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CHRIS COUSINO
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SHELBY TOWNSHIP, MI 48315
(586) 254-4367



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**SOUTH BOULEVARD
OFFICE
DEVELOPMENT**

ROCHESTER HILLS, MI

SECTION 35
TOWN 03 NORTH RANGE 11 EAST
ROCHESTER HILLS, MI
OAKLAND COUNTY, MI

| NO. | DATE | REVISION |
|-----|------------|------------------------|
| 1 | 11/15/2017 | OWNER REVIEW |
| 2 | 11/27/2017 | SITE PLAN SUBMISSION |
| 3 | 01/12/2018 | SITE PLAN SUBMISSION 2 |

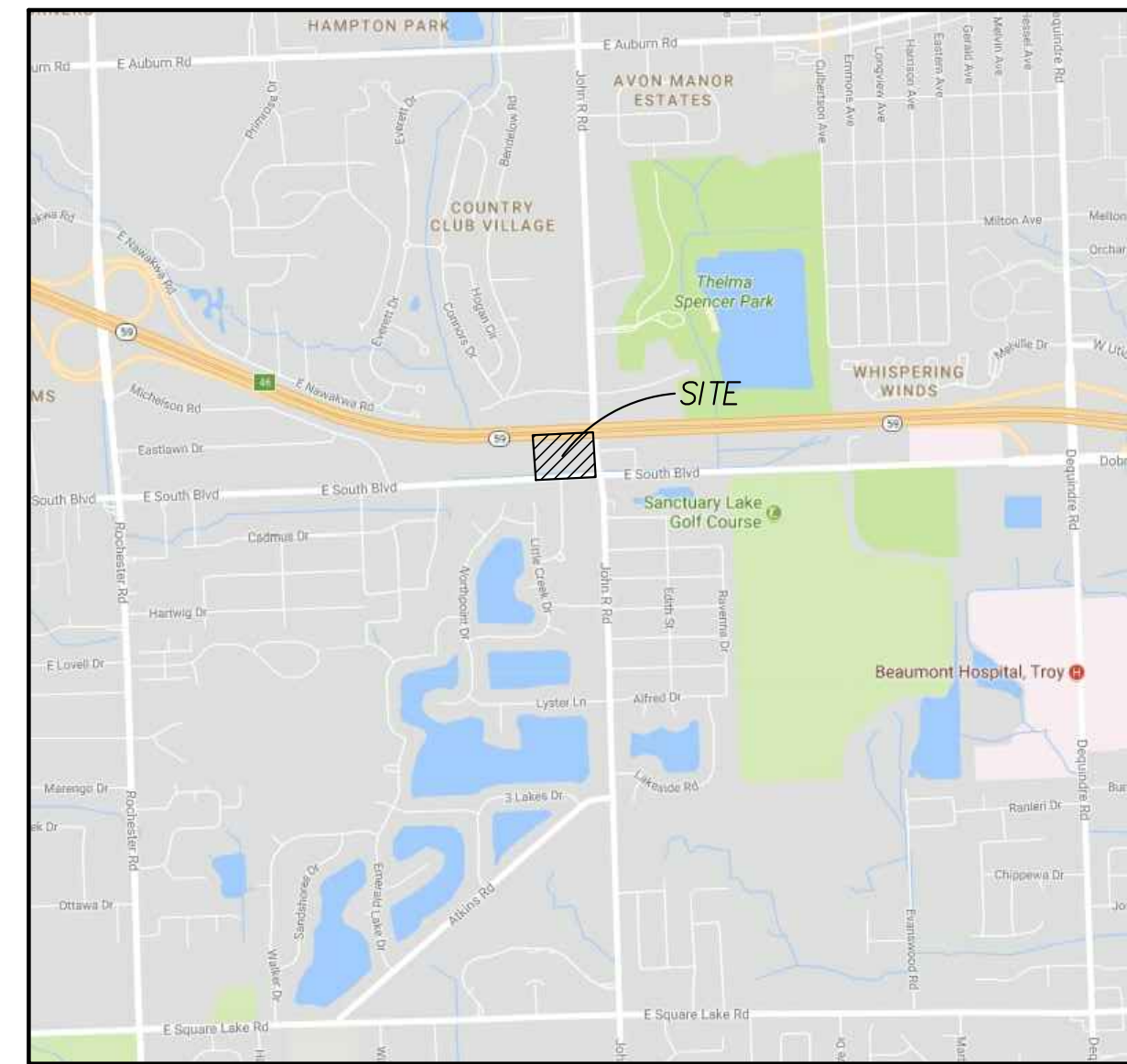
| DRAFTER | DATE |
|-----------------------------|---------------|
| NAB | 11-15-2017 |
| DESIGNER | DATE |
| NAB | 11-15-2017 |
| CHECKED | DATE |
| TJS | 11-15-2017 |
| PROJECT MANAGER | BID PLAN DATE |
| TJS | |
| DEPARTMENT MANAGER APPROVAL | DATE |
| TJS | |

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| JOB NO. | DRAWING NO. |
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| NP17068 | NP17068CVR |
| SCALE: | SHEET NO. |
| | C1.00 |

SOUTH BOULEVARD OFFICE DEVELOPMENT

NORTHWEST CORNER OF SOUTH BOULEVARD EAST AND JOHN R
ROCHESTER HILLS, MICHIGAN 48307



LOCATION MAP
NO SCALE

PROJECT TEAM:

OWNER

DEI PROPERTIES
12955 23 MILE ROAD
SHELBY TOWNSHIP, MI 48315
PHONE (526) 254-4367

ARCHITECT

BIDDISON ARCHITECTURE
320 MARTIN STREET, SUITE 10
BIRMINGHAM, MI 48009
PHONE (248) 554-9500

CIVIL ENGINEER

SPALDING D&D DECKER
905 SOUTH BOULEVARD EAST
ROCHESTER HILLS, MICHIGAN 48307
PHONE (248) 844-5400

LANDSCAPE ARCHITECT

ALLEN DESIGN LLC
557 CARPENTER
NORTHVILLE, MICHIGAN 48167
(248) 467-4668

SPALDING D&D DECKER
ENGINEERS SURVEYORS
ROCHESTER HILLS, MICHIGAN



INDEX OF DRAWINGS

- C1.00 - COVER SHEET
- CIVIL DRAWINGS**
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 - C1.02 - TOPOGRAPHICAL SURVEY AND DEMOLITION PLAN
 - C1.03 - TOPOGRAPHICAL NOTES
 - C1.04 - UTILITY PLAN
 - C1.05 - PAVING & LAYOUT PLAN
 - C1.06 - PAVING & LAYOUT DETAILS
 - C1.07 - GRADING PLAN
 - C1.08 - CITY OF ROCHESTER HILLS STORM SYSTEM STANDARD DETAILS
 - C1.09 - CITY OF ROCHESTER HILLS WATER MAIN STANDARD DETAILS 1 OF 2
 - C1.10 - CITY OF ROCHESTER HILLS WATER MAIN STANDARD DETAILS 2 OF 2
 - C1.11 - CITY OF ROCHESTER HILLS WATER MAIN SPECIAL DETAILS
 - C1.12 - CITY OF ROCHESTER HILLS SANITARY SEWER STANDARD DETAILS 1 OF 2
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ARCHITECTURAL DRAWINGS

- SP.001 - PHOTOMETRIC SITE PLAN
- SP.401 - SITE DETAILS
- A.101 - 1ST FLOOR PLAN
- A.102 - 2ND FLOOR PLAN
- A.201 - ELEVATIONS

LANDSCAPING DRAWINGS

- L-1 - LANDSCAPE PLAN
- L-2 - LANDSCAPE DETAILS
- L-3 - WOODLAND PLAN

BUILDING DATA

TYPE: II-B
SPRINKLED

OCCUPANCY CLASSIFICATION: B
-(2) STORY, 32'-0" (< 75'-0" TABLE 504.3)
-12,767 S.F. (LARGEST SINGLE FLOOR AREA) -SINGLE OCCUPANCY, MULTISTORY BUILDING.

ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLAN:
-(2) STORY (< 4 STORIES ALLOWABLE, TABLE 504.4)

SECTION 506: BUILDING AREA
ALLOWABLE AREA: 506.2.3 SINGLE-OCCUPANCY, MULTI-STORY BUILDING

$A = [A + (NS \times I)] \times S$
 $A = [69,000 + (23,000 \times 0.75)] \times 2$
 $A = 86,250$ (ALLOWABLE AREA)
86,250 SQ.FT. IS GREATER THAN 12,767 SQ.FT. (LARGEST SINGLE FLOOR AREA)

FIRE PROTECTION NOTES

THE BUILDING WILL BE PROVIDED WITH A FULL AUTOMATIC FIRE PROTECTION SPRINKLER SYSTEM (FIRE SUPPRESSION SYSTEM) WHICH WILL BE DESIGNED TO MEET M.B.C. REQUIREMENTS AND THE CITY OF ROCHESTER HILLS INSPECTION AND PERMIT APPROVAL. SPRINKLER CONTRACTOR SHALL BE FULLY LICENSED AND BE RESPONSIBLE FOR PREPARATION OF ENGINEERING DRAWING, SUBMISSION OF DRAWINGS TO ALL LOCAL AND STATE AGENCIES FOR APPROVAL, AND FOR COORDINATION OF REQUIREMENTS WITH OWNERS AND TENANTS INSURANCE CARRIER.

FIRE PROTECTION SYSTEM FOR THE BUILDING EQUAL TO ORDINARY HAZARD N.E.P.A. NO. 13 CRITERIA WITH ONE (1) 6" D.I. BUILDING SERVICE PROVIDED.

BUILDING TO BE EQUIPPED WITH A FIRE ALARM SYSTEM (PER SPECIFICATIONS PAID FOR BY TENANT) AS REQUIRED PER N.E.P.A. 72 - 2013 BASED ON BUILDING OCCUPANCY.

TYPE 2A FIRE EXTINGUISHERS SHALL BE PROVIDED AND SPACED A MAX. OF 75' APART PER SECTION 906.1 OF THE 2015 INTERNATIONAL FIRE CODE AND / OR BY THE DIRECTION OF THE FIRE MARSHAL.

GOVERNING CODES

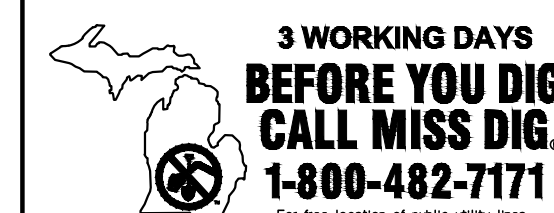
2015 MICHIGAN BUILDING CODE
2015 MICHIGAN PLUMBING CODE
2015 MICHIGAN MECHANICAL CODE
2015 INTERNATIONAL FUEL GAS CODE
2014 N.E.C. W/ PART 9 STATE AMENDMENTS, MICHIGAN ELECTRICAL CODE
ICC/ANSI A117.1-2009 AND MICHIGAN BARRIER FREE DESIGN LAW OF 1966 AS AMENDED.
2015 MICHIGAN UNIFORM ENERGY CODE RULES PART 10 WITH ANSI/ASHRAE/IESNA STANDARD 90.1-2013
2015 INTERNATIONAL FIRE CODE
NFPA 13 - 2013
NFPA 72 - 2013

BUILDING USE: BUILDING B
SPRINKLED

TYPE OF CONSTRUCTION

2015 M.B.C. 2B (UNPROTECTED)
NFPA 220: TYPE II-000

NOT TO BE USED AS CONSTRUCTION DRAWINGS
CITY OF ROCHESTER HILLS FILE NO. 17-048



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SOUTH BOULEVARD OFFICE DEVELOPMENT

ROCHESTER HILLS, MI

GENERAL PLAN

SECTION 35

TOWN 03 NORTH RANGE 11 EAST

ROCHESTER HILLS, MI

OAKLAND COUNTY, MI

| NO. | DATE | REVISION |
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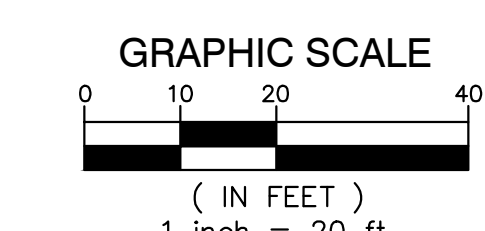
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|--------|-----------|
| 1"=20' | C1.01 |

LEGEND

| | |
|---|---|
| --- PROPOSED WATERMAIN | ● PROPOSED SAN MANHOLE (SAN) |
| --- PROPOSED STORM SEWER | ● PROPOSED STORM MANHOLE (MH) |
| --- PROPOSED GAS MAIN | ● PROPOSED CATCH BASIN (CB) |
| --- PROPOSED ELECTRIC | ■ PROPOSED INLET (NL) |
| ● PROPOSED HYDRANT | ▶ PROPOSED END SECTION (ES) |
| ⊗ PROPOSED GATE VALVE & WELL (GVW) | ⊗ PROPOSED FIELD CATCH BASIN (FCB) W/BEEHIVE COVER OR STANDPIPE (SP) W/ BAR GRATE COVER |
| ⊗ PROPOSED TAPPING SLEEVE VALVE & WELL (TSVW) | ⊗ UTILITY CROSSING (SEE DATA TABLE) |
| ▨ STANDARD BITUMINOUS PAVEMENT | CB STRUCT. TYPE |
| ▨ HEAVY-DUTY BITUMINOUS PAVEMENT | Z STRUCT. NO. |
| ▨ DEEP-STRENGTH BITUMINOUS PAVEMENT | 20 |
| ▨ CONCRETE PAVEMENT | 20 |
| ▨ CONCRETE SIDEWALK | 10 STRUCT. NO. |
| ▨ MILL PAVEMENT | XXX STRUCT. TYPE |



SITE DATA

SITE AREA
GROSS SITE AREA: 1.38 AC / 59,982 SF

PROPOSED LAND USE
TWO STORY OFFICE BUILDING

ZONING DISTRICT
SITE: O-1 OFFICE BUSINESS

SURROUNDING PROPERTY ZONING
NORTH: M-59
SOUTH: NEIGHBORHOOD NODES (CITY OF TROY)
EAST: O-1 OFFICE BUSINESS
WEST: O-1 OFFICE BUSINESS

BUILDING DATA
BUILDING TYPE: TYPE II-B
SIZE: FIRST FLOOR 12,767 SF, SECOND FLOOR 11,775 SF, GROSS 24,542 SF
HEIGHT: REFER TO BUILDING ELEVATIONS
BUILDING MATERIALS: REFER TO BUILDING ELEVATIONS
SEE COVER SHEET FOR MORE DETAILS

REQUIRED SETBACKS PER ARTICLE 5.1

| | O-1 REQUIRED | PROPOSED |
|--------------|--------------|---------------------------------------|
| FRONT | 35 FEET | 81 FEET (MIN) (TO SOUTH BLVD. R.O.W.) |
| REAR | 35 FEET | 67 FEET (TO M-59 R.O.W.) |
| SIDE MINIMUM | 10 FEET | 83 FEET (MIN) (TO WEST LINE) |
| TOTAL | 50 FEET | 26 FEET (MIN) (TO JOHN R. RD. R.O.W.) |

PARKING REQUIREMENTS - PER ARTICLE 11.2

MINIMUM: 1 SPACE PER 350 SF OF FLOOR AREA
MAXIMUM: 125% OF MINIMUM
BARRIER FREE SPACES REQUIRED FOR LOTS WITH 51-75 SPACES: 14.4% OF TOTAL PARKING PROVIDED IN LOT

PARKING CALCULATION BY SF

24,240 SF / 350 SF = 70 SPACES MINIMUM
BARRIER FREE = 1 + (70 * 0.04) = 4 BARRIER FREE SPACES

PARKING LOT PARKING = 69 SPACES
BUILDING GARAGE PARKING = 6 SPACES
TOTAL PARKING PROVIDED = 75 SPACES

PARKING LOT SET-BACK REQUIREMENTS

| | O-1 REQUIRED | PROPOSED |
|-------|--------------|-----------------|
| NORTH | 10 FEET | 14.5 FEET |
| SOUTH | 10 FEET | 10 FEET |
| EAST | 10 FEET | 10 FEET (MIN) |
| WEST | 0 FEET | 10.5 FEET (MIN) |

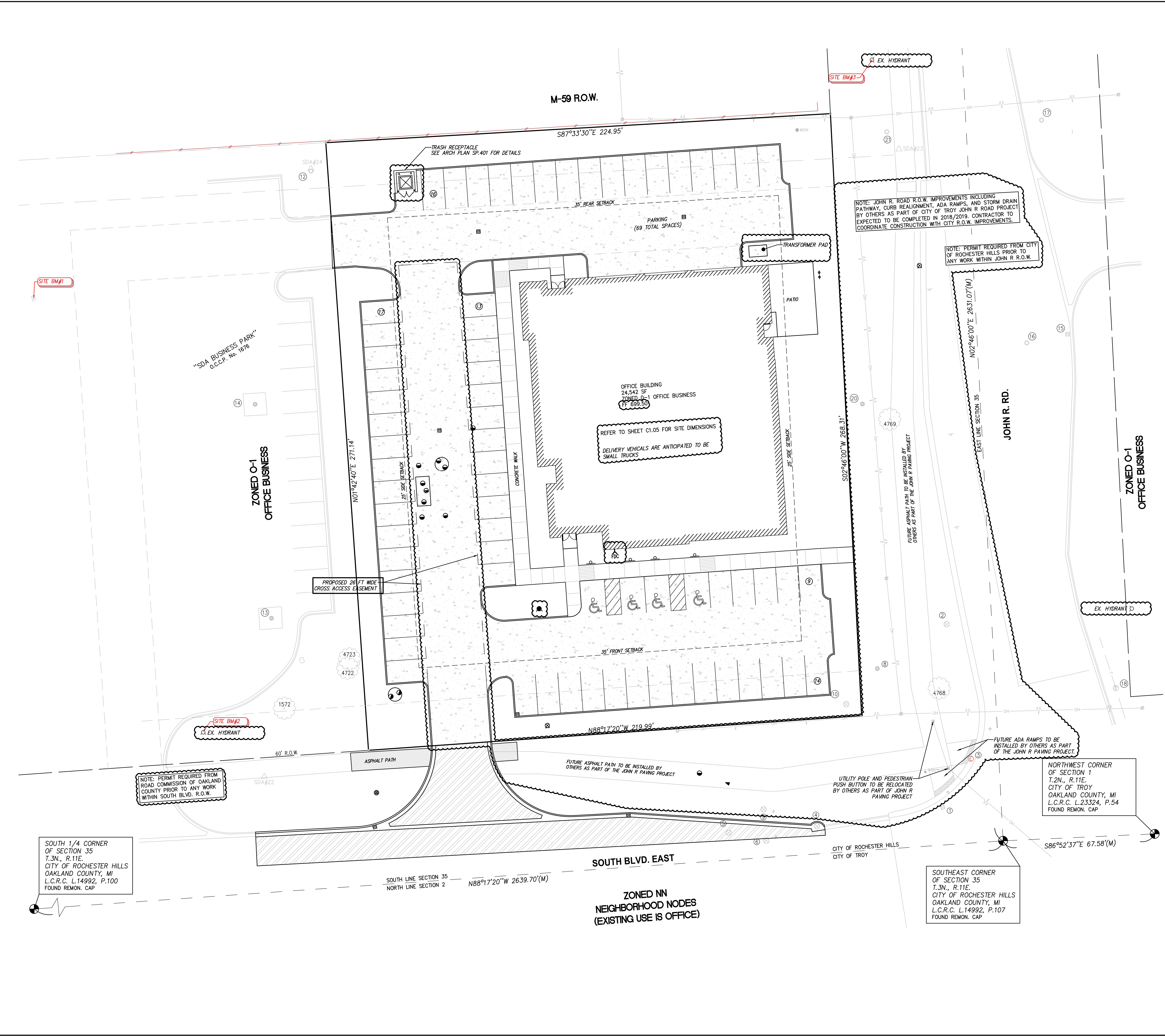
FIRE DEPARTMENT NOTES

- PROVIDE UPDATED KEYS FOR KNOX BOX AT COMPLETION OF PROJECT.
- BUILDING FIRE DEPARTMENT CONNECTION SHALL BE A 4" DIAMETER STORZ CONNECTION.
- FIRE LANES SHALL BE DESIGNATED BY THE FIRE CODE OFFICIAL, AND SHALL BE CONSPICUOUSLY POSTED ON BOTH SIDES OF THE FIRE LANE, WITH FIRE LANE SIGNS, SPACED NOT MORE THAN 100 FEET APART. FIRE LANE SIGNS SHALL READ "NO STOPPING, STANDING, PARKING, FIRE LANE" AND SHALL CONFORM TO THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
- CONSTRUCTION SITES SHALL BE SAFEGUARDED IN ACCORDANCE WITH IFC 2006 CHAPTER 14.
- OPEN BURNING IS NOT PERMITTED INCLUDING THE BURNING OF TRASH, DEBRIS, OR LAND CLEARING MATERIALS. OPEN BURNING FOR WARMING OF SAND AND/OR WATER FOR PREPARATION OF MORTAR SHALL BE WITHIN THE CITY OF ROCHESTER HILLS BURN PERMIT GUIDELINES.
- A KNOX KEY SYSTEM SHALL BE INSTALLED, IN A LOCATION APPROVED BY THE FIRE CODE OFFICIAL. ORDERING INFORMATION IS AVAILABLE FROM THE KNOX COMPANY AT KNOXBOX.COM

REFER TO ARCHITECTURAL PLANS FOR BUILDING INFORMATION AND CODE ANALYSIS

ALL SIGNS MUST MEET CHAPTER 134 OF THE CITY CODE OF ORDINANCES AND BE APPROVED UNDER A SEPARATE PERMIT ISSUED BY THE BUILDING DEPARTMENT.

NOT TO BE USED AS CONSTRUCTION DRAWINGS
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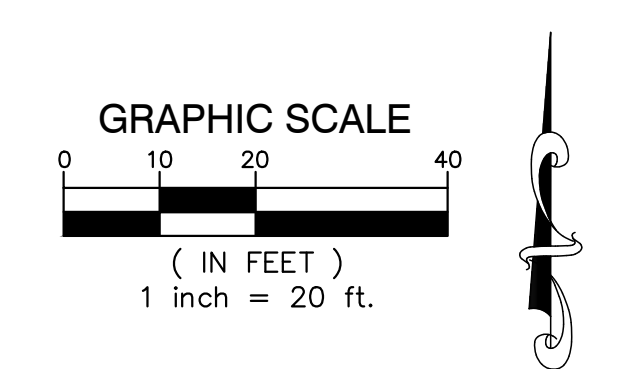
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LEGEND

- GAS
- SANITARY SEWER (SN)
- STORM SEWER (STM)
- WATERMAIN (WM)
- OVERHEAD WIRE
- COMBINED SEWER
- STEAM LINE
- OIL LINE
- UNDERGROUND ELECTRIC (ELEC)
- UNDERGROUND PHONE (PH)
- UNDERGROUND CABLE (CBL)
- MANHOLE
- CATCH BASIN
- SEWER CLEAN OUT
- GAS METER
- GAS SHUT OFF VALVE
- VALVE BOX
- GATE VALVE & WELL
- WATER SHUT OFF VALVE
- FIRE HYDRANT
- SPRINKLER VALVE BOX
- LAWN SPRINKLER HEAD
- HAND HOLE
- ELECTRIC RISER OR METER
- TELEPHONE RISER
- CABLE TV RISER
- AIR CONDITION UNIT
- UTILITY POLE
- UTILITY POLE WITH TRANSFORMER
- UTILITY POLE W/ LAMP EXTENSION
- LIGHT POLE
- LIGHT POLE WITH LAMP EXTENSION
- TRAFFIC SIGNAL
- POLE WITH TRAFFIC SIGNAL (OVER ROAD)
- GUY WIRE
- GUY POLE
- GROUND LEVEL OR DECORATIVE LIGHTING
- FLAG POLE
- PHONE OR PHONE BOOTH
- CHAIN LINK FENCE (C.L.)
- WOOD FENCE
- WOOD WIRE FENCE (W.W.)
- GUARD RAIL
- METAL OR CONC. POST
- MAILBOX
- SIGN
- WATER FOUNTAIN
- PARKING METER
- BILLBOARD OR LARGE SIGN
- BASKETBALL HOOP
- BOULDER
- STATUE OR SCULPTURE
- BENCH
- INV. INVERT ELEVATION
- CMP CORRUGATED METAL PIPE
- CENTERLINE OF DITCH
- CULVERT
- DITCH BANK/TOP OF SLOPE
- PROPERTY LINES
- STUMP
- CONIFEROUS TREE
- DECIDUOUS TREE
- DECIDUOUS SHRUB
- CONIFEROUS SHRUB
- SECTION CORNER
- TRAVERSE POINT
- STRUCTURE NUMBER
- SDA POINT No.
- SPOT ELEVATION
- TOP OF CURB ELEVATION
- GUTTER ELEVATION
- TOP OF PAVEMENT ELEVATION
- EDGE OF METAL ELEVATION
- TOP OF WALK ELEVATION
- TOP OF WALL ELEVATION
- GROUND ELEVATION
- U.G.
- F.O.
- CONC.
- ASPH.
- L.S.
- F.F.
- D.L.
- F.I.
- F.M.
- F.P.K.
- S.I.
- S.P.K.
- S.P.K./TAG SET P.K. NAIL W/SDA TAG
- MAG. SET MAGNETIC NAIL
- MAG/TAG SET MAGNETIC NAIL W/SDA TAG
- M
- R
- C
- S

RCOC RIGHT-OF-WAY NOTES

1. PROPER SIGNING IS REQUIRED BEFORE BEGINNING WORK WITHIN THE RIGHT-OF-WAY. MAINTAIN TWO-WAY TRAFFIC AT ALL TIMES.
2. CALL INSPECTOR OR PERMIT SUPERVISOR 48 HOURS BEFORE BEGINNING ANY WORK IN THE R.O.W.
3. LANE CLOSURES RESTRICTED TO 9-3 MONDAY-FRIDAY.
4. FLAG PERSON REQUIRED FOR TEMPORARY ONE LANE ROAD.
5. FULL DEPTH SAWCUT AND/OR MILL & BUTT JOINT WITH LOCATION/WIDTH AS DIRECTED BY RCOC INSPECTOR.



DEMOLITION NOTES

- 1 REMOVE ASPHALT PAVEMENT TO FULL DEPTH. SAWCUT FULL DEPTH WHERE NEW PAVEMENT WILL BE PLACED ADJACENT TO EXISTING PAVEMENT.
- 2 REMOVE CONCRETE CURB AND GUTTER. SAWCUT FULL DEPTH WHERE NEW CURB AND GUTTER WILL BE PLACED ADJACENT TO EXISTING CURB AND GUTTER.
- 3 CLEAR AND GRUB TO THE LIMITS SHOWN. INCLUDE REMOVAL OF ALL SIGNS, POSTS, FOOTINGS, GRAVEL, BRUSH, SHRUBS, GRASS, AND TREES NOT INDICATED FOR PROTECTION, INCLUDING ROOTS. STRIP TOPSOIL AND STOCKPILE ON SITE IN DESIGNATED LOCATION.
- 4 PROTECT EXISTING UTILITY POLES.
- 5 REMOVE AND SALVAGE EXISTING SIGN TO BE RESET UPON COMPLETION OF CONSTRUCTION ACTIVITIES. LOCATION TO BE DETERMINED BY COUNTY INSPECTOR.
- 6 PROTECT EXISTING ASPHALT PATH. IF DAMAGED, REPLACE WITH NEW ASPHALT PAVEMENT AS DIRECTED BY THE ENGINEER.
- 7 PROTECT EXISTING UTILITIES AND UTILITY STRUCTURES TO REMAIN.
- 8 REMOVE AND RELOCATE BY OTHERS. COORDINATE WITH D.T.E.
- 9 REMOVE AND DISPOSE EXISTING CULVERT END SECTION.
- 10 REMOVE AND DISPOSE EXISTING STORM STRUCTURE.
- 11 PROTECT EXISTING MONUMENT.
- 12 REMOVE AND RELOCATE BY OTHERS. COORDINATE WITH CONSUMERS ENERGY.
- 13 REMOVAL AND RELOCATION BY OTHERS AS PART OF THE JOHN R ROAD PAVING PROJECT EXPECTED TO BE COMPLETED IN 2018/2019.

PROTECT EXISTING TREES AND LANDSCAPING TO REMAIN DURING CONSTRUCTION. SEE TREE PROTECTION DETAIL ON SHEET C1.03.

EXISTING SIGNAGE AND MAILBOXES WITHIN THE CLEARING LIMITS ARE TO BE REMOVED AND SALVAGED. STAGE IN ON SITE LOCATION AS SPECIFIED BY OWNER.

ALL DEPRESSIONS CREATED BY DEMOLITION PROCEDURES SHALL BE BACKFILLED WITH CLASS II FILL MATERIAL, IN 8" LIFTS COMPACTED TO 98% OF MAXIMUM UNIT WEIGHT, UP TO PROPOSED SUBGRADE.

CONTRACTOR IS RESPONSIBLE FOR DOING AN EARTHWORK CALCULATION FOR CUT AND FILL REQUIREMENTS, AND IS RESPONSIBLE FOR INCLUDING IMPORT AND EXPORT OF MATERIALS IN THEIR BID. ALL EXCESS MATERIAL (INCLUDING TOPSOIL, CLEAN FILL, AND WASTE MATERIAL) SHALL BE REMOVED FROM THE SITE.

CONTRACTOR TO PROTECT EXISTING WALKS, PAVEMENT, CURBS, GUTTERS, WALLS, FENCES, GATES, LANDSCAPING AND TREES TO REMAIN DURING CONSTRUCTION.



EAST 1/4 CORNER OF SECTION 35 T.3N., R.11E. CITY OF ROCHESTER HILLS OAKLAND COUNTY, MI L.C.R.C. L.14992, P.106 FOUND REMON. CAP

SOUTHWEST CORNER OF SECTION 1 T.2N., R.11E. CITY OF TROY OAKLAND COUNTY, MI L.C.R.C. L.23324, P.34 FOUND REMON. CAP

NORTHWEST CORNER OF SECTION 1 T.2N., R.11E. CITY OF TROY OAKLAND COUNTY, MI L.C.R.C. L.23324, P.34 FOUND REMON. CAP

SOUTH 1/4 CORNER OF SECTION 35 T.3N., R.11E. CITY OF ROCHESTER HILLS OAKLAND COUNTY, MI L.C.R.C. L.14992, P.100 FOUND REMON. CAP

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For the location of public utility lines

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SOUTH BOULEVARD OFFICE DEVELOPMENT
ROCHESTER HILLS, MI

TOPOGRAPHICAL SURVEY AND DEMOLITION PLAN

SECTION 35
TOWN 03 NORTH RANGE 11 EAST
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OAKLAND COUNTY, MI

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BASIS OF BEARINGS FOR THIS SURVEY IS THE SOUTH LINE OF SECTION 35 AS RECORDED IN BROOKLANDS (LIBER 25 OF PLOTS, PAGES 10, 10A AND 10B, OAKLAND COUNTY RECORDS)

NOTE: UTILITY INFORMATION ON THIS DRAWING MAY BE FROM INFORMATION DISCLOSED TO THIS FIRM BY THE VARIOUS UTILITY COMPANIES, CITY/COUNTY AGENCIES AND OTHER VARIOUS SOURCES. UNDERGROUND UTILITIES WHICH ARE ON PRIVATE PROPERTY ARE USUALLY NOT DELINEATED UPON A UTILITY COMPANY'S PUBLISHED PLANS. THEIR LOCATION, IF SHOWN UPON THIS SURVEY, ARE APPROXIMATED FROM FOUND PAINT MARKS/STAKES, ETC. AS LOCATED BY THIS FIRM FROM SOURCES WHICH ARE UNKNOWN. NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS OR ACCURACY THEREOF.

PRIOR TO CONSTRUCTION, ALL LOCATIONS AND DEPTHS OF EXISTING UTILITIES (IN CONFLICT WITH PROPOSED IMPROVEMENTS) SHALL BE VERIFIED IN THE FIELD. CALL MISS DIG 3 WORKING DAYS PRIOR TO CONSTRUCTION.

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SOUTH BOULEVARD OFFICE DEVELOPMENT

ROCHESTER HILLS, MI

UTILITY PLAN

SECTION 35
TOWN OF NORTH RANGE 11 EAST
ROCHESTER HILLS, MI
OAKLAND COUNTY, MI

| NO. | DATE | REVISION |
|-----|------------|------------------------|
| 1 | 11/15/2017 | OWNER REVIEW |
| 2 | 11/27/2017 | SITE PLAN SUBMISSION |
| 3 | 01/12/2018 | SITE PLAN SUBMISSION 2 |

| DESIGNER | DATE |
|-----------------------------|---------------|
| NAB | 11-15-2017 |
| CHECKED | DATE |
| TJS | 11-15-2017 |
| PROJECT MANAGER | BID PLAN DATE |
| TJS | |
| DEPARTMENT MANAGER APPROVAL | DATE |
| TJS | |

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET,
ADJUST SCALES ACCORDINGLY

| JOB NO. | DRAWING NO. |
|---------|-------------|
| NP17068 | NP17068UTY |
| SCALE: | SHEET NO. |
| 1"=20' | C1.04 |

LEGEND

| | |
|---|--|
| --- PROPOSED WATER MAIN | ● PROPOSED SAN MANHOLE (SAM) |
| --- PROPOSED SANITARY | ● PROPOSED STORM MANHOLE (SM) |
| --- PROPOSED STORM SEWER | ● PROPOSED CATCH BASIN (CB) |
| --- PROPOSED GAS MAIN | ■ PROPOSED INLET (INL) |
| --- PROPOSED ELECTRIC | ▶ PROPOSED END SECTION (ES) |
| ● PROPOSED HYDRANT | ⊕ PROPOSED FIELD CATCH BASIN (FCB) W/ BEEHIVE COVER OR STANDPIPE (SP) W/ BAR GRADE COVER |
| ⊕ PROPOSED GATE VALVE & WELL (GVW) | ⊕ PROPOSED TAPPING SLEEVE, VALVE & WELL (TSW) |
| ⊕ PROPOSED TAPPING SLEEVE, VALVE & WELL (TSW) | |

② - UTILITY CROSSING (SEE DATA TABLE)
CB - STRUCT. TYPE
Z - STRUCT. NO.

○ - SANITARY STRUCTURE
○ - WATER MAIN STRUCTURE

20 - STRUCT. NO.
10 - STRUCT. NO.
XXX - STRUCT. TYPE

Detention Basin
(OAKLAND COUNTY FORMULA - 100-YEAR STORM)
Job Name: South Boulevard Office Development
Job No.: NP17068

ALLOWABLE OUTFLOW CALCULATION
The Van Maele Drain is sized to handle this site's discharge assuming 60% imperviousness. This equates to a C-factor of 0.46, according to OCWRC conversion calculations (% imp x 0.60 + 0.10). We can calculate the allowable discharge as follows:

| | | |
|-------------|------|--------------------------------|
| Area = | 1.38 | acres |
| C-factor = | 0.46 | |
| Time/Conc = | 20 | minutes |
| Intensity = | 6.11 | inches per hour (100-yr storm) |
| Qallow = | 3.88 | CFS (Q = CxIxA) |

| | | | |
|---------------------------------|--------|------|--------|
| Total Area Tributary (At) = | 1.38 | | |
| Area Label | A | C | A°C |
| Lawn Area | 16,500 | 0.20 | 3,300 |
| Hard Surface | 31,000 | 0.95 | 29,450 |
| Roof Area | 12,767 | 0.95 | 12,129 |
| Sum | 60,267 | 2.10 | 44,879 |
| Overall site average C factor : | | | 0.74 |

| | | |
|---|------|----------|
| Enter Standard Allowable Discharge (q): | 2.81 | cfs/acre |
| Overall site C factor : | 0.74 | |
| Overall site acreage contributing to the basin (A): | 1.38 | Ac. |
| Maximum allowable outflow, Qa (q * A): | 3.88 | CFS |

VOLUME REQUIRED CALCULATION
Qo = [(allowable outflow, Qa) / (acreage)(runoff coefficient)]
= 3.799 CFS/(acre*imperviousness)

Storage time calculation:
T = -25 + sqrt(10312.5 / Qo) (100 year storm)
T = 27.10 min.

Maximum volume of storage per acre imperviousness:
Vs = (16,500 (T) / (T + 25)) - 40(Qo)(T) (100 year storm)
Vs = 4463.93 CF/(acre*imperviousness)

Total volume of storage REQUIRED for the entire site:
Vt = (Vs)(site acreage)(runoff coefficient)
Vt = 4,558.57 CF (VOLUME REQUIRED)

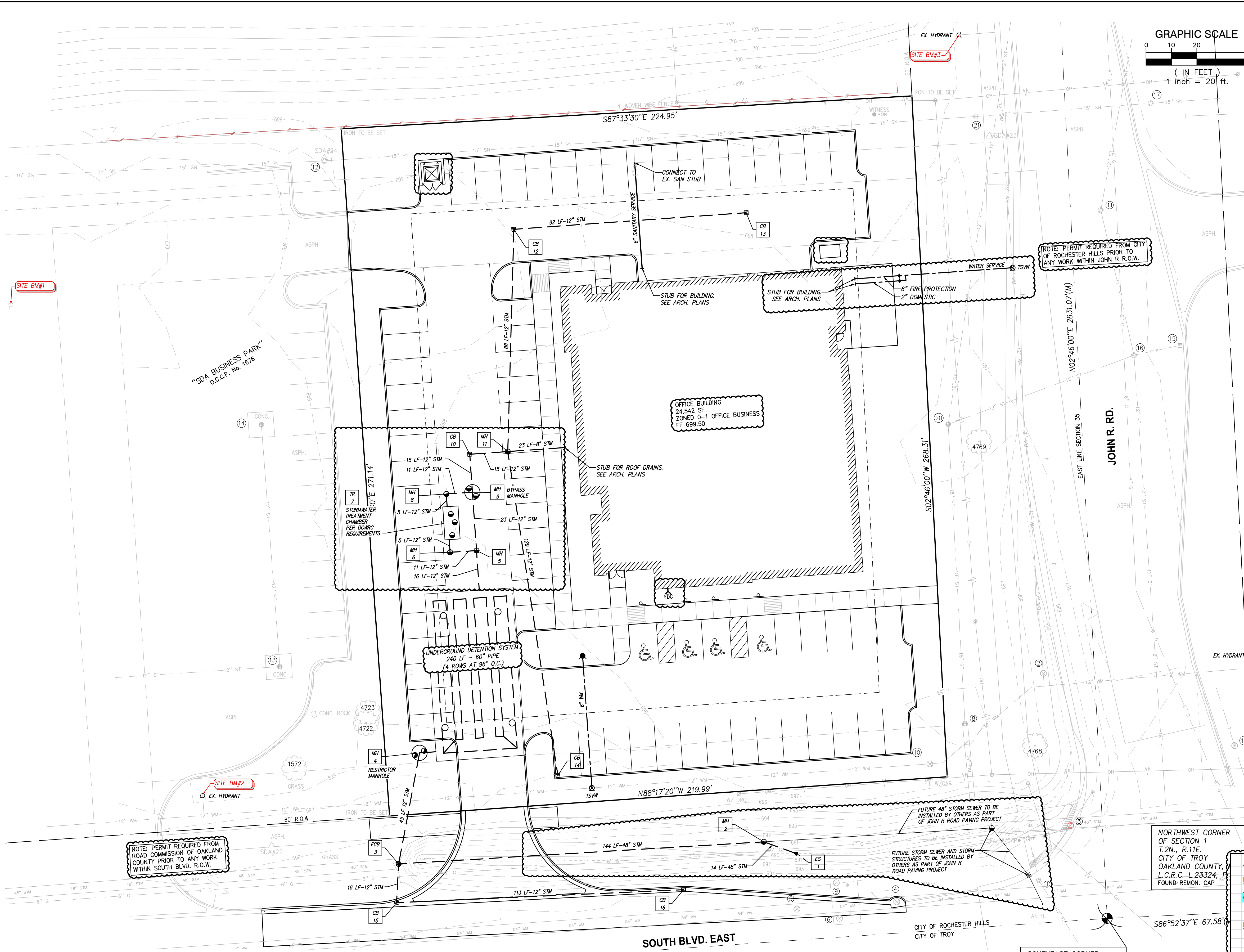
ORIFICE SIZING CALCULATIONS
Enter design depth of storage for the basin: 5 feet
ORIFICE AREA (A") = Qa / (0.62xSQRT(2GH)) = 0.349 square feet
50.22 square inches

AREA = PI x R squared. SOLVE FOR R = 4.00 in. (radius)
RESTRICTOR SIZE REQUIRED = 8 in.
RESTRICTOR SIZE PROVIDED = 8 in.

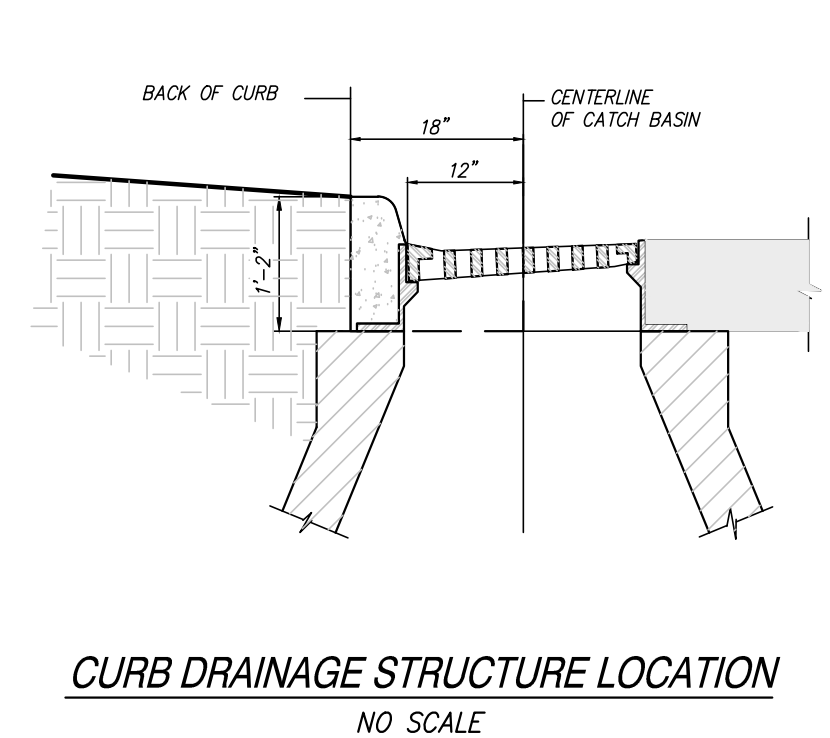
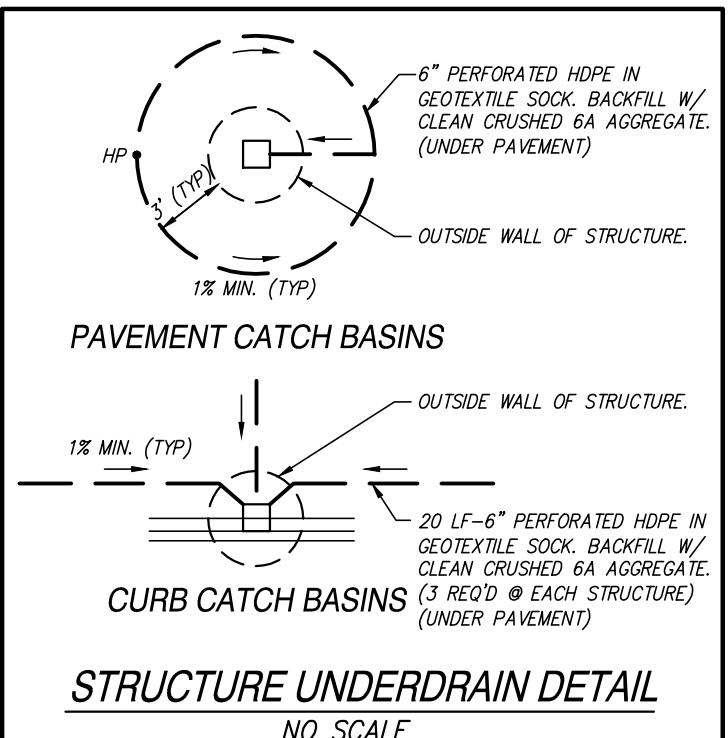
VOLUME PROVIDED CALCULATIONS
VOLUME WILL BE PROVIDED IN UNDERGROUND CORRUGATED STEEL PIPING.
DIAMETER = 60 INCH = 5 FOOT
VOLUME = 19.63 CUBIC FEET PER LINEAL FOOT
LENGTH REQ'D = 232.2 LINEAL FEET
USE FOUR ROWS OF 60"

BASIS FOR SANITARY SEWER DESIGN

| Base factors for Units | Factor | No. of Units | Equivalent REUs |
|--|--|--------------|-----------------|
| Office | 0.4 | 25 | 10 |
| Total = | | | 10 |
| Base Population per Unit | 3.5 people per unit X equivalent REUs = 34 people | | |
| Average Flow | 34 people X 100 GCPD = 3,430 gal/day x 1 day/86400 sec x 1 cfs/7.48 gal = 0.0053 cfs | | |
| Peak Flow | Q = (18 * SQRT(p / 1000)) / (4 * SQRT(p/1000)) = 4.3451 (Ten States Standards) 4.0 Use 4.0 per Site Plan Rev. 1 | | |
| Check Capacity of 6 inch Sanitary Sewer at 1% Per Manning's Eq. | 4.0 x 3.430 gal/day = 13,720 gal/day = 10 GPM 13,720 gal/day x 1 day/86400 sec x 1 cfs/7.48 gal = 0.0212 cfs | | |
| R = (D/4) | D = 0.5000 ft | | |
| R = | 0.1250 ft | | |
| S = | 0.0100 ft/ft | | |
| n = | 0.0130 | | |
| A = (3.14 x D ^2)/4 | A = 0.1963 sq ft | | |
| Q = (1.49/n) x (R^(2/3)) x (S^(1/2)) x A = | 0.56 cfs | | |



- UTILITY NOTES**
1. STORM SEWER 12" AND LARGER SHALL BE C76 CL IV (PREM.JT.) UNLESS OTHERWISE NOTED ON THE PLAN.
 2. STORM SEWER 6" AND SMALLER SHALL BE PVC SDR 23.5. STORM SEWER GREATER THAN 6" THROUGH 10" SHALL BE PVC SDR 26.
 3. SANITARY SEWER SHALL BE PVC TRUSS PIPE. LEADS SHALL BE SOLID WALL, PVC, SDR 23.5.
 4. WATER MAIN SHALL BE CLASS 54 DUCTILE IRON. WATER MAINS SHALL BE LEAKAGE AND PRESSURE TESTED IN ACCORDANCE WITH ANWA STANDARD C600. WATER MAINS SHALL BE DISINFECTED IN ACCORDANCE WITH ANWA STANDARD C651 PRIOR TO BEING PUT INTO SERVICE.
 5. ALL UTILITY TRENCHES THAT FALL WITHIN A 1'-ON-1 INFLUENCE OF PAVEMENT AREAS SHALL BE BACKFILLED WITH CLASS 2 SAND AND COMPACTED TO 95% OF MAXIMUM DENSITY.
 6. ALL WATER MAIN SHALL BE BURIED WITH 6" OF COVER FROM PROPOSED GRADES. USE 22.5° BENDS TO LOWER WATER MAIN WHERE NOTED AT UTILITY CROSSINGS.
 7. WHERE HYDRANTS ARE INDICATED ON THE PLAN, COMPLETE HYDRANT ASSEMBLIES ARE REQUIRED, INCLUDING SHUT-OFF VALVE AND BOX (REFER TO THE STANDARD DETAIL SHEET FOR DETAILED REQUIREMENTS) THE ELEVATION OF THE VALVE BOX SHALL BE EQUAL TO THE FINISH GRADE (FG) ELEVATION OF THE HYDRANT UNLESS OTHERWISE NOTED.
 8. ALL UTILITIES SHALL BE INSTALLED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CITY OF ROCHESTER HILLS.
 9. ALL UTILITIES SHALL BE INSTALLED ON CLASS "B" BEDDING OR BETTER.
 10. ALL HYDRANTS MUST BE AT LEAST 5' FROM THE BACK OF CURB OR EDGE OF PAVEMENT.
 11. ALL UTILITIES SHALL BE PLACED AT LEAST 10' FROM OTHER UTILITIES, SIGNIFICANT TREES, AND FIXED STRUCTURES.
 12. UNLESS OTHERWISE NOTED, ALL STORM SEWER STRUCTURES SHALL BE 4' DIAMETER (INLETS SHALL BE 2' DIAMETER). UNLESS OTHERWISE INDICATED ON THE STANDARD DETAIL SHEETS CASTINGS SHALL BE: P/M/T, CATCH BASINS - EJM 5105 - "M" (FRAMES WITH CURB BOXES WILL NOT BE ALLOWED), YARD CATCH BASINS - EJM 1040 - "02" MANHOLES - EJM 1040 - "A"
 13. PLACEMENT OF EDGE DRAINS AND FINGER DRAINS AT ALL CATCH BASINS IS REQUIRED. SEE STRUCTURE UNDERDRAIN DETAIL ON THIS SHEET.
 14. FOR CURB CATCH BASINS, SEE BASIN LOCATION DETAIL FOR BASIN STAKING RELATIVE TO THE CURB.
 15. SANITARY MANHOLE COVERS SHALL BE LABELED "SANITARY SEWER" ONLY. REFER TO STANDARD DETAIL SHEET FOR REQUIRED TEXT OF UTILITY CASTINGS.
 16. LOCATIONS OF LIGHT POLES, IF SHOWN ON THESE DRAWINGS, MAY BE APPROXIMATE. CONFIRM EXACT LOCATION (I.E. CURB OFFSETS, SIDEWALK OFFSETS, ETC.) PRIOR TO STAKING AND CONSTRUCTION. REFER TO SITE ELECTRICAL PLAN FOR DETAILS, AND COORDINATE WITH ELECTRICAL ENGINEER, ARCHITECT, AND CIVIL ENGINEER TO DETERMINE PROPER PLACEMENT.
 17. WHERE THESE PLANS DIFFER FROM THE STANDARD DETAILS OR STANDARD SPECIFICATIONS OF THE COMMUNITY, THE COMMUNITY REQUIREMENTS SHALL GOVERN.



SOUTHEAST CORNER OF SECTION 35
T.3N., R.11E.
CITY OF ROCHESTER HILLS
OAKLAND COUNTY, MI
L.C.R.C. L14992, P.107
FOUND REMON. CAP

905 South Blvd. East
Rochester Hills, MI 48307
Phone: (248) 844-5400
Fax: (248) 844-5404

400 Renaissance Center, Suite 2600
Detroit, MI 48243
Phone: (313) 309-7051
Fax: (313) 309-7101

39293 Plymouth, Suite 102
Livonia, MI 48150
Phone: (734) 671-4344
Fax: (734) 671-4347

www.sda-eng.com
(800) 598-1600

DEI PROPERTIES
CHRIS COUSINO
12955 23 MILE ROAD
SHELBY TOWNSHIP, MI 48315
(586) 254-4367

**3 WORKING DAYS
BEFORE YOU DIG
CALL MISS DIG.**
1-800-482-7171
For the location of public utility lines

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**SOUTH BOULEVARD
OFFICE
DEVELOPMENT**
ROCHESTER HILLS, MI
PAVING LAYOUT PLAN

SECTION 35
TOWN 03 NORTH RANGE 11 EAST
ROCHESTER HILLS, MI
OAKLAND COUNTY, MI

| NO. | DATE | REVISION |
|-----|------------|------------------------|
| 1 | 11/15/2017 | OWNER REVIEW |
| 2 | 11/27/2017 | SITE PLAN SUBMISSION |
| 3 | 01/12/2018 | SITE PLAN SUBMISSION 2 |

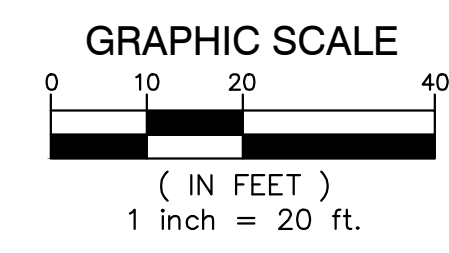
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| NAB | 11-15-2017 |
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| TJS | 11-15-2017 |
| PROJECT MANAGER | BID PLAN DATE |
| TJS | |
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| TJS | |

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET,
ADJUST SCALES ACCORDINGLY

| JOB NO. | DRAWING NO. |
|---------|-------------|
| NP17068 | NP17068SPL |
| SCALE: | SHEET NO. |
| 1"=20' | C1.05 |

LEGEND

| | |
|--|---|
| --- PROPOSED WATER MAIN | ● PROPOSED SAN MANHOLE (SAM) |
| --- PROPOSED SANITARY | ● PROPOSED STORM MANHOLE (SM) |
| --- PROPOSED STORM SEWER | ● PROPOSED STORM CATCH BASIN (CB) |
| --- PROPOSED GAS MAIN | ■ PROPOSED INLET (INL) |
| --- PROPOSED ELECTRIC | ▲ PROPOSED END SECTION (ES) |
| ● PROPOSED HYDRANT | ⊙ PROPOSED FIELD CATCH VALVE & WELL (GVW) |
| ⊙ PROPOSED GATE VALVE & WELL (GVW) | ⊙ PROPOSED FIELD CATCH VALVE & WELL (TSW) |
| ⊙ PROPOSED TAPPING SLEEVE VALVE & WELL (TSW) | ⊙ UTILITY CROSSING (SEE DATA TABLE) |
| STANDARD BITUMINOUS PAVEMENT | STORM SEWER STRUCTURE |
| HEAVY-DUTY BITUMINOUS PAVEMENT | CB STRUCT. TYPE |
| DEEP-STRENGTH BITUMINOUS PAVEMENT | Z STRUCT. NO. |
| CONCRETE PAVEMENT | 20 |
| CONCRETE SIDEWALK | 10 |
| MILL PAVEMENT | XXX STRUCT. TYPE |



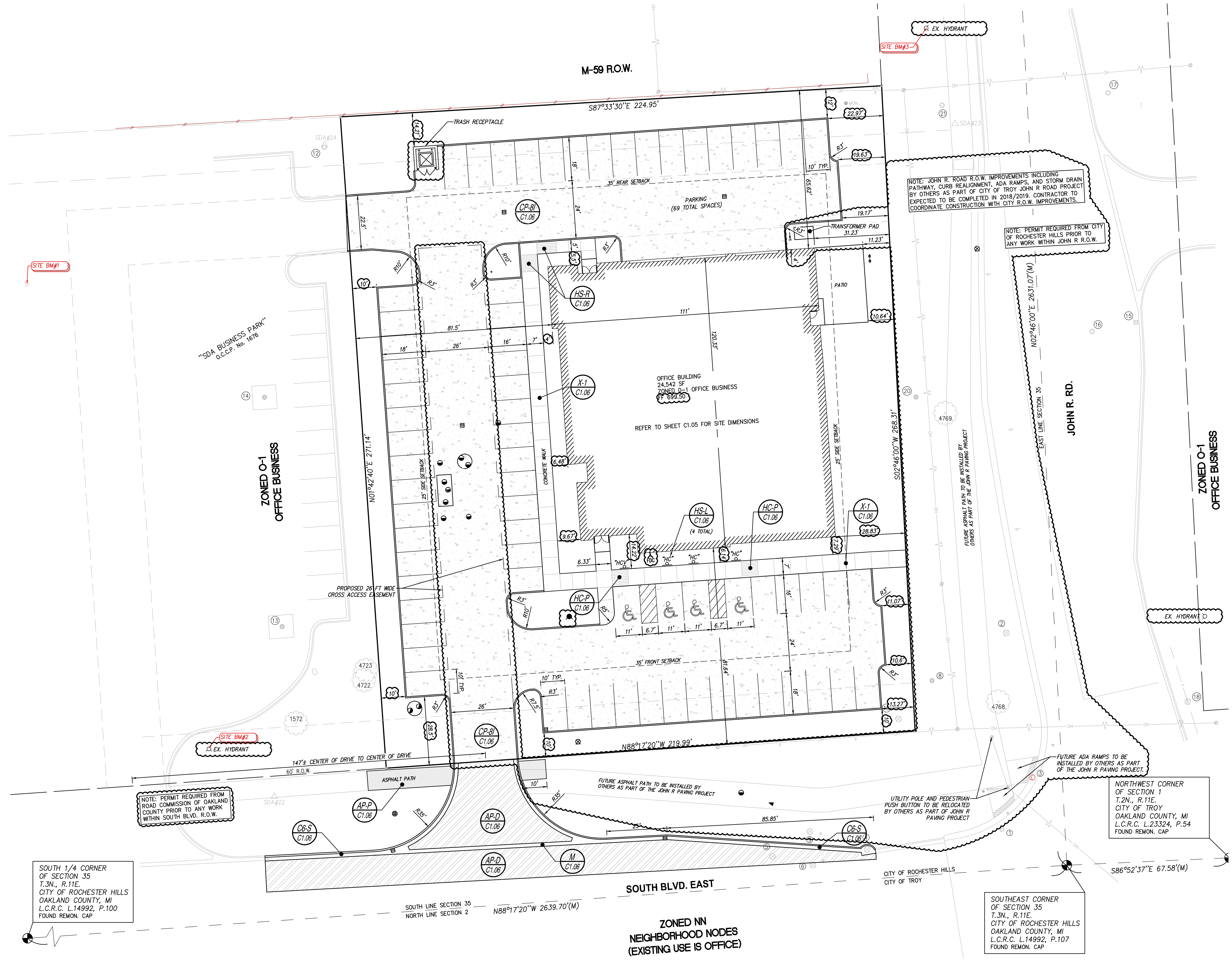
PROPOSED SIGN LEGEND

"HC" - "RESERVED PARKING HANDICAP ONLY" SIGN (R7-B)
"HCV" - "RESERVED PARKING HANDICAP ONLY VAN ACCESSIBLE" SIGNS (R7-B & R7-BA)

ALL SIGNAGE SHALL BE IN ACCORDANCE WITH THE CURRENT M.U.T.C.D. AND THE MDOT TRAFFIC AND SAFETY SIGN SUPPORT STANDARD PLANS.

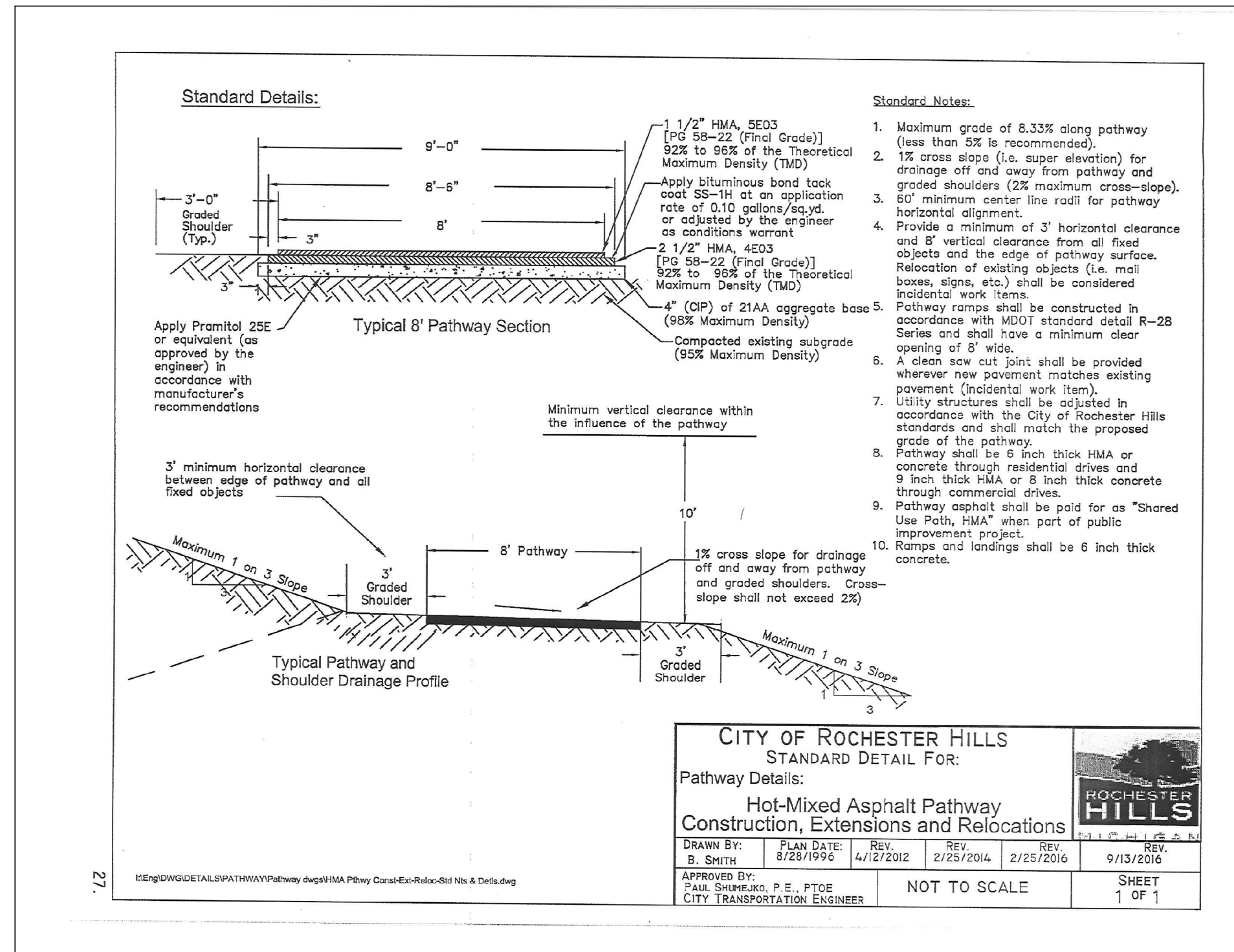
- PAVING CONSTRUCTION NOTES**
- EARTHWORK AND PAVEMENT CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE CURRENT MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION UNLESS OTHERWISE NOTED IN THE FOLLOWING ITEMS.
 - REMOVE ANY EXISTING TOPSOIL, VEGETATION, TREES AND OTHER DELETERIOUS MATERIALS TO EXPOSE THE SUBGRADE SOIL. TREE ROOTS SHALL BE COMPLETELY REMOVED.
 - EXCAVATE TO THE DEPTH OF THE FINAL SUBGRADE ELEVATION TO ALLOW FOR GRADE CHANGES AND THE PLACEMENT OF THE RECOMMENDED PAVEMENT SYSTEM.
 - THE TOP 12 INCHES OF THE EXPOSED SUBGRADE SHALL BE COMPACTED TO A DENSITY NO LESS THAN 95 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY THE MODIFIED PROCTOR (ASTM D 1557-91).
 - THE FINAL SUBGRADE SHALL BE THOROUGHLY PROFFROLLED UNDER THE OBSERVATION OF A GEOTECHNICAL/PAVEMENT ENGINEER. LOOSE OR YIELDING AREAS WHICH CANNOT BE MECHANICALLY STABILIZED SHALL BE REMOVED AND REPLACED WITH ENGINEERED FILL OR AS DICTATED BY FIELD CONDITIONS.
 - THE AGGREGATE BASE SHALL BE COMPACTED TO A DENSITY NO LESS THAN 95 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY THE MODIFIED PROCTOR (ASTM D 1557-91). THE BASE SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND THE PAVED EDGE.
 - ALL BITUMINOUS MATERIAL SHALL BE COMPACTED TO A DENSITY NO LESS THAN 97 PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY THE MARSHALL METHOD.
 - A BOND COAT OF SS-H EMULSION IS REQUIRED BETWEEN THE LEVELING COURSE AND THE WEARING COURSE WHEN EITHER 24 HOURS HAVE ELAPSED BETWEEN PLACEMENT OF THE BITUMINOUS COURSES OR THE SURFACE OF THE PAVEMENT HAS BEEN CONTAMINATED WITH DIRT, DUST, OR FOREIGN MATERIAL. THE BOND COAT SHALL BE APPLIED IN A UNIFORM MANNER OVER THE SURFACE AT A RATE OF 0.1 GALLONS/S.Y. IN THE EVENT A BOND COAT IS NOT REQUIRED, THE LEVELING COURSE MAY REQUIRE LOCALIZED BROOM CLEANING.
 - PERFORMANCE GRADE PG54-22 ASPHALT CEMENT SHALL BE USED IN THE PRODUCTION OF ALL BITUMINOUS MIXTURES. RECLAIMED ASPHALT PAVEMENT (RAP) SHALL BE ALLOWED ONLY AS SPECIFIED BY THE CURRENT MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, UNLESS NOTED ON THE PROJECT DETAILS.
 - CONSTRUCTION TRAFFIC SHALL BE MINIMIZED ON THE NEW PAVEMENT. IF CONSTRUCTION TRAFFIC IS ANTICIPATED ON THE PAVEMENT STRUCTURE, THE PLACEMENT OF THE FINAL FINISH SHALL BE DELAYED UNTIL THE MAJORITY OF THE CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED. THIS ACTION WILL ALLOW REPAIR OF LOCALIZED FAILURE, IF ANY DOES OCCUR, AS WELL AS REDUCE LOAD DAMAGE ON THE PAVEMENT SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR TO ANY DAMAGED SECTION RESULTING FROM CONSTRUCTION ACTIVITY.
 - TAPER CURB HEIGHT DOWN TO ZERO HEIGHT IN FIVE FEET AT ALL CURB ENDINGS UNLESS OTHERWISE NOTED ON THE PLAN.
 - WHERE CURB AND OUTER SECTION IS ADJACENT TO A HANDICAP RAMP, DROP CURB HEIGHT TO MAXIMUM 1/4" ACROSS THE RAMP OPENING.
 - CONTRACTOR SHALL PROTECT EXISTING CURB, SIDEWALK, WALLS, FENCES AND ALL OTHER EXISTING SITE FEATURES NOT INDICATED FOR REMOVAL OR REHABILITATION.
 - PLACE EXPANSION JOINTS WHERE NEW CONCRETE PAVEMENT OR WALKS ABUT BUILDING WALLS (PROPOSED OR EXISTING), CURB, OR EXISTING CONCRETE PAVEMENT. PLACE JOINT SEALANT ON ALL EXPANSION JOINTS.
 - CONTRACTOR TO CONSTRUCT CONTRACTION AND EXPANSION JOINTS IN ALL NEW CONCRETE PAVEMENT. CONTRACTION JOINTS SHALL BE TOoled WHERE SIDEWALK WIDTH IS 8' OR LESS, AND SHALL BE SPACED EQUAL TO THE WIDTH OF THE PAVEMENT (I.E. 8' SPACING FOR 8' WIDE WALK), BUT NOT MORE THAN 10' APART. PLACE EXPANSION JOINTS WITH JOINT SEALANT AT MAXIMUM 50' SPACING. CONTRACTOR SHALL GENERALLY MATCH THE JOINT PATTERNS FOR CONCRETE PAVEMENT WHEN SHOWN ON THE PLANS.
 - WHERE THESE PLANS DIFFER FROM THE STANDARD DETAILS OR STANDARD SPECIFICATIONS OF THE COMMUNITY, THE COMMUNITY REQUIREMENTS SHALL GOVERN.
 - CONCRETE PAVEMENT SHALL MEET THE REQUIREMENTS FOR MOOT GRADE P1 CONCRETE PER THE CURRENT MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

NOT TO BE USED AS CONSTRUCTION DRAWINGS
CITY OF ROCHESTER HILLS FILE NO. 17-048

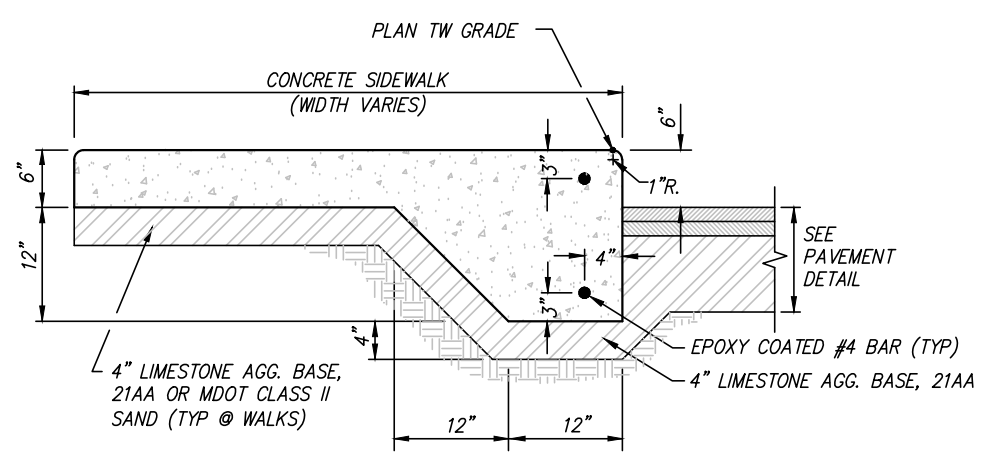


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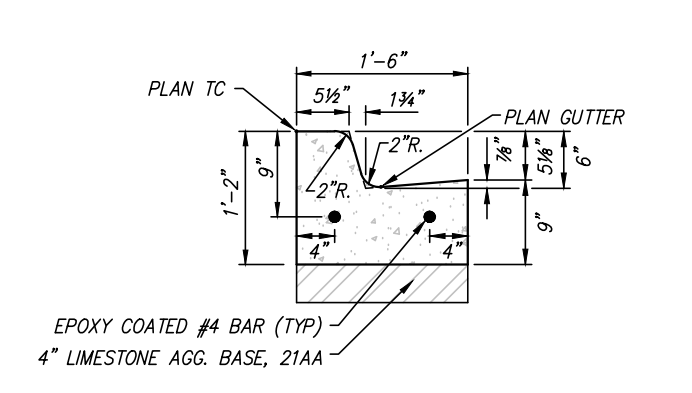
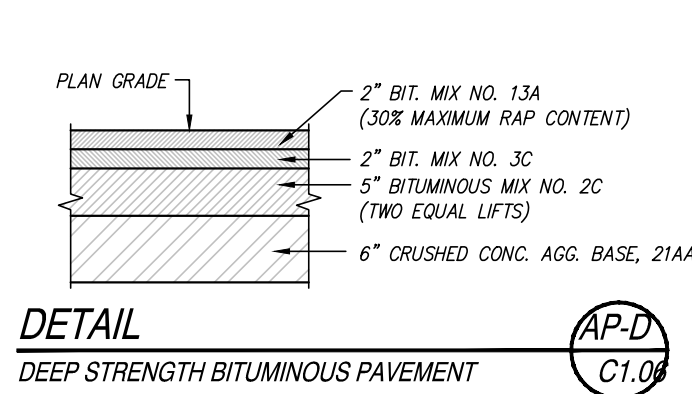
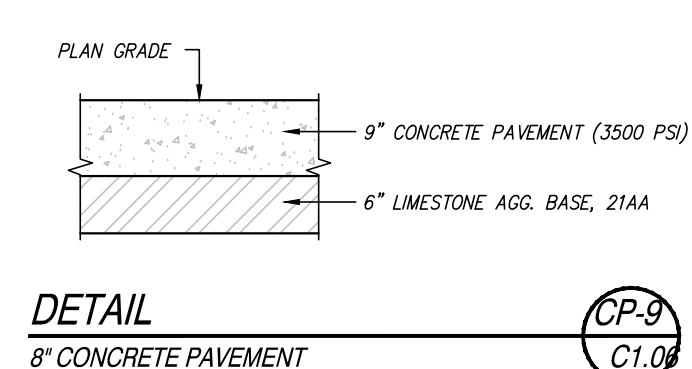
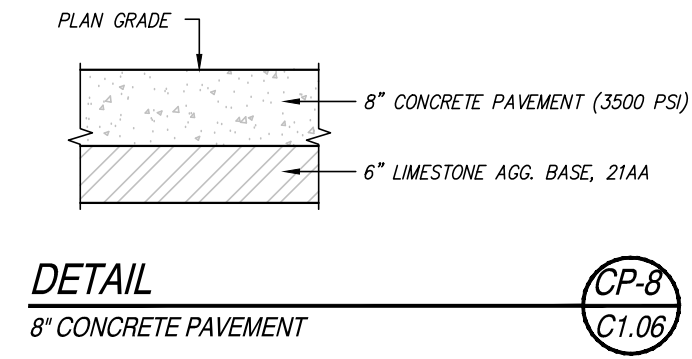
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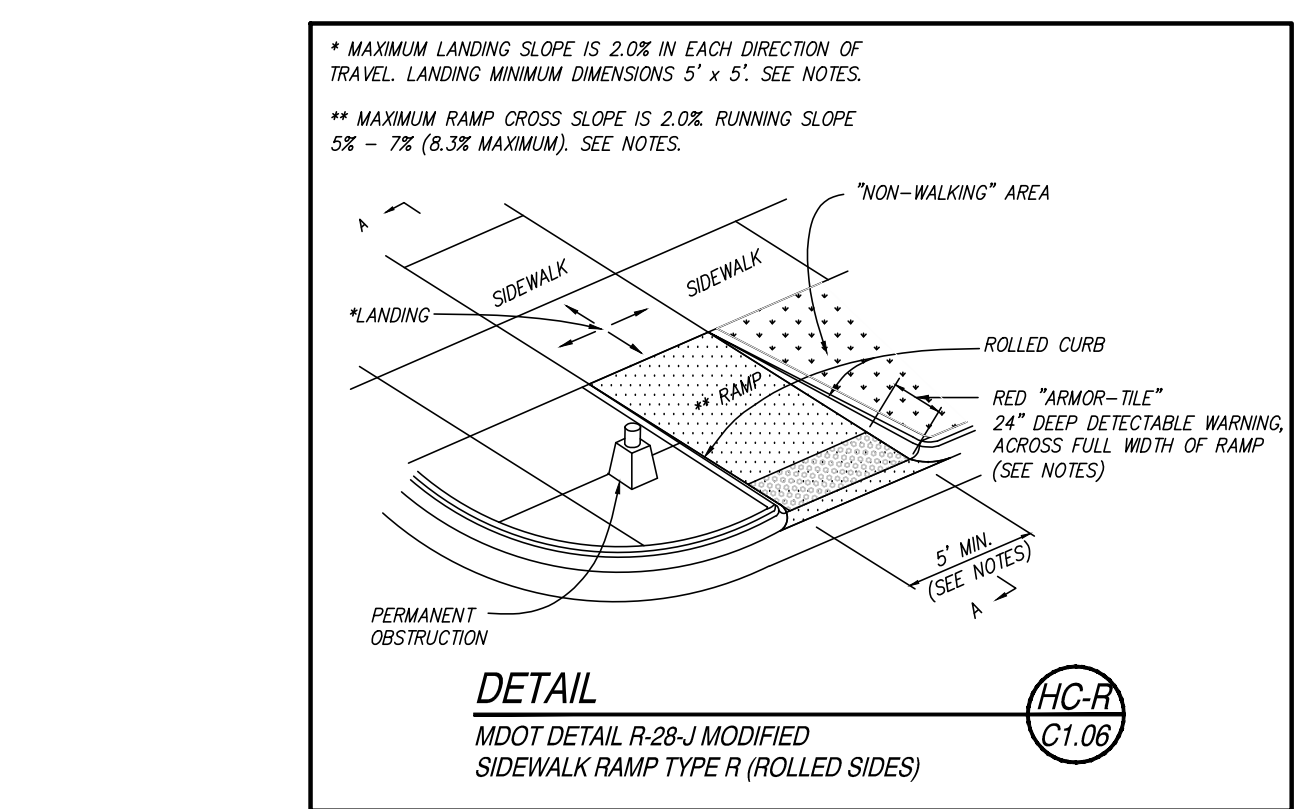
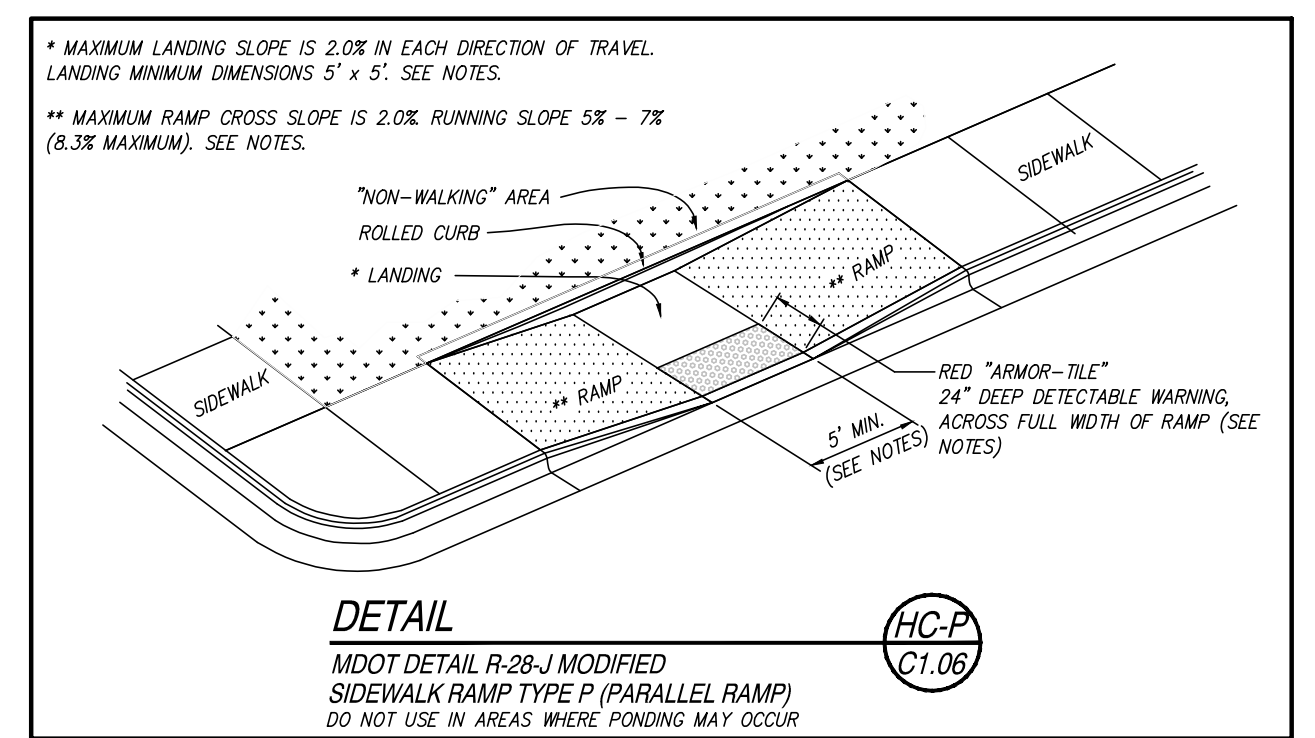
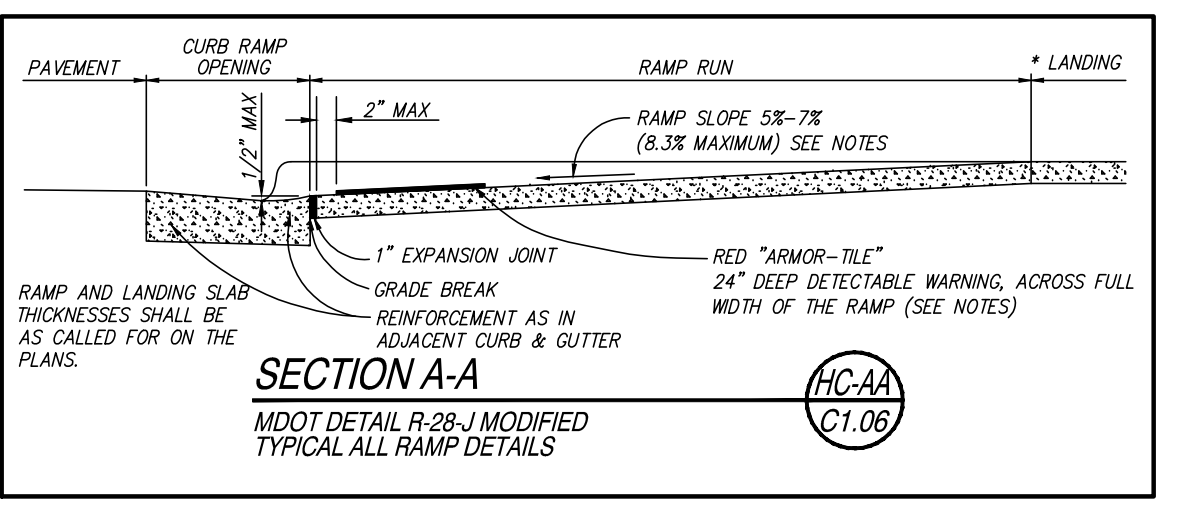
DETAIL
BITUMINOUS PEDESTRIAN PATHWAY
AP-P
C1.06



DETAIL
HANDICAP SIGN DETAIL
HS-L
C1.06



- SIDEWALK RAMP NOTES (MDOT DETAIL R-28-J MODIFIED)**
- DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS BY ALL PUBLIC AGENCIES AND BY ALL PRIVATE ORGANIZATIONS CONSTRUCTING FACILITIES FOR PUBLIC USE.
 - SIDEWALK RAMP ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
 - SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.
 - SIDEWALK SHALL BE RAMPED WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.
 - CARE SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.
 - RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.
 - PROVIDE TURNING SPACES WHERE PEDESTRIAN TURNING MOVEMENTS ARE REQUIRED.
 - WHEN 5' MINIMUM WIDTHS ARE NOT FEASIBLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND TURNING SPACES TO NOT LESS THAN 4' x 4'.
 - CURB RAMPS WITH RUNNING SLOPE EQUAL TO OR LESS THAN 5% DO NOT REQUIRE A TOP LANDING, HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 2% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.
 - DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING CURBED OR FLARED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2" MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE ENDS OF THE RAMP.
 - THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH INCLUDING LANDINGS OR TRANSITIONS.
 - TRANSITION THE GUTTER PAN CROSS SECTION SUCH THAT THE COUNTER SLOPE IN THE DIRECTION OF RAMP TRAVEL IS NOT GREATER THAN 5.0% IN THE AREA OF THE CURB CUT OF THE SIDEWALK RAMP. MAINTAIN THE NORMAL GUTTER PAN CROSS SECTION ACROSS DRAINAGE STRUCTURES.
 - THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.
 - FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.
 - DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING. DETECTABLE WARNING PLATES TO BE RED CAST-IN-PLACE "ARMOR-TILE", OR APPROVED EQUAL, IN ACCORDANCE WITH AAS SECTION 406.13 AND 705, AND ADA CODE OF REGULATION 44.29.



905 South Blvd. East
Rochester Hills, MI 48307
Phone: (248) 844-5400
Fax: (248) 844-5404

400 Renaissance Center, Suite 2600
Detroit, MI 48243
Phone: (313) 309-7051
Fax: (313) 309-7101

39293 Plymouth, Suite 102
Livonia, MI 48150
Phone: (734) 671-4344
Fax: (734) 671-4347

www.sda-eng.com
(800) 598-1600

DEI PROPERTIES
CHRIS COUSINO
12955 23 MILE ROAD
SHELBY TOWNSHIP, MI 48315
(586) 254-4367



NOTE: UTILITY INFORMATION ON THIS DRAWING MAY BE FROM INFORMATION DISCLOSED TO THIS FIRM BY THE VARIOUS UTILITY COMPANIES, CITY/COUNTY AGENCIES AND OTHER VARIOUS SOURCES. UNDERGROUND UTILITIES WHICH ARE ON PRIVATE PROPERTY ARE USUALLY NOT DELINEATED UPON A UTILITY COMPANY'S PUBLISHED PLANS. THEIR LOCATION, IF SHOWN UPON THIS SURVEY, ARE APPROXIMATED FROM FOUND PAINT MARKS/TAKES, ETC. AS LOCATED BY THIS FIRM FROM SOURCES WHICH ARE UNKNOWN. NO GUARANTEE IS GIVEN AS TO THE COMPLETENESS OR ACCURACY THEREOF.

PRIOR TO CONSTRUCTION, ALL LOCATIONS AND DEPTHS OF EXISTING UTILITIES (IN CONFLICT WITH PROPOSED IMPROVEMENTS) SHALL BE VERIFIED IN THE FIELD. CALL MISS DIG 3 WORKING DAYS PRIOR TO CONSTRUCTION.

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SOUTH BOULEVARD OFFICE DEVELOPMENT

ROCHESTER HILLS, MI

PAVING LAYOUT DETAILS

SECTION 35
TOWN 03 NORTH RANGE 11 EAST
ROCHESTER HILLS, MI
OAKLAND COUNTY, MI

| NO. | DATE | REVISION |
|-----|------------|------------------------|
| 1 | 11/15/2017 | OWNER REVIEW |
| 2 | 11/27/2017 | SITE PLAN SUBMISSION |
| 3 | 01/12/2018 | SITE PLAN SUBMISSION 2 |

| DRAFTER | DATE |
|-----------------------------|---------------|
| NAB | 11-15-2017 |
| DESIGNER | DATE |
| NAB | 11-15-2017 |
| CHECKED | DATE |
| TJS | 11-15-2017 |
| PROJECT MANAGER | BID PLAN DATE |
| TJS | |
| DEPARTMENT MANAGER APPROVAL | DATE |
| TJS | |

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET,
ADJUST SCALES ACCORDINGLY

| JOB NO. | DRAWING NO. |
|---------|-------------|
| NP17068 | NP17068SPL |
| SCALE: | SHEET NO. |
| 1"=20' | C1.06 |

NOT TO BE USED AS CONSTRUCTION DRAWINGS
CITY OF ROCHESTER HILLS FILE NO. 17-048

| NO. | DATE | REVISION |
|-----|------------|------------------------|
| 1 | 11/15/2017 | OWNER REVIEW |
| 2 | 11/27/2017 | SITE PLAN SUBMISSION |
| 3 | 01/12/2018 | SITE PLAN SUBMISSION 2 |

| DRAFTER | DATE |
|-----------------------------|---------------|
| NAB | 11-15-2017 |
| DESIGNER | DATE |
| NAB | 11-15-2017 |
| CHECKED | DATE |
| TJS | 11-15-2017 |
| PROJECT MANAGER | BID PLAN DATE |
| TJS | |
| DEPARTMENT MANAGER APPROVAL | DATE |
| TJS | |

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET,
ADJUST SCALES ACCORDINGLY

| JOB NO. | DRAWING NO. |
|---------|-------------|
| NP17068 | NP17068GRD |
| SCALE: | SHEET NO. |
| 1"=20' | C1.07 |

GRADING LEGEND

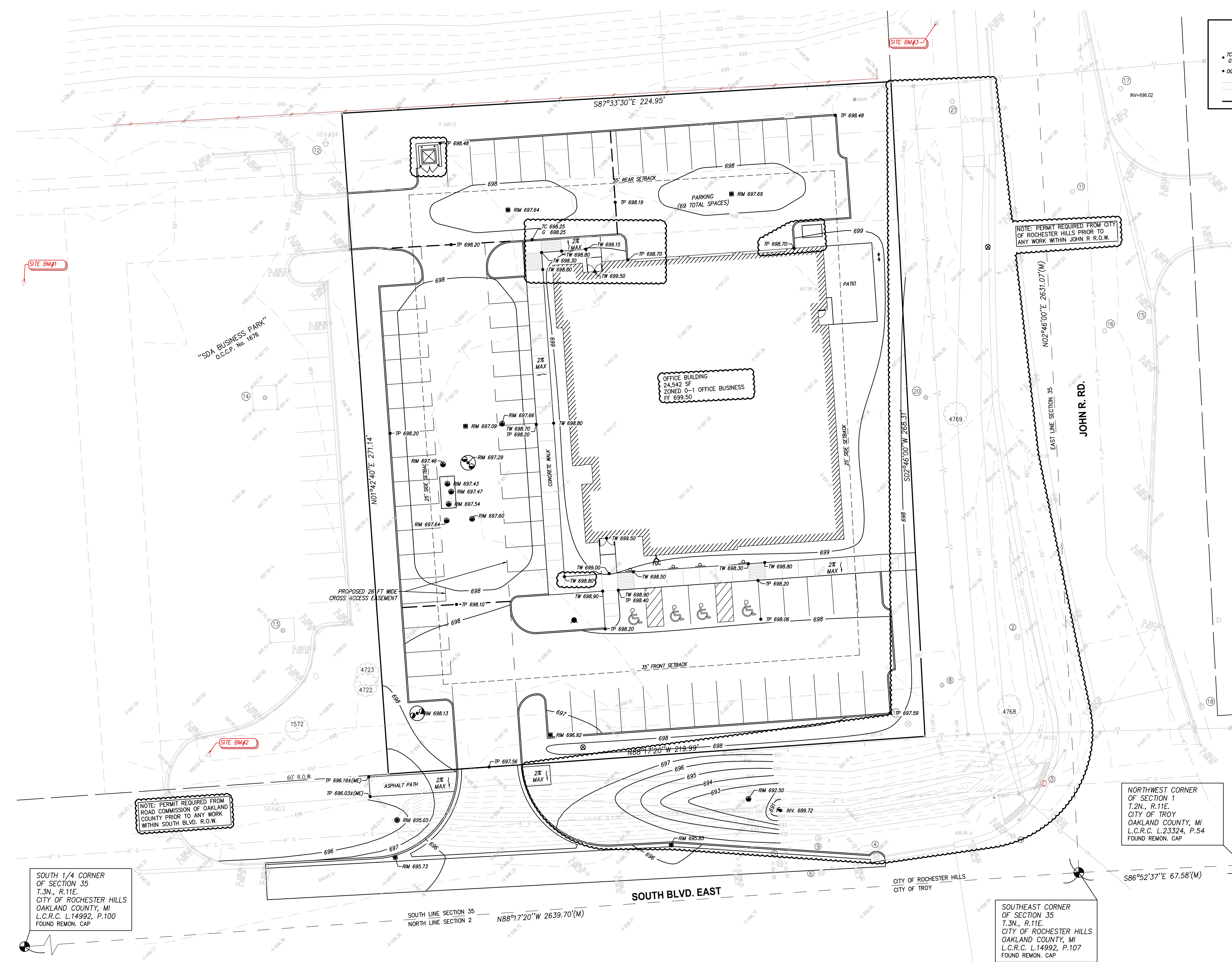
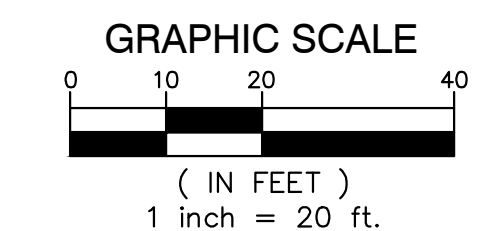
| | |
|-----------------|--------------------------------|
| • TP 000.00 | TOP OF PAVEMENT ELEVATION |
| • TC 000.00 | PROPOSED TOP OF CURB ELEVATION |
| • G 000.00 | PROPOSED GUTTER ELEVATION |
| • OG 000.00 | OUTSIDE GRADE ELEVATION |
| — 11.30 | EXISTING CONTOURS |
| — 11.30 | PROPOSED CONTOURS |
| • TP 000.00 | TOP OF PAVEMENT ELEVATION |
| • TW 000.00 | TOP OF WALK ELEVATION |
| • FG 000.00 | FINISH GRADE ELEVATION |
| • 1/WALL 000.00 | TOP OF WALL ELEVATION |
| • ME 000.00 | MATCH EXISTING ELEVATION |
| — | FLOW ARROW |

LEGEND

| | | | |
|---|--|---|---|
| — | PROPOSED WATERMAIN | ● | PROPOSED SAN MANHOLE (SAN) |
| — | PROPOSED SANITARY | ● | PROPOSED STORM MANHOLE (SM) |
| — | PROPOSED STORM SEWER | ■ | PROPOSED CATCH BASIN (CB) |
| — | PROPOSED GAS MAIN | ■ | PROPOSED INLET (INL) |
| — | PROPOSED ELECTRIC | ■ | PROPOSED END SECTION (ES) |
| ● | PROPOSED HYDRANT | ■ | PROPOSED FIELD CATCH BASIN (FCB) W/BEEHIVE COVER OR STANDPIPE (SP) W/ BAR GRATE COVER |
| ● | PROPOSED GATE VALVE & WELL (GVW) | ○ | PROPOSED FIELD CATCH BASIN (FCB) W/BEEHIVE COVER OR STANDPIPE (SP) W/ BAR GRATE COVER |
| ○ | PROPOSED TAPPING SLEEVE, VALVE & WELL (TSVW) | ○ | UTILITY CROSSING (SEE DATA TABLE) |
| ■ | STANDARD BITUMINOUS PAVEMENT | ○ | CB — STRUCT. TYPE |
| ■ | HEAVY-DUTY BITUMINOUS PAVEMENT | ○ | Z — STRUCT. NO. |
| ■ | DEEP-STRENGTH BITUMINOUS PAVEMENT | ○ | 20 — STRUCT. TYPE |
| ■ | CONCRETE PAVEMENT | ○ | 10 — STRUCT. NO. |
| ■ | CONCRETE SIDEWALK | ○ | XXX — STRUCT. TYPE |
| ■ | MILL PAVEMENT | | |

RESTORATION NOTE
RESTORE ALL NON-PAVED AREAS WITH 3" OF CLEAN TOPSOIL AND SEED MIX (50% KENTUCKY BLUEGRASS, 20% PERENNIAL RYEGRASS, 50% CREEPING RED FESCUE). PLACE MULCH IN ALL SEEDED AREAS ON SLOPES IN EXCESS OF 10 HORIZONTAL TO 1 VERTICAL PLACE NORTH AMERICAN GREEN D5150 MULCH BLANKET IMMEDIATELY AFTER SEEDING. USE METAL STAPLES PER MANUFACTURERS RECOMMENDATIONS TO HOLD MATING IN PLACE.

GRADING NOTE
1. PROPOSED GRADES ARE SOMETIMES BASED ON AN INTERPOLATION OF DATA SHOWN ON THE TOPOGRAPHIC SURVEY. THIS INTERPOLATED DATA IS APPROXIMATE AND COULD DIFFER SLIGHTLY BASED ON THE ACCURACY OF THE SURVEY. CONTRACTOR SHALL CONFIRM THAT THE PROPOSED GRADES SHOWN ON THIS PLAN WILL NOT CREATE A STANDING WATER CONDITION (I.E. A LOW SPOT OR PAVEMENT SLOPES LESS THAN 1%) OR AN UNSAFE CONDITION WITH SLOPES IN EXCESS OF 5%. CONTRACTOR SHALL ADVISE ENGINEER IMMEDIATELY IF THEY BELIEVE THAT ONE OF THESE SITUATIONS WILL OCCUR BASED ON THE PROPOSED GRADES.
2. CONTRACTOR IS RESPONSIBLE FOR CONTROLLING STORMWATER RUNOFF DURING CONSTRUCTION OPERATIONS. PARTICULAR CONCERN WILL BE THE TIME PERIOD AFTER THE SITE HAS BEEN STRIPPED AND NOT YET RESTORED, BUILT UPON, OR PAVED. CONTRACTOR MUST INSTALL OR CONSTRUCT APPROPRIATE TEMPORARY MEASURES TO PROTECT ADJACENT PROPERTIES.

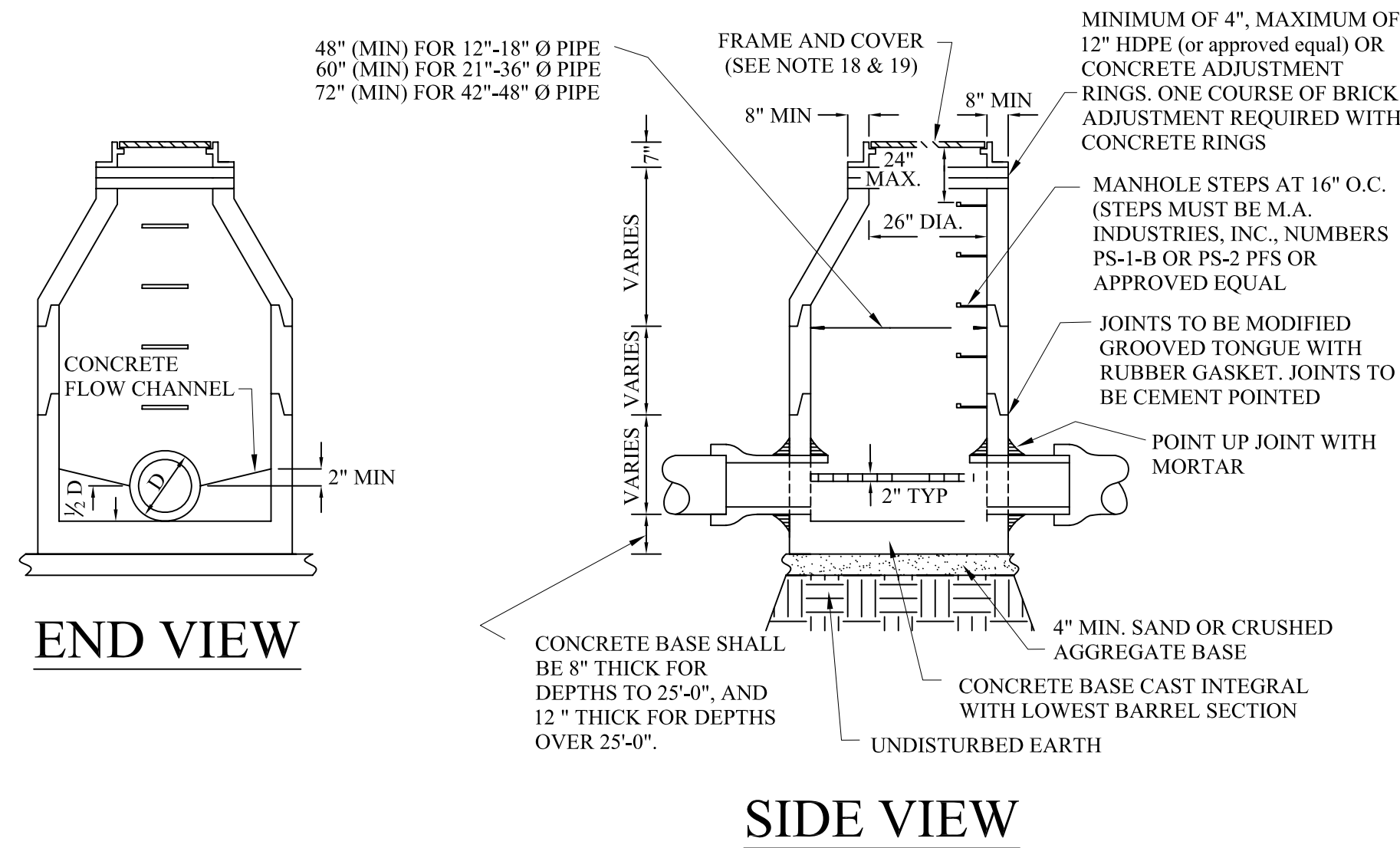


NOTE: PERMIT REQUIRED FROM ROAD COMMISSION OF OAKLAND COUNTY PRIOR TO ANY WORK WITHIN SOUTH BLVD. R.O.W.

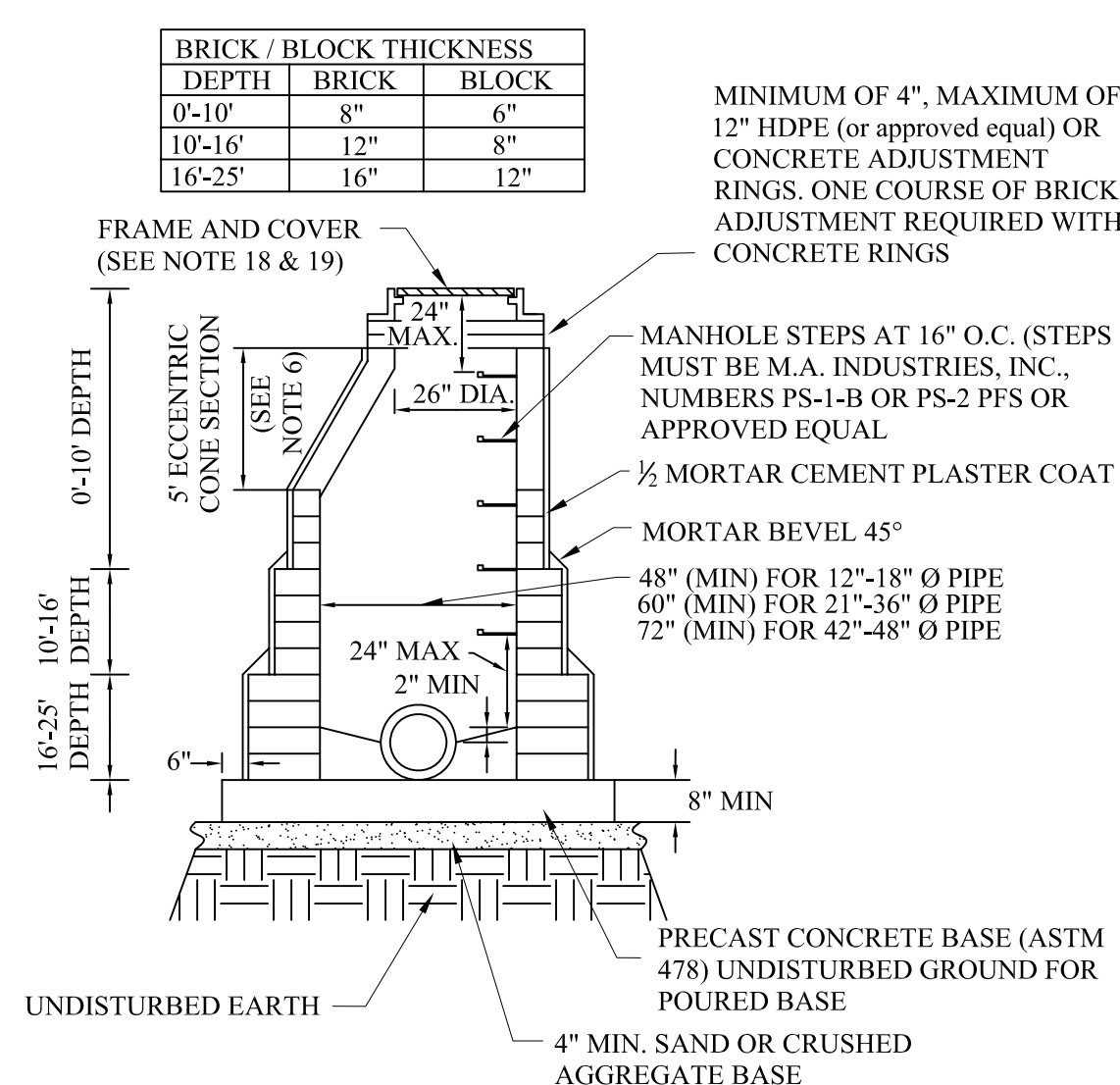
SOUTH 1/4 CORNER OF SECTION 35 T.3N., R.11E. CITY OF ROCHESTER HILLS OAKLAND COUNTY, MI L.C.R.C. L.14992, P.100 FOUND REMON. CAP

NORTHWEST CORNER OF SECTION 1 T.2N., R.11E. CITY OF TROY OAKLAND COUNTY, MI L.C.R.C. L.23324, P.54 FOUND REMON. CAP

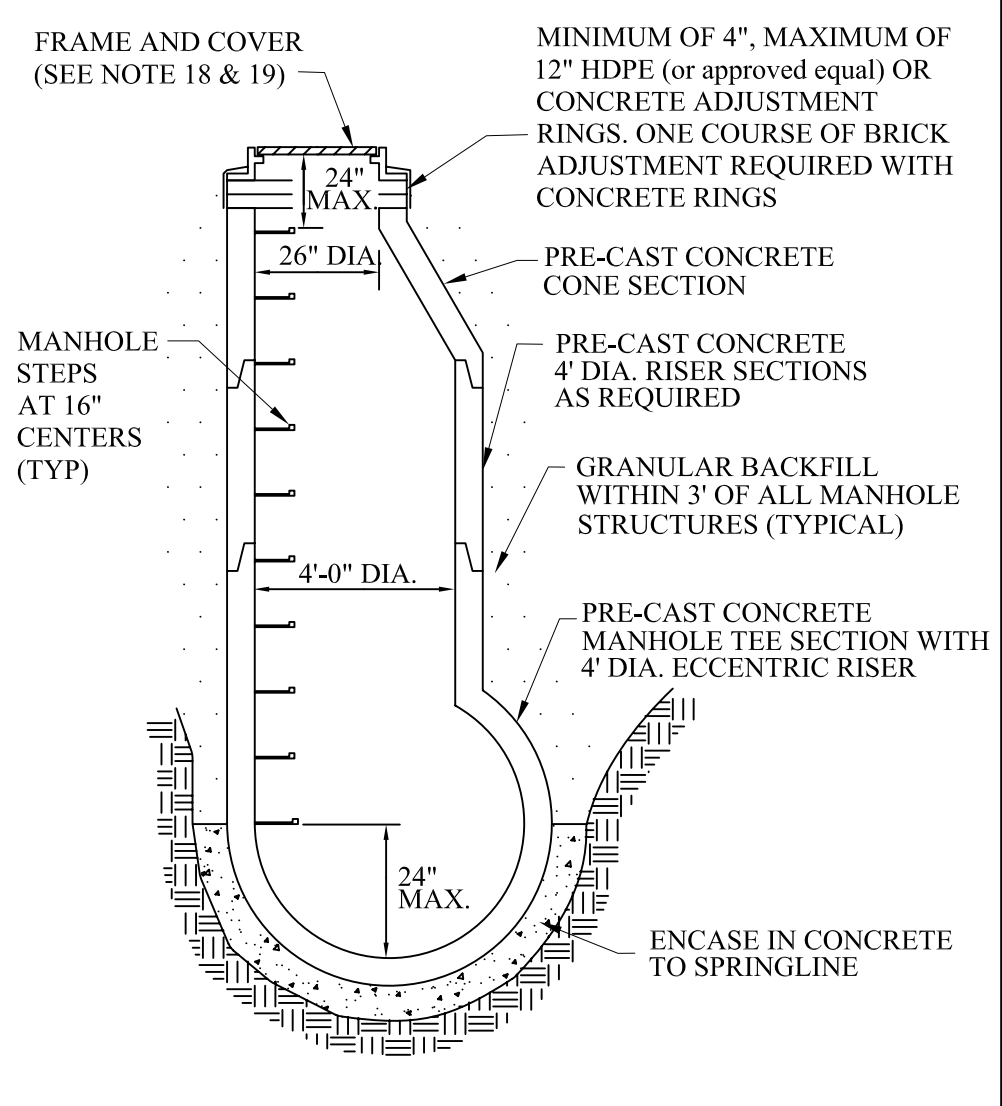
SOUTHEAST CORNER OF SECTION 35 T.3N., R.11E. CITY OF ROCHESTER HILLS OAKLAND COUNTY, MI L.C.R.C. L.14992, P.107 FOUND REMON. CAP



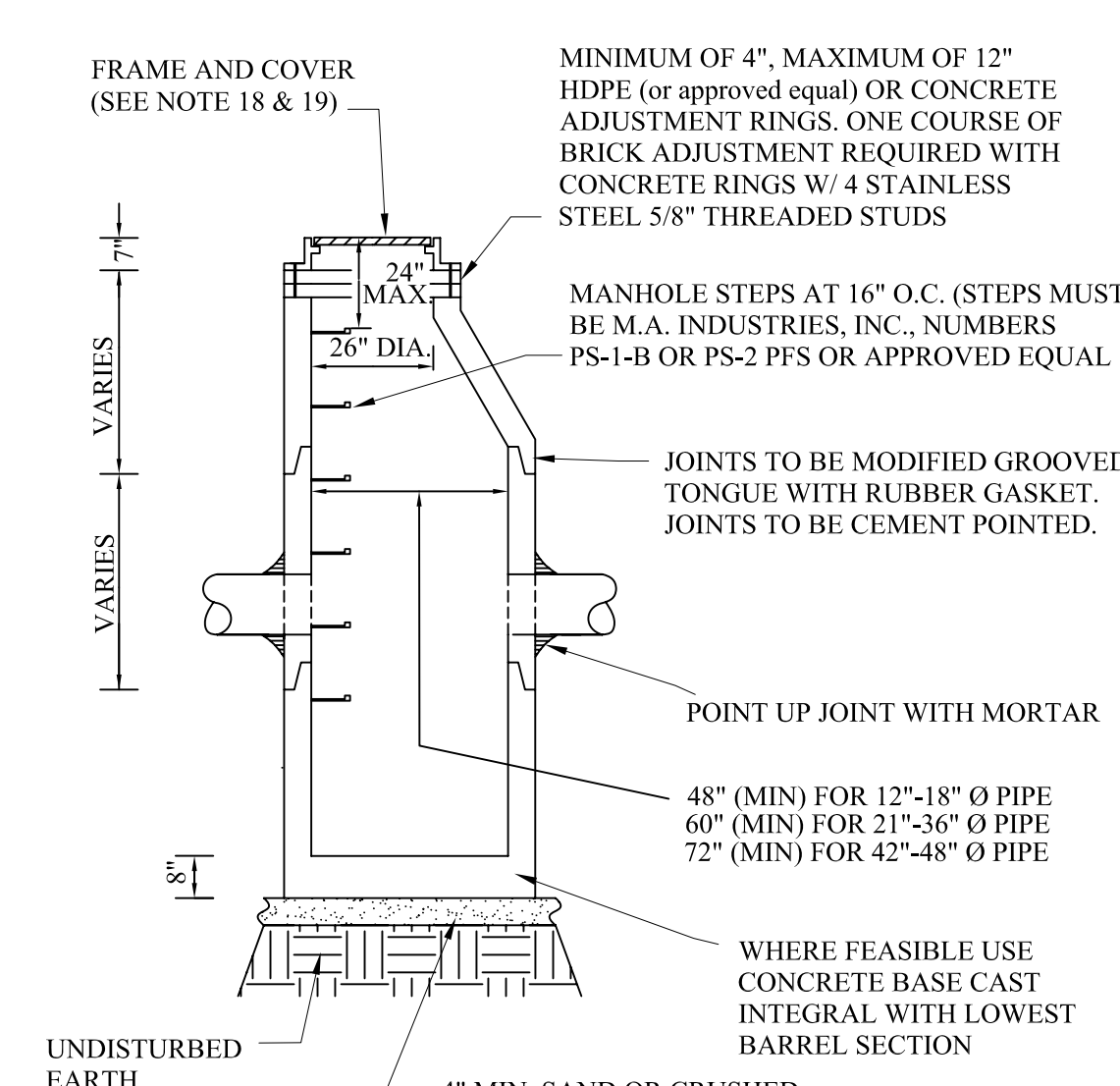
PRE-CAST STORM MANHOLE



BRICK OR BLOCK MANHOLE



PRE-CAST TEE MANHOLE DETAIL



PRECAST STORM CATCH BASIN

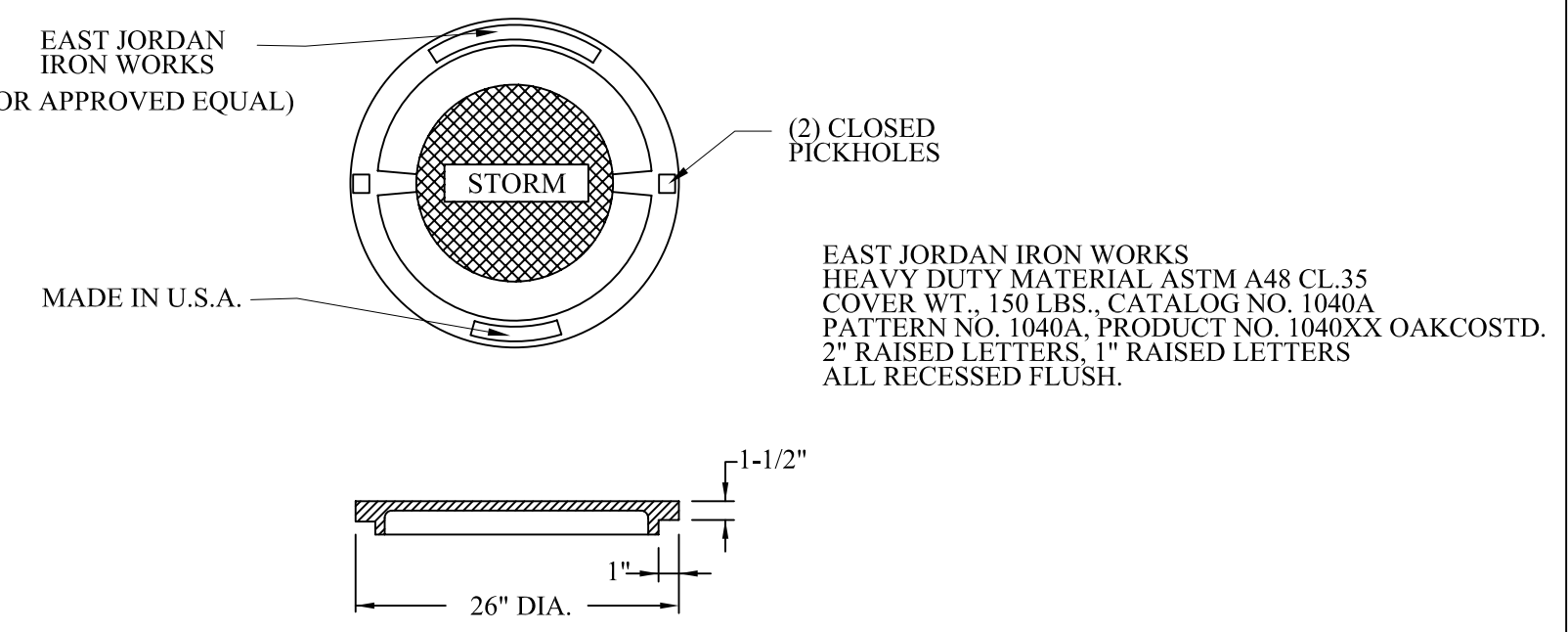
GENERAL NOTES:

- ALL EXISTING AND NEW STORM SYSTEMS SHALL BE CLEANED AND FLUSHED ONCE SITE IS 90% BUILT OUT AND VEGETATED. SEDIMENT, ROCK AND OTHER DEBRIS SHALL BE COLLECTED AND DISPOSED OF IN A PROPER MANNER. IN NO CASE SHALL DEBRIS BE FLUSHED DOWN A STORM OR SANITARY SEWER FOR DISPOSAL. ALL DAMAGED IRRIGATION AND HOUSE DRAINAGE PIPE, DRAIN TILES, SEWER LATERALS AND CULVERTS SHALL BE REPAIRED EXPEDITIOUSLY. DEBRIS COLLECTED SHALL BE DISPOSED IN A COMMERCIAL LANDFILL OR OTHER APPROVED LOCATION.
- STORM SEWER PIPE SHALL BE OF SIZE AND TYPE NOTED ON THE APPROVED PLANS.
- REINFORCED CONCRETE PIPE (RCP) SHALL BE MODIFIED GROOVED TONGUE JOINTS WITH O-RING TYPE RUBBER GASKET, PER ASTM C443.
- ALL CATCH BASIN LEADS AND INLET LEADS SHALL BE ASTM C76-CLASS IV PIPE.
- MINIMUM PIPE SIZE FOR SEWERS, CATCH BASIN LEADS, AND INLET LEADS SHALL BE 12" NOMINAL INTERNAL DIAMETER.
- ECCENTRIC CONES SHALL BE PROVIDED ON ALL STRUCTURES, REGARDLESS OF THE MATERIAL USED. PRECAST REINFORCED CONCRETE MANHOLE, BLOCK, OR BRICK TO PROVIDE A TRUE VERTICAL FACE FOR PLACEMENT OF MANHOLE STEPS.
- THE INSIDE JOINTS OF PIPES SIZES 42" AND LARGER DIAMETER SHALL BE POINTED UP WITH MORTAR UPON COMPLETION OF BACKFILLING OPERATIONS.
- ALL PIPES SHALL HAVE CLASS, LOT NUMBER, AND DATE OF MANUFACTURED CONSPICUOUSLY MARKED ON EACH LENGTH BY MANUFACTURER.
- ALL END SECTIONS 18" AND LARGER SHALL BE PROVIDED WITH A GALVANIZED BAR SCREEN.
- PRECAST REINFORCED CONCRETE SECTIONS SHALL CONFORM TO ASTM 2478.
- IN DRY, STABLE SOILS, PEASTONE (EQUIVALENT TO M.D.O.T. 34R SPECIFICATIONS) MAY BE SUBSTITUTED FOR THE STANDARD BEDDING, IF THE TRENCH IS WET OR UNSTABLE A GEOTEXTILE FABRIC MUST BE USED TO LINE THE TRENCH PRIOR TO THE PLACEMENT OF THE 2NS SAND, PEASTONE, OR 1/4" - 1/2" ANGULAR GRADED STONE.
- SCHEDULE INSPECTIONS 48 HOURS PRIOR TO START OF CONSTRUCTION BY CALLING THE CITY'S INSPECTION LINE AT 248-841-2510. FULL TIME INSPECTION SHALL BE REQUIRED FOR ALL UNDERGROUND STORM SEWER CONSTRUCTION.
- THE CONTRACTOR SHALL CONTACT MISS DIG 72 HOURS BEFORE CONSTRUCTION AT (811) TO LOCATE EXISTING UNDERGROUND UTILITIES.
- PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL HAVE IN HIS POSSESSION A CURRENT SOIL EROSION CONTROL PERMIT AS ISSUED BY THE O.C.D.C.
- MINIMUM SUMP DEPTH IS 2' FOR CATCH BASINS.
- A FLOATABLE TRAP IS REQUIRED FOR THE OUTLET, IN ACCORDANCE WITH CURRENT CITY OF ROCHESTER HILLS DESIGN STANDARDS.
- AS A MEANS OF INSURING PROPER INSTALLATION OF THE STORM SEWER PIPE, AT THE DISCRETION OF THE CITY ENGINEER, THE CONTRACTOR SHALL VIDEO INSPECT, ACCORDING TO THE CITY OF ROCHESTER HILLS VIDEO INSPECTION STANDARDS, 100% OF THE STORM SEWER PIPE 12" AND LARGER IN DIAMETER. IF VIDEO INSPECTION IS REQUIRED BY THE CITY ENGINEER THE CONTRACTOR SHALL PROVIDE 24 HOURS NOTICE TO THE CITY OF ROCHESTER HILLS PRIOR TO VIDEO INSPECTION, SO A REPRESENTATIVE MAY BE PRESENT. ROCHESTER HILLS WILL BE PROVIDED WITH A DIGITAL COPY OF THE VIDEO INSPECTION AND LOG IN ACCORDANCE WITH THE CITY OF ROCHESTER HILLS VIDEO INSPECTION STANDARDS.

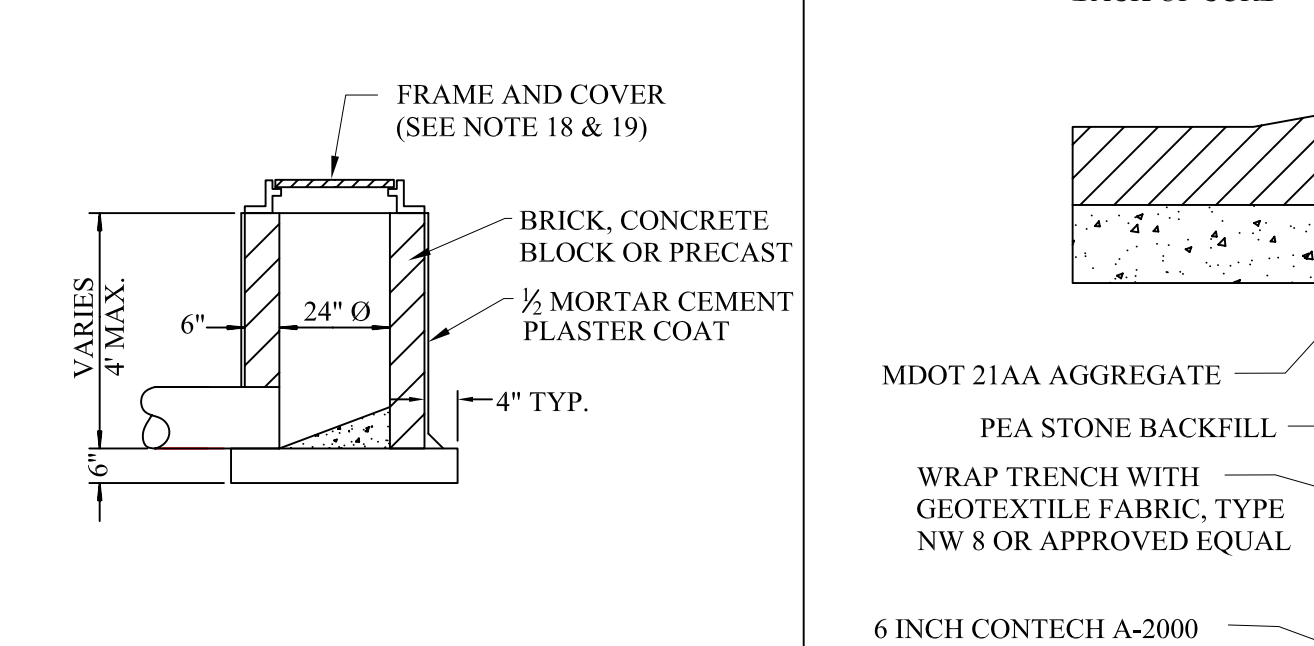
- PROJECTS THAT THE CITY ENGINEER MAY IMPOSE THESE REQUIREMENTS ARE:
- ALL PUBLIC PROJECTS OR PROJECTS BEING CONSTRUCTED ON PUBLIC PROPERTY.
 - ANY PROJECT INVOLVING A DEVELOPMENT, SUBDIVISION, SITE CONDOMINIUM, CONDOMINIUM, OR ASSOCIATION.
 - ANY PROJECT THAT WILL RESULT IN MORE THEN ONE OWNER RESPONSIBLE FOR THE OPERATION AND MAINTENANCE OF THE COMPLETE STORM DRAINAGE SYSTEM

COVERS FOR MANHOLES, CATCH BASINS, AND INLETS

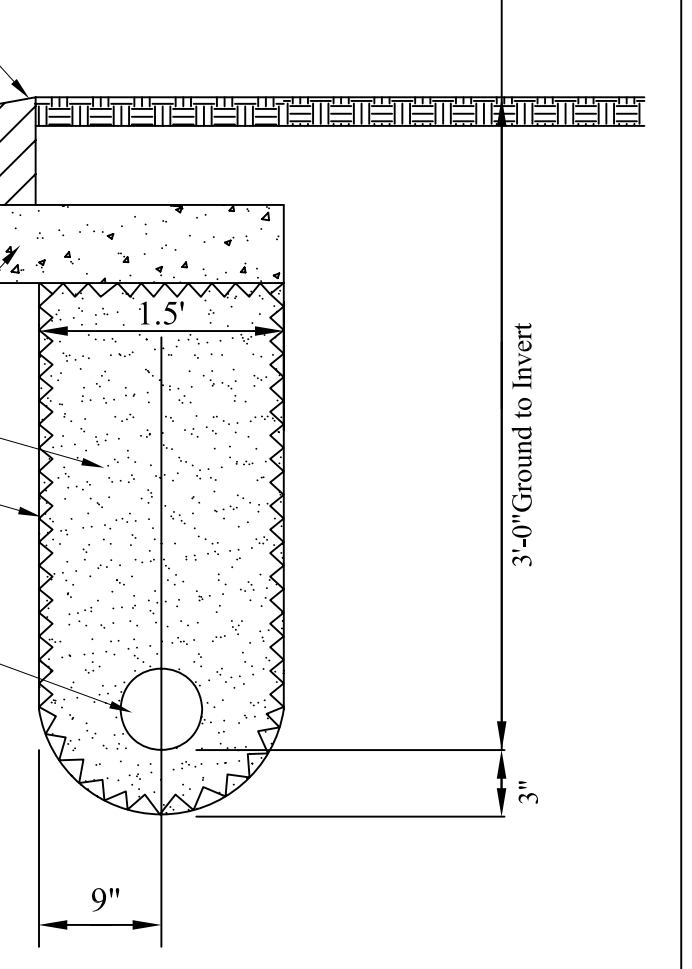
- MANHOLE FRAME AND COVER SHALL BE EIHW 1040, TYPE A COVER OR EQUIVALENT.
 - CATCH BASINS AND INLET FRAME AND COVER SHALL BE AS FOLLOWS:
 - EIHW 7045 WITH TYPE M1 GRATE AND 7050 T1 BACK, OR EQUAL, FOR USE WITH CONCRETE CURB AND GUTTER, (STRAIGHT CURB/ M.D.O.T. F CURB) AND WITH CONCRETE PAVEMENT WITH INTEGRAL CURB.
 - EIHW 7085 WITH TYPE M1 GRATE OR EQUAL, FOR USE WITH CONCRETE B-2 MODIFIED MODIFIED CURB AND GUTTER, AND WITH CONCRETE WITH B-2 MODIFIED INTEGRAL CURB.
 - EIHW 7065 WITH TYPE M1 GRATE AND 7060 T1 BACK, OR EQUAL, FOR USE WITH MOUNTABLE CURB AND GUTTER, AND WITH CONCRETE PAVEMENT WITH MOUNTABLE INTEGRAL CURB.
 - EIHW FRAME 1040 WITH TYPE N OVAL GRATE OR TYPE 02 BEEHIVE GRATE, OR EQUAL, FOR USE ON OPEN DITCH STRUCTURES AND ON CATCH BASINS LOCATED IN SWALES, AND IN EASEMENTS OUTSIDE THE PUBLIC STREET RIGHT-OF-WAY.
 - EIHW FRAME 7030 WITH TYPE M6 VANE GRATE AND T1 BACK, OR EQUAL, FOR USE WITH RELIEF BASINS WHICH ARE ON LONGITUDINAL ROAD SLOPES OF 4% OR GREATER.
 - EIHW FRAME 5105 WITH TYPE M1 SINUSOIDAL GRATE, OR EQUAL, FOR USE IN NON-CURB PAVEMENT AREAS.
- NOTE: COVERS MUST HAVE THE "DUMP NO WASTE! DRAINS TO WATERWAY" LETTERING (WHEN APPLICABLE).



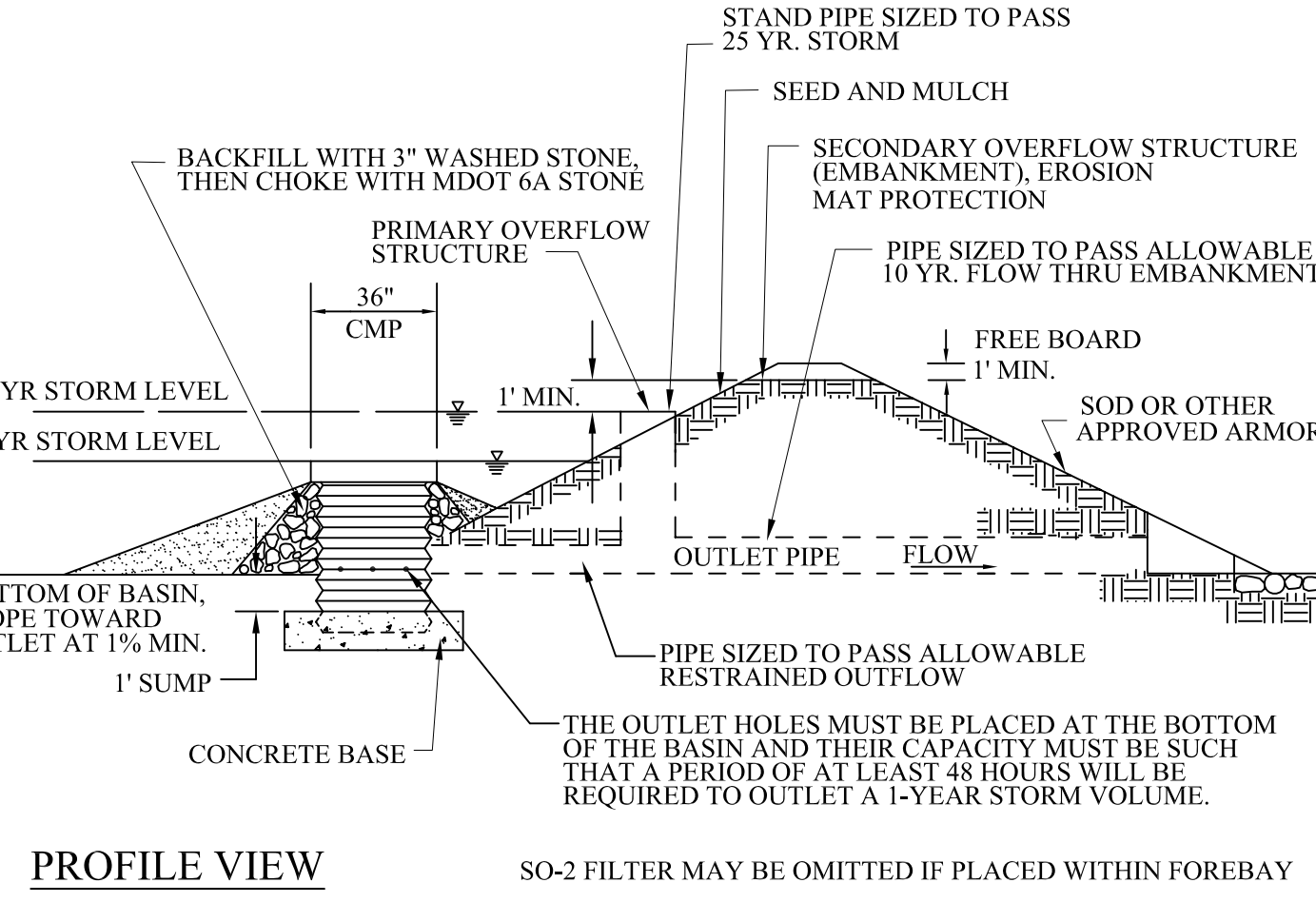
LETTERED MANHOLE COVER



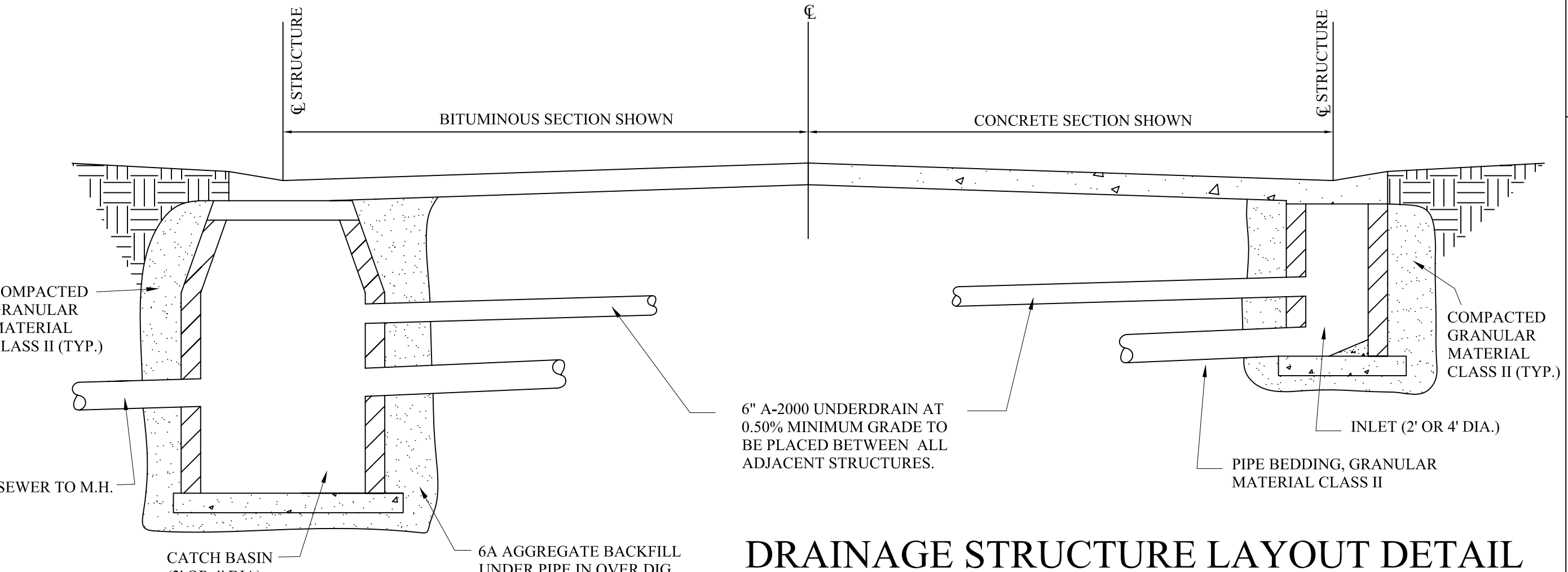
INLET DETAIL



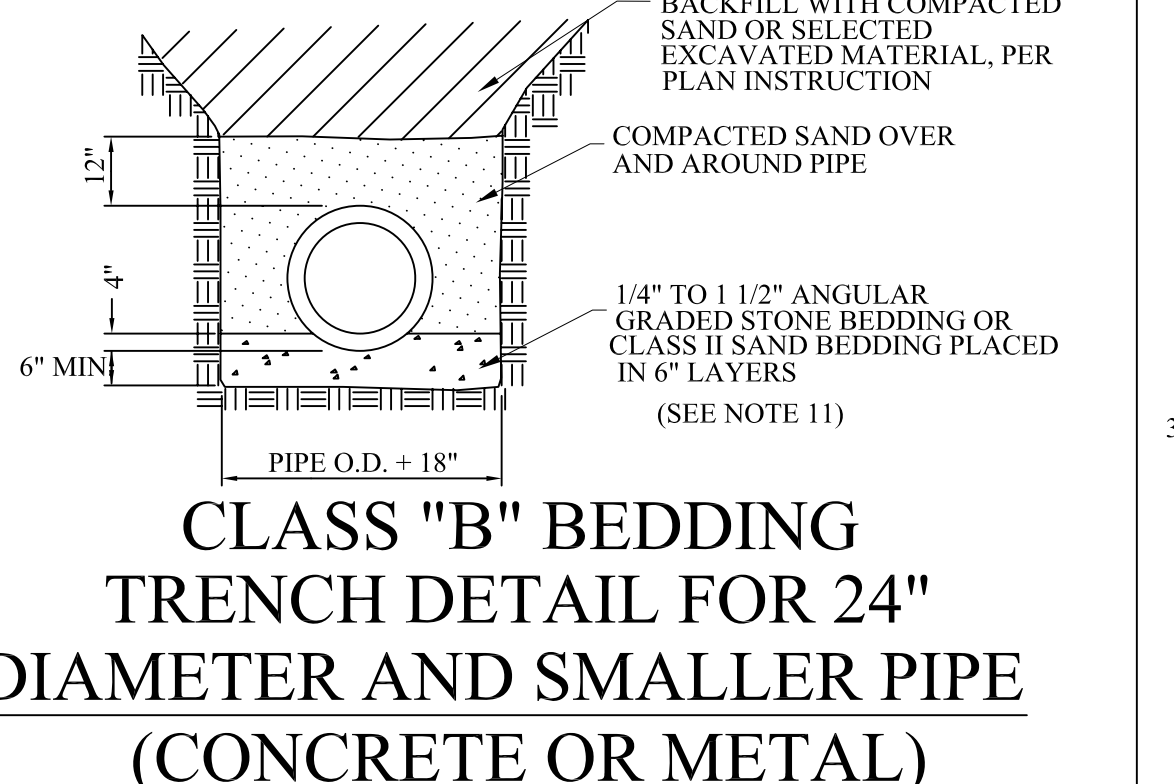
EDGE DRAIN DETAIL FOR PUBLIC AND PRIVATE ROADS



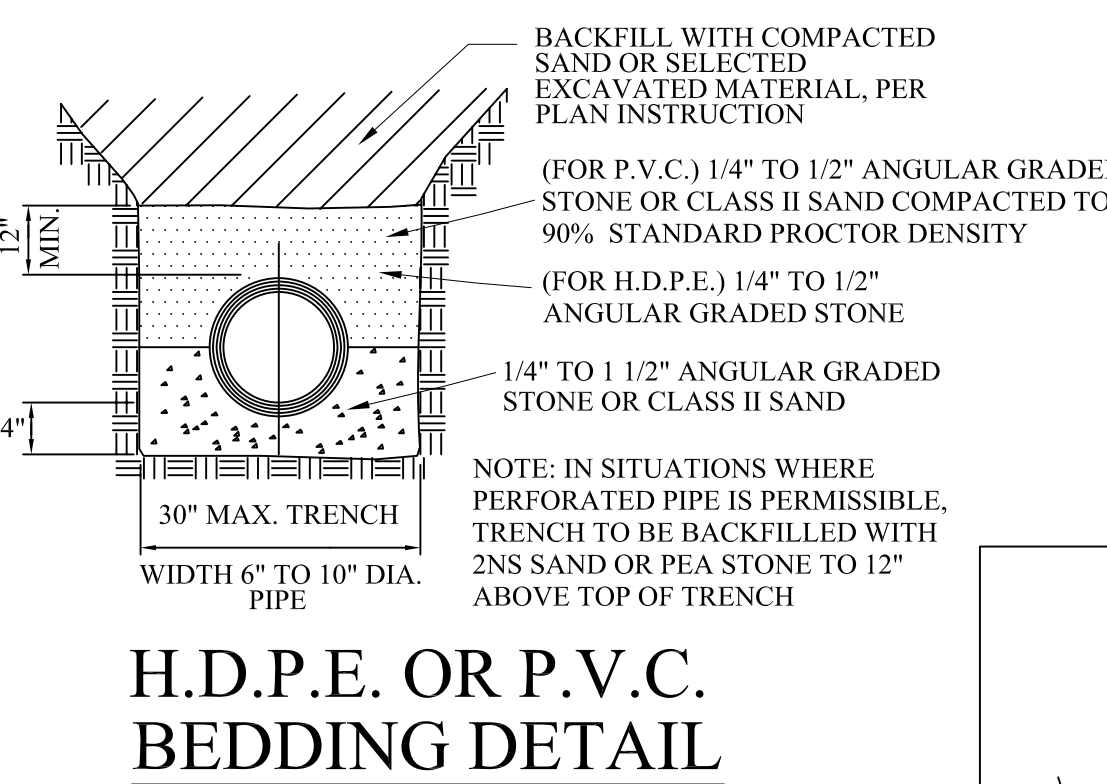
SO-2 DETENTION BASIN OUTLET FILTER (CMP)
(SEE OCDC STANDARD DETAILS FOR SEDIMENT BASIN OR FOREBAY OUTLET STRUCTURE)



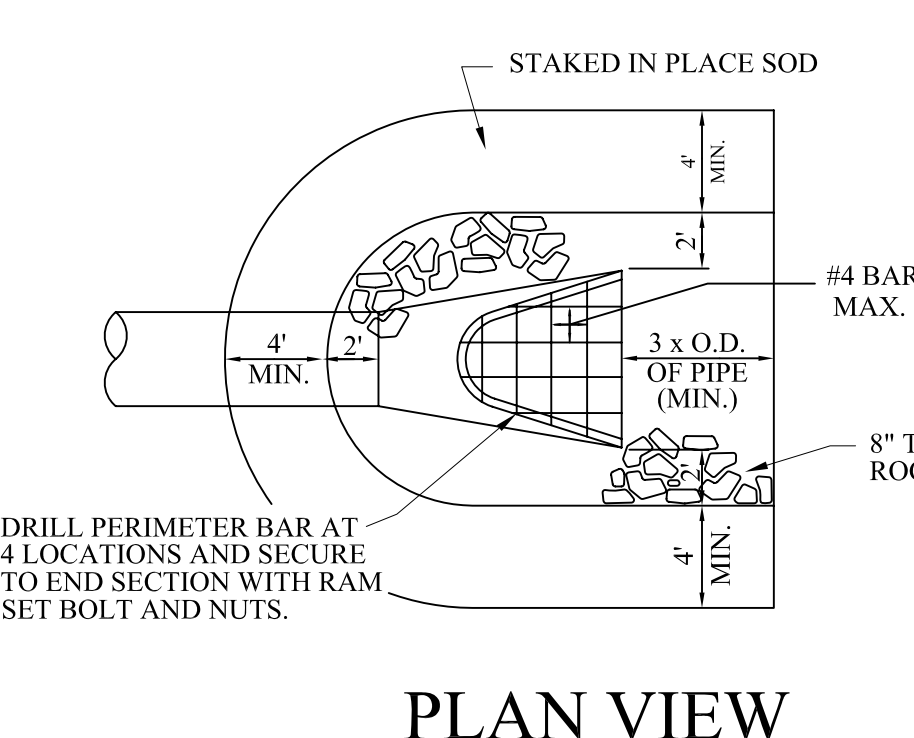
DRAINAGE STRUCTURE LAYOUT DETAIL



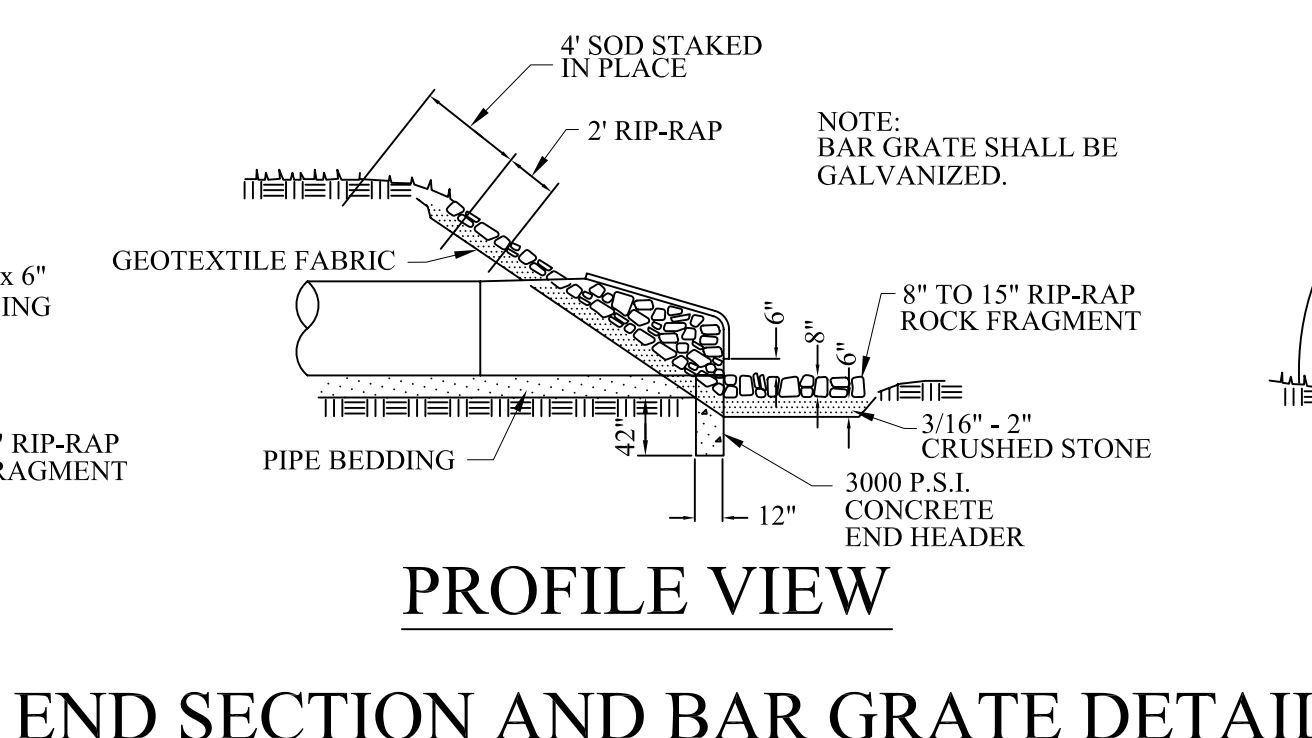
CLASS "B" BEDDING TRENCH DETAIL FOR 24" DIAMETER AND SMALLER PIPE (CONCRETE OR METAL)



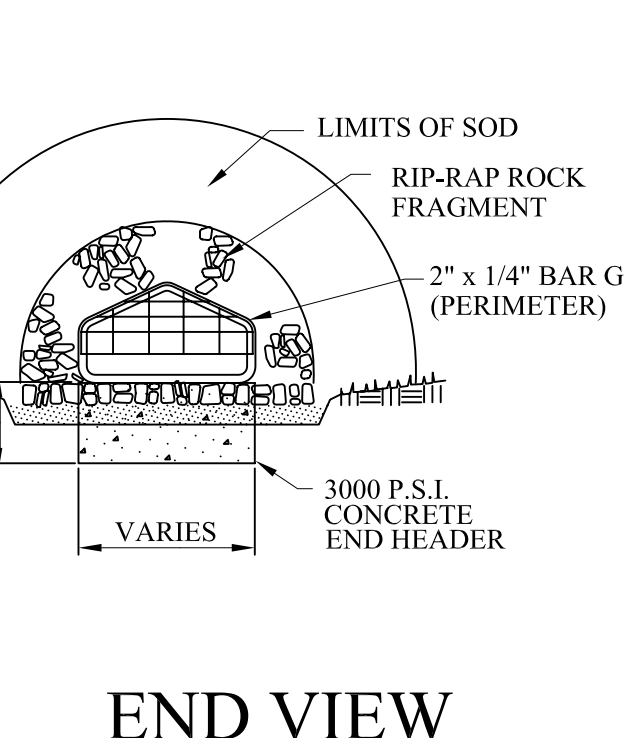
H.D.P.E. OR P.V.C. BEDDING DETAIL



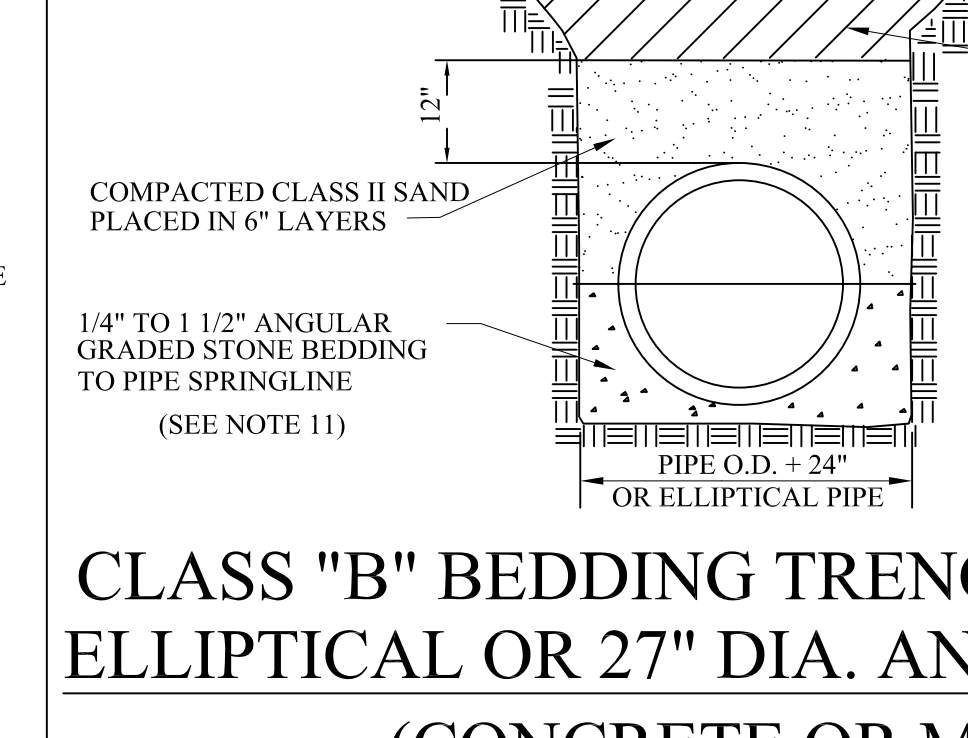
PLAN VIEW



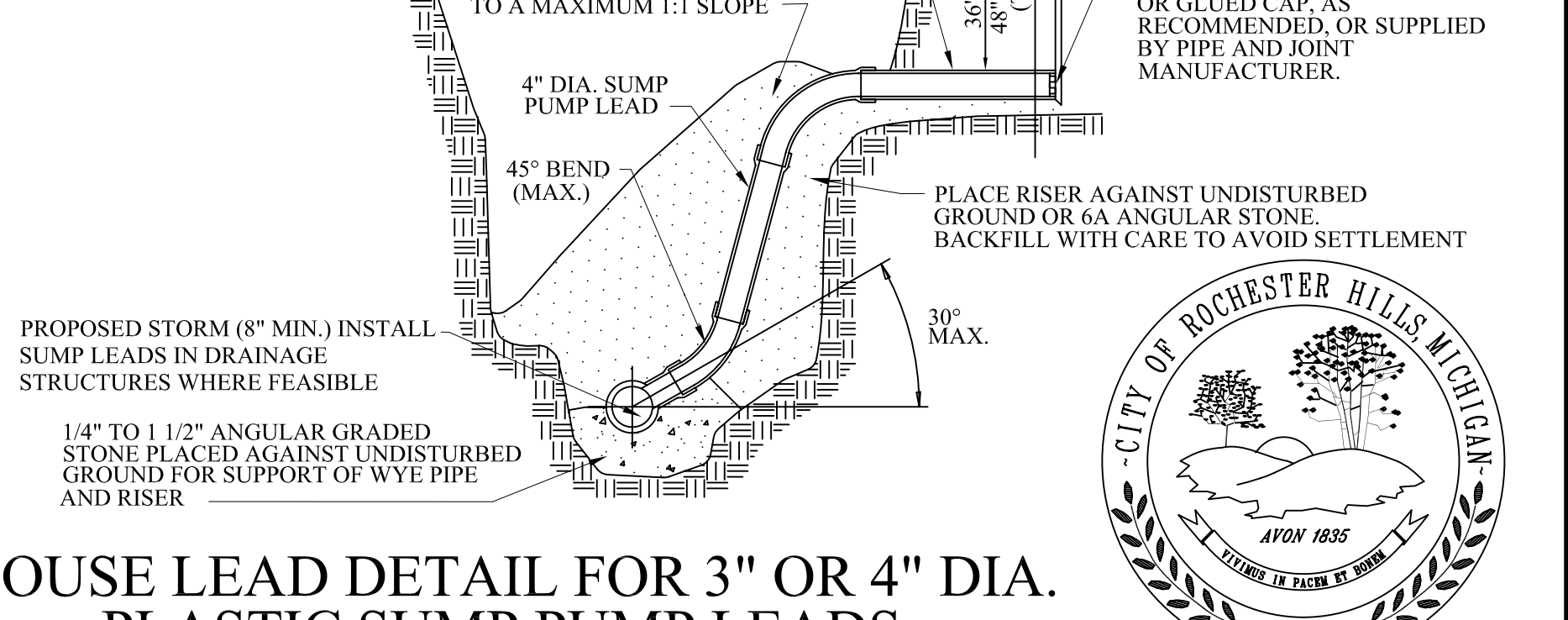
END SECTION AND BAR GRATE DETAIL



END VIEW



CLASS "B" BEDDING TRENCH DETAIL FOR ELLIPTICAL OR 27" DIA. AND LARGER PIPE (CONCRETE OR METAL)



HOUSE LEAD DETAIL FOR 3" OR 4" DIA. PLASTIC SUMP PUMP LEADS



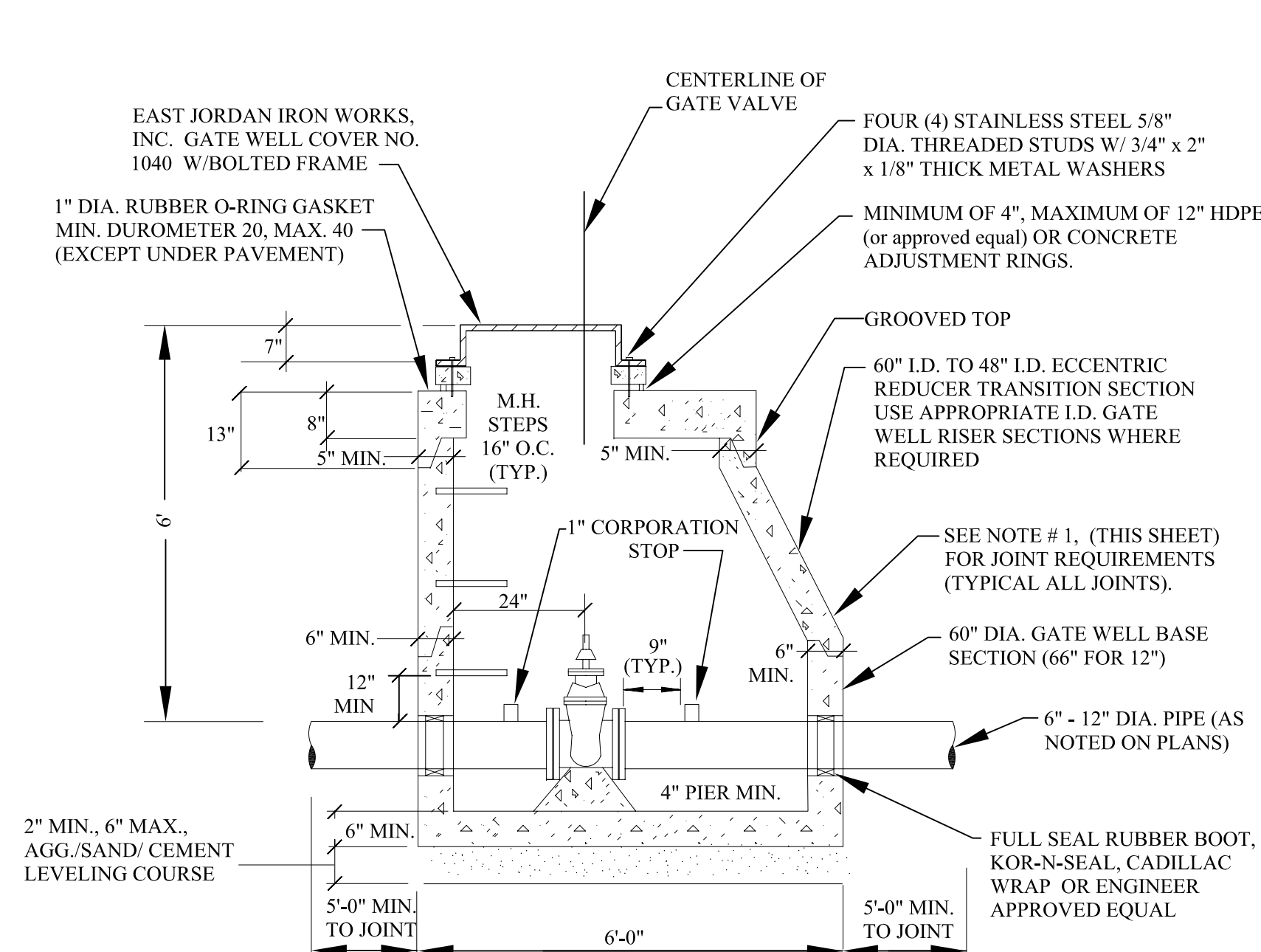
| REVISIONS | DATE | APPROVED BY |
|-------------------|---------|---|
| Edge Drain Detail | 11-7-12 | CITY COUNCIL, DATE: JULY 21, 2008 |
| | | PREPARED BY ENGINEERING DIVISION DEPARTMENT OF PUBLIC SERVICES |

NOTIFY ROCHESTER HILLS ENGINEERING DEPARTMENT @ 248-841-2510 48 HRS. PRIOR TO START OF CONSTRUCTION

City of Rochester Hills
1000 Rochester Hills Drive, Rochester Hills, Michigan 48309

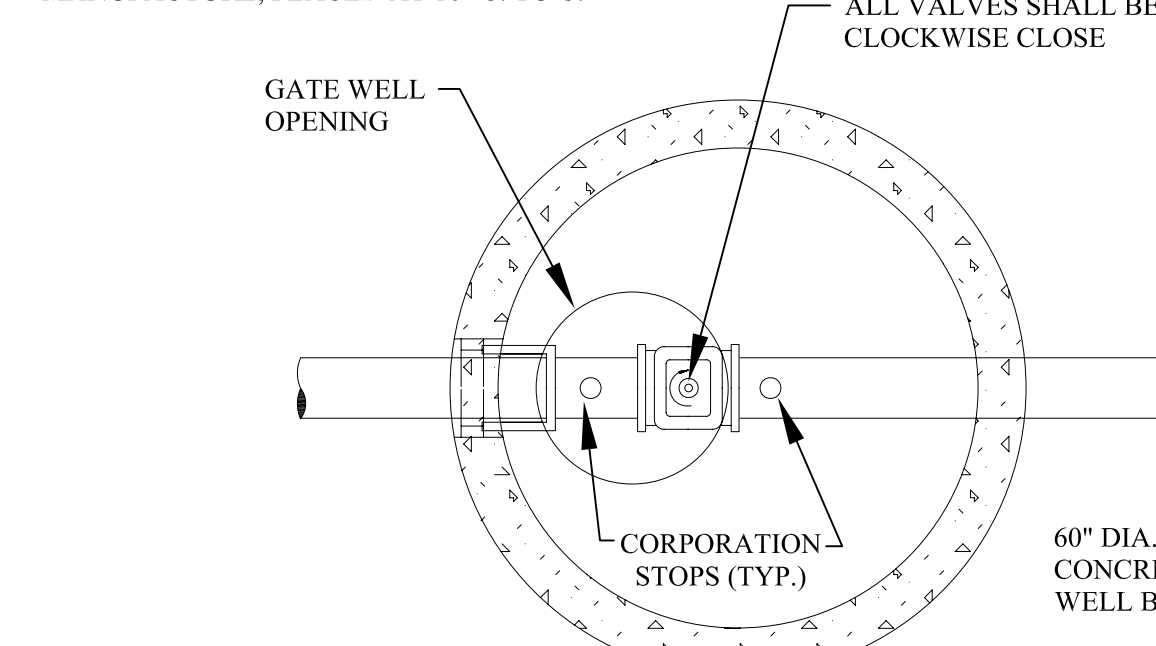
STORM SYSTEM STANDARD DETAILS

| | |
|--------------|-----------------|
| NOT TO SCALE | DATE: 7/21/2008 |
| SHEET 1 OF 1 | |

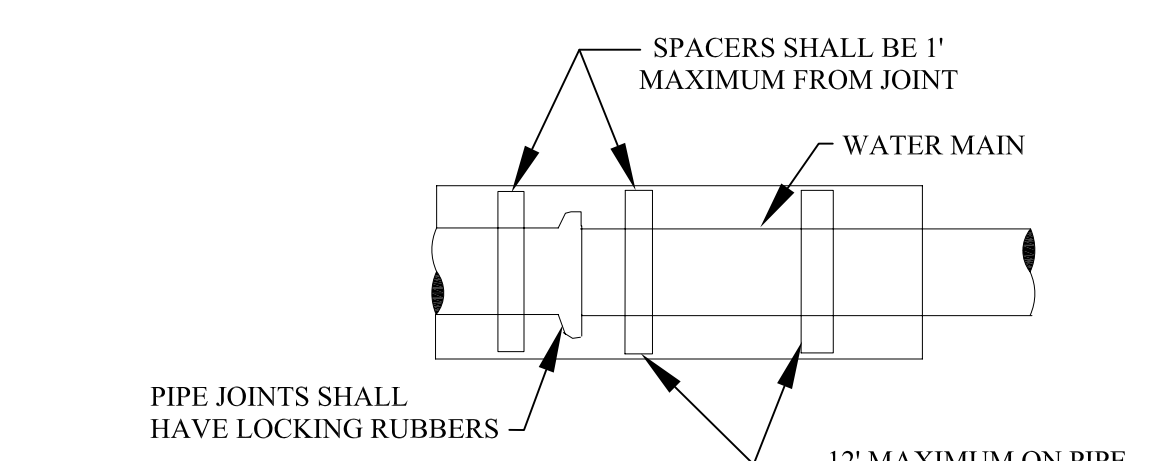


ALL GATE WELLS

MANHOLE STEPS TO BE PLASTIC COATED STEEL MEETING THE REQUIREMENTS IN ASTM D 2146, TYPE II, GRADE 49108. MA INDUSTRIES P.S.I. POLYPROPYLENE OR APPROVED EQUAL. STEPS TO BE INSTALLED DURING MANHOLE MANUFACTURE, PLACED AT 16" C. TO C.



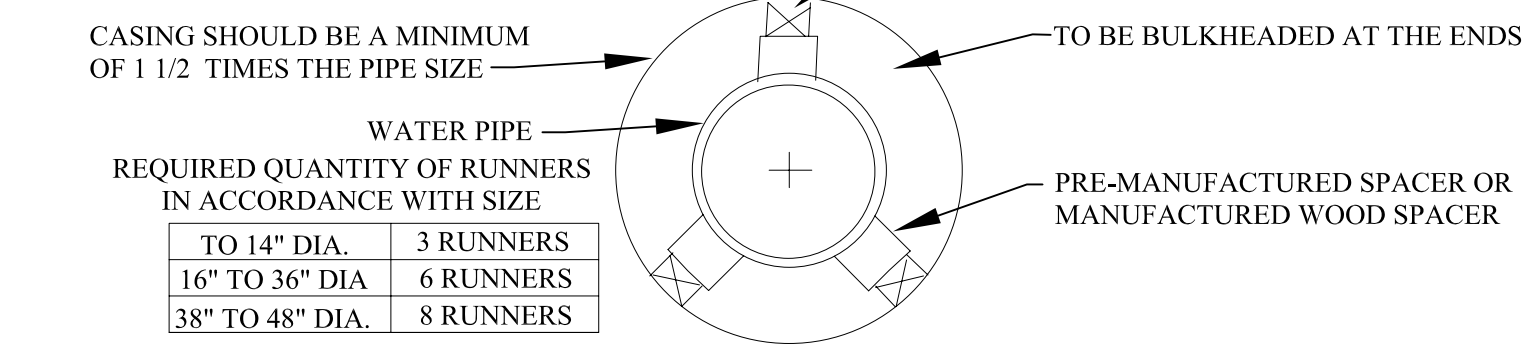
GATE WELL (TYPICAL)



WATER MAIN IN CASING SECTION

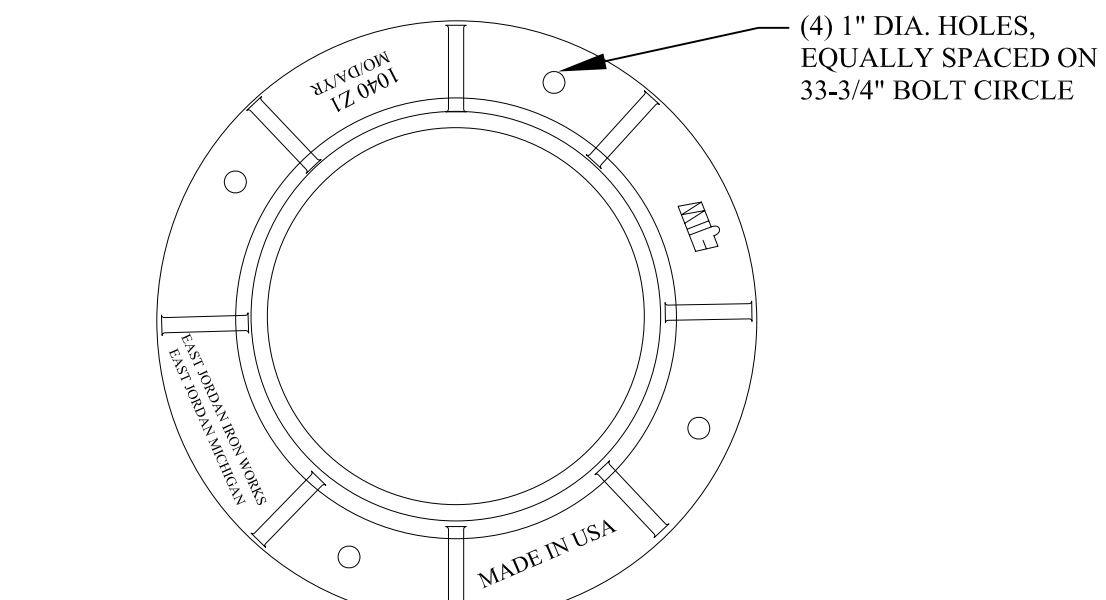
UNLESS OTHERWISE SPECIFIED, MINIMUM CASING PIPE SHALL BE ASTM A-139 GRADE B, WALL THICKNESS AS FOLLOWS:

| NOMINAL SIZE | MINIMUM WALL THICKNESS |
|--------------|------------------------|
| 8" - 42" | 0.375 |
| 48" - 60" | 0.500 |

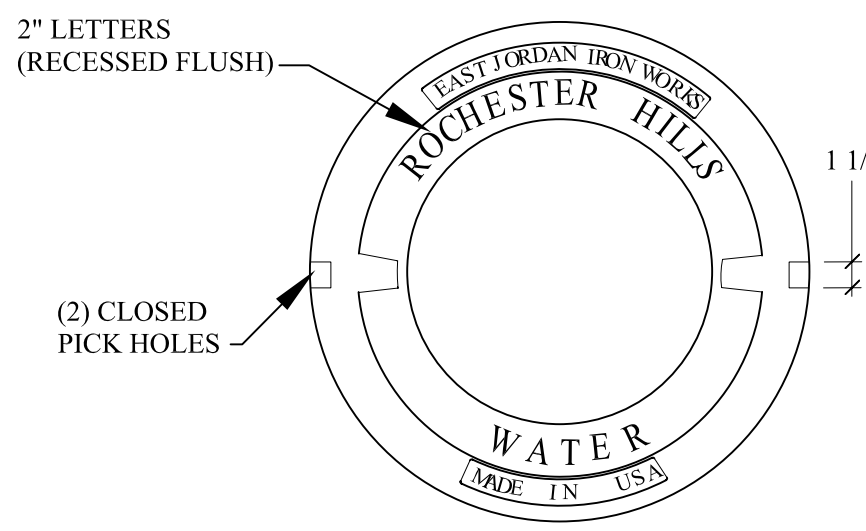


SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING PIPE

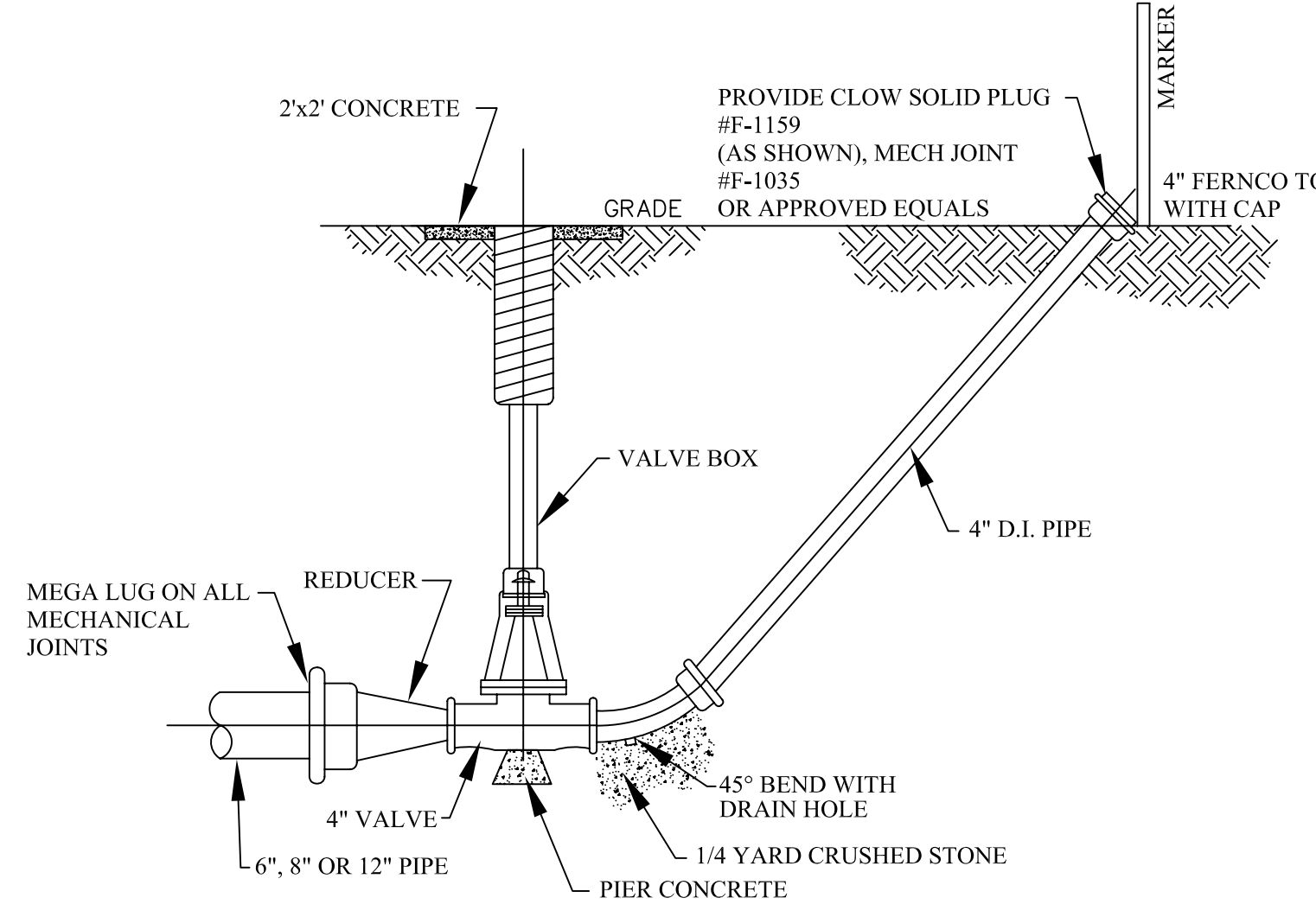
| REQUIRED QUANTITY OF RUNNERS IN ACCORDANCE WITH SIZE | TO 14" DIA. | 3 RUNNERS |
|--|-------------|-----------|
| 16" TO 36" DIA. | 6 RUNNERS | |
| 38" TO 48" DIA. | 8 RUNNERS | |



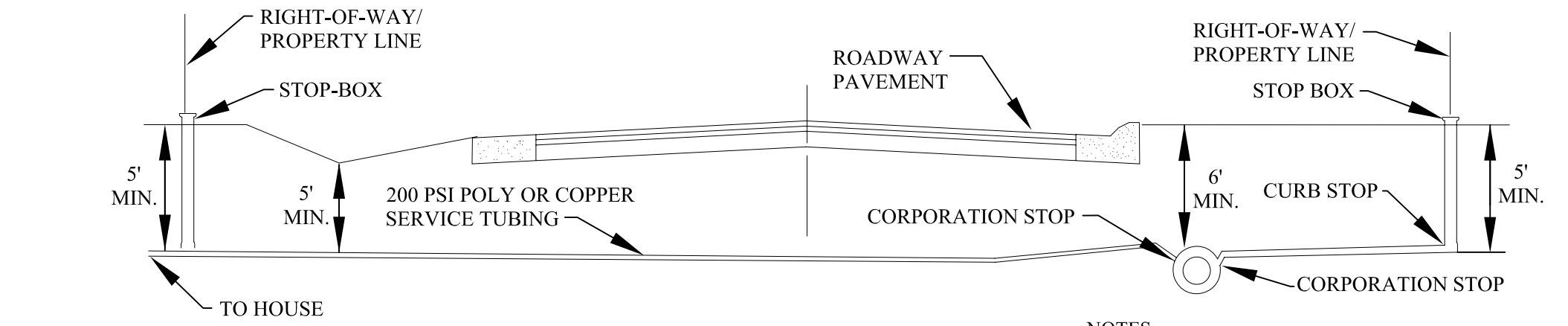
FRAME



LETTERING LAYOUT FOR GATE WELL COVERS

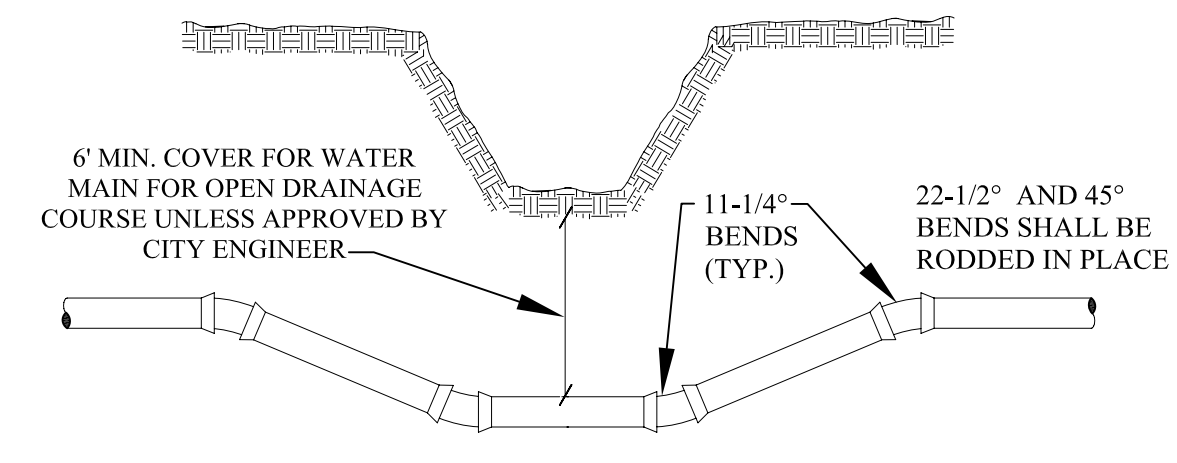


DETAIL OF 4" BLOWOFF

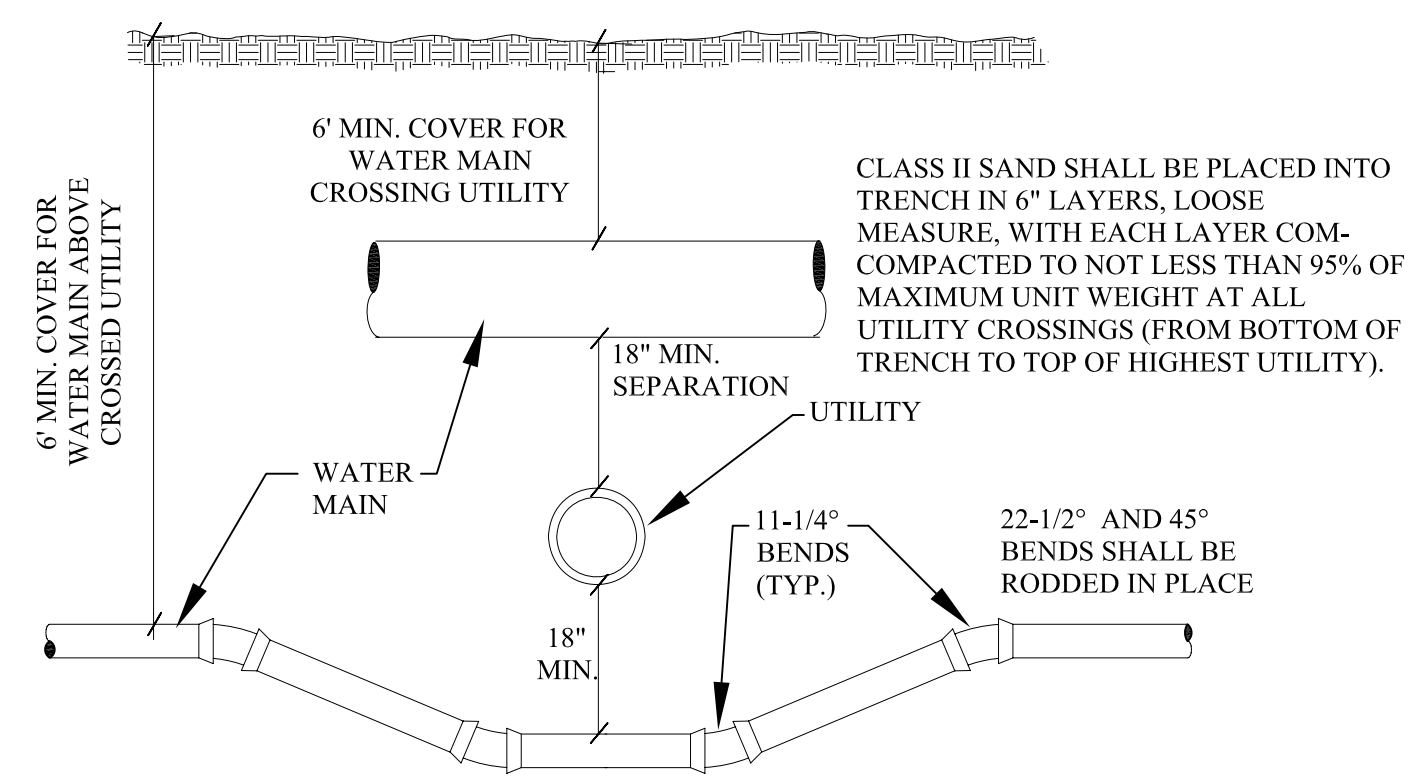


TYPICAL PUBLIC ROAD WATER SERVICE CONNECTION

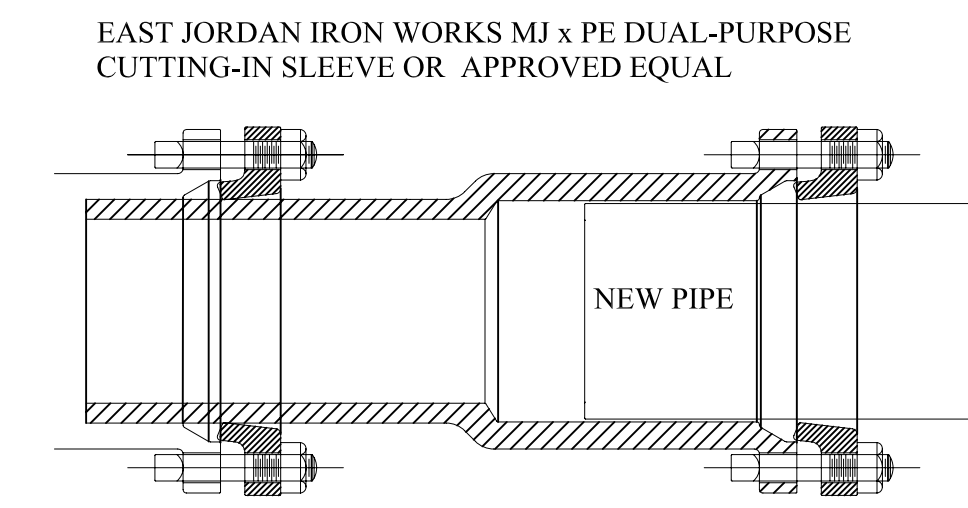
NOTES:
 1. WATER SERVICE SHUT-OFF TO BE PLACED AT PROPERTY LINE.
 2. LATERAL LOCATION SHALL BE AS REQUESTED BY THE ABUTTING PROPERTY OWNER.
 3. ROCHESTER HILLS DPW PERFORMS SERVICE LEAD TAPS UP TO 2" DIAMETER.



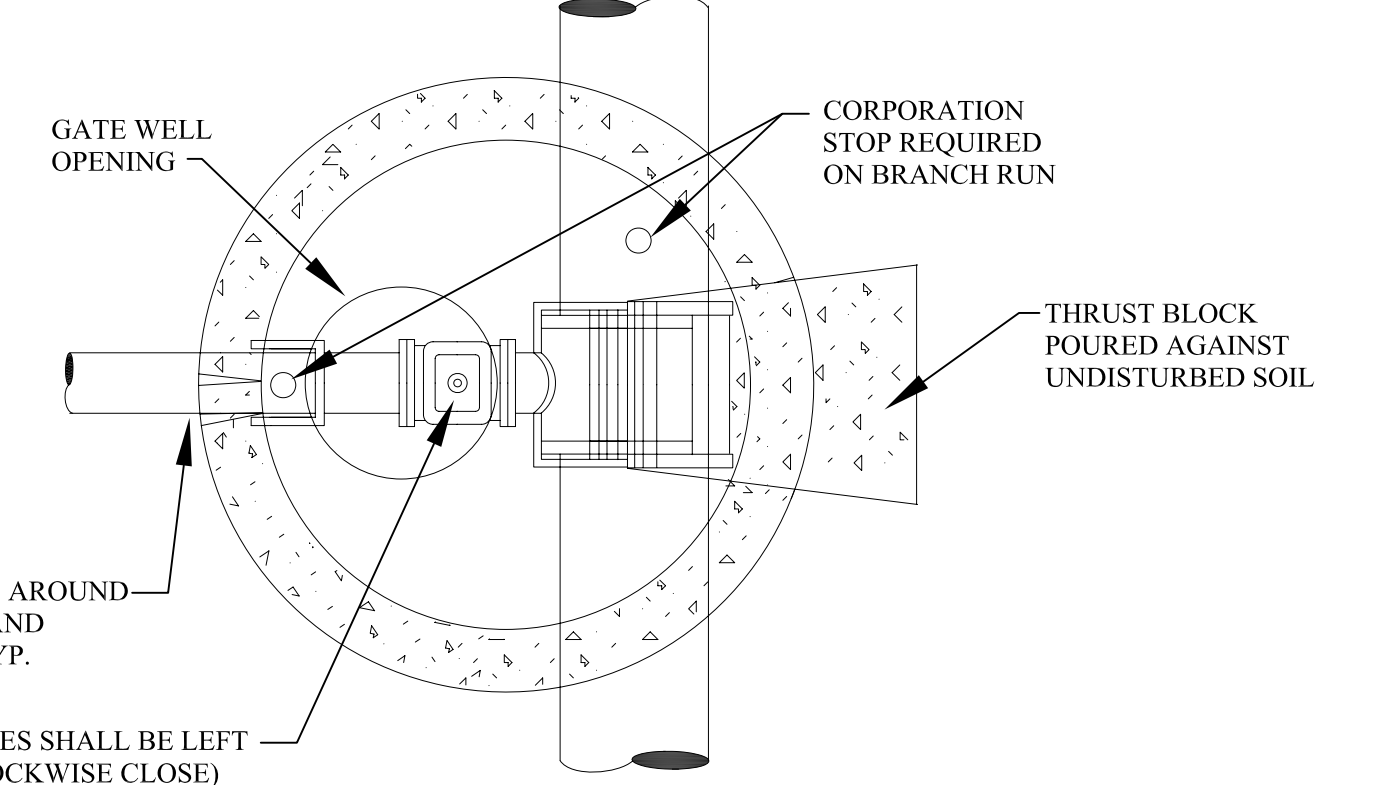
DITCH CROSSING



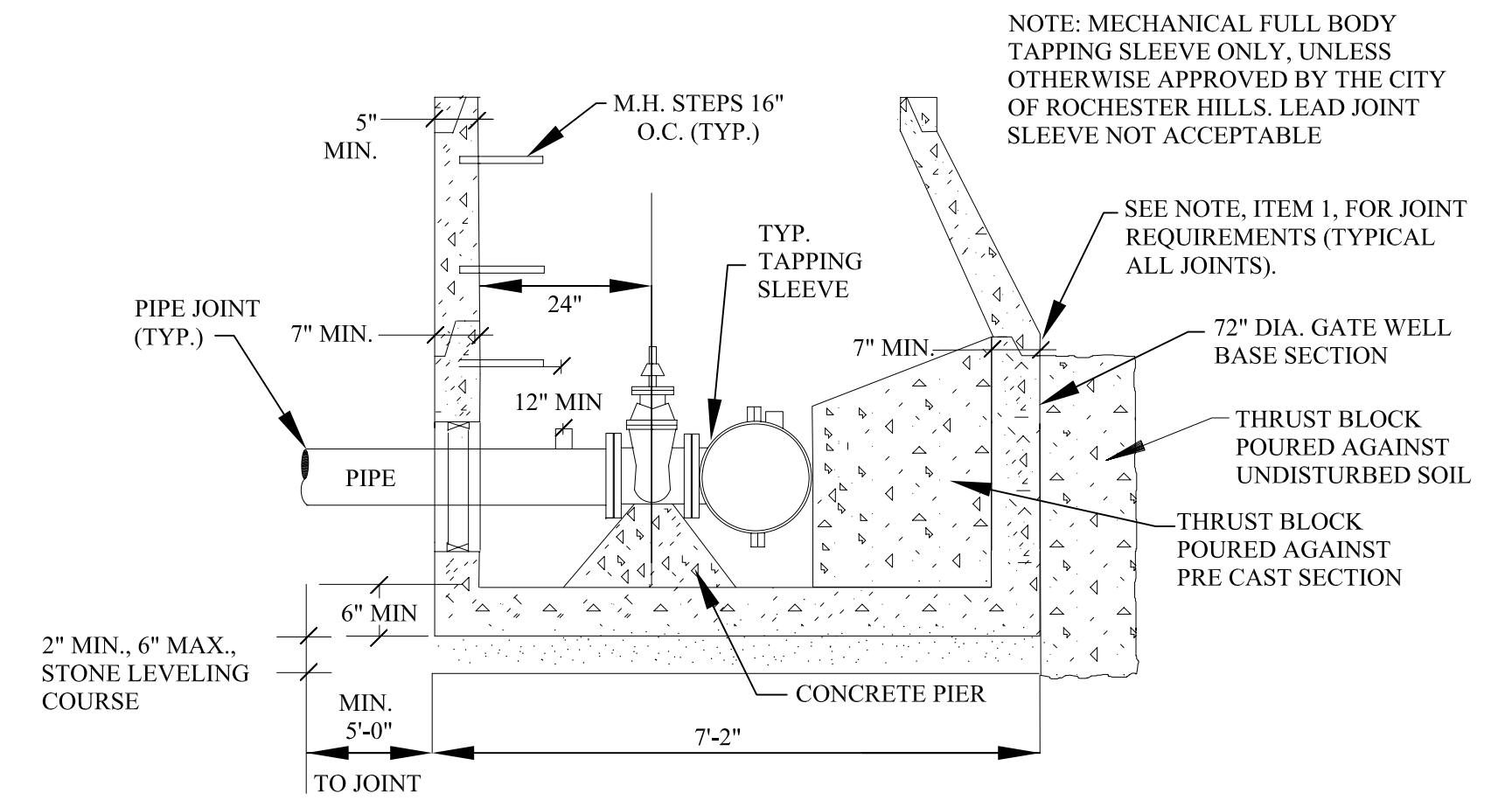
UTILITY CROSSING



BOTTLE SLEEVE



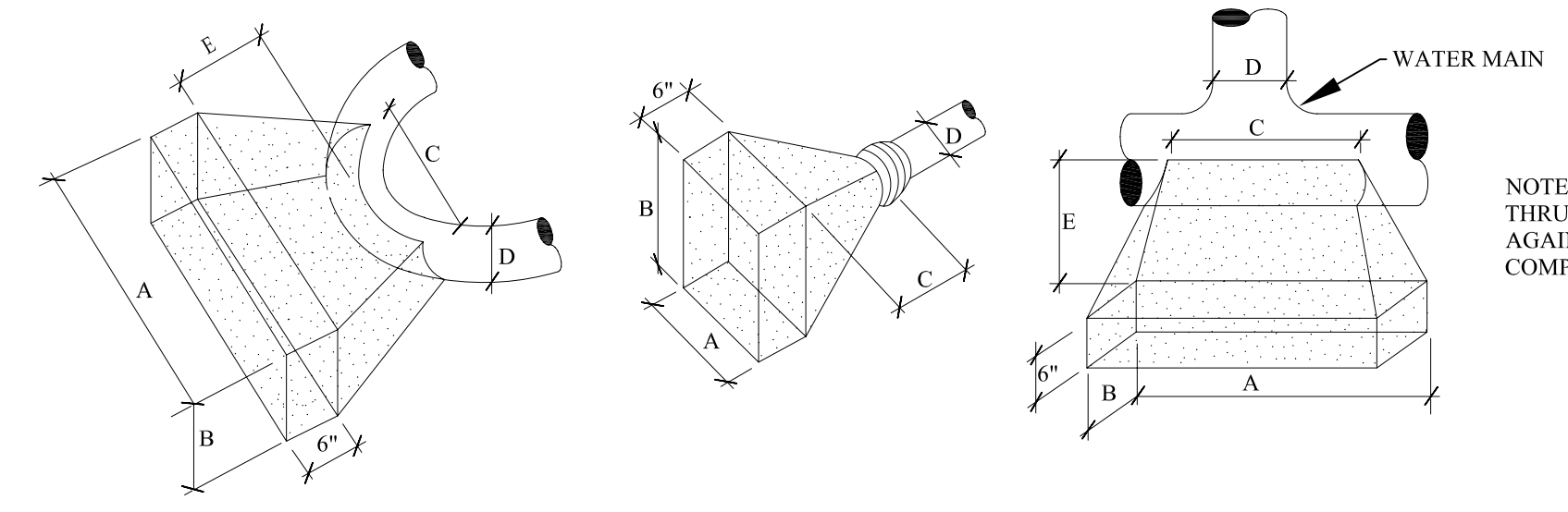
PLAN TAPPING SLEEVE VALVE & WELL (TYPICAL)



TAPPING SLEEVE, VALVE AND WELL (TYPICAL)

NOTES:

- ALL PRECAST CONCRETE GATE WELL SECTIONS SHALL BE MANUFACTURED TO CONFORM WITH A.S.T.M. C478, STANDARD SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS, EXCEPT WALL THICKNESS SHALL BE AS SHOWN ON THESE DETAILS. ALL JOINTS FOR PRECAST CONCRETE GATE WELL SECTIONS SHALL BE "MODIFIED GROOVE TONGUE" WITH GASKET MANUFACTURED TO CONFORM WITH A.S.T.M. C 443, STANDARD SPECIFICATION FOR JOINTS FOR CIRCULAR CONCRETE SEWER AND CULVERT PIPE USING RUBBER GASKETS.
- CONTRACTOR SHALL INSTALL VALVES, TAPPING SLEEVES AND GATE WELL STRUCTURES IN STRICT COMPLIANCE WITH MEASUREMENTS PROVIDED ON SHEET 1 (i.e. 2'-0" BETWEEN GATE WELL WALL & CENTERLINE OF OPERATING NUT) TO ALLOW PROPER OPERATION OF VALVE THROUGH GATE WELL OPENING. FAILURE TO DO SO WILL REQUIRE CONTRACTOR TO CORRECT AT HIS EXPENSE.
- TAPPING SLEEVES SHALL BE MANUFACTURED BY ROMAC INDUSTRIES; MUELLER; EAST JORDAN; SMITH-BLAIR OR APPROVED EQUAL AND APPROVED BY THE CITY OF ROCHESTER HILLS. FULL BODY SLEEVES MUST BE USED EXCEPT FOR REINFORCED CONCRETE PRESSURE PIPE OR A.C. PIPE.
- FOR ALL PIPE USE A 1" CORPORATION STOP. NO CORPS SHALL BE USED IN CONCRETE PRESSURE PIPE.
- RUBBER O-RINGS SHALL NOT BE USED IN PAVEMENT.



| FOR 90° BENDS OR SMALLER | | | | | FOR PLUGS | | | | FOR TEES | | | | |
|--------------------------|----|------|------|--------|-----------|--------|--------|--------|----------|-------|-------|------|--------|
| D | A | B | C | E MIN. | D | A | B | C MIN. | D | A | B | C | E MIN. |
| 20" | 8" | 6.5' | 3.5' | 2.5' | 20" | 7" | 5' | 2.5' | 20" | 6.5' | 4.5' | 3.5' | 3' |
| 16" | 6" | 4' | 2.5' | 2' | 16" | 4'-10" | 4'-10" | 2' | 16" | 4'-8" | 4'-8" | 2.5' | 2.75' |
| 12" | 4" | 3' | 2' | 1.75' | 12" | 4'-4" | 3' | 1'-9" | 12" | 4' | 3' | 2.5' | 2.5' |
| 10" | 3" | 3' | 2' | 1.75' | 10" | 3" | 2' | 1'-6" | 10" | 3' | 2' | 2' | 2.25' |
| 8" | 3" | 2' | 2' | 1.5' | 8" | 2'-10" | 2'-6" | 1'-6" | 8" | 2'-6" | 2' | 2' | 2.25' |
| 6" | 2" | 1.5' | 2' | 1.25' | 6" | 1'-6" | 1'-6" | 3' | 6" | 2' | 2' | 2' | 2.25' |

THRUST BLOCK DETAILS



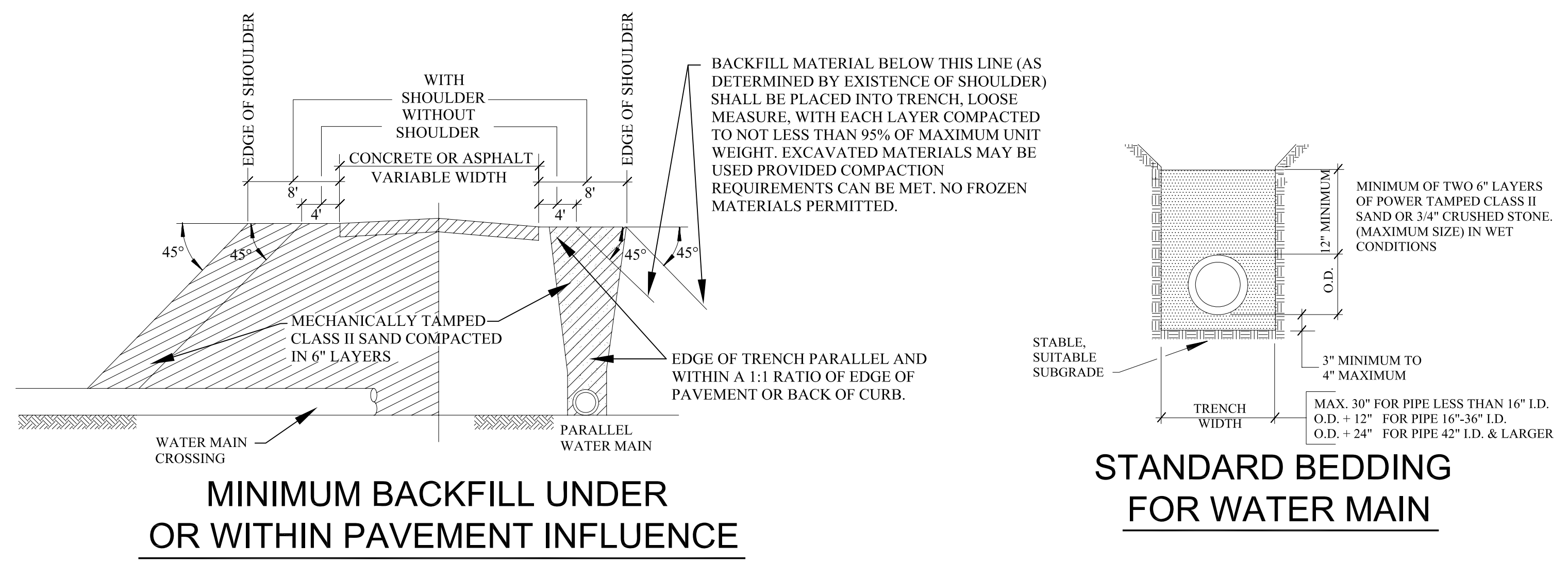
| REVISIONS | DATE | APPROVED BY |
|-----------|------|--|
| | | CITY COUNCIL, DATE: JULY 21, 2008 |
| | | PREPARED BY ENGINEERING DIVISION DEPARTMENT OF PUBLIC SERVICES |

NOTIFY ROCHESTER HILLS ENGINEERING DEPARTMENT @ 248-841-2510 48 HRS. PRIOR TO START OF CONSTRUCTION

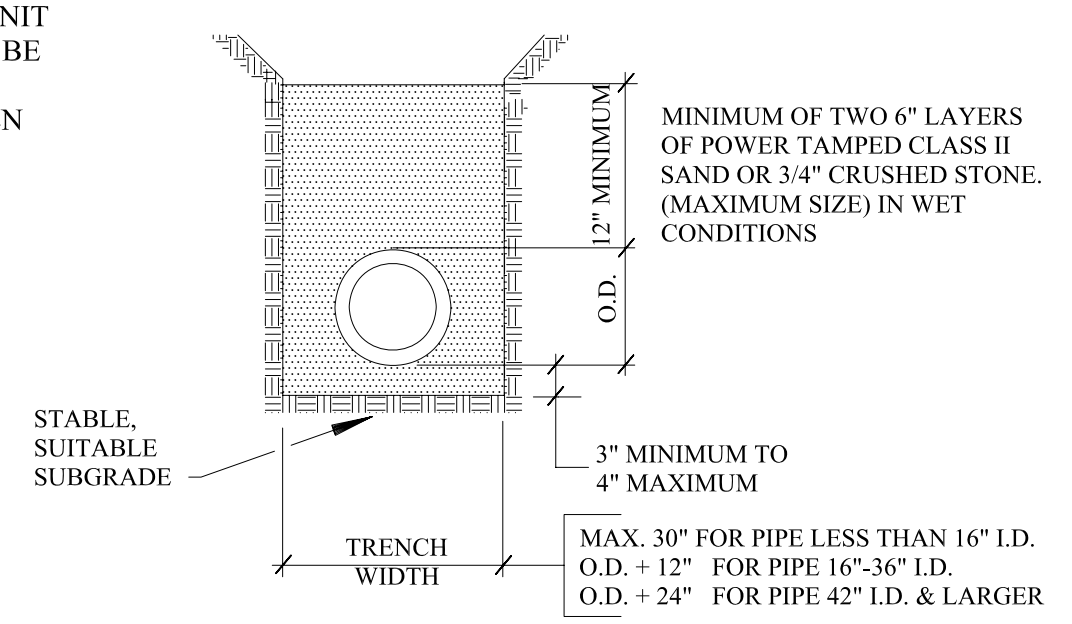
City of Rochester Hills
 1000 Rochester Hills Drive, Rochester Hills, Michigan 48309

WATER MAIN STANDARD DETAILS

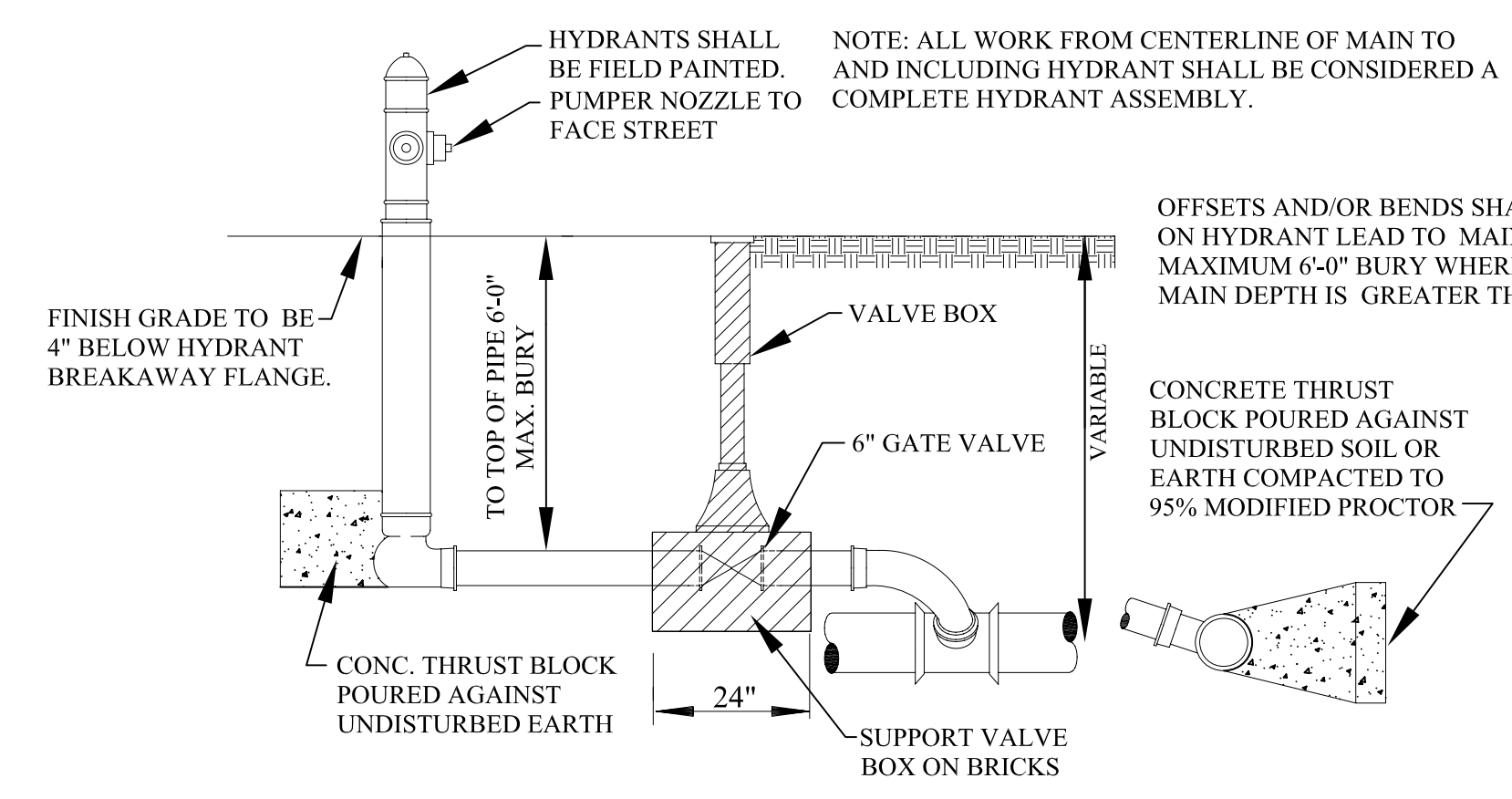
| NOT TO SCALE | DATE: 7/21/2008 |
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| SHEET 1 OF 2 | |



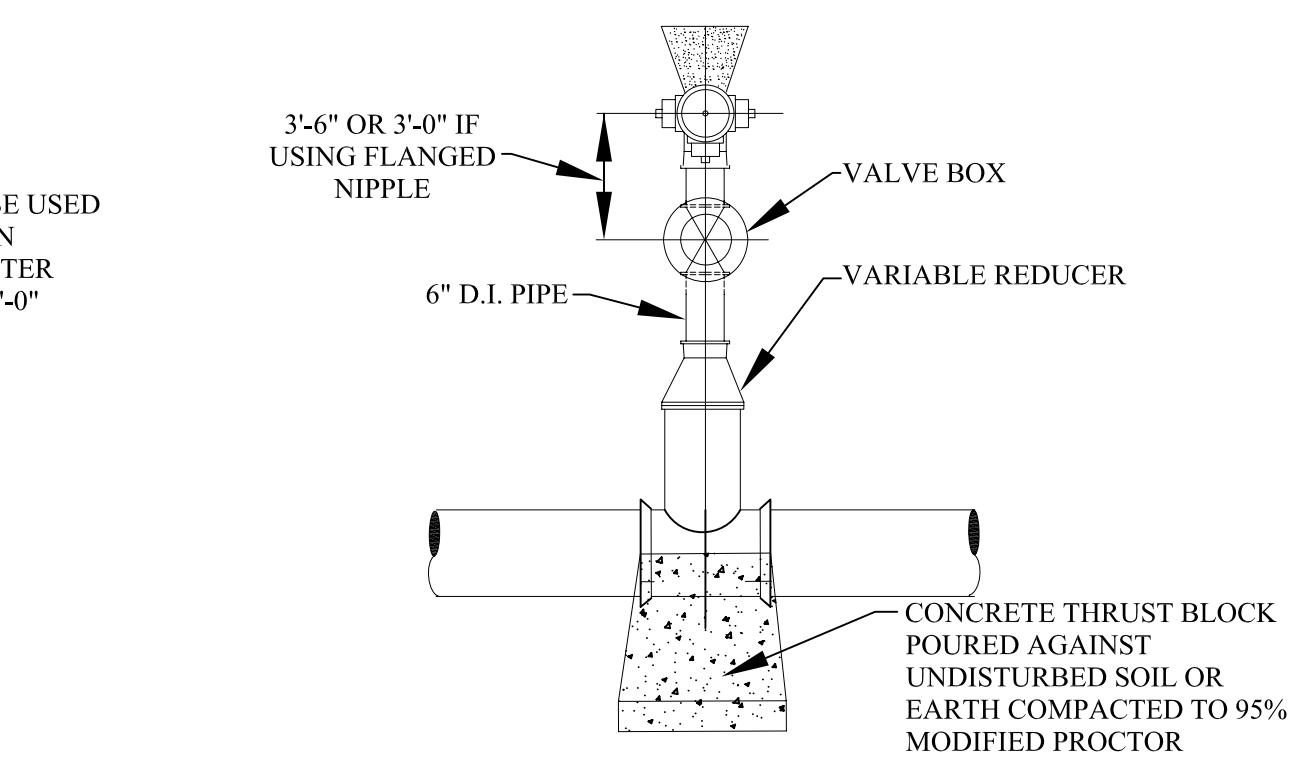
MINIMUM BACKFILL UNDER OR WITHIN PAVEMENT INFLUENCE



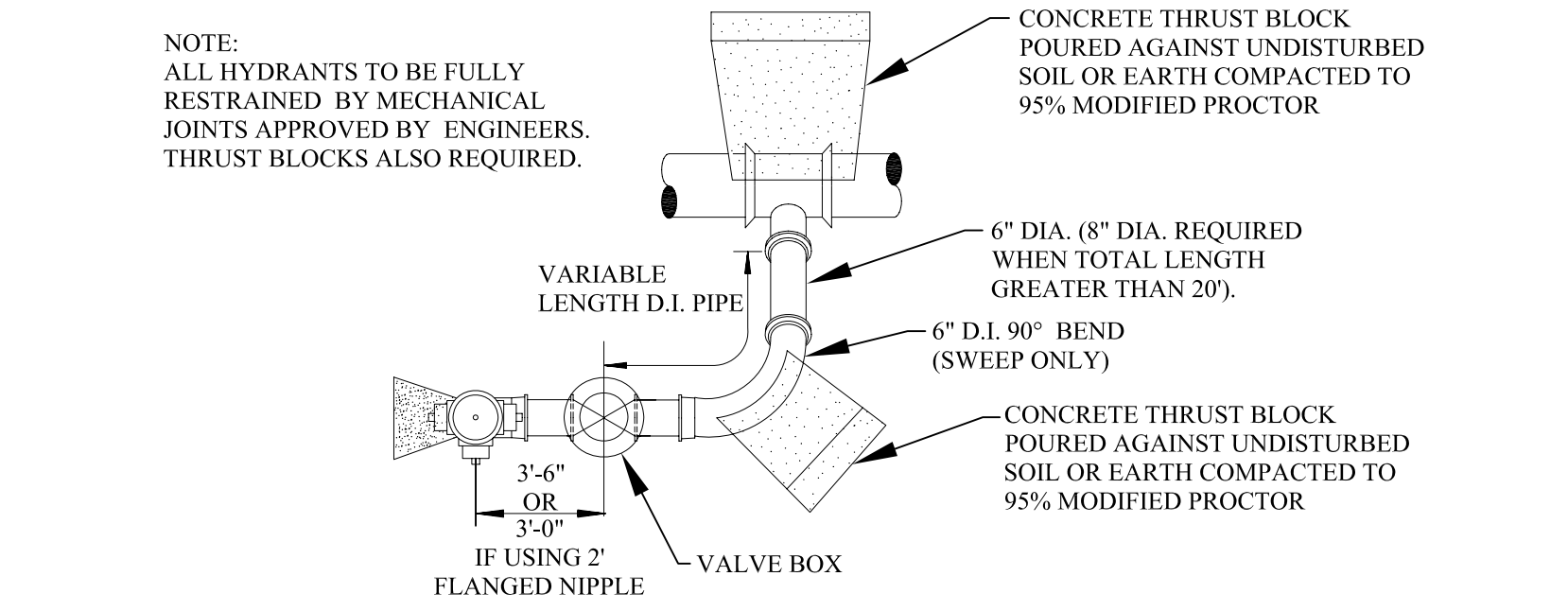
STANDARD BEDDING FOR WATER MAIN



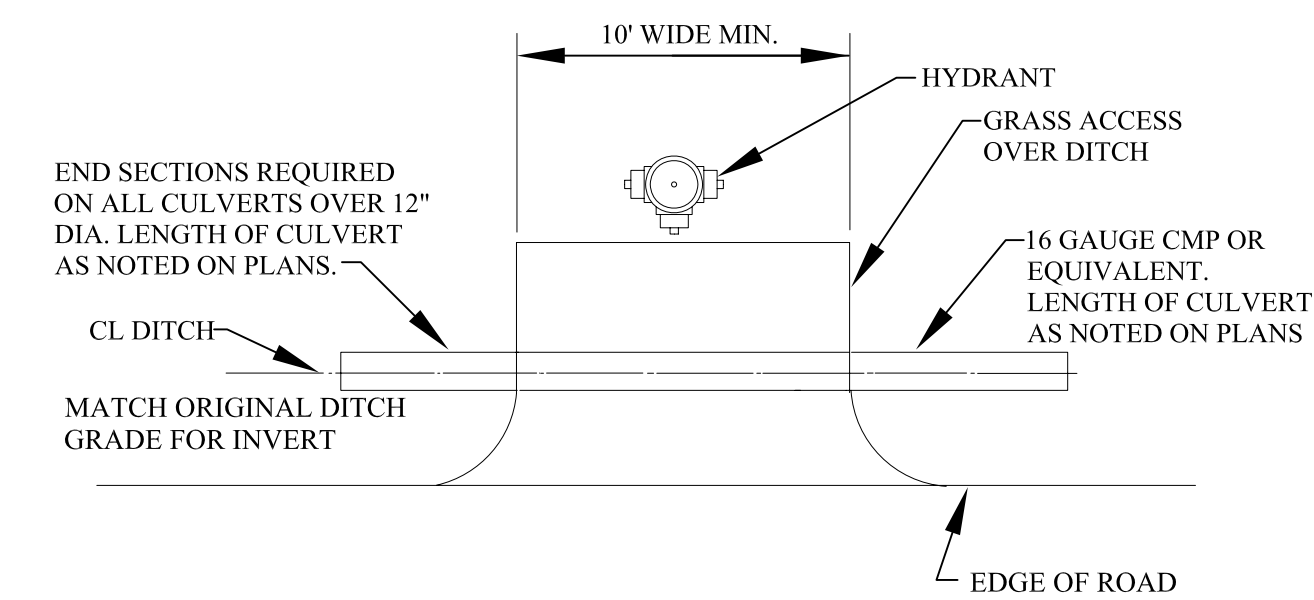
HYDRANT SIDE OUTLET OPTION



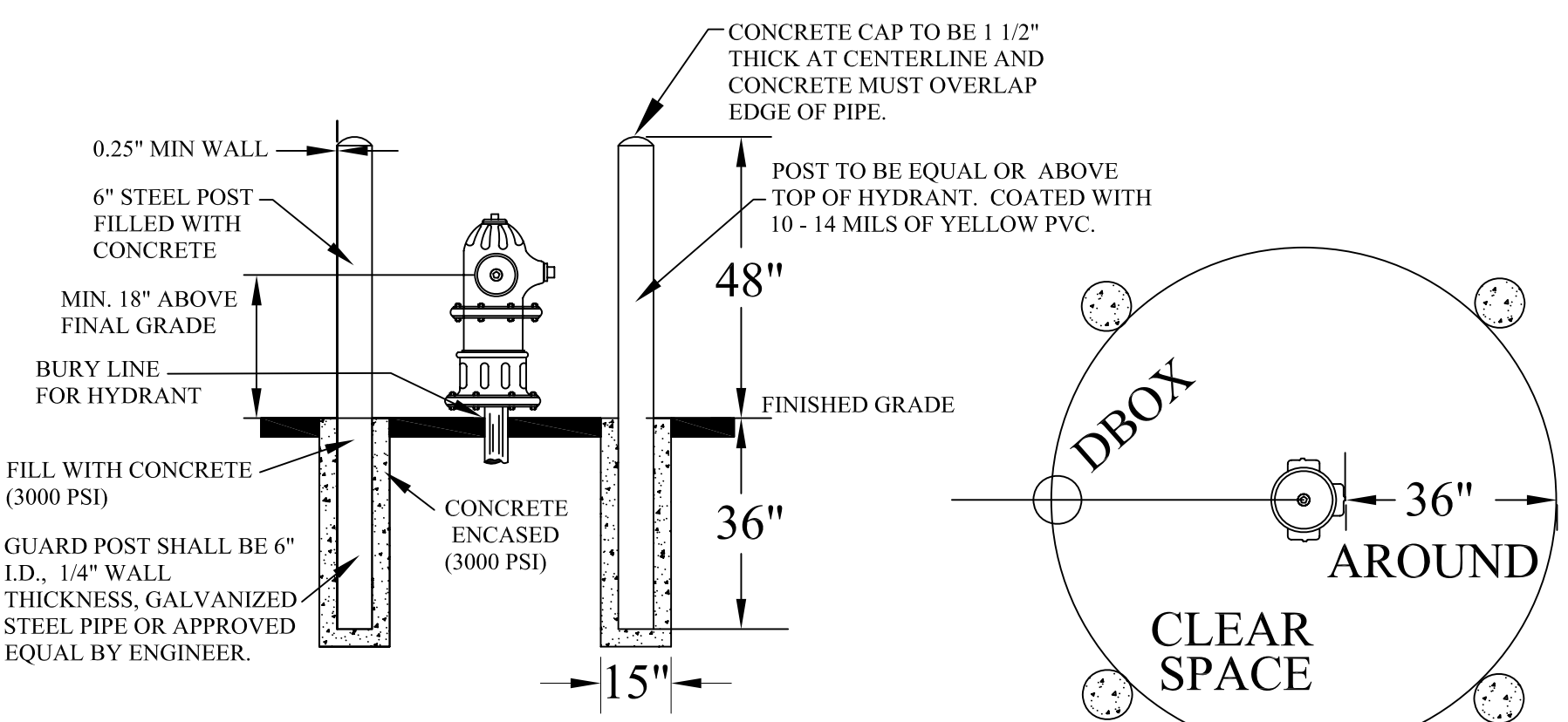
HYDRANT CONNECTION (TYPICAL)



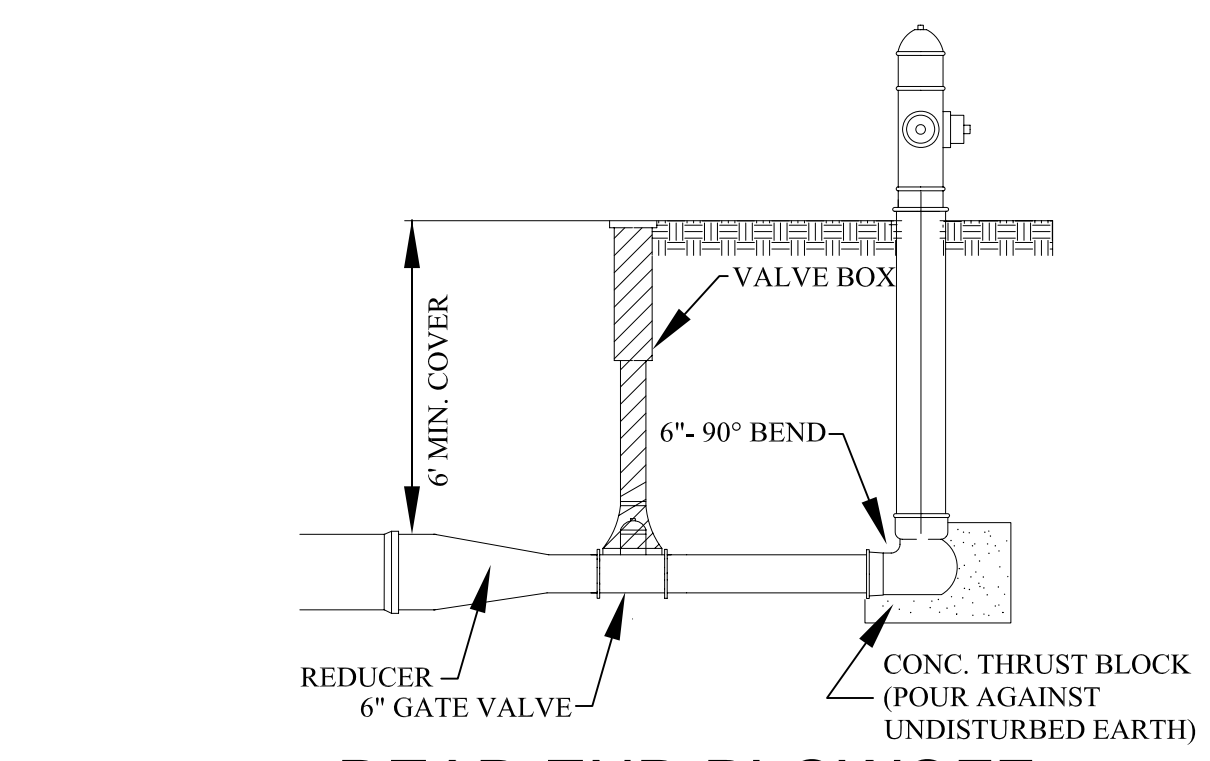
HYDRANT SIDE OUTLET OPTION



DITCH ENCLOSURE AT HYDRANT/ GATE WELL



GUARD POST



DEAD END BLOWOFF CONNECTION

HYDRANT & BLOWOFF DETAILS

GENERAL NOTES

- ALL CONSTRUCTION PROCEDURES AND MATERIALS SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF ROCHESTER HILLS.
- A PRE-CONSTRUCTION MEETING SHALL BE SCHEDULED BY THE CITY OF ROCHESTER HILLS AND HELD PRIOR TO THE START OF CONSTRUCTION.
- CONTRACTOR MUST CONTACT MISS DIG (811) AT LEAST THREE WORKING DAYS PRIOR TO THE START OF CONSTRUCTION FOR UNDERGROUND UTILITY LOCATIONS. ALL UTILITIES SHALL BE STAKED BEFORE CONSTRUCTION BEGINS.
- ALL WATER MAIN EASEMENTS SHALL BE PROVIDED PRIOR TO CONSTRUCTION AND ACCEPTANCE OF THE WATER DISTRIBUTION SYSTEM.
- WATER MAINS SHALL BE CONSTRUCTED WITH A MINIMUM COVER OF 6 FEET BELOW FINISHED GRADES, INCLUDING OPEN DRAINAGE COURSES.
- ALL TRENCHES UNDER OR WITHIN A 1:1 RATIO OF EXISTING OR PROPOSED PAVEMENT OR DRIVEWAYS, SHALL BE BACKFILLED WITH COMPACTED CLASS II SAND TO GRADE (95% MAXIMUM UNIT DENSITY).
- WHERE TWO UTILITIES CROSS, PROVIDE CLASS II BACKFILL MATERIAL IN SIX (6) INCH COMPACTED LAYERS TO TOP OF HIGHEST UTILITY.
- WHERE WATER MAINS DIP UNDER OTHER UTILITIES, THE SECTIONS WHICH ARE DEEPER THAN NORMAL SHALL BE CONSTRUCTED WITH 11-1/4" VERTICAL BENDS, 22 1/2" OR 45" BENDS MUST BE RODDED AND PROPERLY ANCHORED.
- ALL PRECAST CONCRETE GATE WELL SECTIONS SHALL BE IN ACCORDANCE WITH A.S.T.M. C478, STANDARD SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS. WALL THICKNESS SHALL BE AS SHOWN ON THESE DETAILS. ALL JOINTS FOR PRECAST CONCRETE GATE WELL SECTIONS SHALL BE "MODIFIED GROOVE TONGUE" WITH GASKET MANUFACTURED TO CONFORM WITH A.S.T.M. C 443, STANDARD SPECIFICATION FOR JOINTS FOR CIRCULAR CONCRETE SEWER AND CULVERT PIPE USING RUBBER GASKETS.
- CONTRACTOR SHALL INSTALL VALVES, TAPPING SLEEVES AND GATE WELL STRUCTURES IN STRICT COMPLIANCE WITH MEASUREMENTS PROVIDED ON SHEET 1 (2'-0" BETWEEN GATE WELL WALL & CENTERLINE OF OPERATING NUT) TO ALLOW PROPER OPERATION OF VALVE THROUGH GATE WELL OPENING.
- ALL CROSS-CONNECTION CONTROL DEVICES SHALL BE INSTALLED AS REQUIRED BY THE ROCHESTER HILLS PLUMBING INSPECTOR AND IN ACCORDANCE WITH THE STANDARDS OF THE OAKLAND COUNTY DRAIN COMMISSIONER OPERATION AND MAINTENANCE DIVISION AND THE MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF DRINKING WATER AND RADIOLOGICAL PROTECTION.
- ALL WATER SERVICE CONNECTIONS TWO (2) INCHES AND SMALLER SHALL BE MADE BY THE CITY OF ROCHESTER HILLS, DEPARTMENT OF PUBLIC SERVICES AFTER WATER MAIN ACCEPTANCE AND APPLICABLE PERMITS ARE OBTAINED.
- ALL FITTINGS AND BENDS SHOULD BE BLOCKED IN ACCORDANCE WITH THRUST BLOCK DETAILS, UNLESS ALTERNATE THRUST RESTRAINT SYSTEM, AS INDICATED PLANS AND SPECIFICATIONS, IS APPROVED BY THE CITY OF ROCHESTER HILLS DEPARTMENT OF PUBLIC SERVICE.

WATER MAIN MATERIALS NOTES

- TEMPORARY CONNECTIONS, WHICH MAY BE MADE FOR CHLORINATING AND FLUSHING PURPOSES, SHALL INCLUDE A TESTABLE DOUBLE CHECK VALVE BACKFLOW PREVENTER WITH CURRENT CERTIFICATION.
- CORPORATION STOPS USED FOR INSERTION INTO MAINS SHALL BE FORD TYPE B-44. ALL STOPS SHALL HAVE BRONZE CAST BODIES, KEYS, STEM WASHERS AND NUTS. INLET THREADS SHALL CONFORM TO THE LATEST VERSION OF AWWA C800.
- ALL DUCTILE IRON PIPE (D.I.P.) WATER MAIN SHALL BE DESIGNED FOR 150 PSI MINIMUM WORKING PRESSURE.
- THE DUCTILE IRON PIPE TO BE FURNISHED AND DELIVERED UNDER THIS SPECIFICATION SHALL MEET ALL THE REQUIREMENTS OF THE CURRENT AWWA C151 (ANSI A21.5), EXCEPT AS OTHERWISE SPECIFIED HEREIN. PIPE SHALL BE DOUBLE CEMENT-LINED AND SEAL COATED WITH AN APPROVED BITUMINOUS SEAL COAT IN ACCORDANCE WITH AWWA C104 (ANSI A21.4).
- DUCTILE IRON PIPE SHALL BE CLASS 54 FOR SIZES THREE (3) INCH THROUGH TWENTY (20) INCHES SIZE. TWENTY-FOUR (24) INCH AND LARGER SHALL BE CLASS 55 DUCTILE IRON PIPE.
- PIPES TWENTY-FOUR (24) INCHES AND LARGER IN NOMINAL DIAMETER SHALL MEET ALL THE REQUIREMENTS OF THE CURRENT AWWA C100 FOR DUCTILE IRON WATER PIPE.
- MECHANICAL JOINTS FOR DUCTILE IRON WATER MAIN SHALL BE IN ACCORDANCE WITH AWWA C111 (ANSI A21.11).
- FLANGE JOINTS FOR DUCTILE IRON WATER MAIN SHALL BE IN ACCORDANCE WITH AWWA C110 (ANSI A21.10).
- FITTINGS FOR DUCTILE IRON PIPE SHALL BE DUCTILE IRON AND SHALL MEET REQUIREMENTS OF AWWA C110 (ANSI A21.10) OR AWWA C151 (ANSI A21.5). DUCTILE IRON FITTINGS SHALL BE RATED FOR 350 PSI. PIPE SIZES TWENTY-FOUR (24) INCH DIAMETER AND LESS, AND 250 PSI FOR PIPE SIZES OVER TWENTY-FOUR (24) INCH DIAMETER. DUCTILE IRON FLANGE FITTINGS SHALL BE RATED FOR 250 PSI FOR ALL PIPE DIAMETERS.
- ALL DUCTILE IRON PIPE, FITTINGS AND HYDRANTS SHALL BE ENCASED WITH POLYETHYLENE ENCASEMENT IN ACCORDANCE WITH THE REQUIREMENTS OF A.N.S.I./A.W.A. STANDARD SPECIFICATION D1248 AND AWWA C105. POLYETHYLENE TUBE MATERIAL SHALL HAVE A THICKNESS OF .008" (8-MILS). ADHESIVE TAPE SHALL BE A GENERAL PURPOSE ADHESIVE TAPE 2" WIDE AND APPROXIMATELY 10-MILS THICK, SUCH AS SCOTCHRAP, NO.50, POLYKEN NO. 900, OR TAPECOAT CT.

VALVE AND SLEEVE NOTES

- GATE VALVES, SIZES THREE (3) INCH THROUGH SIXTEEN (16) INCH AND TAPPING VALVES SHALL MEET THE CITY OF ROCHESTER HILLS STANDARD AS DETAILED WITH NON-RISING STEM. (EAST JORDAN IRON WORKS, AMERICAN FLOW CONTROL, MUELLER)
- ALL IN LINE GATE VALVES EIGHT (8) INCH AND LARGER SHALL BE IN WELLS. SPECIFICATIONS SHALL INCLUDE THE DIRECTION OF OPERATION OF ALL VALVES (CLOCKWISE CLOSURE). VALVE BOX USE TO BE APPROVED BY ENGINEERING DIVISION.
- ALL GATE WELL COVERS SHALL BE CITY OF ROCHESTER HILLS STANDARD AS DETAILED.
- ALL GATE VALVES WITH OPERATING NUTS AT A DISTANCE GREATER THAN FIVE (5) FEET BELOW GROUND SURFACE SHALL BE PROVIDED WITH AN EXTENSION STEM. THE LENGTH OF THE EXTENSION STEM SHALL REACH WITHIN FIVE (5) FEET FROM THE GROUND SURFACE. WHEN AN EXTENSION STEM IS USED, IT SHALL BE HELD IN PLACE BY AN EXTENSION STEM GUIDE SUITABLY FASTENED TO THE WALL OF THE GATE WELL. THE EXTENSION STEM SHALL BE MECHANICALLY ATTACHED TO THE OPERATING NUT. DETAILS OF THE EXTENSION SYSTEM AND THE METHOD OF INSTALLATION SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
- BUTTERFLY VALVES SHALL BE USED FOR VALVES GREATER THAN 16-INCH DIAMETER AND SHALL BE MODEL 2F11 AS MANUFACTURED BY HENRY PRATT COMPANY OR APPROVED EQUAL.
- TAPPING VALVES SHALL BE SERIES "A" AS MANUFACTURED BY EAST JORDAN IRON WORKS OR RESILIENT SEATED GATE VALVES AS APPROVED BY THE CITY OF ROCHESTER HILLS ENGINEERING SERVICES.
- TAPPING SLEEVES SHALL BE MANUFACTURED BY ROMAC INDUSTRIES; MUELLER; EAST JORDAN; SMITH-BLAIR OR APPROVED EQUAL AND APPROVED BY THE CITY OF ROCHESTER HILLS. FULL BODY SLEEVES MUST BE USED EXCEPT FOR REINFORCED CONCRETE PRESSURE PIPE OR A.C. PIPE.

HYDRANT REQUIREMENTS

- ALL HYDRANTS SHALL BE CONSTRUCTED WITH A SIX (6) INCH COMPANION GATE VALVE IN A THREE (3) PIECE, ADJUSTABLE DUCTILE IRON VALVE BOX, WHICH SHALL INCLUDE A FIVE AND ONE-QUARTER (5-1/4) INCH SCREW SHAFT. VALVE BOXES SHALL BE SERIES 6860 AS MANUFACTURED BY TYLER PIPE OR APPROVED EQUAL.
- ALL HYDRANTS SHALL BE EAST JORDAN IRON WORKS NO. 5-BR-250 TRAFFIC MODEL, OR AMERICAN FLOW CONTROL MODEL WB-67250. SELF-DRAINING HYDRANTS SHALL NOT BE USED. HYDRANTS SHALL HAVE BREAKAWAY FLANGE.
- ALL HYDRANTS SHALL BE PAINTED RED ABOVE GROUND AND BLACK BELOW GROUND WITH A FINISH COAT OF GLAMORTEX 501 ENAMEL, COLOR 314 VERMILION OR APPROVED EQUAL. HYDRANT CAPS SHALL BE PAINTED SAME COLOR AS THE HYDRANT.
- ALL FIRE HYDRANT JOINTS SHALL BE TOTALLY RESTRAINED BY THE USE OF RESTRAINED JOINT. THRUST BLOCKS ARE ALSO REQUIRED.

ACCEPTANCE OF NEW WATER MAINS

- PRIOR TO WATER MAIN ACCEPTANCE THE FOLLOWING CONDITIONS MUST BE MET: 1) PRESSURE TESTING AND BACTERIA TESTING MUST BE COMPLETED IN ACCORDANCE WITH THE CITY OF ROCHESTER HILLS 2) ALL EASEMENT AND RIGHT-OF-WAY ACQUISITION MUST BE ACCEPTED BY THE CITY OF ROCHESTER HILLS ENGINEERING SERVICES 3) THE CITY OF ROCHESTER HILLS MUST BE PROVIDED WITH THE BILL OF SALE AND 4) ALL MYLAR "AS-BUILT DRAWINGS" MUST BE ACCEPTED AND APPROVED BY THE CITY OF ROCHESTER HILLS, ENGINEERING SERVICES. THE CITY OF ROCHESTER HILLS INSPECTION DIVISION MUST WITNESS THE CONNECTION OF THE WATER MAIN TO THE EXISTING WATER MAIN, AFTER WHICH RESIDENTIAL AND COMMERCIAL TAPS WILL BE ALLOWED.
- THE CONTRACTOR SHALL NOTIFY THE CITY OF ROCHESTER HILLS, INSPECTION DEPARTMENT (248.841.2510) FOR PRESSURE TESTING, BACTERIOLOGICAL SAMPLING, CONNECTIONS TO EXISTING WATER MAIN AND FINAL FIELD REVIEW. A FORTY-EIGHT (48) HOUR ADVANCE NOTICE IS REQUIRED.
- THE CONTRACTOR SHALL DISINFECT AND PRESSURE TEST ALL NEW WATER MAIN IN ACCORDANCE WITH ROCHESTER HILLS STANDARDS. THE WATER MAIN SHALL PASS A 150 PSI PRESSURE TEST FOR A TWO (2) HOUR PERIOD. WATER LOSS SHALL NOT EXCEED A RATE OF 11.65 U.S. GALLONS PER INCH DIAMETER PER MILE OF WATER MAIN IN TWENTY-FOUR (24) HOURS.
- WHERE CONTRACTOR SUPPLIED GAUGES ARE REQUIRED, MINIMUM SIZE SHALL BE 3 1/2" DIAMETER OR LARGER GRADUATED IN ONE (1) OR TWO (2) POUND INCREMENTS FROM 1 TO 160 P.S.I. OR HIGHER AND HAVE CURRENT CERTIFICATION.
- PRESSURE TESTING AND BACTERIA TESTING MUST BE COMPLETED AND APPROVED PRIOR TO CONNECTING TO THE EXISTING WATER MAIN.

CITY OF ROCHESTER HILLS WATER SYSTEMS AS-BUILT DRAWING SPECIFICATIONS

IN AREAS WHERE WATER SYSTEMS ARE OPERATED AND MAINTAINED BY THE CITY OF ROCHESTER HILLS DEPARTMENT OF PUBLIC SERVICES, FINAL ACCEPTANCE OF THE WATER SYSTEM MUST BE RENDERED BY THE DEPARTMENT OF PUBLIC SERVICES, BEFORE THE SYSTEM CAN BE USED FOR THE SERVICE INTENDED.

ONE ITEM REQUIRED FOR FINAL ACCEPTANCE SHALL BE THE SUBMISSION OF AS-BUILT DRAWINGS TO THE CITY OF ROCHESTER HILLS, DPS, BY THE DESIGN ENGINEER. AS-BUILT DRAWINGS SHALL BE DEFINED AS AND CONTAIN THE FOLLOWING INFORMATION:

- FINAL AS-BUILT DRAWINGS SHALL BE PROVIDED ON THREE (3) MIL. MYLAR. XEROX OR ANY HEAT PROCESS REPRODUCTIONS WILL NOT BE ACCEPTED.
- ALONG WITH THE MYLAR PLAN SET, PROVIDE THREE (3) SETS OF BLUEPRINTS, PRODUCED FROM THE MYLARS AND THE PLANS ON ELECTRONIC MEDIA IN AUTOCAD FORMAT (LATEST VERSION).
- EACH AND EVERY SHEET SHALL BE SEALED BY THE DESIGN ENGINEER, ALONG WITH THE FOLLOWING CERTIFICATION STATEMENT ON THE COVER SHEET:

I HEREBY CERTIFY THAT OUR FIRM HAS PREPARED THESE AS-BUILT DRAWINGS OF THE IMPROVEMENTS AS CONSTRUCTED, AND THAT TO THE BEST OF MY KNOWLEDGE THOSE IMPROVEMENTS NOTED AS "AS BUILT" WERE CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED CONSTRUCTION PLANS; AND ALSO THAT THE WATER MAIN AND STRUCTURES, AS CONSTRUCTED, LIE WITHIN THE EASEMENT DESCRIPTIONS REQUIRED BY THE CITY OF ROCHESTER HILLS.

(COMPANY NAME)

(ENGINEER'S SIGNATURE)

PROFESSIONAL ENGINEER NO. _____

ENGINEER SEAL

- THE MAXIMUM SCALE SHALL BE ONE (1) INCH EQUALS FIFTY (50) FEET.
- THE SIZE, LENGTH, CLASS AND MANUFACTURER OF PIPE INSTALLED SHALL BE INDICATED.
- THE SIZE, BRAND AND MODEL NUMBERS OF ALL VALVES AND HYDRANTS INSTALLED SHALL BE INDICATED.
- A TOTAL AS-BUILT DRAWING QUANTITY LIST SHALL BE INCLUDED, AS WELL AS AN AS-BUILT DRAWING QUANTITY LIST ON EACH INDIVIDUAL SHEET.
- THE LOCATIONS SHALL BE SHOWN ON THE PLANS WITH AN ACCURACY OF ONE (1) FOOT.
- THE OFFSET OF THE WATER MAIN FROM PROPERTY LINES SHALL BE INDICATED.
- ALL GATE VALVE WELLS, HYDRANTS AND ALL WATER SYSTEM APPURTENANCES SHALL BE LOCATED FROM TWO FIXED OBJECTS (MANHOLES, BUILDING CORNERS ECT.).
- ALL UNDERGROUND APPURTENANCES, SUCH AS GATE VALVE WELLS, METER PITS, PRESSURE REDUCING VALVE PITS, ETC. SHALL BE LOCATED FROM THE NEAREST HYDRANT THAT IS CONNECTED TO THE SAME WATER MAIN AS THE APPURTENANCE.
- THE LOCATION AND SIZE OF EVERY RESTRAINED JOINT SHALL BE NOTED.
- THE ACCURATE LOCATION OF ALL UTILITY CROSSINGS WHERE THE VERTICAL SEPARATION, IS LESS THAN 18" SHALL BE NOTED.
- AS-BUILT SHALL BE PREPARED IN ACCORDANCE WITH THE CITY OF ROCHESTER HILLS AS-BUILT GUIDELINES AS PROVIDED AT THE PRE-CONSTRUCTION MEETING.



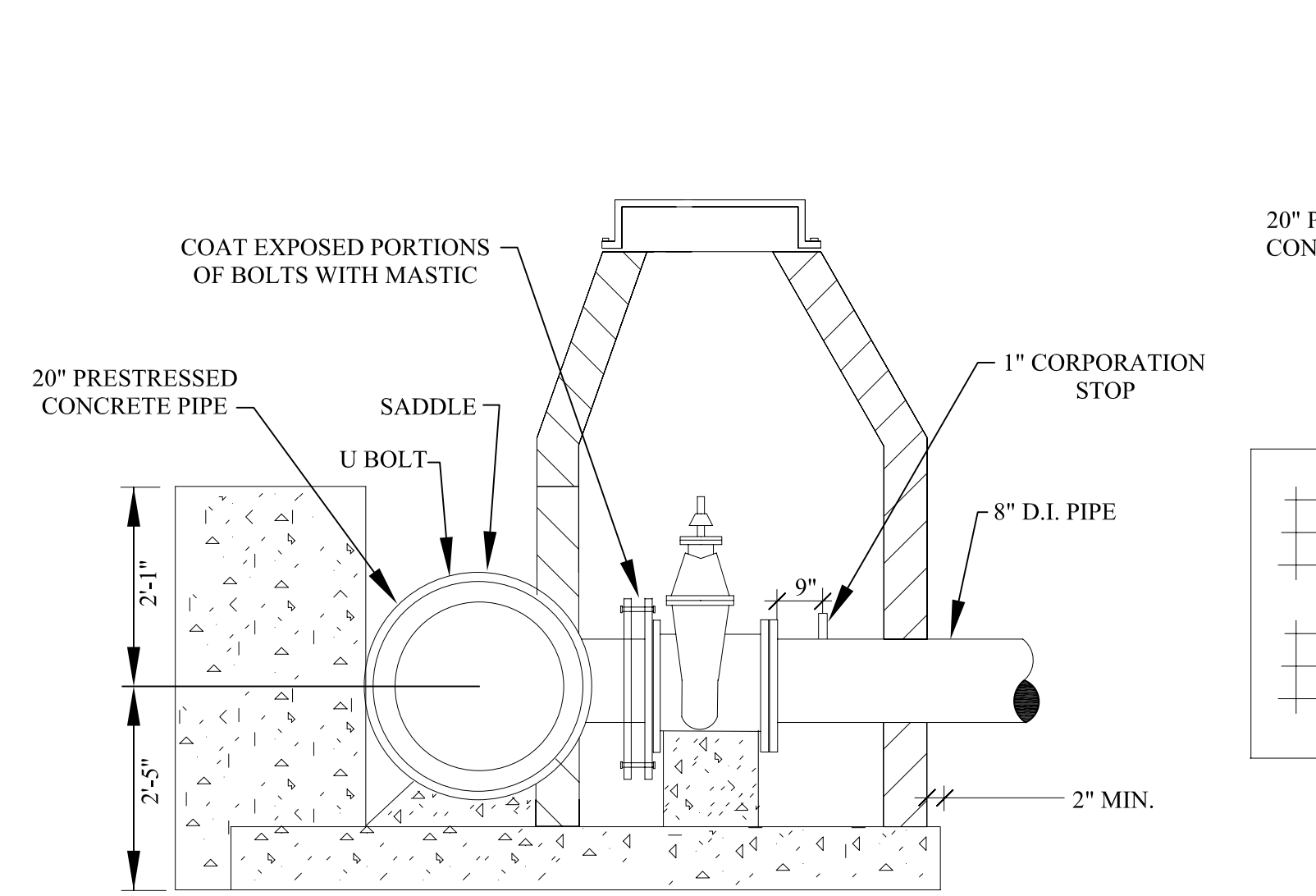
| REVISIONS | DATE | APPROVED BY |
|-----------|------|--|
| | | CITY COUNCIL, DATE: JULY 21, 2008 |
| | | PREPARED BY ENGINEERING DIVISION DEPARTMENT OF PUBLIC SERVICES |

NOTIFY ROCHESTER HILLS ENGINEERING DEPARTMENT @ 248-841-2510 48 HRS. PRIOR TO START OF CONSTRUCTION

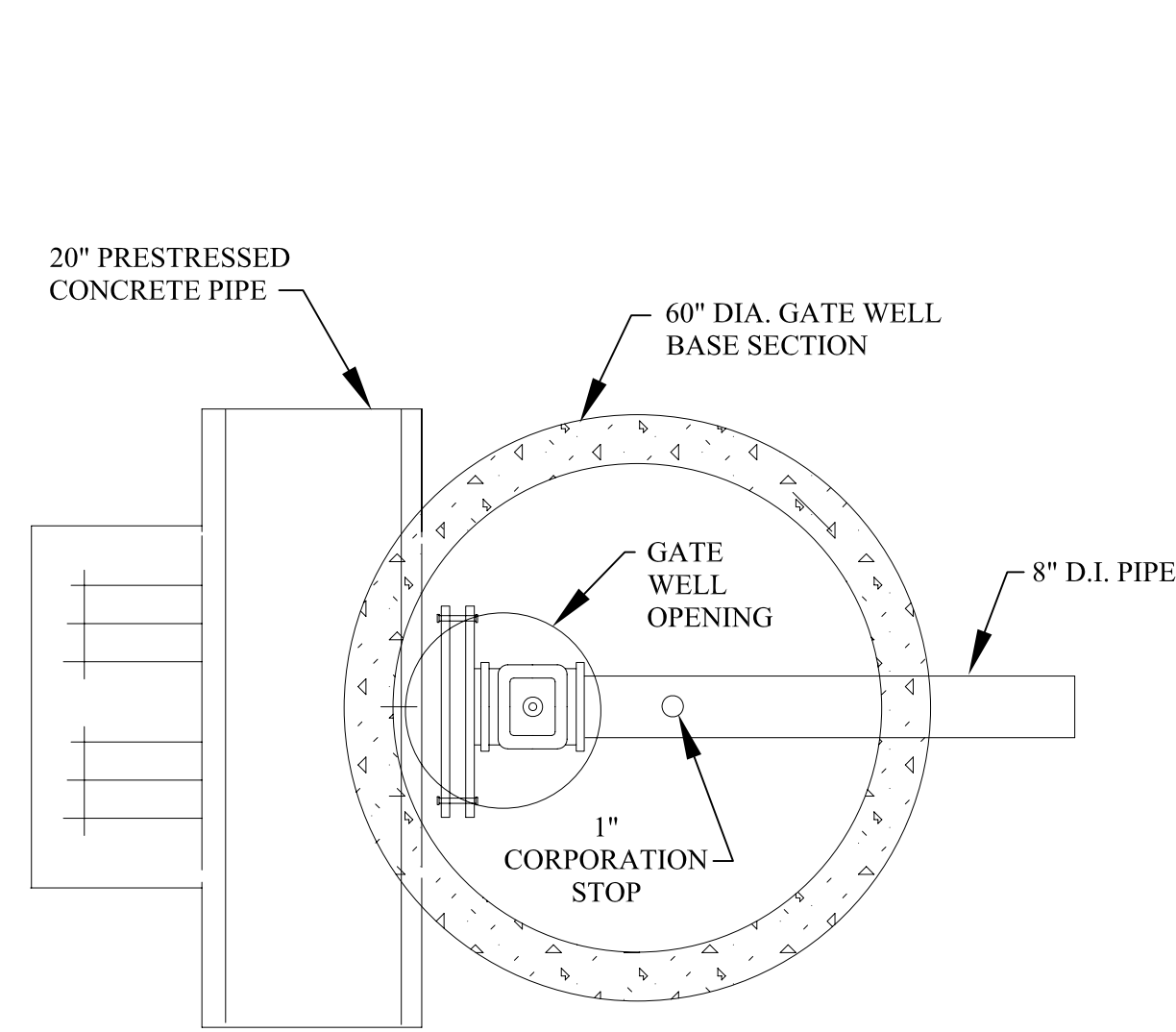
City of Rochester Hills
1000 Rochester Hills Drive, Rochester Hills, Michigan 48309

WATER MAIN STANDARD DETAILS

| | |
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| NOT TO SCALE | DATE: 7/21/2008 |
| SHEET 2 OF 2 | |

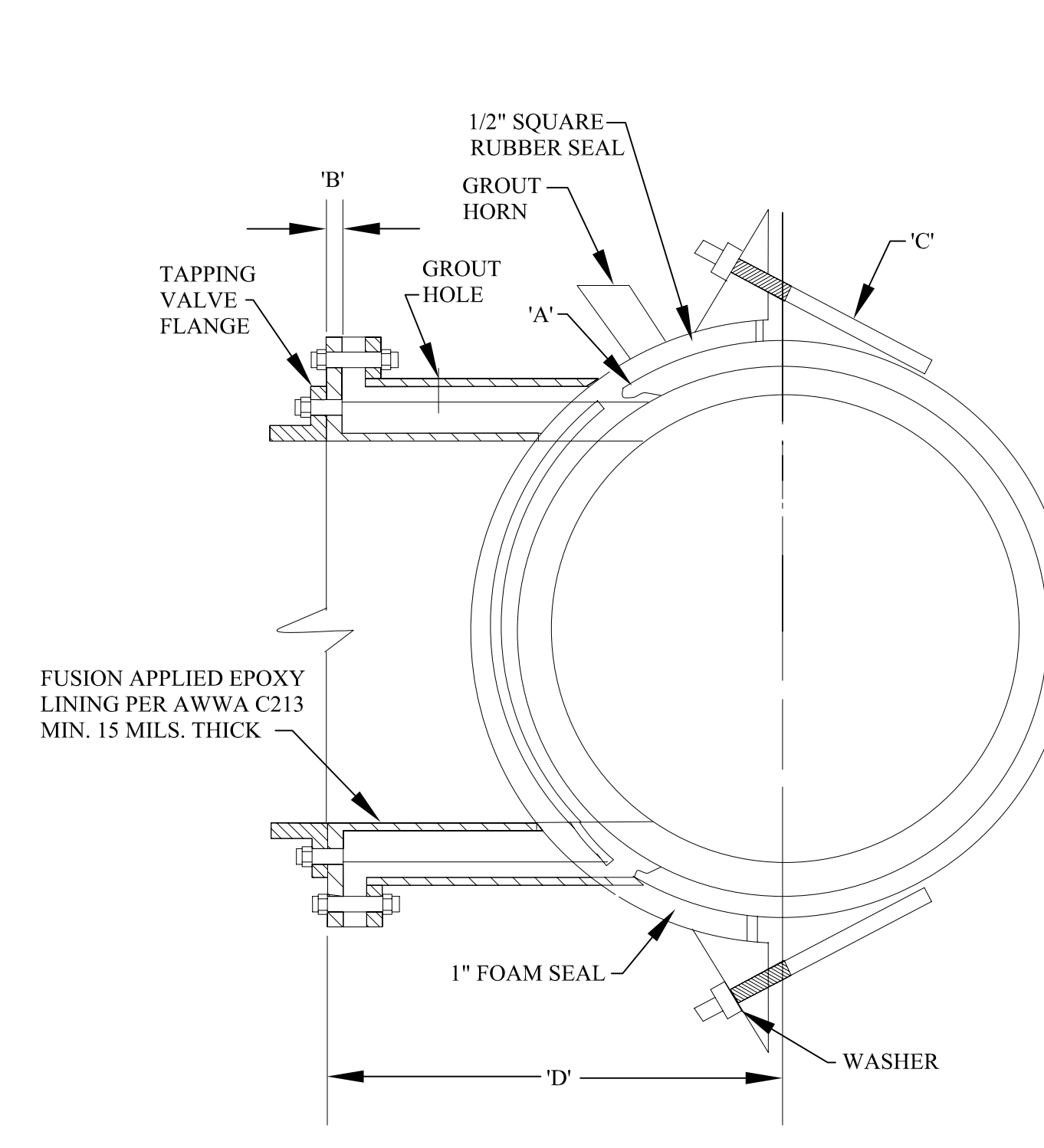
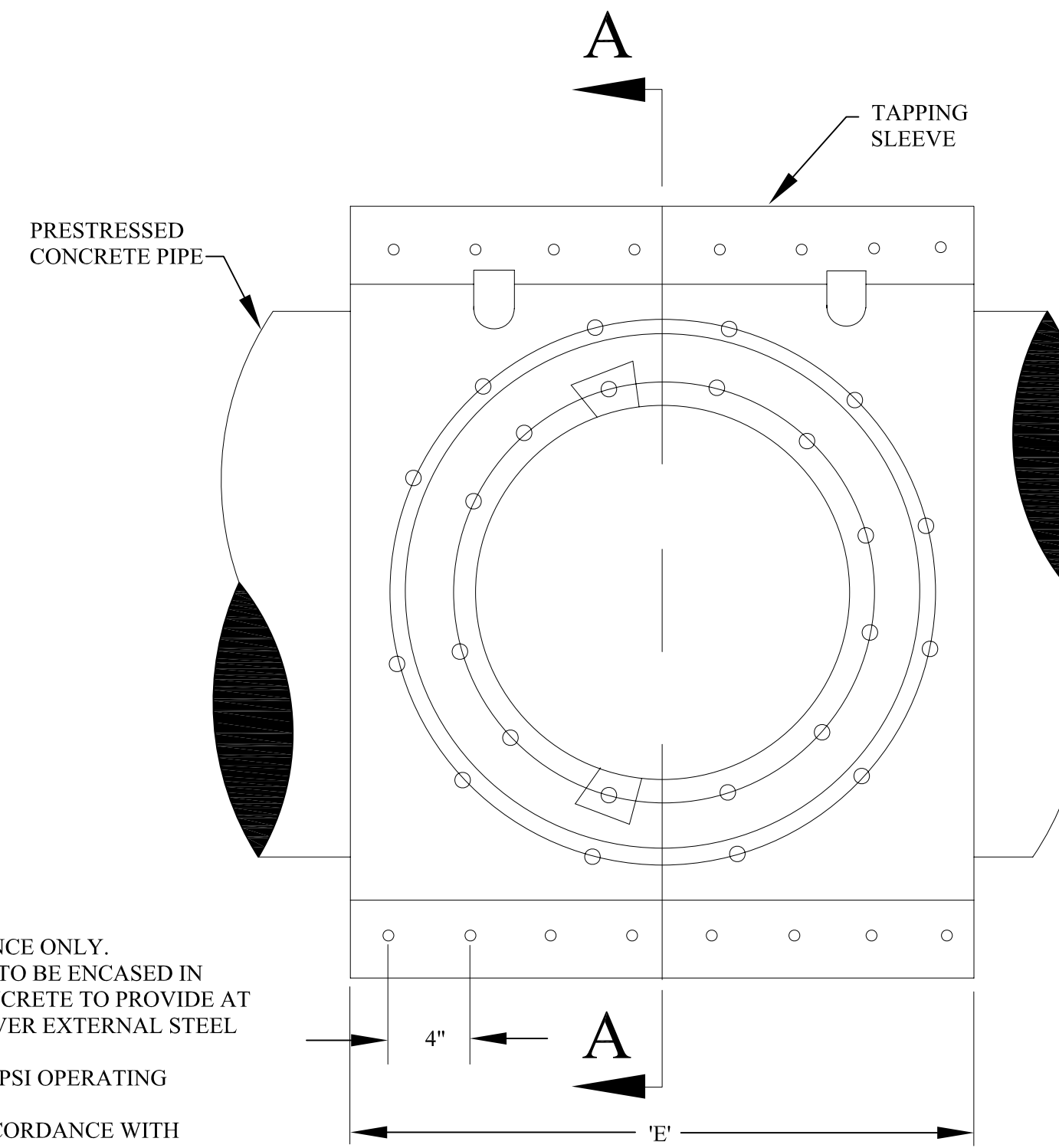


20"x 8" CONCRETE PRESSURE TAP VALVE & WELL ASSEMBLY W/ CONCRETE ENCASEMENT



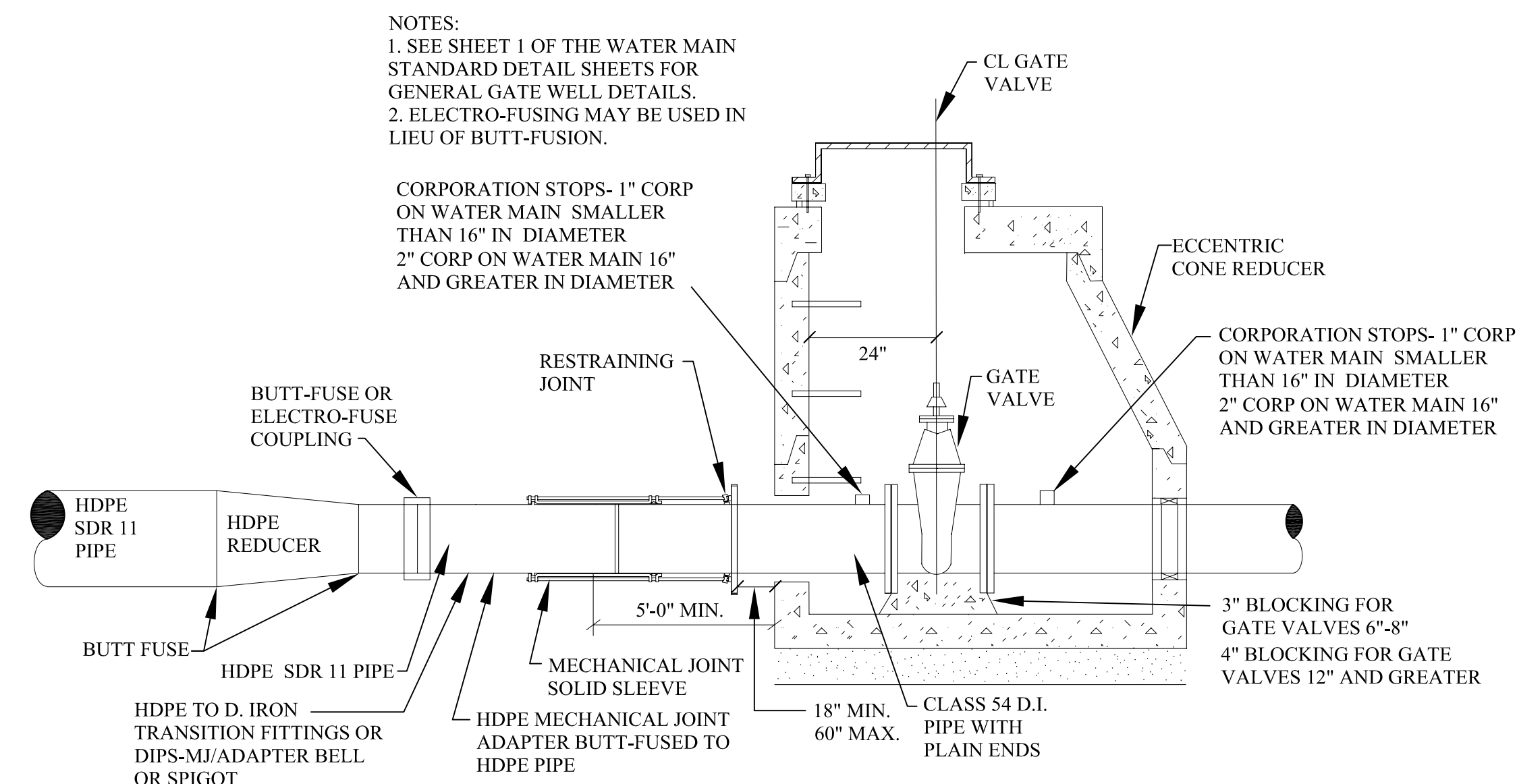
- NOTES: 1) THESE DIMENSIONS ARE FOR REFERENCE ONLY.
 2) ENTIRE SADDLE, INCLUDING STRAPS, TO BE ENCASED IN PORTLAND CEMENT MORTAR OR CONCRETE TO PROVIDE AT LEAST ONE (1) INCH OF THICKNESS OVER EXTERNAL STEEL SURFACES PRIOR TO BACKFILLING.
 3) TAP SADDLES ARE DESIGNED FOR 150 PSI OPERATING PRESSURE.
 4) FLANGE DRILLED AND TAPPED IN ACCORDANCE WITH AWWA C207 CLASS D, CENTERING RING CONFORMS TO MSS-SP 60.
 5) GROUT SHALL SET A MINIMUM OF TWENTY-FOUR (24) HOURS PRIOR TO PRESSURE TESTING.

CONCRETE TAPPING SLEEVE DETAILS

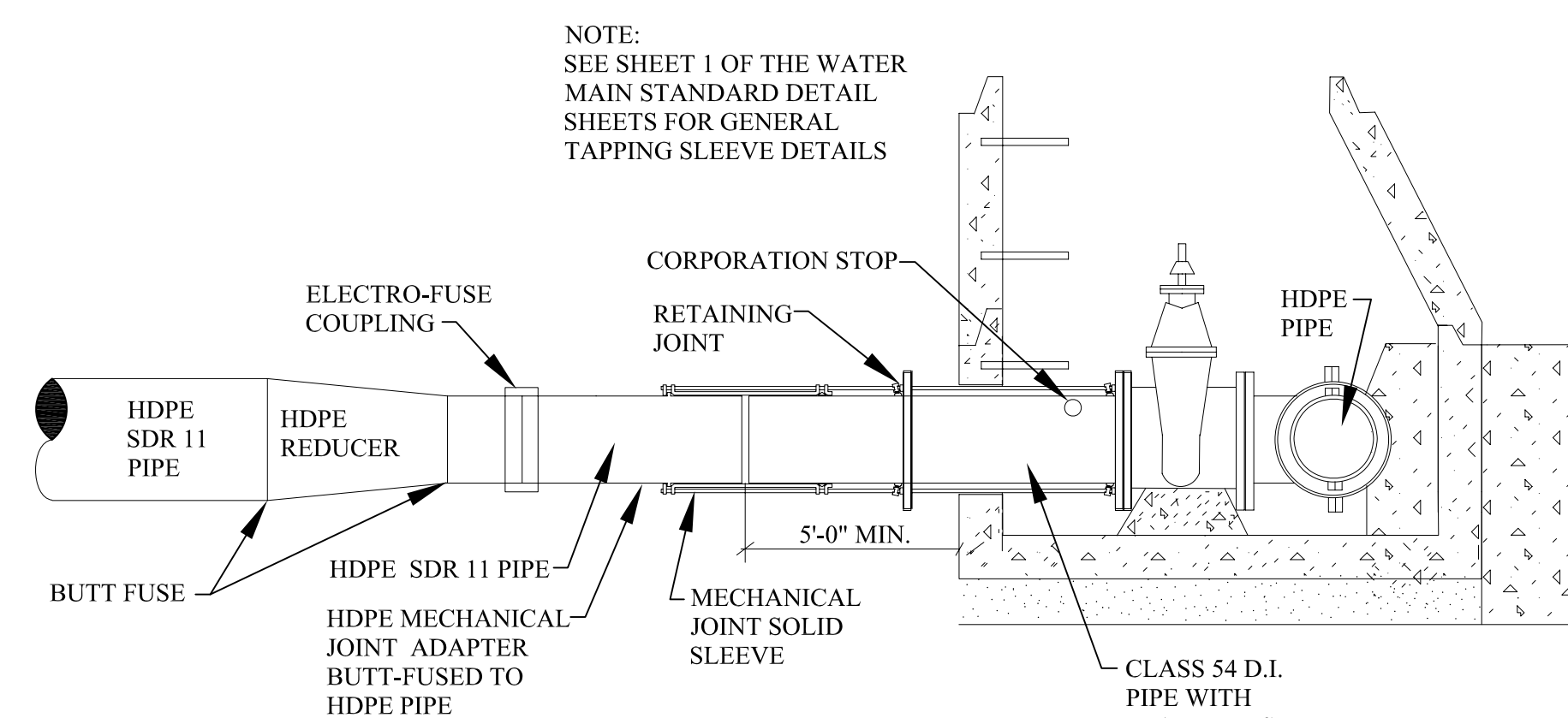


SECTION A-A

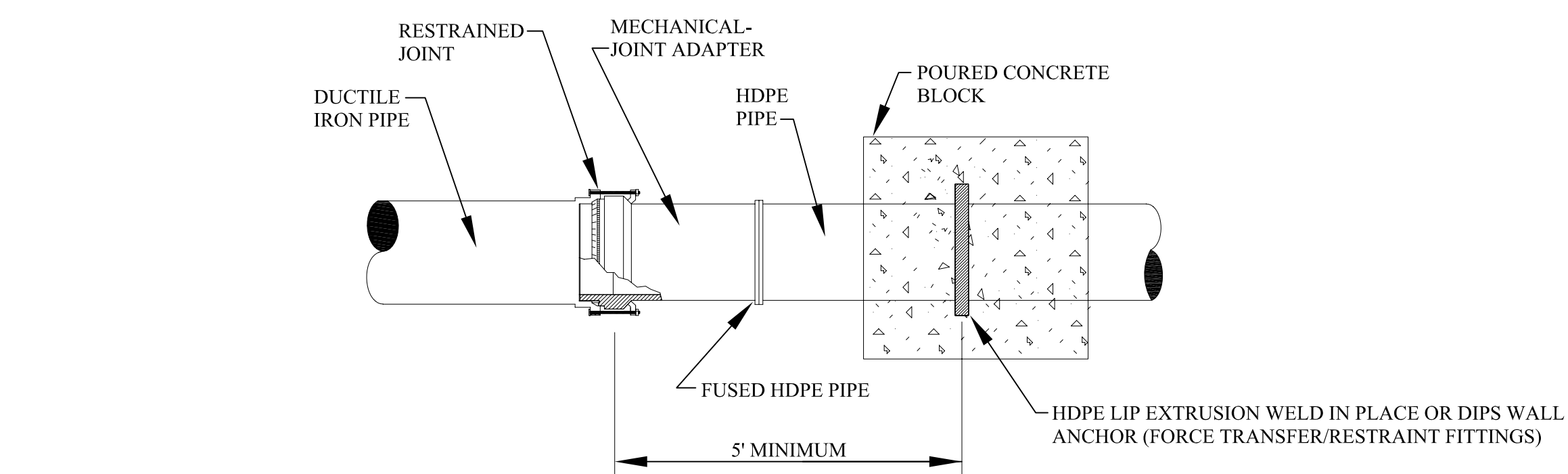
| PIPE SIZE X TAP SIZE | A | B | C | D | E |
|----------------------|------|--------|-----|----------|-----|
| 16" X 4" | 1/4" | 7/8" | 6" | 14-1/16" | 24" |
| 16" X 6" | 1/4" | 1-1/8" | 6" | 14-5/16" | 24" |
| 16" X 8" | 1/4" | 1-1/8" | 6" | 14-5/16" | 24" |
| 16" X 10" | 1/4" | 1-3/8" | 7" | 14-9/16" | 28" |
| 16" X 12" | 1/4" | 1-3/8" | 8" | 14-9/16" | 32" |
| 20" X 4" | 1/4" | 7/8" | 6" | 16-1/2" | 24" |
| 20" X 6" | 1/4" | 1-1/8" | 6" | 16-1/2" | 24" |
| 20" X 8" | 1/4" | 1-1/8" | 6" | 16-1/2" | 24" |
| 20" X 10" | 1/4" | 1-3/8" | 7" | 17" | 28" |
| 20" X 12" | 1/4" | 1-3/8" | 8" | 17" | 32" |
| 24" X 4" | 1/4" | 7/8" | 6" | 18-3/4" | 24" |
| 24" X 6" | 1/4" | 1-1/8" | 6" | 19" | 24" |
| 24" X 8" | 1/4" | 1-1/8" | 6" | 19" | 24" |
| 24" X 10" | 1/4" | 1-3/8" | 7" | 19-1/4" | 28" |
| 24" X 12" | 1/4" | 1-3/8" | 8" | 19-1/4" | 32" |
| 30" X 4" | 1/4" | 7/8" | 6" | 22-1/8" | 24" |
| 30" X 6" | 1/4" | 1-1/8" | 6" | 22-3/8" | 24" |
| 30" X 8" | 1/4" | 1-1/8" | 6" | 22-3/8" | 24" |
| 30" X 10" | 1/4" | 1-3/8" | 7" | 22-5/8" | 28" |
| 30" X 12" | 1/4" | 1-3/8" | 8" | 22-5/8" | 32" |
| 36" X 4" | 1/4" | 7/8" | 6" | 25-1/2" | 24" |
| 36" X 6" | 1/4" | 1-1/8" | 6" | 25-3/4" | 24" |
| 36" X 8" | 1/4" | 1-1/8" | 7" | 25-3/4" | 28" |
| 36" X 10" | 1/4" | 1-3/8" | 8" | 26" | 32" |
| 36" X 12" | 1/4" | 1-3/8" | 9" | 26" | 36" |
| 42" X 4" | 1/4" | 7/8" | 6" | 28-7/8" | 24" |
| 42" X 6" | 1/4" | 1-1/8" | 7" | 29-1/8" | 28" |
| 42" X 8" | 1/4" | 1-1/8" | 8" | 29-1/8" | 32" |
| 42" X 10" | 3/8" | 1-3/8" | 9" | 29-3/8" | 36" |
| 42" X 12" | 3/8" | 1-3/8" | 10" | 29-3/8" | 40" |
| 48" X 4" | 3/8" | 7/8" | 7" | 32-1/4" | 28" |
| 48" X 6" | 3/8" | 1-1/8" | 7" | 32-1/2" | 28" |
| 48" X 8" | 3/8" | 1-1/8" | 7" | 32-1/2" | 28" |
| 48" X 10" | 3/8" | 1-3/8" | 7" | 32-3/4" | 28" |
| 48" X 12" | 3/8" | 1-3/8" | 9" | 32-3/4" | 36" |



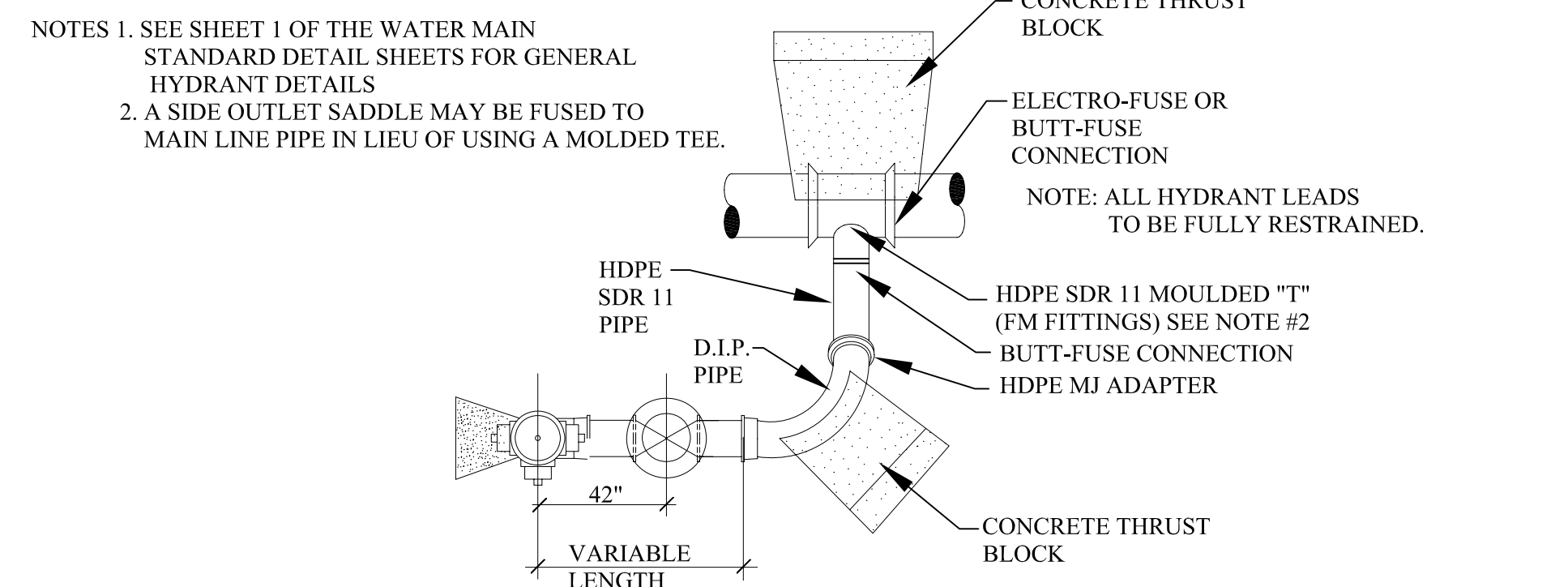
TYPICAL GATE VALVE CONNECTION TO HDPE



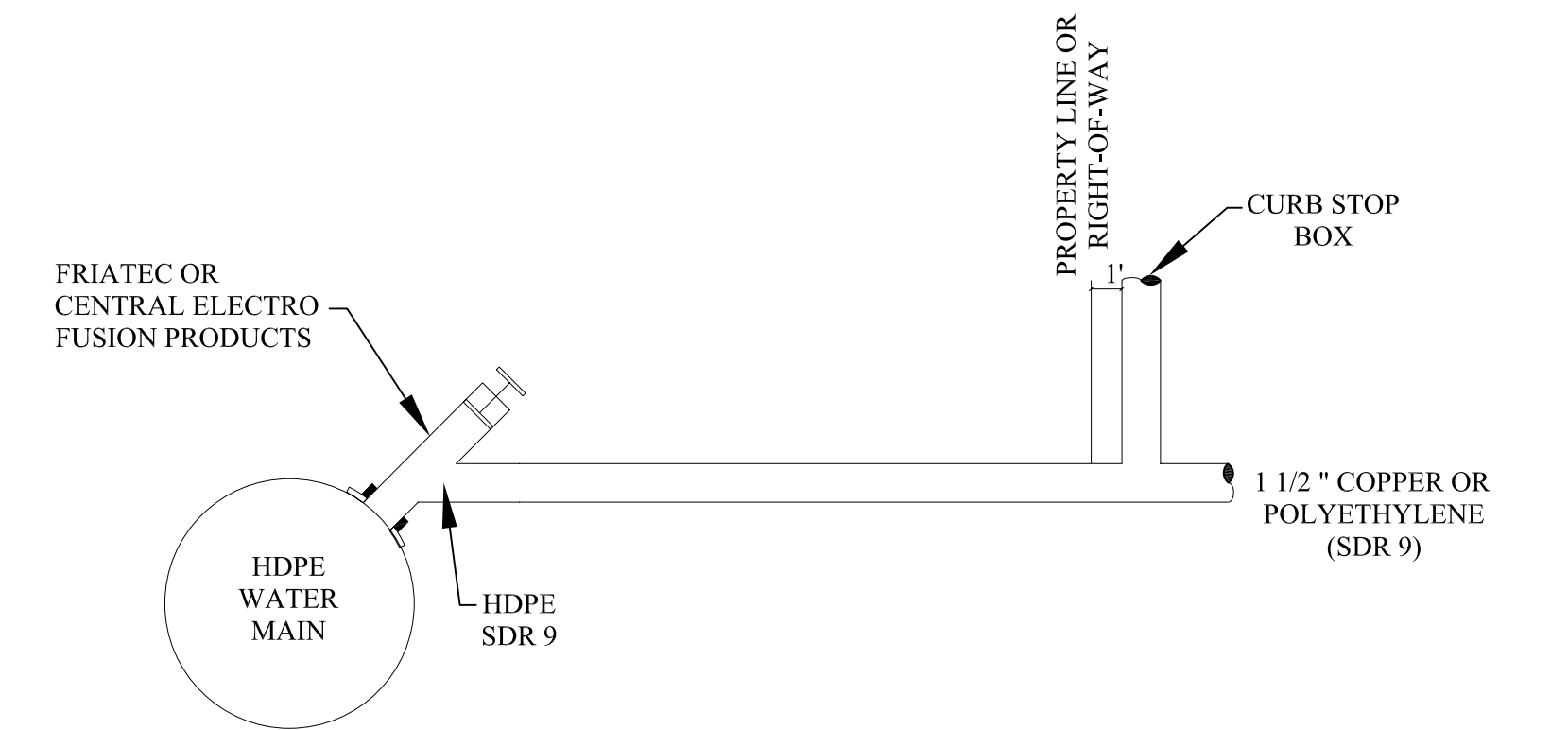
TAPPING SLEEVE, VALVE & WELL



MECHANICAL-JOINT ADAPTER



PLAN HYDRANT SIDE OUTLET



HOUSE LEAD DETAIL HDPE TO COPPER OR POLYETHYLENE (SDR 9)

DETAILS FOR HIGH DENSITY POLYETHYLENE PIPE (HDPE)

| REVISIONS | DATE | APPROVED BY |
|-----------|------|--|
| | | CITY COUNCIL, DATE: JULY 21, 2008 |
| | | PREPARED BY ENGINEERING DIVISION DEPARTMENT OF PUBLIC SERVICES |

NOTIFY ROCHESTER HILLS ENGINEERING DEPARTMENT @ 248-841-2510 48 HRS. PRIOR TO START OF CONSTRUCTION

City of Rochester Hills
 1000 Rochester Hills Drive, Rochester Hills, Michigan 48309

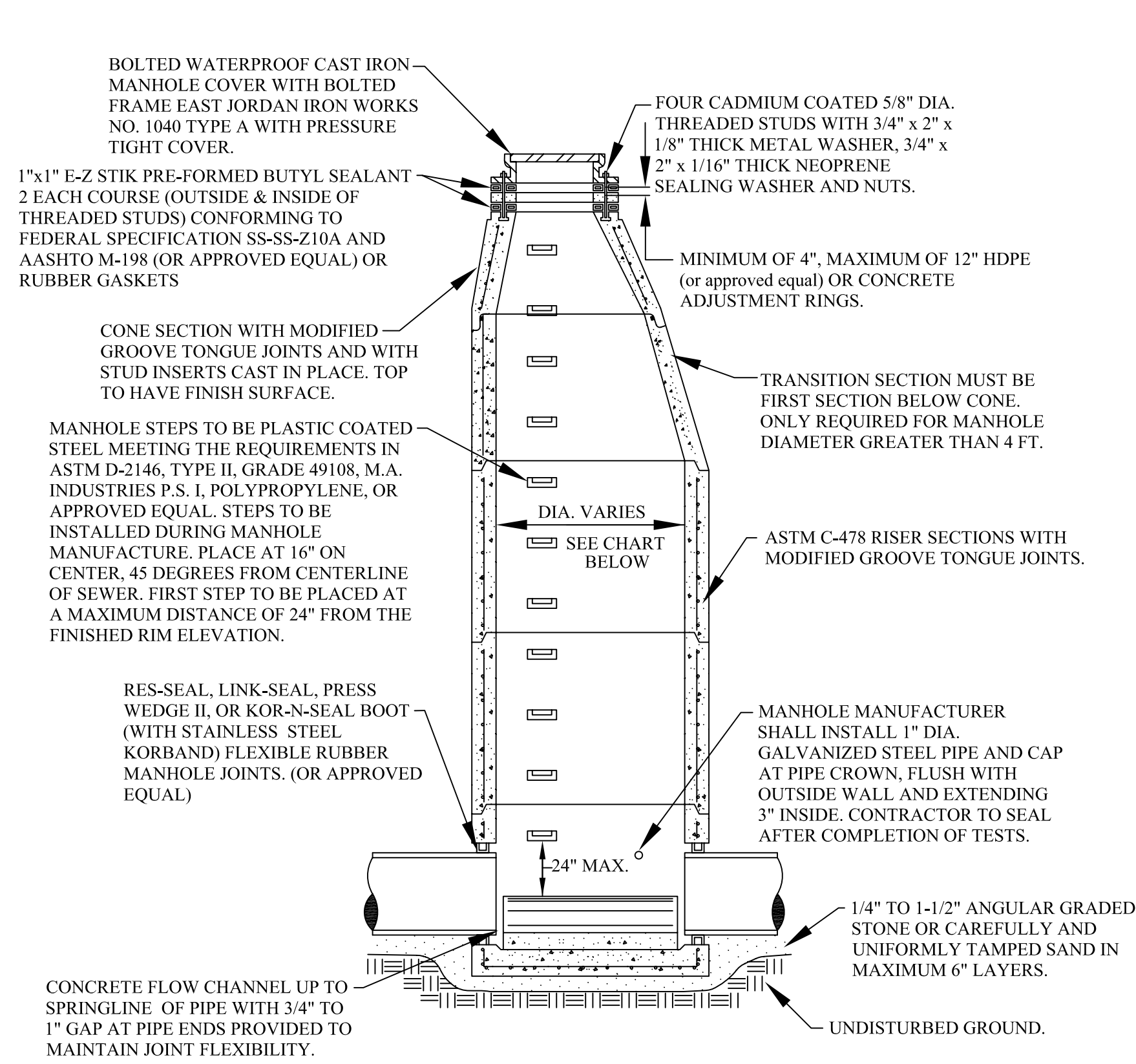
WATER MAIN SPECIAL DETAILS

| | |
|--------------|-----------------|
| NOT TO SCALE | DATE: 7/21/2008 |
| SHEET 1 OF 1 | |



SANITARY SEWER CONSTRUCTION NOTES

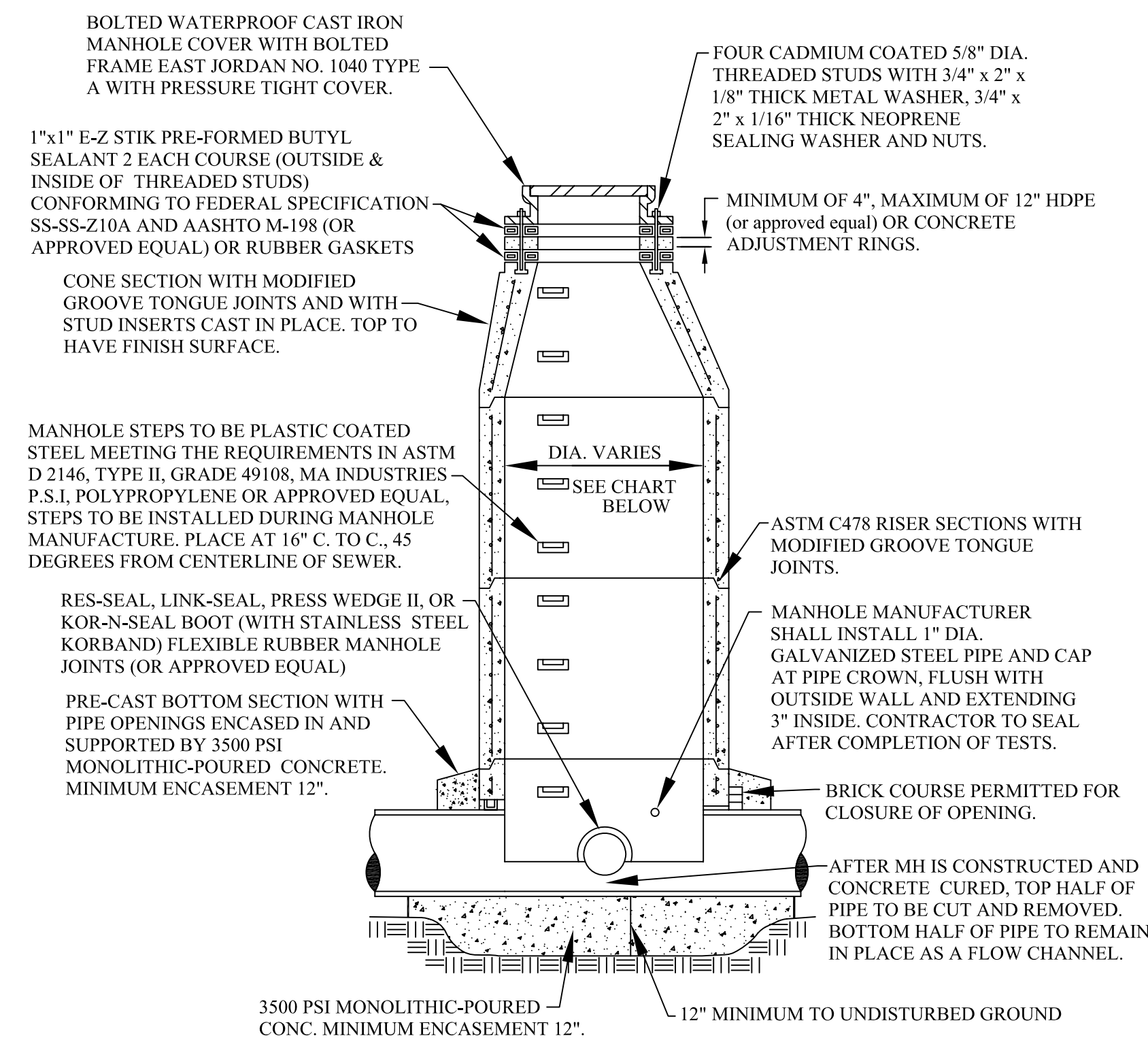
- ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF ROCHESTER HILLS AND THE OAKLAND COUNTY DRAIN COMMISSIONER (OCD). ALL SANITARY SEWER CONSTRUCTION SHALL HAVE FULL-TIME INSPECTION SUPERVISED BY THE CITY OF ROCHESTER HILLS INSPECTION SERVICES.
- NO SEWER INSTALLATION SHALL HAVE AN INFILTRATION EXCEEDING 100 GALLONS PER INCH DIAMETER PER MILE OF PIPE IN A 24 HOUR PERIOD, AND NO SINGLE RUN OF SEWER BETWEEN MANHOLES SHALL EXCEED 100 GALLONS PER INCH DIAMETER PER MILE. AIR TESTS IN LIEU OF INFILTRATION TESTS SHALL BE AS SPECIFIED IN THE OAKLAND COUNTY DRAIN COMMISSIONER STANDARDS. PRELIMINARY-AIR TESTS ARE WITNESSED BY THE CITY AND FINAL AIR TESTS ARE WITNESSED BY BOTH THE CITY AND THE OCD. ONLY PIPE AND PIPE JOINTS APPROVED BY THE CITY MAY BE USED FOR SANITARY SEWER CONSTRUCTION.
- LOCATED IN THE FIRST MANHOLE UPSTREAM FROM THE POINT OF ALL CONNECTIONS TO AN EXISTING SEWER, OR EXTENSION, A TEMPORARY 12-INCH DEEP SUMP SHALL BE PROVIDED IN THE FIRST MANHOLE ABOVE THE CONNECTION WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY ACCEPTANCE TEST UP TO THE STANDARD FILLET PROVIDED FOR THE FLOW CHANNEL. A WATERTIGHT BULKHEAD SHALL BE PROVIDED ON THE DOWNSTREAM SIDE OF THE SUMP MANHOLE.
- AT ALL TIMES WHEN LAYING OF NEW PIPE IS NOT ACTUALLY IN PROGRESS, THE UPSTREAM OPEN END OF THE PIPE SHALL BE CLOSED BY TEMPORARY WATERTIGHT PLUGS OR BY OTHER APPROVED MEANS. IF WATER IS IN THE TRENCH WHEN WORK IS RESUMED, THE PLUG SHALL NOT BE REMOVED UNTIL THE DANGER OF WATER ENTERING THE PIPE HAS PASSED. ALL MAIN LINE PIPE SHALL BE LAID WITH A PIPE LASER BEAM FOR LINE AND GRADE. A TARGET MUST BE INSTALLED AT THE END OF THE PIPE BEING LAYED.
- ALL BUILDING LEADS AND RISERS SHALL BE SIX INCH SDR 23.5 PVC PIPE WITH CHEMICALLY FUSED JOINTS OR GASKETED JOINTS APPROVED BY CITY ENGINEER. BUILDING LEADS TO BE FURNISHED WITH REMOVABLE AIRTIGHT AND WATERTIGHT STOPPERS.
- ALL SEWER PIPE SHALL BE INSTALLED IN CLASS "B" BEDDING OR BETTER.
- ALL NEW MANHOLES SHALL HAVE CITY APPROVED FLEXIBLE, WATERTIGHT SEALS WHERE PIPES PASS THROUGH WALLS. MANHOLES SHALL BE OF PRE CAST SECTIONS WITH MODIFIED GROOVE TONGUE AND RUBBER GASKET TYPE JOINTS. PRE CAST MANHOLE CONE SECTIONS SHALL BE CITY APPROVED MODIFIED ECCENTRIC CONE TYPE. ALL MANHOLES SHALL BE PROVIDED WITH BOLTED, WATERTIGHT COVERS.
- AT ALL CONNECTIONS TO MANHOLES IN ALL SEWERS, OR EXTENSIONS, DROP CONNECTIONS WILL BE REQUIRED WHEN THE DIFFERENCE IN INVERT ELEVATIONS EXCEEDS 18 INCHES.
- GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWN SPOUT DRAINAGE OR WEEP TILE DRAINAGE SHALL NOT BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.
- PRIOR TO ANY EXCAVATION, THE CONTRACTOR SHALL TELEPHONE MISS DIG THREE (3) DAYS IN ADVANCE (811) FOR THE LOCATION OF UNDERGROUND PIPELINE AND CABLE FACILITIES AND SHALL ALSO NOTIFY REPRESENTATIVES OF OTHER UTILITIES LOCATED IN THE VICINITY OF THE WORK.
- AN 18 INCH MINIMUM VERTICAL SEPARATION AND A 10 FOOT MINIMUM HORIZONTAL SEPARATION MUST BE MAINTAINED BETWEEN SANITARY SEWER AND ALL OTHER UTILITIES.
- AS A MEANS OF INSURING PROPER INSTALLATION OF THE SANITARY SEWER PIPE, THE CONTRACTOR SHALL VIDEO INSPECT, ACCORDING TO THE CITY OF ROCHESTER HILLS VIDEO INSPECTION STANDARDS, 100% OF THE SANITARY SEWER PIPE. THE CONTRACTOR SHALL PROVIDE 24 HOURS NOTICE TO THE OAKLAND COUNTY DRAIN COMMISSIONER OR THE CITY OF ROCHESTER HILLS PRIOR TO VIDEO INSPECTION, SO A REPRESENTATIVE MAY BE PRESENT. ROCHESTER HILLS WILL BE PROVIDED WITH A DIGITAL COPY OF THE VIDEO INSPECTION AND LOG IN ACCORDANCE WITH THE CITY OF ROCHESTER HILLS INSPECTION STANDARDS.



STANDARD MANHOLE

MANHOLE SIZING CHART

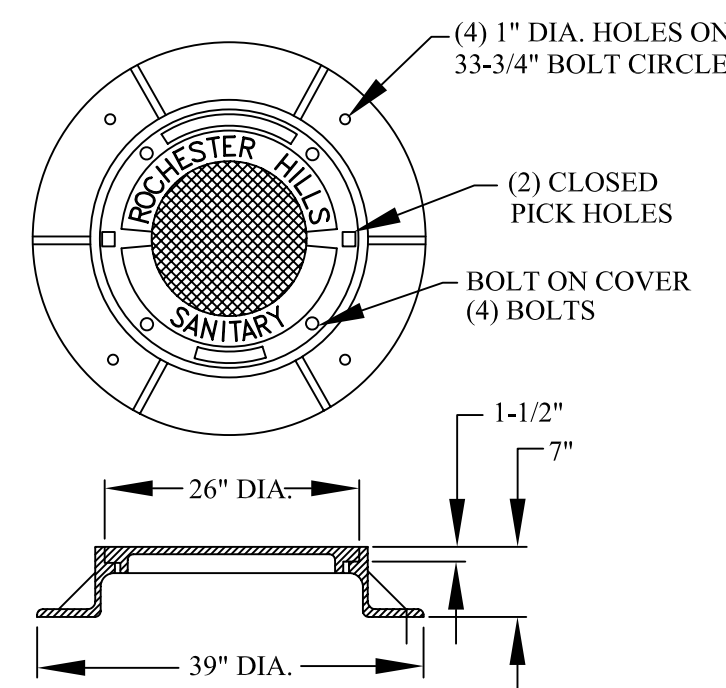
| MANHOLE DIAMETER | MAX. PIPE SIZE FOR STRAIGHT THRU INST. | MAX. PIPE SIZE FOR RIGHT ANGLE INST. |
|------------------|--|--------------------------------------|
| 4' | 24" | 18" |
| 5' | 36" | 24" |
| 6' | 42" | 36" |
| 7' | 60" | 42" |



MANHOLE CONSTRUCTED OVER EXISTING SEWER

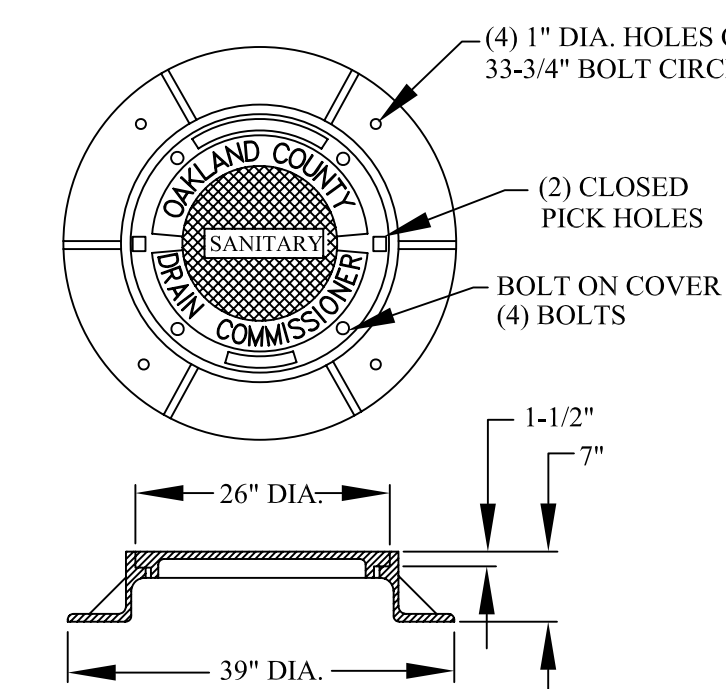
MANHOLE SIZING CHART

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



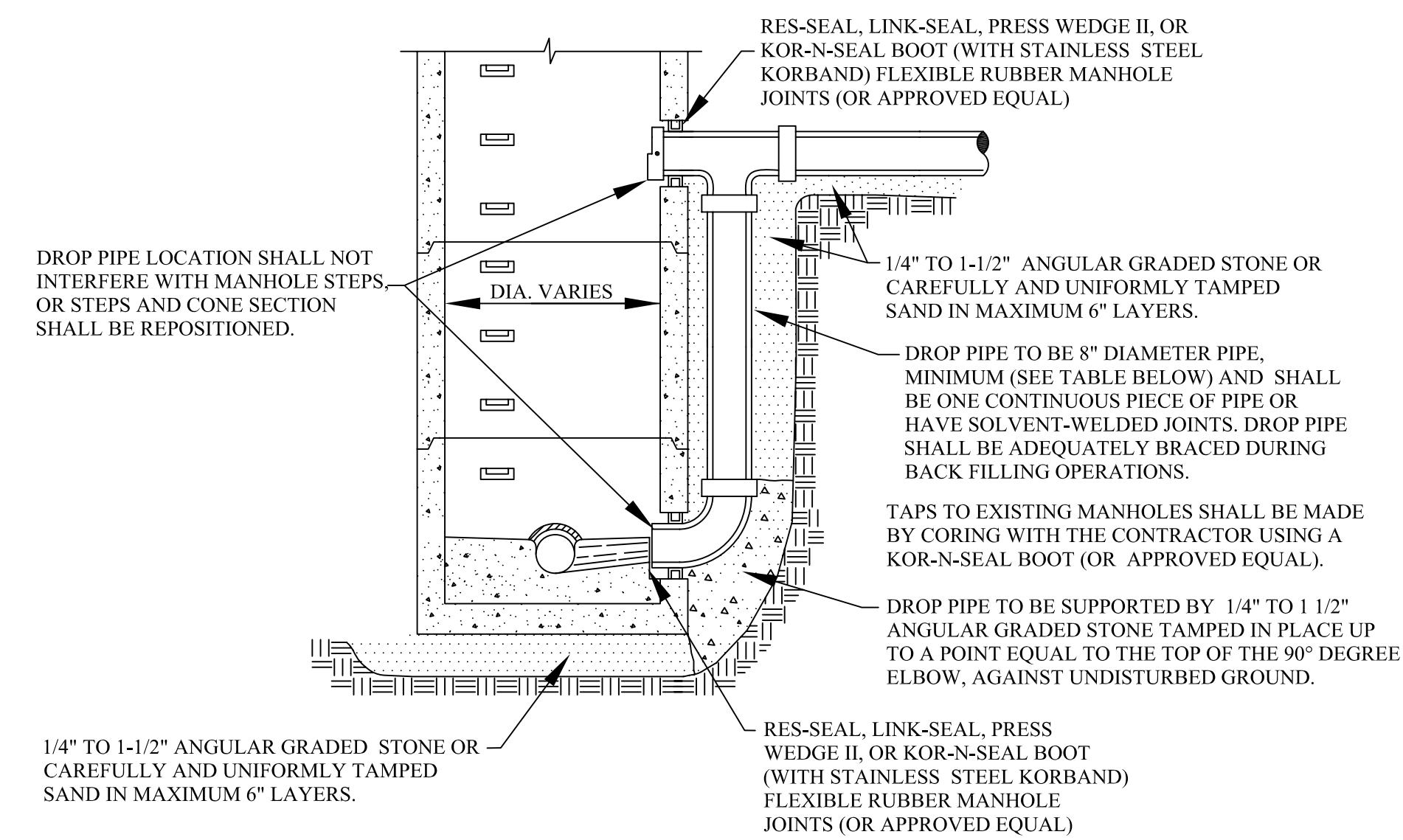
EAST JORDAN IRON WORKS HEAVY DUTY MATERIAL ASTM A48 CL.35 COVER WT., 150 LBS., CATALOG NO. 1040 TYPE A

ROCHESTER HILLS MANHOLE COVER



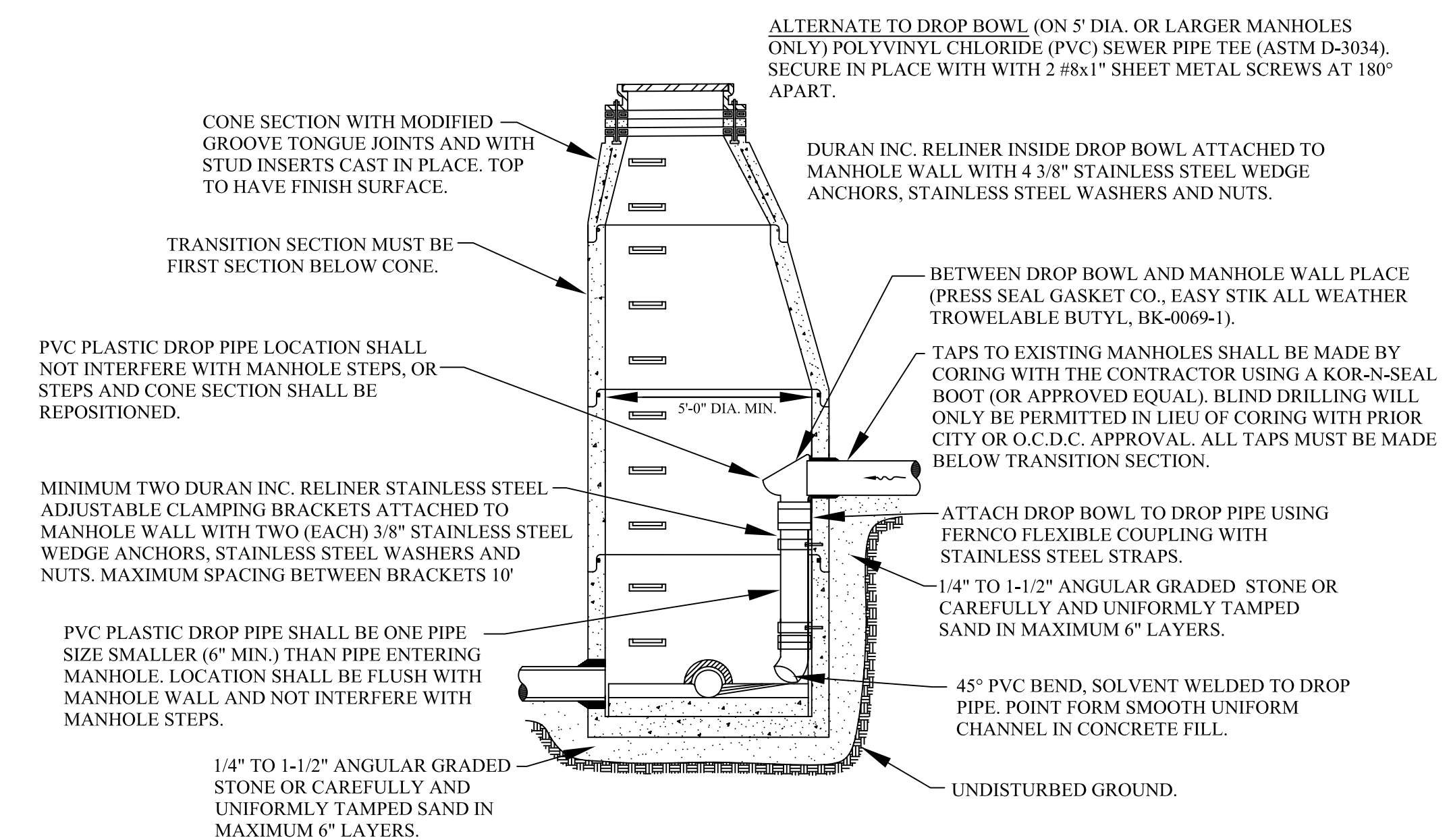
EAST JORDAN IRON WORKS HEAVY DUTY MATERIAL ASTM A48 CL.35 COVER WT., 150 LBS., CATALOG NO. 1040 TYPE A

O.C.D.C. LETTERED MANHOLE COVER



EXTERIOR DROP CONNECTION

| SEWER SIZE | DROP SIZE | MH SIZE |
|------------|-----------|---------|
| UP TO 10" | 8" | 4' |
| UP TO 18" | 10" | 4' |
| UP TO 30" | 18" | 5' |



INTERIOR DROP CONNECTION

NOTE: INTERIOR DROP CONNECTION PERMITTED ONLY WHEN APPROVED BY CITY ENGINEER.



| REVISIONS | DATE | APPROVED BY |
|-----------|------|--|
| | | CITY COUNCIL, DATE: JULY 21, 2008 |
| | | PREPARED BY ENGINEERING DIVISION DEPARTMENT OF PUBLIC SERVICES |

NOTIFY ROCHESTER HILLS ENGINEERING DEPARTMENT @ 248-841-2510 48 HRS. PRIOR TO START OF CONSTRUCTION

City of Rochester Hills
1000 Rochester Hills Drive, Rochester Hills, Michigan 48309

SANITARY SEWER STANDARD DETAILS

| | |
|--------------|-----------------|
| NOT TO SCALE | DATE: 7/21/2008 |
| SHEET 1 OF 2 | |

CITY OF ROCHESTER HILLS GRAVITY BUILDING LEAD REQUIREMENTS AND DETAILS

- ALL BUILDING LEAD WORK MUST BE PERFORMED UNDER THE CITY OF ROCHESTER HILLS INSPECTION.
- FOR ALL CITY OF ROCHESTER HILLS SYSTEMS CALL 248-841-2510 48-HOURS PRIOR TO SCHEDULING INSPECTION.
FOR ALL ODCD-OPERATED SYSTEMS, CALL 248-858-1110 48-HOURS IN ADVANCE PRIOR TO SCHEDULING INSPECTION.
- SANITARY SEWER MAY NOT BE USED AS A DEWATERING OUTLET.
- WHERE AN EXISTING BUILDING LEAD IS BEING EXTENDED, DISSIMILAR TYPES AND SIZES OF PIPE SHALL BE JOINED USING A CITY OF ROCHESTER HILLS APPROVED ADAPTER.
- APPROVED BUILDING LEAD PIPE FOR GRAVITY SEWER LEADS:
A. PVC PLASTIC, ASTM D2751, SDR 23.5.
B. DUCTILE IRON PIPE, AMERICAN WATER WORKS ASSOCIATION (AWWA) C-104/A21.4, CLASS 54. JOINTS SHALL BE SUPER BEL TITE, TYTON, TY-SEAL, MULTI-TITE, DUAL-TITE, OR VERI-TITE.
C. ANY DEVIATIONS FROM ABOVE SPECIFICATIONS REQUIRES APPROVAL BY CITY ENGINEER.
- ALLOWABLE TYPES OF SEWER PIPE ADAPTERS: FERNCO ADAPTER OR FERNCO FLEXIBLE COUPLING.
- FOR 6" LEADS A CLEANOUT MUST BE INSTALLED EVERY 100 FT. FOR 4" LEADS A CLEANOUT MUST BE INSTALLED EVERY 50 FT. 90° BENDS NOT ALLOWED EXCEPT FROM THE HORIZONTAL TO THE VERTICAL WITHIN 5 FEET OF THE BUILDING

CITY OF ROCHESTER HILLS SANITARY SEWER SYSTEM AS-BUILT DRAWING SPECIFICATIONS

IN AREAS WHERE SANITARY SEWER SYSTEMS ARE OPERATED AND MAINTAINED BY THE CITY OF ROCHESTER HILLS DEPARTMENT OF PUBLIC SERVICES, FINAL ACCEPTANCE OF THE SANITARY SEWER SYSTEM MUST BE RENDERED BY THE DEPARTMENT OF PUBLIC SERVICES, BEFORE THE SYSTEM CAN BE USED FOR THE SERVICE INTENDED.

ONE ITEM REQUIRED FOR FINAL ACCEPTANCE SHALL BE THE SUBMISSION OF AS-BUILT DRAWINGS TO THE CITY OF ROCHESTER HILLS ENGINEERING DIVISION, BY THE DESIGN ENGINEER. AS-BUILT DRAWINGS SHALL BE DEFINED AS AND CONTAIN THE FOLLOWING INFORMATION:

- FINAL AS-BUILT DRAWINGS SHALL BE PROVIDED ON MYLAR. XEROX OR ANY HEAT PROCESS REPRODUCTIONS WILL NOT BE ACCEPTED.
- ALONG WITH THE MYLAR PLAN SET, PROVIDE THREE (3) SETS OF BLUEPRINTS, PRODUCED FROM THE MYLARS AND THE PLANS ON ELECTRONIC MEDIA IN AUTOCAD FORMAT (LATEST VERSION).
- THE COVER SHEET SHALL BE SEALED BY THE PROJECT DESIGN ENGINEER, ALONG WITH THE FOLLOWING CERTIFICATION STATEMENT.

I HEREBY CERTIFY THAT OUR FIRM HAS PREPARED THESE AS-BUILT DRAWINGS OF THE IMPROVEMENTS AS CONSTRUCTED, AND THAT TO THE BEST OF MY KNOWLEDGE THOSE IMPROVEMENTS NOTED AS "AS BUILT" WERE CONSTRUCTED IN SUBSTANTIAL CONFORMANCE WITH THE APPROVED CONSTRUCTION PLANS; AND ALSO THAT THE SANITARY SEWER AND STRUCTURES, AS CONSTRUCTED, LIE WITHIN THE EASEMENT DESCRIPTIONS REQUIRED BY THE CITY OF ROCHESTER HILLS.

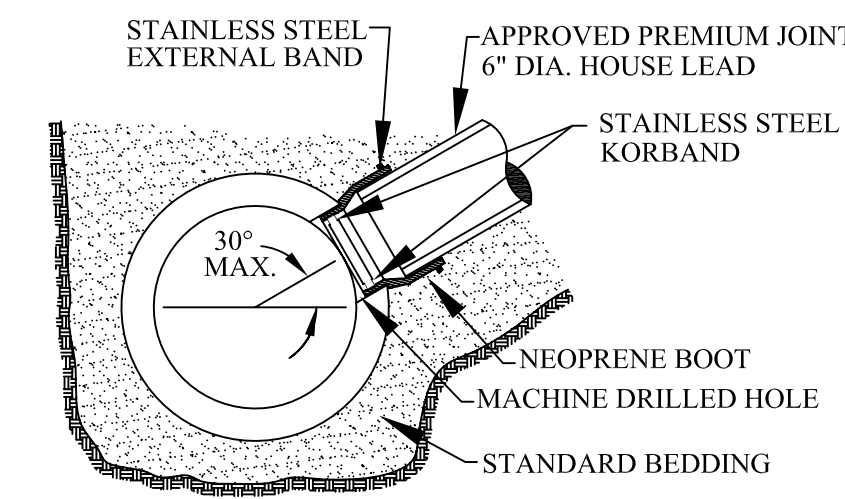
(COMPANY NAME)

(ENGINEER'S SIGNATURE)

PROFESSIONAL ENGINEER NO. _____

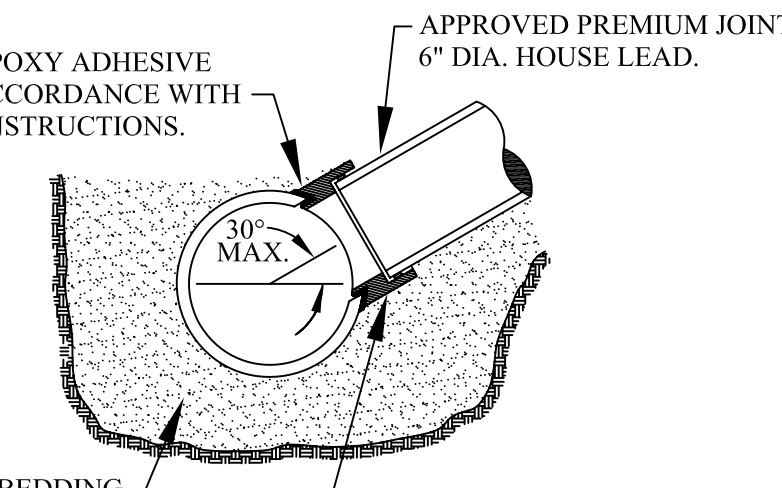
ENGINEER SEAL

- THE MAXIMUM SCALE SHALL BE ONE (1) INCH EQUALS FIFTY (50) FEET.
- THE SIZE, LENGTH, CLASS AND MANUFACTURER OF PIPE INSTALLED SHALL BE INDICATED.
- THE SIZE, MANUFACTURER AND MODEL NUMBERS OF ALL VALVES AND PUMPS INSTALLED SHALL BE INDICATED.
- A TOTAL AS-BUILT DRAWING QUANTITY LIST SHALL BE INCLUDED.
- THE LOCATIONS SHALL BE SHOWN ON THE PLANS WITH AN ACCURACY OF ONE (1) FOOT.
- THE OFFSET OF THE SANITARY MAIN FROM PROPERTY LINES SHALL BE INDICATED.
- ALL MANHOLES, VALVE WELLS, PUMPS AND ALL SANITARY SYSTEM APPURTENANCES SHALL BE LOCATED FROM TWO FIXED OBJECTS (MANHOLES, BUILDING CORNERS ETC.).
- ALL UNDERGROUND APPURTENANCES, SUCH AS TFC/ARV WELLS, METER PITS, GRINDER PUMPS AND PUMP STATION PITS, ETC. SHALL BE LOCATED FROM THE NEAREST MANHOLE THAT IS CONNECTED TO THE SAME SANITARY MAIN AS THE APPURTENANCE.
- THE ACCURATE LOCATION OF ALL UTILITY CROSSINGS WHERE THE VERTICAL SEPARATION IS LESS THAN 18" SHALL BE NOTED.
- AS-BUILTS SHALL BE PREPARED IN ACCORDANCE WITH CITY OF ROCHESTER HILLS AS-BUILT GUIDELINES AS PROVIDED AT THE PRE-CONSTRUCTION MEETING



KOR-N-TEE TAP FOR CONCRETE PIPE

TWO-COMPONENT EPOXY ADHESIVE JOINT, APPLIED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

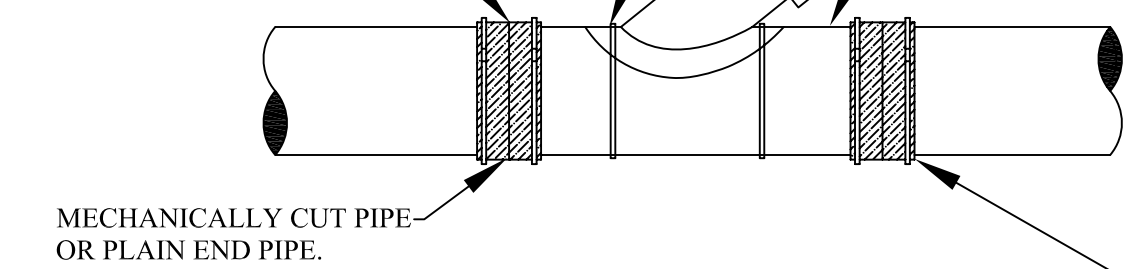


NOTE: SURFACE OF MAIN SEWER SHALL BE CLEANED WITH AN ABRASIVE GRINDER PRIOR TO EPOXY APPLICATION. DUE TO VARIATION OF SET-UP TIME OF EPOXY ADHESIVE WITH TEMPERATURE, ANCHOR STRAPS SHALL BE USED TO SECURE SADDLE IN POSITION IN COLD WEATHER OR WHENEVER WORK IS TO PROCEED PRIOR TO COMPLETE CURE OF EPOXY.

SEWER TAP-ALL SIZES OF MAIN SEWER PIPES VITRIFIED CLAY

WYE SADDLE SAME AS PIPE (PVC) CUT HOLE WITH MECHANICAL SAW WYE SADDLE GLUED IN PLACE WITH STAINLESS STEEL STRAPPING.

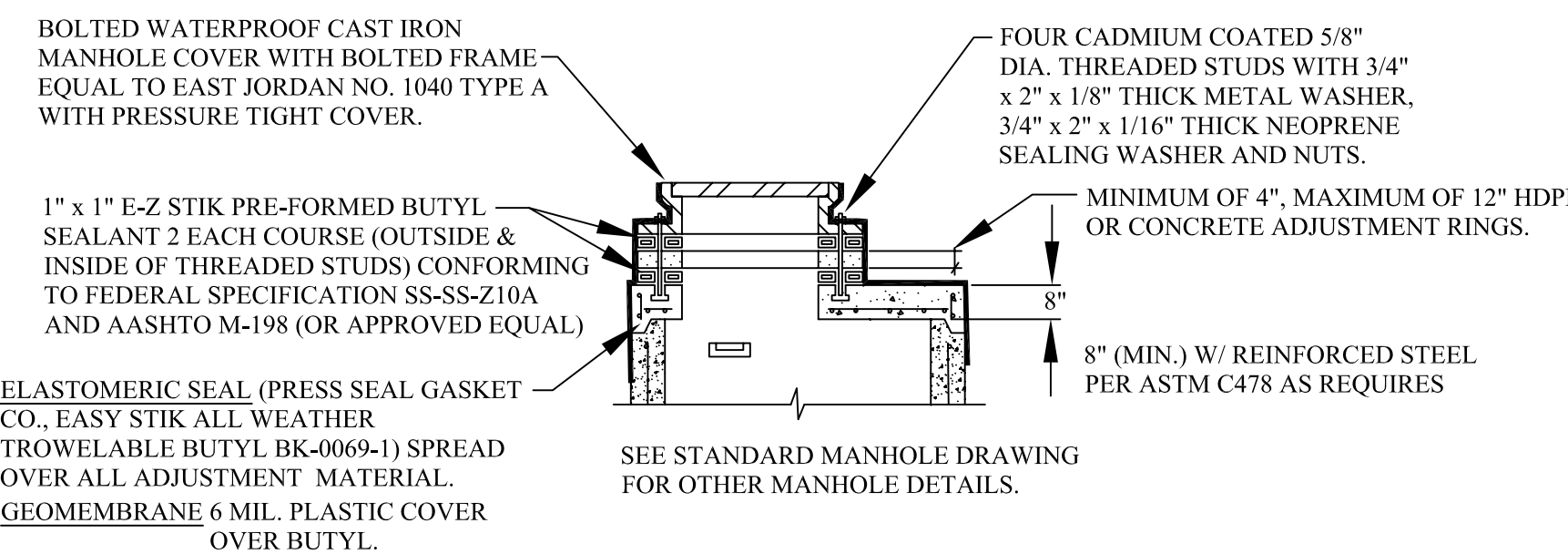
GAP BETWEEN PIPE ENDS SHALL BE AS SMALL AS POSSIBLE WITH A MAXIMUM OF 1/2".



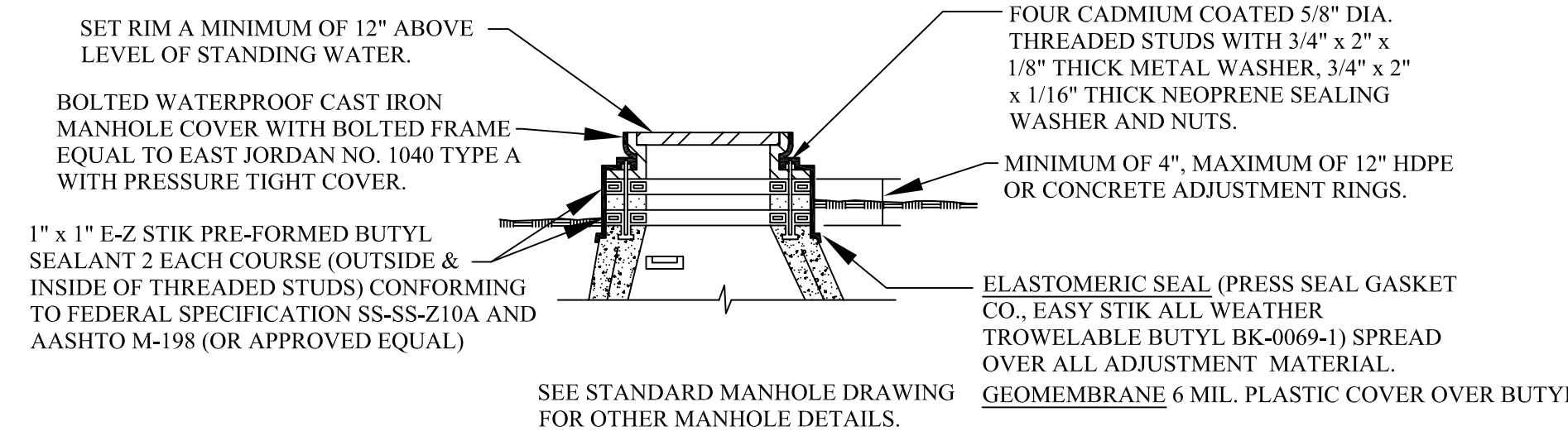
FERNCO FLEXIBLE COUPLING, OR APPROVED EQUAL, USE MANUFACTURER'S BUSHINGS IF DISSIMILAR PIPE ARE CONNECTED. WATER MAIN REPAIR CLAMPS, SMITH-BLAIR, BAKER, FORD OR EQUAL (ALL STAINLESS STEEL) MAY ALSO BE USED.

NOTE: PIPE SHALL BE BEDDED IN STANDARD PLASTIC PIPE BEDDING.

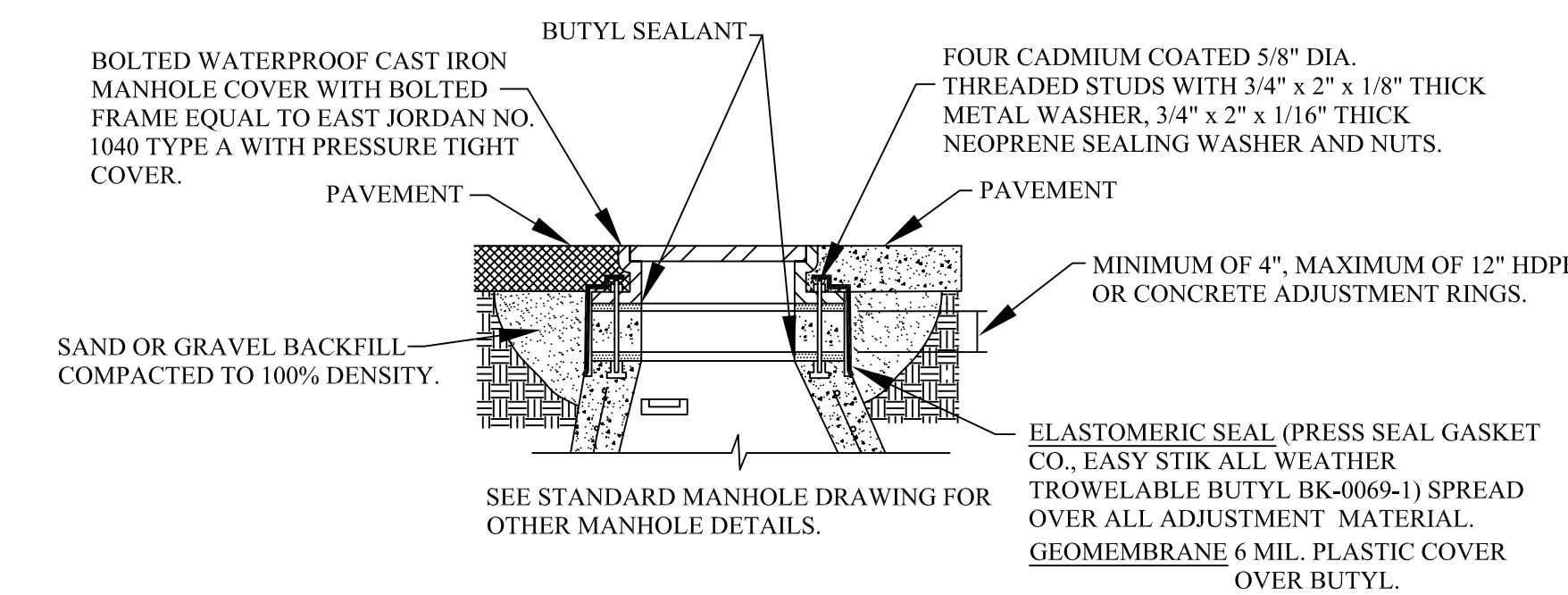
WYE PIPE INSERTION WITH FLEXIBLE COUPLINGS (RIGID PIPE)



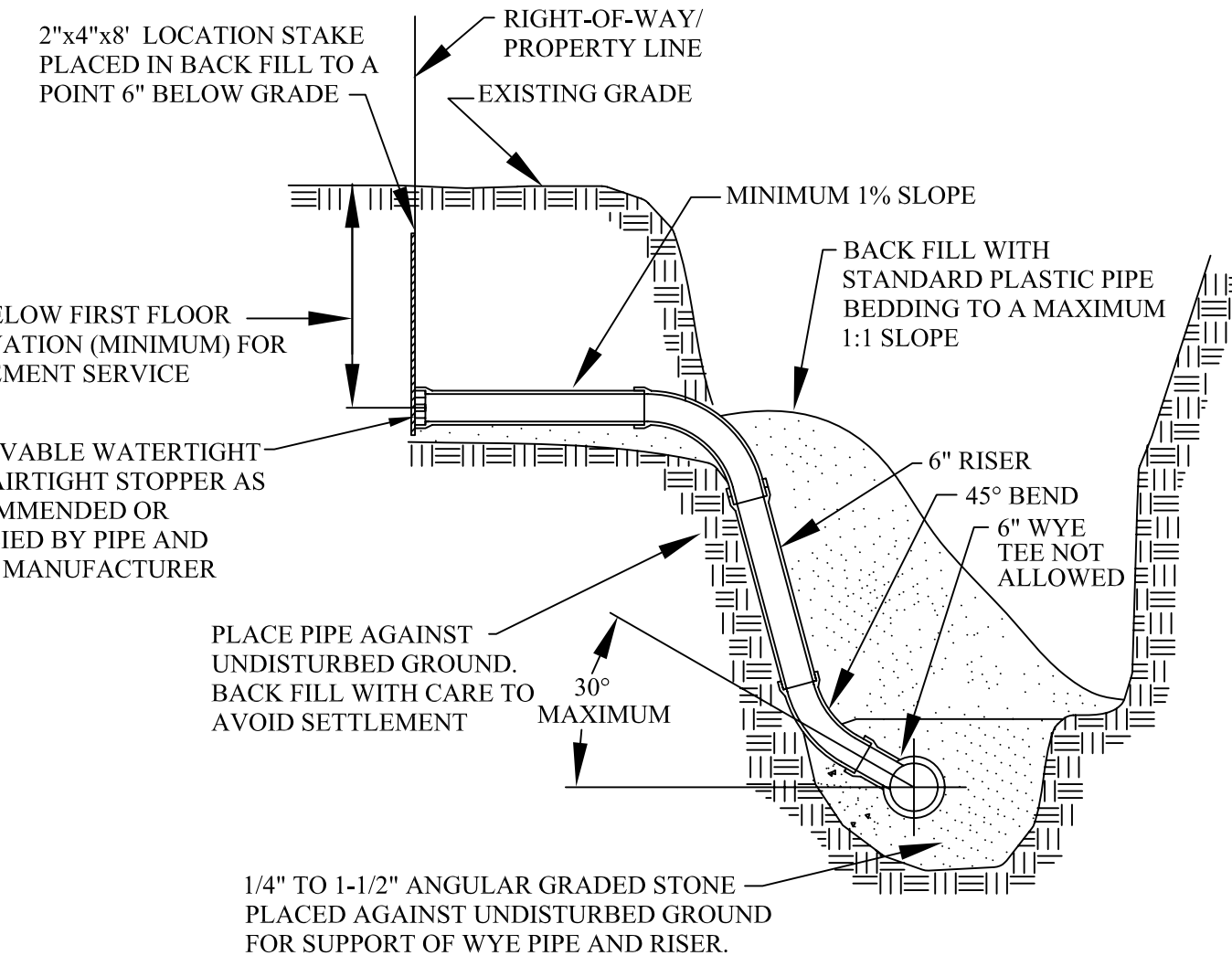
FLAT TOP MANHOLE



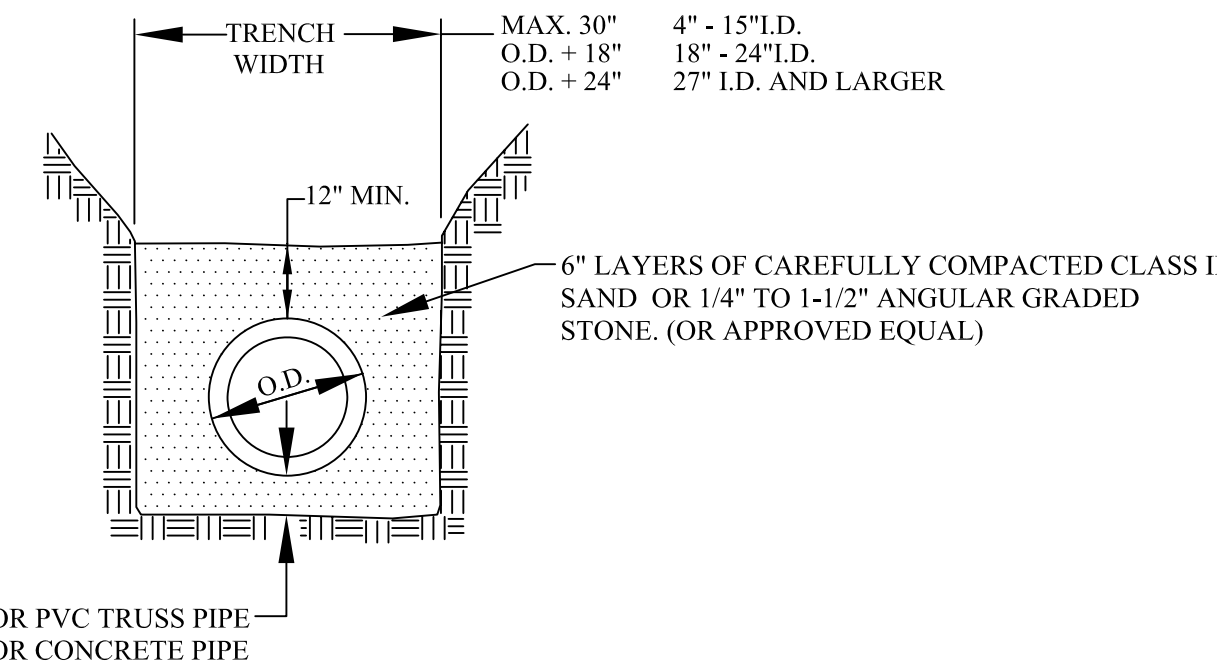
ADJUSTMENT DETAIL FOR MANHOLE TOPS WITHIN FLOOD PRONE AREAS



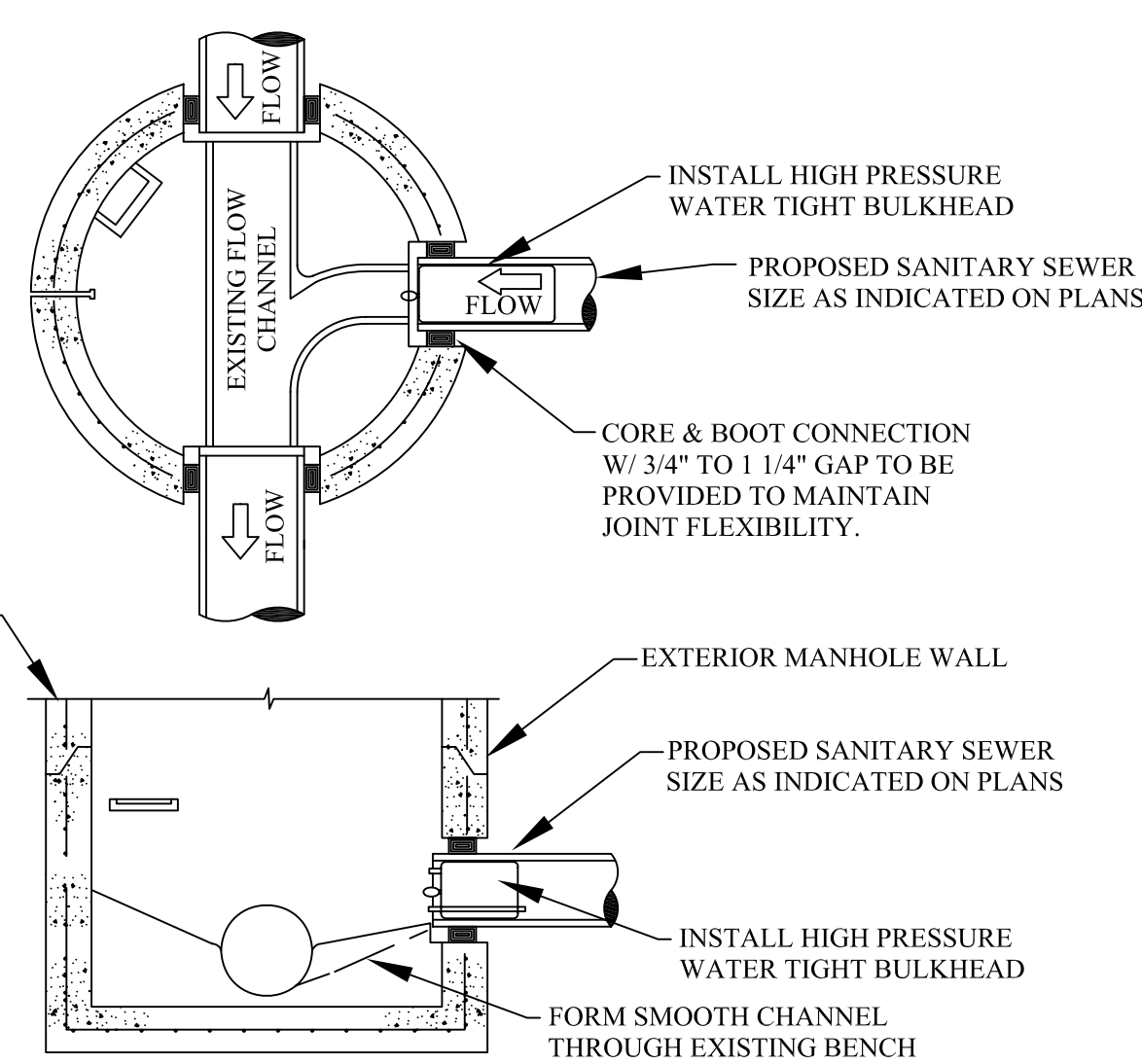
ADJUSTMENT DETAIL MANHOLE TOPS WITHIN PAVEMENT AREAS



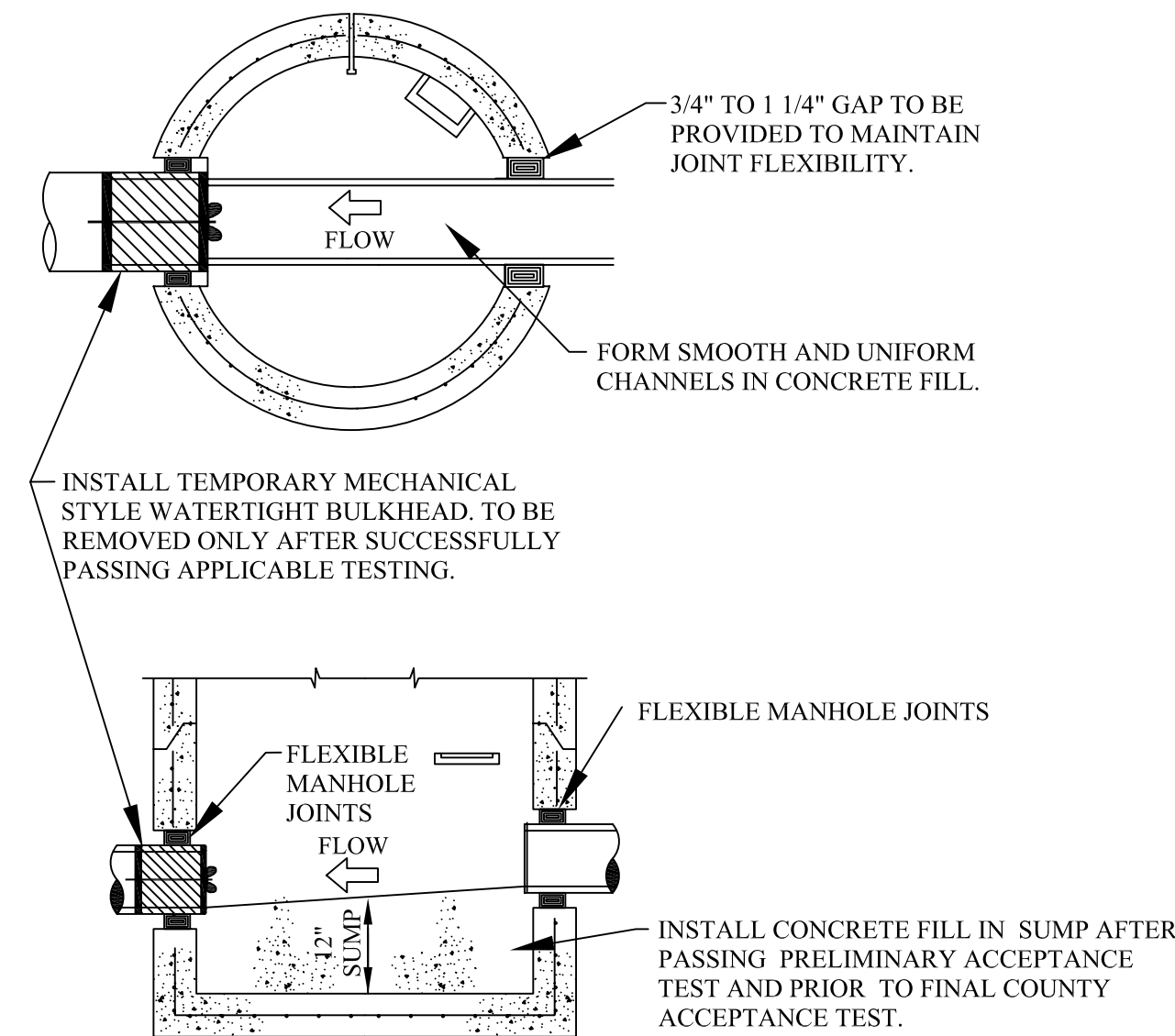
HOUSE LEAD DETAIL



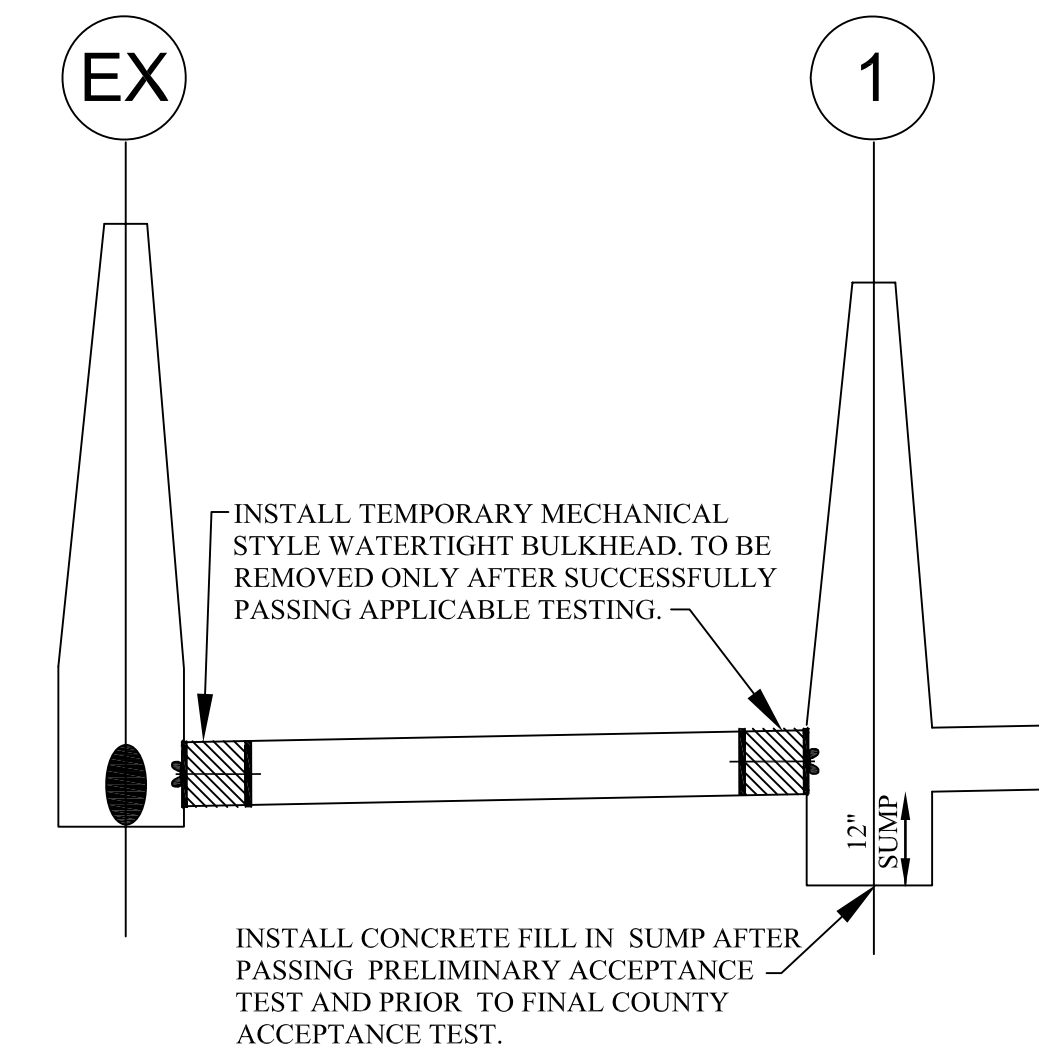
STANDARD BEDDING (CLASS B)



TESTING BULKHEAD IN EXISTING MANHOLE



FIRST MANHOLE UPSTREAM FROM SANITARY TAP



PROFILE OF BULKHEADS AND ONE FOOT SUMP

| REVISIONS | DATE | APPROVED BY |
|-----------|------|---|
| | | CITY COUNCIL, DATE: JULY 21, 2008 |
| | | PREPARED BY ENGINEERING DIVISION DEPARTMENT OF PUBLIC SERVICES |

NOTIFY ROCHESTER HILLS ENGINEERING DEPARTMENT @ 248-841-2510 48 HRS. PRIOR TO START OF CONSTRUCTION

City of Rochester Hills
1000 Rochester Hills Drive, Rochester Hills, Michigan 48309

**SANITARY SEWER
STANDARD DETAILS**

| | |
|--------------|-----------------|
| NOT TO SCALE | DATE: 7/21/2008 |
| SHEET 2 OF 2 | |