEDS.	1 X PER YEAR
DETENTION AREA	INSPECT FOR SEDIMENT IN FOREBAYS AND CLEAN OUT AND REMOVE WEEDS AS NEEDED	1 X PER YEAR
CATCHBASINS & STRUCTURES	CLEAN OUT SUMP, REMOVE DEBRIS FROM INLET AREA.	2 X FIRST YEAR 1 X PER YEAR THEREAFTER
CURB AND GUTTER	INSPECT FOR POSITIVE WATER FLOW AND ANY DAMAGED CURB AND REPAIR AS NEEDED. REMOVE DEBRIS FROM GUTTER.	1 X PER YEAR
LAWN AREAS	INSPECT FOR EROSION, REPAIR AND RE-SEED ERODED AREAS AND AREAS OF POOR VEGETATION.	3 X FIRST YEAR 1 X PER YEAR THEREAFTER

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

PROPERTY DESCRIPTION

PART OF THE SOUTHEAST 1/4 OF SECTION 23, TOWNSHIP 5 NORTH, RANGE 6 EAST, CITY OF FENTON, GENESEE COUNTY, MICHIGAN. DESCRIBED AS COMMENCING AT THE SOUTHEAST CORNER OF SECTION 23, TOWNSHIP 5 NORTH, RANGE 6 EAST; THENCE N01°35'19"W, 367.00' TO THE POINT OF BEGINNING; THENCE S87°00'11"W, 343.00'; THENCE N01°35'19"W, PARALLEL WITH THE EAST LINE OF SAID SECTION; THENCE N87°00'11"E, 343.00'; THENCE S01°35'19"E, ALONG THE EAST LINE OF SAID SECTION, TO THE POINT OF BEGINNING. CONTAINING 0.79 ACRES MORE OR LESS, AND SUBJECT TO RESERVATIONS, EASEMENTS, RIGHTS-OF-WAY AND RESTRICTIONS OF RECORD.

THE ABOVE DESCRIPTION WAS PROVIDED BY WILLIAM A KIBBE ASSOCIATES, INC.

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REVISION:

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N. LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN
CLIENT: Dr. Joseph M. Leppek O.D.

SOIL EROSION & SEDIMENTATION CONTROL PLAN

DESIGN TEAM: — PROJ MNGR: LME; DESIGNED BY: LME; DRAWN BY: MHD; CHECK BY:

DRAWING INFORMATION:
854860_C300-SESC
061622 lisae

JUNE 2022
F&V PROJECT NO.
854860

C300

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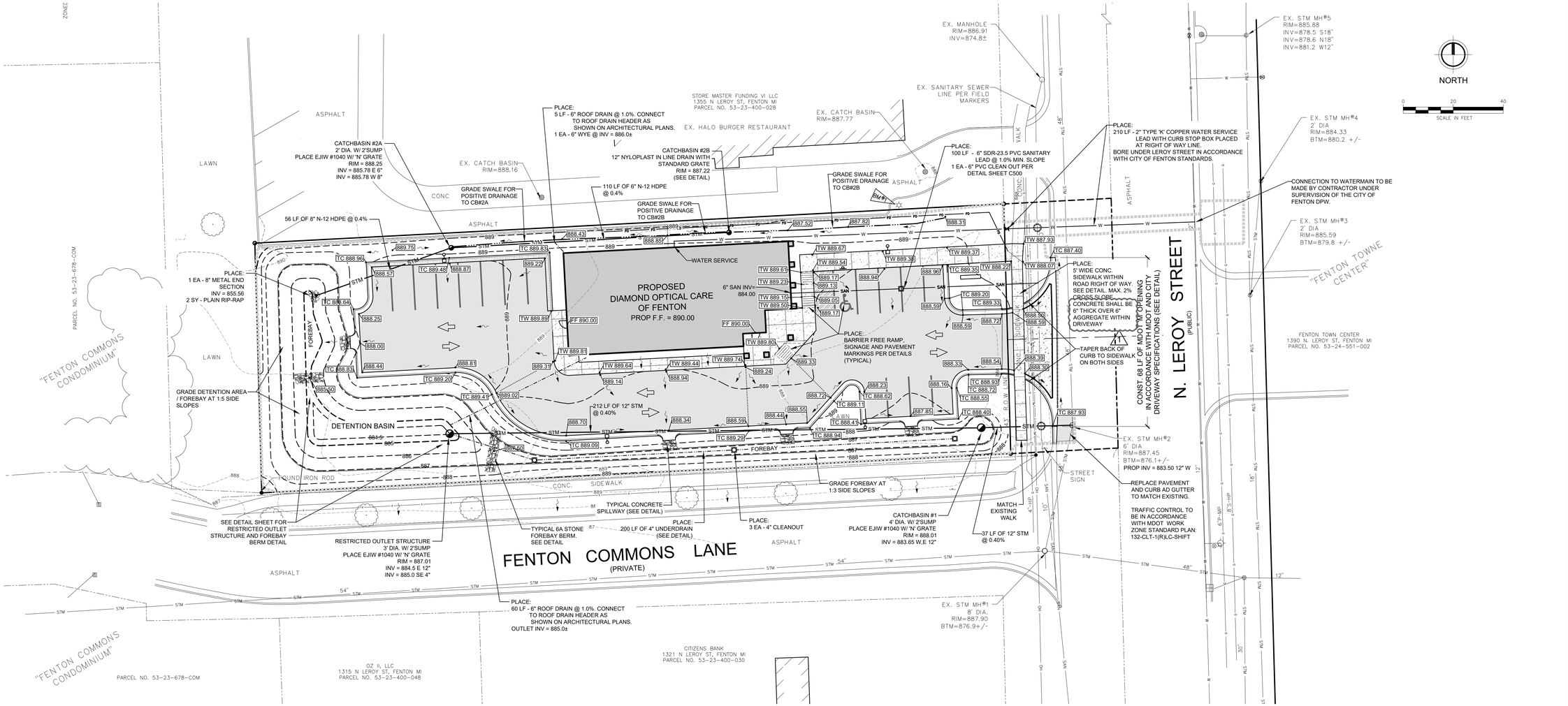

UTILITY CROSSING NOTE:

MAINTAIN MINIMUM 18" VERTICAL CLEARANCE AT ALL UTILITY CROSSINGS. SEE PLAN FOR INVERTS AT GRAVITY LINE CROSSINGS. AT ALL OTHER CROSSINGS ADJUST PIPE TO ACHIEVE MINIMUM CLEARANCE ACCORDING TO UTILITY OWNER SPECIFICATIONS.

COMPACTED SAND BACKFILL NOTE:

ALL PROPOSED UTILITIES, WHEN PLACED UNDER OR WITHIN 5' OF PAVEMENT, SHALL BE BACKFILLED WITH COMPACTED SAND (MDOT GRANULAR, CL II). ALL SAND BACKFILL SHALL BE COMPACTED TO 95% DENSITY (MODIFIED PROCTOR). THE CONTRACTOR SHALL PROVIDE SUFFICIENT SOIL COMPACTION TESTS FOR THE CONSTRUCTION MANAGER TO DETERMINE COMPLIANCE WITH THE REQUIRED DESIGN DENSITY OF 95% (MODIFIED PROCTOR). TESTS SHALL BE PERFORMED BY AN INDEPENDENT TESTING SERVICE AND ALL FEES PAID BY THE CONTRACTOR.

UTILITY NOTE:

ALL PROPOSED TELEPHONE/FIBER OPTIC, CABLE TV, ELECTRIC AND GAS SERVICES ARE TO BE PLACED UNDERGROUND. THE LOCATION, SIZE, AND PLACEMENT SHALL BE COORDINATED BETWEEN THE CONTRACTOR AND UTILITY OWNERS.

ARCHITECTURAL PLANS:

REFER TO THE ARCHITECTURAL PLANS FOR ALL PROPOSED ELEMENTS WITHIN AND 5 FEET FROM THE EXTERIOR BUILDING WALLS.

STORM SEWER NOTES:

SEE FRAME AND COVER DETAILS ON ATTACHED CITY OF FENTON STORM SEWER STANDARD DETAILS SHEET 1 OF 1 .

SEE END SECTION AND BAR SCREEN DETAIL ON ATTACHED CITY OF FENTON STORM SEWER STANDARD DETAILS SHEET 1 OF 1 FOR FLARED END SECTION SPECIFICATIONS.

PROPOSED GRADING & UTILITY LEGEND

- 888.54 — PAVEMENT OR GRADE ELEVATION
- TC 888.93 — TOP OF CURB ELEVATION
- TW 889.37 — TOP OF WALK ELEVATION
- 889 — PROPOSED CONTOUR
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- STANDARD CONCRETE CURB & GUTTER
- MODIFIED CONCRETE CURB & GUTTER
- TOP OF CURB TAPER
- HMA PAVEMENT (MEDIUM DUTY)
- CONCRETE SIDEWALK
- SIDEWALK RAMP
- SAN — SANITARY SEWER LEAD
- SANITARY SEWER CLEAN OUT
- W — WATER SERVICE
- VALVE AND BOX
- BARRIER FREE SIGNS
- PAINTED BARRIER FREE SYMBOL
- PAINTED PAVEMENT STRIPING
- PARKING LOT LIGHTS
- APPROXIMATE LIMITS OF DISTURBANCE

Know what's below. Call before you dig.

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.
9475 Holly Rd, Suite 201
Grand Blanc, MI 48439
P: 810.743.9120
F: 810.771.7860

REVISION:
Comment from City Engineer 10-18-22 LME

DIAMOND OPTICAL CARE OF FENTON
N. LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN
CLIENT: Dr. Joseph M. Leppek O.D.

UTILITY AND GRADING PLAN

DESIGN TEAM:	PROJ MNGR: LME
	DESIGNED BY: LME
	DRAWN BY: MHD
	CHECK BY:

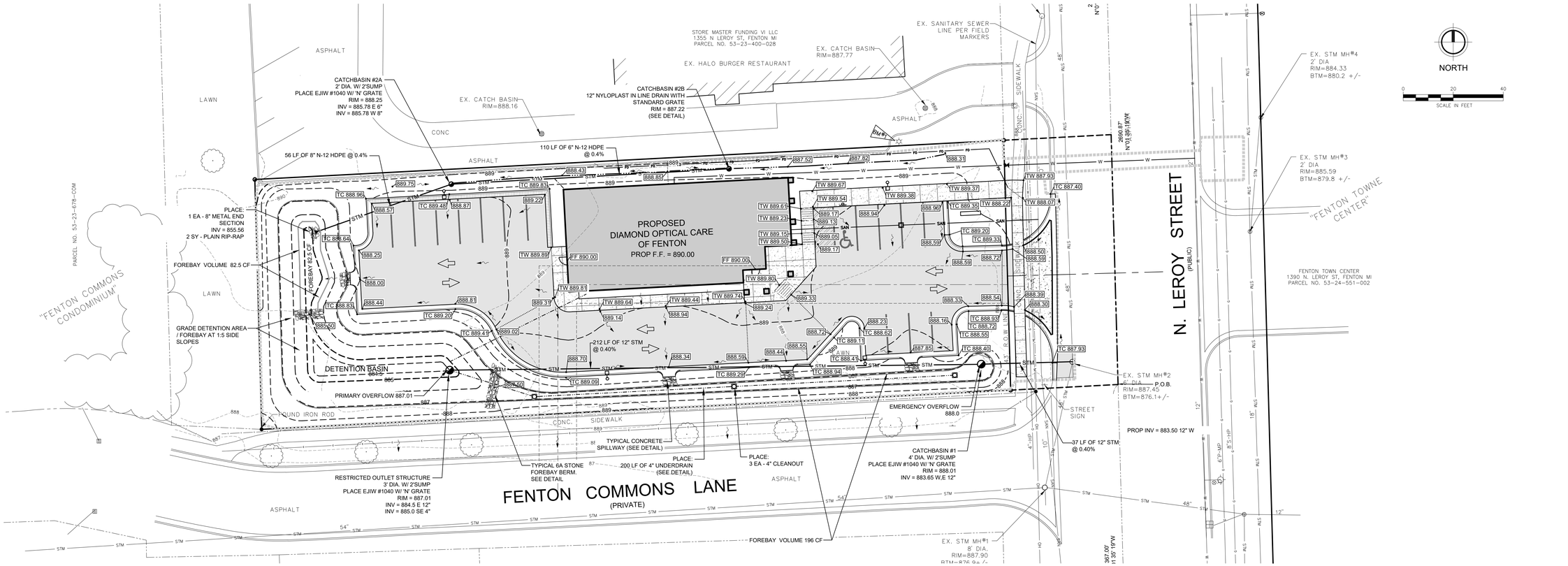
DRAWING INFORMATION:
854860_C400-grade
102622 lisae

JUNE 2022

F&V PROJECT NO.
854860

C400

M:\Projs\853001-855000\854860 Diamond Optical - City of Fenton 2022\Civil\Proj\854860_C400-grade.dwg - plotted on 10/26/2022 8:57 AM



Soil Name & Group	Cover Description	C	Area (acres)	CxArea
Boyer Sandy Loam	Open area turf grass / vegetation	0.15	0.32	0.05
	Impervious Surface (parking, bldg)	0.95	0.37	0.35
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
				0.00
		Totals =	0.69	0.40

C (weighted) = Total CxArea/Total Area = 0.58

DETERMINE ALLOWABLE DISCHARGE:

Receiving Drain/ Storm Sewer/ Etc.: Storm Sewer on N. Leroy
Contributing Drainage Area = 0.69 Acres
Post-development runoff factor C = 0.58

Allowable Discharge (Qa) = Area * 0.15 cfs/acre
Allowable Discharge (Qa) = **0.104** CFS

DETERMINE REQUIRED STORAGE:

Proposed Area (A) = 0.69 Acres

Maximum Outflow per Impervious Acre (Qo) = Qa/ AC
Maximum Outflow per Impervious Acre (Qo) = **0.259** CFS/ A

Storage Time (T_{100}) = $(10{,}312.5/Qo)^{1/2}$-25
Storage Time (T_{100}) = **175** Minutes

Max. Vol.of Storage per Impervious Acre (Vs_{100}) = [(16,500xT)/(T+25)]-(40xQoxT)
Max. Vol.of Storage per Impervious Acre (Vs_{100}) = **12,627** CFT/ Ai

Total Volume of Storage Required for the Site (Vt_{100}) = Vs x AC
5,053 CFT

FORBAY VOLUME

5% of Design Storm Volume .05 x5054
= **253** CFT

FIRST FLUSH VOLUME

1850 x Tributary Area x C factor 1850 x 0.69 x 0.58
= **740** CFT

BANKFULL VOLUME

8170 x Tributary Area x C factor 8170 x 0.69 x 0.58
= **3270** CFT

Orifice Sizing

First Flush 0.008569 cfs 3155/(24*60*) @ 24hr at constant outflow rate
0.012847 cfs @ 3/2 outlet rate due to dropping head
outlet rate 0.012847222 cfs 1/2 rate for 2 holes 0.006424
Head Differential (dH) = 0.9 Feet 0.9
nter of Orifice to Maximum Ponding Elevation)
Area of orifice (a) = Qa/[0.62(64.4(dH))$^{1/2}$] Qa/[0.62(64.4(dH))$^{1/2}$]
Area of orifice (a) = **0.0027** Square Feet **0.0014**
Maximum Circular Orifice Diameter = **0.71** Inches **0.50** Inches
Use 2-0.50" Holes

Bank Full 0.025229 cfs 3270/(36*60*) @ 36hr at constant outflow rate
0.037824 cfs @ 3/2 outlet rate due to dropping head
lower holes outlet rate with max from FF
Head Differential (dH) = 2 Feet

Outlet rate = A * [0.62(64.4(dH))$^{1/2}$]
outlet rate = **0.0192** cfs

upper holes
outlet rate allowable less lower holes 0.0187 cfs
Head Differential (dH) = 1.14 Feet
nter of Orifice to Maximum Ponding Elevation)
Area of orifice (a) = Qa/[0.62(64.4(dH))$^{1/2}$]
Area of orifice (a) = **0.0035** Square Feet
Maximum Circular Orifice Diameter = **0.80** Inches
Use 1-0.8" Holes

100 yr 0.104 cfs Max Rate

Lower holes outlet rate with max from FF holes
Head Differential (dH) = 2.5 Feet

Outlet rate = A * [0.62(64.4(dH))$^{1/2}$]
outlet rate = **0.0214** cfs

Middle holes outlet rate with max from BF Holes
Head Differential (dH) = 1.66 Feet

Outlet rate = A * [0.62(64.4(dH))$^{1/2}$]
outlet rate = **0.0225** cfs

upper holes
outlet rate allowable less lower holes 0.0596 1/2 rate for 2 holes 0.0298 cfs
Head Differential (dH) = 0.52 Feet 0.52 Feet
(Center of Orifice to Maximum Ponding Elevation)
Area of orifice (a) = Qa/[0.62(64.4(dH))$^{1/2}$] Qa/[0.62(64.4(dH))$^{1/2}$]
Area of orifice (a) = **0.0166** Square Feet **0.0083** Square Feet
Maximum Circular Orifice Diameter = **1.74** Inches **1.23** Inches
Use 2-1.23" Holes

Line	To Line	Line Length	Incr. Area	Total Area	Runoff Coeff.	Incr C x A	Total C x A	Inlet Time	Time Conc	Rnfal Int	Total Runoff	Adnl Flow	Total Flow	Capac Full	Veloc	Pipe Size	Pipe Slope	Inv Elev Dn	Inv Elev Up	HGL Up	HGL Dn	Grnd/Rim Dn	Grnd/Rim Up	Line ID
		(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
1	Outfall	212.000	0.69	0.69	0.58	0.40	0.40	15.0	15.0	4.4	1.75	0.00	1.75	2.25	3.22	12	0.40	883.65	884.50	884.21	885.30	888.00	887.01	

Combined Volume Total Volume

884.5	0
885	253
886	1655.5
887	4976
888	10846.5

First Flush Volume = **740** CF

886 -	885 =	Storage Elev. (x) -	885
1655.5 -	253	740 -	253

FF Elev = x= **885.35**

Bank Full \ Volume = **3270** CF

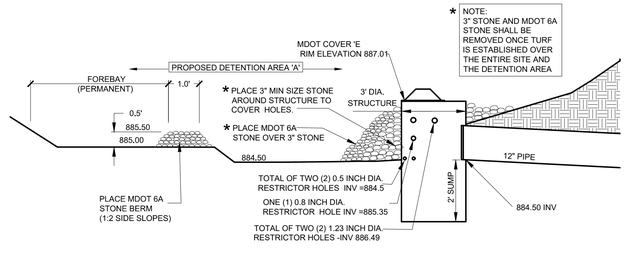
887	886 =	Storage Elev. (x) -	886
4976	1656	3270 -	1656

BF Elev= x= **886.49**

Detention Volume = **5,053** CF

888 -	887 =	Storage Elev. (x) -	887
10846.5 -	4976	5053 -	4976

Det Elev = x= **887.01**



RESTRICTED OUTLET STRUCTURE AND FOREBAY BERM DETAIL

NOT TO SCALE

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REVISION:

DIAMOND OPTICAL CARE OF FENTON
N. LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN
CLIENT: Dr. Joseph M. Leppek O.D.

Storm Water Management Plan

DESIGN TEAM:	PROJ MNGR: LME DESIGNED BY: LME DRAWN BY: MHD CHECK BY:

DRAWING INFORMATION:
854860_C400-grade
102622 lisae

JUNE 2022
F&V PROJECT NO.
854860

C401

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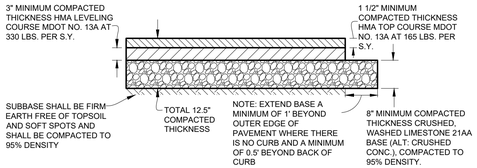
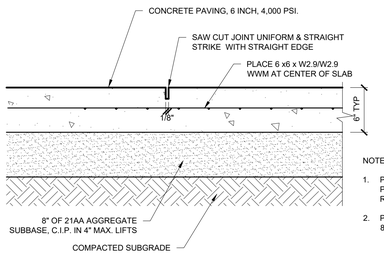


LIMESTONE BASE WITH HMA SURFACE

MEDIUM DUTY PARKING LOT PAVEMENT CROSS SECTION

NOT TO SCALE



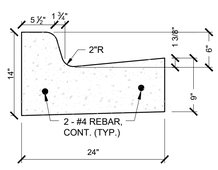
NOTE:

1. PROVIDE 1/2" EXPANSION JOINT WHERE PAVEMENT MEETS BUILDING OR RETAINING WALL.
2. PROVIDE CONTROL JOINTS AT 6' O/C OR 8' O/C TO MATCH PAVEMENT WIDTH.

REVIEW CONTROL JOINT SPACING WITH OWNERS REPRESENTATIVE PRIOR TO COMMENCEMENT OF SAW CUTTING.

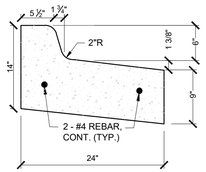
CONCRETE DRIVE APPROACH PAVING SECTION

NOT TO SCALE



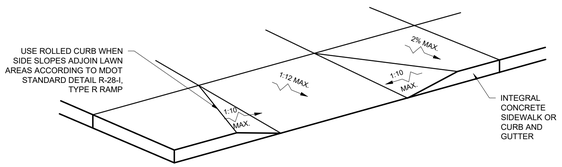
STANDARD MDOT F4 CONCRETE CURB AND GUTTER DETAIL

NOT TO SCALE



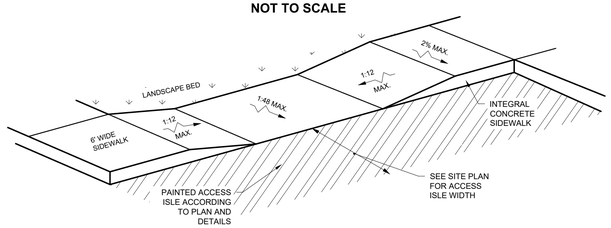
MODIFIED MDOT F4 CONCRETE CURB AND GUTTER DETAIL

NOT TO SCALE



SIDEWALK RAMP DETAIL 'A'

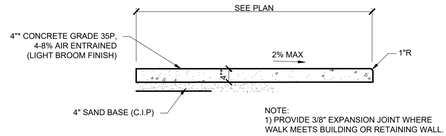
NOT TO SCALE



SIDEWALK RAMP DETAIL 'B'

NOT TO SCALE

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



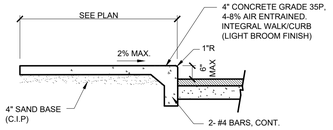
NOTE:
1) PROVIDE 3/8" EXPANSION JOINT WHERE WALK MEETS BUILDING OR RETAINING WALL.

2) PROVIDE CONTROL JOINTS AT 8' O/C

3) * - THICKNESS SHALL BE 6" ACROSS DRIVE APPROACH

STANDARD SIDEWALK

NOT TO SCALE

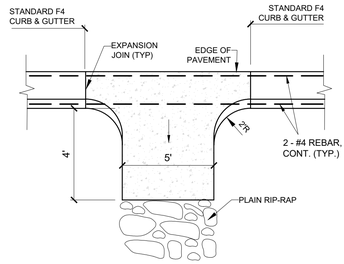


NOTE:
1) PROVIDE 3/8" EXPANSION JOINT WHERE WALK MEETS BUILDING OR RETAINING WALL.

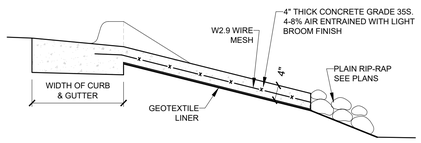
2) PROVIDE CONTROL JOINTS AT 8' O/C

INTEGRAL CONCRETE SIDEWALK

NOT TO SCALE



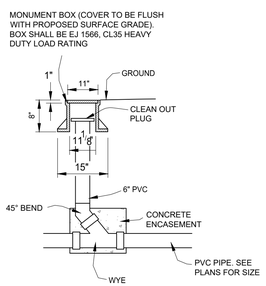
PLAN



SECTION

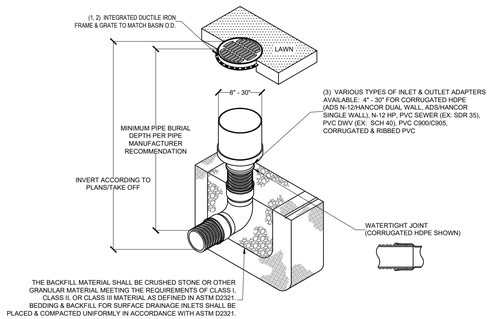
CONCRETE SPILLWAY DETAIL

NOT TO SCALE

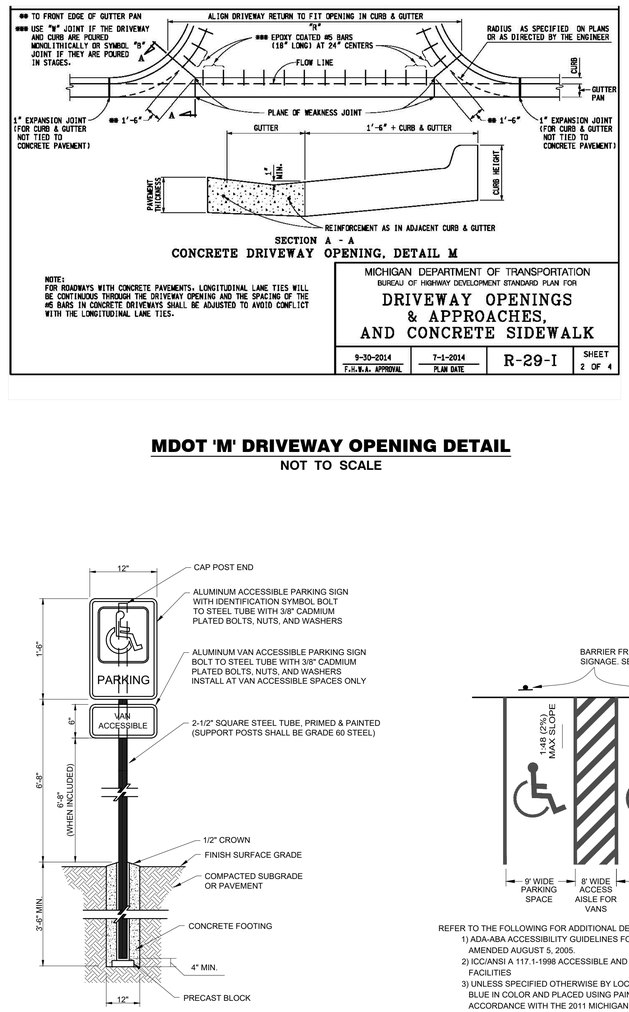


CLEANOUT DETAIL

NOT TO SCALE



NYLOPLAST INLINE DRAIN WITH STANDARD GRATE

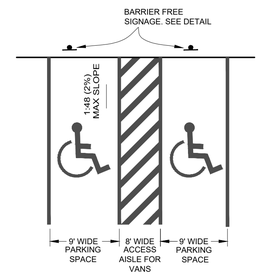


MDOT 'M' DRIVEWAY OPENING DETAIL

NOT TO SCALE

BARRIER FREE PARKING SIGN DETAIL

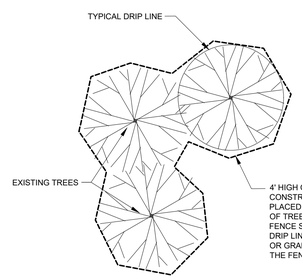
NOT TO SCALE



REFER TO THE FOLLOWING FOR ADDITIONAL DETAILS AND REQUIREMENTS:
1) ADA-ABA ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES AS AMENDED AUGUST 5, 2005.
2) ICC/ANSI A 117.1-1998 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
3) UNLESS SPECIFIED OTHERWISE BY LOCAL REGULATIONS, MARKINGS SHALL BE BLUE IN COLOR AND PLACED USING PAINTS OR THERMOPLASTICS IN ACCORDANCE WITH THE 2011 MICHIGAN M.U.T.C.D.

BARRIER FREE PARKING SPACE DETAIL

NOT TO SCALE



EXISTING TREE PROTECTION DETAIL

NOT TO SCALE

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P: 810.743.9120
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REVISION:

DIAMOND OPTICAL CARE OF FENTON
N. LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN
CLIENT: Dr. Joseph M. Leppek O.D.

SITE DETAILS

DESIGN TEAM:	PROJ MNGR: LME
	DESIGNED BY:
	DRAWN BY:
	CHECK BY:

DRAWING INFORMATION:
854860_C500-details
081622 michaelc

JUNE 2022

F&V PROJECT NO.
854860

C501

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NO DRAWING DETAIL PROVIDED

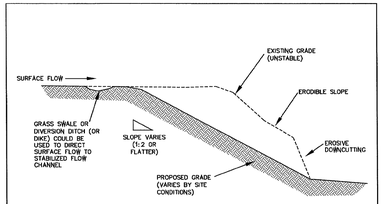
APPLICATIONS

1. ON CONSTRUCTION SITES DURING PERIODS OF LOW PRECIPITATION, LOW HUMIDITY, AND HIGH TEMPERATURE OR HIGH WINDS.
2. USE ON UNPAVED ROADWAYS, CONSTRUCTION SITES WITH VEHICLE TRAFFIC, SOIL STOCKPILE AREAS AND GENERAL AREAS WITH UNSTABILIZED OR FINE SOILS.

DESIGN

1. DUST CONTROL APPLICATIONS CAN INCLUDE WATERING, CHEMICAL DUST SUPPRESSION, GRAVEL OR ASPHALT SURFACING, TEMPORARY AGGREGATE COVER AND HAUL TRUCK COVERS.
2. FOLLOW MANUFACTURER'S INSTRUCTIONS REGARDING APPLICATION OF ANY DUST PALLIATIVE AND MIXING DETAILS.
3. APPLY DUST SUPPRESSANT TO SURFACES USING A PRESSURE TYPE WATER DISTRIBUTOR TRUCK EQUIPPED WITH A SPRAY SYSTEM.
4. LIMIT VEHICULAR TRAFFIC TO 15 MILES PER HOUR.
5. IMMEDIATELY CLEAN-UP SEDIMENT TRACKED ONTO PAVED ROADS. KEEP CONSTRUCTION TRAFFIC DIRECTED TO STABILIZED SITE ROADWAYS WHEN POSSIBLE.
6. DUST CONTROL APPLICATION NEEDS TO BE APPLIED ON A REGULAR SCHEDULE TO MAINTAIN EFFECTIVENESS.

DUST CONTROL [1]



NOTE: PROPOSED GRADE DEPENDENT ON SITE SPECIFIC CHARACTERISTICS SUCH AS SOIL TYPE, VEGETATIVE COVER, AND WATER MOVEMENT ABOVE AND BELOW GRADE.

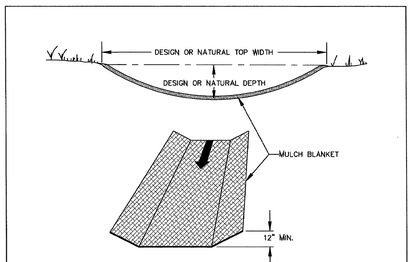
APPLICATIONS

1. WHENEVER EXISTING SLOPES OR CONSTRUCTION ACTIVITIES RESULT IN GRADES WHICH MAY BE SUBJECT TO EROSIVE FLOW VELOCITIES CAPABLE OF DOWNCUTTING OR EROSION RESULTING IN OFF-SITE SEDIMENTATION.
2. WHERE EXISTING NATURAL OR CREATED GRADES ARE SUBJECT TO SURFACE FLOWS CAPABLE OF CREATING GULLIES, RILLS, OR OTHER SURFACE EROSION PROBLEMS.

DESIGN

1. ESTABLISH SLOPES APPROPRIATE FOR INTENDED USE. SLOPES, IN GENERAL, SHOULD BE FLATTER THAN 1:2. SLOPES REQUIRING MOWING SHOULD BE NO STEEPER THAN 1:3.
2. AVOID SENSITIVE AREAS (WATERCOURSES, WETLANDS, VEGETATIVE BUFFERS) WITH GRADING/SHAPING.
3. DIVERT SURFACE FLOWS TO AREAS APPROPRIATELY STABILIZED TO HANDLE EXPECTED VOLUMES AND VELOCITIES.
4. LOCATE SPOIL AREAS AWAY FROM SENSITIVE AREAS OR FLOW PATHS AND STABILIZE WITH SEED.
5. EXPOSED AREAS SHOULD BE STABILIZED WITH VEGETATION OR OTHER GROUND COVER AS SOON AS WORK IS COMPLETED OR INTERRUPTED FOR 2 NORMAL WORK WEEKS.

SELECTIVE GRADING AND SHAPING [2]



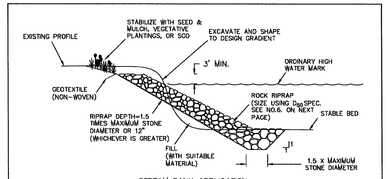
APPLICATIONS

1. STEEP SLOPES.
2. CHANNEL AND ROADSIDE DITCH BOTTOMS.
3. USE SEED AND HIGH VELOCITY MULCH BLANKETS TO STABILIZE THE GRASSED LINED CHANNEL IMMEDIATELY AFTER GRADING (ONE DAY MAX).
4. MUST NOT BE PLACED ON FROZEN SOIL; MUST REMAIN IN IN CONTACT WITH SEED AND SOIL.
5. MUST BE USED DURING THE NON-GROWING SEASON TO MINIMIZE EROSION UNTIL VEGETATION IS ESTABLISHED.

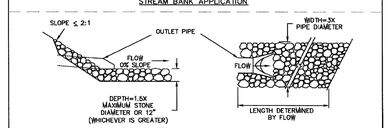
DESIGN

1. FOR DITCHES AND CHANNELS ROLL HIGH VELOCITY MULCH BLANKETS IN THE DIRECTION OF FLOW. DO NOT STRETCH.
2. FASTEN OR PEG MULCH BLANKET PER MANUFACTURERS INSTRUCTIONS.
3. ON BACKSLOPES, BLANKETS SHALL BE PLACED AT RIGHT ANGLES TO ROADBED OR PIPE LINE.
4. OVERLAY ENDS BY 18" AND EDGES BY 4".
5. AT ALL BLANKET EDGES, BURY 6"-10" OF BLANKET IN 3"-4" DEEP TRENCH AND COMPACT TRENCH WITH NATIVE SOIL BACKFILL OR MDOT 6AA STONE.

SEEDING WITH MULCH BLANKET AND/OR MATTING [6]



STREAM BANK APPLICATION



OUTLET POINT APPLICATION

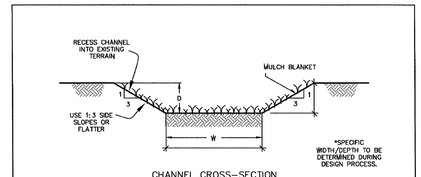
SIZE OF TYPICAL RIPRAP STONES

Weight (lbs.)	Average Spherical Diameter (in.) D_{50}	Typical Rectangular Shape	
		Length (in.)	Width/Height (in.)
50	10	18	6
100	13	21	7
150	14	24	8
300	18	30	10
500	22	36	12
1000	27	45	15
1500	31	52	17
2000	34	57	19
4000	43	72	24
6000	49	83	28
8000	54	90	30

Source: Adapted from USDA NRCS

RIP RAP, RUBBLE, GABIONS [13]

1 of 2



CHANNEL CROSS-SECTION

APPLICATIONS

1. WHEN SURFACE FLOW VELOCITIES WITHIN A CREATED STORMWATER CHANNEL HAVE THE POTENTIAL TO CAUSE EROSION.
2. TO SLOW WATER VELOCITY AND REDUCE EROSION AND SEDIMENT LOADING IN THE STORMWATER CHANNEL.
3. FOR USE IN CONSTRUCTED DRAINAGEWAYS WHERE RUN-OFF MAY CAUSE EROSION.

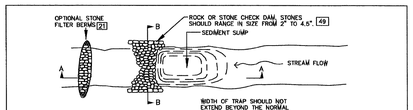
DESIGN

1. REVIEW SUBJECT SITE TO IDENTIFY CHANNEL AREAS POTENTIALLY SUSCEPTIBLE TO HIGH FLOWS, EROSIVE VELOCITIES OR FLOODING.
2. CONSULT A PROFESSIONAL LANDSCAPE ARCHITECT, PROFESSIONAL ENGINEER OR CPESC REGARDING CONSIDERATIONS OF CHANNEL DESIGN BASED ON WATER VELOCITY, CHANNEL SLOPE, DISCHARGE VOLUME AND SOIL TYPE.
3. GENERAL CAPACITY REQUIREMENTS SHOULD ALLOW FOR CONVEYANCE OF A 10-YEAR, 24-HOUR RAIN EVENT AT A MINIMUM.
4. CHANNEL SHAPE SHOULD EITHER BE PARABOLIC "U" OR TRAPEZOIDAL. V-SHAPED CHANNELS ARE NOT RECOMMENDED AS THEY FORM GULLIES AND INCREASE THE EROSION POTENTIAL.
5. ALL VEGETATED CHANNELS SHOULD HAVE A DEPTH OF ONE FOOT OR MORE.

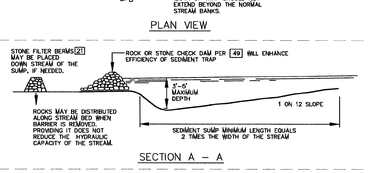
DESIGN (CONT)

6. EXCAVATE OR GRADE CHANNEL SURFACE ACCORDING TO DESIGN. LOCATE CHANNELS IN NATURAL TOPOGRAPHIC DEPRESSIONS WHERE POSSIBLE. RECESS CHANNEL INTO EXISTING GRADE SO THAT CHANNEL TOP IS FLUSH WITH ADJACENT GRADE.
7. DETERMINE VEGETATIVE SPECIES BASED ON THE DEPTH TO WATER TABLE, CLIMATE, ANTICIPATED FLOW VELOCITIES, AND FINAL MANAGED LENGTH OF VEGETATION. UTILIZE NATIVE SPECIES FOR VEGETATION PURPOSES.
8. IN CHANNELS TO BE SEEDED, PREPARE SEEDBED, APPLY SEED, AND INSTALL MULCH BLANKET/TRM.
9. IN CHANNELS PLANTED WITH VEGETATIVE PLUGS OR SEEDLINGS, PREPARE CHANNEL AND INSTALL MULCH BLANKET/TRM.
10. NOT RECOMMENDED TO USE DORMANT SEEDINGS DUE TO HIGH FAILURE RATE.
11. ESTABLISH VEGETATED CHANNEL PRIOR TO PERIODS OF HIGH RUN-OFF.
12. PRIOR TO CONSTRUCTION WORK IN AREA SURROUNDING CHANNEL, ALLOW VEGETATION IN CHANNEL TO ESTABLISH.
13. CHECK DAMS OR VELOCITY DISSIPATERS MAY BE NEEDED UNTIL VEGETATION IS ESTABLISHED.

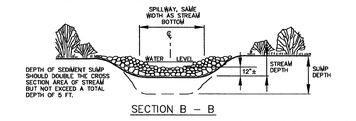
GRASSED WATERWAY [24]



PLAN VIEW



SECTION A – A



SECTION B – B

APPLICATION

1. FLOWING STREAMS.

DESIGN

1. TRAP DESIGN FOR APPROXIMATELY 170 FT^3 OF SEDIMENT.
2. REMOVED SEDIMENT AND RESTORE ORIGINAL CAPACITY WHEN SUMP IS 50% FULL.
3. STONE SHALL BE MAINTAINED AND REPAIRED WHEN DAMAGE OR DISPLACED.
4. WARNING! THIS DEVICE MAY CAUSE FLOODING OF ADJACENT PROPERTY.

SEDIMENT TRAP [33]

APPLICATIONS

1. INLETS WITH DRAINAGE OF 1 ACRE OR LESS AND SLOPES LESS THEN 5%.
2. SERVICE, CLEAN AND REPAIR AFTER EACH STORM EVENT.

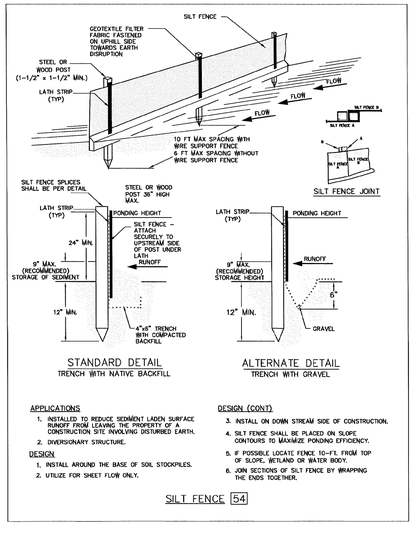
* NOTE *

DO NOT USE SILT FENCE IN LIEU OF FILTER FABRIC FOR THIS APPLICATION.

DESIGN

1. FILTER BAGS MAY BE PLACED IN THE MANHOLE TO INCREASE THE EFFECTIVENESS OF THIS DEVICE.
2. IN SOME CASES FILTER BAGS IN THE MANHOLE MAY BE USED ALONE.
3. WARNING! THIS DEVICE MAY CAUSE FLOODING OF ADJACENT PROPERTY!
4. TOP OF FRAME DRAINING HEIGHTS MUST BE LOWER THAN GROUND ELEVATION DOWN STREAM TO PREVENT BYPASSING THE INLET. A TEMPORARY DIKE MAY BE NECESSARY DOWN SLOPE OF THE STRUCTURE.

CATCH BASIN INLET PROTECTION [36]



APPLICATIONS

1. INSTALLED TO REDUCE SEDIMENT LADEN SURFACE RUNOFF FROM LEAVING THE PROPERTY OF A CONSTRUCTION SITE INVOLVING DISTURBED EARTH.
2. DIVERSIONARY STRUCTURE.

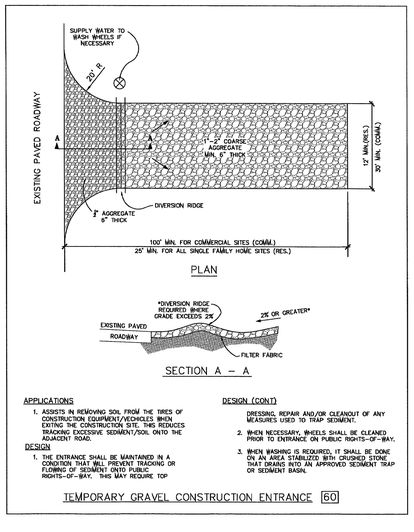
DESIGN

1. INSTALL AROUND THE BASE OF SOIL STOCKPILES.
2. UTILIZE FOR SHEET FLOW ONLY.

DESIGN (CONT)

3. INSTALL ON DOWN STREAM SIDE OF CONSTRUCTION.
4. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
5. IF POSSIBLE LOCATE FENCE 10-FT FROM TOP OF SLOPE, WETLAND OR WATER BODY.
6. JOIN SECTIONS OF SILT FENCE BY WRAPPING THE ENDS TOGETHER.

SILT FENCE [54]



PLAN

SECTION A – A

APPLICATIONS

1. ASSISTS IN REMOVING SOIL FROM THE TIRES OF CONSTRUCTION EQUIPMENT/VECHICLES WHEN EXITING THE CONSTRUCTION SITE. THIS REDUCES TRACKING EXCESSIVE SEDIMENT/SOIL ONTO THE ADJACENT ROAD.

DESIGN

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ON PUBLIC RIGHTS-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE [60]

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.
9475 Holly Rd, Suite 201
Grand Blanc, MI 48439
P: 810.743.9120
F: 810.771.7860

REVISION:

DIAMOND OPTICAL CARE OF FENTON
N. LEROY STREET, CITY OF FENTON, GENESEE COUNTY, MICHIGAN
CLIENT: Dr. Joseph M. Leppek O.D.

SOIL EROSION & SEDIMENTATION CONTROL DETAILS

DESIGN TEAM: | PROJ MNGR:
DESIGNED BY:
DRAWN BY: LME
CHECK BY:

DRAWING INFORMATION:
854860_C501-SESC
081522 michaelc

NOT FOR CONSTRUCTION

JUNE 2022

F&V PROJECT NO.
854860

C501

Know what's below. Call before you dig.

M:\Proj853001-855000\854860 Diamond Optical - City of Fenton 2022\Civil\Proj\854860_C501-SESC.dwg - 8/15/22

michigan unified keying system (modified)

✳ indicates applicability of a specific control measure to one or more of the seven problem areas

KEY	DETAIL	CHARACTERISTICS	SLOPES A	STREAMS AND WATERWAYS B	SURFACE DRAINAGEWAYS C	ENCLOSED DRAINAGE (Inlet & Outfall Control) D	LARGE FLAT SURFACE AREAS E	BORROW AND STOCKPILE AREAS F	ADJACENT PROPERTIES G
1	Dust Control – No Detail –	DUST CONTROL APPLICATIONS CAN INCLUDE WATERING, CHEMICAL DUST SUPPRESSION, GRAVEL OR ASPHALT SURFACING, TEMPORARY AGGREGATE COVER AND HAUL TRUCK COVERS	✳				✳	✳	
2	Selective Grading & Shaping	WATER CAN BE DIVERTED TO MINIMIZE EROSION FLATTER SLOPES EASE EROSION PROBLEMS	✳				✳	✳	✳
3	Grubbing Omitted	SAVES COST OF GRUBBING, PROVIDES NEW SPROUTS RETAINS EXISTING ROOT MAT SYSTEM, REDUCES WIND FALL AT NEW FOREST EDGE. DISCOURAGES EQUIPMENT ENTRANCE	✳				✳		✳
4	Vegetative Stabilization	MAY UTILIZE A VARIETY OF PLANT MATERIAL STABILIZES SOIL SLOWS RUNOFF VELOCITY FILTERS SEDIMENT FROM RUNOFF	✳	✳	✳		✳	✳	✳
5	AVAILABLE DETAIL								
6	Seeding with Wash Basket and/or Matting	FACILITATES ESTABLISHMENT OF VEGETATIVE COVER EFFECTIVE FOR DRAINAGEWAYS WITH LOW VELOCITY EASILY PLACED IN SMALL QUANTITIES BY INEXPERIENCED PERSONNEL. SHOULD INCLUDE PREPARED TOPSOIL BED	✳		✳			✳	✳
7	AVAILABLE DETAIL								
8	Sodding	PROVIDES IMMEDIATE PROTECTION CAN BE USED ON STEEP SLOPES WHERE SEED MAY BE DIFFICULT TO ESTABLISH. EASY TO PLACE; MAY BE REPAIRED IF DAMAGED SHOULD INCLUDE PREPARED TOPSOIL BED	✳		✳		✳	✳	✳
9	Vegetative Buffer Strip	SLOWS RUNOFF VELOCITY FILTERS SEDIMENT FROM RUNOFF REDUCES VOLUME OF RUNOFF ON SLOPES	✳	✳					✳
10	Mulching	USED ALONE TO PROTECT EXPOSED AREAS FOR SHORT PERIODS PROTECTS SOIL FROM IMPACT OF FALLING RAIN PRESERVES SOIL MOISTURE AND PROTECTS GERMINATING SEED FROM TEMPERATURE EXTREMES	✳				✳	✳	
11	Roughened Surface	REDUCES VELOCITY AND INCREASES INFILTRATION RATES COLLECTS SEDIMENT HOLDS WATER, SAND AND MULCH BETTER THAN SMOOTH SURFACES	✳				✳		
12	AVAILABLE DETAIL								
13	Riprap, Rubble, Gabions	USED WHERE VEGETATION IS NOT EASILY ESTABLISHED EFFECTIVE FOR HIGH VELOCITIES OR HIGH CONCENTRATIONS PERMITS RUNOFF TO INFILTRATE SOIL DISSIPATES ENERGY FLOW AT SYSTEM OUTLETS	✳	✳	✳				
14	AVAILABLE DETAIL								
15	AVAILABLE DETAIL								
16	AVAILABLE DETAIL								
17	Benches	REDUCES RUNOFF VELOCITY BY REDUCING EFFECTIVE SLOPE LENGTH COLLECTS SEDIMENT, PROVIDES ACCESS TO SLOPES FOR SEEDING, MULCHING AND MAINTENANCE	✳					✳	
18	Earth Diversion Berm	DIVERTS WATER FROM VULNERABLE AREAS COLLECTS AND DIRECTS WATER TO PREPARED DRAINAGEWAYS MAY BE PLACED AS PART OF NORMAL CONSTRUCTION OPERATION	✳					✳	✳
18A	Earth Diversion Berm With Stone Outlet and Filter	DIVERTS WATER FROM VULNERABLE AREAS COLLECTS AND DIRECTS WATER TO PREPARED DRAINAGEWAYS MAY BE PLACED AS PART OF NORMAL CONSTRUCTION OPERATION	✳					✳	✳
19	Diversion Ditch	COLLECTS AND DIVERTS WATER TO REDUCE EROSION POTENTIAL MAY BE INCORPORATED IN PERMANENT PROJECT DRAINAGE SYSTEMS	✳					✳	✳
20	Diversion Berm & Ditch	DIVERTS WATER TO A PREPARED DRAINAGEWAY MAY BE USED AT INTERVALS ACROSS SLOPE FACE TO REDUCE EFFECTIVE SLOPE LENGTH	✳					✳	✳
21	Stone Filter Berm	CONSTRUCTED OF GRAVEL OR STONE INTERCEPTS AND DIVERTS RUNOFF TO STABILIZED AREAS OR PREPARED DRAINAGE SYSTEMS SLOWS RUNOFF AND COLLECTS SEDIMENT	✳	✳					✳
21A	Stone Filter Berm with Silt Fence	CONSTRUCTED OF GRAVEL OR STONE INTERCEPTS AND DIVERTS RUNOFF TO STABILIZED AREAS OR PREPARED DRAINAGE SYSTEMS SLOWS RUNOFF AND COLLECTS SEDIMENT – SILT FENCE PREVENTS EROSION AROUND SPILLWAY	✳	✳					✳
22	AVAILABLE DETAIL								
23	AVAILABLE DETAIL								
24	Grassed Waterway	MUCH MORE STABLE FORM OF DRAINAGEWAY THAN BARE CHANNEL GRASS TENDS TO SLOW RUNOFF AND FILTER OUT SEDIMENT USED WHERE BARE CHANNEL WOULD BE ERODED			✳				
25	Slope Drain (Surface Pipe)	PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGES OF SLOPE AREA. USUALLY TEMPORARY CAN BE CONSTRUCTED OR EXTENDED AS GRADING PROGRESSES	✳						
26	Slope Drain – Paved Chute/Flume	PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGE OF SLOPE AREA. USUALLY PERMANENT CAN BE CONSTRUCTED OR EXTENDED AS GRADING PROGRESSES	✳						
27	Slope Drain (Subsurface Pipe)	PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGE OF SLOPE AREA. USUALLY PERMANENT CAN BE CONSTRUCTED AS GRADING PROGRESSES	✳						
28	Drop Spillway	SLOWS VELOCITY OF FLOW, REDUCING EROSIVE CAPACITY		✳	✳				
29	Pipe Drop	REDUCES RUNOFF VELOCITY REMOVES SEDIMENT AND TURBIDITY CAN BE DESIGNED TO HANDLE LARGE VOLUMES OF FLOW			✳				
30	Pipe Spillway	REMOVES SEDIMENT AND TURBIDITY FROM RUNOFF MAY BE PART OF PERMANENT EROSION CONTROL PLAN			✳				
31	Energy Dissipater	SLOWS RUNOFF VELOCITY TO NON-EROSIVE LEVEL PERMITS SEDIMENT COLLECTION FROM RUNOFF	✳		✳	✳			
32	Level Spreader	CONVERTS COLLECTED CHANNEL OR PIPE FLOW BACK TO SHEET FLOW AVOIDS CHANNEL EASEMENTS AND CONSTRUCTION OFF PROJECT SITE SIMPLE TO CONSTRUCT			✳				
33	Sediment Trap	MAY BE CONSTRUCTED OF A VARIETY OF MATERIALS TRAPS SEDIMENT AND REDUCES VELOCITY OF FLOW CAN BE CLEANED AND EXPANDED AS NEEDED		✳	✳				
34	Sediment Basin	TRAPS SEDIMENT RELEASES RUNOFF AT NON-EROSIVE RATES CONTROLS RUNOFF AT SYSTEM OUTLETS CAN BE VISUAL AMENITIES		✳	✳	✳			
35	AVAILABLE DETAIL								
36	Catch Basin Inlet Protection	COLLECTS HIGH VELOCITY CONCENTRATED RUNOFF MAY USE FILTER CLOTH OVER INLET					✳		✳
37	Sod Filter	INEXPENSIVE AND EASY TO CONSTRUCT PROVIDES IMMEDIATE PROTECTION PROTECTS AREAS AROUND INLETS FROM EROSION				✳			
38	AVAILABLE DETAIL								
39	Fabric Filter Curb Inlet Protection	CAN UTILIZE MATERIAL FOUND ON SITE EASY TO CONSTRUCT FILTERS SEDIMENT FROM RUNOFF				✳			✳
40	Inlet Sediment Trap	EASY TO SHAPE COLLECTS SEDIMENT MAY BE CLEANED AND EXPANDED AS NEEDED				✳			
41	Stone and Rock Ford Crossing	MAY BE ROCK OR CLEAN RUBBLE MINIMIZES STREAM TURBIDITY INEXPENSIVE MAY ALSO SERVE AS DITCH CHECK OR SEDIMENT TRAP		✳					
42	Temporary Culvert	ELIMINATES STREAM TURBULENCE AND TURBIDITY PROVIDES UNOBSTRUCTED PASSAGE FOR FISH AND OTHER WATER LIFE CAPACITY FOR NORMAL FLOW CAN BE PROVIDED WITH STORM WATER FLOWING OVER ROADWAY		✳					
43	Culvert Sediment Trap	EASY TO INSTALL AT INLET KEEPS CULVERT CLEAN AND FREE FLOWING MAY BE CONSTRUCTED OF LUMBER OR LOGS		✳					✳
44	AVAILABLE DETAIL								
45	Temporary Stream Channel Change	NEW CHANNEL KEEPS NORMAL FLOWS AWAY FROM CONSTRUCTION REQUIRES STATE PERMIT		✳					
46	AVAILABLE DETAIL								
47	Cofferdam	WORK CAN BE CONTINUED DURING MOST ANTICIPATED STREAM CONDITIONS CLEAN WATER CAN BE PUMPED DIRECTLY BACK INTO STREAM		✳					
48	AVAILABLE DETAIL								
49	Check Dam	REDUCES FLOW VELOCITY CATCHES SEDIMENT CAN BE CONSTRUCTED OF LOGS, STRAW, HAY, ROCK, LUMBER, MASONRY, OR SAND BAGS		✳	✳				
50	AVAILABLE DETAIL								
51	Retaining Wall	REDUCES GRADIENT WHERE SLOPES ARE EXTREMELY STEEP PERMITS RETENTION OF EXISTING VEGETATION, KEEPING SOIL STABLE IN CRITICAL AREAS, MINIMIZES MAINTENANCE	✳						✳
52	AVAILABLE DETAIL								
53	Windbreak	MINIMIZES WIND EROSION MAY BE SNOW FENCE					✳		
54	Silt Fence	USES GEOTEXTILE FABRIC AND POSTS OR POLES EASY TO CONSTRUCT AND LOCATE AS NECESSARY	✳		✳		✳		✳
55	Stone Filter–Before Paving	STONE FILTER TO PROVIDE INEXPENSIVE AND EASILY CONSTRUCTED SEDIMENT CONTROL PRIOR TO PAVING SEE DETAIL AT LEFT			✳	✳			
55A	Stone Filter–After Paving	STONE FILTER TO PROVIDE INEXPENSIVE AND EASILY CONSTRUCTED SEDIMENT CONTROL AFTER PAVING SEE DETAIL AT LEFT			✳	✳			
56	AVAILABLE DETAIL								
57	Stream – Liner	MAY BE 6A TYPE STONE, SMALL ROCKS OR SIMILAR-SIZED CLEAN CONCRETE–MASONRY RUBBLE, MINIMIZES STREAM TURBIDITY RELATIVELY INEXPENSIVE MAY BE USED AS DITCH CHECK OR SEDIMENT TRAP		✳	✳				
58	Sediment Sump	CONTROLS SEDIMENTATION IN LARGE STREAMS, CONSIST OF OVER EXCAVATING THE DRAIN BY ONE TO TWO FEET. THE SUMP WILL BE AT LEAST 200 FEET LONG. SEDIMENTS ACCUMULATED DURING CONSTRUCTION WILL BE REMOVED UPON PROJECT COMPLETION		✳	✳				
59	AVAILABLE DETAIL								
60	Temporary Construction Entrance	ASSISTS IN REMOVING SOIL FROM THE TIRES OF CONSTRUCTION EQUIPMENT/VEHICLES WHEN EXITING THE CONSTRUCTION SITE. THIS REDUCES TRACKING EXCESSIVE SEDIMENT/SOIL ONTO THE ADJACENT ROAD							✳

SOIL EROSION AND SEDIMENTATION CONTROL

1. CONSTRUCTION OPERATIONS SHALL BE SCHEDULED AND PERFORMED SO THAT PREVENTATIVE EROSION CONTROL MEASURES ARE IN PLACE PRIOR TO EXCAVATION AND TEMPORARY STABILIZATION MEASURES ARE IN PLACE IMMEDIATELY FOLLOWING BACKFILLING AND/OR GRADING OPERATIONS.
2. SPECIAL PRECAUTIONS WILL BE TAKEN IN THE USE OF CONSTRUCTION EQUIPMENT TO PREVENT SITUATIONS THAT PROMOTE EROSION.
3. CLEANUP WILL BE DONE IN A MANNER TO INSURE THAT EROSION CONTROL MEASURES ARE NOT DISTURBED.
4. THE PROJECT WILL CONTINUALLY BE INSPECTED FOR SOIL EROSION AND SEDIMENT CONTROL COMPLIANCE. DEFICIENCIES WILL BE CORRECTED BY THE CONTRACTOR WITHIN 24 HOURS.
5. TEMPORARY EROSION CONTROL MEASURES SHALL BE COMPLETELY REMOVED BY THE CONTRACTOR UPON ESTABLISHMENT OF PERMANENT CONTROL MEASURES.

CONSTRUCTION SEQUENCE

1. EXCAVATION AND STOCKPILING OF SOIL.
2. IMPLEMENTATION OF TEMPORARY EROSION CONTROL MEASURES; SELECTIVE GRADING, DIVERSIONS AS REQUIRED IN FIELD, PROTECTION OF STORM SEWER FACILITIES.
3. PERIODIC MAINTENANCE OF AFFECTED EROSION CONTROL MEASURES.
4. PERMANENT MEASURES; FINAL GRADING, SEEDING AND MULCHING.

SEE UNIFIED KEYING SYSTEM FOR EROSION CONTROL KEY NUMBERS

MDEQ STREAM CROSSING NOTES

CONSTRUCTION OF STREAM CROSSINGS SHALL BE SUBJECT TO THE SPECIFICATIONS FOR PROTECTION OF NATURAL RESOURCES AT UTILITY CROSSINGS AS GIVEN IN THE ADMINISTRATIVE RULES OF PART NO. 301 OF PUBLIC ACT 451, AS AMENDED, 1994.

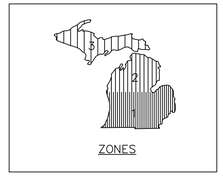
A SILTATION BARRIER SHALL BE CONSTRUCTED IMMEDIATELY DOWNSTREAM OF THE CONSTRUCTION SITE PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION ACTIVITIES. (SEE MICHIGAN UNIFIED KEYING SYSTEM FOR SPECIFIED BARRIER) THE SILTATION BARRIER SHALL BE MAINTAINED IN GOOD WORKING ORDER THROUGHOUT THE DURATION OF THE PROJECT.

BACKFILL SHALL CONSIST OF INERT MATERIALS WHICH WILL NOT CAUSE SILTATION NOR CONTAIN SOLUBLE CHEMICALS OR ORGANIC MATTER WHICH IS BIODEGRADABLE. ALL FILL SHALL BE CONTAINED IN SUCH A MANNER SO AS NOT TO ERODE INTO ANY WATERCOURSE.

ALL RAW BANKS SHALL BE STABILIZED WITH RIPRAP TO THREE FEET ABOVE THE ORDINARY HIGH WATER WATER MARK, THEN SEEDED, FERTILIZED AND MULCHED, OR SODDED TO PREVENT EROSION.

UPON PROJECT COMPLETION THE EXCESS SPOILS SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED UPLAND SITE.

SILTATION BARRIER MAY BE REMOVED UPON PLACEMENT OF PERMANENT EROSION CONTROL MEASURES.



ZONES

ZONE 1

TYPE OF SEED	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	RATE OF APPLICATION* PER/1000 S.F.	PER ACRE
OATS / BARLEY ANNUAL RYE	▨	▨	▨	▨	▨	15TH		2 LBS. 3/4 LB.	3 BUSHELS 25 LBS.
SUDANGRASS			▨	15TH				1 LB.	35 LBS.
CEREAL RYE					▨	▨	15TH	1.5 LBS.	2 BU.
WINTER WHEAT						20TH	15TH	1.5 LBS.	2 BU.

TEMPORARY SEEDING GUIDE

▨ RECOMMENDED PLANTING SEASON

* RATE OF APPLICATION APPLIES TO ALL ZONES

ZONE	TYPE OF IRRIGATION	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.
ZONE 1	IRRIGATED and/or MULCHED	▨	▨	▨	▨	▨	▨	▨
	without IRRIGATION or MULCH		▨	▨	▨	▨	▨	
ZONE 2	IRRIGATED and/or MULCHED		▨	▨	▨	▨	▨	
	without IRRIGATION or MULCH			▨	▨	▨	▨	
ZONE 3	IRRIGATED and/or MULCHED		▨	▨	▨	▨	▨	
	without IRRIGATION or MULCH			▨	▨	▨	▨	

PERMANENT SEEDING GUIDE

▨ RECOMMENDED PLANTING SEASON

TO BE COMPLETED BY CONTRACTOR FOR PERMIT

SOIL EROSION / SEDIMENTATION CONTROL
OPERATION TIME SCHEDULE

CONSTRUCTION SEQUENCE	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP	OCT	NOV	DEC
STRIP & STOCKPILE TOPSOIL												
ROUGH GRADE / SEDIMENT CONTROL												
TEMP. CONTROL MEASURES												
STORM FACILITIES												
TEMP. CONSTRUCTION ROADS												
FOUNDATION / BLDG. CONSTRUCTION												
SITE CONSTRUCTION												
PERM. CONTROL MEASURES												
FINISH GRADING												
LANDSCAPING												

GENESEE COUNTY DRAIN COMMISSIONER
DIVISION OF WATER & WASTE SERVICES
G-4610 BEECHER ROAD FLINT, MI 48532
PHONE: 810-732-7870 FAX: 810-732-9773

SOIL EROSION KEY SHEET

JEFFREY WRIGHT
GENESEE COUNTY
DRAIN COMMISSIONER

GENESEE COUNTY WWS DRAIN COMMISSIONER

DRAWN: LMM
APPROVED: MTR
SCALE: NONE
DATE: 2013

XX

CLR. TBL.: I:\standards\MsI\B\plotting\block.pib PEN TBL.: I:\standards\MsI\B\dgt\color2.tbl TIME: 25-MAR-2008 14:26
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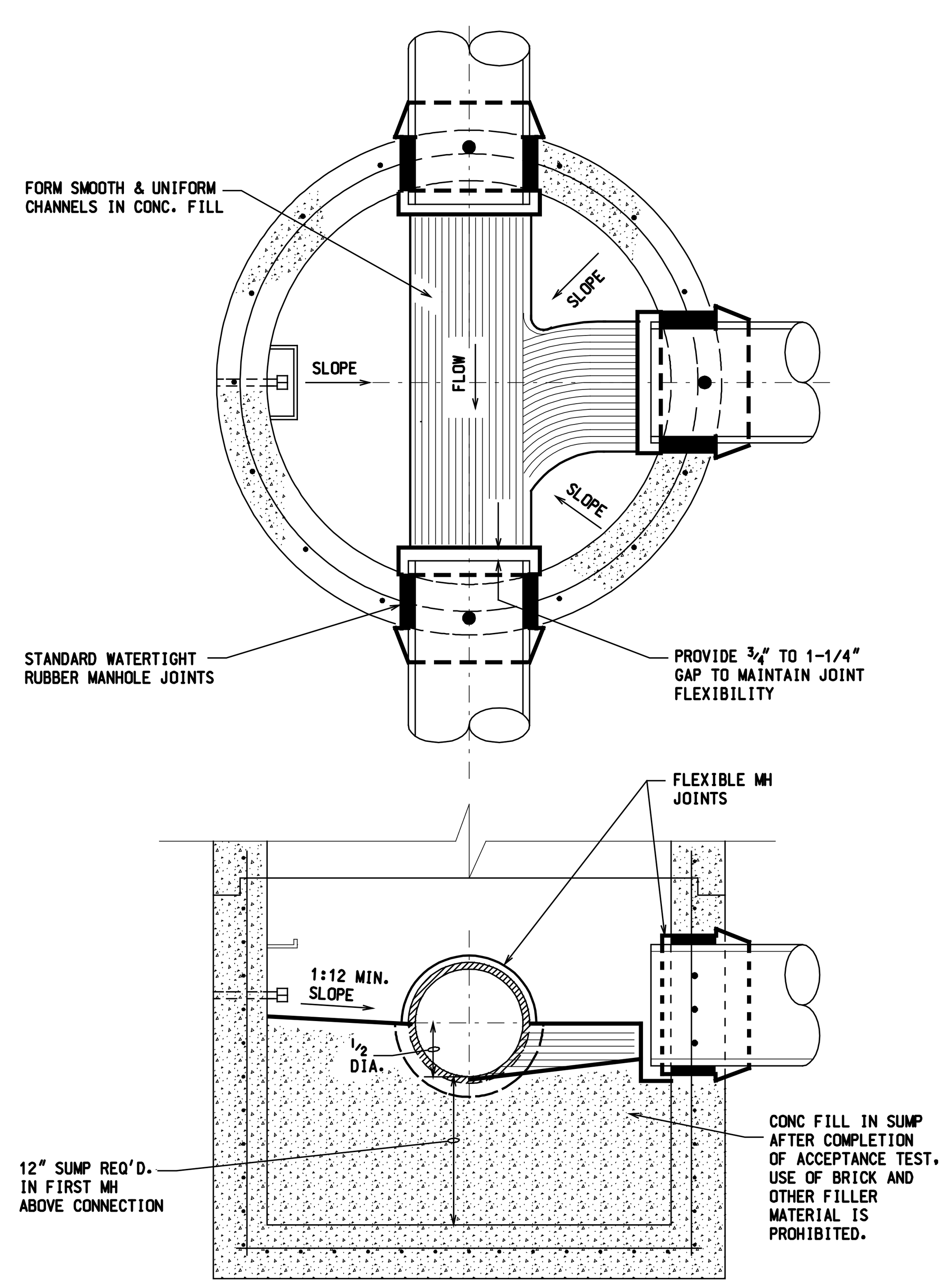
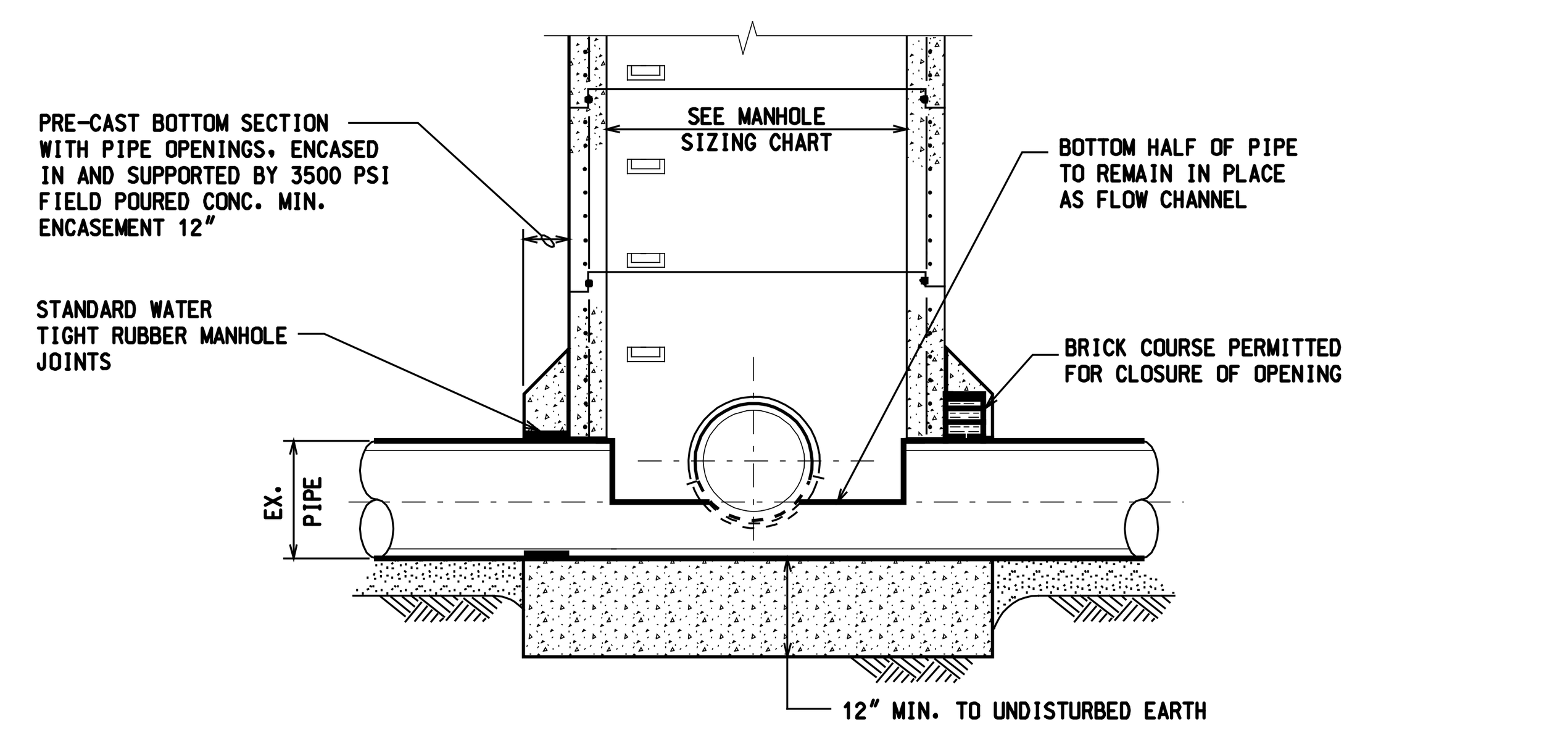
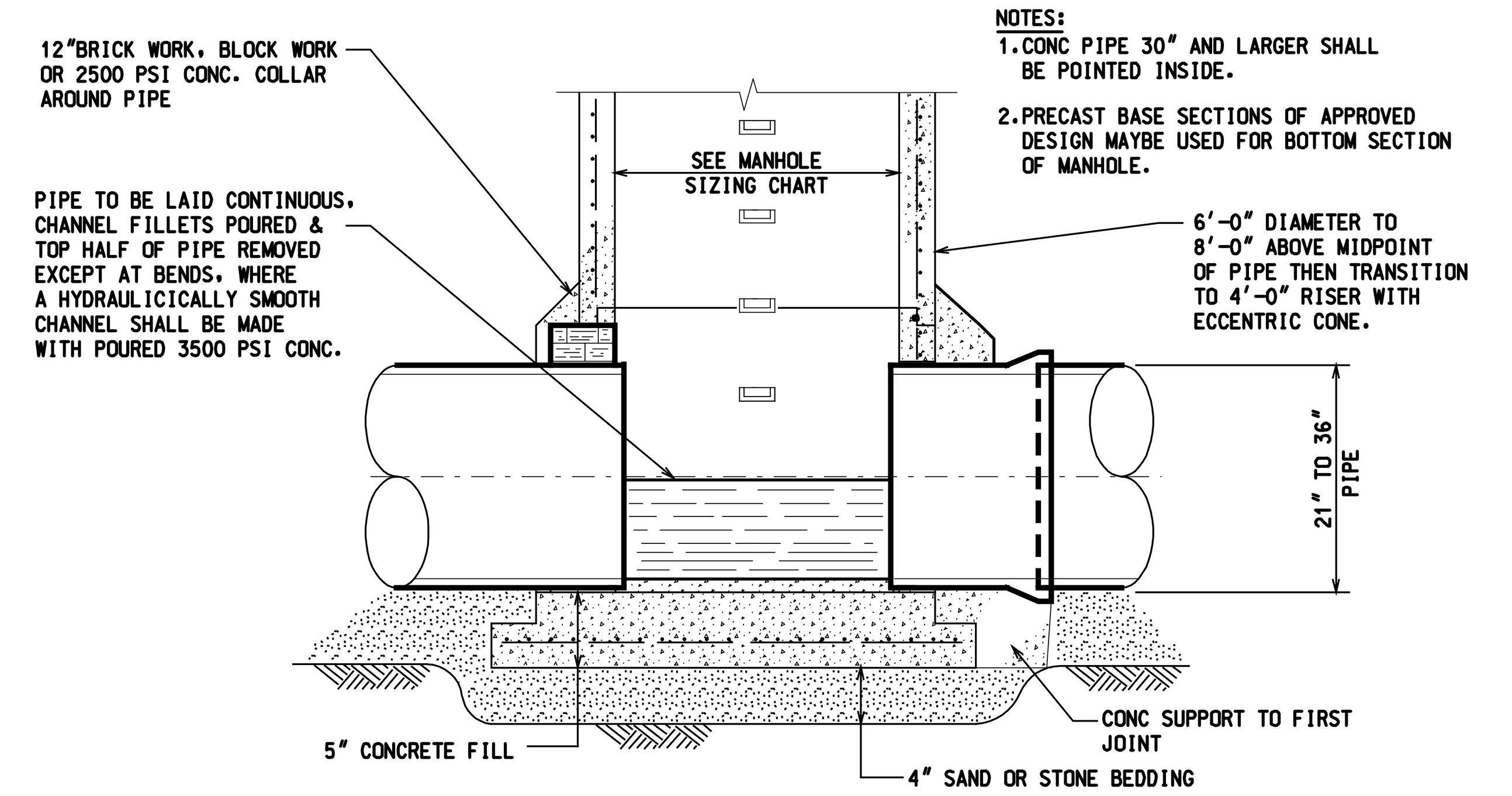


SANITARY SUMP MANHOLE



MANHOLE CONSTRUCTION OVER EXISTING SANITARY SEWER

NOTES:
1. CONC PIPE 30" AND LARGER SHALL BE POINTED INSIDE.
2. PRECAST BASE SECTIONS OF APPROVED DESIGN MAYBE USED FOR BOTTOM SECTION OF MANHOLE.



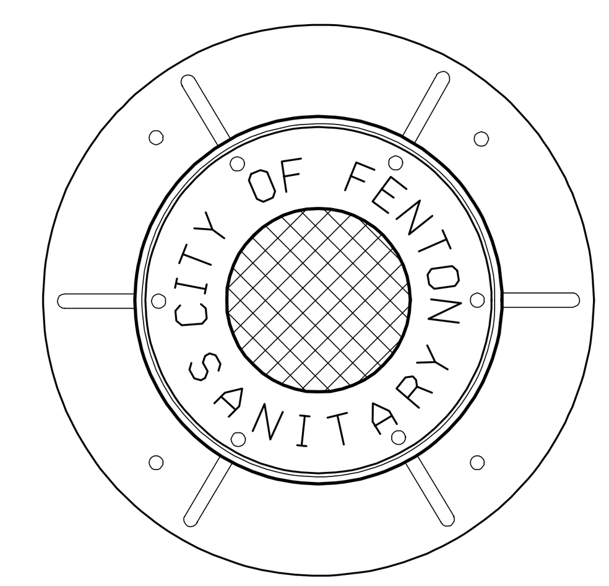
MANHOLE CONSTRUCTION FOR 21" TO 36" DIAMETER SANITARY SEWER

MANHOLE SIZING CHART

MANHOLE DIAMETER	MAX. PIPE SIZE FOR STRAIGHT THRU INST.	MAX. PIPE SIZE FOR RIGHT ANGLE INST.
4'	24"	18"
5'	36"	24"
6'	42"	36"
7'	60"	42"

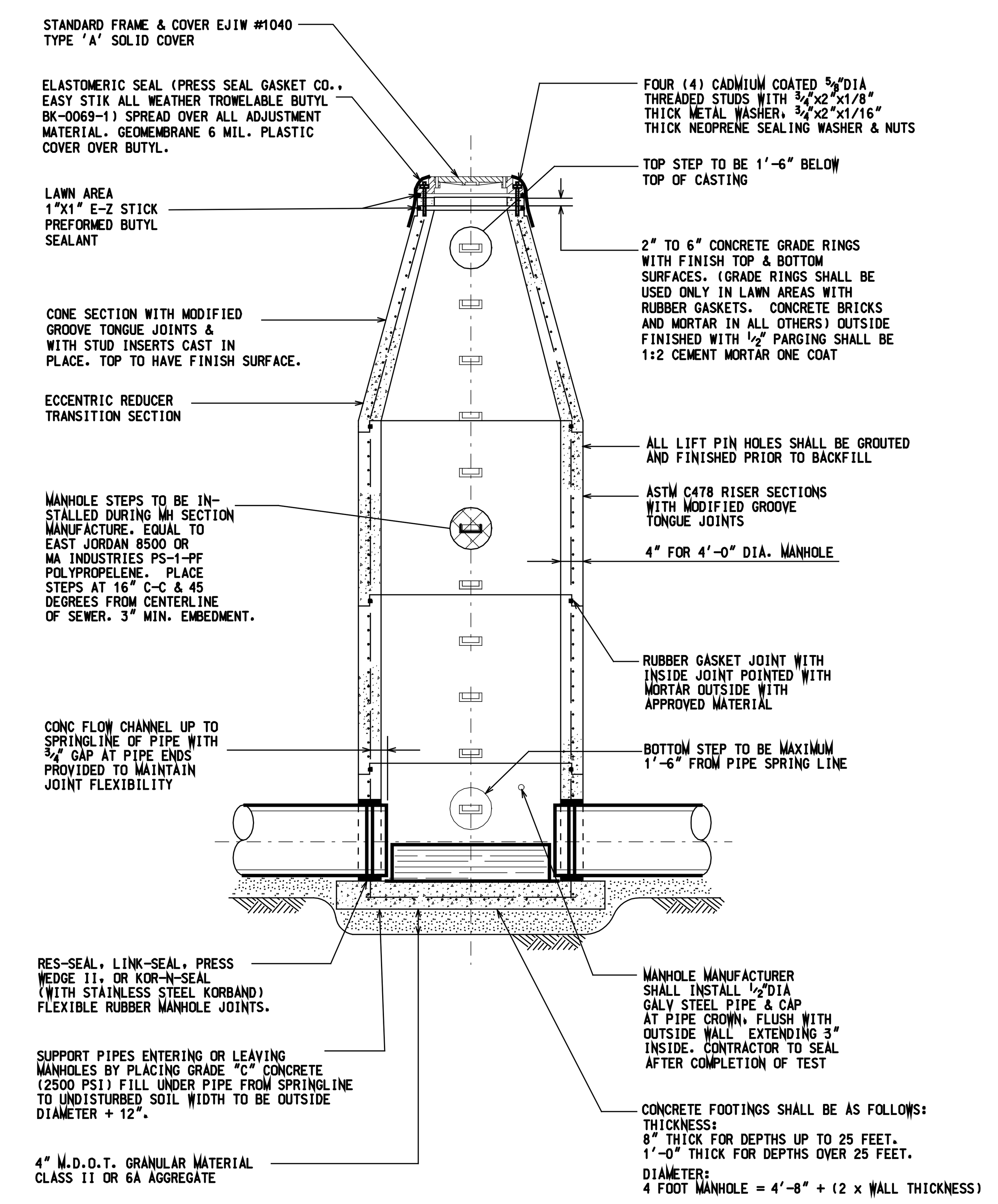
MAXIMUM TRENCH WIDTH TABLE

PIPE I.D.	TRENCH WIDTH
4" - 12"	32"
15"	36"
18"	39"
21"	43"
24"	46"
27"	50"
30"	53"
36"	68"
42"	75"



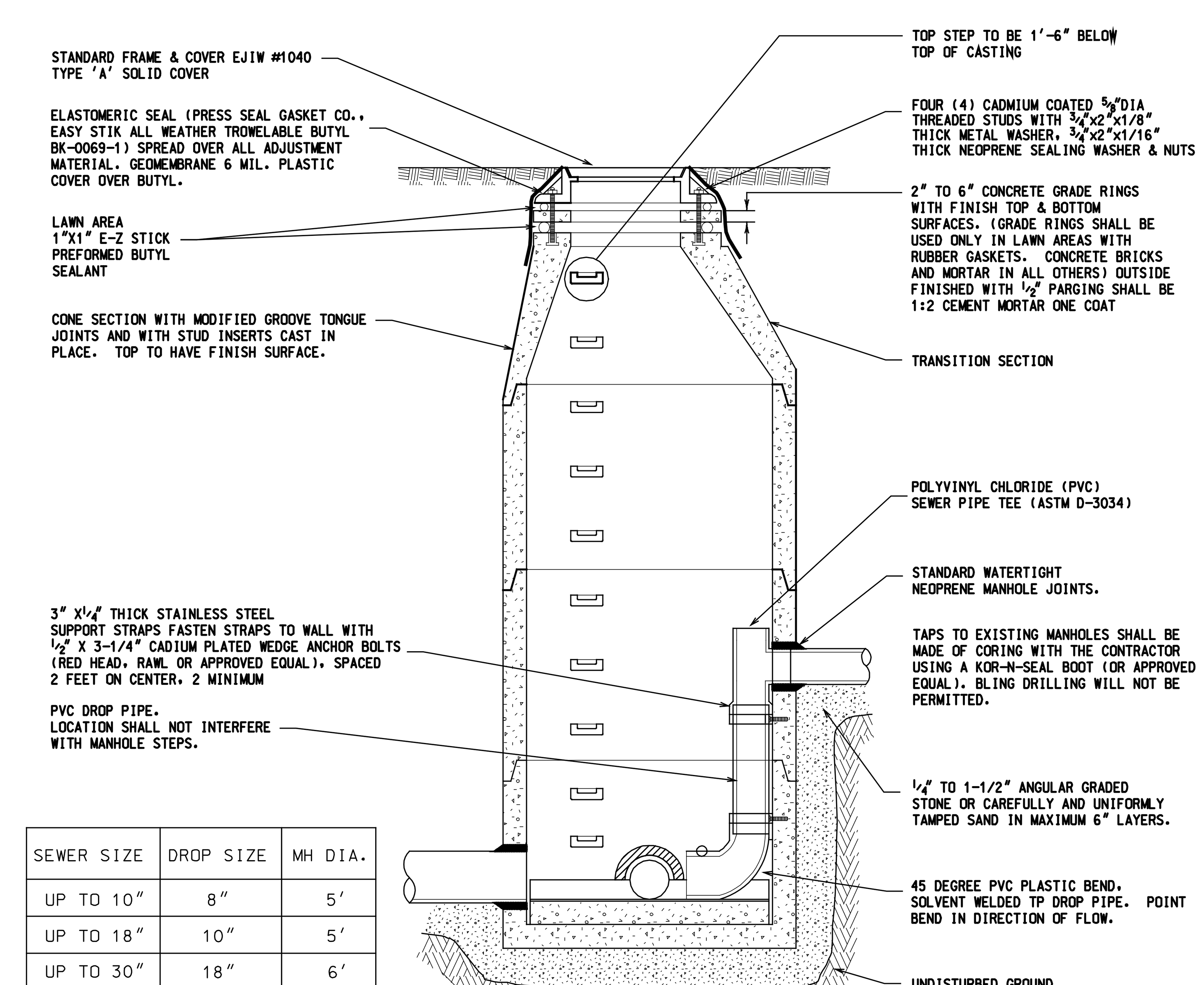
SANITARY COVER

SANITARY FRAME & COVER EJIW #1040 WT. WITH TYPE "A" WITH BOLT DOWN COVER AND RAISED LETTERS.



SANITARY MANHOLE

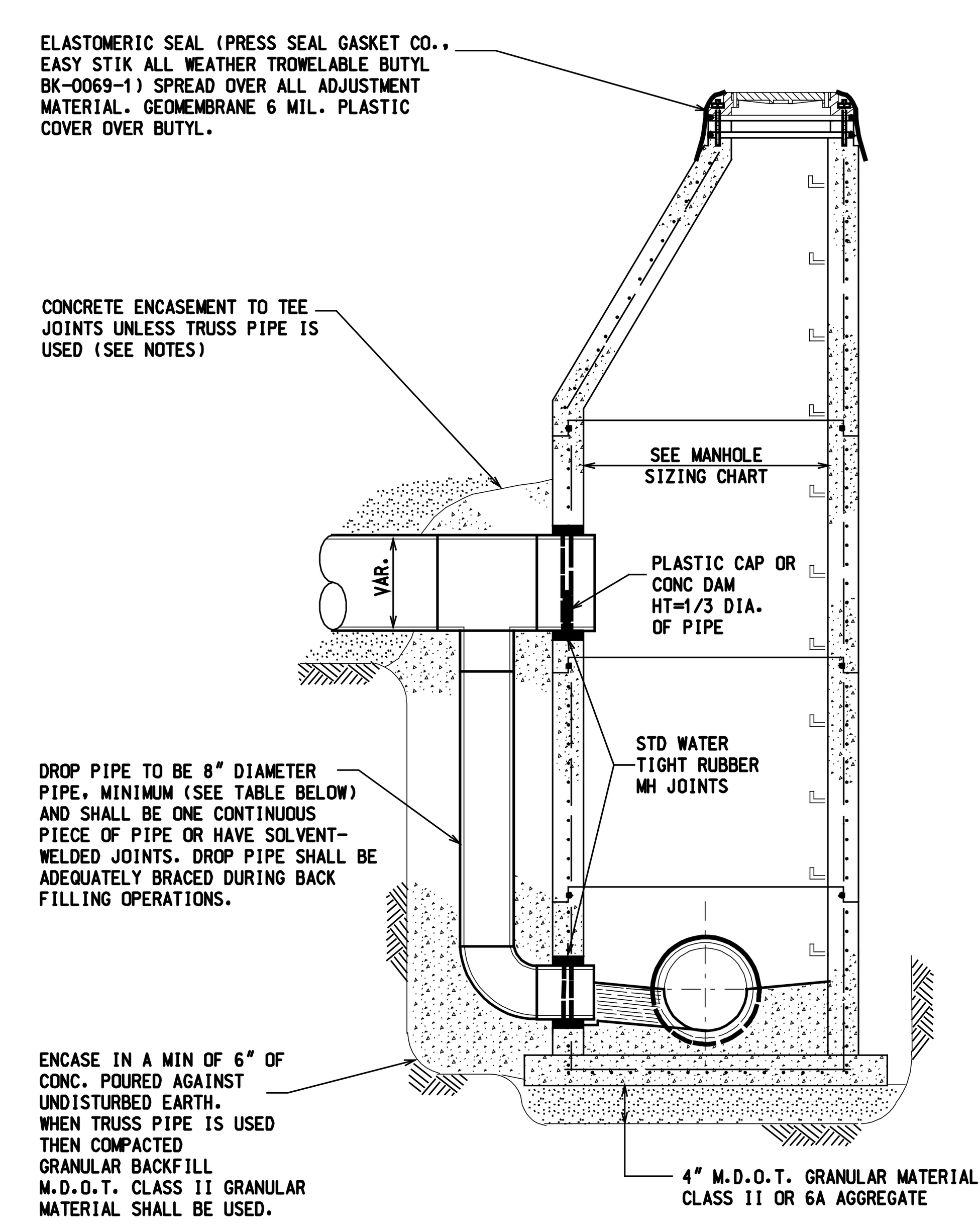
NOTE:
INVERT OF SEWER PIPE TO BE FLUSH W/ PRE-CAST MANHOLE CHANNEL. IF NOT, GROUT AREA TO PROVIDE SMOOTH TRANSITION



SEWER SIZE	DROP SIZE	MH DIA.
UP TO 10"	8"	5'
UP TO 18"	10"	5'
UP TO 30"	18"	6'

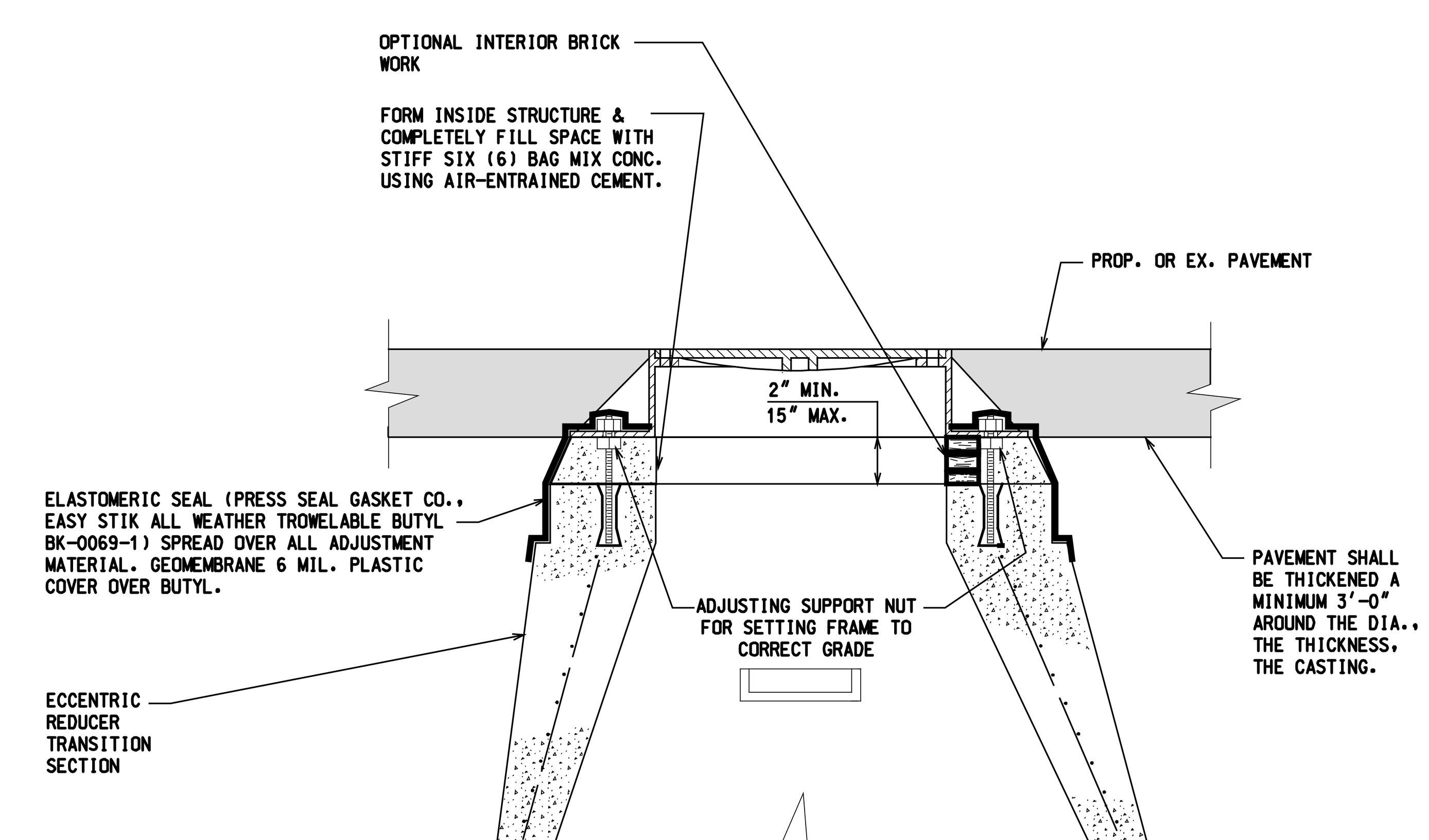
INTERNAL DROP CONNECTION INSIDE LARGE DIAMETER MANHOLE

NOTE:
ONLY TO BE USED BY SPECIAL APPROVAL BY CITY ADMINISTRATION OR ENGINEER



SEWER SIZE	DROP SIZE	MH DIA.
UP TO 10"	8"	4'
12" TO 18"	10"	4'
18" TO 30"	18"	5'

EXTERNAL DROP MANHOLE CONNECTION



RIM ADJUSTMENT WITHIN PAVEMENT

City of Fenton

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DATE	ADDITIONS AND/OR REVISIONS
3-24-08	ADOPTED BY CITY COUNCIL

DESIGNED	
DRAWN	J. REC
CHECKED	M. DARGA
APPROVED	J. BOOTH

V:\200700\2007048\C\san_det01_V8.dgn

CITY OF FENTON
STANDARD CONSTRUCTION DETAILS

SANITARY SEWER STANDARDS 1 OF 2

HRC JOB NO. 20070048	SCALE NONE
DATE JULY, 2007	SHEET NO. 1 OF 2

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GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT ENGINEERING DESIGN STANDARDS AND SPECIFICATIONS OF THE CITY OF FENTON. SANITARY SEWER CONSTRUCTION SHALL HAVE FULL TIME INSPECTION SUPERVISED BY A LICENSED PROFESSIONAL ENGINEER PROVIDED BY, OR CAUSED TO BE PROVIDED BY, THE CITY OF FENTON.

2. BEFORE THE START OF CONSTRUCTION, THE CONTRACTOR MUST REQUEST AND HAVE IN HIS POSSESSION AN APPROVED CONNECTION PERMIT ISSUED BY THE CITY OF FENTON OR ITS AGENT. THE CONTRACTOR SHALL NOTIFY THE CITY OF FENTON 48 HOURS PRIOR TO THE BEGINNING OF ANY CONSTRUCTION.

3. NO SINGLE RUN OF SEWER INSTALLATION SHALL HAVE AN INFILTRATION EXCEEDING 100 GALLONS PER INCH DIA. PER MILE OF PIPE PER 24 HOUR PERIOD. AIR TEST IN LIEU OF INFILTRATION TESTS SHALL BE ALLOWED SUBJECT TO APPROVAL OF THE CITY OF FENTON.

4. A WATER TIGHT BULKHEAD WITH A CAPPED 1-INCH DIA PIPE TO PERMIT MEASURING INFILTRATION SHALL BE PROVIDED. A TEMPORARY 12-INCH DEEP SUMP SHALL ALSO BE PROVIDED IN THE FIRST MANHOLE ABOVE THE CONNECTION WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY INFILTRATION TEST UP TO THE STANDARD FILET PROVIDED FOR THE FLOW CHANNEL.

5. BUILDING LEADS AND RISERS SHALL BE 6-INCH DIA, DR 26 OR SCHEDULE 40 BUILDING LEADS TO BE FURNISHED WITH MANUFACTURER APPROVED REMOVABLE AIR-TIGHT AND WATER-TIGHT STOPPERS.

6. NEW MANHOLES SHALL HAVE FLEXIBLE, WATER-TIGHT SEALS WHERE PIPES PASS THROUGH WALLS. MANHOLES SHALL BE OF PRECAST SECTIONS WITH MODIFIED GROOVE TONGUE AND RUBBER GASKET TYPE JOINTS. PRECAST MANHOLE CONE SECTIONS SHALL BE THE CITY OF FENTON APPROVED ECCENTRIC CONE TYPE.

7. DROP CONNECTIONS WILL BE REQUIRED WHEN THE DIFFERENCE IN INVERT ELEVATIONS EXCEEDS 18 INCHES. ONLY OUTSIDE DROP CONNECTIONS WILL BE APPROVED.

8. NEW MANHOLES CONSTRUCTED DIRECTLY ON EXISTING SEWERS SHALL BE PROVIDED WITH COVERS READING "CITY OF FENTON SANITARY" IN RAISED LETTERS ONLY. NEW MANHOLES BUILT OVER ANY EXISTING SANITARY SEWERS SHALL HAVE MONOLITHIC POURED BOTTOMS.

9. TAPS TO EXISTING MANHOLES SHALL BE MADE BY CORING. THE CONTRACTOR SHALL PLACE A KOR-N-SEAL BOOT (OR APPROVED EQUAL) AFTER CORING IS COMPLETED.

10. NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWNSPOUT DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER.

11. PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL TELEPHONE MISS DIG (800-482-7171) FOR THE LOCATION OF UNDERGROUND GAS, ELECTRIC, TELEPHONE AND CABLE FACILITIES, AND SHALL ALSO NOTIFY REPRESENTATIVES OF OTHER UTILITIES LOCATED IN THE VICINITY OF THE WORK.

12. A MINIMUM VERTICAL CLEARANCE OF 18-INCHES SHALL BE MAINTAINED BETWEEN SANITARY SEWER AND ALL OTHER UTILITIES OR CONCRETE ENCASEMENT IS REQUIRED.

13. IT SHALL BE THE OWNER'S ENGINEERS AND CONTRACTOR'S RESPONSIBILITY TO VERIFY AND/OR OBTAIN ANY INFORMATION NECESSARY REGARDING THE PRESENCE OF UNDERGROUND UTILITIES WHICH MIGHT AFFECT THE JOB.

14. THE MINIMUM ALLOWABLE SIZE OF A PUBLIC SANITARY SEWER IS 8" DIA. THE LAST UPSTREAM RUN OF SEWER MUST BE AT A GRADE OF 1.00% OR GREATER.

15. ONE SEWER LEAD PER UNIT MUST BE PROVIDED. MULTI UNITS SERVICED FROM A SINGLE LEAD WILL NOT BE PERMITTED.

SPECIFICATIONS FOR TRUSS PIPE SANITARY SEWER

MATERIALS AND CERTIFICATIONS

ARMCO TRUSS PIPE AND FITTINGS SHALL BE A DESCRIBED UNDER ASTM DESIGNATION D2680 STANDARD SPECIFICATION FOR POLYVINYL CHLORIDE (PVC) COMPOSITE SEWER PIPING. APPENDIX XI OF SAID SPECIFICATION SHALL BE MODIFIED BY THE BEDDING REQUIREMENTS OUTLINED BELOW.

SOLID WALL PVC PIPE FOR 6" HOUSE CONNECTION SEWERS SHALL BE SCH. 40 OR DR 26 CONFORMING TO ASTM DESIGNATION D2751 STANDARD SPECIFICATIONS FOR POLYVINYL CHLORIDE (PVC) SEWER PIPE AND FITTINGS. SOLID WALL PIPE SHALL BE INSTALLED IN ACCORDANCE WITH BEDDING REQUIREMENTS OUTLINED BELOW.

ALL PIPE SHALL BE CERTIFIED BY THE MANUFACTURER TO MEET THE APPLICABLE ASTM SPECIFICATION REQUIREMENTS. CERTIFICATION FORMS, TOGETHER WITH A REPORT OF THE TEST RESULTS, SHALL BE PROVIDED TO THE INSPECTOR WITH PIPE DELIVERIES AND COPIES SHALL BE FORWARDED TO THE ENGINEER OR THE OWNER. CERTIFICATION FORMS SHALL INCLUDE PROJECT NAME, LOCATION, CONTRACTOR, AND TEST LOT NUMBER. LOT SIZES SHALL BE ACCEPTABLE TO THE ENGINEER.

ALL PIPE AND FITTINGS SHALL BE SUITABLY MARKED TO PROVIDE MANUFACTURER'S NAME, LOT OR PRODUCTION NUMBER, ASTM DESIGNATION, NOMINAL DIAMETER, AND SDR NUMBER, WHERE APPLICABLE. FITTINGS, HOWEVER, NEED NOT CONTAIN LOT OR PRODUCTION NUMBER. PIPE SHALL HAVE A "HOME" MARK. TRUSS PIPE WITH AN ABSENCE OF FILLER MATERIAL AT THE ENDS GREATER THAN 1/4" DEEP SHALL BE SUBJECT TO REJECTION OR ACCEPTABLE REPAIR.

BEDDING

BEDDING FOR TRUSS PIPE AND PVC SOLID WALL PIPE SHALL BE IN ACCORDANCE WITH ASTM D2321, EXCEPT, (1) ONLY CLASS I AND CLASS II MATERIALS MAY BE USED, (2) BEDDING SHALL EXTEND TO MINIMUM 12" ABOVE TOP OF PIPE, AND (3) FLOODING OR PUDDLING SHALL NOT BE USED TO ACHIEVE COMPACTION. IT IS ESSENTIAL THAT IT BE RECOGNIZED THAT THE SUCCESSFUL USE OF FLEXIBLE AND SEMI-FLEXIBLE PIPE REQUIRES BEDDING THAT PROVIDES UNYIELDING SIDE SUPPORT AND COMPLETE BEDDING CONTACT UNDER PIPE HAUNCHES.

WHERE UNSTABLE BOTTOMS ARE ENCOUNTERED, THE CONTRACTOR SHALL PROVIDE A RECOMMENDATION FOR FOUNDATION SUPPORT PREPARED BY A LICENSED PROFESSIONAL ENGINEER WITH GEO-TECHNICAL EXPERIENCE FOR THIS FOUNDATION WHICH MAY CONSIST OF AN APPROVED GRADED AND PROCESSED ANGULAR STONE OR GRAVEL TO ACT AS AN IMPERVIOUS MAT TO PREVENT MIGRATION OR VERTICAL MOVEMENT OF UNSTABLE SOILS OR BEDDING MATERIALS. WHERE TRENCH SHEETING, PLATES, OR A TRENCH BOX ARE USED DUE TO SEVERE GROUND CONDITIONS, ALL VOIDS TO THE SIDE AND BELOW THE TOP OF THE PIPE CAUSED BY THE SHEETING, PLATES, OR BOX WITHDRAWAL SHALL BE COMPLETELY FILLED OR THE SUPPORTS LEFT IN PLACES BELOW THE TOP OF THE PIPE.

CONCRETE CRADLE BEDDING SHALL NOT BE USED WHERE ALLOWABLE TRENCH WIDTHS ARE EXCEEDED. IN LIEU OF CONCRETE CRADLE BEDDING, STANDARD PIPE BEDDING SHOWN SHALL BE PROVIDED TO THE FULL WIDTH BETWEEN UNDISTURBED TRENCH WALLS OR AT LEAST 2.5 PIPE DIAMETERS ON BOTH SIDES OF THE PIPE

DUE TO POTENTIAL DAMAGE TO EXTERIOR WALLS OF TRUSS PIPE, PARTICULARLY UNDER COLD WEATHER CONDITIONS, THE CONTRACTOR SHALL CAREFULLY AVOID DUMPING ANY MATERIALS OTHER THAN APPROVED BEDDING SAND OR STONE ON THE PIPE UNTIL 12" COVER IS PLACED OVER THE PIPE. PIPE WALLS AND ENDS SHALL ALSO BE PROTECTED FROM ABRASION AND DAMAGE DURING HANDLING, AND SHALL BE FULLY INSPECTED JUST PRIOR TO PLACING IN THE TRENCH.

CARE SHALL BE TAKEN DURING BEDDING COMPACTION TO AVOID DISTORTING THE SHAPE OF THE PIPE OR DAMAGES ITS EXTERIOR WALL. MOBILE EQUIPMENT SHALL NOT BE USED OVER THE PIPE TRENCHES UNTIL 48" OF COVER HAS BEEN PLACED.

HOUSE CONNECTIONS SHALL BE MADE TO WYE FITTINGS. BEDDING FOR HOUSE CONNECTION SEWERS SHALL BE EQUAL TO THAT OF THE MAIN SEWER BEDDING. RISERS IN DEEP AND UNSTABLE TRENCHES SHOULD BE BEDDED IN ANGULAR STONE TO AVOID SETTLEMENT. CONCRETE SHALL NOT BE USED FOR BEDDING. END CAPS OR PLUGS SHALL BE BRACED OR ANCHORED TO WITHSTAND AIR TEST PRESSURES.

JOINTS

JOINTS FOR PIPE AND FITTINGS SHALL BE OF THE ELASTOMERIC GASKET PUSH-ON TYPE. SUCH JOINTS SHALL CONFORM TO ASTM D3212 AND THE PIPE MANUFACTURER SHALL FILE WITH THE CITY OF FENTON A COPY OF CERTIFIED TEST RESULTS OF ITS JOINTING SYSTEM PRIOR TO USE. GASKET JOINTS SHALL BE INSTALLED IN ACCORDANCE WITH PROCEDURES SPECIFIED BY THE PIPE MANUFACTURER. CARE SHALL BE TAKEN TO INSURE ALL JOINTS BEING PUSHED TO THE FULL "HOME" POSITION AND HELD TIGHTLY IN THE "HOME" POSITION DURING ANY GRADE OR LINE ADJUSTMENTS. JOINTS FOR SEWER LEAD PIPE SHALL BE CHEMICALLY WELDED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION. PIPE SHALL BE ROTATED DURING JOINT INSERTION TO INSURE A COMPLETE SPREAD OF JOINTING CEMENT. PVC PLASTIC CEMENT PRIMER AND PVC PLASTIC PIPE CEMENT SHALL ARRIVE AT THE JOB SITE IN SEALED AND LABELED CONTAINERS. "JOHNNY MOPS" OR SIMILAR SWAB TYPE APPLICATIONS SHALL BE USED TO APPLY PRIMER AND CEMENT. OPENED CONTAINERS IN THE TRENCH SHALL BE PROTECTED FROM DIRT, WATER, AND OTHER CONTAMINANTS.

CUTTING AND HANDLING

CUTTING OF PIPE LENGTHS, WHERE REQUIRED, SHALL BE PERFORMED BY THE USE OF TOOLS OR EQUIPMENT THAT WILL PROVIDE A NEAT, PERPENDICULAR CUT WITHOUT DAMAGE TO THE PLASTIC OR THE FILLER MATERIAL. THE CONTRACTOR SHALL STORE AND PROTECT THE PIPE TO MINIMIZE BOWING. NOMINAL 12.5FT LENGTHS HAVING DEVIATIONS FROM STRAIGHT GREATER THAN 1" SHALL NOT BE USED.

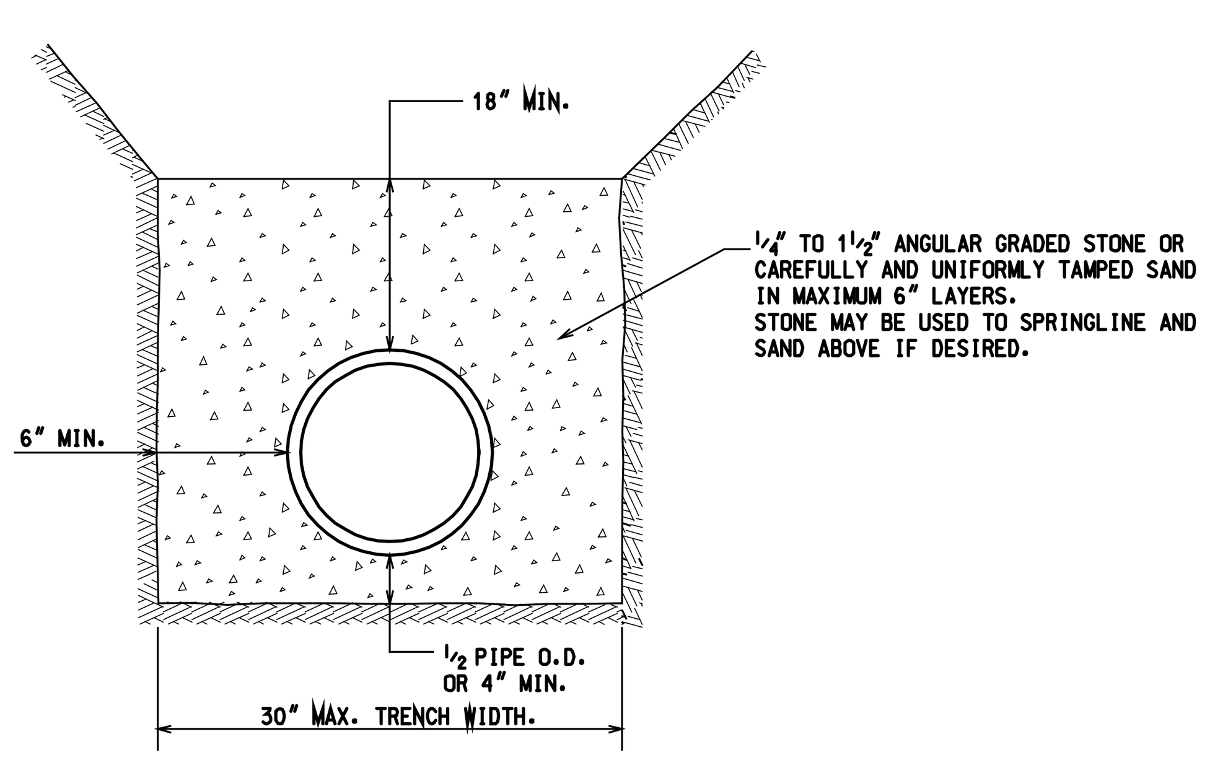
SPECIAL CONDITIONS

THE COMPLETED INSTALLATION SHALL AT NO POINT HAVE OUT-OF-ROUND PIPE DEFLECTIONS GREATER THAN 5%. THE ENGINEER SHALL HAVE THE OPTION OF REQUIRING DEFLECTOMETER OR GO NO-GO GAUGING TEST RUN PRIOR TO ACCEPTANCE ON PIPELINES WHERE HIGH DEFLECTIONS ARE SUSPECTED.

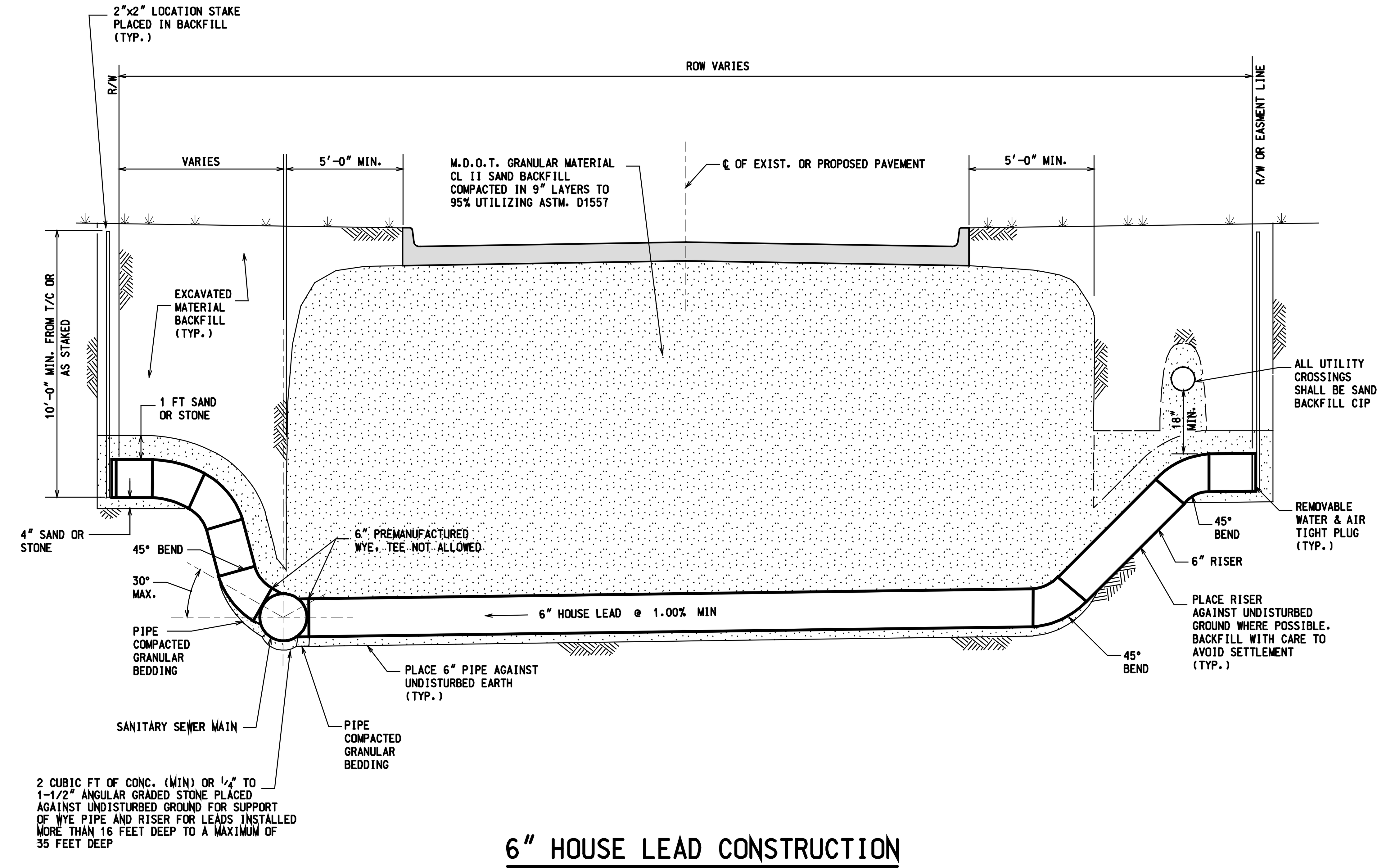
RECORD DRAWING PLANS SHALL BE PROVIDED TO THE CITY OF FENTON BY THE ENGINEER AND RECORD DRAWING PLANS SHALL SPECIFICALLY DESIGNATE THE TYPE OF SEWER PIPE INSTALLED AT ALL LOCATIONS.

TELEVISING OF NEW SANITARY SEWER

NO SOONER THAN 30 DAYS AFTER THE INSTALLATION OF NEW SANITARY SEWER MAINS, THE PIPE SHALL BE INTERNALLY INSPECTED VIA VIDEO CAMERA. THE VIDEO EQUIPMENT SHALL BE SPECIFICALLY DESIGNED FOR THE INTERNAL INSPECTION OF THE PIPE. THE CONTRACTOR SHALL PROVIDE THE CITY OF FENTON WITH 2 COPIES OF BOTH A COLOR DVD AND A WRITTEN LOG DESCRIBING THE CONTENT OF THE VIDEO FOR THE ENTIRE LENGTH OF THE NEW SEWER. THE VIDEO WILL BE REVIEWED BY THE CITY OF FENTON OR ITS AGENTS PRIOR TO ISSUANCE OF FINAL ACCEPTANCE. IF DEFECTS ARE DISCOVERED, THE CONTRACTOR SHALL MAKE THE NECESSARY REPAIRS AT HIS/HER COST PRIOR TO FINAL ACCEPTANCE OF THE SEWER BY THE CITY OF FENTON. A FOLLOW UP VIDEO WILL BE REQUIRED TO BE SUPPLIED BY THE CONTRACTOR TO ENSURE THE REPAIRS HAVE BEEN COMPLETED TO THE CITY OF FENTON'S SATISFACTION.

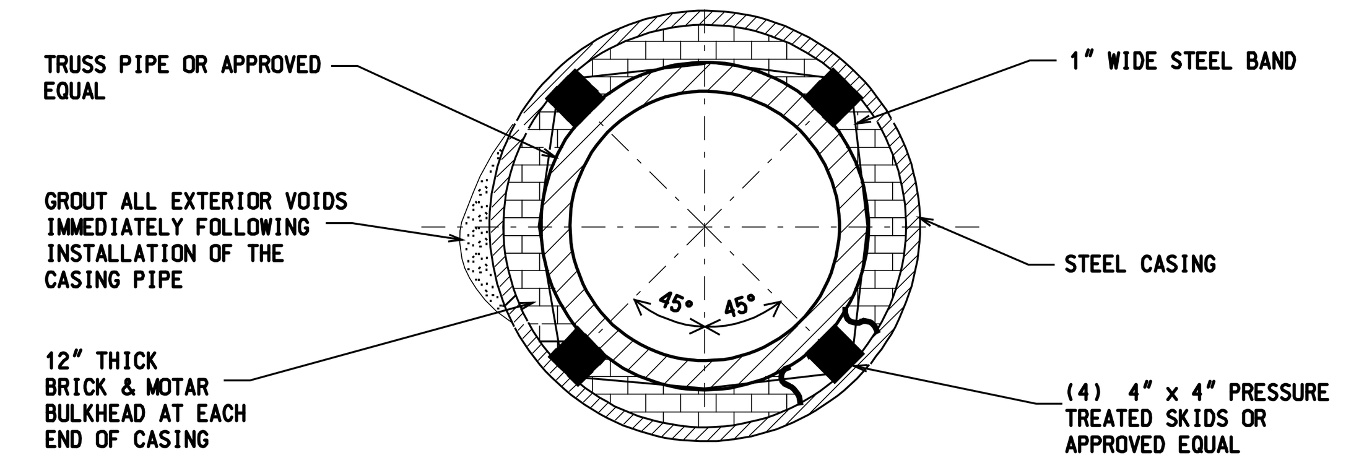


TRUSS & SOLID WALL PIPE BEDDING DETAIL



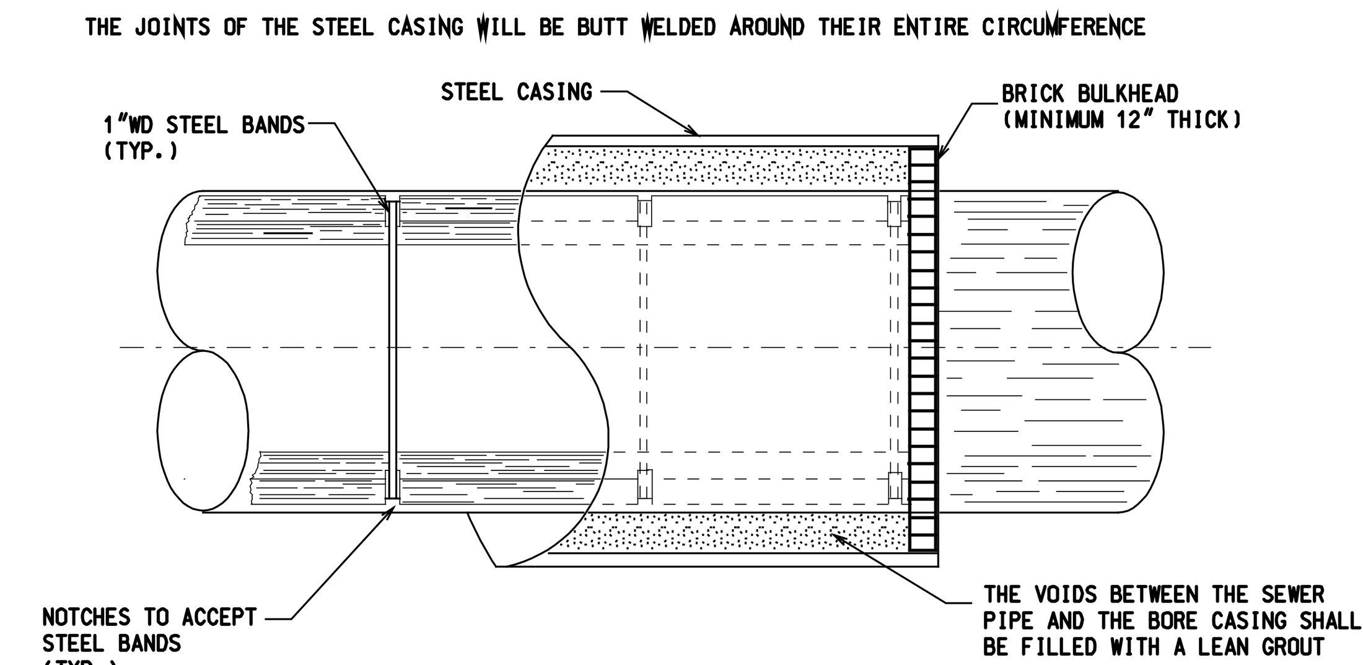
6" HOUSE LEAD CONSTRUCTION

NOTE:
ALL UTILITIES - PUBLIC OR PRIVATE THAT FALL WITHIN A ONE ON ONE ZONE OF INFLUENCE FROM A POINT 5'-0" BEHIND BACK OF CURB AT TOP OF CURB SHALL BE BACKFILLED WITH M.D.O.T. GRANULAR MATERIAL, CLASS II COMPACTED TO 95% OF MAXIMUM DENSITY UTILIZING ASTM D1557.



SPACING OF STEEL BANDS	NOMINAL SIZE	MIN WALL THICKNESS	
5 BANDS EQUALLY SPACED PER LENGTH OF PIPE	12" - 20"	0.250"	CASING PIPE SHALL BE NEW OR UNUSED ASTM A-139 GRADE "B" & WALL THICKNESS AS NOTED.
	24" - 36"	0.375"	
	42"	0.500"	
	48" - 60"	0.625"	

THE JOINTS OF THE STEEL CASING WILL BE BUTT WELDED AROUND THEIR ENTIRE CIRCUMFERENCE



NOTES:

1. THE CONTRACTOR SHALL SUBMIT IN WRITING TO THE CITY OF FENTON, THE APPROPRIATE PIPE CASING INSTALLATION DETAILS FOR REVIEW & APPROVAL BEFORE CONSTRUCTION BEGINS.

2. THE DIAMETER OF THE BORE CASING SHALL BE A MINIMUM OF 8" LARGER THAN THE SEWER TO ACCOMODATE 4" SKIDS ON ALL SIDES.

3. A 4" MIN. DIA. PVC GROUT FILL TUBE SHALL BE INSTALLED AT EACH END OF THE CASING. FLOWABLE FILL SHALL BE INSERTED FROM ONE END UNTIL ALL AIR IS REMOVED FROM CASING.

SEWER MAIN BORE

City of Fenton

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DATE	ADDITIONS AND/OR REVISIONS
3-24-08	ADOPTED BY CITY COUNCIL

DESIGNED
DRAWN J. REC
CHECKED M. DARGA
APPROVED J. BOOTH
V:\200700\20070048\C\san_det02_V8.dgn

CITY OF FENTON
STANDARD CONSTRUCTION DETAILS

SANITARY SEWER STANDARDS 2 OF 2

HRC JOB NO. 20070048 | SCALE NONE
DATE JULY, 2007 | SHEET NO. 2 OF 2

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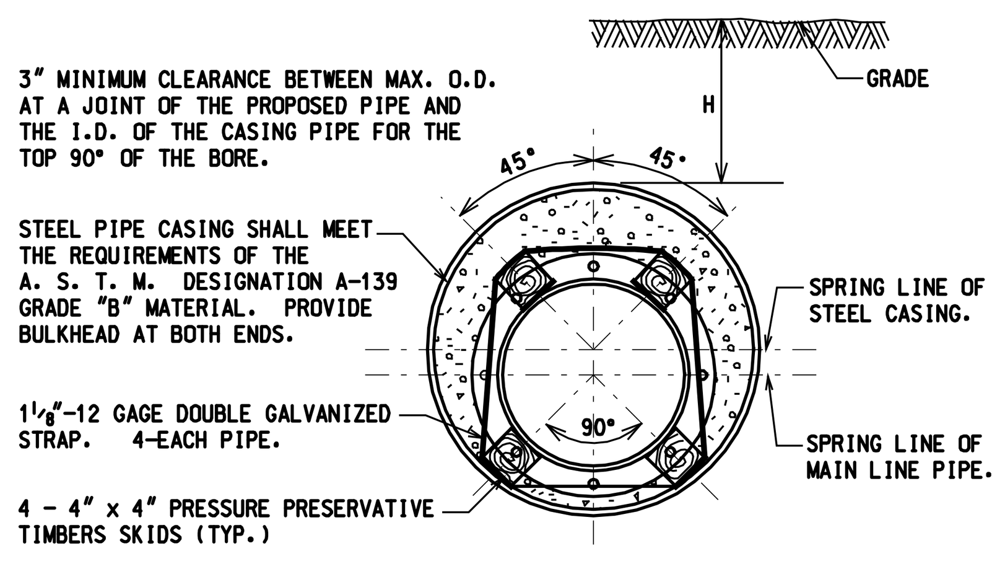


SECTION

NO SCALE

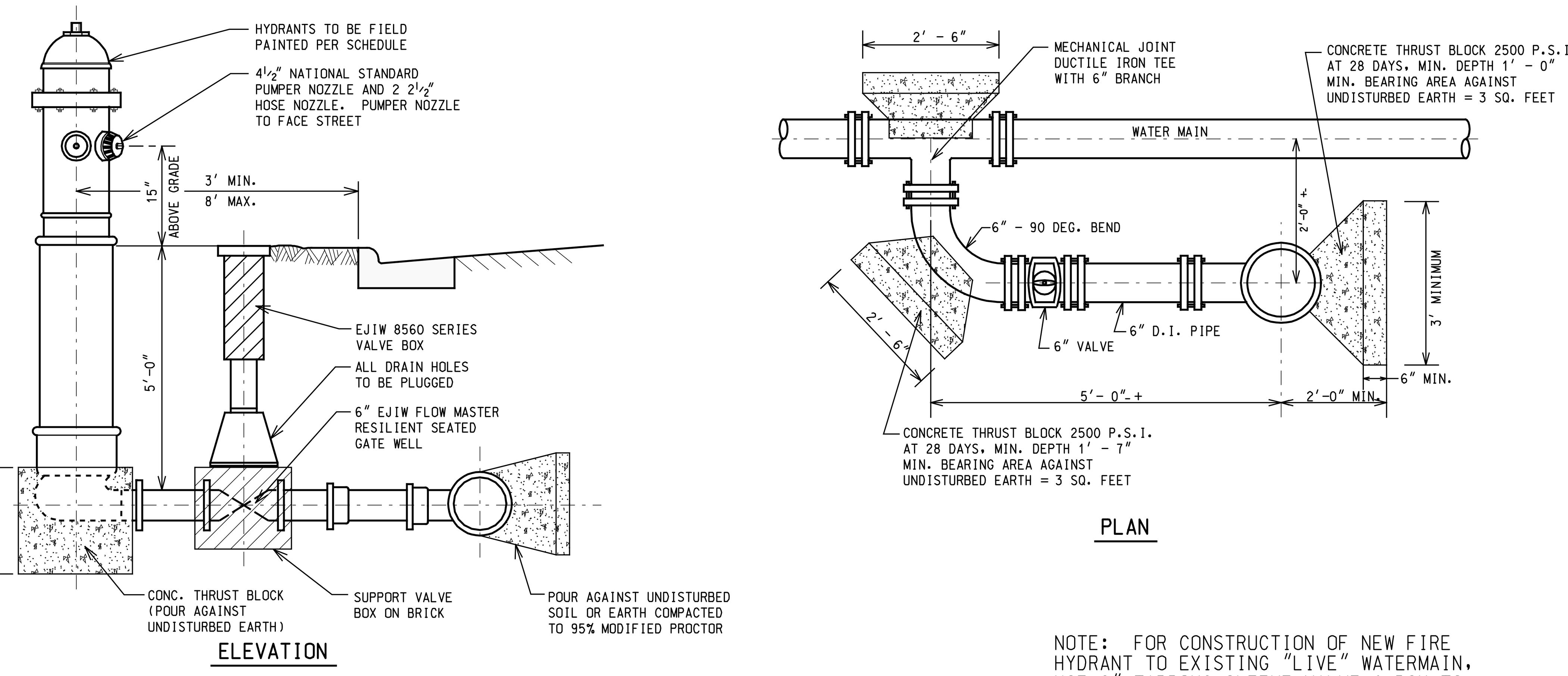
ALL VOIDS BETWEEN THE WATER MAIN AND THE CASING PIPE SHALL BE FILLED WITH A LEAN GROUT. 12" MIN. BULKHEADS MUST BE PLACED AT EACH END.

ALLOWABLE HEIGHT OF COVER (H.) IN FT., FOR STEEL CASING											
WALL THICKNESS (IN.)		STEEL CASING OUTSIDE DIAMETER (IN.)									
FRACT.	DEC.	12	14	16	18	20	24	28	30	36	42
	.1875	39	30	24	21	19	17	16	X	X	X
1/4	.250	50	50	39	31	27	21	19	18	16	X
5/16	.3125	X	X	50	48	39	28	23	21	18	17
	.375	X	X	X	50	50	39	29	27	22	19
	.4375	X	X	X	X	X	50	39	34	26	21
	.500	X	X	X	X	X	X	50	44	31	25
9/16	.5625	X	X	X	X	X	X	X	50	39	30
5/8	.625	X	X	X	X	X	X	X	X	48	35
TYPICAL TUNNEL CASING DETAIL											

NOTES:

1. CASING PIPE JOINTS TO BE FULLY WELDED AROUND THE CIRCUMFERENCE BY A CERTIFIED WELDER.
2. THE DIAMETER OF THE BORE CASING SHALL BE A MINIMUM OF 8" LARGER THAN THE WATERMAIN TO ACCOMMODATE 4" SKIDS ON ALL SIDES.
3. A 4" MIN. DIA. PVC GROUT FILL TUBE SHALL BE INSTALLED AT EACH END OF THE CASING. FLOWABLE FILL SHALL BE INSERTED FROM ONE END UNTIL ALL AIR IS REMOVED FROM CASING.

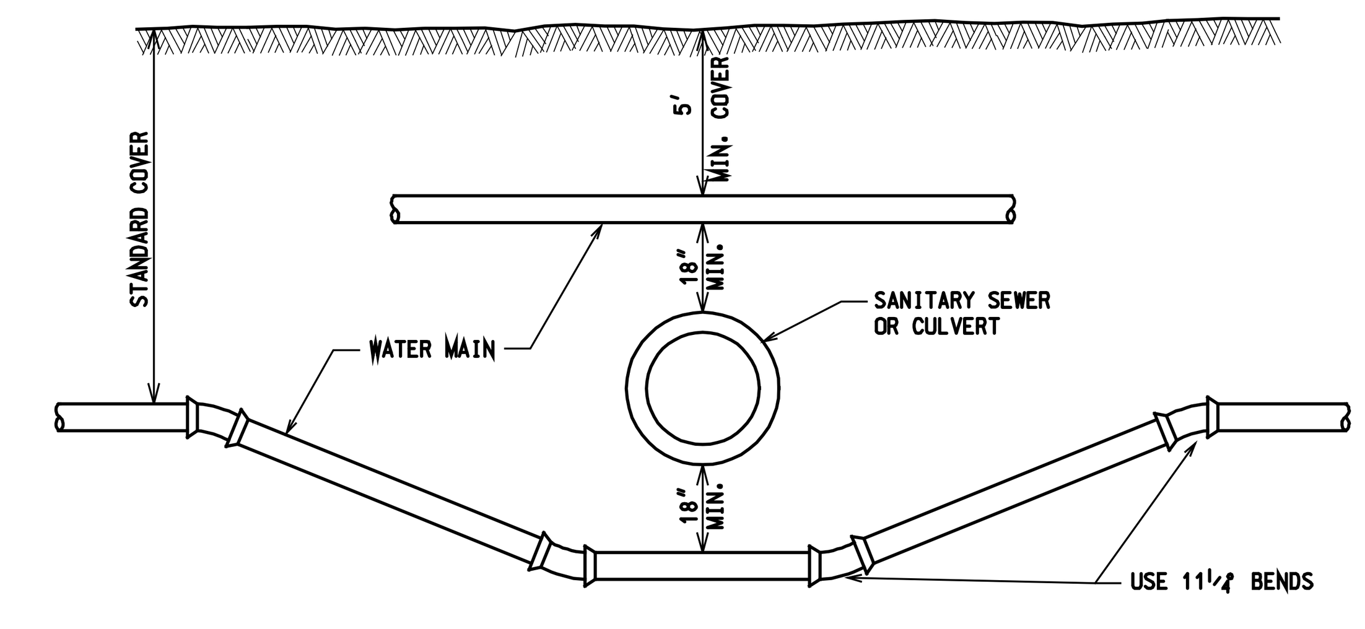
TYPICAL WATER MAIN TUNNEL CASING DETAIL



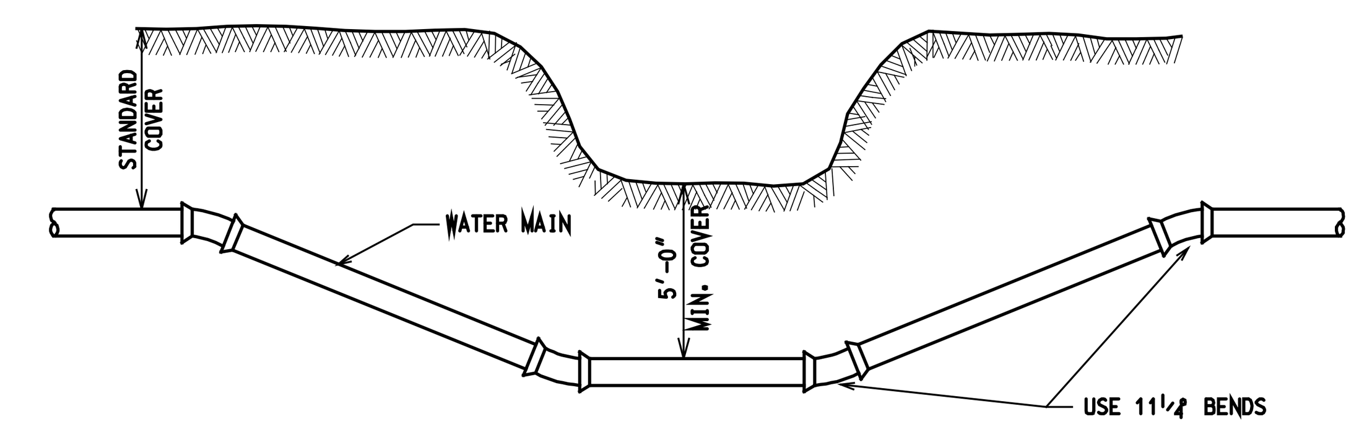
NOTE: FOR CONSTRUCTION OF NEW FIRE HYDRANT TO EXISTING "LIVE" WATERMAIN, USE 6" TAPPING SLEEVE VALVE & BOX TO MAKE CONNECTION.

"L" HYDRANT CONNECTION

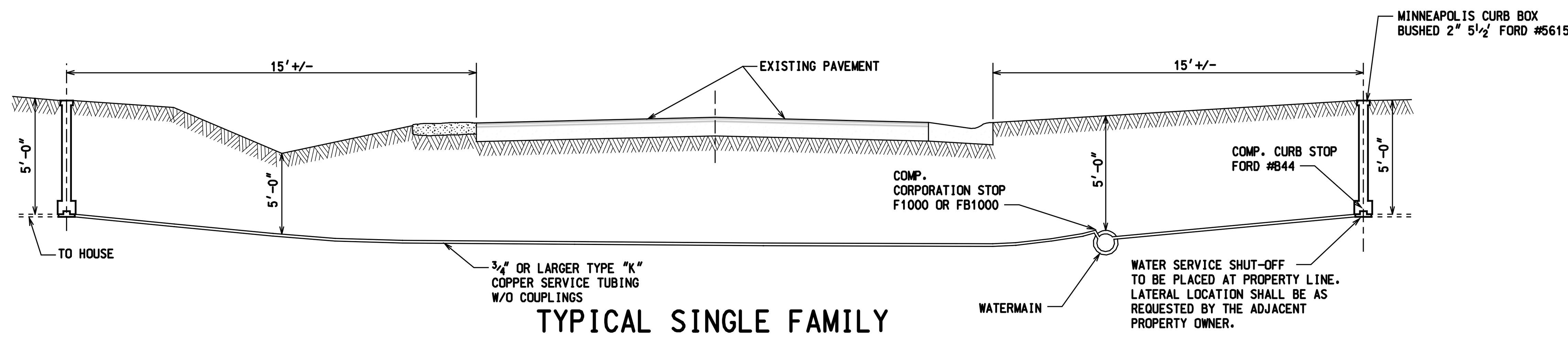
W-9



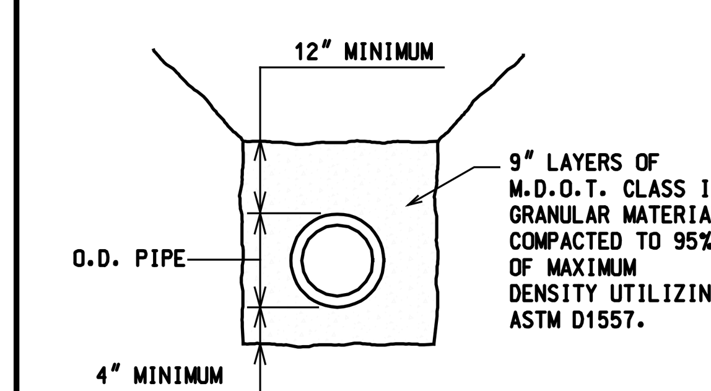
SEWER OR CULVERT CROSSING



DITCH AND STREAM CROSSING



TYPICAL SINGLE FAMILY WATER SERVICE CONNECTION



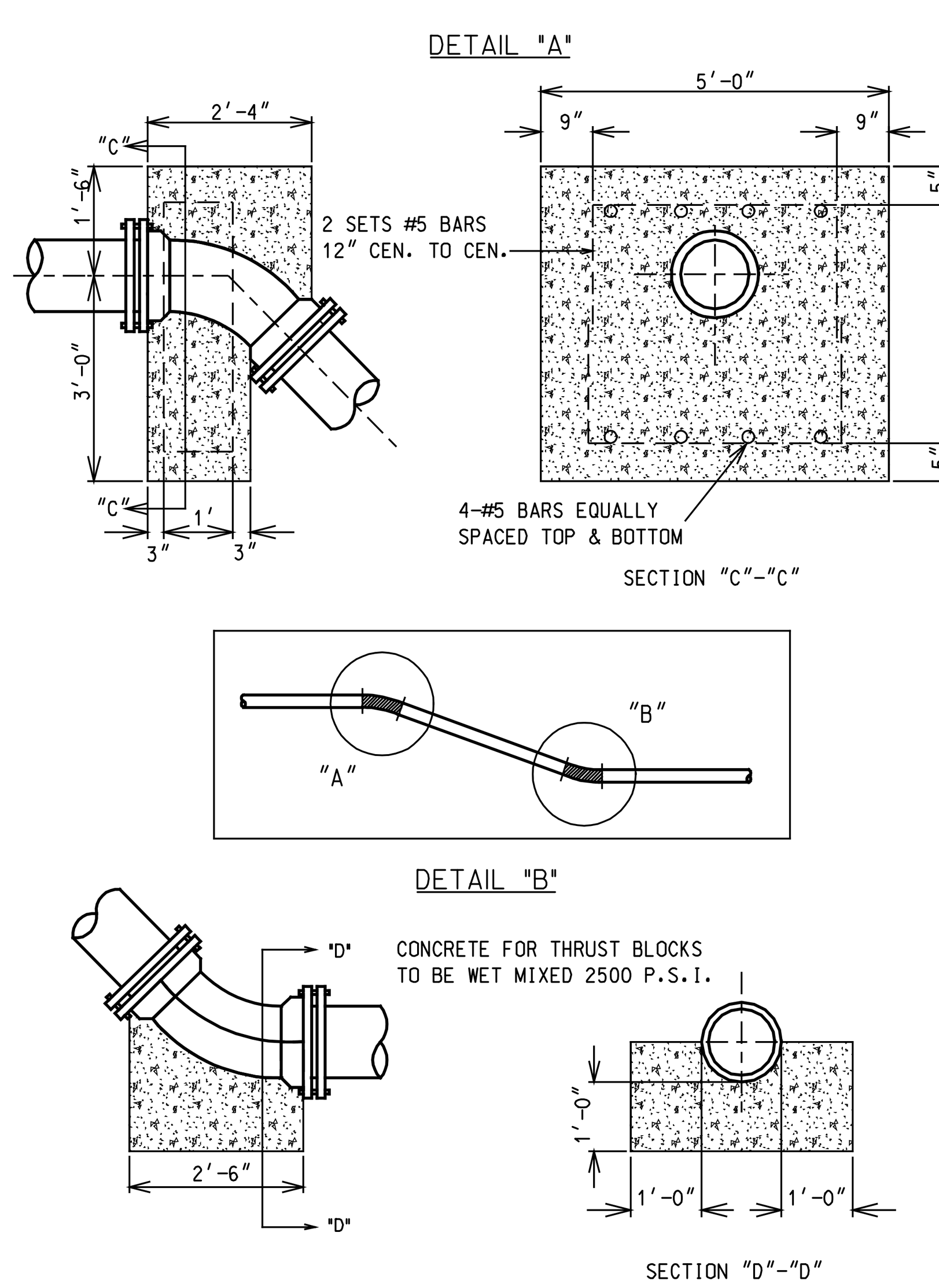
STANDARD BEDDING FOR WATER PIPE

HYDRANT PAINTING SCHEDULE		
WATER MAIN SIZE	COLOR OF HYDRANT BODY	HYDRANT ACCENT COLOR *
LESS THAN 6"	YELLOW	RED
6" TO 8"	YELLOW	OMAHA ORANGE
10" TO 16"	YELLOW	HUNTER GREEN

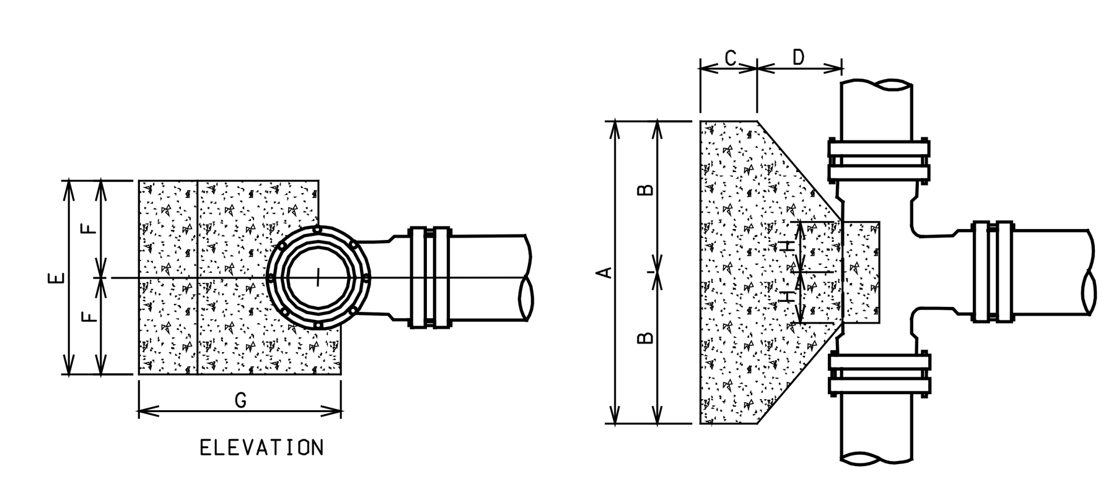
* FOR EAST JORDAN HYDRANTS, PAINT ACCENT COLOR ON ENTIRE SWIVEL FLANGE AND UP, INCLUDING CAPS. FOR MUELLER HYDRANTS, PAINT ACCENT COLOR ON ALL CAPS AND THE BONNET. THE SHADE OF THE ACCENT COLOR TO BE APPROVED BY THE CITY D.P.W.

GENERAL NOTES:

1. ALL CONSTRUCTION PROCEDURES AND MATERIALS USED SHALL CONFORM TO THE CITY OF FENTON CURRENT ENGINEERING DESIGN STANDARDS AND SPECIFICATIONS.
2. ALL HYDRANTS SHALL BE EAST JORDAN IRON WORKS NO. 5-BR TRAFFIC MODEL OR MUELLER CENTURION A-423. SELF DRAINING HYDRANTS SHALL NOT BE USED.
3. ALL HYDRANTS SHALL BE PAINTED IN ACCORDANCE WITH THE PAINTING SCHEDULE ABOVE GROUND AND BLACK BELOW.
4. ALL GATE VALVES WITH OPERATING NUTS AT A DISTANCE GREATER THAN 5 FEET BELOW GROUND SURFACE SHALL BE PROVIDED WITH AN EXTENSION STEM. THE LENGTH OF THE STEM SHALL BE SUCH THAT IT WILL BE WITHIN 5 FEET OF THE GROUND SURFACE WHEN AN EXTENSION STEM IS USED. THE EXTENSION STEM SHALL BE MECHANICALLY ATTACHED TO THE OPERATING NUT. DETAILS OF THE EXTENSION STEM AND METHOD OF INSTALLATION SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
5. FOR PIPE DIAMETERS 20 " AND SMALLER, DUCTILE IRON PIPE SHALL BE CLASS 54 DOUBLE CEMENT LINED WITH TWO BRASS WEDGES PER JOINT. MINIMUM DEPTH COVER IS 5' BELOW FINISHED GRADE.
6. THE CONTRACTOR SHALL OBTAIN A WATER MAIN CONSTRUCTION PERMIT AND WATER USE PERMIT PRIOR TO THE START OF CONSTRUCTION FROM THE CITY OF FENTON.
7. THE CONTRACTOR SHALL NOTIFY THE CITY OF FENTON FOR TAP INSPECTION TO THE EXISTING WATER MAIN, PRESSURE TEST WITNESS, BACTERIOLOGICAL SAMPLING AND FOR FINAL INSPECTION. (MINIMUM 48 HOURS PRIOR NOTICE IS REQUIRED).
8. FOR NON CITY ADMINISTERED PROJECTS, ALL 2 INCH AND SMALLER WATER SERVICE CONNECTIONS ARE MADE BY THE CITY OF FENTON DPW PERSONNEL AFTER WATER MAIN ACCEPTANCE AND APPLICABLE PERMITS ARE OBTAINED.
9. 2 BAND BRONZE TAPPING SADDLES SHALL BE USED FOR ALL SERVICE TAPS LARGER THAN 1".
10. ALL NECESSARY EASEMENTS SHALL BE PROVIDED IN THE NAME OF THE CITY OF FENTON AND/OR ITS AGENT FOR THE INSTALLATION, OPERATION AND MAINTENANCE OF THE PROVIDED WATER MAINS BEFORE ACCEPTANCE OF THE WATER MAIN DISTRIBUTION SYSTEM.
11. THE DESIGN ENGINEER SHALL FURNISH THE CITY OF FENTON WITH MYLAR 'RECORD DRAWING' WATER MAIN PLANS PER CITY STANDARDS UPON JOB COMPLETION. PLANS SHALL LOCATE ALL WATER MAINS, HYDRANTS AND GATE VALVES PER CITY 'RECORD DRAWING' STANDARDS.
12. ALL REQUIRED CROSS CONNECTION AND CONTROL DEVICES SHALL BE INSTALLED AS REQUIRED BY THE CITY OF FENTON AND IN ACCORDANCE WITH THE STANDARDS OF THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY.
13. THE CONTRACTOR SHALL NOTIFY THE CITY OF FENTON OR THEIR AGENT 48 HOURS PRIOR TO THE START OF CONSTRUCTION AND REQUEST INSPECTION.
14. ALL TRENCHES UNDER 45 DEGREE LINE OF INFLUENCE OF EXISTING OR PROPOSED PAVEMENTS, SIDEWALKS, BIKE PATHS & DRIVE APPROACHES SHALL BE BACK FILLED WITH MDOT CLASS II SAND COMPACTED TO 95% OF MAXIMUM UNIT WEIGHT.



VERTICAL BEND THRUST BLOCKS FOR 8"-12" MAINS



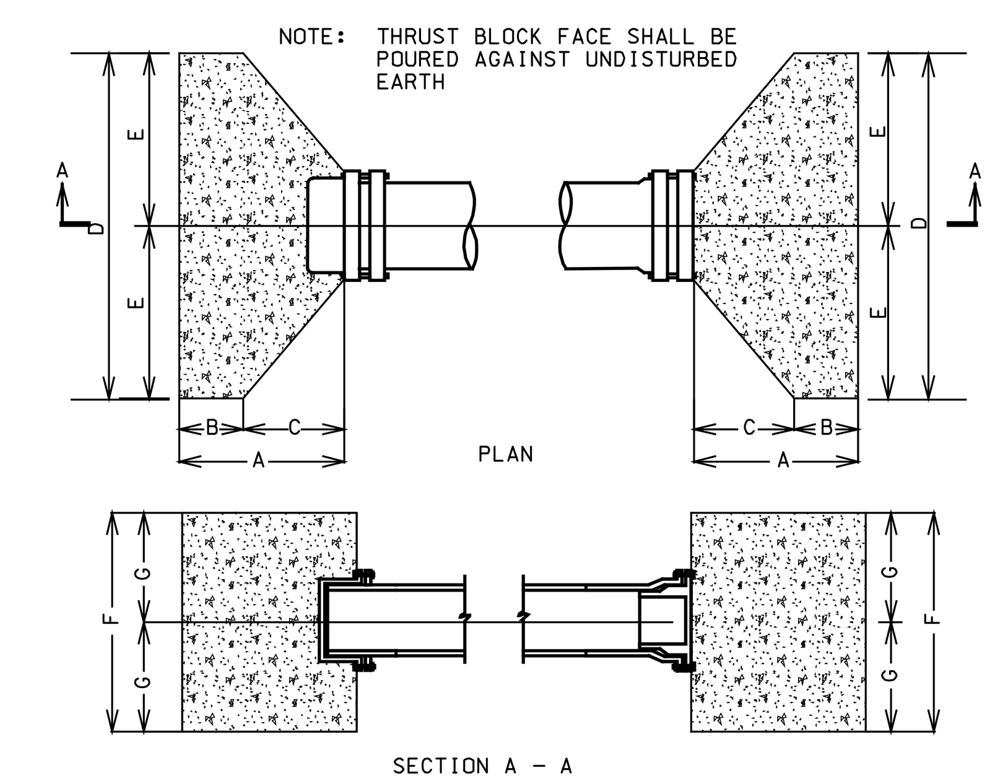
THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.

CONCRETE FOR THRUST BLOCKS TO BE WET MIXED 2500 P.S.I.

SCHEDULE OF THRUST BLOCK DIMENSIONS				
CODE		TEE SIZE		
		8"x8" 12"x8" 16"x8" 24"x8"	12"x12" 16"x12" 24"x12"	16"x16" 24"x16"
A		3'-0"	4'-0"	5'-0"
B		1'-6"	2'-0"	2'-6"
C		0'-9"	0'-9"	1'-0"
D		1'-0"	1'-4"	1'-8"
E		2'-0"	3'-0"	4'-0"
F		1'-0"	1'-6"	2'-0"
G	8"	2'-2"		
G	12"	2'-6"	2'-10"	
G	16"	2'-10"	3'-1"	3'-8"
G	24"	3'-3"	3'-7"	4'-2"
H	8"	0'-6"		
H	12"	0'-6"	0'-10"	
H	16"	0'-6"	0'-10"	1'-0"
H	24"	0'-6"	0'-10"	1'-0"

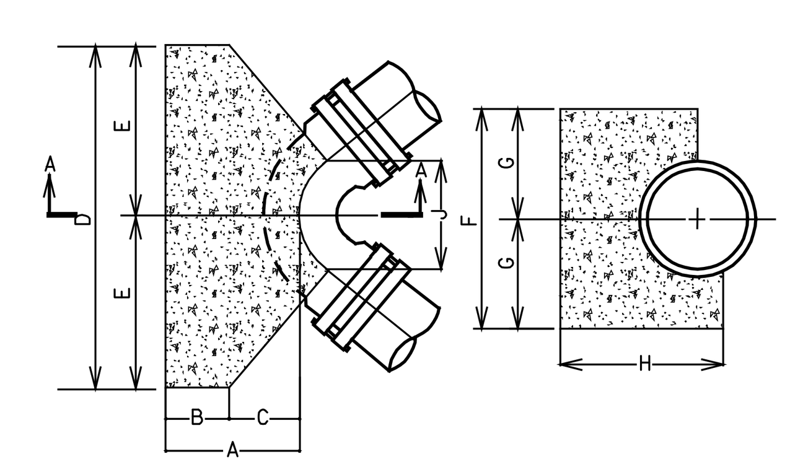
CONCRETE THRUST BLOCK FOR TEES

NOTE: THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH



SIZE	A MIN.	B MIN.	C	D	E	F	G
8"	1'- 11"	0'- 9"	1'- 2"	3'- 0"	1'- 6"	2'- 0"	1'- 0"
12"	2'- 1"	0'- 9"	1'- 4"	4'- 0"	2'- 0"	3'- 0"	1'- 6"
16"	2'- 8"	1'- 0"	1'- 8"	5'- 0"	2'- 6"	4'- 0"	2'- 0"

CONC. THRUST BLOCKS FOR PLUGS & CAPS



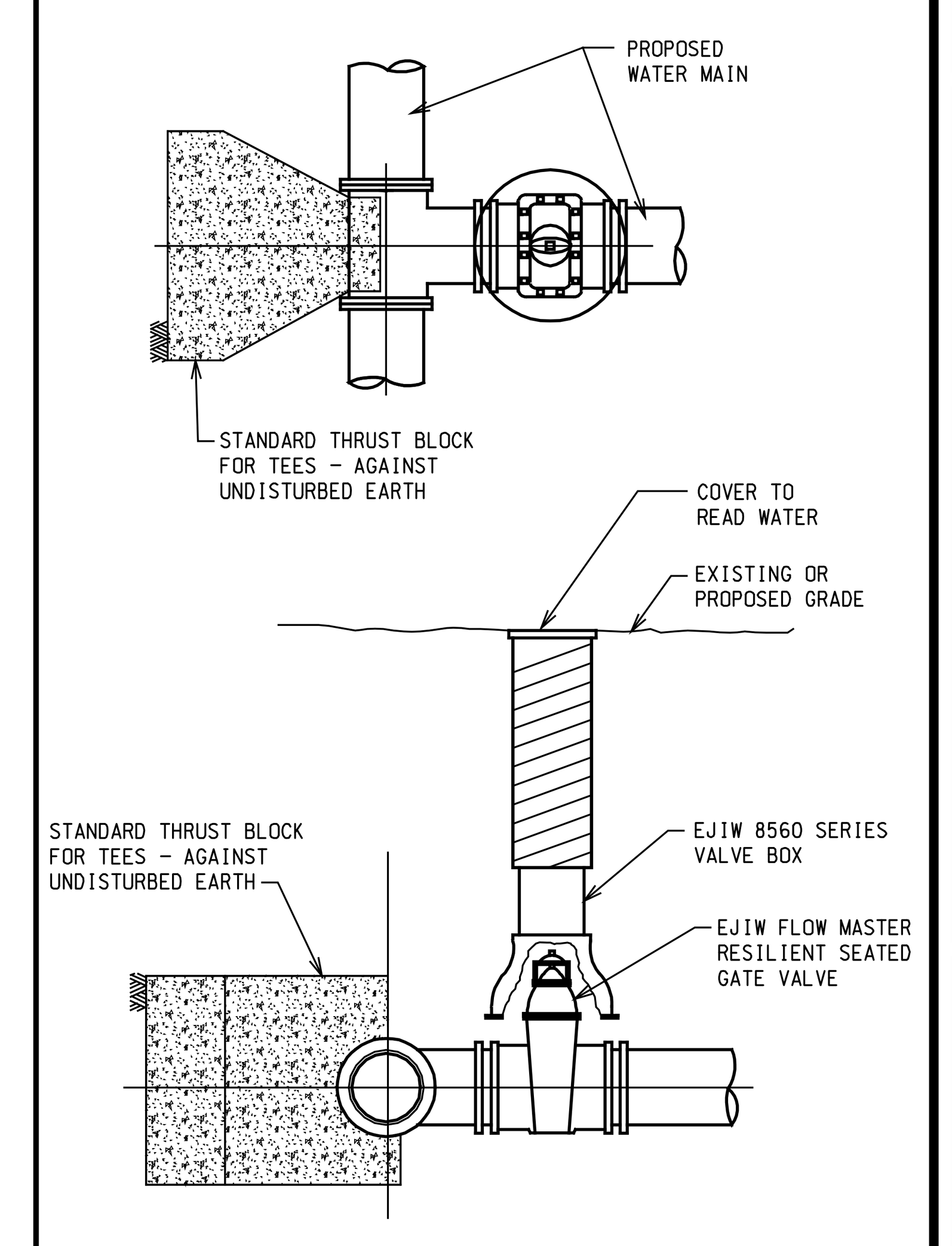
NOTE:

THRUST BLOCK FACE TO BE POURED AGAINST UNDISTURED EARTH

CONCRETE FOR THRUST BLOCKS TO BE WET MIXED 2500 P.S.I.

SIZE	ANGLE	A MIN.	B MIN.	C	D	E	F	G	H MIN.	J
6"	45°	1'-6"	0'-9"	0'-9"	1'-6"	0'-9"	1'-6"	0'-9"	1'-8"	0'-10"
6"	90°	1'-6"	0'-9"	0'-9"	2'-0"	1'-0"	2'-0"	1'-0"	1'-8"	0'-10"
8"	45°	1'-9"	0'-9"	1'-0"	2'-4"	1'-2"	2'-0"	1'-0"	1'-11"	1'-4"
8"	90°	1'-9"	0'-9"	1'-0"	3'-4"	1'-8"	2'-6"	1'-3"	1'-11"	1'-2"
12"	22-1/2°	1'-9"	0'-9"	1'-0"	2'-6"	1'-3"	2'-0"	1'-0"	2'-0"	1'-4"
12"	45°	2'-1"	0'-9"	1'-4"	3'-6"	1'-9"	2'-6"	1'-3"	2'-4"	1'-4"
12"	90°	2'-1"	0'-9"	1'-4"	5'-6"	2'-9"	3'-0"	1'-6"	2'-4"	1'-8"
16"	22-1/2°	2'-8"	1'-0"	1'-8"	3'-4"	1'-8"	2'-6"	1'-3"	3'-0"	1'-2"
16"	45°	2'-8"	1'-0"	1'-8"	5'-4"	2'-8"	3'-0"	1'-6"	3'-0"	1'-6"
16"	90°	2'-8"	1'-0"	1'-8"	6'-0"	3'-0"	5'-0"	2'-6"	3'-0"	1'-8"
24"	90°	4'-7"	1'-0"	3'-7"	10'-0"	5'-0"	7'-0"	3'-6"	5'-4"	2'-4"

CONCRETE THRUST BLOCK FOR BENDS



GATE VALVE & BOX

City of Fenton

HRC
HUBBELL, ROTH & CLARK, INC
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3399 E. GRAND RIVER AVE. SUITE 102
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WEB SITE: http: //www.hrc-engr.com

DATE	ADDITIONS AND/OR REVISIONS
3-24-08	ADOPTED BY CITY COUNCIL

DESIGNED	
DRAWN	J. REC
CHECKED	M. DARGA
APPROVED	J. BOOTH

V:\200700\20070048\C\wm_det01_V8.dgn

CITY OF FENTON

STANDARD CONSTRUCTION DETAILS

WATER MAIN STANDARDS

HRC JOB NO. 20070048	SCALE NONE
DATE JULY, 2007	SHEET NO. 1 OF 1

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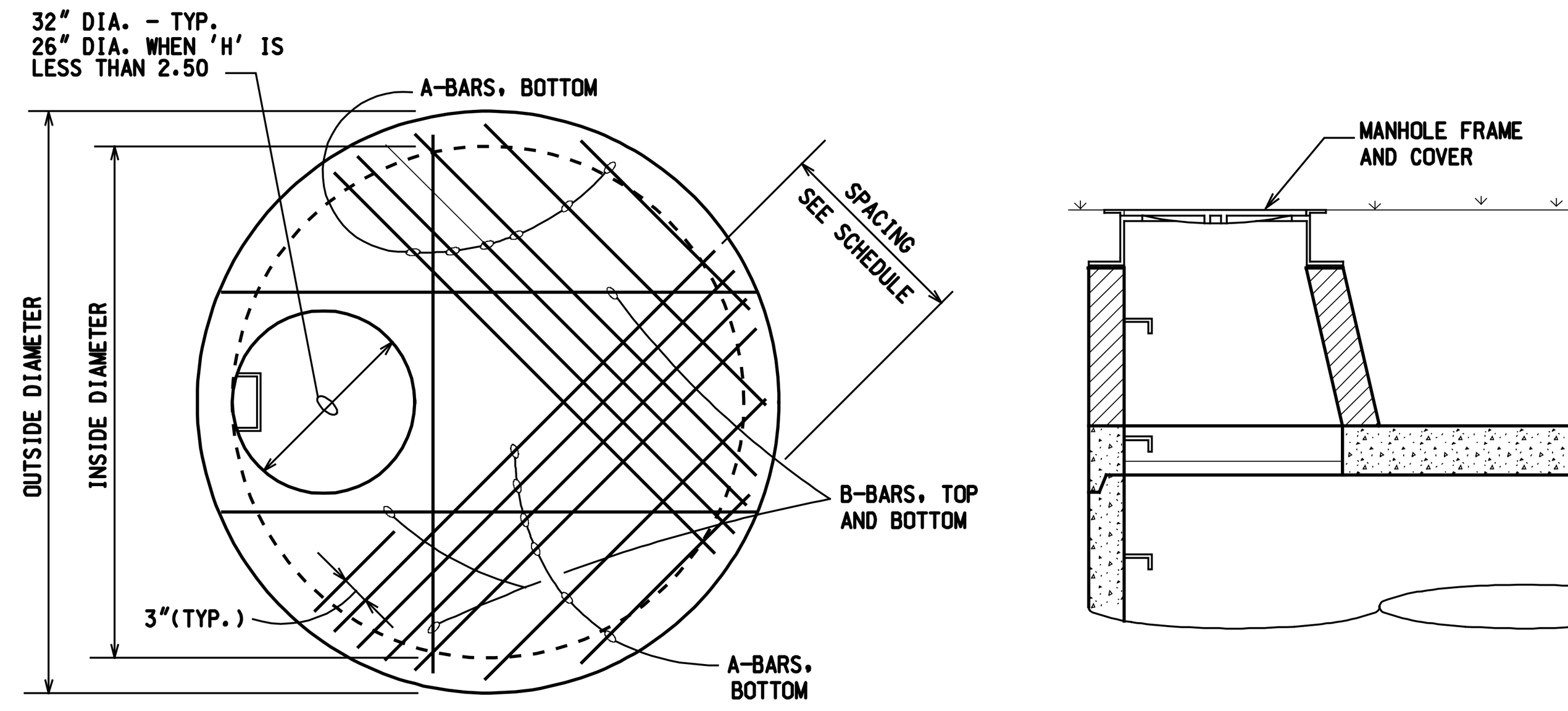
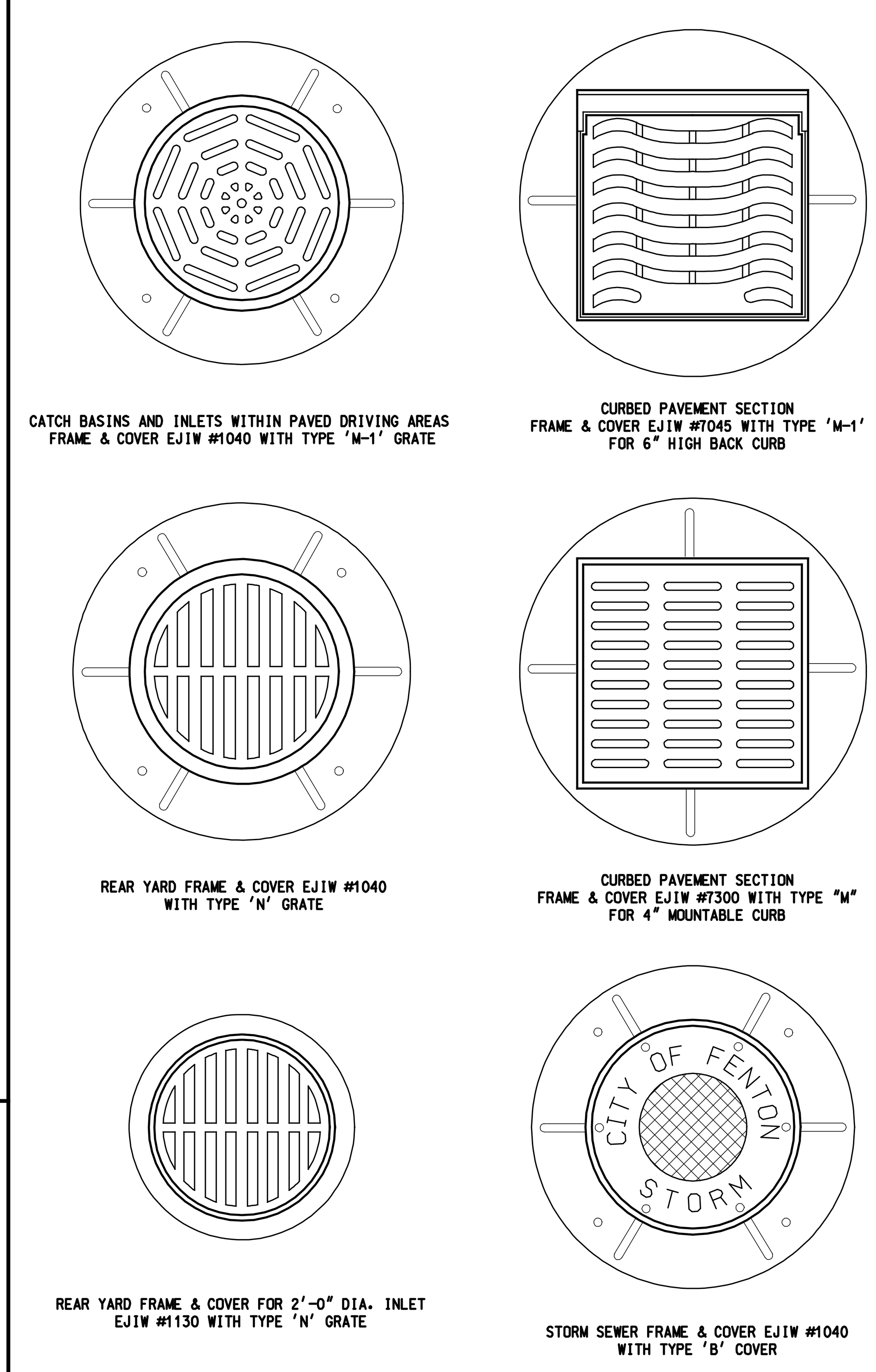


PLAN

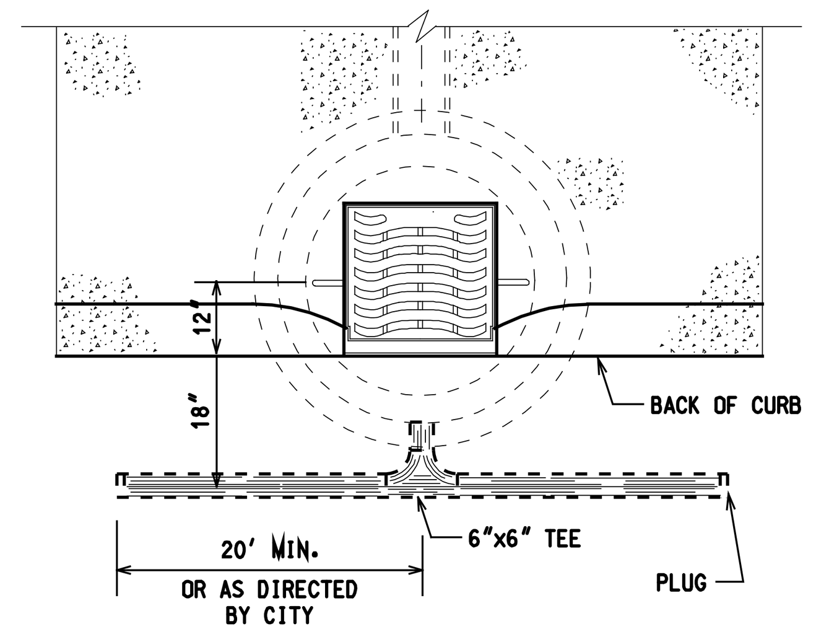
SECTION

INSIDE DIA.	SLAB THICKNESS	MAX. HEIGHT OF COVER	REINFORCEMENT		
			A-BARS EA. SIDE		B-BARS TOP & BOTTOM
			NO. SIZE	SPACING	
4'-0"	8"	8'-0"	(4)-#5	3 @ 3"	(3)-#5
5'-0"	8"	8'-0"	(6)-#5	3 @ 3" 2 @ 6"	(3)-#5
6'-0"	8"	8'-0"	(5)-#6	4 @ 8"	(3)-#5
7'-0"	8"	8'-0"	(7)-#6	6 @ 6"	(3)-#5
8'-0"	8"	8'-0"	(9)-#6	8 @ 6"	(3)-#5
9'-0"	10"	8'-0"	(11)-#6	10 @ 6"	(3)-#5
10'-0"	10"	8'-0"	(13)-#7	12 @ 6"	(3)-#5

MANHOLE REINFORCEMENT DETAIL



FRAME AND COVER



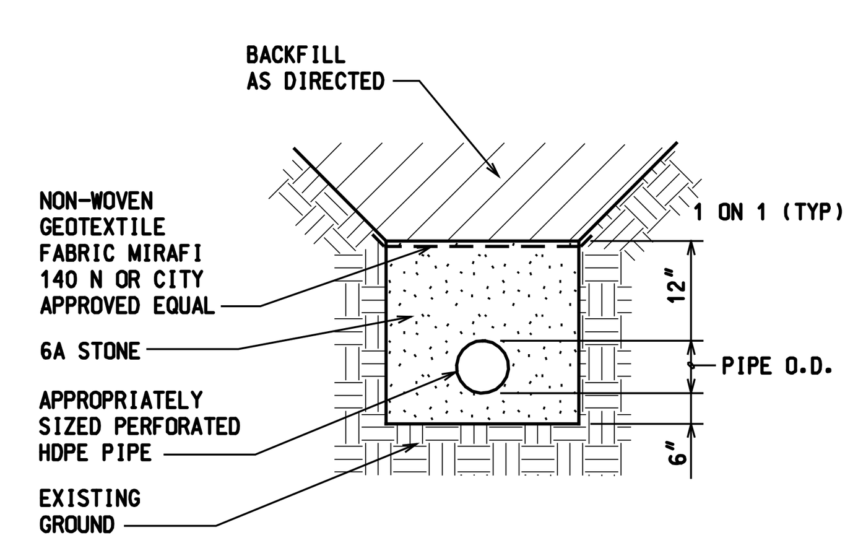
NOTES:

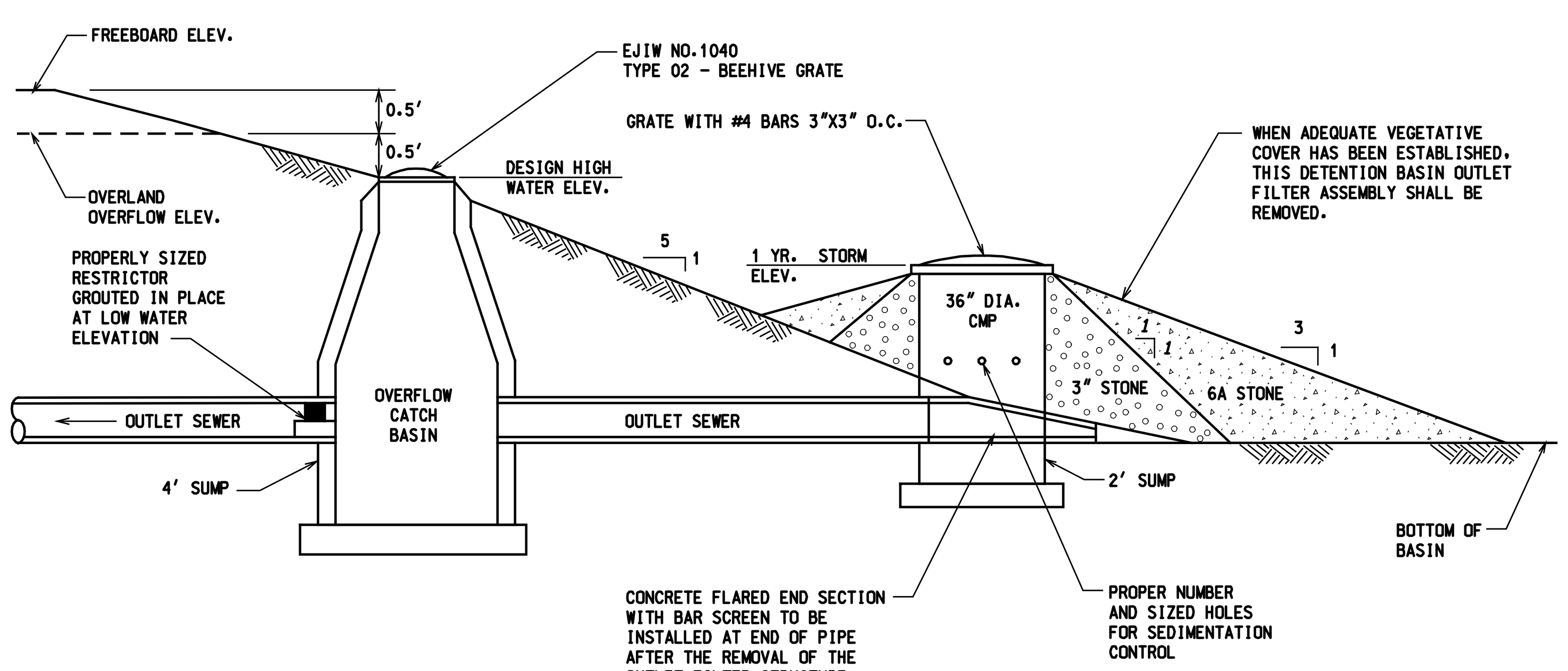
1. LENGTH OF 6" EDGE DRAIN TO BE 20' IN EACH DIRECTION OR AS DETERMINED BY THE CITY IN THE FIELD.
2. EDGE DRAIN SHALL BE INSTALLED AT ALL CATCH BASINS & INLETS WITHIN LIMITS OF PAVEMENT OF A ROADWAY.
3. 6" EDGE DRAIN TO BE CORRUGATED PLASTIC PIPE WITH FOUR ROWS OF SLOTTED PERFORATIONS, OR APPROVED EQUAL.
4. THE AGGREGATE SURROUNDING THE 6" EDGE DRAIN SHALL BE WRAPPED WITH A NON-WOVEN GEOTEXTILE FABRIC, GEOTEX 801 OR APPROVED EQUAL.

6" EDGE DRAIN

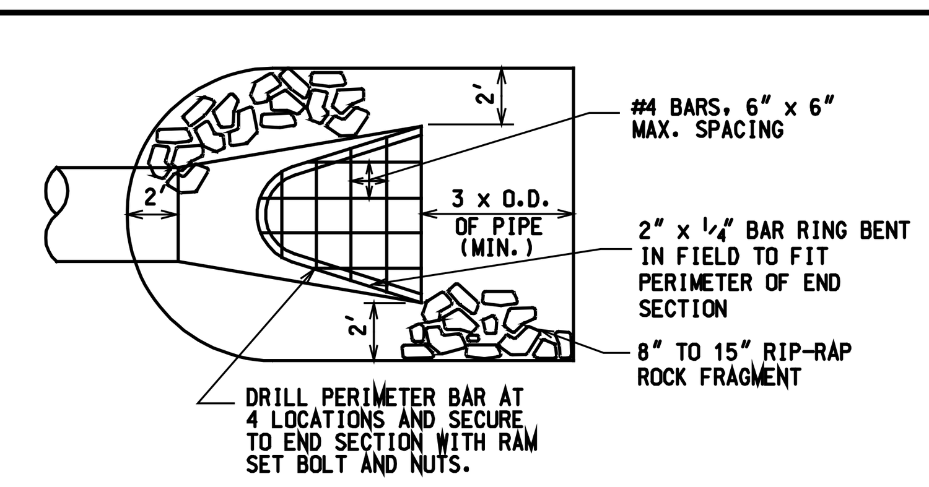
STORM SEWER NOTES:

1. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT ENGINEERING DESIGN STANDARDS AND SPECIFICATIONS OF THE CITY OF FENTON.
2. IT SHALL BE THE OWNER'S ENGINEER AND CONTRACTOR'S RESPONSIBILITY TO VERIFY THE EXISTENCE AND LOCATION OF ALL UNDERGROUND UTILITIES.
3. ALL SEWER TRENCHES UNDER THE 45 DEGREE ZONE OF INFLUENCE LINE OF EXISTING OR PROPOSED PAVEMENTS, BIKE PATHS, SIDEWALKS OR DRIVE APPROACHES SHALL BE BACKFILLED WITH MDOT CLASS II SAND COMPACTED TO AT LEAST 95% OF MAXIMUM UNIT WEIGHT.
4. ALL RCP STORM SEWER SHALL BE INSTALLED ON CLASS "B" BEDDING OR BETTER.
5. JOINTS FOR STORM SEWER SHALL BE PREMIUM JOINTS (TONGUE AND GROOVE WITH RUBBER GASKETS).
6. LEAD MATERIAL SHALL BE SCHED 40 PVC OR DR 26.
7. ALLOWABLE PIPE MATERIAL FOR STORM SEWERS SHALL BE:
   A. C-76 REINFORCED CONCRETE PIPE CONFORMING TO CLASSES III, IV OR V.
   B. PERFORATED HIGH DENSITY POLYETHYLENE WITH SMOOTH INTERIOR AND ANNULAR EXTERIOR CORRUGATION MEETING REQUIREMENTS OF ASTM F2306. BEDDING AND BACKFILL SHALL BE AS SHOWN IN THE FOLLOWING DETAIL:

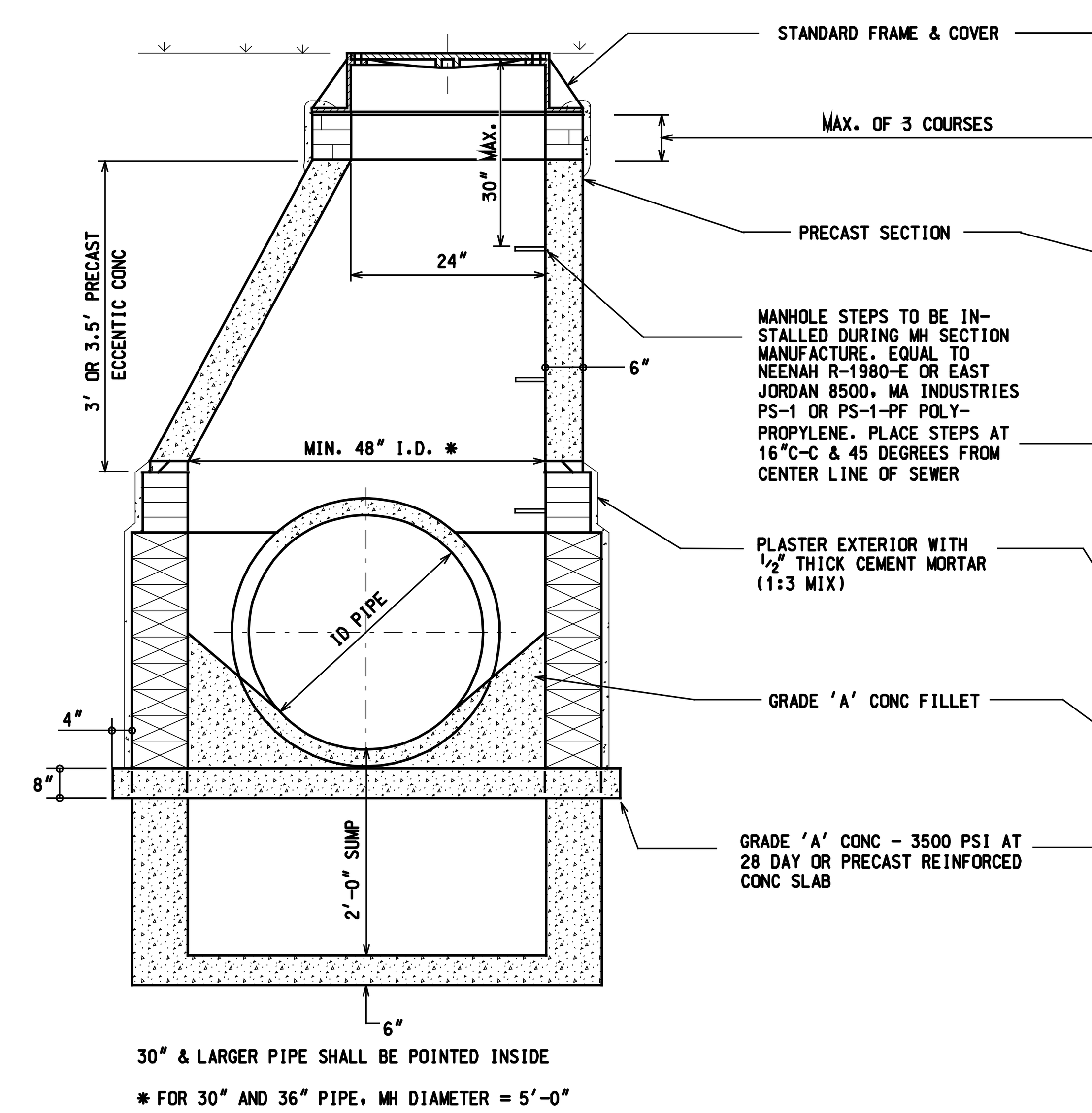




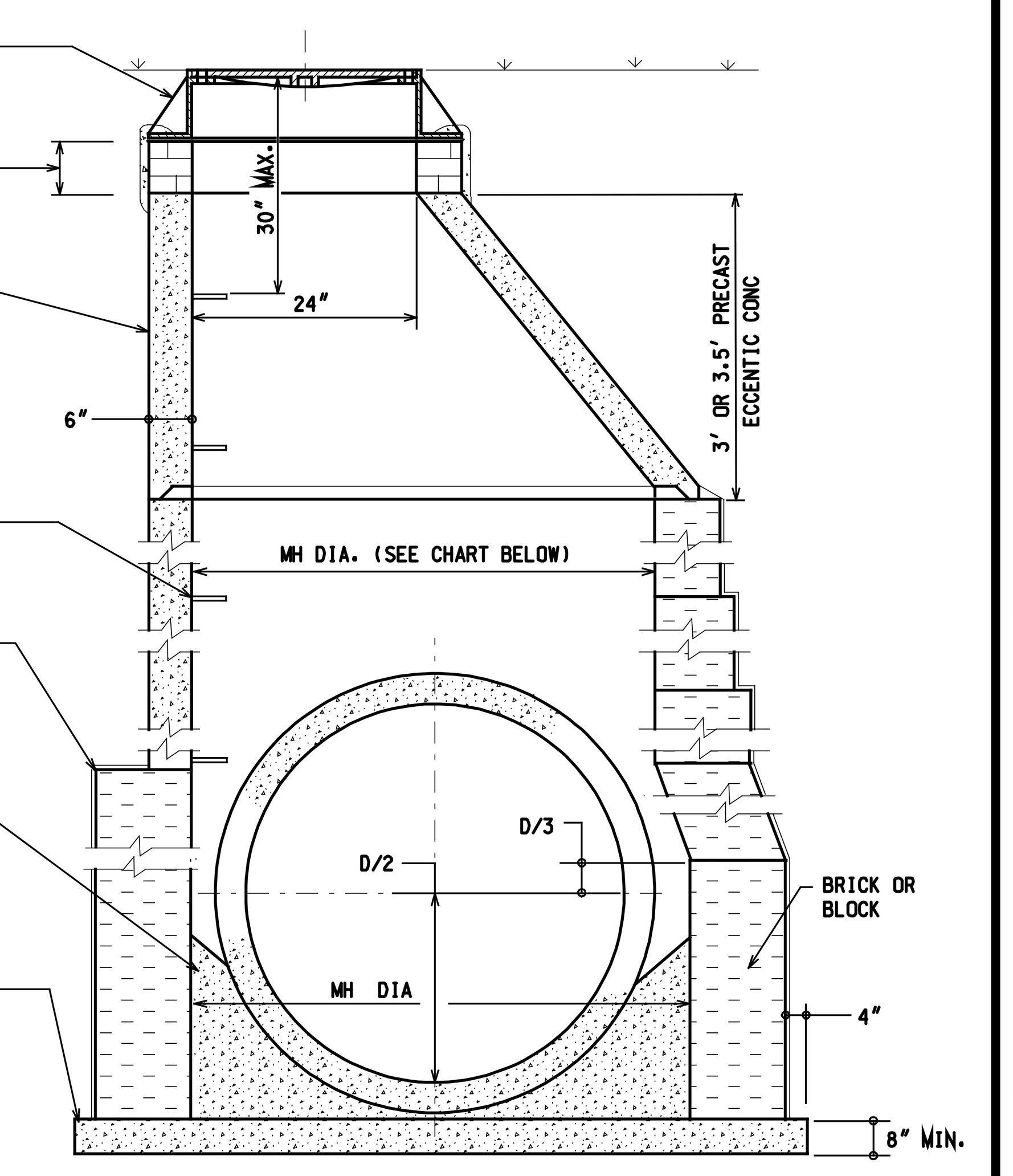
OUTLET STRUCTURE DETAIL



END SECTION AND BAR SCREEN DETAIL

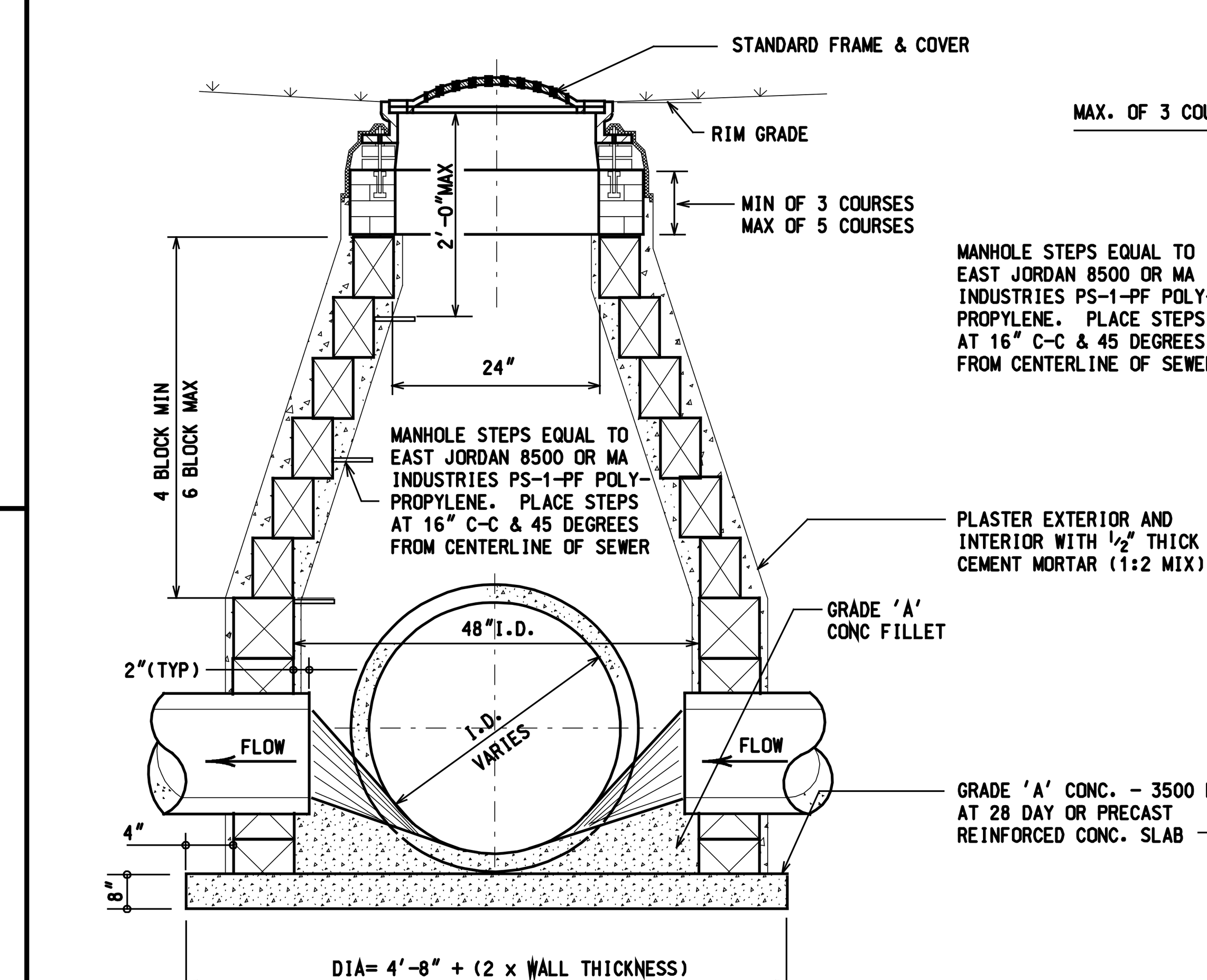


STORM MANHOLE FOR 42" PIPE AND SMALLER

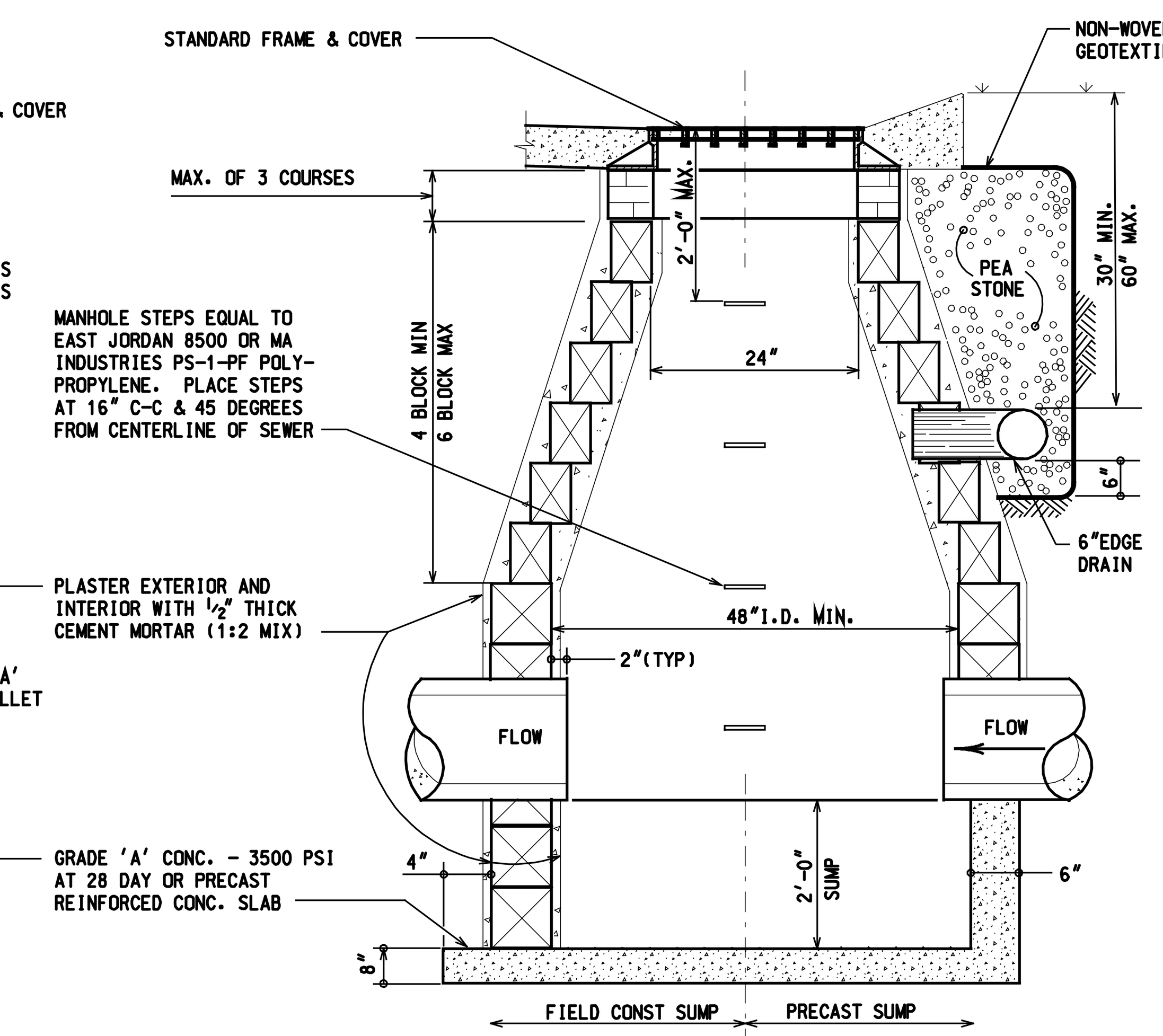


MH DIA	72"	78"	84"	96"	102"	108"	126"
D=SEWER PIPE ID SIZE	48"	54"	60"	66"	72"	84"	96"

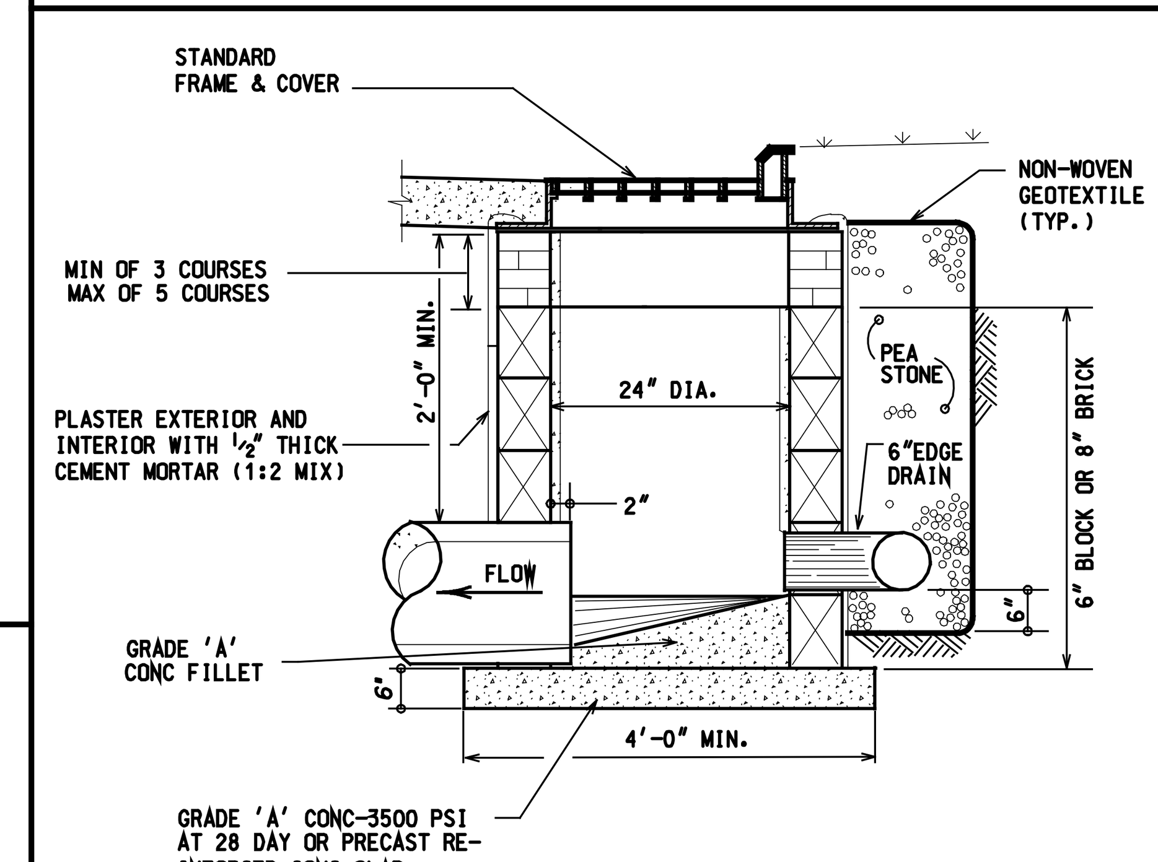
STORM MANHOLE FOR 48" PIPE AND LARGER



YARD CATCH BASIN



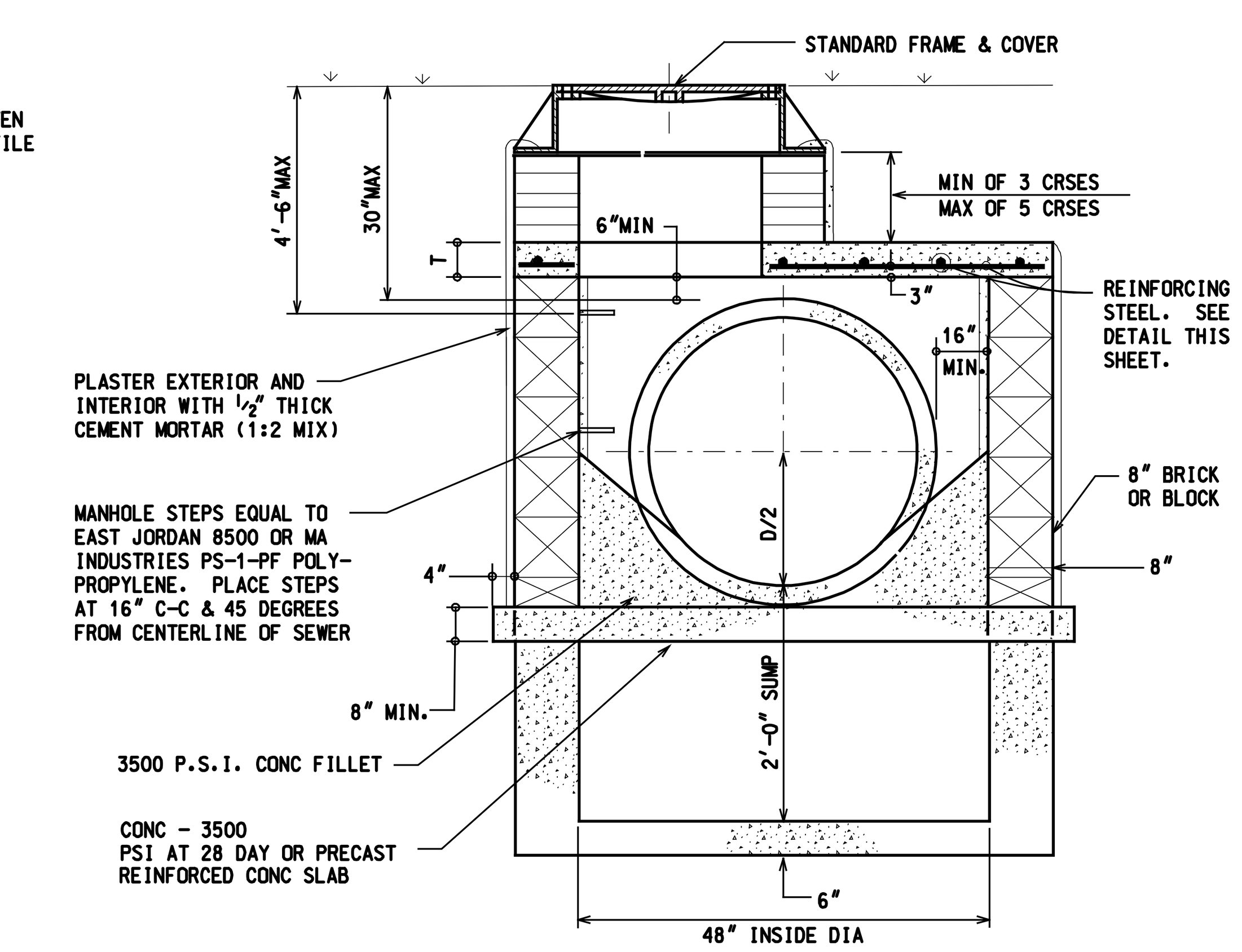
PAVEMENT CATCH BASIN



NOTES:

1. IF CLEARANCE IS LESS THAN 2'-0" BETWEEN SUB-GRADE & TOP OF PIPE BACKFILL WILL SHALL CONSIST OF A DRY SAND-CEMENT MIXTURE COMPACTED IN PLACE
2. 4" M.D.O.T. GRANULAR MATERIAL CLASS II OR 6A AGGREGATE BEDDING REQUIRED UNDER ALL STRUCTURES UNLESS OTHERWISE DIRECTED.

LOW HEAD INLET



LOW-HEAD STORM SEWER STRUCTURE

City of Fenton

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HUBBELL, ROTH & CLARK, INC
Consulting Engineers
3399 E. GRAND RIVER AVE. SUITE 102
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PHONE: (248) 454-6300
DIRECT PHONE: (517) 552-9199
FAX: (517) 552-6099
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DATE	ADDITIONS AND/OR REVISIONS
3-24-08	ADOPTED BY CITY COUNCIL

DESIGNED	
DRAWN	J. REC
CHECKED	M. DARGA
APPROVED	J. BOOTH

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CITY OF FENTON
STANDARD CONSTRUCTION DETAILS

STORM SEWER STANDARDS

HRC JOB NO. 20070048	SCALE NONE
DATE JULY, 2007	SHEET NO. 1 OF 1

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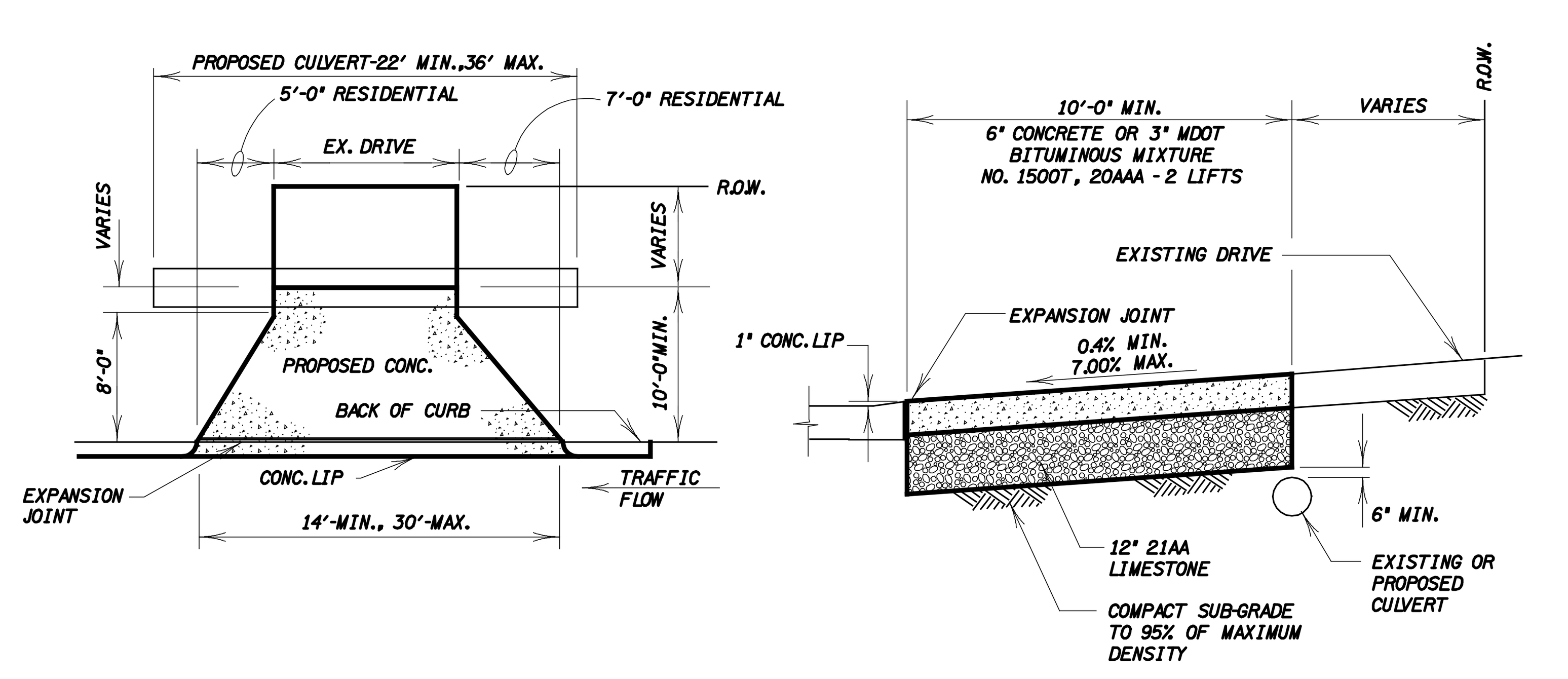
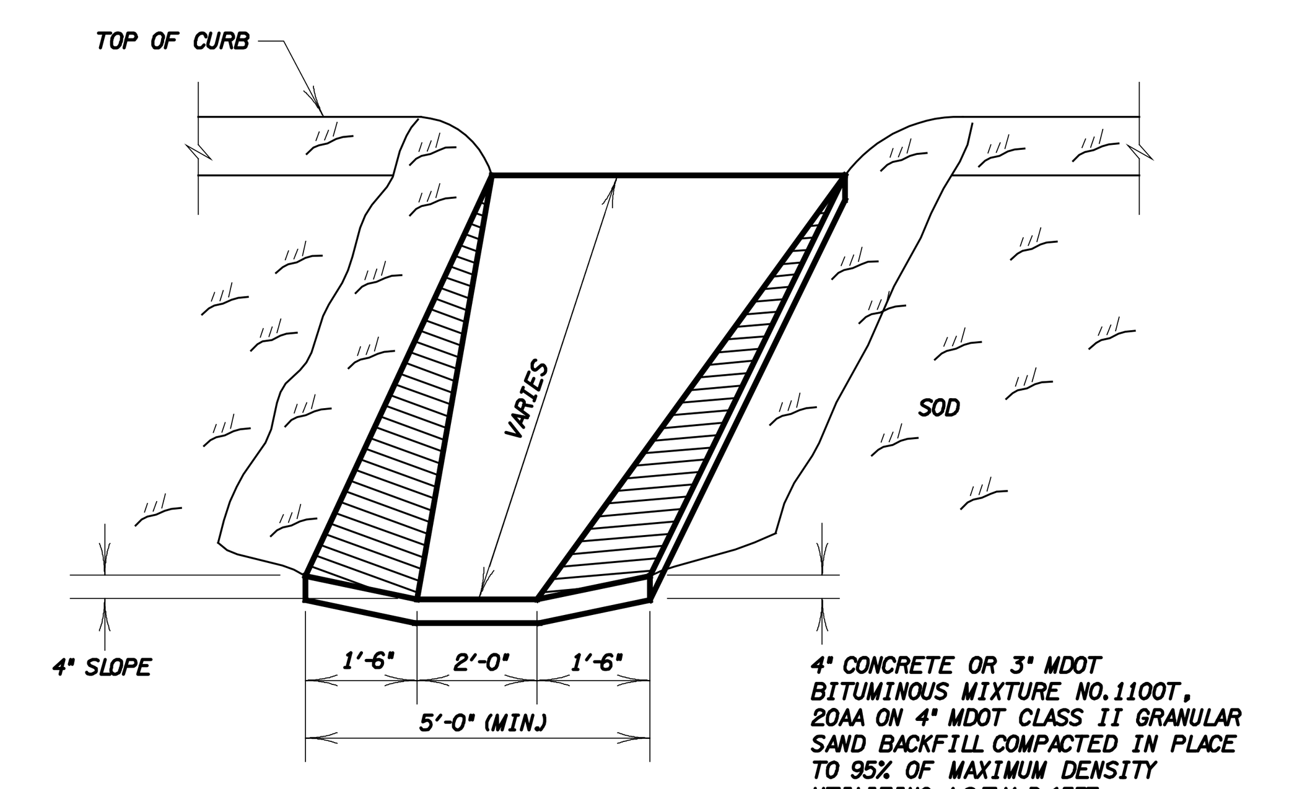
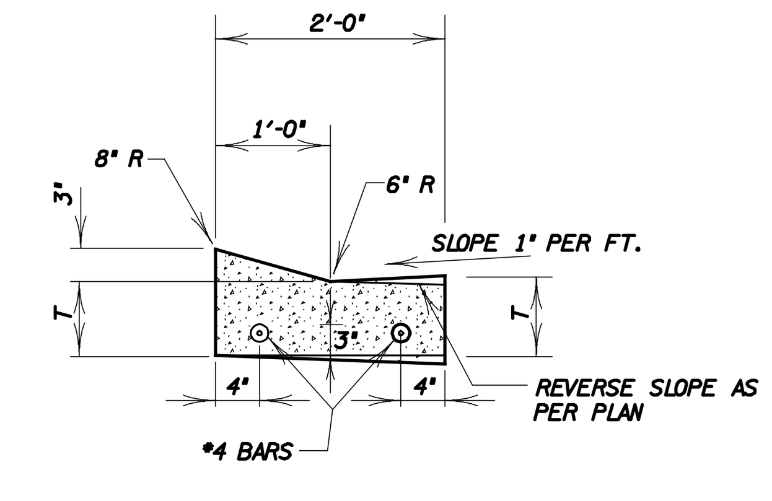


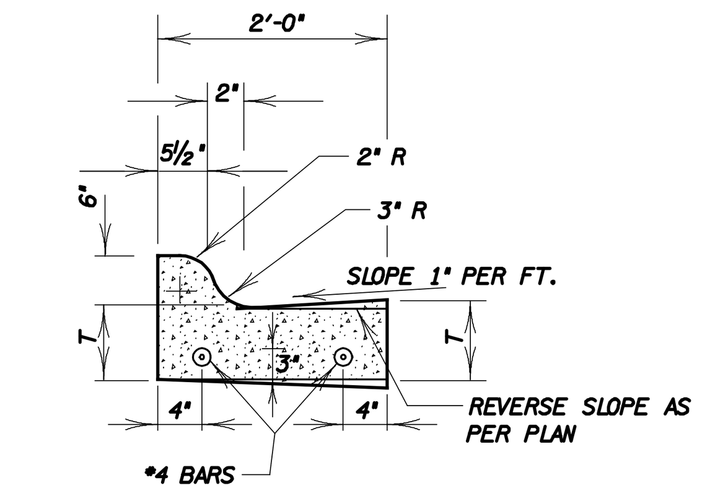
RESIDENTIAL DRIVEWAY APPROACH



CONCRETE SPILLWAY



4" MOUNTABLE CURB & GUTTER



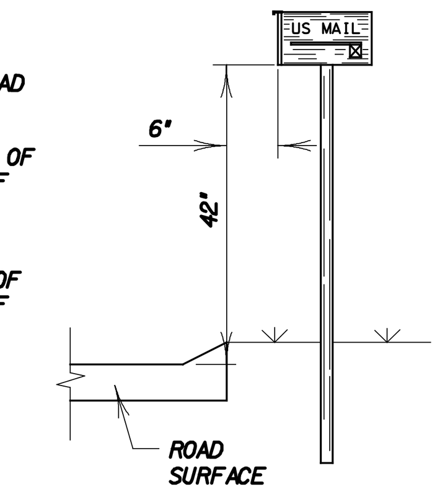
6" STRAIGHT FACED CURB & GUTTER

NOTES:

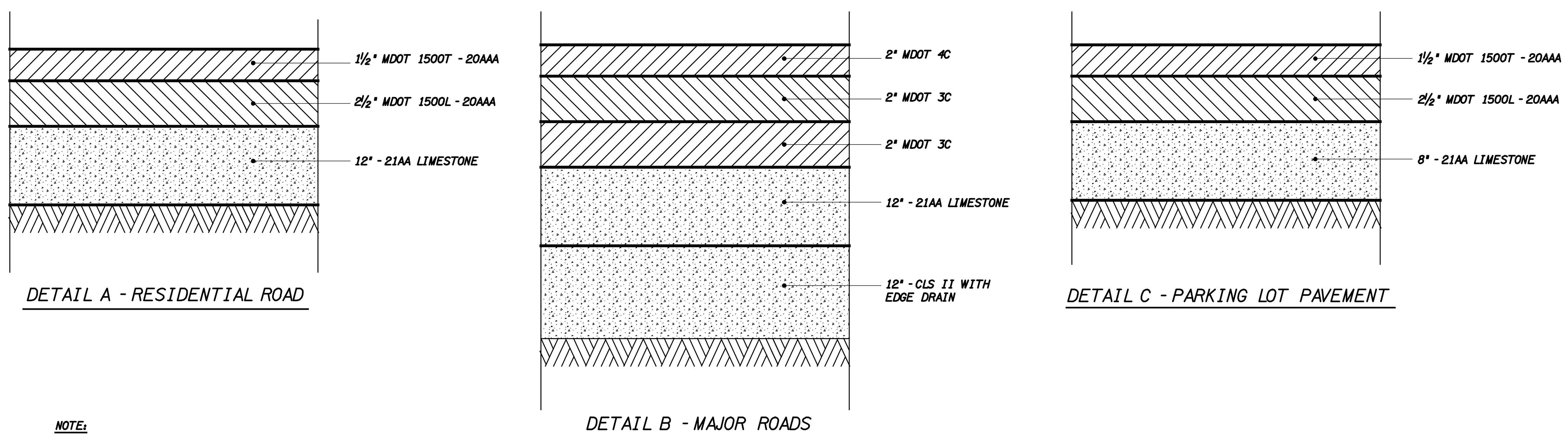
1. WHITE MEMBRANE CURING COMPOUND SHALL CONFORM TO THE REQUIREMENTS OF A.S.T.M. C-309, TYPE 2 AND PLACED AS DIRECTED BY THE CITY.
2. T - THICKNESS OF CONCRETE PAVEMENT OR 9" WHEN USED WITH BITUMINOUS PAVEMENT, WHICHEVER IS GREATER.

NOTES:

1. HEIGHT OF MAIL BOX IS 42" FROM SURFACE OF ROAD
2. ON ROADS WITH GRAVEL SHOULDERS, LOCATE FACE OF MAILBOX 6" FROM EDGE OF SHOULDER.
3. ON ROADS WITH SOD SHOULDER, LOCATE FACE OF MAILBOX 6" FROM EDGE OF PAVEMENT.
4. ROADS WITH CURBS, LOCATE FACE OF MAILBOX 6" FROM BACK OF CURB.

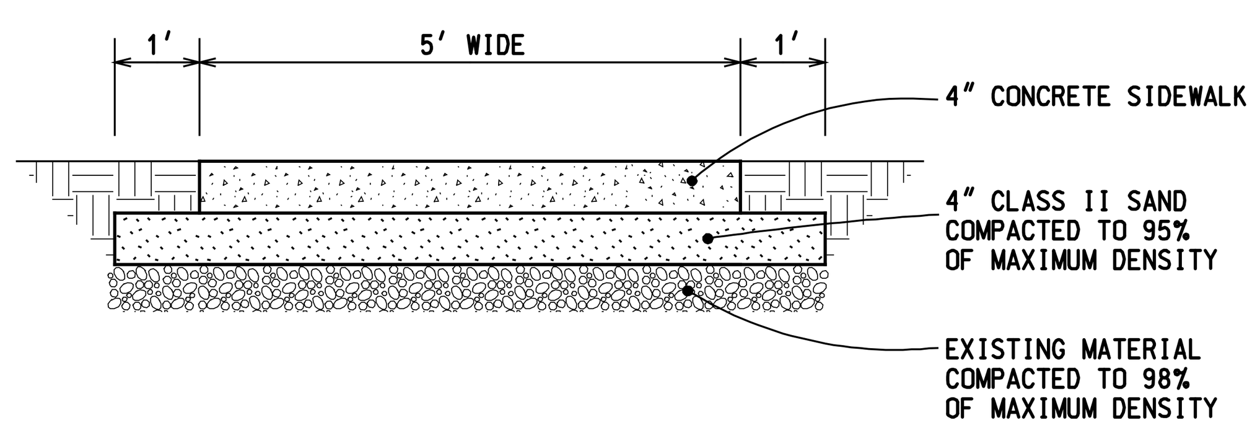


MAIL BOX LOCATION

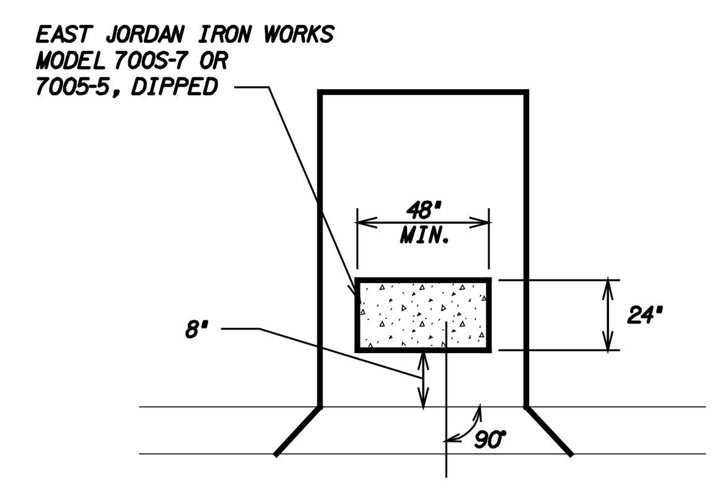


NOTE:
ASPHALT PAVEMENT THICKNESS MAY VARY SUBJECT TO EX. GROUND CONDITIONS AND SOIL BORING INFORMATION

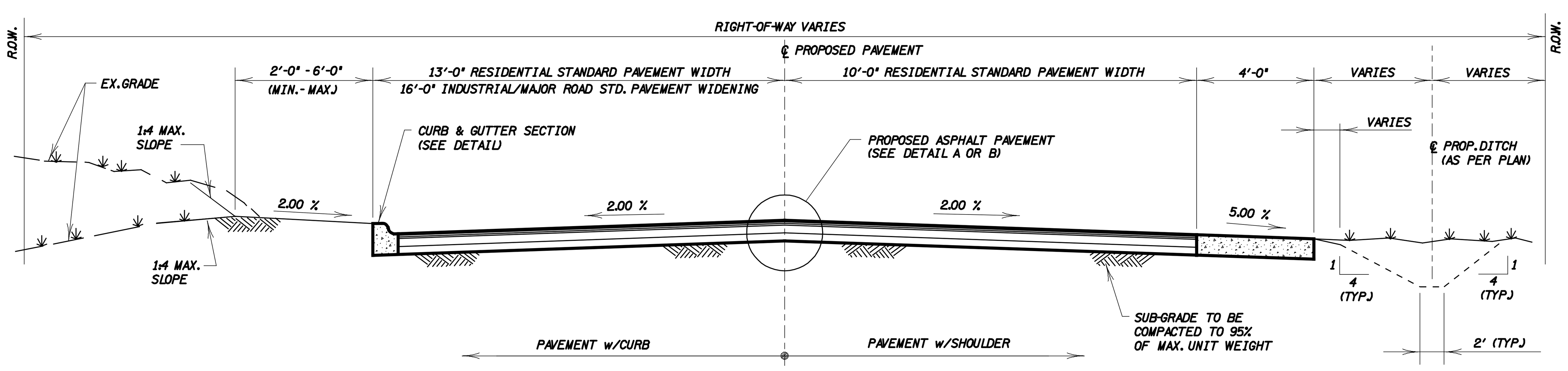
TYPICAL BITUMINOUS SECTIONS



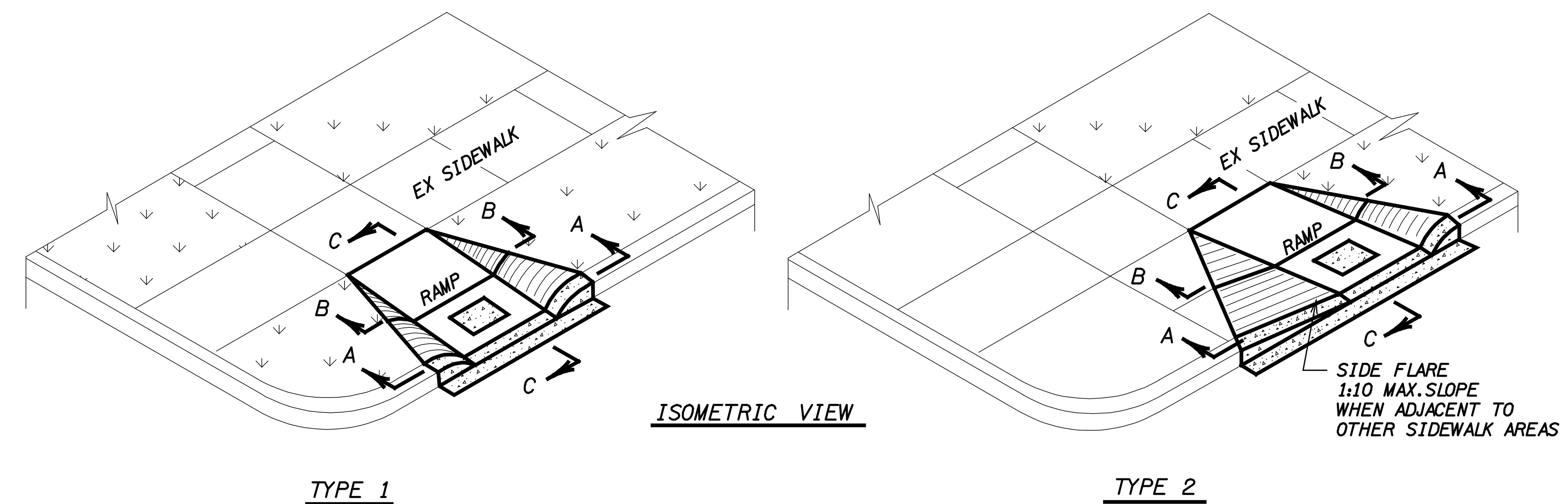
CONCRETE SIDEWALK SECTION

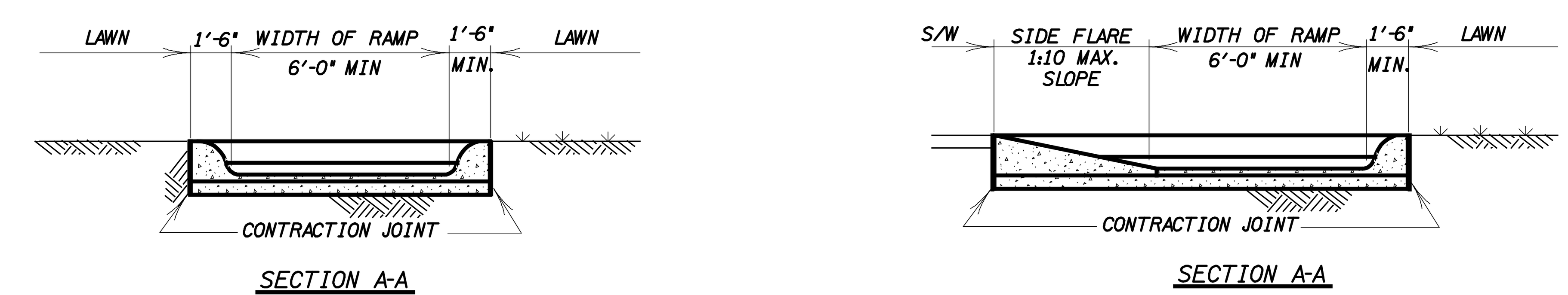


ADA DETECTABLE WARNING PLATE



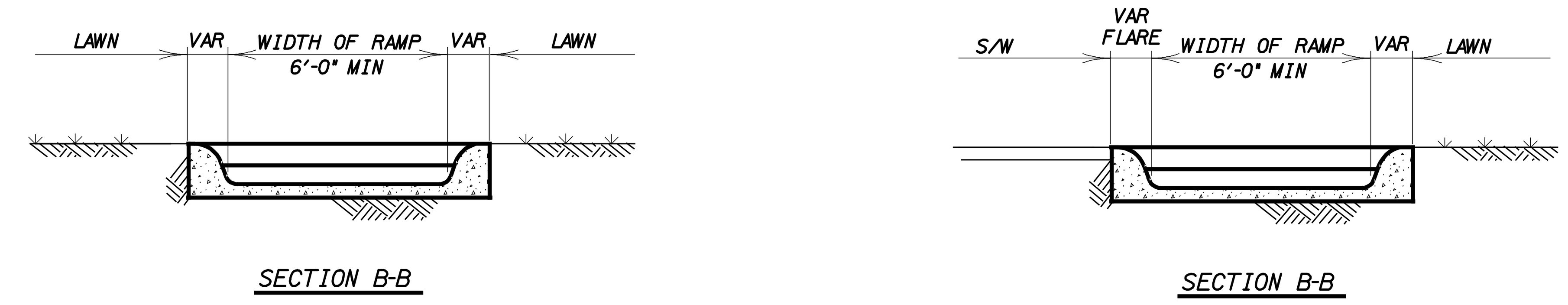
BITUMINOUS PAVEMENT SECTION

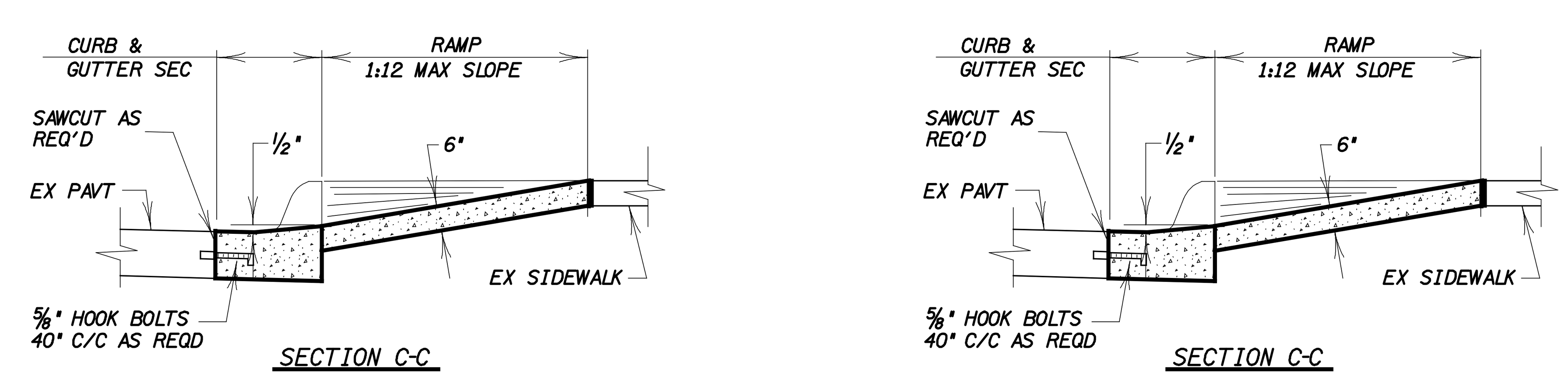




NOTE:
ALL SIDEWALK RAMPS TO BE A MINIMUM 6" THICK CONCRETE.

NOTE:
ALL SIDEWALK RAMPS TO BE A MINIMUM 6" THICK CONCRETE.





NOTE:
PLACE EXPANSION JOINT AT B/C LINE OR SIDEWALK JOINT

NOTE:
PLACE EXPANSION JOINT AT B/C LINE OR SIDEWALK JOINT

ADA CONCRETE SIDEWALK RAMPS

City of Fenton

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DATE	ADDITIONS AND/OR REVISIONS
3-24-08	ADOPTED BY CITY COUNCIL

DESIGNED	
DRAWN	J. REC
CHECKED	M. DARGA
APPROVED	J. BOOTH

V:\200700\20070048\C\pvg_det01_V8.dgn

CITY OF FENTON

STANDARD CONSTRUCTION DETAILS

PAVEMENT STANDARDS

HRC JOB NO. 20070048	SCALE NONE
DATE JULY, 2007	SHEET NO. 1 OF 1

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TIME = 25-MAR-2008 14:22
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