SPECIAL
PLANNING COMMISSION MEETING
Monday, June 25, 2018 – 7:00 p.m.
City Council Chambers
23600 Liberty Street
Farmington, MI 48335

AGENDA

1. **Roll Call**

2. **Approval of Agenda**

3. **Final Site Plan Review – PUD Planned Unit Development: Liberty Hill, 32795 Ten Mile Road**

4. **Public Comment**

5. **Planning Commission Comment**

6. **Adjournment**

Farmington Planning Commission Staff Report	**Special Planning Commission** **Date:** June 25, 2018	**Reference Number 3**

Submitted by: Kevin Christiansen, Economic and Community Development Director

Description Final Site Plan Review - PUD Planned Unit Development: Liberty Hill, 32795 Ten Mile Road

Background

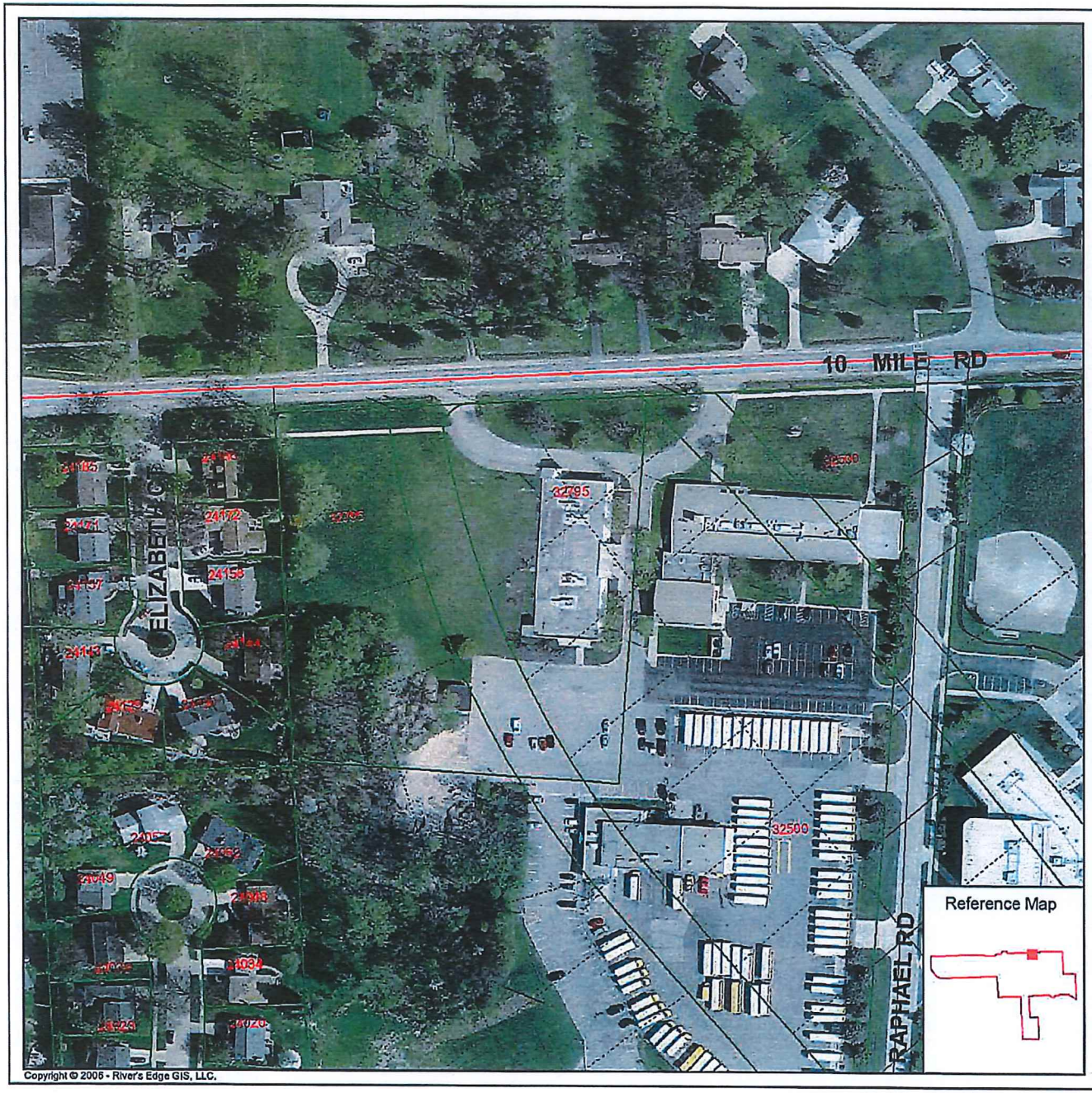
This item is a Final Site Plan Review on a proposed PUD Planned Unit Development Plan for the redevelopment of the Old 47th District Courthouse Property. At the November 13, 2017 Planning Commission meeting, the Commission held a pre-application conference (discussion and review) with the applicant on a proposed PUD planned unit development concept plan for the redevelopment of the Old Courthouse Site and scheduled the required public meeting at the December 11, 2017 Planning Commission meeting. At the January 8, 2018 Planning Commission meeting, the Commission held the required PUD Public Hearing and recommended approval of the preliminary/conceptual PUD Plan to the City Council. At their March 19, 2018 meeting, the City Council approved the preliminary/conceptual PUD plan and PUD agreement for Liberty Hill.

The applicant, Boji Development, Inc., 10 Mile Development Group, LLC of Farmington Hills has submitted a Final PUD Site Plan for the redevelopment of the Old 47th District Courthouse Property. The final site plan includes a conceptual plan, an existing conditions survey of the site, a final site plan, a landscape planting plan, proposed floor plans and proposed building elevations. Also attached is an aerial photo of the site. The following additional information is attached:

- A Final PUD Site Plan planning review letter from OHM dated 6-21-18
- A Final PUD Site Plan engineering review letter from OHM dated 6-21-18.
- Colored renderings of the proposed floor plans, building elevations and landscape plan (previously submitted by the applicant).

The applicant requested and will be at the special June 25, 2018 meeting to present the Final PUD Site Plan to the Commission.

Attachments



City of Farmington CivicSight Map

MAP LEGEND:

- CITY BOUNDARY
- RIVERS-STREAMS
- MULTITENANTBUILDING (Type)
  - BUILT
  - PROPOSED
- COMM_INDUST BLDGS
- RAPHAEL STREET(POLY)2
- RAPHAEL STREET(POLY)
- PARCELS
- ROADS OUTSIDE FARMINGTON
- RIGHTOFWAY
- MULTITENANTPAVING
- ROW EXTEND
- LOT HISTORY
- OPEN WATER (FEATURETYP)
  - DetentionPond
  - StreamRiver
  - LakePond
  - Channel
  - SwampMarsh
- 2010 AERIAL PHOTOS (Image)

Map Scale: 1 inch = 165 feet
Map Date: 6/07/2014
Data Date: May 30, 2014

Sources: City of Farmington, Oakland County GIS Utility, River's Edge GIS, LLC.

Disclaimer:
Note: The information provided by this program has been compiled from recorded deeds, plats, taxmaps, surveys, and other public records and data. It is not a legally recorded map or survey and is not intended to be used as one. Users of this data are hereby notified that the information sources mentioned above should be consulted for verification of the information. Once again, USE AT YOUR OWN RISK!!!

LIBERTY HILL

FINAL SITE / ENGINEERING PLANS

CITY OF FARMINGTON, OAKLAND COUNTY

PROPRIETOR:
BK DEVELOPMENT GROUP, LLC
31000 NORTHWESTERN HIGHWAY,
SUITE 145
FARMINGTON HILLS, MI 48334
CONTACT: FRANCIS BOJI
PHONE: 248-702-6919
FAX: 248-702-6369

SURVEYOR/ENGINEER:
ALPINE ENGINEERING, INC.
46892 WEST ROAD, SUITE 109
NOVI, MI 48377
CONTACT: SHILOH DAHLIN, PE
PHONE: 248-926-3701
FAX: 248-926-3765

LANDSCAPE ARCHITECT:
ALLEN DESIGN
557 CARPENTER
NORTHVILLE, MI 48167
CONTACT: JIM ALLEN, RLA
PHONE: 248-467-4668

LOCATION MAP
SCALE: 1" = ±700'

SHEET INDEX:

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

NOTE:
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STATE OF MICHIGAN
SHILOH A. DAHLIN
ENGINEER
NO. 49888
LICENSED PROFESSIONAL ENGINEER

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SITE ENGINEERING
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CONSTRUCTION LAYOUT

SURVEYING
ALTA SURVEYS
BOUNDARY SURVEYS
TOPOGRAPHIC SURVEYS
PARCEL SPLITS

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

CLIENT: *BOJI DEVELOPMENT*

COVER SHEET

LIBERTY HILL
TOWNSHIP-IN
CITY OF FARMINGTON
OAKLAND COUNTY
MICHIGAN

SECTION: 27 RANGE: 9E

REVISED
03-07-2018 PSP SUBMITTAL
06-11-2018 ENG SUBMITTAL

DATE: 12-04-2017
DRAWN BY: SD
CHECKED BY: TG
NOT TO SCALE
FBK:
CHF:
SCALE HOR 1"= FT.
VER 1"= FT.

1

17-484

DESCRIPTION:

A PARCEL OF LAND BEING ALL OF LOTS 1, 2, 3, 26 AND 27 AND PARTS OF LOTS 49, 50, 29, 29, 25 AND 4 AND PART OF MARBLEHEAD BOULEVARD (60' WIDE) OF "FARMINGTON WOODS" BEING A SUBDIVISION OF PARTS OF THE NORTHEAST 1/4 AND OF THE EAST 1/2 OF THE NORTHWEST 1/4 OF SECTION 27, TOWN 1 NORTH, RANGE 9 EAST, VILLAGE OF FARMINGTON (NOW CITY OF FARMINGTON), OAKLAND COUNTY, MICHIGAN AS RECORDED IN LIBER 40 OF PLATS, PAGE 24, OAKLAND COUNTY RECORDS, BEING MORE PARTICULARLY DESCRIBED AS: BEGINNING AT A POINT DISTANT S87°57'00"W 886.53 FEET ALONG THE NORTH LINE OF SECTION 27 (ALSO BEING THE CENTERLINE OF 10 MILE ROAD) AND S06°03'10"W 30.17 FEET FROM THE NORTH 1/4 CORNER OF SECTION 27; THENCE S06°03'10"W 445.01 FEET; THENCE N84°14'55"W 376.96 FEET; THENCE N00°02'00"E 404.38 FEET; THENCE N89°57'00"E 421.75 FEET TO THE POINT OF BEGINNING.

CONTAINING 169,150 SQ. FT. OR 3.88 ACRES OF LAND.

BENCHMARK:

BM – ARROW ON HYDRANT ±64' NORTHWEST OF THE NORTHWEST BUILDING CORNER.
ELEVATION 761.15 NAVD88

NOTE:

BEARINGS BASED ON NORTH LINE OF FARMINGTON WOODS SUB, L.40 OF PLATS, P.24

NOTE:

SURVEY WAS PERFORMED IN WINTER CONDITIONS UNDER SNOW AND ICE.

LEGEND:

- EX. CATCH BASIN
- EX. STORM MANHOLE
- EX. END SECTION
- EX. SANITARY MANHOLE
- EX. CLEANOUT
- EX. WATER GATE VALVE
- EX. COMMUNICATIONS MANHOLE
- EX. HYDRANT
- EX. WATER VALVE
- EX. WATER SHUTOFF
- EX. GAS SHUTOFF
- EX. GAS VENT
- EX. ELECTRIC MANHOLE
- EX. HANDHOLE
- EX. PEDESTAL
- EX. TRANSFORMER
- EX. LIGHTPOLE
- EX. UTILITY POLE
- EX. GUY ANCHOR
- EX. COMMUNICATION MANHOLE
- EX. GENERIC MANHOLE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. WATER MAIN

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TOPOGRAPHIC SURVEY

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MICHIGAN
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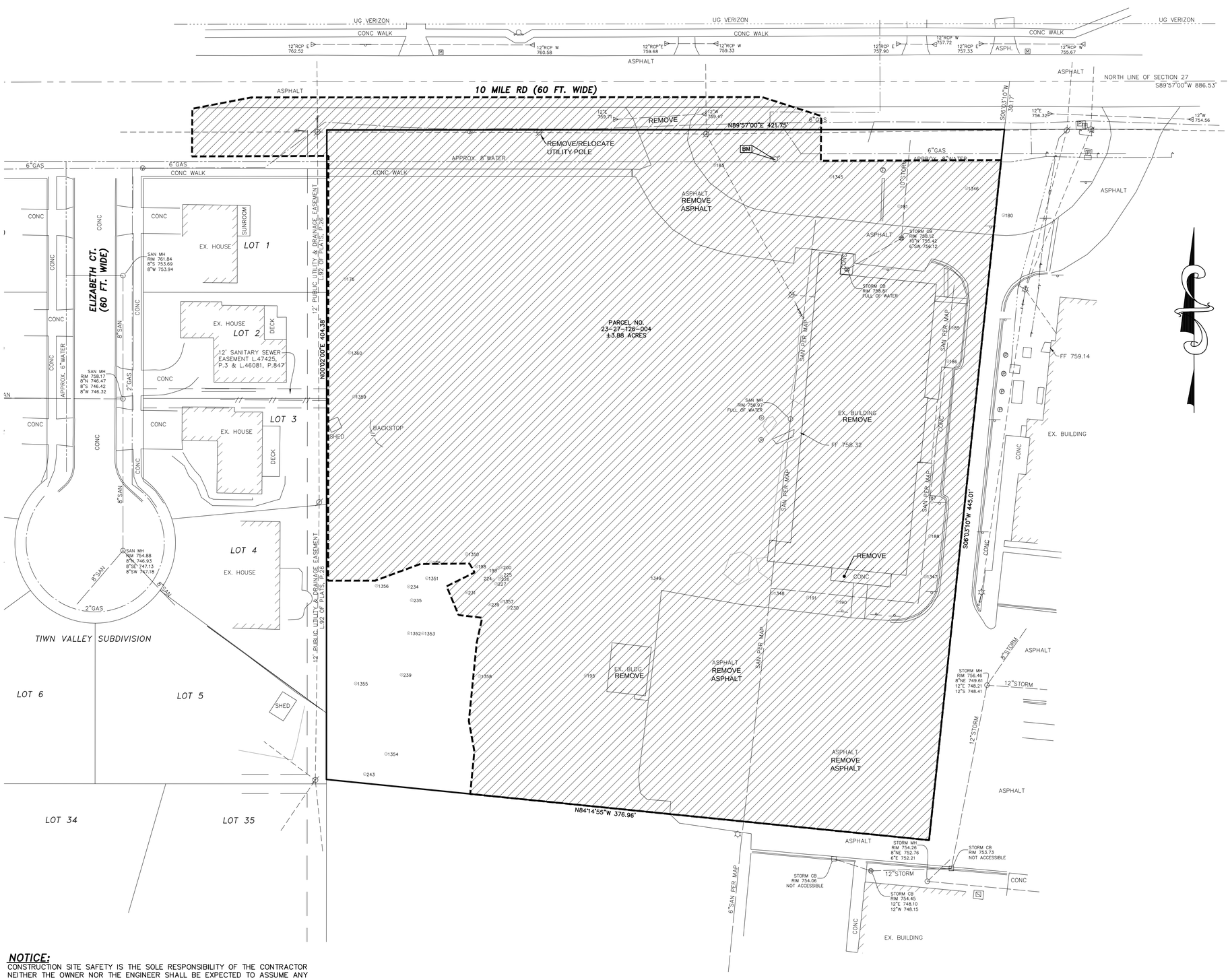

NOTES:

1. DEMOLITION PLAN IS FOR GENERAL INFORMATION PURPOSES ONLY. CONTRACTOR IS RESPONSIBLE FOR OBTAINING NECESSARY PERMITS AND COORDINATING WITH OWNER TO DETERMINE DETAILED DEMOLITION REQUIREMENTS.

2. CONTRACTOR TO FIELD VERIFY LOCATION, SIZE, AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO START OF CONSTRUCTION.

3. CONTRACTOR TO COORDINATE WITH FRANCHISE UTILITY COMPANIES AND/OR CITY AND COUNTY DEPARTMENTS FOR REMOVAL AND/OR RELOCATION OF METER BOXES, UTILITY POLES, UNDERGROUND LINES, ABOVE GROUND LINES, ETC., AS NECESSARY.

4. REMOVE EXISTING BUILDING WALLS, FLOOR SLABS, AND FOUNDATION AS DIRECTED BY THE GEOTECHNICAL ENGINEER. BACKFILL THE OPENING WITH SUITABLE MATERIAL TO CARRY BUILDING/ROAD LOADS.

5. REMOVE OR GROUT IN PLACE, AS DIRECTED BY THE FIELD INSPECTOR, EX. SEWERS AND/OR MAINS TO BE ABANDONED AS NECESSARY.

6. CONTACT OWNER FOR ENVIRONMENTAL REPORT FOR ANY ENVIRONMENTAL CONCERNS.

7. 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.

8. CONTRACTOR TO PROTECT EX. WALKS, POSTS, CONDUITS, PAVEMENT, CURBS, GUTTER, WALLS, BUILDINGS, FENCES, LANDSCAPING, TREES, ETC. TO REMAIN DURING CONSTRUCTION.

9. PRIOR TO THE REMOVAL OR ABANDONMENT OF ANY EX. UNDERGROUND UTILITY OR BUILDING SERVICE LINES CALLED FOR ON THE PLANS OR DISCOVERED DURING EXCAVATION, THE CONTRACTOR MUST DETERMINE IF THE UTILITY LINE OR BUILDING SERVICE IS STILL IN USE. IF THE UTILITY LINE OR BUILDING SERVICE IS IN USE/ACTIVE THE CONTRACTOR MUST TAKE ALL THE NECESSARY STEPS TO GUARANTEE THAT THE UTILITY LINE OR BUILDING SERVICE IS RECONNECTED WITHOUT AN INTERRUPTION IN SERVICE. THE RECONNECTION OF THE UTILITY LINE OR BUILDING SERVICE MUST BE IN ACCORDANCE WITH THE STANDARDS AND THE REQUIREMENTS OF THE APPROPRIATE GOVERNMENTAL AGENCY OR PRIVATE UTILITY COMPANY.

10. CONTRACTOR TO COORDINATE WITH THE ADJACENT LAND OWNERS AS REQUIRED.

11. PROVIDE POSITIVE DRAINAGE AT ALL LOCATIONS TO ENSURE NO STANDING WATER WITHIN PAVEMENT OR GREEN AREAS. PRIOR TO CONSTRUCTION, FIELD VERIFY EXISTING PAVEMENT AND CURB ELEVATIONS WHERE PROPOSED PAVEMENT AND CURB MEETS EXISTING PAVEMENT AND CURB. PAVING CONTRACTOR SHALL TAKE EXTRA CARE TO ENSURE 1% MINIMUM PAVEMENT SLOPE IS ACHIEVED AND SHALL CONTACT DESIGN ENGINEER PRIOR TO CONSTRUCTION IF A CONFLICT IS APPARENT.

12. CONTRACTOR TO FIELD VERIFY EXISTING IRRIGATION LOCATIONS AND REMOVE OR RELOCATE EXISTING IRRIGATION AS NECESSARY TO FACILITATE CONSTRUCTION.

13. CONTRACTOR TO ESTABLISH NEW BENCHMARKS, AS NECESSARY PRIOR TO DEMOLITION WORK.

14. THE ELEVATION, LOCATION, AND LAYOUT OF EXISTING UNDERGROUND UTILITIES ARE SHOWN BASED ON A FIELD SURVEY AND AVAILABLE UTILITY COMPANY RECORDS. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. EXACT LOCATION, DEPTH, AND SIZE OF SOME UTILITY LEADS ARE UNKNOWN. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF A CONFLICT IS APPARENT.

15. REFER TO THE LANDSCAPE PLANS PREPARED BY ALLEN DESIGN FOR TREE REMOVALS.

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- EX. COMMUNICATION MANHOLE
- EX. GENERIC MANHOLE
- EX. SANITARY SEWER
- EX. STORM SEWER
- EX. WATER MAIN
- APPROX. LIMITS OF DEMOLITION/DISTURBANCE. CONTRACTOR TO COORDINATE WITH THE OWNER AND ADJACENT LAND OWNERS AS NECESSARY.

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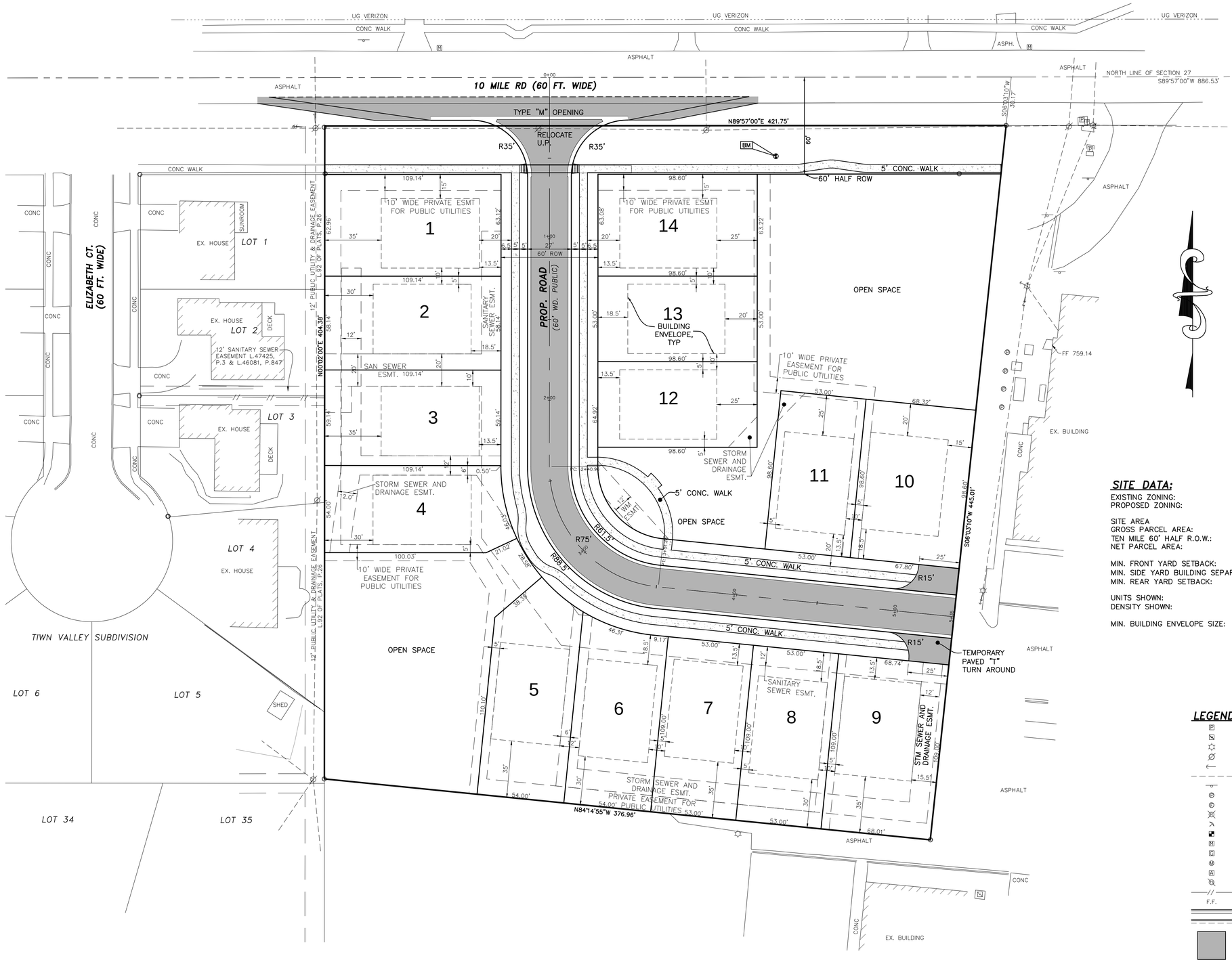

SITE DATA:

EXISTING ZONING:	R-1
PROPOSED ZONING:	PUD
SITE AREA	
GROSS PARCEL AREA:	3.88 ACRES
TEN MILE 60' HALF R.O.W.:	0.29 ACRES
NET PARCEL AREA:	3.59 ACRES
MIN. FRONT YARD SETBACK:	13.5' (20' FROM BACK OF WALK)
MIN. SIDE YARD BUILDING SEPARATION:	10'
MIN. REAR YARD SETBACK:	20'
UNITS SHOWN:	14
DENSITY SHOWN:	3.90 UNITS/ACRE (14/3.59 ACRES)
MIN. BUILDING ENVELOPE SIZE:	43' WIDE x 60' DEEP

LEGEND:

- EX. PEDESTAL
- EX. TRANSFORMER
- EX. LIGHTPOLE
- EX. UTILITY POLE
- EX. GUY ANCHOR
- EX. OVERHEAD LINE
- EX. SIGN
- EX. POST/BOLLARD
- EX. FLAGPOLE
- EX. RAILROAD SIGNAL
- EX. SATELLITE DISH
- EX. SOIL BORING
- EX. MAILBOX
- EX. GENERATOR
- EX. MONITOR WELL
- EX. AIR CONDITIONER
- EX. TRAFFIC SIGNAL
- EX. FENCE
- F.F. PROP. FINISH FLOOR ELEVATION
- PROP. CURB & GUTTER (PITCH IN)
- PROP. CURB & GUTTER (PITCH OUT)
- PROP. ASPHALT
- PROP. CONCRETE

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NOTES:

1. SIDEWALKS TO COMPLY WITH ADA REQUIREMENTS.

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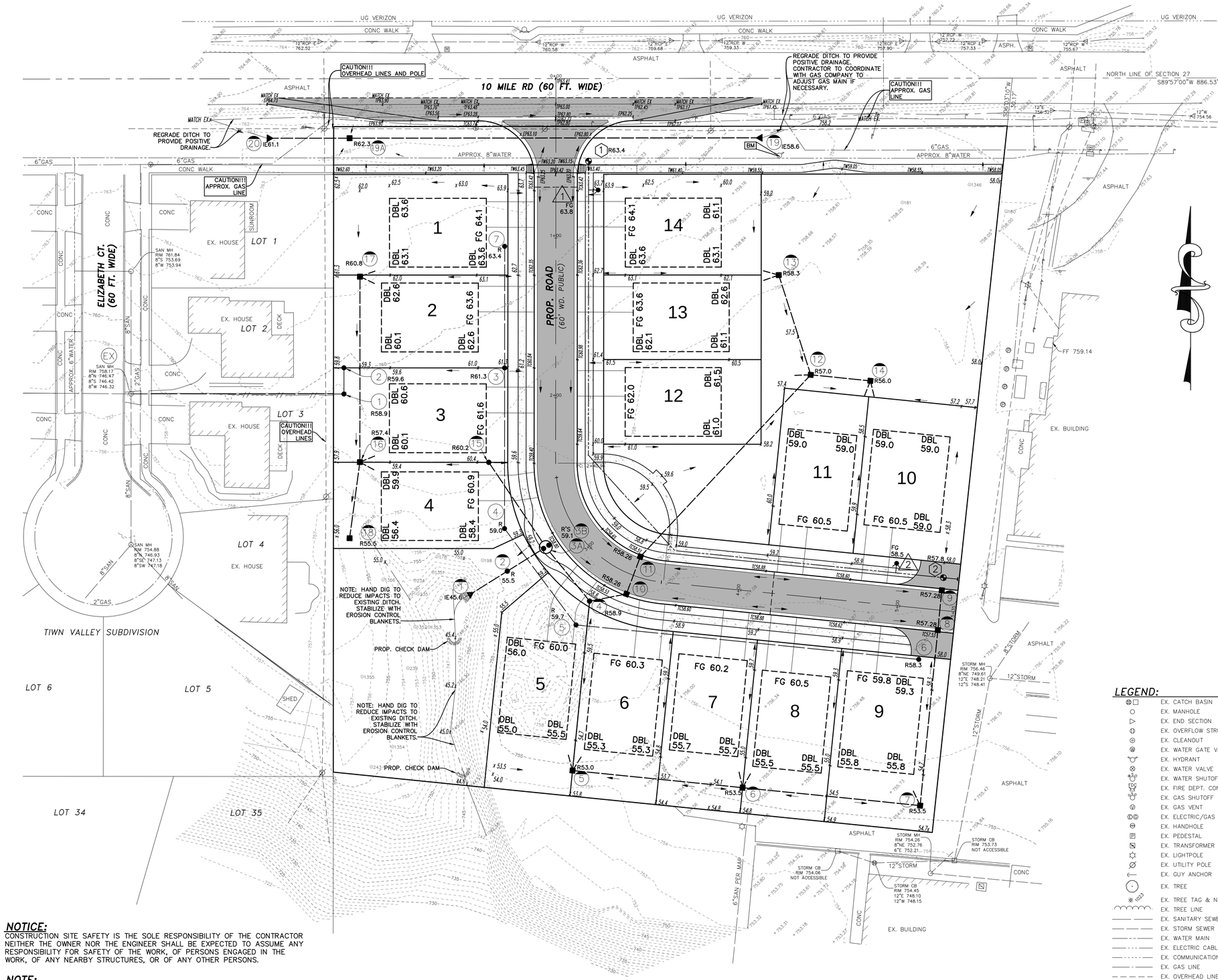

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ELEVATION 761.15 NAVD88

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EX. MANHOLE	EX. MAILBOX
EX. END SECTION	EX. GENERATOR
EX. OVERFLOW STRUCTURE	EX. MONITOR WELL
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EX. WATER GATE VALVE	EX. TRAFFIC SIGNAL
EX. HYDRANT	EX. FENCE
EX. WATER VALVE	F.F. PROP. FINISH FLOOR ELEVATION
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EX. GAS SHUTOFF	PROP. STORM SEWER
EX. GAS VENT	PROP. SANITARY SEWER
EX. ELECTRIC/GAS METER	PROP. WATER MAIN
EX. HANDHOLE	PROP. STRUCTURE
EX. PEDESTAL	PROP. END SECTION
EX. TRANSFORMER	PROP. CLEAN-OUT
EX. LIGHTPOLE	PROP. HYDRANT
EX. UTILITY POLE	PROP. GATE VALVE
EX. GUY ANCHOR	V.B. PROP. CURB BOX
EX. TREE	xGU 642.00 PROP. GUTTER ELEV.
EX. TREE TAG & NUMBER	xTC 642.50 PROP. TOP OF CURB ELEV.
EX. TREE LINE	xTW 642.50 PROP. TOP OF WALK ELEV.
EX. SANITARY SEWER	xTP 642.00 PROP. TOP OF PAVEMENT ELEV.
EX. STORM SEWER	x643.5 PROP. SPOT ELEV.
EX. WATER MAIN	PROP. DRAINAGE ARROW
EX. ELECTRIC CABLE	PROP. SILT FENCE
EX. COMMUNICATION	PROP. TREE PROTECTION FENCE
EX. GAS LINE	PROP. INLET FILTER
EX. OVERHEAD LINE	PROP. ASPHALT
EX. SIGN	
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46892 WEST ROAD
SUITE 109
NOVI, MICHIGAN 48377

(248) 926-3701 (BUS)
(248) 926-3765 (FAX)
WWW.ALPINE-INC.NET

811 Know what's below Call before you dig.

CLIENT: BOJI DEVELOPMENT

GRADING PLAN

LIBERTY HILL
TOWNSHIP IN
CITY OF FARMINGTON
OAKLAND COUNTY
MICHIGAN

SECTION: 27 RANGE: 9E

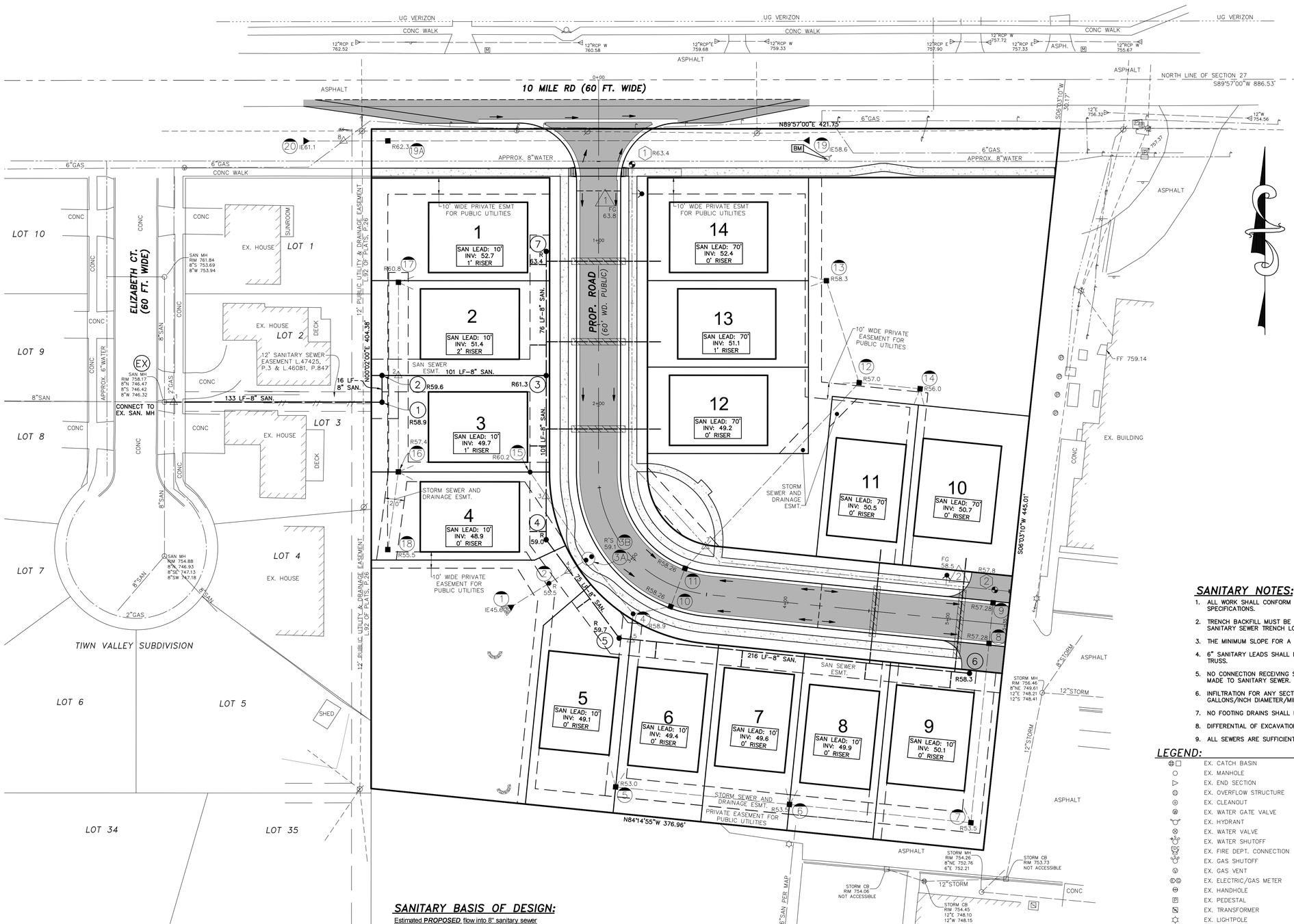
REVISED
03-07-2018 PSP SUBMITTAL
06-11-2018 ENG SUBMITTAL

DATE: 12-04-2017
DRAWN BY: SD
CHECKED BY: TG

0 15 30

FBK:
CHF:
SCALE HOR 1"= 30 FT.
VER 1"= FT.

5
17-484



NOTICE:

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NOTE:

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SANITARY BASIS OF DESIGN:

Estimated ***PROPOSED*** flow into 8" sanitary sewer

Usage	Unit Factor		Units	Single Family Units (SFU)	Population (3.2 People Per Unit)
Residential	1.00	per dwelling	14	14	45
				TOTAL POPULATION	***45***

Estimated Flow from Liberty Park

Total Population:	45	people			
Average Daily Flow:	100	gallons/capita/day			
Average Flow:	4,500	gallons/day	=	0.007	c.f.s.
Peaking Factor:	4.00				
Peak Flow:	**18,000**	**gallons/day**	**=**	**0.028**	**c.f.s.**

Estimated Pipe Capacity of 8" sanitary sewer

Pipe Size:	8	inch
Minimum Slope:	0.40	%
Area:	0.35	s.f.
n:	0.013	
Capacity of 8" Pipe:	**0.77**	**c.f.s.**

Therefore pipe has sufficient capacity

ESTIMATED SANITARY SEWER QUANTITIES:

(FOR INFORMATION USE ONLY)

SANITARY SEWER

8" PVC SDR 26	585 LF
8" HDPE SDR 11	133 LF
6" HOUSE LEAD PVC SDR 23.5 (INCL. RISERS)	445 LF
4' DIA. MANHOLE	7 EA

SANITARY NOTES:

1. ALL WORK SHALL CONFORM TO THE CURRENT CITY/COUNTY/STATE STANDARDS AND SPECIFICATIONS.
2. TRENCH BACKFILL MUST BE MDOT CLASS II GRANULAR MATERIAL COMPACTED TO 95% FOR SANITARY SEWER TRENCH LOCATED UNDER OR WITHIN THREE FEET OF PAVEMENT.
3. THE MINIMUM SLOPE FOR A HOUSE LEAD IS 1.00%
4. 6" SANITARY LEADS SHALL BE PVC SDR 23.5 AND MAINS SHALL BE PVC SDR 26 OR PVC TRUSS.
5. NO CONNECTION RECEIVING STORM WATER, SURFACE WATER OR GROUND WATER SHALL BE MADE TO SANITARY SEWER.
6. INFILTRATION FOR ANY SECTION OF SEWER BETWEEN MANHOLES SHALL NOT EXCEED 100 GALLONS/INCH DIAMETER/MILE/24 DAY.
7. NO FOOTING DRAINS SHALL BE CONNECTED TO THE BUILDING SEWER.
8. DIFFERENTIAL OF EXCAVATION AROUND EXISTING MANHOLES SHALL NOT EXCEED SIX (6) FEET.
9. ALL SEWERS ARE SUFFICIENTLY DEEP TO SERVE BASEMENTS.

LEGEND:

⊕□	EX. CATCH BASIN	[M]	EX. MAILBOX
○	EX. MANHOLE	[G]	EX. GENERATOR
▷	EX. END SECTION	Ⓜ	EX. MONITOR WELL
◍	EX. OVERFLOW STRUCTURE	[A]	EX. AIR CONDITIONER
⊙	EX. CLEANOUT	⊗	EX. TRAFFIC SIGNAL
Ⓖ	EX. WATER GATE VALVE	//	EX. FENCE
	EX. HYDRANT	F.F.	PROP. FINISH FLOOR ELEVATION
⊗	EX. WATER VALVE		PROP. CURB & GUTTER (PITCH IN)
	EX. WATER SHUTOFF		PROP. CURB & GUTTER (PITCH OUT)
	EX. FIRE DEPT. CONNECTION		PROP. STORM SEWER
	EX. GAS SHUTOFF		PROP. SANITARY SEWER
Ⓥ	EX. GAS VENT		PROP. WATER MAIN
	EX. ELECTRIC/GAS METER	●■	PROP. STRUCTURE
	EX. HANDHOLE	▶	PROP. END SECTION
[P]	EX. PEDESTAL		PROP. HYDRANT
	EX. TRANSFORMER		PROP. GATE VALVE
	EX. LIGHTPOLE	xGU 642.00	PROP. GUTTER ELEV.
	EX. UTILITY POLE	xTC 642.50	PROP. TOP OF CURB ELEV.
←	EX. GUY ANCHOR	xTW 642.50	PROP. TOP OF WALK ELEV.
	EX. SANITARY SEWER	xTP 642.00	PROP. TOP OF PAVEMENT ELEV.
	EX. STORM SEWER	x643.5	PROP. SPOT ELEV.
	EX. WATER MAIN	→	PROP. DRAINAGE ARROW
	EX. ELECTRIC CABLE		
	EX. COMMUNICATION		PROP. ASPHALT
	EX. GAS LINE		
	EX. OVERHEAD LINE		
	EX. SIGN		PROP. CONCRETE
	EX. POST/BOLLARD		
	EX. FLAGPOLE		
	EX. WATER WELL		COMPACTED SAND BACKFILL MUST BE M.D.O.T. CLASS II MATERIAL COMPACTED TO 95% MAXIMUM UNIT DENSITY.
	EX. RAILROAD SIGNAL		
	EX. SATELLITE DISH		
		1△	PROP. UTILITY CROSSING (REFER TO THE UTILITY PROFILES)

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LAND SURVEYING
CONSTRUCTION LAYOUT

SURVEYING ALTA SURVEYS
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Know what's **below** **Call** before you dig.

CLIENT: *BOJI DEVELOPMENT*

ROAD & SANITARY SEWER PLAN

LIBERTY HILL
TOWNSHIP IN:
CITY OF FARMINGTON
OAKLAND COUNTY
MICHIGAN

SECTION: 27 RANGE: 9E

REVISED
06-11-2018 ENG SUBMITTAL

DATE: 12-04-2017
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CHECKED BY: TG

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FBK:
CHF:

SCALE HOR 1"= 30 FT.
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6
17-484

NOTES:

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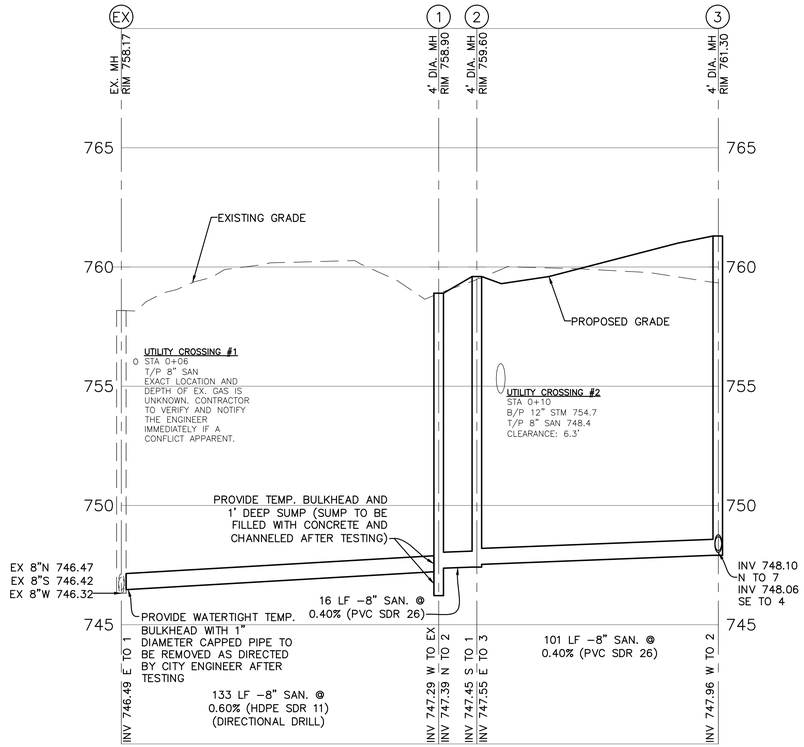
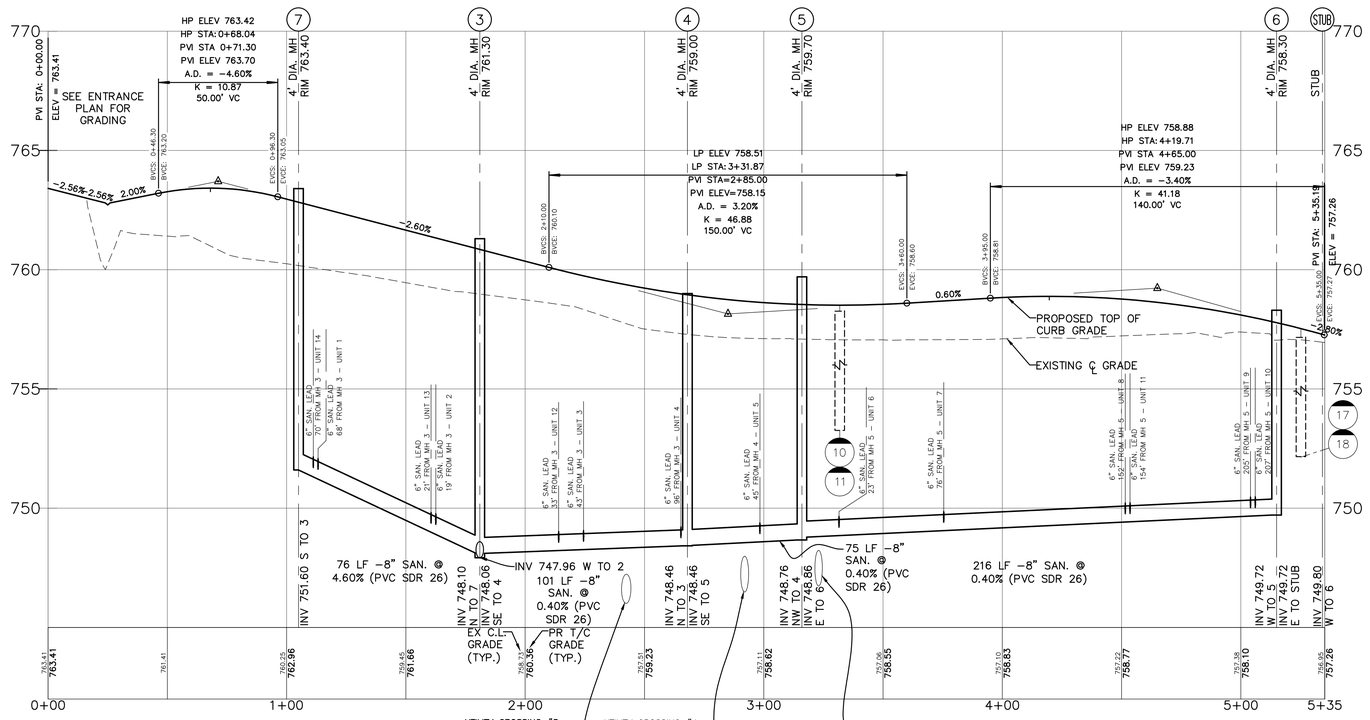
2. CONTRACTOR TO PROVIDE CONCRETE CRADLE PER CITY/COUNTY REQUIREMENTS.



SANITARY SEWER PROFILE



ROAD AND SANITARY SEWER PROFILE

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ROAD & SANITARY SEWER PROFILES

LIBERTY HILL
TOWNSHIP 1N
CITY OF FARMINGTON
OAKLAND COUNTY
MICHIGAN

SECTION: 27 RANGE: 9E

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SCALE HOR 1"= 30 FT.
VER 1"= 3 FT.

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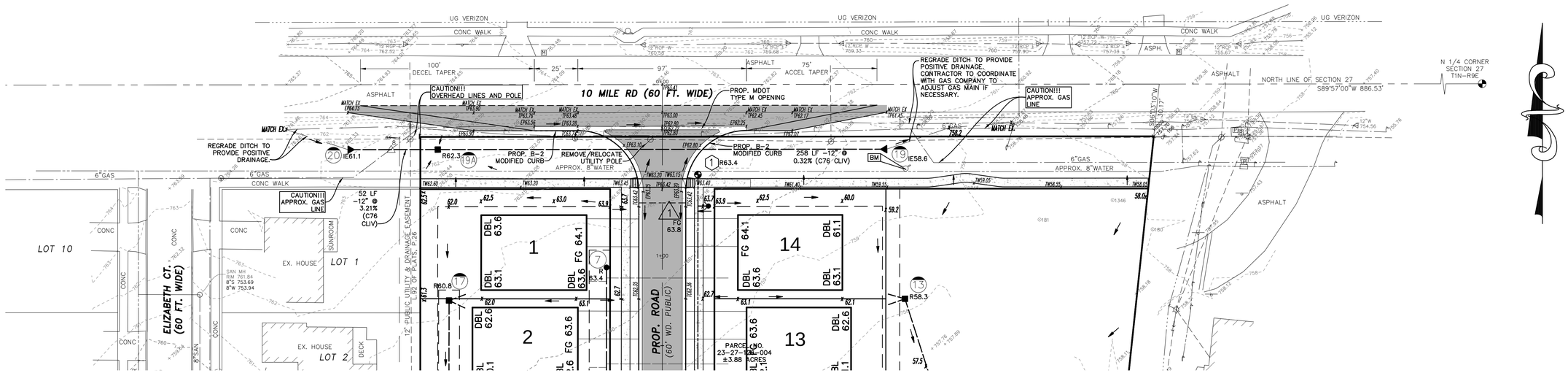

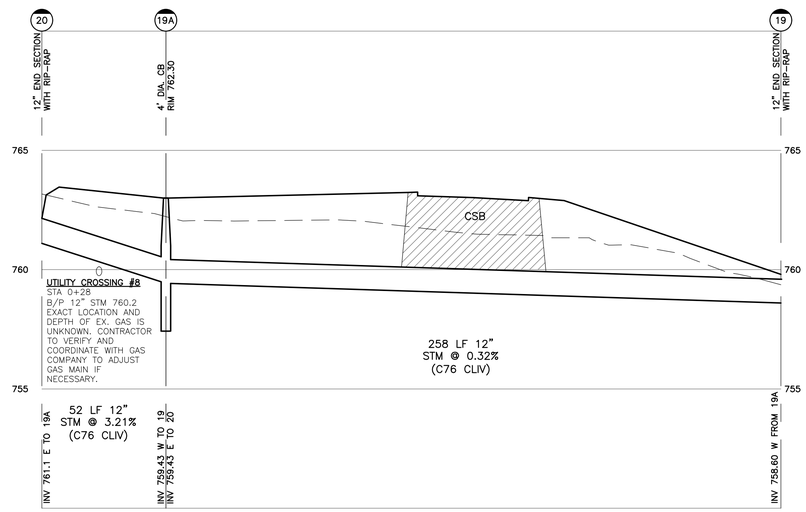

STORM SEWER PROFILE:
SCALE: 1" = 30 FEET (H)
1" = 3 FEET (V)

NOTES:
1. ALL WORK SHALL CONFORM TO THE CURRENT CITY/COUNTY/STATE STANDARDS AND SPECIFICATIONS.
2. ANY WORK WITHIN THE 10 MILE ROAD RIGHT-OF-WAY WILL REQUIRE A PERMIT FROM THE CITY OF FARMINGTON HILLS.
3. SIDEWALKS TO COMPLY WITH ADA REQUIREMENTS.

LEGEND:

⊕□	EX. CATCH BASIN	▪	EX. SOIL BORING
○	EX. MANHOLE	Ⓜ	EX. MAILBOX
▷	EX. END SECTION	Ⓜ	EX. MONITOR WELL
◍	EX. OVERFLOW STRUCTURE	Ⓐ	EX. AIR CONDITIONER
◎	EX. CLEANOUT		EX. TRAFFIC SIGNAL
Ⓦ	EX. WATER GATE VALVE	//——	EX. FENCE
	EX. HYDRANT	F.F.	PROP. FINISH FLOOR ELEVATION
⊗	EX. WATER VALVE		PROP. CURB & GUTTER (PITCH IN)
	EX. WATER SHUTOFF		PROP. CURB & GUTTER (PITCH OUT)
	EX. FIRE DEPT. CONNECTION		PROP. STORM SEWER
	EX. GAS SHUTOFF		PROP. SANITARY SEWER
Ⓥ	EX. GAS VENT		PROP. WATER MAIN
	EX. ELECTRIC/GAS METER		PROP. STRUCTURE
	EX. HANDHOLE		PROP. END SECTION
	EX. PEDESTAL	C.O.	PROP. CLEAN-OUT
	EX. TRANSFORMER		PROP. HYDRANT
	EX. LIGHTPOLE		PROP. GATE VALVE
	EX. UTILITY POLE	V.B.	PROP. CURB BOX
	EX. GUY ANCHOR	xGU 642.00	PROP. GUTTER ELEV.
	EX. TREE	xTC 642.50	PROP. TOP OF CURB ELEV.
		xTW 642.50	PROP. TOP OF WALK ELEV.
	EX. TREE TAG & NUMBER	xTP 642.00	PROP. TOP OF PAVEMENT ELEV.
	EX. TREE LINE	x643.5	PROP. SPOT ELEV.
	EX. SANITARY SEWER		PROP. DRAINAGE ARROW
	EX. STORM SEWER		PROP. ASPHALT
	EX. WATER MAIN		
	EX. ELECTRIC CABLE		
	EX. COMMUNICATION		
	EX. GAS LINE		PROP. CONCRETE
	EX. OVERHEAD LINE		
	EX. SIGN		
	EX. POST/BOLLARD		
	EX. FLAGPOLE	1△	PROP. UTILITY CROSSING (REFER TO THE UTILITY PROFILES)

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ENTRANCE PLAN

LIBERTY HILL
TOWNSHIP 1N RANGE: 9E
CITY OF FARMINGTON
OAKLAND COUNTY
MICHIGAN
SECTION: 27

REVISED
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SCALE HOR 1"= 30 FT.
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LEGEND:

⊕□	EX. CATCH BASIN	⊕	EX. POST/BOLLARD
○	EX. MANHOLE	⊕	EX. FLAGPOLE
▷	EX. END SECTION	⊠	EX. RAILROAD SIGNAL
◍	EX. OVERFLOW STRUCTURE	↗	EX. SATELLITE DISH
◎	EX. CLEANOUT	▪	EX. SOIL BORING
Ⓦ	EX. WATER GATE VALVE	Ⓜ	EX. MAILBOX
⊕	EX. HYDRANT	⊡	EX. GENERATOR
⊗	EX. WATER VALVE	Ⓜ	EX. MONITOR WELL
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▣	EX. PEDESTAL		PROP. STORM SEWER
▨	EX. TRANSFORMER		PROP. SANITARY SEWER
☼	EX. LIGHTPOLE		PROP. WATER MAIN
⌀	EX. UTILITY POLE	●■	PROP. STRUCTURE
⟵	EX. GUY ANCHOR	▶	PROP. END SECTION
ⓣ	EX. TREE	●C.O.	PROP. CLEAN-OUT
※ 1023	EX. TREE TAG & NUMBER		PROP. HYDRANT
	EX. TREE LINE	●V.B.	PROP. GATE VALVE
	EX. SANITARY SEWER		PROP. CURB BOX
	EX. STORM SEWER		PROP. ASPHALT
	EX. WATER MAIN		
	EX. ELECTRIC CABLE		PROP. CONCRETE
	EX. COMMUNICATION		
	EX. GAS LINE		COMPACTED SAND BACKFILL MUST BE M.D.O.T. CLASS II MATERIAL, COMPACTED TO 95% MAXIMUM UNIT DENSITY.
	EX. OVERHEAD LINE		
	EX. SIGN	1△	PROP. UTILITY CROSSING (REFER TO THE UTILITY PROFILES)

WATER MAIN AND STORM SEWER NOTES:

1. ALL WORK SHALL CONFORM TO THE CURRENT CITY/COUNTY/STATE STANDARDS AND SPECIFICATIONS.
2. PROPOSED WATER MAIN SHALL HAVE AT LEAST 5.5 FEET OF COVER.
3. COMPACTED SAND BACKFILL SHALL BE PROVIDED FOR ALL UTILITIES WITHIN THE INFLUENCE OF PAVED AREAS.
4. PROVIDE 18" MINIMUM VERTICAL CLEARANCE AT ALL UTILITY CROSSINGS. DIP WATER MAIN PER CITY STANDARDS AND SPECIFICATIONS, AS NECESSARY. IF 18" MINIMUM VERTICAL CLEARANCE CANNOT BE ACHIEVED, PROVIDE CONCRETE CRADLE PER CITY REQUIREMENTS.
5. STORM SEWER PIPE 12-INCHES AND LARGER SHALL BE C76 CLIV R.C.P. WITH PREMIUM JOINTS.
6. ALL WATER MAIN 6-INCHES AND LARGER SHALL BE DUCTILE IRON CLASS 54.

ESTIMATED WATER MAIN AND STORM SEWER QUANTITIES:

(FOR INFORMATION USE ONLY)

WATER MAIN	
8" D.I. CL52 WATER MAIN	445 LF
8"x8" T.S. GATE VALVE & WELL	1 EA
8" GATE VALVE & WELL	1 EA
HYDRANT	2 EA
STORM SEWER	
3" STORM SEWER (SUMP LEADS)	140 LF
12" STORM SEWER	561 LF
15" STORM SEWER	609 LF
18" STORM SEWER	307 LF
12" END SECTION	2 EA
18" END SECTION	1 EA
2' DIA. STRUCTURE	5 EA
4' DIA. STRUCTURE	10 EA
5' DIA. STRUCTURE	1 EA
PRE-TREATMENT STRUCTURE	1 EA
4' DIA. STRUCTURE WITH RESTRICTOR	1 EA

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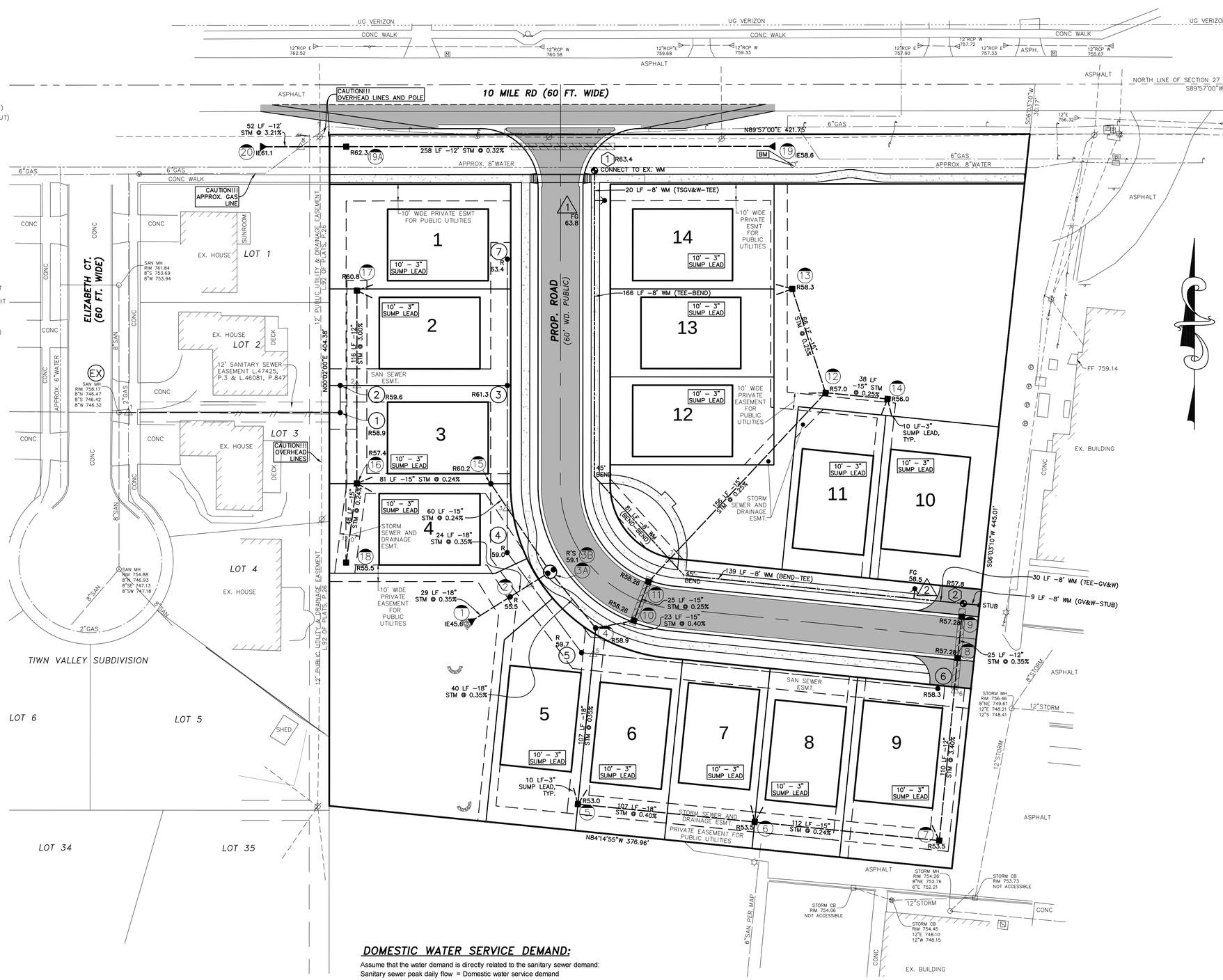

DOMESTIC WATER SERVICE DEMAND:

Assume that the water demand is directly related to the sanitary sewer demand:
Sanitary sewer peak daily flow = Domestic water service demand

Usage	Unit Factor	Units	Single Family Units (SFU)	Population (3.2 People Per Unit)
Residential	1.00 per dwelling	14	14	45
			TOTAL POPULATION	***45***

Estimated water service demand from Liberty Park

Total Population:	45	people
Average Daily Flow:	100	gallons/capita/day
Average Flow:	4,500	gallons/day
Peaking Factor:	4.00	
Peak Flow:	**18,000**	**gallons/day**

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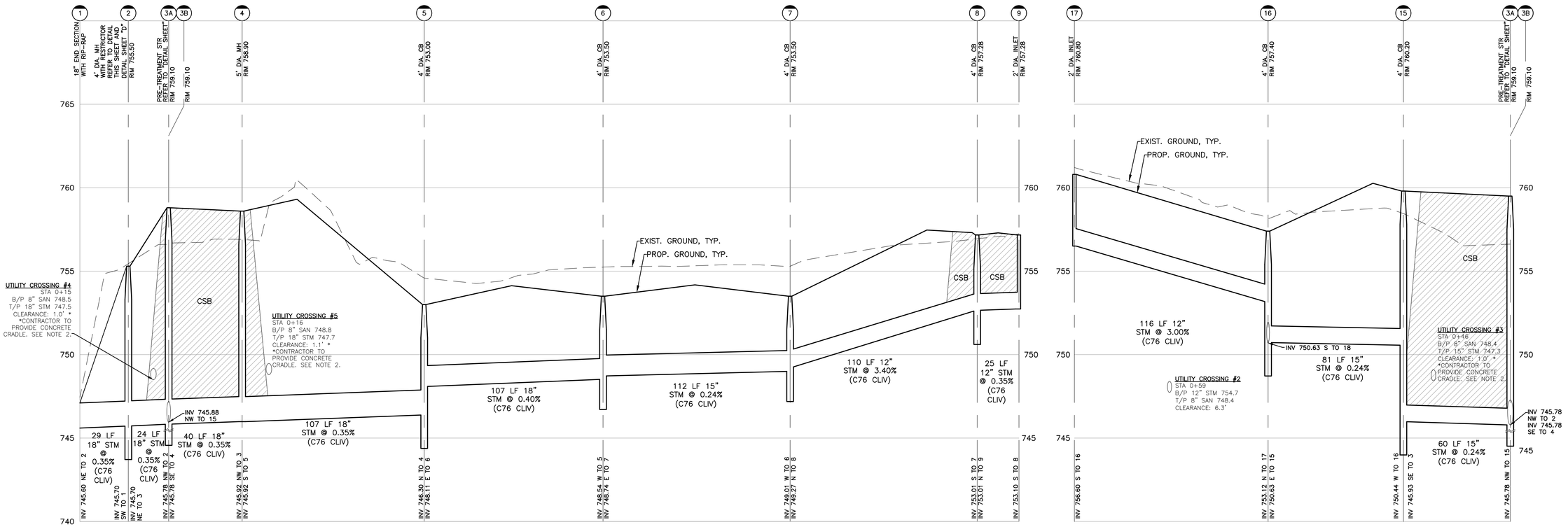

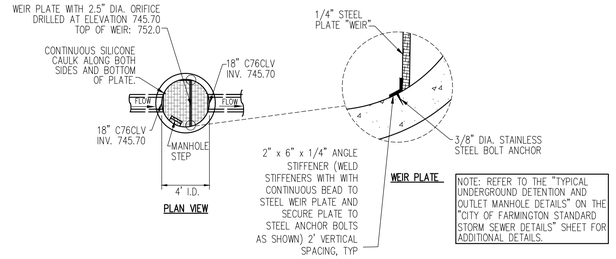

DETENTION RESTRICTOR DETAIL (STRUCTURE 2)

NOT TO SCALE

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NOVI, MICHIGAN 48377

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CLIENT: BOJI DEVELOPMENT

STORM SEWER PROFILES

LIBERTY HILL
TOWNSHIP: 1N RANGE: 9E
CITY OF FARMINGTON
OAKLAND COUNTY
MICHIGAN
SECTION: 27

REVISED
06-11-2018 ENG SUBMITTAL

DATE: 12-04-2017
DRAWN BY: SD
CHECKED BY: TG

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FBK:
CHF:
SCALE HOR 1"= 30 FT.
VER 1"= 3 FT.

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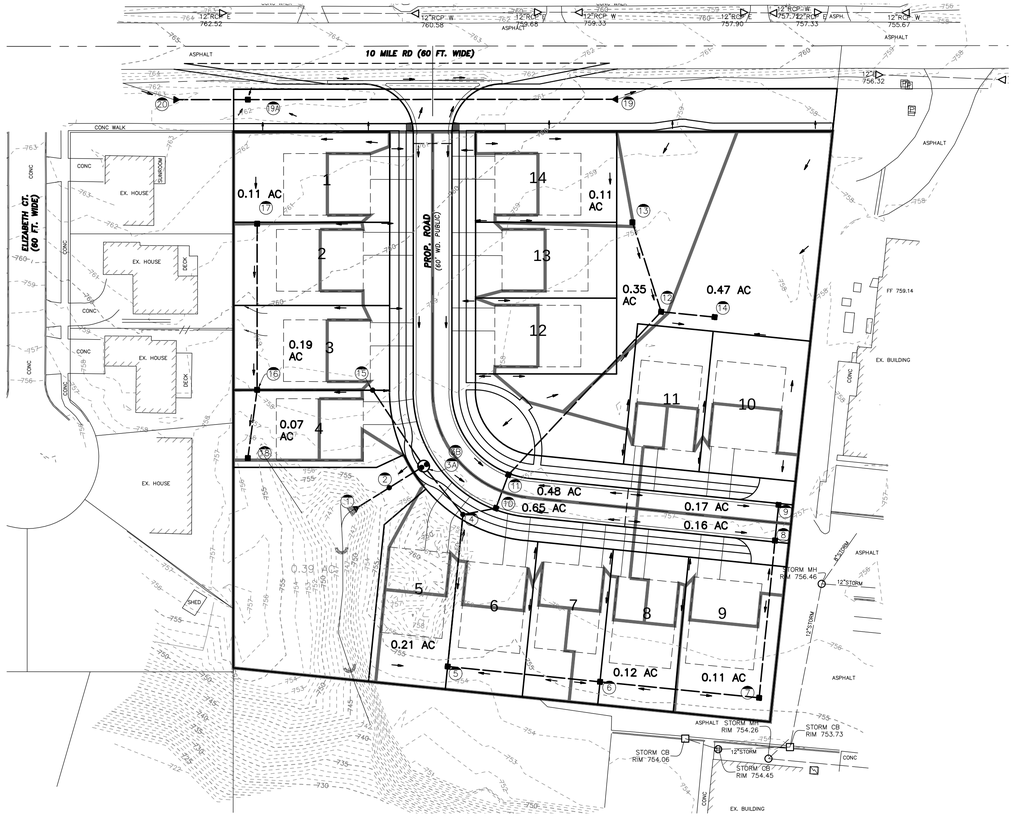
17-484



DRAINAGE NARRATIVE:

A PROPOSED 14 UNIT SINGLE FAMILY CONDOMINIUM DEVELOPMENT ON APPROXIMATELY 3.6 ACRES LOCATED BETWEEN FARMINGTON ROAD AND POWER ROAD ON THE SOUTH SIDE OF 10 MILE ROAD. THE SITE CURRENTLY HAS AN EXISTING BUILDING AND PARKING LOT ON IT. THE EXISTING TOPOGRAPHY INDICATES MOST OF THE SITE SHEET DRAINS SOUTH TOWARDS FARMINGTON ROAD AND ULTIMATELY INTO THE UPPER BRANCH OF THE RIVER ROUGE.

ON-SITE STORM WATER MANAGEMENT IMPROVEMENTS ARE PROPOSED TO ACCOMMODATE THE INCREASE IN IMPERVIOUS AREA BETWEEN THE EXISTING AND PROPOSED CONDITIONS. STORM WATER TREATMENT AND RUNOFF FROM THE DEVELOPMENT IS PROPOSED TO BE ACCOMMODATED VIA UNDERGROUND STORM SEWER AND A MECHANICAL PRE-TREATMENT STRUCTURE. THE PROPOSED STORM WATER OUTLET IS AN EXISTING ON-SITE DITCH WHICH FLOWS SOUTH TOWARDS AN OPEN FIELD/FARMINGTON ROAD.

Existing Conditions

RUNOFF COEFFICIENT CALCULATION

LAND USE	AREA (A) (acres)	RUNOFF COEFFICIENT (C)
Buildings/Pavement	1.12	0.90
Permanent Water	0.00	1.00
Grass	2.47	0.20
Total Area	3.59	
Existing CxA =	**1.51**	

CALCULATE THE WEIGHTED RUNOFF COEFFICIENT:

C=SUM (Ai x Ci) / A = (1.12 x 0.90) + (0.00 x 1.00) + (2.47 x 0.20) / 3.59

= 0.42

Proposed Conditions

RUNOFF COEFFICIENT CALCULATION

LAND USE	AREA (A) (acres)	RUNOFF COEFFICIENT (C)
Buildings/Pavement	1.41	0.90
Permanent Water	0.00	1.00
Grass	2.18	0.20
Total Area	3.59	
Proposed CxA =	**1.69**	
Increase in CxA =	**0.18**	

CALCULATE THE WEIGHTED RUNOFF COEFFICIENT:

C=SUM (Ai x Ci) / A = (1.41 x 0.90) + (0.00 x 1.00) + (2.18 x 0.20) / 3.59

= 0.47

100 YEAR STORM DETENTION DESIGN (FOR INCREASE IN IMPERVIOUS AREA)

Increase in CxA =	0.18	
Allowable Discharge (Qa) (restrict to 0.10 cfs/acre)	0.36	cfs
Calculation of Required Discharge/Acre		
Qo = ((Qa)/(CA):	2.00	cfs/acre imperv.
T = -25 + ((10312.5/Qo))0.5:	46.81	min.
Storage Volume Required (100 YEAR)		
Vs = (16500(T)/(T+25)) - 40Qo(T):	7010.87	cf/ acre imperv.
Vt = (Vs)(CA):	**1,258**	**cf**
STORAGE VOLUME REQUIRED:	**1,258**	**C.F.**

UNDERGROUND DETENTION VOLUME PROVIDED IN PIPES

DIA. (IN.)	DIA. (FT.)	AREA PER FT. (S.F.)	LENGTH PROVIDED (FT.)	VOLUME PROVIDED IN PIPES (C.F.)
12	**1.00**	**0.79**	**51.0**	**40**
15	**1.25**	**1.23**	**609.0**	**747**
18	**1.50**	**1.77**	**278.0**	**491**
			TOTAL PROVIDED:	**1,279**

BASIN ORIFICE OUTLET SIZING

RESTRICTED OUTLET SIZING

PER THE DETENTION BASIN VOLUME CALCULATIONS, THE MAXIMUM ALLOWABLE RELEASE RATE AT THE DESIGN WATER LEVEL OF Z_{100} IS:	=	0.36 cfs
CALCULATE THE MAXIMUM HEAD ON THE BANKFULL ORIFI FOR A 100 YR EVENT:		
Z_o	=	748.00 ft
Z_{100}	=	752.00 ft
$h_{max} = (Z_{100} - Z_o)$	=	4.00 ft
CALCULATE RESTRICTED OUTLET PIPE SIZE TO ACCOMMODATE ALLOWABLE OUTFLOW: A = Q / (0.62 * sqrt(2*g*h))	=	0.0362 sf
RESTRICTED OUTLET PIPE DIAMETER TO ACCOMMODATE ALLOWABLE OUTFLOW:	=	2.6 inch
USE A 2.5" DIAMETER RESTRICTOR IN THE OUTLET CONTROL STRUCTURE		

WEIGHTED RUNOFF COEFFICIENT CALCULATIONS

Stm Structure	Area Total	Area (Grass)	C	Area (Pvm't/Bldg.)	C	Weighted C
5	0.21	0.1357	0.20	0.0743	0.90	0.45
6	0.12	0.0755	0.20	0.0445	0.90	0.46
7	0.11	0.0767	0.20	0.0333	0.90	0.41
8	0.16	0.0428	0.20	0.1172	0.90	0.71
9	0.17	0.0516	0.20	0.1184	0.90	0.69
10	0.65	0.1821	0.20	0.4679	0.90	0.70
11	0.48	0.1837	0.20	0.2963	0.90	0.63
12	0.35	0.2908	0.20	0.0592	0.90	0.32
13	0.11	0.0803	0.20	0.0297	0.90	0.39
14	0.47	0.4072	0.20	0.0628	0.90	0.29
16	0.19	0.1296	0.20	0.0604	0.90	0.42
17	0.11	0.0798	0.20	0.0302	0.90	0.39
18	0.07	0.0403	0.20	0.0297	0.90	0.50

STORM SEWER CALCULATIONS

FROM MH INPUT	TO MH	INCRE-MENT ACRES (A)	C	EQUIV. AREA 100% ACRES CA	TOTAL AREA 100% ACRES SUM CA	T TIME (MIN.)	I (IN PER HOUR)	Q=CIA C.F.S. FLOW	CAPAC-ITY OF SEWER (C.F.S.)	DIAM. OF PIPE (IN.)	LENGTH OF LINE (FT.)	SLOPE OF PIPE (%)	MIN HG BASED ON "Q" (%)	HG FOR 2.5 FPS GIVEN "D" (%)	ACTUAL HG (%)	VEL. FLOW FULL (FT./ SEC.)	TIME OF FLOW (MIN.)	H.G. ELEV. UPPER END	H.G. ELEV. LOWER END	GROUND ELEV. UPPER END	GROUND ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END
9	8	0.17	0.69	0.12	0.12	20.00	3.89	0.46	2.11	12	25	0.35	0.02	0.30	0.02	2.7	0.2	753.82	753.81	757.28	757.28	753.10	753.01
8	7	0.16	0.71	0.11	0.23	20.20	3.87	0.89	6.57	12	110	3.40	0.06	0.30	0.06	8.4	0.2	750.14	750.07	757.28	753.50	753.01	749.27
7	6	0.11	0.41	0.05	0.28	20.40	3.85	1.06	3.16	15	112	0.24	0.03	0.23	0.03	2.6	0.7	749.77	749.74	753.50	753.50	749.01	748.74
6	5	0.12	0.46	0.06	0.33	21.10	3.80	1.26	6.64	18	107	0.40	0.01	0.18	0.01	3.8	0.5	749.33	749.31	753.50	753.00	748.54	748.11
5	4	0.21	0.45	0.09	1.47	21.60	3.76	5.54	6.21	18	107	0.35	0.28	0.18	0.28	3.5	0.5	747.42	747.12	753.00	758.90	746.30	745.92
4	3A/3B	0.00	0.80	0.00	1.63	22.10	3.72	6.06	6.21	18	40	0.35	0.33	0.18	0.33	3.5	0.2	747.12	746.98	758.90	759.10	745.92	745.78
3A/3B	2	0.00	0.80	0.00	1.63	22.30	3.70	6.06	6.21	18	24	0.35	0.33	0.18	0.33	3.5	0.1	746.98	746.90	759.10	755.50	745.78	745.70
2	1	0.00	0.80	0.00	1.63	22.10	3.72	6.06	6.21	18	29	0.35	0.33	0.18	0.33	3.5	0.1	746.89	746.80	755.50	--	745.70	745.60
17	16	0.11	0.39	0.04	0.04	20.00	3.89	0.17	6.17	12	116	3.00	0.00	0.30	0.00	7.9	0.2	753.92	753.92	760.80	757.40	756.60	753.12
16	15	0.19	0.42	0.08	0.16	20.20	3.87	0.61	3.16	15	81	0.24	0.01	0.23	0.01	2.6	0.5	751.44	751.44	757.40	760.20	750.63	750.44
15	3A/3B	0.00	0.80	0.00	0.16	20.70	3.83	0.61	3.16	15	60	0.24	0.01	0.23	0.01	2.6	0.4	746.79	746.78	760.20	759.10	745.93	745.78
18	16	0.07	0.50	0.04	0.04	20.00	3.89	0.14	3.16	15	48	0.24	0.00	0.23	0.00	2.6	0.3	751.64	751.63	755.50	757.40	750.75	750.63
13	12	0.11	0.39	0.04	0.04	20.00	3.89	0.17	3.23	15	66	0.25	0.00	0.23	0.00	2.6	0.4	751.59	751.59	758.30	757.00	750.75	750.59
12	11	0.35	0.32	0.11	0.29	20.40	3.85	1.12	3.23	15	156	0.25	0.03	0.23	0.03	2.6	1.0	751.24	751.20	757.00	758.26	750.59	750.20
11	10	0.48	0.63	0.30	0.59	21.40	3.77	2.24	3.23	15	25	0.25	0.12	0.23	0.12	2.6	0.2	750.96	750.93	758.26	758.26	750.00	749.93
10	4	0.65	0.70	0.46	1.05	21.60	3.76	3.94	4.09	15	23	0.40	0.37	0.23	0.37	3.3	0.1	750.93	750.84	758.26	758.90	749.93	749.84
14	12	0.47	0.29	0.14	0.14	20.00	3.89	0.53	3.23	15	38	0.25	0.01	0.23	0.01	2.6	0.2	751.66	751.66	756.00	757.00	750.75	750.66

COMMERCIAL SITE PLANNING
SITE ENGINEERING
INDUSTRIAL & MULTI-UNIT
LAND SURVEYING
CONSTRUCTION LAYOUT

SURVEYING
ALTA SURVEYS
BOUNDARY SURVEYS
TOPOGRAPHIC SURVEYS
PARCEL SPLITS

RESIDENTIAL SUBDIVISION
SITE CONDOMINIUM
MULTI-FAMILY
PLOT PLANS
CONSTRUCTION LAYOUT

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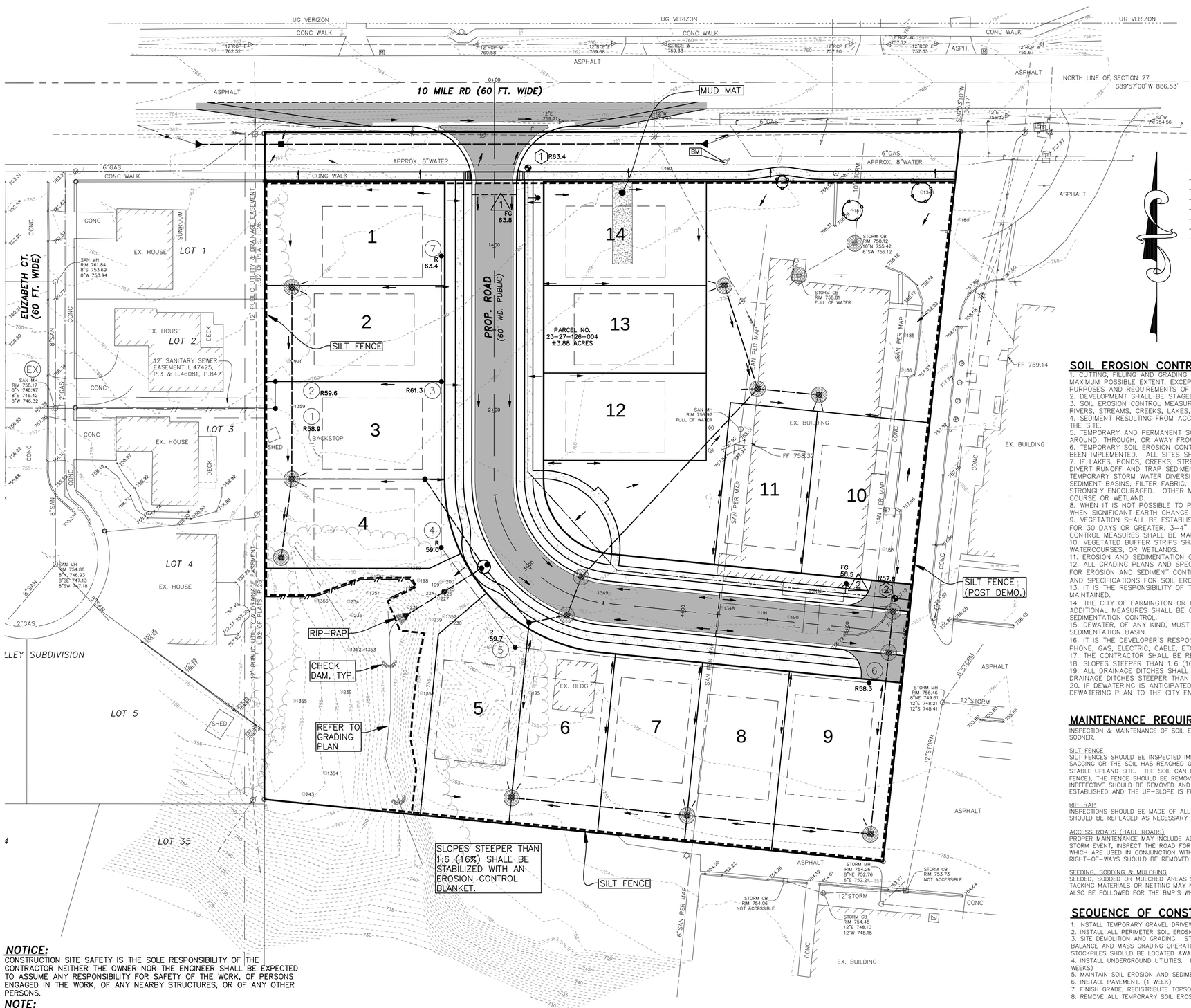

LEGEND:

EX. CATCH BASIN	EX. SOIL BORING
EX. MANHOLE	EX. MAILBOX
EX. END SECTION	EX. MONITOR WELL
EX. OVERFLOW STRUCTURE	EX. AIR CONDITIONER
EX. CLEANOUT	EX. FENCE
EX. WATER GATE VALVE	PROP. FINISH FLOOR ELEVATION
EX. HYDRANT	PROP. CURB & GUTTER (PITCH IN)
EX. WATER VALVE	PROP. CURB & GUTTER (PITCH OUT)
EX. WATER SHUTOFF	PROP. STORM SEWER
EX. HANDHOLE	PROP. SANITARY SEWER
EX. PEDESTAL	PROP. WATER MAIN
EX. TRANSFORMER	PROP. STRUCTURE
EX. LIGHTPOLE	PROP. END SECTION
EX. UTILITY POLE	PROP. CLEAN-OUT
EX. GUY ANCHOR	PROP. HYDRANT
EX. TREE	PROP. GATE VALVE
EX. TREE TAG & NUMBER	PROP. CURB BOX
EX. TREE LINE	xGU 642.00 PROP. GUTTER ELEV.
EX. SANITARY SEWER	xTC 642.50 PROP. TOP OF CURB ELEV.
EX. STORM SEWER	xTW 642.50 PROP. TOP OF WALK ELEV.
EX. WATER MAIN	xTP 642.00 PROP. TOP OF PAVEMENT ELEV.
EX. ELECTRIC CABLE	x643.5 PROP. SPOT ELEV.
EX. COMMUNICATION	PROP. DRAINAGE ARROW
EX. GAS LINE	PROP. SILT FENCE
EX. OVERHEAD LINE	PROP. TREE PROTECTION FENCE
	PROP. INLET FILTER

SOIL EROSION CONTROL NOTES

1. CUTTING, FILLING AND GRADING SHALL BE MINIMIZED AND THE NATURAL TOPOGRAPHY OF THE SITE SHALL BE PRESERVED TO THE MAXIMUM POSSIBLE EXTENT, EXCEPT WHERE SPECIFIC FINDINGS DEMONSTRATE THAT MAJOR ALTERATIONS WILL STILL MEET THE PURPOSES AND REQUIREMENTS OF THIS ORDINANCE.
2. DEVELOPMENT SHALL BE STAGED TO KEEP THE EXPOSED AREAS OF SOIL AS SMALL AS PRACTICABLE.
3. SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED BETWEEN THE DISTURBED AREA AND ANY WATER COURSES INCLUDING RIVERS, STREAMS, CREEKS, LAKES, PONDS AND OTHER WATER COURSES; WETLANDS OR ROADWAYS ON OR NEAR THE SITE.
4. SEDIMENT RESULTING FROM ACCELERATED SOIL EROSION SHALL BE REMOVED FROM RUNOFF WATER BEFORE THAT WATER LEAVES THE SITE.
5. TEMPORARY AND PERMANENT SOIL EROSION CONTROL MEASURES DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF WATER AROUND, THROUGH, OR AWAY FROM THE SITE SHALL BE DESIGNED TO LIMIT THE WATER FLOW TO A NON-EROSIVE VELOCITY.
6. TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE REMOVED AFTER PERMANENT SOIL EROSION CONTROL MEASURES HAVE BEEN IMPLEMENTED. ALL SITES SHALL BE STABILIZED WITH PERMANENT SOIL EROSION CONTROL MEASURES.
7. IF LAKES, PONDS, CREEKS, STREAMS, OR WETLANDS ARE LOCATED ON OR NEAR THE SITE, EROSION CONTROL MEASURES WHICH DIVERT RUNOFF AND TRAP SEDIMENT MUST BE PROVIDED AT STRATEGIC LOCATIONS. STRAW BALE BERMS MAY BE USED AS TEMPORARY STORM WATER DIVERSION STRUCTURES, BUT WILL NOT BE CONSIDERED SUFFICIENT FOR TRAPPING SEDIMENT. THE USE OF SEDIMENT BASINS, FILTER FABRIC, VEGETATED BUFFER STRIPS, AND ROCK FILTERS IN LIEU OF STRAW BALE BERMS SHALL BE STRONGLY ENCOURAGED. OTHER MEASURES MAY BE REQUIRED IF REASONABLY DETERMINED TO BE NECESSARY TO PROTECT A WATER COURSE OR WETLAND.
8. WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH CHANGE HAS BEEN COMPLETED OR WHEN SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED.
9. VEGETATION SHALL BE ESTABLISHED WITHIN 5 DAYS OF FINAL GRADE, OR WHENEVER DISTURBED AREAS WILL REMAIN UNCHANGED FOR 30 DAYS OR GREATER. 3-4" OF TOPSOIL WILL BE USED WHERE VEGETATION IS REQUIRED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED.
10. VEGETATED BUFFER STRIPS SHALL BE CREATED OR RETAINED ALONG THE EDGES OF ALL LAKES, PONDS, CREEKS, STREAMS, OR WATERCOURSES, OR WETLANDS.
11. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL RECEIVE REGULAR MAINTENANCE TO ASSURE PROPER FUNCTIONING.
12. ALL GRADING PLANS AND SPECIFICATIONS, INCLUDING EXTENSIONS OF PREVIOUSLY APPROVED PLANS, SHALL INCLUDE PROVISIONS FOR EROSION AND SEDIMENT CONTROL IN ACCORDANCE WITH, BUT NOT LIMITED TO, THE STANDARDS CONTAINED IN THE "STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", PUBLISHED BY THE OAKLAND SOIL CONSERVATION DISTRICT.
13. IT IS THE RESPONSIBILITY OF THE DEVELOPER TO INSURE THAT ALL SOIL EROSION CONTROL MEASURES ARE INSTALLED AND MAINTAINED.
14. THE CITY OF FARMINGTON OR IT'S AGENT SHALL INSPECT ALL SOIL EROSION CONTROL MEASURES. UPON THEIR DIRECTION ADDITIONAL MEASURES SHALL BE CONSTRUCTED, OR MAINTENANCE WORK SHALL BE PERFORMED TO ASSURE EROSION AND SEDIMENTATION CONTROL.
15. DEWATER, OF ANY KIND, MUST BE DISCHARGED THROUGH A STONE FILTER, A FILTER BAG, DENSE VEGETATION OR INTO THE SEDIMENTATION BASIN.
16. IT IS THE DEVELOPER'S RESPONSIBILITY TO GRADE AND STABILIZE DISTURBANCES DUE TO INSTALLATION OF PUBLIC UTILITIES (IE. PHONE, GAS, ELECTRIC, CABLE, ETC)
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR STREET SWEEPING AND DUST CONTROL.
18. SLOPES STEEPER THAN 1:6 (16%) SHALL BE STABILIZED WITH AN EROSION CONTROL BLANKET.
19. ALL DRAINAGE DITCHES SHALL BE STABILIZED WITH EROSION CONTROL BLANKET AND SHALL UTILIZE CHECK DAMS AS NECESSARY. DRAINAGE DITCHES STEEPER THAN 3% SHALL BE SODDED.
20. IF DEWATERING IS ANTICIPATED OR ENCOUNTERED DURING CONSTRUCTION THE CONTRACTOR IS REQUIRED TO SUBMIT A DEWATERING PLAN TO THE CITY ENGINEERING DIVISION FOR REVIEW.

MAINTENANCE REQUIREMENTS

INSPECTION & MAINTENANCE OF SOIL EROSION CONTROL MEASURES TO BE CONDUCTED ON A WEEKLY BASIS OR AS INDICATED BELOW, WHICHEVER IS SOONER.

SILT FENCE
SILT FENCES SHOULD BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND SEVERAL TIMES DURING PROLONGED RAINFALLS. IF THE FENCE IS SAGGING OR THE SOIL HAS REACHED ONE HALF THE HEIGHT OF THE FABRIC, THE SOIL BEHIND THE FABRIC MUST BE REMOVED AND DISPOSED OF IN A STABLE UPLAND SITE. THE SOIL CAN BE ADDED TO THE SPOIL PILE. IF THE FABRIC IS BEING UNDERCUT (I.E. IF THE WATER IS SEEPING UNDER THE FENCE), THE FENCE SHOULD BE REMOVED AND REINSTALLED FOLLOWING THE GIVEN PROCEDURES. FABRIC WHICH DECOMPOSES OR OTHERWISE BECOMES INEFFECTIVE SHOULD BE REMOVED AND SAVED WITH NEW FILTER FABRIC IMMEDIATELY. FILTER FENCES SHOULD BE REMOVED ONCE VEGETATION IS WELL ESTABLISHED AND THE UP-SLOPE IS FULLY STABILIZED OR UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

RIP-RAP
INSPECTIONS SHOULD BE MADE OF ALL RIP-RAPPED SITES IMMEDIATELY AFTER THE FIRST RAINFALL FOLLOWING INSTALLATION. DISPLACED RIP-RAP SHOULD BE REPLACED AS NECESSARY FOR PROPER FUNCTION.

ACCESS ROADS (HAUL ROADS)
PROPER MAINTENANCE MAY INCLUDE ADDING ADDITIONAL LAYERS OF STONE WHEN THE ORIGINAL STONE BECOMES COVERED WITH MUD. AFTER EACH STORM EVENT, INSPECT THE ROAD FOR EROSION AND MAKE ANY NECESSARY REPAIRS. IT IS ALSO IMPORTANT TO CHECK AND MAINTAIN ANY BMP'S WHICH ARE USED IN CONJUNCTION WITH THIS BMP, ESPECIALLY THOSE FOR DRAINAGE. ALL SEDIMENT DROPPED OR ERODED ONTO PUBLIC RIGHT-OF-WAYS SHOULD BE REMOVED IMMEDIATELY BY SWEEPING.

SEEDING, SODDING & MULCHING
SEEDED, SODDED OR MULCHED AREAS SHOULD BE CHECKED FOLLOWING EACH RAIN TO ENSURE THE MATERIAL IS STAYING IN PLACE. ADDITIONAL TACKING MATERIALS OR NETTING MAY NEED TO BE APPLIED TO HOLD THE AFOREMENTIONED MATERIALS IN PLACE. MAINTENANCE PROCEDURES SHOULD ALSO BE FOLLOWED FOR THE BMP'S WHICH WERE IMPLEMENTED TO KEEP ERODED SOIL OR CONCENTRATED RUNOFF AWAY FROM THESE TARGET AREAS.

SEQUENCE OF CONSTRUCTION

1. INSTALL TEMPORARY GRAVEL DRIVEWAY(S) AS INDICATED ON PLANS. (1 DAY)
2. INSTALL ALL PERIMETER SOIL EROSION AND SEDIMENTATION CONTROL MEASURES. INSTALL INLET FILTERS ON EXISTING STRUCTURES. (1 DAY)
3. SITE DEMOLITION AND GRADING. STRIP EXISTING TOPSOIL, VEGETATION AND ORGANIC MATERIAL FROM THE DISTURBANCE AREA. COMMENCE LAND BALANCE AND MASS GRADING OPERATIONS. MAINTAIN A MINIMUM 5' BUFFER OF EXISTING VEGETATION AROUND PERIMETER WHENEVER POSSIBLE. STOCKPILES SHOULD BE LOCATED AWAY FROM EXISTING DRAINAGE FACILITIES. SILT FENCE IS REQUIRED AROUND ANY STOCKPILED MATERIAL. (4 WEEKS)
4. INSTALL UNDERGROUND UTILITIES. INLET PROTECTION MUST BE INSTALLED IMMEDIATELY FOLLOWING THE CONSTRUCTION OF EACH CATCH BASIN. (2 WEEKS)
5. MAINTAIN SOIL EROSION AND SEDIMENTATION CONTROL MEASURES, AS NECESSARY.
6. INSTALL PAVEMENT. (1 WEEK)
7. FINISH GRADE, REDISTRIBUTE TOPSOIL, SEED AND MULCH ALL DISTURBED AREAS. (1 WEEK)
8. REMOVE ALL TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES. (1 DAY)

SOIL TYPE

PER THE USDA WEB SOIL SURVEY, THE PREDOMINENT SOILS IN THE IMPROVEMENT AREA IS MARLETTE SANDY LOAM AND SLOAN-MARLETTE ASSOCIATION. A PORTION OF THE PROPERTY IS DESCRIBED AS URBAN LAND.

AREA OF DISTURBANCE: ±3.8 ACRES

NOTICE:
CONSTRUCTION SITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR NEITHER THE OWNER NOR THE ENGINEER SHALL BE EXPECTED TO ASSUME ANY RESPONSIBILITY FOR SAFETY OF THE WORK, OF PERSONS ENGAGED IN THE WORK, OF ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

NOTE:
THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AS DISCLOSED BY AVAILABLE UTILITY COMPANY RECORDS AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE COMPANY. NO GUARANTEE IS EITHER EXPRESSED OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY THEREOF. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL NOTIFY THE DESIGN ENGINEER IMMEDIATELY IF A CONFLICT IS APPARENT.

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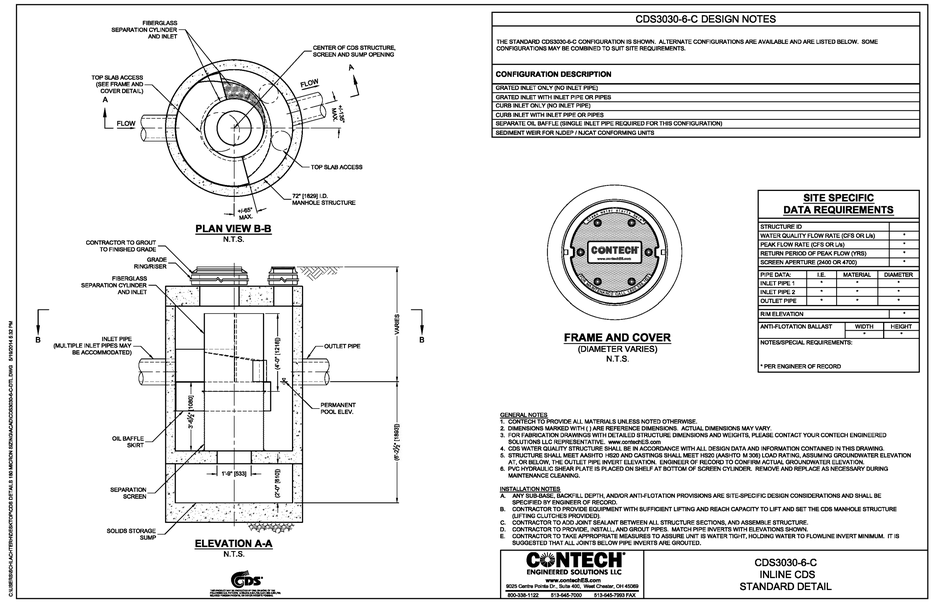
12
17-484



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS3030-6-C DESIGN NOTES
THE STANDARD CDS3030-6-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.
CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			*
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST	WIDTH		HEIGHT
	*		*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE, www.contech-cds.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO H20 AND CASTINGS SHALL MEET H20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

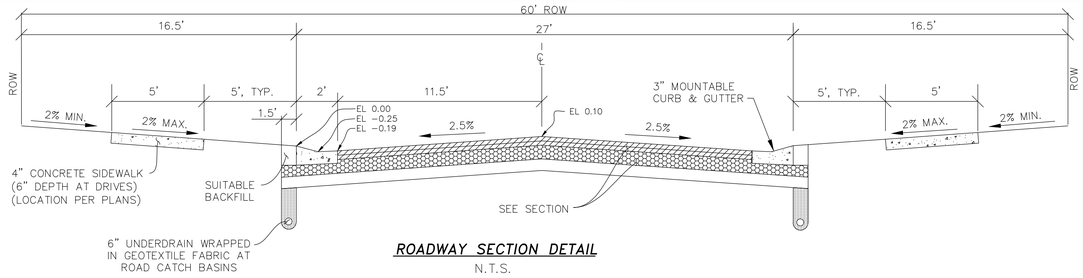
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE (LIFTING CLUTCHES PROVIDED).
C. CONTRACTOR TO ACID JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS, AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT PIPES. MATCH PIPE INVERTS WITH ELEVATIONS SHOWN.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contech-cds.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS3030-6-C
INLINE CDS
STANDARD DETAIL

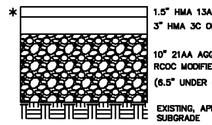
PRE-TREATMENT STRUCTURE (STRUCTURE 3A/3B)
N.T.S.

NOTE:
CONTRACTOR TO PROVIDE SHOP DRAWINGS OF THE PRE-TREATMENT STRUCTURE PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR TO COORDINATE WITH THE MANUFACTURER OF THE PRE-TREATMENT STRUCTURE FOR PROPER INSTALLATION PROCEDURES.

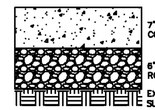


ROADWAY SECTION DETAIL
N.T.S.

HMA

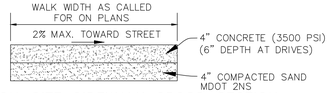


CONCRETE

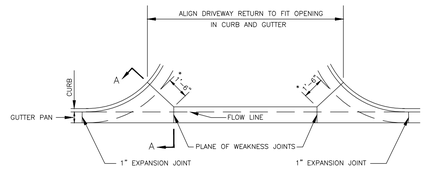


* SS – 1H @ 0.10/GAL./SYD. BETWEEN LIFTS COMMERICAL A.D.T. COULD WARRANT A DIFFERENT TYPE HMA MIXTURE

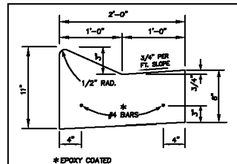
HMA
- TOP COURSE AW = 280
- 5% MIN. A.C. CONTENT
- TARGET AIR VOIDS = 3%



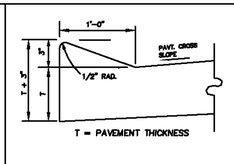
TYPICAL ON-SITE SIDEWALK CROSS-SECTION
N.T.S.



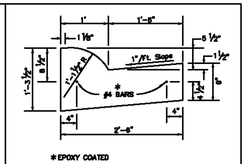
M.D.O.T. TYPE M DRIVEWAY OPENING



MOUNTABLE CURB & GUTTER DETAIL

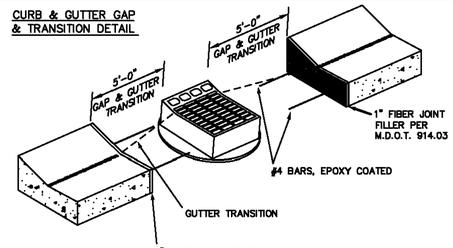


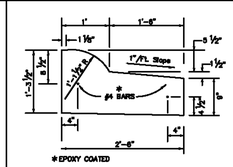
INTEGRAL MOUNTABLE CURB DETAIL



B-2 MODIFIED CURB & GUTTER

CURB & GUTTER GAP & TRANSITION DETAIL



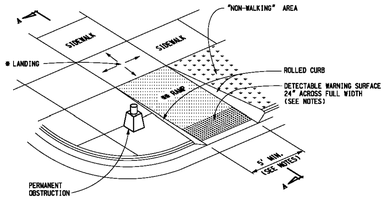


B-2 MODIFIED REVERSE GUTTER

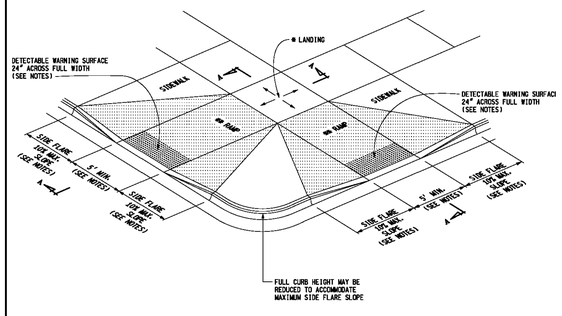
ROAD COMMISSION FOR OAKLAND COUNTY
SUBDIVISION STANDARD PLAN
FOR
CURB & GUTTER DETAILS
REVISED 05/05/10 FIGURE 3-12

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

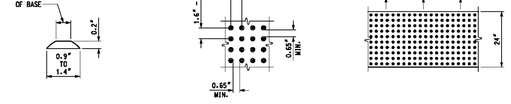
** MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE R
(ROLLED SIDES)



SIDEWALK RAMP TYPE F
(FLARED SIDES, TWO RAMPS SHOWN)



DOME SECTION | DOME SPACING | DOME ALIGNMENT

DETECTABLE WARNING DETAILS

NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

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.

WHEN 5' MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND LANDINGS TO NOT LESS THAN 4' X 4'.

CURB RAMPS WITH A RUNNING SLOPE ≤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 EXCLUDING 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 RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH 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 NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN ½". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

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 WEAVING.

PREPARED BY DESIGN DIVISION	DEPARTMENT DIRECTOR Kirk T. Steudle	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR		
DRAWN BY: R.L.T.	APPROVED BY: DIRECTOR, BUREAU OF FIELD SERVICES	SIDEWALK RAMP AND DETECTABLE WARNING DETAILS		
CHECKED BY: M.K.P.	APPROVED BY: DIRECTOR, BUREAU OF DEVELOPMENT	F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J SHEET 1 OF 7

		MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF DEVELOPMENT STANDARD PLAN FOR		
		SIDEWALK RAMP AND DETECTABLE WARNING DETAILS		
		F.H.W.A. APPROVAL	12-11-2017 PLAN DATE	R-28-J SHEET 7 OF 7

COMMERCIAL
CONSTRUCTION
SITE ENGINEERING
INDUSTRIAL & MULTI-UNIT
LAND SURVEYING
CONSTRUCTION LAYOUT

SURVEYING
ALTA SURVEYS
BOUNDARY SURVEYS
TOPOGRAPHIC SURVEYS
PARCEL SPLITS

RESIDENTIAL
SUBDIVISIONS
SITE CONDOMINIUM
MULTI-FAMILY
PLOT PLANS
CONSTRUCTION LAYOUT

ALPINE ENGINEERING, INC.
CIVIL ENGINEERS & LAND SURVEYORS

46892 WEST ROAD
SUITE 109
NOVI, MICHIGAN 48377

(248) 926-3701 (BUS)
(248) 926-3765 (FAX)
WWW.ALPINE-INC.NET

Know what's below Call before you dig.

CLIENT: BOJI DEVELOPMENT

DETAIL SHEET

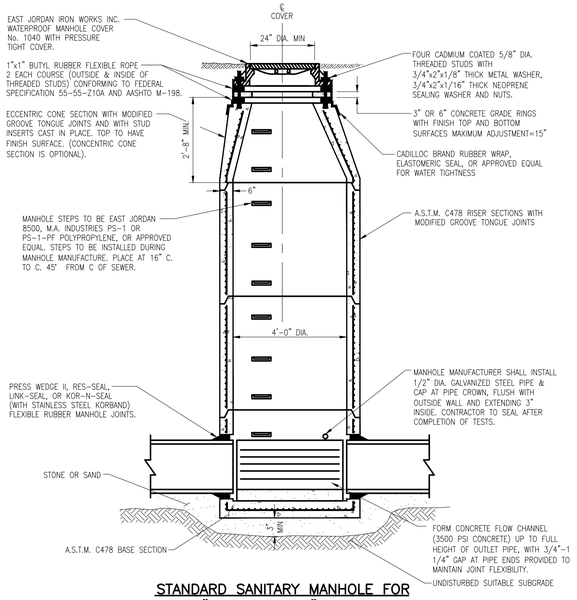
LIBERTY HILL
TOWNSHIP: 1N RANGE: 9E
CITY OF FARMINGTON
OAKLAND COUNTY
MICHIGAN
SECTION: 27

REVISED
03-07-2018 PSP SUBMITTAL
06-11-2018 ENG SUBMITTAL

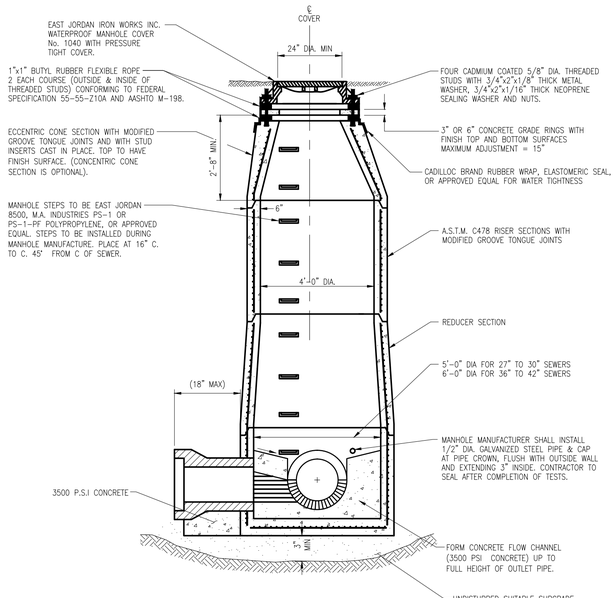
DATE: 12-04-2017
DRAWN BY: SD
CHECKED BY: TG

FBK:
CHF:
SCALE HOR 1"= FT.
VER 1"= FT.

13
17-484

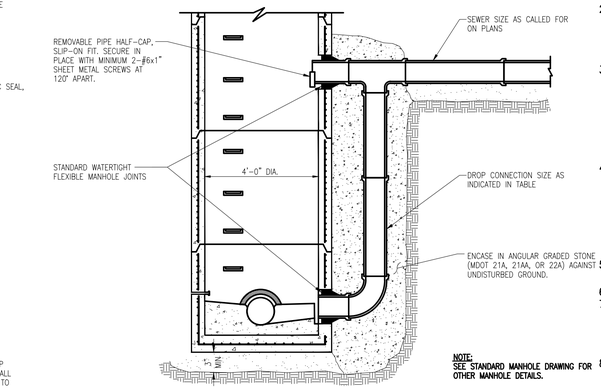


STANDARD SANITARY MANHOLE FOR 10" THROUGH 24" SEWERS



STANDARD SANITARY MANHOLE FOR 27" THRU 42" SEWERS

DIA OF SEWER	DIA OF DROP CONNECTION
8" & 10"	8"
12", 15", & 18"	12"
21", 24", & 30"	18"
36" & 42"	24"



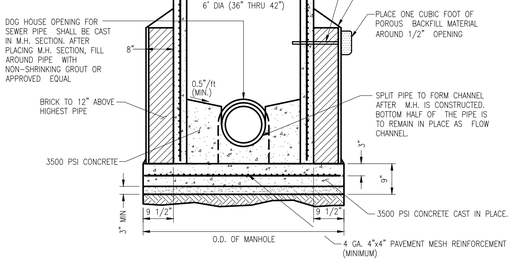
NOTE:
SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE DETAILS.

EXTERNAL DROP MANHOLE CONNECTION

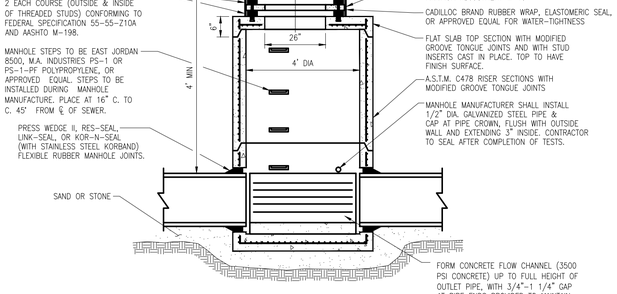
SANITARY SEWER CONSTRUCTION NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF FARMINGTON AND THE DETROIT WATER & SEWERAGE DEPARTMENT. ALL SANITARY SEWER CONSTRUCTION SHALL HAVE FULL TIME INSPECTION DIRECTED BY A PROFESSIONAL ENGINEER PROVIDED BY OR CAUSED TO BE PROVIDED BY THE CITY OF FARMINGTON.
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN ANY NECESSARY INSPECTION PERMITS AND TO COMPLY WITH ANY COUNTY OR CITY REQUIREMENTS. THE SANITARY SEWER CONTRACTOR SHALL NOTIFY THE DETROIT WATER & SEWERAGE DEPARTMENT AT LEAST 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION. THE CONTRACTOR SHALL ALSO NOTIFY THE CITY OF FARMINGTON AT LEAST 3 WORKING DAYS BEFORE THE START OF CONSTRUCTION.
3. ALL SANITARY SEWER AND STUBS SHALL BE SUBJECT TO INFILTRATION/EXFILTRATION OR AIR TESTING. INFILTRATION AND EXFILTRATION FOR ANY SECTION OF SANITARY SEWER BETWEEN MANHOLES SHALL NOT EXCEED 100 GALLONS PER INCH DIAMETER PER MILE OF PIPE PER 24 HOUR PERIOD PER SECTION 33.93 OF THE CURRENT EDITION OF THE RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES. AIR TESTS IN LIEU OF INFILTRATION TESTS SHALL BE AS SPECIFIED BY ASTM TEST F1417 (PLASTIC PIPE) OR C924 (CONCRETE PIPE). FINAL AIR TESTS MUST BE WITNESSED BY CITY PERSONNEL AND MUST BE SCHEDULED IN ADVANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CITY AND COUNTY CHARGES AND SHOULD CONTACT THEM PRIOR TO BIDDING TO CONFIRM THESE FEES AND CHARGES.
4. A VIDEOTAPE (WITH LOG AND LEAD LOCATIONS) SHALL BE SUBMITTED TO AND APPROVED BY THE CITY OF FARMINGTON PRIOR TO FINAL SEWER ACCEPTANCE. SAID VIDEOTAPE SHALL BE PERFORMED A MINIMUM OF 30 DAYS AFTER CONSTRUCTION IS COMPLETED. IN ADDITION, A NINE-POINT MANDREL TEST IS REQUIRED FOR ALL FLEXIBLE PIPES AND SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 33.85b OF THE CURRENT EDITION OF THE RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES. THE COMPLETED INSTALLATION SHALL HAVE NO PIPE DEFLECTIONS GREATER THAN 5%. IF THE PIPE FAILS ANY OF THE REQUIRED TESTS OR VIDEOTAPE REVIEW, THE CONTRACTOR SHALL FIX OR REPAIR THE NONCONFORMITY AT HIS COST. THE CONTRACTOR SHALL THEN RE-TEST AND RE-VIDEOTAPE THE SEWER AT HIS COST UNTIL FINAL ACCEPTANCE OF THE SEWER IS ACHIEVED.
5. THREE (3) WORKING DAYS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL TELEPHONE MISS DIG (1-800-482-7171) FOR UNDERGROUND FACILITIES LOCATIONS.
6. ALL ELEVATIONS SHALL BE BASED UPON OAKLAND COUNTY DATUM (USC&GS).
7. AT ALL CONNECTIONS TO AN EXISTING CITY OF FARMINGTON, OR D.W.S.D. SEWER OR TO EXTENSIONS THERETO, A WATERTIGHT BULKHEAD WITH A CAPPED 1 INCH DIAMETER PIPE SHALL BE PROVIDED TO PERMIT MEASURING INFILTRATION. A TEMPORARY 12 INCH DEEP SUMP SHALL ALSO BE PROVIDED IN THE FIRST MANHOLE UPSTREAM FROM THE CONNECTION, WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY INFILTRATION TEST UP TO THE STANDARD FILLET PROVIDED FOR THE FLOW CHANNEL.
8. ONLY MODIFIED GROOVE TONGUE, ASTM C443, O-RING, UNILOC, AMVIT, NOBEL, RING-TITE, FLUID-TITE OR EQUAL, AS APPROVED BY THE W.C.D.O.E. MAY BE USED FOR SEWER JOINTS. ALL JOINTS SHALL MEET REQUIREMENTS OF ASTM C443.
9. ALL BUILDING LEADS AND RISERS SHALL BE 6 INCH S.D.R., 23.5 ABS PIPE WITH CHEMICALLY FUSED JOINTS, SCHEDULE 40 PVC WITH RUBBER GASKET JOINT, OR AN APPROVED EQUAL PIPE AND JOINT. SEWER PIPE WYE OPENINGS SHALL CONTAIN FACTORY INSTALLED PREMIUM JOINT MATERIAL OF THE TYPE IDENTICAL TO THAT OF THE BUILDING LEAD PIPE USED. BUILDING LEADS TO BE FURNISHED WITH REMOVABLE AIRTIGHT AND WATERTIGHT STOPPERS.
10. ALL SEWER PIPE SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE BEDDING DETAILS.
11. ALL NEW MANHOLES SHALL HAVE APPROVED FLEXIBLE, WATERTIGHT SEALS WHERE PIPES PASS THROUGH WALLS. MANHOLES SHALL BE PRECAST SECTIONS WITH MODIFIED GROOVE TONGUE AND RUBBER GASKET TYPE JOINTS. PRECAST MANHOLE SECTIONS SHALL BE D.W.S.D. APPROVED MODIFIED ECCENTRIC CONE (OR OPTIONAL CONCENTRIC CONE). ALL MANHOLES SHALL BE PROVIDED WITH BOLTED, WATERTIGHT COVERS.
12. MANHOLES SHALL BE CONSTRUCTED WITH FLOW CHANNEL WALLS THAT ARE FORMED TO THE FULL HEIGHT OF THE CROWN OF THE OUTLET SEWER. A BENCH SHALL BE PROVIDED ON EACH SIDE OF THE MANHOLE FLOW CHANNEL AND SHALL HAVE A SLOPE OF NOT LESS THAN 0.5 INCHES PER FOOT. (REFER TO SECTIONS 34.4 AND 34.5 OF THE CURRENT EDITION OF THE RECOMMENDED STANDARDS FOR WASTEWATER FACILITIES.)
13. WHEREVER EXISTING MANHOLES ARE TO BE TAPPED, THE TAP SHALL BE MADE BY CORING. THE CONTRACTOR SHALL PLACE A KOR-N-SEAL BOOT (OR APPROVED EQUAL) AFTER CORING IS COMPLETED. BLIND DRILLING WILL NOT BE PERMITTED IN LIEU OF CORING.
14. AT ALL SEWER CONNECTIONS TO MANHOLES, DROP CONNECTIONS WILL BE REQUIRED WHEN THE DIFFERENCE IN INVERT ELEVATIONS EXCEEDS 18 INCHES. EXTERNAL DROP CONNECTIONS ARE STANDARD. INTERNAL DROP CONNECTIONS WILL ONLY WILL BE ALLOWED FOR DEEP MANHOLE CONSTRUCTION AS APPROVED BY THE CITY.
15. THE ELEVATION DIFFERENTIAL OF EXCAVATION AROUND EXISTING MANHOLES MUST NOT EXCEED 6 FEET.
16. MANHOLES CONSTRUCTED OR ADJUSTED AS PART OF THE SYSTEM MAINTAINED BY THE CITY OF FARMINGTON SHALL BE PROVIDED WITH COVERS READING "SANITARY SEWER" PER THE DETAIL.
17. NO GROUND WATER, STORM WATER, CONSTRUCTION WATER, DOWNSPOUT DRAINAGE, FOOTING, OR WEEP TILE DRAINAGE SHALL BE ALLOWED TO ENTER ANY SANITARY SEWER INSTALLATION.
18. ALL WATER MAIN ENTERING THE EXCAVATIONS OR OTHER PARTS OF THE WORK SHALL BE REMOVED UNTIL ALL THE WORK HAS BEEN COMPLETED. NO SANITARY SEWER SHALL SHALL BE USED FOR THE DISPOSAL OF TRENCH WATER.
19. 18 INCH MINIMUM VERTICAL SEPARATION AND 10' MINIMUM HORIZONTAL SEPARATION MUST BE MAINTAINED BETWEEN SANITARY SEWER AND WATER MAIN.
20. NO CLAY PIPE WILL BE ALLOWED FOR MAIN LINE SANITARY SEWER OR FOR SANITARY SEWER LEADS.
21. WHERE SANITARY SEWER CLEANOUTS FALL WITHIN A PAVED AREA (PARKING LOT, SERVICE DRIVE AREA, ETC.), THE CLEANOUT SHALL HAVE A CAST IRON COVER THAT IS CENTERED IN A 2'x2'x6" CONCRETE SLAB HAVING A COMPRESSIVE STRENGTH OF 3000 PSI AT 28-DAY CURE TIME.

DOG HOUSE CUT OUT SIZES	
SEWER SIZE	MAX CUT OUT SIZE
10"	17 1/2"
12" THRU 15"	20"

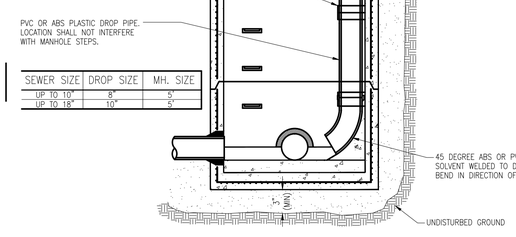


STANDARD SANITARY MANHOLE ON EXISTING 10" THROUGH 42" DIAMETER SEWERS



FLAT TOP MANHOLE FOR SHALLOW MANHOLE INSTALLATIONS

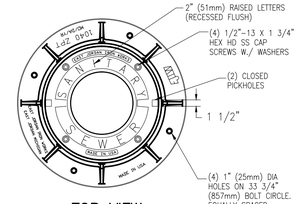
SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE DETAILS.



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

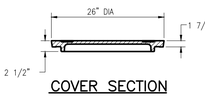
INTERNAL DROP MANHOLE CONNECTION FOR DROP CONNECTIONS GREATER THAN 20 FEET DEPTH

(ONLY AS APPROVED BY CITY OF FARMINGTON)

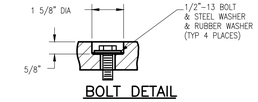


TOP VIEW

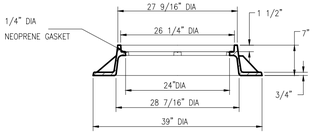
BOTTOM VIEW



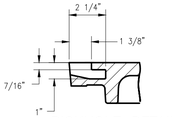
COVER SECTION



BOLT DETAIL

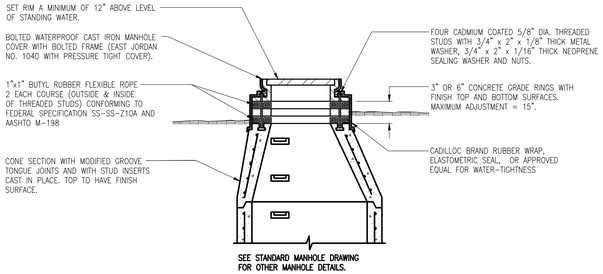


FRAME SECTION

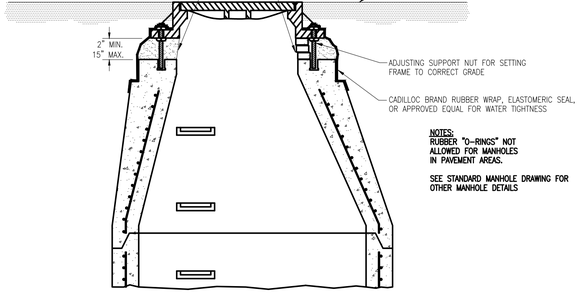


PICKHOLE DETAIL

CAST IRON MANHOLE COVER E.J.I.W. 1040 TYPE "A" SOLID COVER



CONSTRUCTION DETAILS FOR MANHOLE TOPS WITHIN FLOOD PRONE AREAS



NOTES:
RUBBER "O-RINGS" NOT ALLOWED FOR MANHOLES IN PAVEMENT AREAS.

SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE DETAILS

OPTIONAL CONSTRUCTION DETAILS FOR MANHOLE TOPS WITHIN PAVEMENT AREAS

DRAWING PATH: H:\Municipal\Farmington\City\Engineering Design Stds\APPENDICES\STD DETAILS\F-SAN1.dwg Aug 24, 2015 - 11:26am

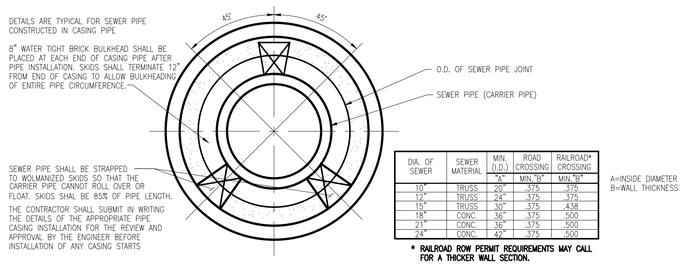
OHM

CITY/VILLAGE/TOWNSHIP CITY OF FARMINGTON
COUNTY OAKLAND
JOB # ####
SCALE V: NA H: NTS
HORIZ DATUM ####
VERT DATUM ####
CLIENT #####
DESIGNED ####
DRAWN ####
CHECKED ####
APPROVED ####
PROJ MGR ####
ENGINEER ####
CADD ####
BID DATE ####
DATE
REVISIONS
DATE:

34000 Plymouth Road | Livonia, MI 48150 | P (734) 522-6711 | F (734) 522-6427 | WWW.OHM-ADVISORS.COM

CITY OF FARMINGTON STANDARD SANITARY SEWER DETAILS

SHEET 1 OF 2 A



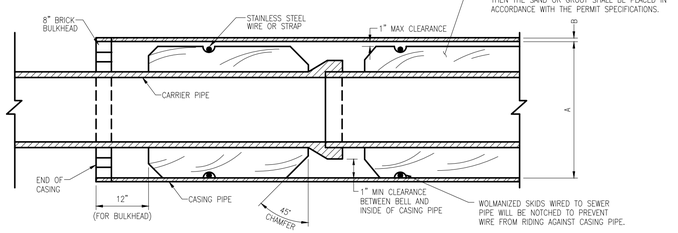
DIA. OF SEWER	SEWER MATERIAL	MIN. (I.D.) "A"	ROAD CROSSING MIN."B"	RAILROAD* CROSSING MIN."B"
10"	TRUSS	20"	.375	.375
12"	TRUSS	24"	.375	.375
15"	TRUSS	30"	.375	.438
18"	CONC.	36"	.375	.500
21"	CONC.	36"	.375	.500
24"	CONC.	42"	.375	.500

A=INSIDE DIAMETER
B=WALL THICKNESS

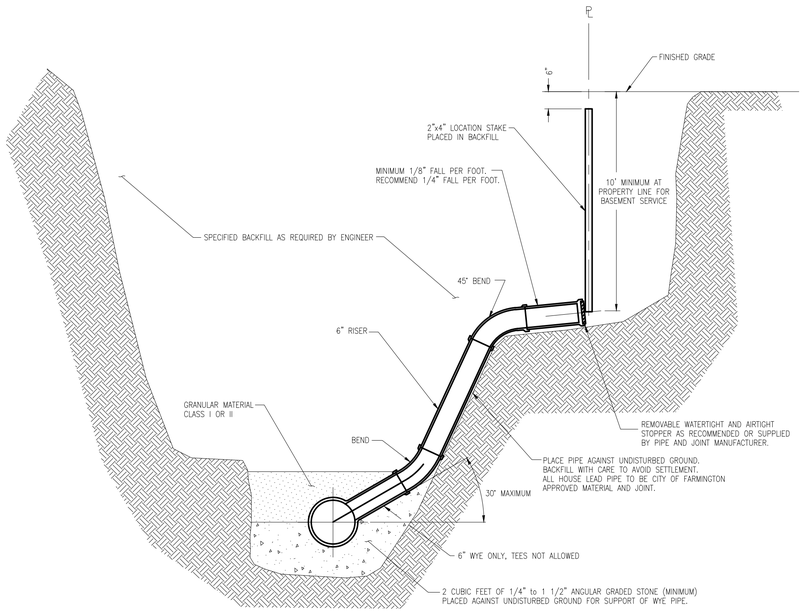
*** RAILROAD ROW PERMIT REQUIREMENTS MAY CALL FOR A THICKER WALL SECTION.**

PIPE BARREL SUPPORT FOR SEWER PIPE CONSTRUCTED IN CASING PIPE

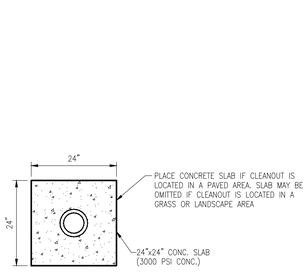
CASING SHALL BE SPIRAL WELDED STEEL PIPE A.S.T.M. A-252, GR. 2.



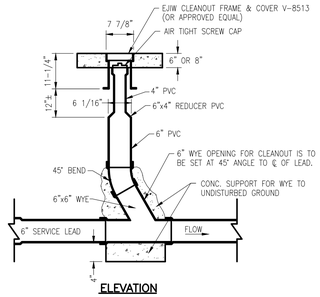
STANDARD CASING SECTION



HOUSE LEAD DETAIL

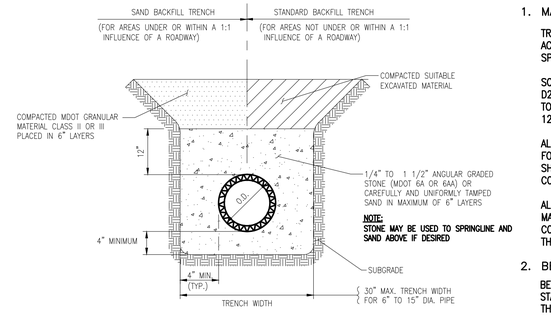


TOP VIEW

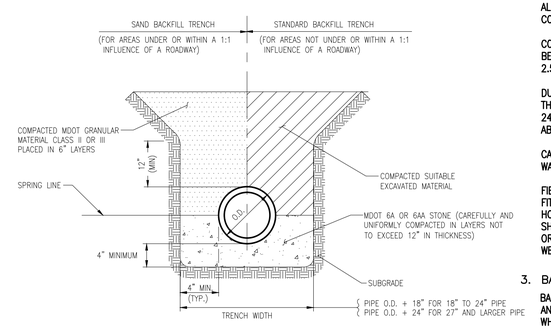


ELEVATION

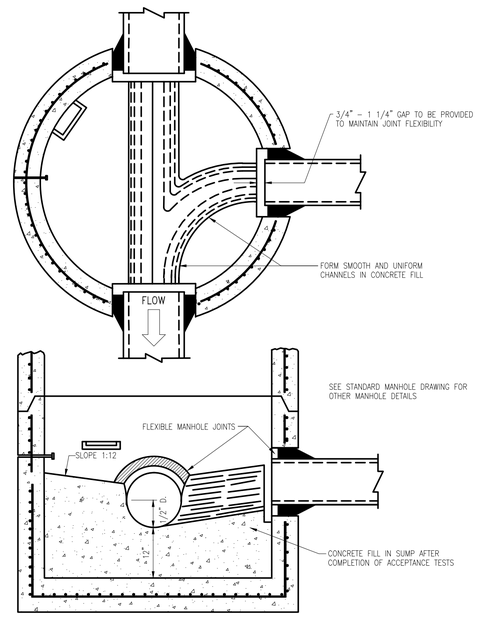
DETAIL OF SANITARY SEWER CLEANOUT



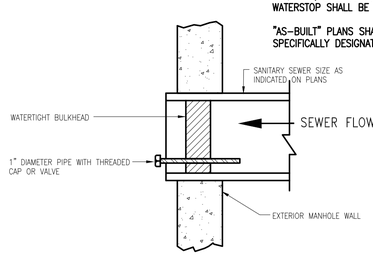
FLEXIBLE PIPE (10" OR 15" DIA ABS TRUSS OR PVC TRUSS) STANDARD BEDDING AND TRENCH BACKFILL DETAIL



RIGID PIPE (18" DIAMETER AND LARGER CONCRETE) STANDARD BEDDING AND TRENCH BACKFILL DETAIL



SUMP MANHOLE FOR TESTING, CLEANING & DEWATERING



BULKHEAD WITH PIPE TAP FOR TESTING

AT ALL CONNECTIONS TO AN EXISTING SEWER OR EXTENSIONS THERETO A WATERTIGHT BULKHEAD WITH A CAPPED 1 INCH DIAMETER PIPE TO PERMIT MEASURING INFILTRATION SHALL BE PROVIDED. A TEMPORARY 12 INCH DEEP SUMP SHALL ALSO BE PROVIDED IN THE FIRST MAN-HOLE UPSTREAM FROM THE CONNECTION WHICH WILL BE FILLED IN AFTER SUCCESSFUL COMPLETION OF ANY INFILTRATION TEST UP TO THE STANDARD FILLET PROVIDED FOR THE FLOW CHANNEL.

SPECIFICATIONS FOR TRUSS PIPE SANITARY SEWERS

1. MATERIALS AND CERTIFICATIONS

TRUSS PIPE AND FITTINGS SHALL BE AS DESCRIBED UNDER THE CURRENT ASTM DESIGNATION D2680, STANDARD SPECIFICATION FOR ACRYLONITRILE–BUTADIENE–STYRENE (ABS) AND POLY(VINYL CHLORIDE) (PVC) COMPOSITE SEWER PIPING. APPENDIX XI OF SAID SPECIFICATION SHALL BE AS MODIFIED BY THE BEDDING REQUIREMENTS OUTLINED BELOW.

SOLID WALL ABS PIPE FOR 6" HOUSE CONNECTION SEWERS SHALL BE SDR 23.5 CONFORMING TO THE CURRENT ASTM DESIGNATION D2751 STANDARD SPECIFICATION FOR ACRYLONITRILE–BUTADIENE–STYRENE (ABS) SEWER PIPE AND FITTINGS, OR PVC SCHEDULE 40 CONFORMING TO THE CURRENT ASTM DESIGNATION D1785 STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE SCHEDULES 40, 80 AND 120. SOLID WALL PIPE SHALL BE INSTALLED IN ACCORDANCE WITH BEDDING REQUIREMENTS OUTLINED BELOW.

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

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

2. BEDDING

BEDDING FOR TRUSS PIPE AND ABS SOLID WALL PIPE SHALL BE IN ACCORDANCE WITH THE CURRENT ASTM DESIGNATION D2321 AND AS SHOWN IN THE STANDARD BEDDING DETAILS EXCEPT THAT FLOODING OR PUDDLING SHALL NOT BE USED. THE USE OF FLEXIBLE AND SEMI–FLEXIBLE PIPE REQUIRES THAT THE BEDDING PROVIDE UNYIELDING SIDE SUPPORT AND COMPLETE CONTACT UNDER PIPE HAUNCHES. BEDDING MATERIAL MUST BE PROPERLY PLACED AND COMPACTED TO PROVIDE LATERAL RESTRAINT AGAINST DEFLECTION IN THE PIPE DIAMETER. PIPE MUST BE BEDDED TO THE TRUE LINE AND GRADE THROUGHOUT ITS LENGTH. BELL HOLES SHALL BE PROVIDED WHERE REQUIRED. BEDDING FOR RIGID PIPE SHALL BE IN ACCORDANCE WITH ASTM DESIGNATION C12.

WHERE UNSTABLE BOTTOMS ARE ENCOUNTERED, THE CONTRACTOR SHALL PROVIDE A FOUNDATION CONSISTING OF AN APPROVED GRADED AND PROCESSED ANGULAR STONE OR GRAVEL TO ACT AS AN IMPERVIOUS MAT TO PREVENT MIGRATION OR VERTICAL MOVEMENT OF UNSTABLE SOILS OR BEDDING MATERIALS. WHERE TRENCH SHEETING, PLATES, OR A TRENCH BOX ARE USED DUE TO SEVERE GROUND CONDITIONS, ALL VOIDS TO THE SIDE AND BELOW THE TOP OF THE PIPE CAUSED BY THE SHEETING, PLATES, OR BOX WITHDRAWAL SHALL BE COMPLETELY FILLED OR THE SUPPORTS LEFT IN PLACE BELOW THE TOP OF THE PIPE.

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

DUE TO POTENTIAL DAMAGE TO EXTERIOR WALLS OF TRUSS PIPE IF ROCKS, FROZEN MATERIALS, OR LARGE OBJECTS STRIKE THE PIPE, THE CONTRACTOR SHALL CAREFULLY AVOID DUMPING ANY MATERIALS OTHER THAN APPROVED BEDDING SAND OR STONE ON THE PIPE UNTIL 24" COVER IS PLACED ON IT, PARTICULARLY UNDER COLD WEATHER CONDITIONS. PIPE WALLS AND ENDS SHALL ALSO BE PROTECTED FROM ABRASION AND DAMAGE DURING HANDLING, AND SHALL BE FULLY INSPECTED JUST PRIOR TO PLACING IN THE TRENCH.

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

FIELD TAPS OF EXISTING SANITARY SEWERS SHALL BE MADE BY INSTALLING A WYE FITTING FOR A HOUSE LEAD CONNECTION. FERNCO FITTINGS WITH STAINLESS STEEL BANDS SHALL BE USED TO SECURE THE WYE FITTING TO THE SANITARY SEWER PIPE. BEDDING FOR HOUSE CONNECTION SEWERS SHALL BE EQUAL TO THAT OF THE MAIN SEWER BEDDING. RISERS IN DEEP AND UNSTABLE TRENCHES SHOULD BE BEDDED IN 6A OR 6AA ANGULAR STONE TO AVOID SETTLEMENT. CONCRETE SHALL NOT BE USED FOR BEDDING. END CAPS OR PLUGS SHALL BE BRACED OR ANCHORED TO WITHSTAND AIR TEST PRESSURES. CAPS OR PLUGS SHALL NOT BE CHEMICALLY WELDED IN PLACE.

3. BACKFILL

BACKFILL SHALL BE COMPACTED ABOVE PIPE OR AS INDICATED ON CONSTRUCTION DRAWINGS. TRENCH BACKFILL SHALL BE A SUITABLE MATERIAL AND SHALL BE FREE OF ANY ORGANIC MATERIALS AND LARGE ROCKS. UNDER ROAD SURFACES, PAVEMENT, SIDEWALKS, CURBS, DRIVEWAYS AND AREAS WHERE TRENCH IS WITHIN A 1:1 INFLUENCE OF THE PAVEMENT, SAND BACKFILL SHALL BE USED WHICH SHALL CONSIST OF MDOT GRANULAR MATERIAL CLASS II OR III COMPACTED IN LAYERS NOT TO EXCEED 12" IN THICKNESS TO A DENSITY OF 95% AS DETERMINED BY AASHTO T99. ALL BACKFILL PLACED WITHIN 3' OF STRUCTURES SHALL BE APPROVED SAND, PLACED IN 1' LAYERS AND COMPACTED. TRENCHES WHICH ARE TO BE LEFT OPEN OVERNIGHT SHALL BE ENCLOSED WITH SUITABLE FENCING AND LIGHTED BARRICADES, UNLESS OTHERWISE APPROVED BY THE CITY.

4. CHEMICALLY WELDED JOINTS

JOINTS FOR ABS TRUSS PIPE SHALL BE CHEMICALLY WELDED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION AND THE CURRENT ASTM DESIGNATIONS D2680 AND D2235. ADDITIONALLY, ALL EXPOSED ENDS OF TRUSS PIPE SHALL BE FULLY AND THOROUGHLY COATED WITH PLASTIC JOINTING CEMENT PRIOR TO MAKING JOINTS SO AS TO SEAL ENDS AND ELIMINATE THE POSSIBILITY OF FALSE LOW PRESSURE AIR TESTS. CARE SHALL BE TAKEN TO INSURE ALL JOINTS ARE PUSHED TO THE FULL "HOME" POSITION AND HELD TIGHTLY IN THE "HOME" POSITION DURING ANY GRADE OR LINE ADJUSTMENTS. PIPE SHALL BE ROTATED DURING JOINT INSERTION TO INSURE A COMPLETE SPREAD OF JOINTING CEMENT. ABS PLASTIC CEMENT PRIMER AND ABS PLASTIC PIPE CEMENT SHALL ARRIVE AT THE JOB SITE IN SEALED AND LABELED CONTAINERS. "JOHNNY MOPS" OR SIMILAR SWAB TYPE APPLICATORS SHALL BE USED TO APPLY PRIMER AND CEMENT. OPENED CONTAINERS IN THE TRENCH SHALL BE PROTECTED FROM DIRT, WATER, AND OTHER CONTAMINANTS.

5. ELASTOMERIC GASKET JOINTS

JOINTS FOR PVC TRUSS PIPE AND FITTINGS SHALL BE OF THE ELASTOMERIC GASKET PUSH–ON TYPE. SUCH JOINTS SHALL CONFORM TO THE CURRENT ASTM DESIGNATION D3212 AND THE PIPE MANUFACTURER SHALL FILE WITH THE CITY OF FARMINGTON A COPY OF CERTIFIED TEST RESULTS OF ITS JOINTING SYSTEM PRIOR TO USE. GASKET JOINTS SHALL BE INSTALLED IN ACCORDANCE WITH PROCEDURES SPECIFIED BY THE PIPE MANUFACTURER, SUCH THAT THE GASKET WILL BE COMPRESSED (NOT DISPLACED) IN THE JOINT TO FORM A POSITIVE SEAL. CARE SHALL BE TAKEN TO INSURE ALL JOINTS BE PUSHED TO THE FULL "HOME" POSITION AND HELD TOGETHER IN THE "HOME" POSITION DURING ANY GRADE OR LINE ADJUSTMENTS.

6. CUTTING AND HANDLING

CUTTING OF PIPE LENGTHS, WHERE REQUIRED, SHALL BE PERFORMED WITH TOOLS OR EQUIPMENT THAT WILL PROVIDE A NEAT, PERPENDICULAR CUT WITHOUT DAMAGE TO THE PLASTIC OR THE FILLER MATERIAL. BOWING OR WARPING OF TRUSS PIPE CAN OCCUR WITH TEMPERATURE FLUCTUATIONS. THE CONTRACTOR SHALL STORE AND PROTECT THE PIPE TO MINIMIZE BOWING. NOMINAL 12'6" OR LONGER PIPE LENGTHS HAVING DEVIATIONS FROM STRAIGHT GREATER THAN 1", AS MEASURED ALONG A STRAIGHT LINE, SHALL NOT BE USED.

7. SPECIAL CONDITIONS

TO MAINTAIN THE FLEXIBILITY OF THE PIPE MATERIALS, CONCRETE ENCASEMENT OF DROP CONNECTIONS SHALL NOT BE USED. DROP CONNECTIONS SHALL BE ENCASED IN ANGULAR GRADED STONE (MDOT 21A, 21AA, OR 22A). WHERE ADAPTORS TO OTHER MATERIALS ARE REQUIRED, ONLY APPROVED ADAPTORS AND JOINTS MAY BE USED. WHERE THE CONNECTIONS ARE MADE TO EXISTING MANHOLES, A RUBBER WATERSTOP SHALL BE USED AROUND THE PIPE.

"AS–BUILT" PLANS SHALL BE PROVIDED TO THE CITY OF FARMINGTON BY THE ENGINEER AND "AS–BUILT" PLANS SHALL SPECIFICALLY DESIGNATE WHERE ABS TRUSS OR PVC TRUSS SEWER PIPE WAS INSTALLED.

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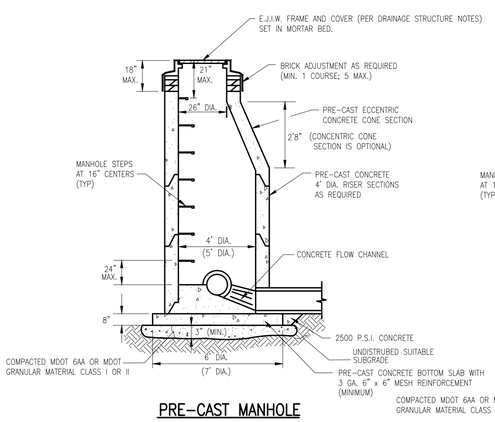
CITY/VILLAGE/TOWNSHIP: CITY OF FARMINGTON
COUNTY: OAKLAND
JOB #: ####
CLIENT: ####
SCALE: H: NTS V: NA
DATE:
VERT DATUM: ####
HORZ DATUM: ####
RANGE ####
TOWN ####
SECTION ####
PROJ MGR ####
ENGINEER ####
CADD ####
BID DATE ####
DATE

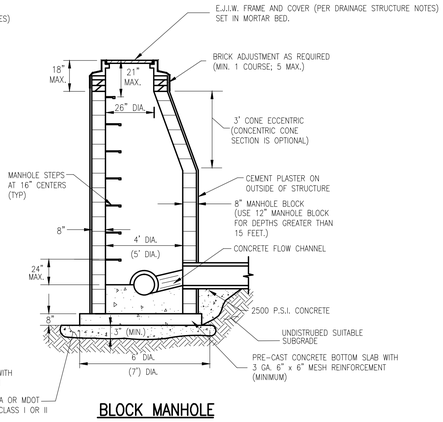
REVISIONS: DATE:
REVISIONS: DATE:

CITY OF FARMINGTON
STANDARD SANITARY SEWER DETAILS

SHEET
45
OF 65
B



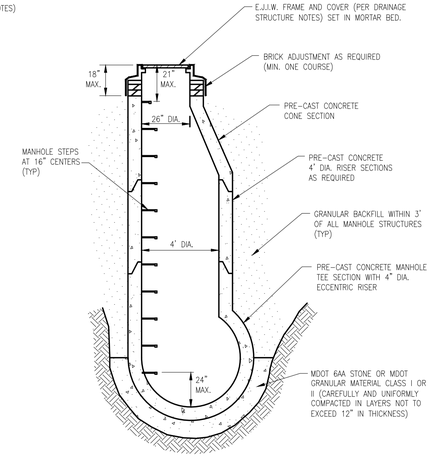
PRE-CAST MANHOLE



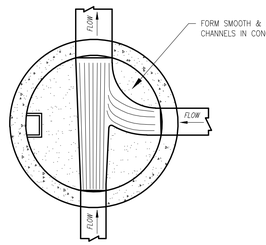
BLOCK MANHOLE

NOTE: FOR PRE-CAST OR BLOCK MANHOLES WITH AN OUTLET SEWER OF 24" DIAMETER OR SMALLER, THE CONCRETE FLOW CHANNEL SHALL BE OMITTED AND A 2' DEEP SUMP SHALL BE ADDED.

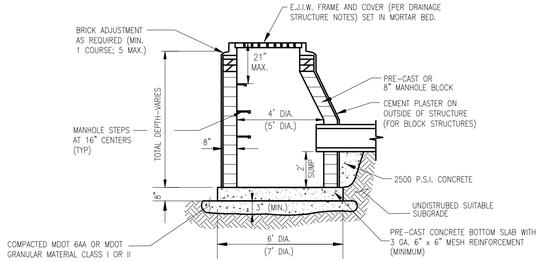
STANDARD MANHOLE DETAILS



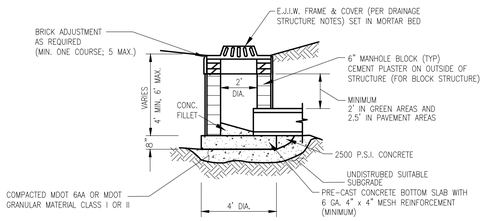
PRE-CAST TEE MANHOLE DETAIL



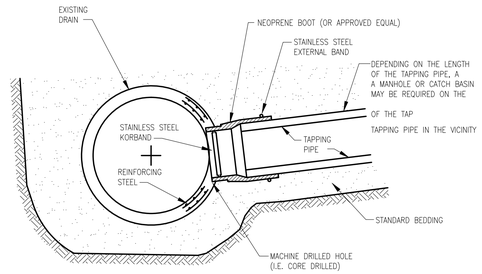
CHANNEL DETAIL



CATCH BASIN DETAIL

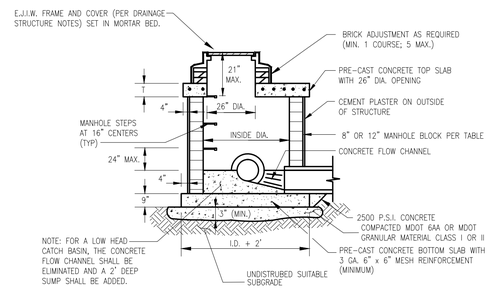


2' DIA. INLET DETAIL

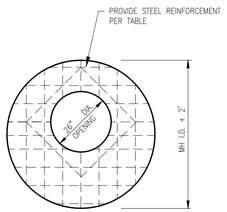


CONNECTION DETAIL FOR DIRECT TAPS TO PIPE WALL OF EXISTING DRAINS, ONLY AS APPROVED BY CITY ENGINEER

KOR-N-TEE TAP FOR CONCRETE PIPE



PROFILE VIEW

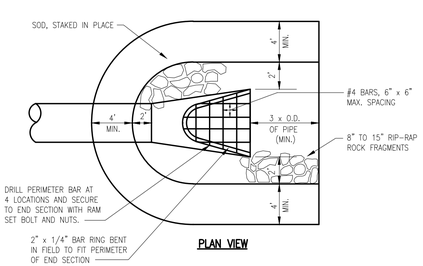


PRE-CAST CONCRETE TOP SLAB DETAIL

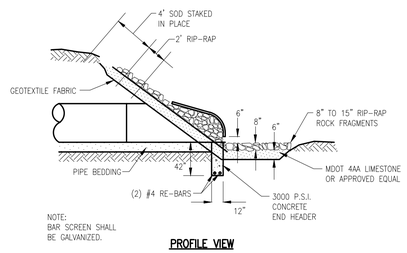
OUTLET PIPE DIA.	M.H. I.D.	TOP SLAB "T"	MH BLOCK	TOP SLAB
** 24" OR LESS	4'	9"	8"	#6 @ 9" EA. WAY
30"	4'	9"	8"	#6 @ 9" EA. WAY
36"	4'	9"	12"	#6 @ 9" EA. WAY
42"	5'	10"	12"	#6 @ 9" EA. WAY
48"	6'	11"	12"	#7 @ 9" EA. WAY
54"	7'	12"	12"	#7 @ 9" EA. WAY
60"	8'	12"	12"	#8 @ 9" EA. WAY

STEEL REINFORCEMENT TABLE

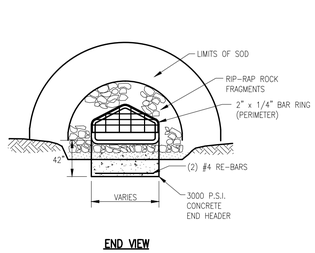
LOW HEAD MANHOLE AND CATCH BASIN DETAIL



PLAN VIEW

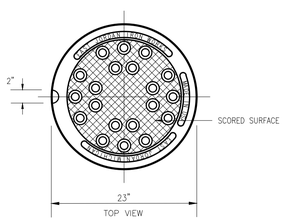


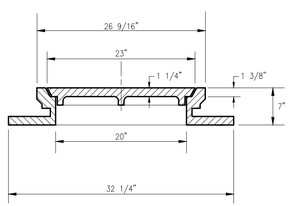
PROFILE VIEW



END VIEW

END SECTION AND BAR SCREEN DETAIL





CAST IRON MANHOLE COVER
E.J.I.W. 1010 FRAME AND
TYPE B PERFORATED COVER

GENERAL NOTES FOR STORM SEWER CONSTRUCTION

1. All materials and workmanship shall be in accordance with the standards and specifications of the City of Farmington.
   a. Type and class of pipe shall be as specified on plans.
   b. Bedding shall be used as called for on the details.
   c. All end sections 18" and larger shall be provided with a galvanized bar screen.
2. Contractor shall construct manholes with precast reinforced concrete in lieu of concrete, brick and block manholes in accordance with the following conditions:
   a. No openings shall be made in precast units which would leave less than 12" of undisturbed precast structure wall between pipes (as measured between outside pipe walls) or would remove more than 40% of the circumference along any horizontal plane.
   b. Structures for sewers larger than 18", or those not meeting the opening requirements, may be built of block or brick up to a minimum of 8" above the top of sewer, with precast units being used above this point. Where precast units rest on the block or brick, the groove in the precast unit shall be filled with mortar.
   c. Openings for the outlet sewer shall be precast with a diameter of 3 inches larger than the outside diameter of the outlet pipe. All other openings shall be made in the field after the manhole has been constructed.
3. All vertical openings in concrete block structure walls shall be completely filled with mortar. All vertical wall joints shall be cement pointed.
4. Concrete pipe requirements:
   a. The contractor shall provide reinforced concrete pipe as specified on the plans.
   b. All round reinforced concrete pipe shall meet the requirements of ASTM C76 with modified grooved tongue and rubber gasket meeting the requirements of ASTM C443.
   c. All elliptical reinforced concrete pipe shall meet the requirements of ASTM C507 with tongue and grooved joints with bituminous (DeWitt #10) joint material meeting the requirements of C443. Elliptical concrete pipe joints shall also be wrapped per ASTM C877 for external sealing bands for non-circular concrete pipe. In addition, elliptical concrete pipe of 42" equivalent size and larger shall require inside concrete pointing.
   d. The inside joints of round pipe over 27" diameter shall be pointed with mortar upon completion of backfilling operations.
   e. Where unstable ground conditions are encountered, stone bedding shall be used as directed by the Engineer in order to provide a stable foundation for pipe and manholes.
   f. All pipes entering or leaving a manhole shall be adequately supported by pouring 250 psi concrete fill from undisturbed earth to springline or with approved crushed aggregate.
5. HDPE pipe requirements:
   a. Large diameter HDPE storm sewer may be used for underground storm water detention systems if approved by the City, depending on site conditions.
   b. All HDPE storm sewer pipe that is used for underground storm water detention shall have a smooth interior.
   c. HDPE pipe shall meet the requirements of ASTM M294 and D3350 with push-on type joints meeting the requirements of ASTM D3212 and F477.
6. Pipe bedding and backfilling:
   a. Bedding shall extend a minimum of 4" below pipe, unless otherwise noted on construction plans. Bedding shall be uniform in gradation. However, if the existing native soils meet the requirements for MDOT granular material Class II (minimum 4" thick), then the storm sewer may be laid directly on the compacted native subgrade soils.
   b. Backfill shall be compacted above pipe or as indicated on construction drawings. Trench backfill shall be of a suitable material and shall be free of any organic materials and rocks larger than 3" in size. Backfill shall be ramped into trench and compacted with a small dozer or other approved methods. Where trench is within a 1:1 influence of streets, alleys, sidewalks, driveways and parking areas, sand backfill shall be used which shall consist of MDOT granular material Class II or III compacted in layers not to exceed 12" in thickness to a density of 95% as determined by AASHTO T99. All backfill placed within a 1:1 influence of structures shall be approved sand, placed in 1' layers and compacted. No frozen material shall be buried more than 4' below the final elevation of the ground.
   c. Trenches which are to be left open overnight shall be enclosed with suitable fencing and lighted barricades, unless otherwise approved by the City.
7. Sump pump lead requirements:
   a. Sump pump leads shall be SDR 35, non-perforated, solid wall, PVC, ARMCO Truss Pipe, or approved equal, with premium joints.
   b. Sump collection system pipes shall be connected at drainage structures. However, if approved by the engineer, taps to 12" storm sewer may be made with a Fernco EZ Tap or approved equal. Taps to other size storm sewer may be made with a Romac saddle, KOR-N-TEE lateral connector for concrete pipe, or approved equal.
   c. All sump pump leads shall be taken to the property line, easement line or as indicated on the plan.
   d. Sump pump cleanouts shall be a minimum inside diameter of 24" and be constructed at changes of alignment, ends of sump pump mains or as indicated on the plan.

DRAINAGE STRUCTURE REQUIREMENTS:

1. All manholes and catch basins shall be 4' or 5' in diameter unless otherwise indicated on construction drawings. Larger diameter drainage structures (6', 7', 8', 10', 12' diameter) may be needed for large storm sewer pipe or for situations where the angles between entering pipes require a larger diameter structure in order to maintain at least 1' of structure wall between the pipes. 2' diameter inlets may be used where approved by the City Engineer.
2. Manhole and catch basin steps shall be steel, encased with polypropylene plastic or approved equivalent. Acceptable steps include M.A. Industries, Inc., PSI-375 or East Jordan Iron Works 8502. Manhole steps shall be set at 16" centers.
3. Manhole frame and cover shall be East Jordan Iron Works 1010, type "B" perforated cover or as per construction drawings.
4. Catch Basin and inlet frame and cover shall be:
   a. East Jordan Iron Works 5080, type "M2" sinusoidal cover for areas with straight face or integral curb and gutter
   b. East Jordan Iron Works 7045, type "M2" sinusoidal cover for areas with straight face or integral curb and gutter where areas of curb inlets are needed.
   c. East Jordan Iron Works 1010, type "M" cover for low points in paved parking areas.
   d. East Jordan Iron Works 1010, type "01" cover (beehive) to be used in open ditches and swales.
   e. East Jordan Iron Works 1010, type "N" cover (low beehive) to be used for low points in lawn areas or rear yard
5. Manhole and Catch Basin Frames shall be set in full bed of mortar and the side shall be overlapped to prevent leakage.
6. A proper channel shall be constructed within the existing manhole or other structure at which the connection is to be made in order to direct the flow to the existing outlet in a manner which will tend to create the least amount of turbulence. The channel shall be constructed to the same size as the inside diameter of the existing pipes, and shall be built to height of 1/3 the existing pipe diameter with a minimum of 2% slope on the benches.
7. Standard Brick Adjustment: minimum of one course and a maximum of 5 courses of brick.
   a. All bricks and blocks used for adjustment shall be concrete.
   b. Block used for standard catch basins and manholes shall be 8" (for 0'-15' deep) and 12" (for 15'-25' deep). Block used for 2' diameter inlets and catch basins shall be 6".
   c. Precast reinforced concrete section as minimum shall conform to ASTM C-478.
   d. Concrete base for manhole, catch basin, and inlet shall be MDOT grade 30P (Min.), 8" thick, 3000 psi.
8. Plaster all outside masonry surfaces with 1:2 1/2 masonry cement (type II) 1/2" thick.
9. When tapping into an existing structure, a brick collar shall be placed 12" thick around the pipe and extended 12" beyond the opening. If pre-cast section is tapped, bend mesh and use as reinforcement with brick collar.
10. All precast riser(s) shall be placed in a full bed of mortar. All joints & liftholes shall be pointed up with mortar on the outside and inside.
11. Hinged bar grates will be required for headwalls per MDOT standards.
    a. All vertical and horizontal bars shall be tack-welded to the angle frame.
    b. The bar grate screen shall be hot-dipped galvanized after fabrication is complete.

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OHM

CITY/VILLAGE/TOWNSHIP: CITY OF FARMINGTON
COUNTY: OAKLAND
JOB #: ####
SCALE: H: 1"=40' V: 1"=4'
DATE:
REVISIONS:

TOWN #### RANGE #### SECTION #### CASE: #### PROJ.MGR #### ENGINEER #### CADD #### BID DATE: ####

DATE | REVISIONS: | DATE:

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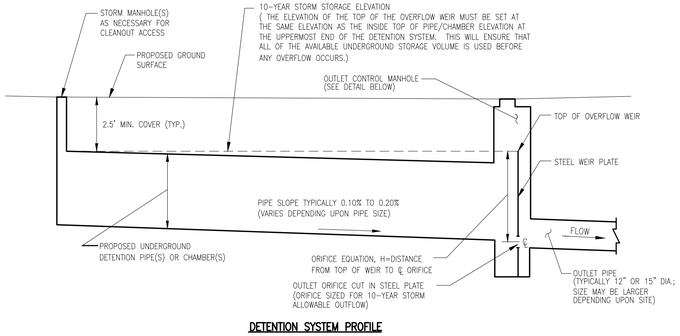
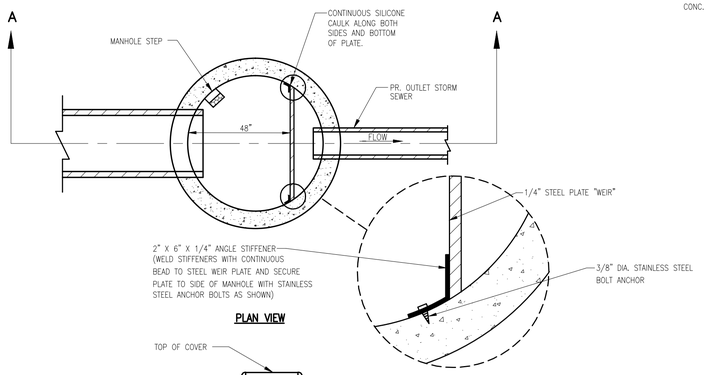
CITY OF FARMINGTON
STANDARD STORM SEWER DETAILS

SHEET 40 OF 65

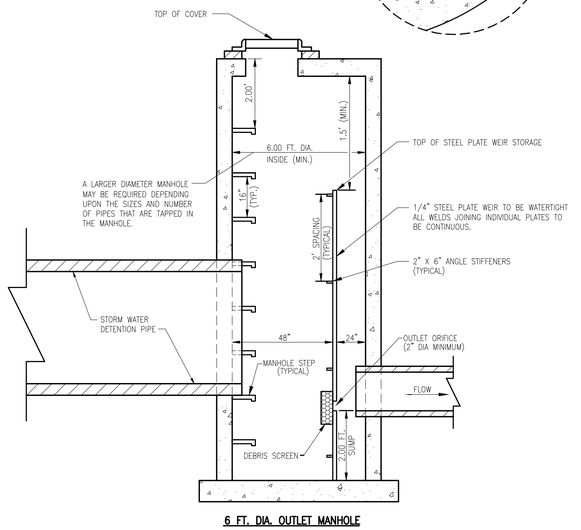
C



DETENTION SYSTEM PROFILE

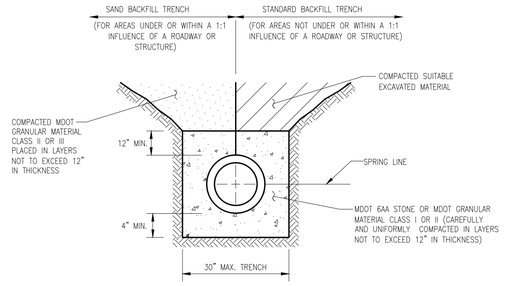


PLAN VIEW

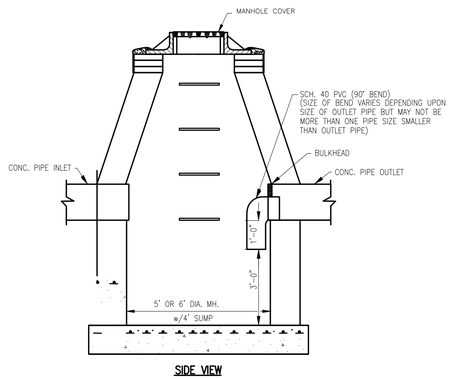


6 FT. DIA. OUTLET MANHOLE
SECTION A-A

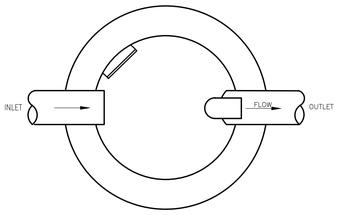
TYPICAL UNDERGROUND DETENTION AND OUTLET MANHOLE DETAILS



BEDDING AND TRENCH BACKFILL DETAIL FOR 18" DIAMETER AND SMALLER PIPE (PVC AND HDPE PIPE)



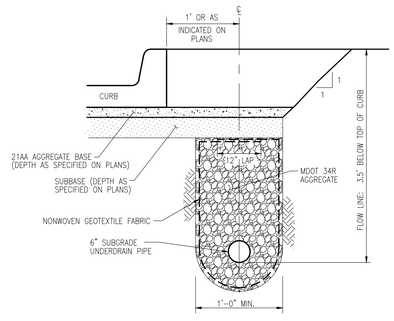
SIDE VIEW



PLAN VIEW

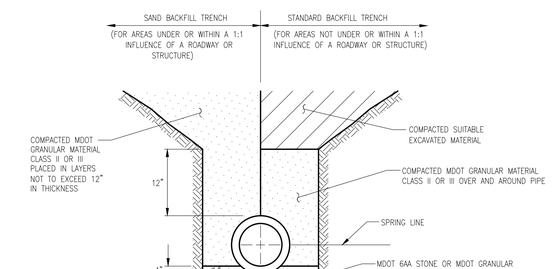
OIL/GAS SEPARATOR PLACEMENT DETAIL FOR 18" DIAMETER AND SMALLER OUTLET PIPE

(FOR OUTLET PIPES LARGER THAN 18" IN DIAMETER AN ALTERNATE DESIGN MUST BE APPROVED BY THE CITY ENGINEER)

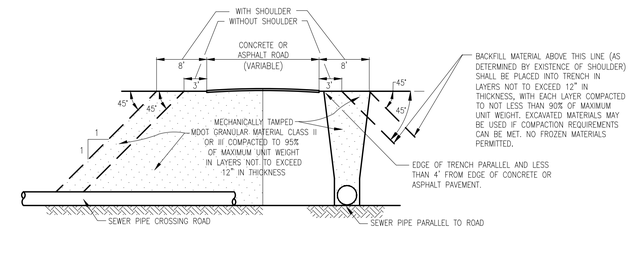


NOTES:
1. LOCATION MAY BE ADJUSTED IN THE FIELD BY THE ENGINEER.
2. ALL UNDERDRAIN SHALL BE APPROVED PLASTIC PIPE. METAL PIPE SHALL NOT BE USED.
3. ALL UNDERDRAIN SHALL OUTLET TO DRAINAGE STRUCTURE.
4. UNDERDRAIN CONNECTIONS (AT LOW POINTS) SHALL BE MADE AS CLOSE TO THE STRUCTURE INVERT AS PRACTICAL, WITH A SPIRAL WRAP OF THE STRUCTURE USED TO MAKE THE TRANSITION FROM THE REQUIRED FLOW LINE DEPTH TO STRUCTURE INVERT.

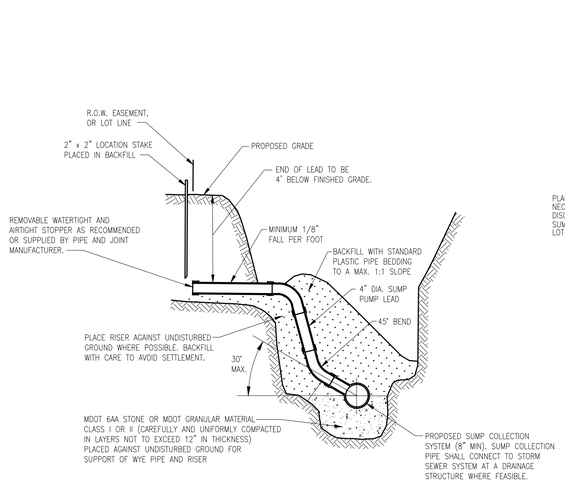
SUBGRADE UNDERDRAIN, 6"



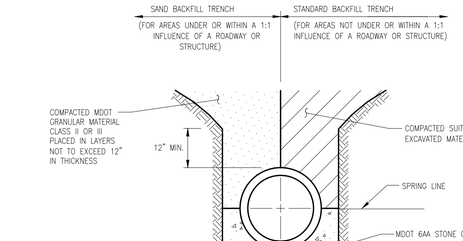
BEDDING AND TRENCH BACKFILL DETAIL FOR 24" DIAMETER AND SMALLER PIPE (CONCRETE AND METAL PIPE)



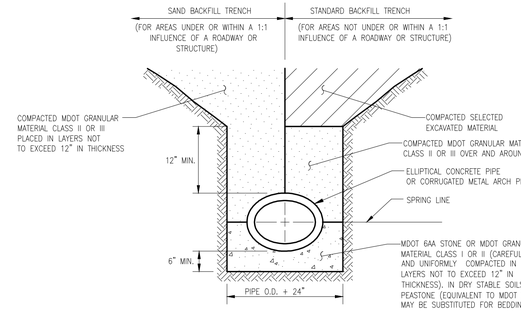
SAND OR GRAVEL BACKFILL DETAILS FOR SEWERS UNDER CONCRETE OR ASPHALT PAVEMENTS, SIDEWALKS, DRIVEWAYS AND PARKING AREAS



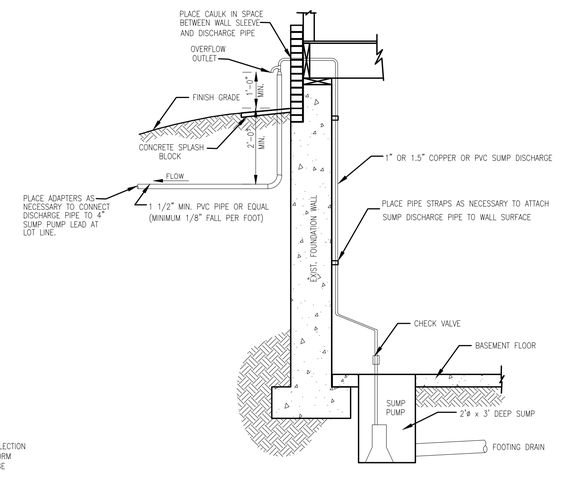
HOUSE LEAD DETAIL FOR 4" DIA. PLASTIC SUMP PUMP LEADS



BEDDING AND TRENCH BACKFILL DETAIL FOR 27" DIAMETER AND LARGER PIPE (CONCRETE AND METAL PIPE)



BEDDING AND TRENCH BACKFILL DETAIL FOR ELLIPTICAL CONCRETE PIPE OR CORRUGATED METAL ARCH PIPE



1) ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE CITY OF FARMINGTON.
2) UNDERDRAIN AND/OR DRAIN TILE SHALL BE INSTALLED AT THE LOCATIONS SHOWN ON THE PLANS AND AS REQUIRED BY THE CITY ENGINEER.
3) FIELD INSPECTION FOR SUMP PUMPS AND UNDERDRAINS SHALL BE PERFORMED BY THE ENGINEERING DIVISION.

SUMP PUMP DETAIL AT HOUSE

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CITY/VILLAGE/TOWNSHIP: CITY OF FARMINGTON
COUNTY: OAKLAND
JOB #: ####
CLIENT: ####
SCALE: H: 1"=40' V: 1"=4'
HORIZ DATUM: ####
VERT DATUM: ####

DATE	BID DATE	CADD	ENGINEER	PROJ MGR	SECTION	TOWN	RANGE
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CITY OF FARMINGTON STANDARD STORM SEWER DETAILS

SHEET 41 OF 65 D

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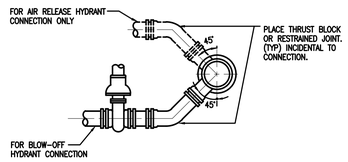
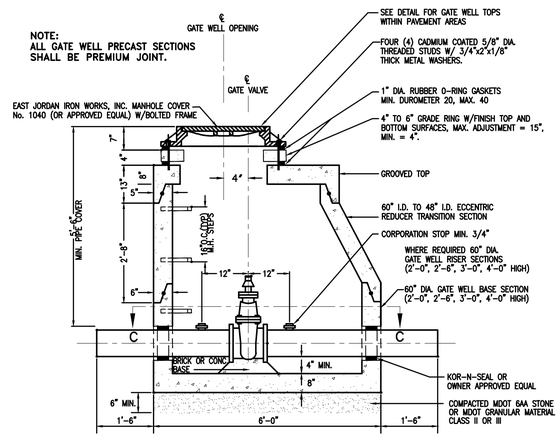
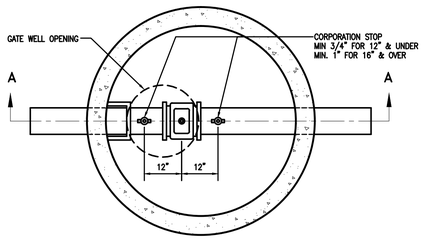


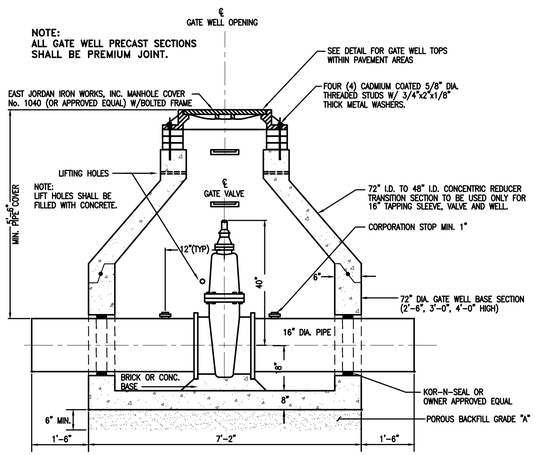
AIR RELEASE AND BLOW-OFF CONNECTION



6", 8" AND 12" GATE WELL
(A–A)

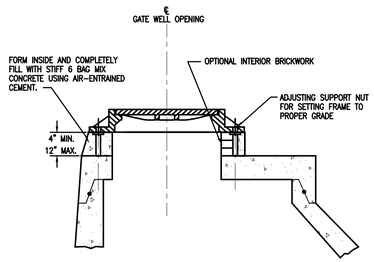


6", 8" AND 12" GATE WELL TYPICAL
(PLAN VIEW, C–C)

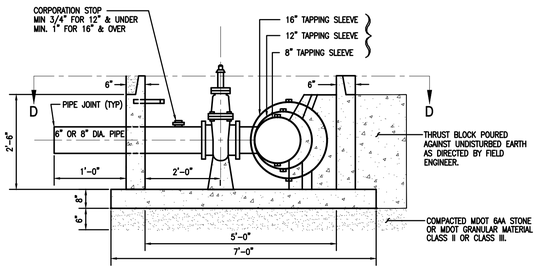


16" GATE WELL

NOTE:
16" VALVE WITH REDUCERS SHALL BE USED FOR WATER MAIN LARGER THAN 16" DIAMETER.



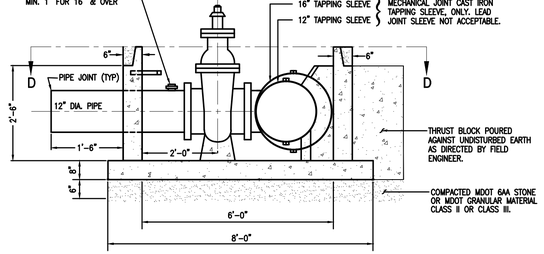
GATE WELL TOPS WITHIN PAVEMENT AREAS



16"x8", 16"x6", 12"x8", 12"x6", 8"x8"*, 8"x6", 6"x6"* TAPPING SLEEVE, VALVE & WELL
(B–B)

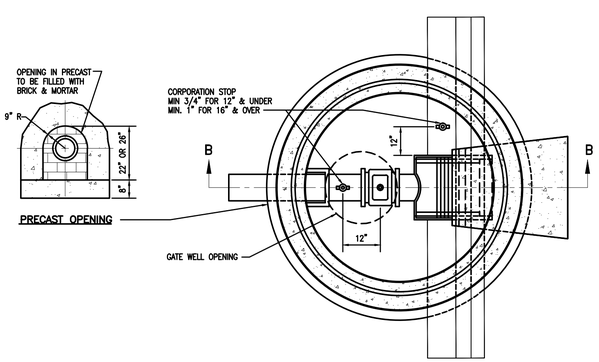
NOTES:
TAPPING SLEEVE VALVE AND WELL FOR WATER MAIN LARGER THAN 16" DIAMETER SHALL BE PER DWSD STANDARDS, AND MUST BE SHOWN ON THE PLANS.

*USE OF 6"x6" OR 8"x8" TAPPING SLEEVE VALVE AND WELL MUST BE APPROVED BY Farmington D.P.W.

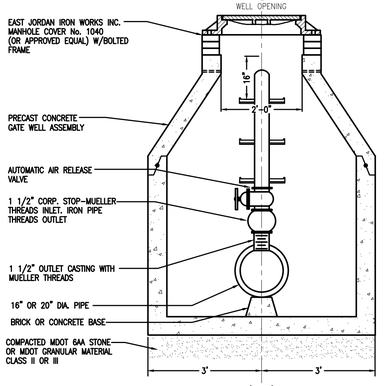


16"x12", 12"x12"* TAPPING SLEEVE, VALVE & WELL
(B–B)

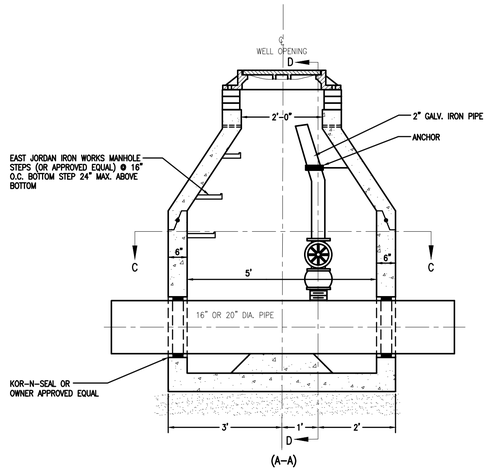
*NOTE:
USE OF 12"x12" TAPPING SLEEVE VALVE AND WELL MUST BE APPROVED BY Farmington D.P.W.



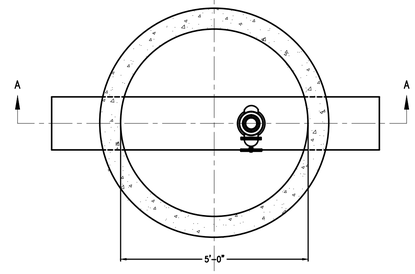
TAPPING SLEEVE VALVE & WELL TYPICAL
(PLAN VIEW, D–D)



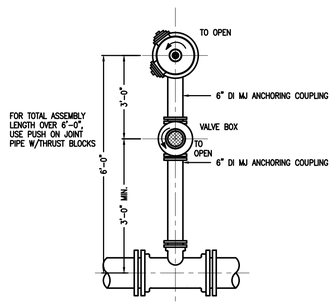
(D–D)



(A–A)

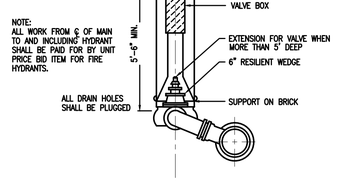


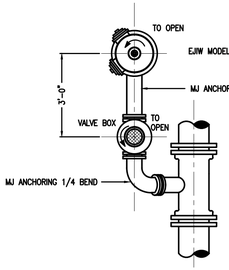
(PLAN VIEW, C–C)



STANDARD AIR RELEASE VALVE & WELL FOR 16" & 20" WATER MAIN
(FOR PLACEMENT AT HIGH POINTS IN WATER MAIN SYSTEM AS DIRECTED BY THE CITY ENGINEER)

NOTES:
1. ALL AIR RELEASE WELLS SHALL BE PRECAST STRUCTURES.
2. ALL AIR RELEASE VALVES SHALL BE AUTOMATIC PER CITY OF FARMINGTON DPS REQUIREMENTS.





NOTE:
MECHANICAL JOINT (MJ) FITTINGS FOR ALL HYDRANT INSTALLATIONS SHALL BE "SWIVEL" FITTINGS AS MANUFACTURED BY TYLER PIPE, OR APPROVED EQUAL.

DETAIL OF HYDRANT SETTINGS

WATER MAIN NOTES

1. All construction procedures and materials used on all water main projects shall conform to Detroit Water and Sewerage Department and The City of Farmington current Standards and Specifications.
2. All hydrants shall be E.J.I.W. #5BR–250 WaterMaster and shall conform to AWWA specification C502 as ammended and shall have a minimum 5 1/4" valve opening which closes with the water pressure. Hydrants shall meet all test requirements and be listed by Underwriters Laboratories, Inc, and meet the requirments of Factory Mutual. They must also be in accordance with the East Jordan Iron Works 5BR–250 Fire Hydrant Specifications– Farmington. Hydrants shall be traffic style with breakable flange and coupling. Hydrants shall have a swivel flange to allow bonnet to be turned 360 degrees without removing the bonnet, and barrel flanges shall be integrally cast with the barrel. Inlet shoe shall have a bronze valve seat, which can be removed without digging. Inlet connection shall be 6" mechanical joint, ASA–A21–11. Stem threads shall be sealed with double "O" rings and shall be permanently lubricated with all weather grease. Hose connections: Two (2) 2 1/2" hose nozzles, and One (1) 4 1/2" pumper nozzle, with National Standard threads. Operating Nut: (1) 1½" P–F pentagon, open left. All hydrants shall have a Carroll drain. Hydrants shall be painted red above the ground and black below, with a finish coat of Glamaroter 501 enamel or approved equal. Nozzle caps shall be painted red.
3. All water mains shall be ductile iron, as per the following specification Ductile iron pipe shall be ANSI 1–A21.51 (AWWA–C151) standard wall thickness, cement lined with bituminous seal coat Class 54 for sizes 6" through 20" and Class 55 for 24" pipe.
4. Gate Valves shall be iron body, fully bronze mounted, E.J.I.W. resilient wedge, non–rising stem, opening counter clockwise conforming to City of Detroit Water and Sewerage Department specifications. All gate valves with operating nuts at a distance greater than 5' below ground surface shall be provided with an extension stem. The length of the extension shall be such that it will be within 5' of ground surface when an extension stem is used. It shall be held in place by two extension stem guide assemblies. Each assembly shall be comprised of a "J" bracket and "L" bracket supplied by E.J.I.W. The stem guides shall be located opposite from each other, and shall be suitably fastened to the wall of the gate well. In addition, a "stop" shall be welded to the extension stem in a location that will prevent the extension stem from slipping off the operating nut. Details of extension stem and method of installation shall be approved by the engineer prior to installation. All precast concrete gate well sections shall be manufactured to conform with ASTM C478, standard specifications for precast reinforced concrete manhole sections, except wall thickness, shall be shown on these details. All joints for precast concrete gate well sections shall be "modified grooved tongue" with gasket manufactured to conform with ASTM C443, standard specification for joints for circular concrete sewer and culvert pipe rubber gaskets. All gate well covers shall be E.J.I.W. #1040 with bolted and have words "Water Dept" in raised letters on the frame cover, or approved equal.
5. Tapping sleeve shall be mechanical joint with DWS Mechanical Joint Tapping Gate Valve. Lead joint sleeves shall not be used.
6. Water mains shall be laid at least 10 feet horizontally from any existing or proposed gravity sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge. In cases where it is not pratical to maintain a 10 foot separation, the reviewing authority may allow deviation on a case–by–case basis, if supported by data from the design engineer.
7. No installation of water main shall be attempted without City's inspector being present. Unless otherwise specified on plans, top of all water mains shall be 5.5 ft. below existing or proposed road centerline, or 5.5 ft. below existing or proposed ground, whichever results in lower elevation. An 18" minimum vertical clearance between storm or sanitary sewer shall be maintained. This shall be the case where the water main is either above or below the sewer with preference to the water main located above the sewer.
8. Installed pipe shall be pressure tested and leak tested in accordance with AWWA standards. New, cleaned and repaired water mains shall be disinfected in accordance with AWWA standard C651. The specifications shall include detailed procedures for adequate flushing, disinfection, and microbiological testing of all water mains.
9. The design engineer shall furnish The City of Farmington with mylar "As–Built" water main plans along with a computer disk using the most recent release of AutoCad, upon job completion. Plans shall locate all water mains, hydrants and gate valves and wells.
10. All required cross connection devices shall be installed as required by the local plumbing inspector and in accordance with the standards of the Michigan Department of Public Health.
11. Three (3) working days before you dig, dial MISS DIG at 1–800–482–7171.
12. Where work is to be performed in the vicinity of a City of Detroit water main, the contractor shall notify the Detroit Metropolitan Water Services Inspection Department, (Bill Cowins) at (313) 833–8649 (7:30–9:30 AM, 3:30–4:30 PM), 3 working days prior to start of construction and request an inspection of the job.
13. All pipe and all pipe fittings shall be made in the U.S.A.
14. All bolts on all flanged and mechanical joint fittings shall be domestic origin high strength, low alloy COR–BLUE steel bolts or approved equal. These bolts shall meet the current provisions of American National Standard ANSI/AWWA C111/A21.11–90 for rubber gasket joints for ductile iron pressure pipes and fittings. Bolt manufacturer's certificate of compliance must accompany each shipment.
15. All bolts used in securing fittings to the water main shall be "COR–BLUE" bolts or approved equal.
16. BACKFILL NOTE: Under road surfaces, pavement, sidewalk, curb, driveways and where the edge of the trench is within 3 (three) feet of the pavement or as called for on the plans, the trench depth shall be 4 (four) inches lower than the proposed water main elevation. The trench width shall be the outside diameter plus 16 (sixteen) inches for pipe diameters up to 36 (thirty–six) inches and larger. The trench shall be backfilled by placing granular material by the "controlled Density Method" or other means having approval of the engineer and compacting it to 95 (ninety–five) percent of its maximum unit weight.
17. Tracing wire shall be provided for all water main. Wire shall be copper, 12 gage stranded, insulated per city requirements Connection is required at all service leads, hydrants, and gate well, with exposed wire above the ground surface. Conductivity shall be tested by the City prior to the acceptance of the main. All splices shall be made using a gel–cap product which provides a waterproof seal, such as 3M's Direct Bury Splice kit #P054007/09964 or approved equal.
18. Polywrap shall be placed as required by the City.
19. Like size to like size tapping sleeves shall not be used with transite pipe.
20. Where water main is located under pavement, the City shall not be responsible for repairing pavement within the easement in the event that maintenance or repairs to the water main become necessary.

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CITY/VILLAGE/TOWNSHIP: CITY OF FARMINGTON
COUNTY: OAKLAND
JOB #: ####
SCALE: H: 1"=40' V: 1"=4'
HORIZ DATUM: ####
VERT DATUM: ####
DATE:
REVISIONS:

DATE	BID DATE	CADD	ENGINEER	PROJ MGR	SECTION	TOWN	RANGE
	####	####	####	####	####	####	####

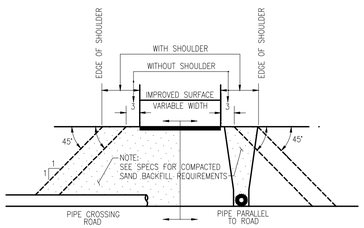
CASEY #####
DATE:
REVISIONS:

CITY OF FARMINGTON STANDARD WATER MAIN DETAILS

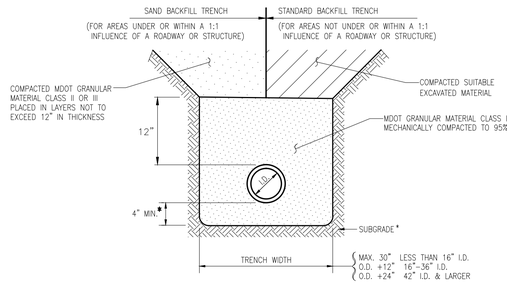
SHEET 42 OF 65

E

DRAWING PATH: H:\Municipal\FarmingtonCity\Engineering Design Stds\APPENDICES\STD DETAILS\F-WM01.dwg Apr 21, 2016 - 4:11pm

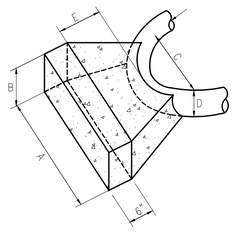


BACKFILL IN THE AREA OF STREETS, ALLEYS SIDEWALKS, DRIVES & PARKING LOTS



STANDARD BEDDING AND TRENCH BACKFILL DETAIL FOR WATER MAIN

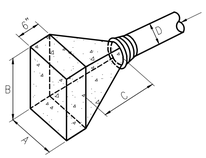
* NOTE: IF THE EXISTING SUBGRADE SOILS MEET THE REQUIREMENTS FOR MDOT GRANULAR MATERIAL CLASS II (MINIMUM 4" THICK), THEN THE WATER MAIN MAY BE LAID DIRECTLY ON THE COMPACTED NATIVE SUBGRADE SOILS.



FOR 90° BENDS OR SMALLER

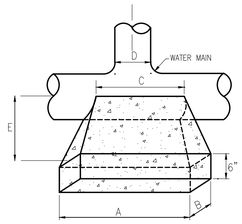
D	A	B	C	E MIN.
20"	8'	6.5'	3.5'	2.5'
16"	6'	4'	2.5'	2'
12"	4'	3'	2'	1.75'
10"	3'	3'	2'	1.75'
8"	3'	2'	2'	1.5'
6"	2'	1.5'	2'	1.25'

NOTE:
3000 PSI CONCRETE TO BE USED. THRUST BLOCK TO ABUT & REST AGAINST UNDISTURBED SOIL.



FOR PLUGS

D	A	B	C MIN.
20"	7'	5'	2.5'
16"	4'-10"	4'-10"	2'
12"	4'-4"	3'	1'-9"
10"	3'	2'	1'-6"
8"	2'-10"	2'-6"	1'-6"
6"	1'-6"	1'-6"	3"

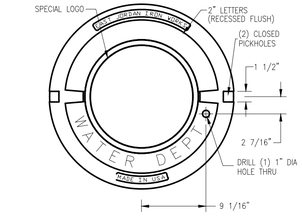


FOR TEES

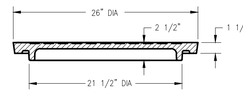
D	A	B	C	E MIN.
20"	6.5'	4.5'	3.5'	3'
16"	4'-8"	4'-8"	2.5'	2.75'
12"	4'	3'	2.5'	2.5'
10"	3'	2'	2'	2.25'
8"	2'-6"	2'	2'	2.25'
6"	2'	2'	2'	2.25'

THRUST BLOCK DETAILS

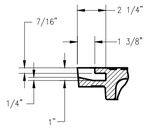
NOTE:
ADDITIONAL CONCRETE TO BE PLACED PER ENGINEER'S DIRECTION FOR HYDRANTS REQUIRING THRUST BLOCKS. THE THRUST BLOCKS ARE INCIDENTAL TO HYDRANT INSTALLATION.



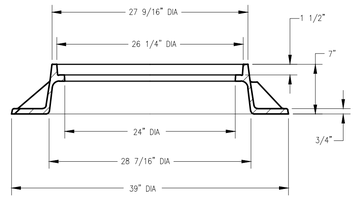
BOTTOM VIEW



COVER SECTION

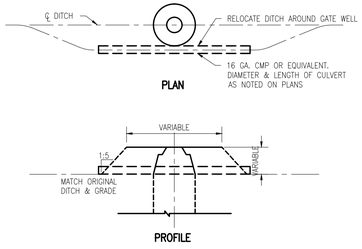


PICKHOLE DETAIL



FRAME SECTION

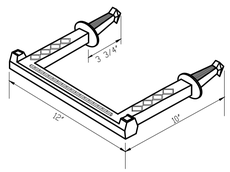
CAST IRON GATE WELL COVER E.J.I.W. 1040 TYPE "C" SOLID COVER



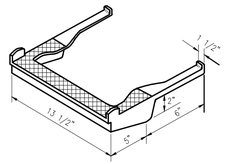
PLAN

PROFILE

DITCH ENCLOSURE AT GATE WELL OR HYDRANT

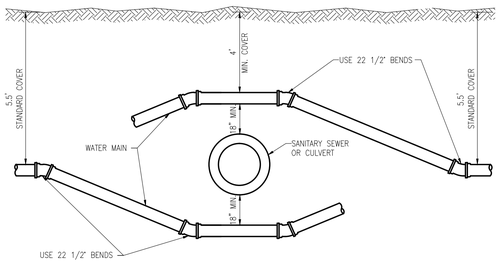


M.A. INDUSTRIES PSI-375



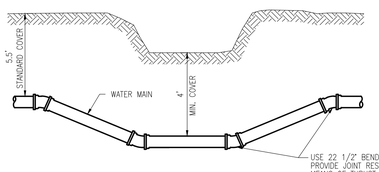
E.J.I.W. 8502

STANDARD MANHOLE STEP



SEWER OR CULVERT CROSSING

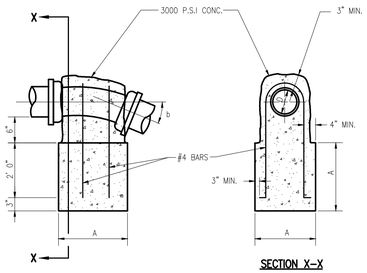
NOTE:
1. BENDS CAN BE ELIMINATED FOR MINOR VERTICAL DEFLECTIONS IN DUCTILE IRON PIPE (1 DEGREE OR LESS). IN THIS CASE, THE PIPE MAY BE DEFLECTED UP TO 4" PER JOINT.
2. PLACE AND COMPACT GRANULAR MATERIAL CLASS II BETWEEN PIPES IN THE VICINITY OF THE CROSSING.
3. PROVIDE JOINT RESTRAINT BY MEANS OF THRUST BLOCKS AND VERTICAL ANCHORAGES OR OTHER METHOD THAT IS APPROVED BY THE ENGINEER.



USE 22 1/2° BENDS PROVIDE JOINT RESTRAINT BY MEANS OF THRUST BLOCKS AND VERTICAL ANCHORAGES OR OTHER METHOD THAT IS APPROVED BY THE ENGINEER.

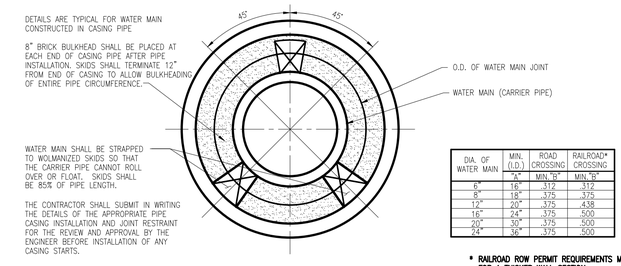
DITCH OR STREAM CROSSING

DIA. OF WATER MAIN, D	BEND, b	A	NUMBER OF BARS
6"	45°	2'0"	2
8"	22 1/2°	2'0"	2
	45°	3'3"	2
12"	22 1/2°	3'3"	2
	45°	4'0"	3
16"	11 1/4°	3'3"	2
	22 1/2°	4'0"	3



SECTION X-X

VERTICAL ANCHORAGE DETAIL

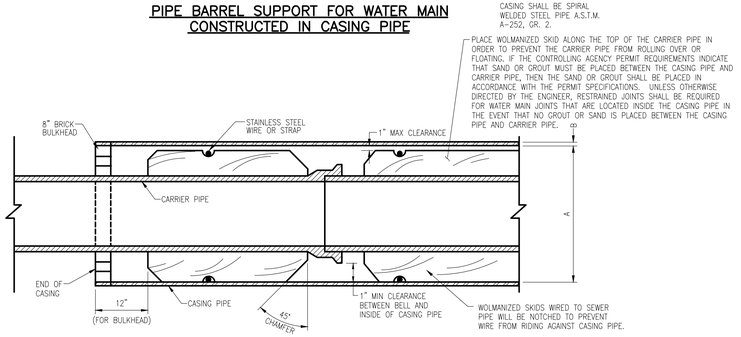


DIA. OF WATER MAIN	MIN. I.D.	ROAD CROSSING	RAILROAD* CROSSING
	"A"	MIN."B"	MIN."B"
6"	16"	.312	.312
8"	18"	.375	.375
12"	20"	.375	.438
16"	24"	.375	.500
20"	30"	.375	.500
24"	36"	.375	.500

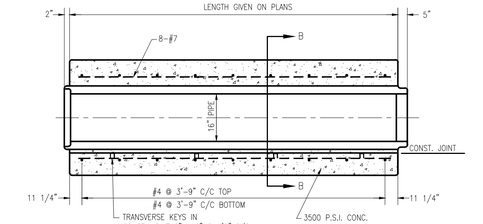
A=INSIDE DIAMETER
B=WALL THICKNESS

* RAILROAD ROW PERMIT REQUIREMENTS MAY CALL FOR A THICKER WALL SECTION.

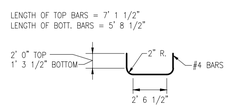
PIPE BARREL SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING PIPE



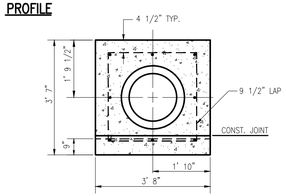
STANDARD CASING SECTION



PROFILE



BAR BENDS



SECTION B-B

16" WATER MAIN ENCASEMENT UNDER DRAINS & DITCHES

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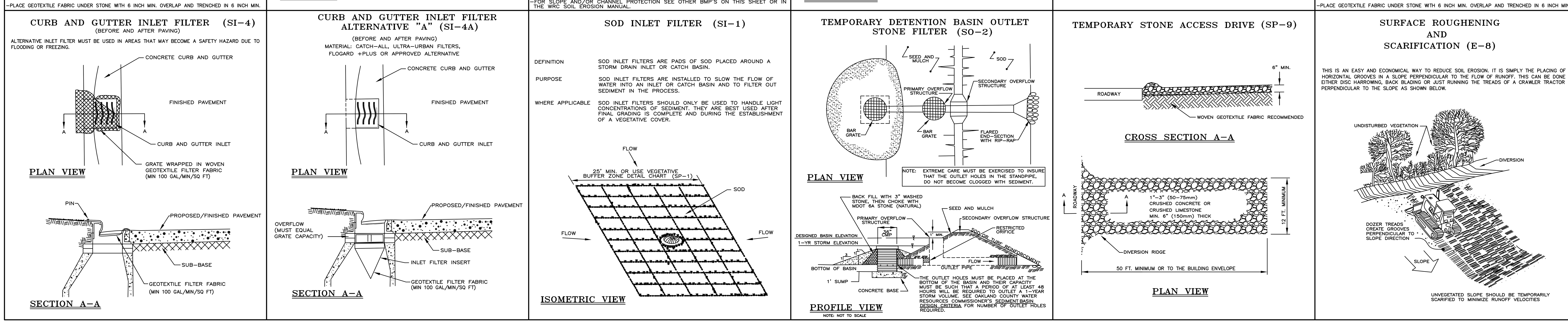
DATE | BID DATE ####
CADD ####
ENGINEER ####
PROJ MGR ####
SECTION ####
TOWN ####
RANGE ####
CASE# ####
JOB # ####
CITY/VILLAGE/TOWNSHIP CITY OF FARMINGTON
COUNTY OAKLAND
SCALE H: 1"=40' V: 1"=4'
HORIZ DATUM ####
VERT DATUM ####
DATE:
REVISIONS:
DATE:
REVISIONS:
DATE:
REVISIONS:

CITY OF FARMINGTON STANDARD WATER MAIN DETAILS

SHEET 43 OF 65 F



NOTE:

WHILE PERFORMING WORK INVOLVING GROUNDS MAINTENANCE AND/OR THE CONSTRUCTION/MAINTENANCE OF ANY INFRASTRUCTURE, INCLUDING ROADS, WATER MAINS, SANITARY SEWERS, STORM DRAINS AND STORM WATER BEST MANAGEMENT PRACTICES (BMPS), CONTRACTORS SHALL MINIMIZE POLLUTION FROM STORM WATER RUNOFF THAT CAN AFFECT WATER QUALITY RELATED TO WORK ACTIVITIES. POLLUTANTS THAT COULD IMPAIR WATER QUALITY MAY INCLUDE FUEL, GREASE AND OIL, NUTRIENTS, BACTERIA AND PATHOGENS, LITTER AND DEBRIS, AND SOIL EROSION AND SEDIMENTATION. APPLICABLE BMPS SHALL BE IMPLEMENTED BY THE CONTRACTOR TO THE MAXIMUM EXTENT PRACTICABLE TO PROTECT WATER QUALITY AND WILDLIFE HABITAT.

Plotfile Name: GISQtrs.ctb
File Location: J:\Drain\MappingUnit\Standard\Details\AppProductionStandard\STD-SErs1of1.dwg

SOIL EROSION AND SEDIMENTATION CONTROL DETAILS

REVISION BLOCK

Data Source / Source Date: N/A

Rev. No.:	Rev. By:	Rev. Date:	Description:
1	lz	3-22-07	PROPOSED DETAIL EDITS
2	lz	2-26-09	STANDARDS COMMITTEE APPROVAL / NAME CHANGES
3	DS	3-25-11	SILT FENCE ALTERNATIVE "A" DETAIL (SP-2A) ADDED
4	DS	4-16-13	STANDARDS COMMITTEE APPROVAL / NOTE CHANGES

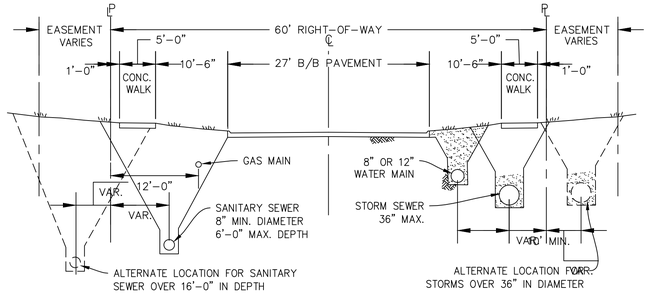
ORIG. DATE:	01/01/01
SCALE:	NONE
DESIGNED BY:	WRC
DRAWN BY:	Mapping

WRC WATER RESOURCES COMMISSIONER Jim Nash

ONE PUBLIC WORKS DRIVE, BLDG 95 WEST
WATERFORD, MICHIGAN
48328-1907

SHEET NO.: 1 of 1

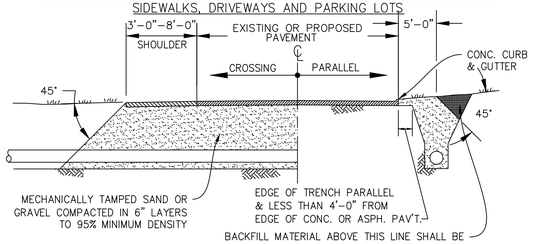
G



TYPICAL SECTION FOR SUBDIVISION LOCAL ROAD R.O.W.

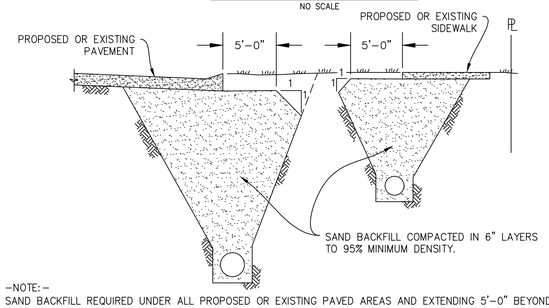
NO SCALE

MINIMUM SAND OR GRAVEL BACKFILL UNDER EX. OR PROP. PAVEMENTS, SIDEWALKS, DRIVEWAYS AND PARKING LOTS



SAND BACKFILL DETAIL

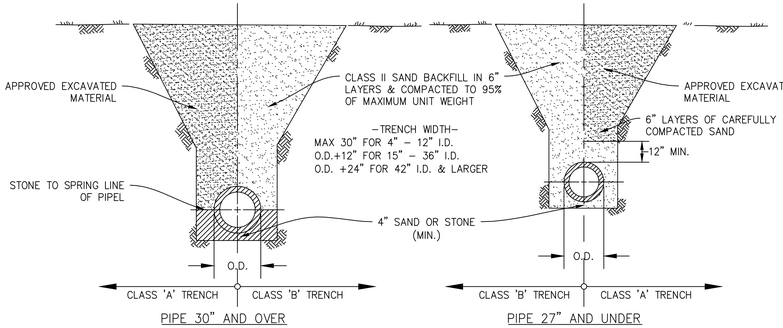
NO SCALE



–NOTE:–
SAND BACKFILL REQUIRED UNDER ALL PROPOSED OR EXISTING PAVED AREAS AND EXTENDING 5'–0" BEYOND THE EDGE OF THE SLAB THAN TAPERING AT 1 ON 1 SLOPE TO ORIGINAL GROUND.

SAND BACKFILL UNDER PAVED AREAS

NO SCALE

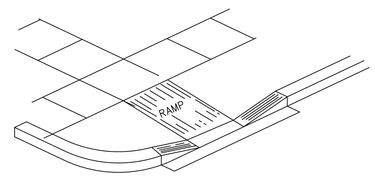


PIPE 30" AND OVER — PIPE 27" AND UNDER

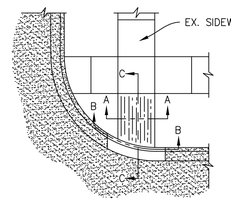
NOTE: APPROVAL MAY BE GIVEN TO MATERIAL EQUAL OR BETTER THAN CL. II SAND & METHODS TO ACHIEVE CL. 'A' OR CL. 'B' BEDDING

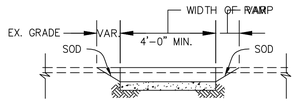
SEWER PIPE TRENCH DETAILS

NO SCALE

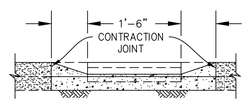


ISOMETRIC VIEW

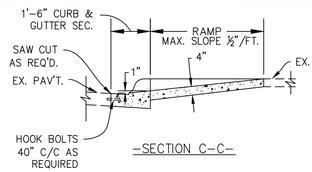




–SECTION A–A–



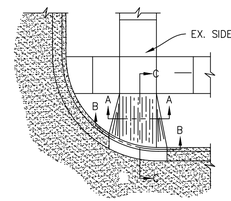
–SECTION B–B–

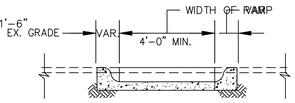


–SECTION C–C–

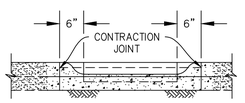
NOTE: PLACE EXPANSION JOINT AT B/C LINE OR SIDEWALK JOINT

TYPE I–A

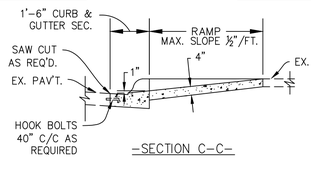




–SECTION A–A–



–SECTION B–B–



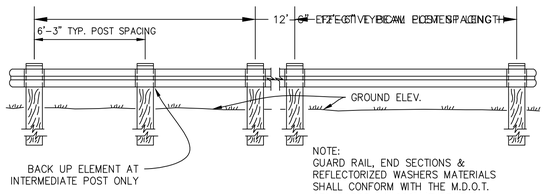
–SECTION C–C–

TYPE 2

TYPE 1

SIDEWALK RAMPS

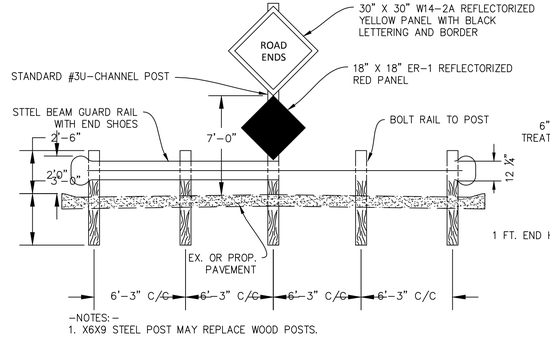
NO SCALE



NOTE:
GUARD RAIL, END SECTIONS & REFLECTORIZED WASHERS MATERIALS SHALL CONFORM WITH THE M.D.O.T. STANDARDS (III–60C) (TYPE 'B')

BEAM GUARD RAIL TYPE 'B'

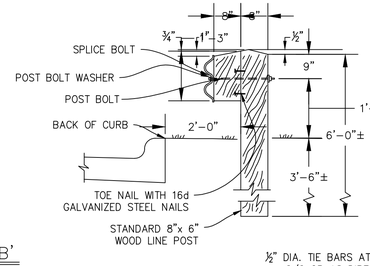
NO SCALE

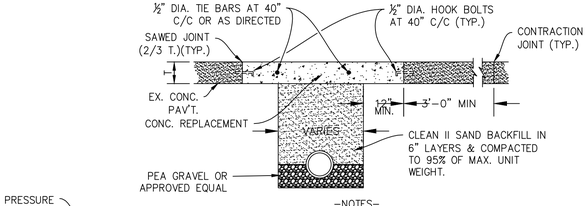


–NOTES:–
1. X6X9 STEEL POST MAY REPLACE WOOD POSTS.
2. CHANNEL TO BE BOLTED TO POSTS.
3. GUARD RAIL AND FITTINGS TO CONFORM TO M.D.O.T. STANDARDS

ROAD END STEEL BEAM GUARD RAIL & SIGNING

NO SCALE





–NOTES–

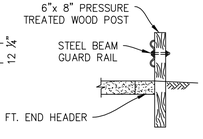
1. WHERE PAVEMENT REPLACEMENT DOES NOT IMMEDIATELY FOLLOW BACK FILL OPERATION, A TEMPORARY SURFACING SHALL BE PLACED AS DIRECTED BY ENGINEER.

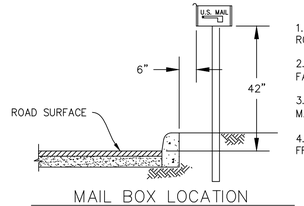
2. ASPHALT REPLACEMENT SHALL MEET CURRENT M.D.S.H. SPEC'S. FOR BITUMINOUS AGGREGATE SURFACE COURSE AS PER PLAN.

3. CONCRETE REPLACEMENT SHALL MEET CURRENT M.D.S.H. SPEC'S. FOR HIGH EARLY STRENGTH CONCRETE.

PAVEMENT REPLACEMENT

NO SCALE





–NOTE–

1. HEIGHT OF MAILBOX IS 42" FROM SURFACE OF ROAD.

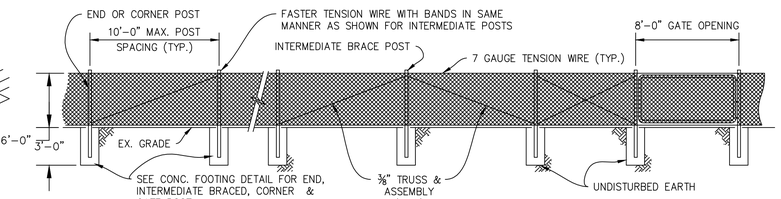
2. ON ROADS WITH GRAVEL SHOULDERS, LOCATE FACE OF MAILBOX 6" FROM EDGE OF SHOULDER.

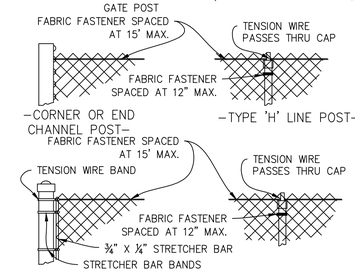
3. ON ROADS WITH SOD SHOULDER LOCATE FACE OF MAILBOX 6" FROM EDGE OF PAVEMENT.

4. ROADS WITH CURBS, LOCATE OF MAILBOX 6" FROM BACK OF CURB.

MAIL BOX LOCATION

NO SCALE





NOTES:

1. INTERMEDIATE BRACED POSTS SHALL BE PLACED AT 660 FT. INTERVALS OR MIDWAY BETWEEN END AND CORNER POSTS, WHEN THE DISTANCE IS LESS THAN 1320 FT. AND MORE THAN 660 FT.

2. TENSION WIRE WILL BE STRETCHED TAUT.

3. TOP & BOTTOM SELVAGES OF FENCE FABRIC SHALL HAVE A KNUCKLED FINISH.

4. ALTERNATE MATERIALS MAY BE USED WITH THE APPROVAL OF THE CITY ENGINEER.

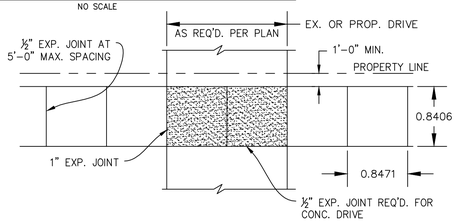
5. FENCE FABRIC SHALL BE FASTENED TO TOP TENSION WIRE AND TO EACH POST.

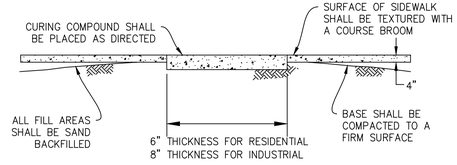
6. IF HOG RINGS ARE USED, THEY SHALL BE 12 GAUGE IF TIGHTLY CRIMPED ABOUT BOTH THE TENSION WIRE AND THE FABRIC WIRE,OR 11 GAUGE IF UNCRIMPED.

7. tENSION WIRE WILL BE 7 GAUGE.

CHAIN LINK FENCE AND POST CONSTRUCTION

NO SCALE





SIDEWALK PLACEMENT DETAIL

NO SCALE

CITY OF FARMINGTON HILLS
OAKLAND COUNTY, MI

ENGINEERING DIVISION

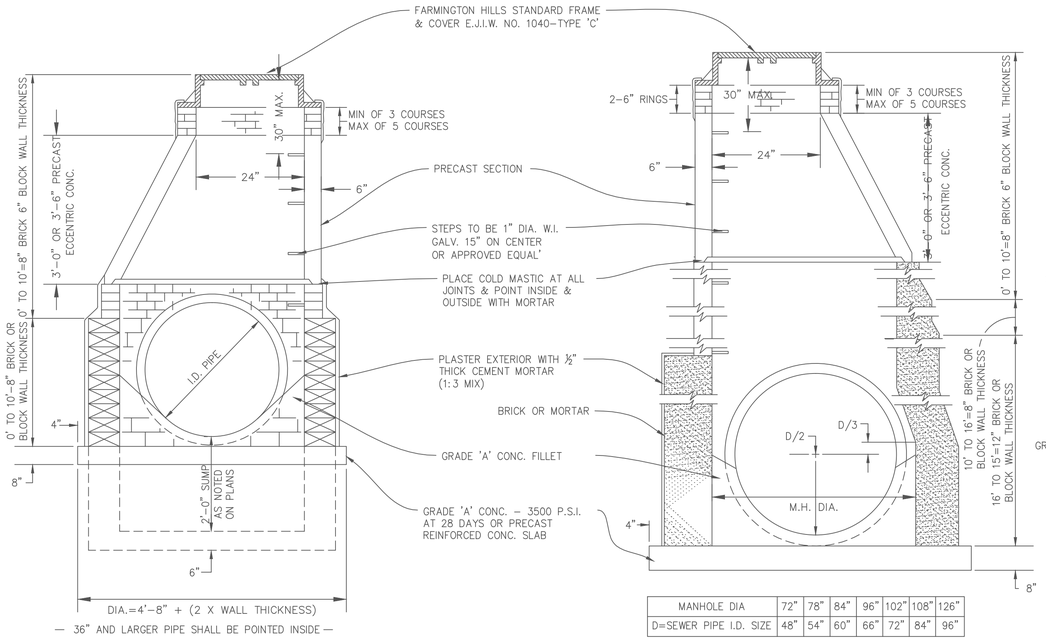
STANDARD DETAIL DRAWINGS

GENERAL STANDARDS H

JOB NO.	
SCALE: HORIZ. NA	VERT. NA
DRAWN: CADATOMIC	DATE: 7/1/13
DESIGNED BY: FH	DATE: 7/1/13
REVISED BY: LJC	DATE: 2/28/14
APPROVED BY:	DATE:

SHEET 1 OF 1

DIRECTOR, PUBLIC SERVICES DEPT.



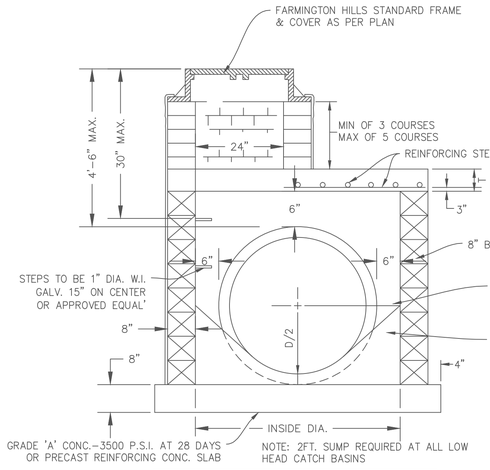
STORM MANHOLE FOR PIPE 42" AND UNDER

NO SCALE

MANHOLE DIA	72"	78"	84"	96"	102"	108"	126"
D=SEWER PIPE I.D. SIZE	48"	54"	60"	66"	72"	84"	96"

STORM MANHOLE FOR PIPE 48" AND OVER

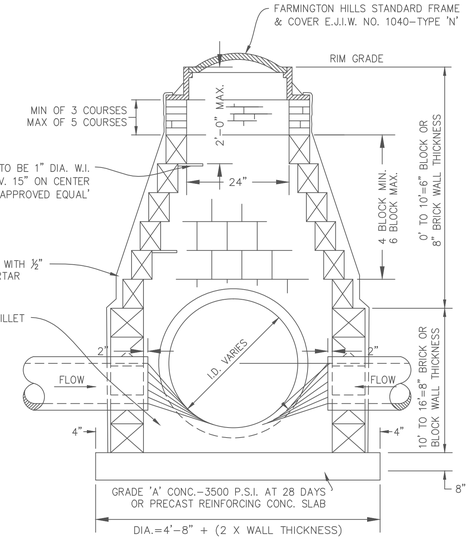
NO SCALE



STD. I.D.	TOP SLAB 'T'	REINFORCING STEEL
4'–0"	8"	NO. 6 AT 9" EACH WAY
5'–0"	12"	NO. 6 AT 9" EACH WAY
6'–0"	12"	NO. 7 AT 9" EACH WAY
7'–0"	12"	NO. 8 AT 9" EACH WAY
8'–0"	12"	NO. 8 AT 9" EACH WAY
9'–0"	12"	NO. 8 AT 9" EACH WAY

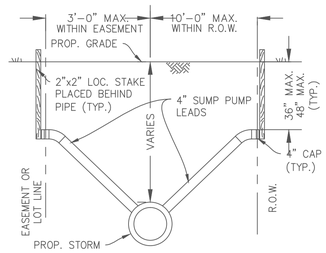
LOW HEAD STORM SEWER STRUCTURE

NO SCALE



TYPE 9–N REAR YARD INLET

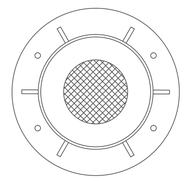
NO SCALE

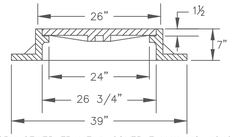


INSTALL SUMP PUMP LEADS IN DRAINAGE STRUCTURES WHERE FEASIBLE

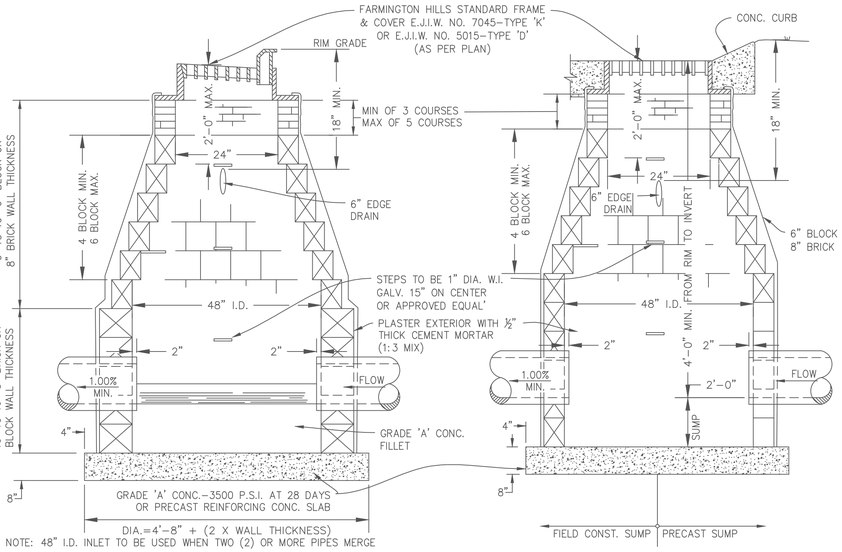
4" SUMP PUMP LEADS

NO SCALE





STORM SEWER FRAME & COVER E.J.I.W. NO. 1040 – MANHOLE 'C' COVER –

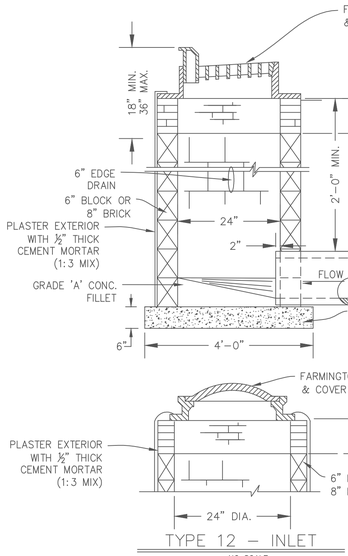


TYPE 9–N INLET

NO SCALE

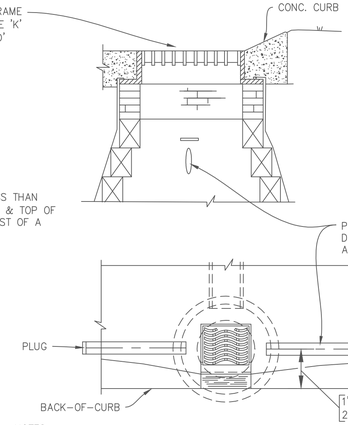
TYPE 10 CATCH BASIN

NO SCALE



TYPE 12 – INLET

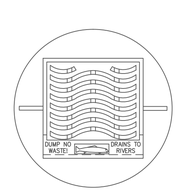
NO SCALE



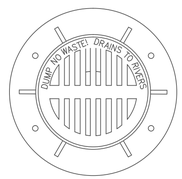
NOTES:
1. LENGTH OF 6" EDGE DRAIN TO BE 10 FT. EACH WAY UNLESS OTHERWISE DETERMINED BY THE FIELD ENGINEER.
2. EDGE DRAIN SHALL BE INSTALLED AT ALL CATCH BASINS & INLETS.
3. 6" EDGE DRAIN TO BE CORRUGATED PLASTIC PIPE WITH A MIN. DEPTH OF 18" AND A MAX. 36" FROM FINISHED GROUND TO TOP OF PIPE.
4. EDGE DRAIN TRENCH TO BE BACKFILLED WITH PEA STONE FROM 6" BELOW BOTTOM OF PIPE TO TOP OF TRENCH.

6" EDGE DRAIN

NO SCALE



CATCH BASIN & INLET FRAME & COVER E.J.I.W. NO.7045 AS PER PLAN – 'K' COVER –

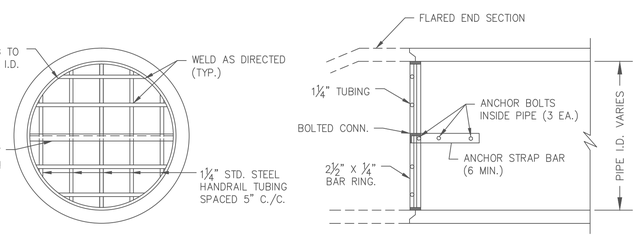


REAR YARD FRAME & COVER FOR 48" DIA. STR. E.J.I.W. NO. 1140 – 'N' COVER –

REAR YARD FRAME & COVER FOR 24" DIA. STR. E.J.I.W. NO. 1170 – 'N' COVER –

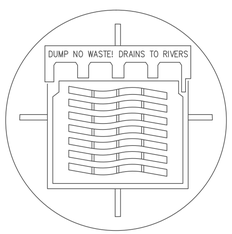
STORM STRUCTURE FRAME & COVER

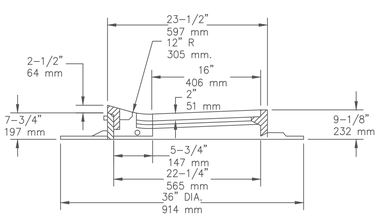
NO SCALE



TYPICAL STEEL GRATE DETAIL

NO SCALE

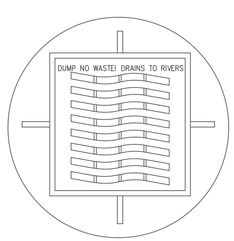


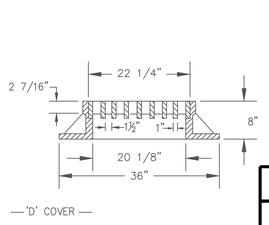


CATCH BASIN CURB INLET FRAME & COVER

E.J.I.W. NO. 7065 ONLY AS PER PLAN

NO SCALE





— 'D' COVER —

FARMINGTON HILLS STANDARD CATCH BASIN & INLET FRAME & COVER E.J.I.W. NO. 5105

NO SCALE

NOTE: FOR TRENCH REQUIREMENTS SEE GENERAL STANDARD SHEET

CITY OF FARMINGTON HILLS
OAKLAND COUNTY, MI

ENGINEERING DIVISION

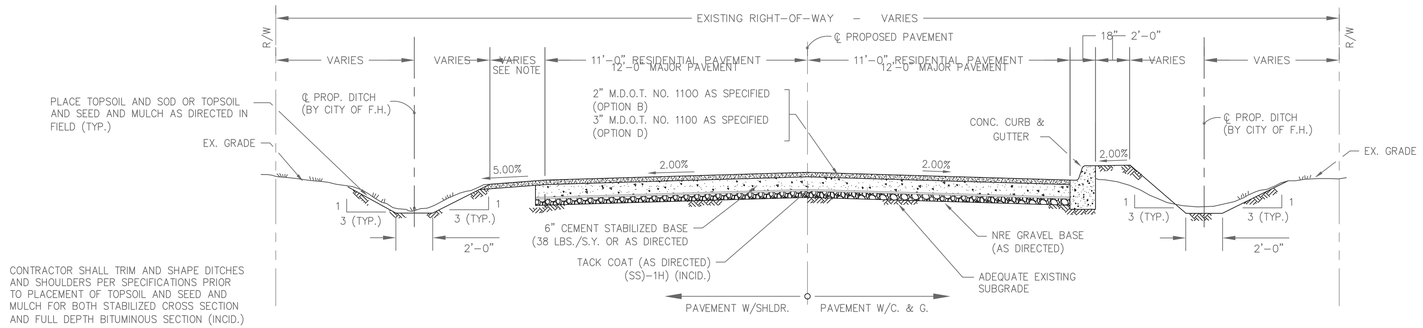
STANDARD DETAIL DRAWINGS

STORM SEWER STANDARDS I

JOB NO.	
SCALE: HORIZ. NA	VERT. NA
DRAWN: CADATOMIC	DATE: 7/1/13
DESIGNED BY: FH	DATE: 7/1/13
CHECKED BY:	DATE:
APPROVED BY:	DATE:

SHEET 1 OF 1

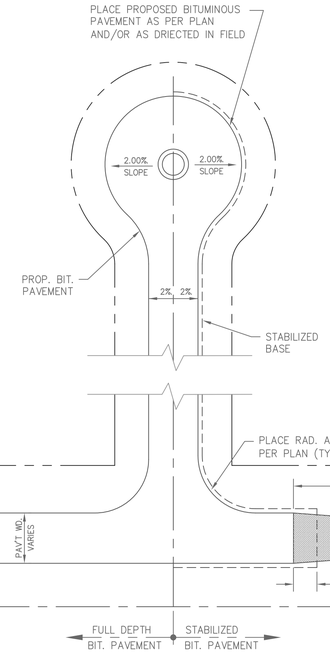
DIRECTOR, PUBLIC SERVICES DEPT.

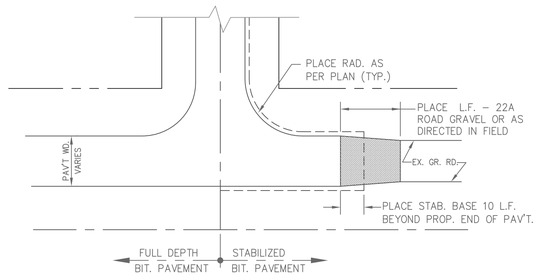


CONTRACTOR SHALL TRIM AND SHAPE DITCHES AND SHOULDERS PER SPECIFICATIONS PRIOR TO PLACEMENT OF TOPSOIL AND SEED AND MULCH FOR BOTH STABILIZED CROSS SECTION AND FULL DEPTH BITUMINOUS SECTION (INCID.)

STABILIZED CROSS SECTION

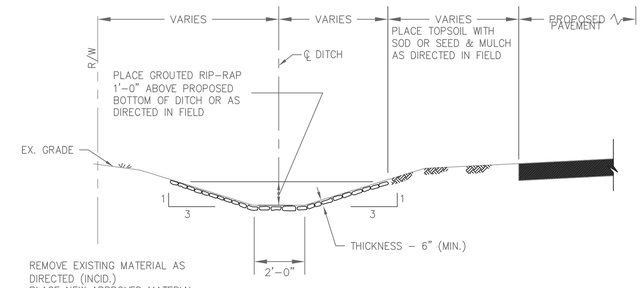
NO SCALE





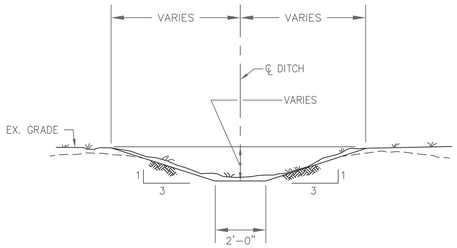
CUL-DE-SAC DETAIL

NO SCALE



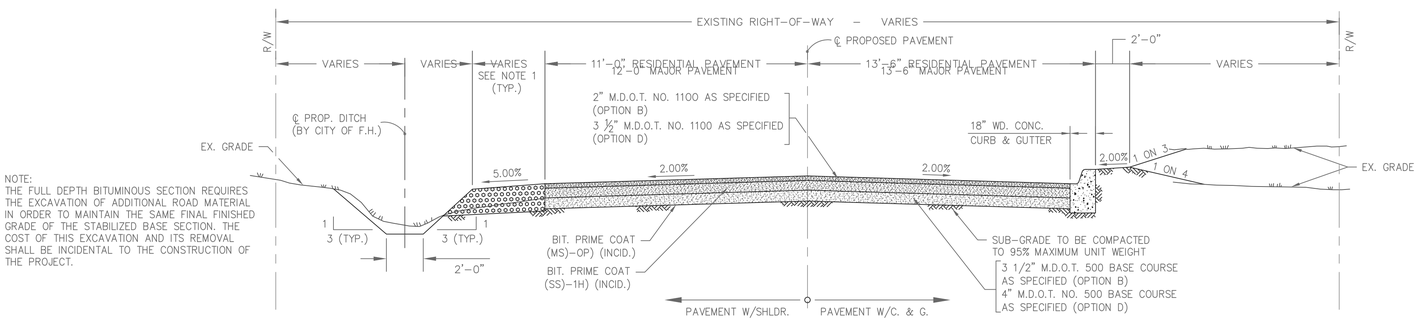
GROUTED RIP-RAP DITCH DETAIL

NO SCALE



DITCHING IN EASEMENTS DETAIL

NO SCALE

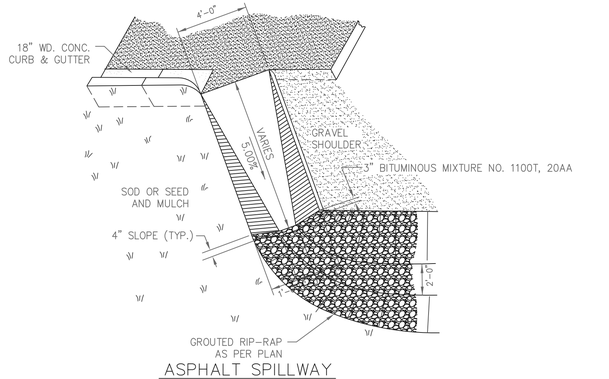


NOTE:
THE FULL DEPTH BITUMINOUS SECTION REQUIRES THE EXCAVATION OF ADDITIONAL ROAD MATERIAL IN ORDER TO MAINTAIN THE SAME FINAL FINISHED GRADE OF THE STABILIZED BASE SECTION. THE COST OF THIS EXCAVATION AND ITS REMOVAL SHALL BE INCIDENTAL TO THE CONSTRUCTION OF THE PROJECT.

FULL DEPTH BITUMINOUS SECTION

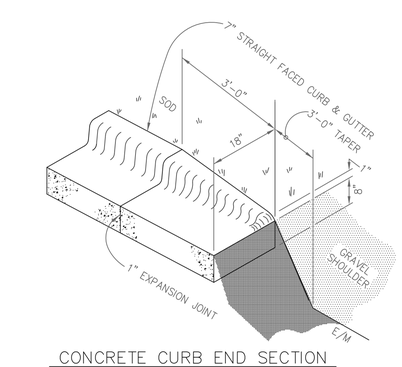
NO SCALE

NOTE: FOR ALL PAVEMENT CROSS SECTIONS, THE EXISTING SUBGRADE SHALL BE TRIMMED AND SHAPED TO THE PRE-PAVEMENT GRADE AS SPECIFIED IN THE FIELD. THE MATERIAL EXCAVATED FROM THE EXISTING ROAD BED SHALL BE USED AS SUB-BASE MATERIAL WHEREVER POSSIBLE AS DIRECTED IN THE FIELD AND SHALL BE COMPACTED TO 95 PERCENT OF MAX. UNIT WEIGHT. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE CONTRACT. SURPLUS EXCAVATED MATERIAL THAT CANNOT BE INCORPORATED INTO THE PROJECT SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE DIRECTED BY THE ENGINEER.



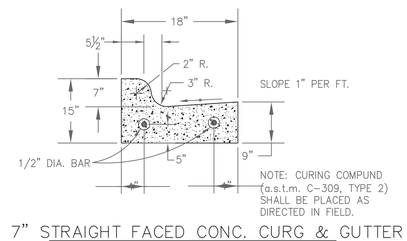
ASPHALT SPILLWAY

NO SCALE



CONCRETE CURB END SECTION

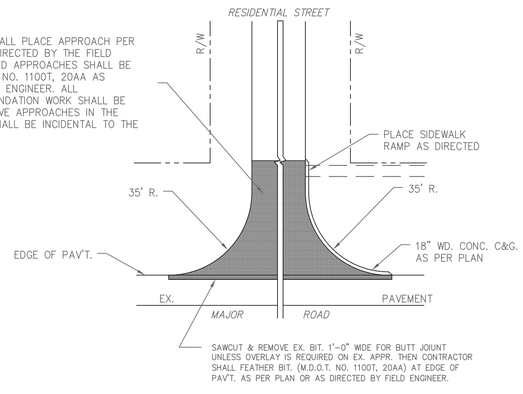
NO SCALE



7" STRAIGHT FACED CONC. CURG & GUTTER

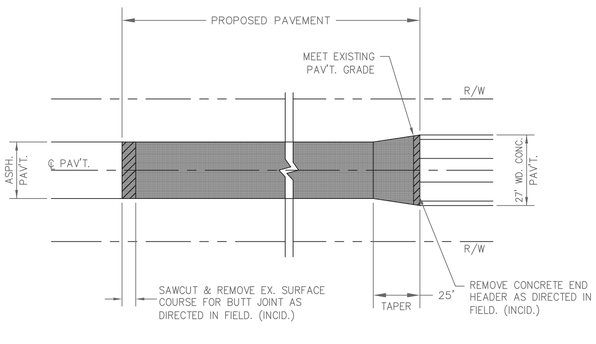
NO SCALE

NOTE: CONTRACTOR SHALL PLACE APPROACH PER SELECTED OPTION AS DIRECTED BY THE FIELD ENGINEER. EX. SURFACED APPROACHES SHALL BE OVERLAYED WITH MDOT NO. 1100T, 20AA AS DIRECTED BY THE FIELD ENGINEER. ALL PREPARATION AND FOUNDATION WORK SHALL BE AS DESCRIBED FOR DRIVE APPROACHES IN THE SPECIFICATIONS AND SHALL BE INCIDENTAL TO THE PROJECT.



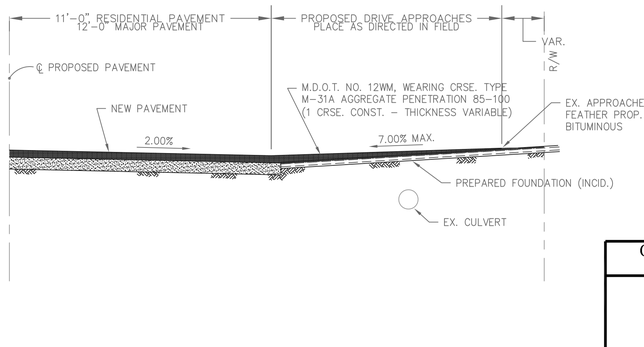
EXTERIOR APPROACH DETAIL

NO SCALE



BUTT JOINT DETAIL

NO SCALE



DRIVE APPROACH DETAIL

NO SCALE

CITY OF FARMINGTON HILLS
OAKLAND COUNTY, MI

ENGINEERING DIVISION

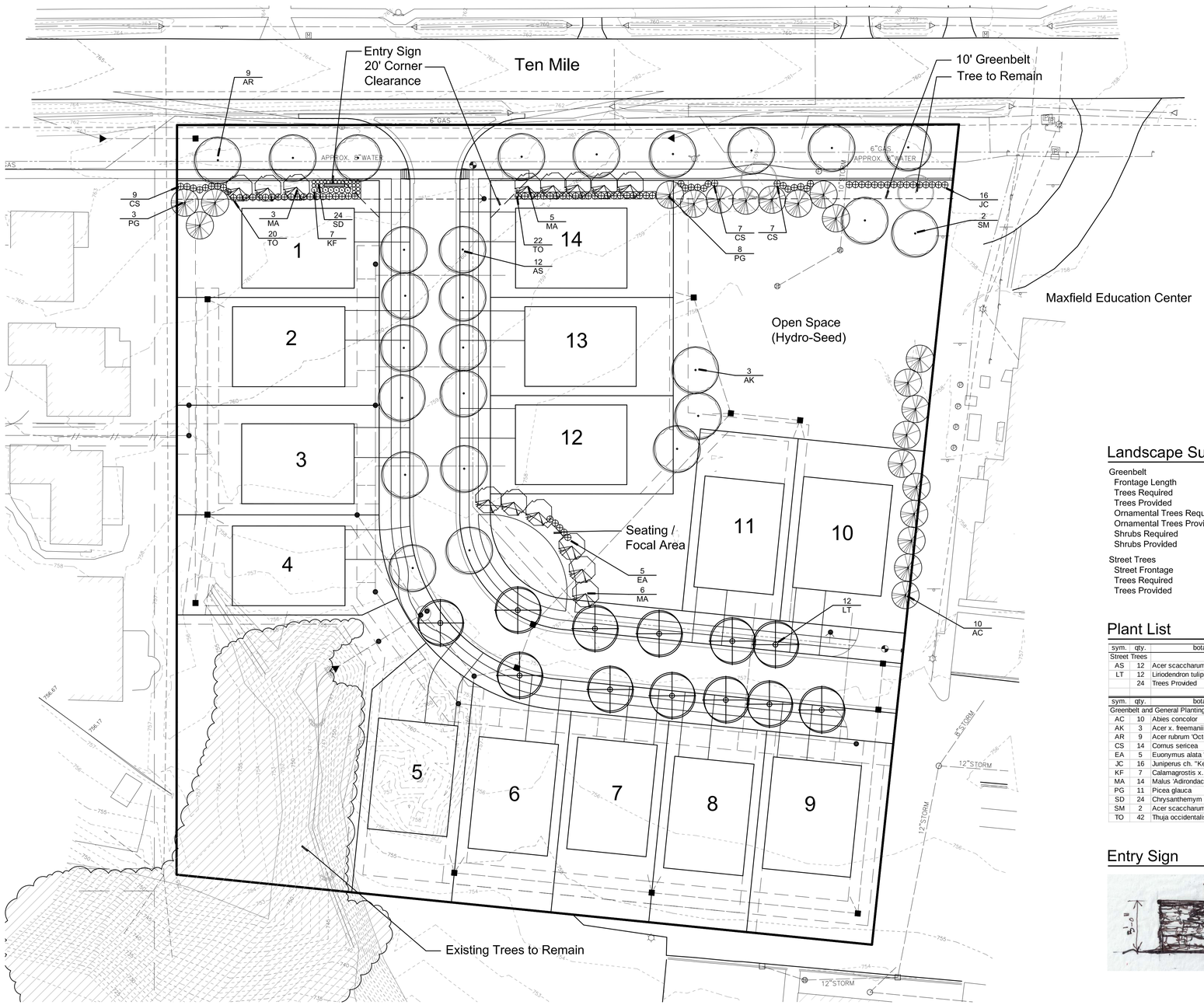
STANDARD DETAIL DRAWINGS

STABILIZATION AND PAVEMENT STANDARDS J

JOB NO.	
SCALE: HORIZ. NA	VERT. NA
DRAWN: CADATOMIC	DATE: 7/1/13
DESIGNED BY: FH	DATE: 7/1/13
CHECKED BY:	DATE:
APPROVED BY:	DATE:

SHEET 1 OF 1

DIRECTOR, PUBLIC SERVICES DEPT.



Landscape Summary

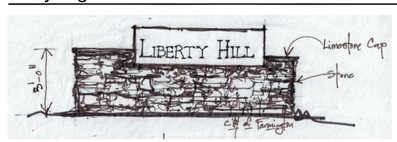
Greenbelt	
Frontage Length	422 l.f.
Trees Required	14 Trees (422 / 30)
Trees Provided	14 Trees
Ornamental Trees Required	0 Trees
Ornamental Trees Provided	12 Trees
Shrubs Required	84 Shrubs (422 / 30) x 6
Shrubs Provided	93 Shrubs
Street Trees	
Street Frontage	952 l.f.
Trees Required	24 Trees (952 / 40)
Trees Provided	24 Trees

Plant List

sym.	qty.	botanical name	common name	caliper	spacing	root	height
Street Trees							
AS	12	Acer scaccharum 'Green Mountain'	Green Mountain Sugar Maple	2.5"	as shown	B&B	
LT	12	Liriodendron tulipifera	Tulip Tree	2.5"	as shown	B&B	
	24	Trees Provided					

sym.	qty.	botanical name	common name	caliper	spacing	root	height
Greenbelt and General Plantings							
AC	10	Abies concolor	Concolor Fir		as shown	B&B	8'
AK	3	Acer x. freemanii 'Autumn Blaze'	Autumn Blaze Maple	2.5"	as shown	B&B	
AR	9	Acer rubrum 'October Glory'	October Glory Red Maple	2.5"	as shown	B&B	
CS	14	Comus sericea	Red-osier Dogwood		as shown		24"
EA	5	Euonymus alata "Compacta"	Compact Burning Bush		as shown		24"
JC	16	Juniperus ch. "Keteleer"	Keteleer Juniper		as shown	B&B	6'
KF	7	Calamagrostis x. a. 'Karl Forester'	Karl Forester Grass		as shown		#2 cont.
MA	14	Malus 'Adirondack'	Adirondack Crab	2.0"	as shown	B&B	
PG	11	Picea glauca	White Spruce		as shown	B&B	8'
SD	24	Chrysanthemym x superbum 'Alaska'	Alaska Shasta Daisy		as shown		#2 cont.
SM	2	Acer saccharum 'Green Mountain'	Green Mountain Sugar Maple	2.5"	as shown	B&B	
TO	42	Thuja occidentalis "Techny"	Techny Arborvitae		as shown	B&B	6'

Entry Sign



ALLEN DESIGN
LAND PLANNING / LANDSCAPE ARCHITECTURE
557 CARPENTER • NORTHVILLE, MI 48167
248 467 4668 • Fax 248 349 0559
Email: jca@wideopenwest.com

Seal:

JAMES C. ALLEN Landscape Architect 901 STATE OF MICHIGAN REGISTERED LANDSCAPE ARCHITECT

Title:

Landscape Plan

Project:

Liberty Hill
Farmington, Michigan

Prepared for:

Boji Development
31000 Northwestern Highway, Suite 145
Farmington Hills, Michigan 48334
248.702.6919

Revision:	Issued:
Submission	December 5, 2017
Revised	March 8, 2018
Revised	June 11, 2018

Job Number:

17-049

Drawn By:	Checked By:
jca	jca

0' 15' 30'

NORTH
1"=30'

Know what's below. Call before you dig.

Sheet No.

L-1

Tree List

TAG NO.	DIAMETER	COMMON NAME	BOTANICAL NAME	CONDITION	REMARKS	LANDMARK
176	43	Silver Maple	Acer saccharinum	Good	Save	Yes
178	27	Box Elder	Acer negundo	Good	Save	No
180	12	Norway Maple	Acer platanoides	Poor	Save	No
181	17	Norway Maple	Acer platanoides	Poor	Remove	No
183	8	Norway Maple	Acer platanoides	Poor	Remove	No
185	12	Norway Maple	Acer platanoides	Poor	Remove	No
186	13	Norway Maple	Acer platanoides	Poor	Remove	No
187	10	Norway Maple	Acer platanoides	Fair	Remove	No
188	13	Norway Maple	Acer platanoides	Poor	Save	No
190	13	Crimson King Maple	Acer platanoides 'Crimson King'	Good	Remove	No
191	13	Crimson King Maple	Acer platanoides 'Crimson King'	Good	Remove	No
195	18	Eastern Cottonwood	Populus deltoides	Good	Remove	No
198	16	Black Walnut	Juglans nigra	Good	Save	No
199	13	Eastern Cottonwood	Populus deltoides	Good	Remove	No
200	11,17	Eastern Cottonwood	Populus deltoides	Good	Remove	No
224	Dead				Remove	
225	14	Eastern Cottonwood	Populus deltoides	Good	Remove	No
226	14	Eastern Cottonwood	Populus deltoides	Good	Remove	No
227	10	Eastern Cottonwood	Populus deltoides	Good	Remove	No
229	8,10,12	Box Elder	Acer negundo	Good	Remove	No
230	18	Eastern Cottonwood	Populus deltoides	Good	Remove	No
231	Dead				Remove	
234	14	Box Elder	Acer negundo	Good	Save	No
235	15	Box Elder	Acer negundo	On Ground	Save	No
239	19	Black Walnut	Juglans nigra	Good	Save	No
243	13	Black Walnut	Juglans nigra	Good	Save	No
1345	19	Honey Locust	Gleditsia triacanthos	Good	Save	No
1346	16	Black Maple	Acer nigrum	Good	Save	No
1347	13	Norway Maple	Acer platanoides	Good	Remove	No
1348	13	Crimson King Maple	Acer platanoides 'Crimson King'	Good	Remove	No
1349	13	Norway Maple	Acer platanoides	Good	Remove	No
1350	16	Box Elder	Acer negundo	Lean, Fair	Remove	No
1351	8,12	Box Elder	Acer negundo	Lean, Fair	Save	No
1352	9	Black Walnut	Juglans nigra	Good	Save	No
1353	9	Box Elder	Acer negundo	Good	Save	No
1354	11	Black Walnut	Juglans nigra	Good	Save	No
1355	6,9	Common Apple	Malus Spp.	Poor	Save	No
1357	10	Box Elder	Acer negundo	Poor	Remove	No
1358	8	Box Elder	Acer negundo	Good	Save	No
1359	8,14,14,14	Box Elder	Acer negundo	Good	Remove	No
1360	8	Blue Spruce	Picea pungens	Good	Remove	No

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Seal:

Title:

Woodland Plan

Project:

Liberty Hill
Farmington, Michigan

Prepared for:

Boji Development
31000 Northwestern Highway, Suite 145
Farmington Hills, Michigan 48334
248.702.6919

Revision:	Issued:
Revised	June 11, 2018

Job Number:

17-049

Drawn By:	Checked By:
jca	jca

0' 15' 30'

NORTH
1"=30'

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

Sheet No.

L-2

NOTE:
GUY DECIDUOUS TREES ABOVE 3"CAL.. STAKE DECIDUOUS TREES BELOW 3" CAL.

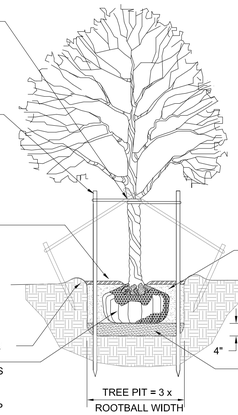
STAKE TREES AT FIRST BRANCH USING 2"-3" WIDE BELT-LIKE NYLON OR PLASTIC STRAPS. ALLOW FOR SOME MINIMAL FLEXING OF THE TREE. REMOVE AFTER ONE YEAR.

2" X 2" HARDWOOD STAKES, MIN. 36" ABOVE GROUND FOR UPRIGHT, 18" IF ANGLED. DRIVE STAKES A MIN. 18" INTO UNDISTURBED GROUND OUTSIDE ROOTBALL. REMOVE AFTER ONE YEAR.

MULCH 4" DEPTH WITH SHREDDED HARDWOOD BARK. NATURAL IN COLOR. LEAVE 3" CIRCLE OF BARE SOIL AT BASE OF TREE TRUNK. PULL ANY ROOT BALL DIRT EXTENDING ABOVE THE ROOT FLARE AWAY FROM THE TRUNK SO THE ROOT FLARE IS EXPOSED TO AIR.

MOUND EARTH TO FORM SAUCER

REMOVE ALL NON-BIODEGRADABLE MATERIALS COMPLETELY FROM THE ROOTBALL. CUT DOWN WIRE BASKET AND FOLD DOWN BURLAP FROM TOP 1/2 OF THE ROOTBALL.



PLANTING MIXTURE: AMEND SOILS PER SITE CONDITIONS AND REQUIREMENTS OF THE PLANT MATERIAL.

SCARIFY SUBGRADE AND PLANTING PIT SIDES. RECOMPACT BASE OF TO 4" DEPTH.

NOTE:
TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS IT BORE ORIGINALLY OR SLIGHTLY HIGHER THAN FINISH GRADE UP TO 6" ABOVE GRADE, IF DIRECTED BY LANDSCAPE ARCHITECT FOR HEAVY CLAY SOIL AREAS.

DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR BROKEN BRANCHES.

REMOVE ALL TAGS, STRING, PLASTICS AND OTHER MATERIALS THAT ARE UNSIGHTLY OR COULD CAUSE GIRDLING.

DECIDUOUS TREE PLANTING DETAIL

NOTE:
GUY EVERGREEN TREES ABOVE 12' HEIGHT. STAKE EVERGREEN TREE BELOW 12' HEIGHT.

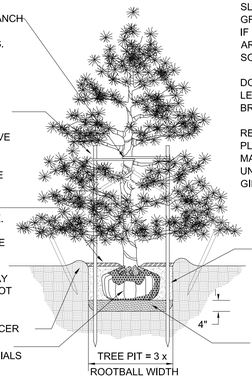
STAKE TREES AT FIRST BRANCH USING 2"-3" WIDE BELT-LIKE NYLON OR PLASTIC STRAPS. ALLOW FOR SOME MINIMAL FLEXING OF THE TREE. REMOVE AFTER ONE YEAR.

2" X 2" HARDWOOD STAKES, MIN. 36" ABOVE GROUND FOR UPRIGHT, 18" IF ANGLED. DRIVE STAKES A MIN. 18" INTO UNDISTURBED GROUND OUTSIDE ROOTBALL. REMOVE AFTER ONE YEAR.

MULCH 4" DEPTH WITH SHREDDED HARDWOOD BARK. NATURAL IN COLOR. LEAVE 3" CIRCLE OF BARE SOIL AT BASE OF TREE TRUNK. PULL ANY ROOT BALL DIRT EXTENDING ABOVE THE ROOT FLARE AWAY FROM THE TRUNK SO THE ROOT FLARE IS EXPOSED TO AIR.

MOUND EARTH TO FORM SAUCER

REMOVE ALL NON-BIODEGRADABLE MATERIALS COMPLETELY FROM THE ROOTBALL. CUT DOWN WIRE BASKET AND FOLD DOWN BURLAP FROM TOP 1/2 OF THE ROOTBALL.



PLANTING MIXTURE: AMEND SOILS PER SITE CONDITIONS AND REQUIREMENTS OF THE PLANT MATERIAL.

SCARIFY SUBGRADE AND PLANTING PIT SIDES. RECOMPACT BASE OF TO 4" DEPTH.

NOTE:
TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS IT BORE ORIGINALLY OR SLIGHTLY HIGHER THAN FINISH GRADE UP TO 6" ABOVE GRADE, IF DIRECTED BY LANDSCAPE ARCHITECT FOR HEAVY CLAY SOIL AREAS.

DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR BROKEN BRANCHES.

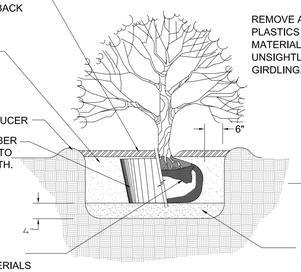
REMOVE ALL TAGS, STRING, PLASTICS AND OTHER MATERIALS THAT ARE UNSIGHTLY OR COULD CAUSE GIRDLING.

EVERGREEN TREE PLANTING DETAIL

MULCH 3" DEPTH WITH SHREDDED HARDWOOD BARK. NATURAL IN COLOR. PULL BACK 3" FROM TRUNK.

PLANTING MIXTURE: AMEND SOILS PER SITE CONDITIONS AND REQUIREMENTS OF THE PLANT MATERIAL.
MOUND EARTH TO FORM SAUCER

REMOVE COLLAR OF ALL FIBER POTS. POTS SHALL BE CUT TO PROVIDE FOR ROOT GROWTH. REMOVE ALL NONORGANIC CONTAINERS COMPLETELY.



REMOVE ALL NON-BIODEGRADABLE MATERIALS COMPLETELY FROM THE ROOTBALL. FOLD DOWN BURLAP FROM TOP 1/3 OF THE ROOTBALL.

SCARIFY SUBGRADE AND PLANTING PIT SIDES. RECOMPACT BASE OF TO 4" DEPTH.

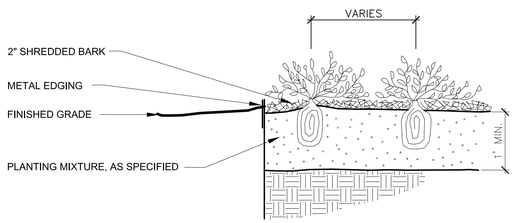
NOTE:
TREE SHALL BEAR SAME RELATION TO FINISH GRADE AS IT BORE ORIGINALLY OR SLIGHTLY HIGHER THAN FINISH GRADE UP TO 4" ABOVE GRADE, IF DIRECTED BY LANDSCAPE ARCHITECT FOR HEAVY CLAY SOIL AREAS.

PRUNE ONLY DEAD OR BROKEN BRANCHES.

REMOVE ALL TAGS, STRING, PLASTICS AND OTHER MATERIALS THAT ARE UNSIGHTLY OR COULD CAUSE GIRDLING.

SHRUB PLANTING DETAIL

NOT TO SCALE

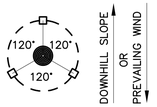


PERENNIAL PLANTING DETAIL

Not to scale

LANDSCAPE NOTES

1. All plants shall be north Midwest American region grown, No. 1 grade plant materials, and shall be true to name, free from physical damage and wind burn.
2. Plants shall be full, well-branched, and in healthy vigorous growing condition.
3. Plants shall be watered before and after planting is complete.
4. All trees must be staked, fertilized and mulched and shall be guaranteed to exhibit a normal growth cycle for at least two (2) full years following City approval.
5. All material shall conform to the guidelines established in the most recent edition of the American Standard for Nursery Stock.
6. Provide clean backfill soil, using material stockpiled on site. Soil shall be screened and free of any debris, foreign material, and stone.
7. "Agriform" tabs or similar slow-release fertilizer shall be added to the planting pits before being backfilled.
8. Amended planting mix shall consist of 1/3 screened topsoil, 1/3 sand and 1/3 peat, mixed well and spread to the depth as indicated in planting details.
9. All plantings shall be mulched per planting details located on this sheet.
10. The Landscape Contractor shall be responsible for all work shown on the landscape drawings and specifications.
11. No substitutions or changes of location, or plant types shall be made without the approval of the Landscape Architect.
12. The City of Novi's Landscape Architect shall be notified of any discrepancies between the plans and field conditions prior to installation.
13. The Landscape Contractor shall be responsible for maintaining all plant material in a vertical condition throughout the guaranteed period.
14. The Landscape Architect shall have the right, at any stage of the installation, to reject any work or material that does not meet the requirements of the plans and specifications, if requested by owner.
15. Contractor shall be responsible for checking plant quantities to ensure quantities on drawings and plant list are the same. In the event of a discrepancy, the quantities on the plans shall prevail.
16. The Landscape Contractor shall seed and mulch or sod (as indicated on plans) all areas disturbed during construction, throughout the contract limits.
17. A pre-emergent weed control agent, "Preen" or equal, shall be applied uniformly on top of all mulching in all planting beds.
18. All landscape areas shall be provided with an underground automatic sprinkler system.
19. Sod shall be two year old "Baron/Cheriadelphi" Kentucky Blue Grass grown in a sod nursery on loam soil.

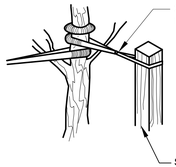


NOTE:
ORIENT STAKING/GUYING TO PREVAILING WINDS, EXCEPT ON SLOPES GREATER THAN 3:1 ORIENT TO SLOPE.

USE SAME STAKING/GUYING ORIENTATION FOR ALL PLANTS WITHIN EACH GROUPING OR AREA

STAKING/GUYING LOCATION

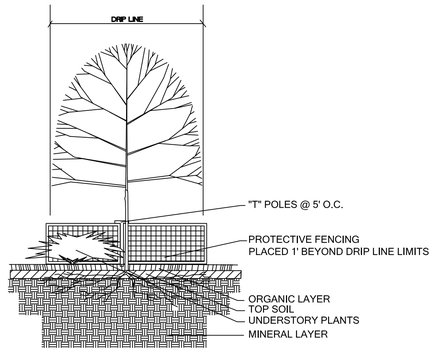
GUYING DETAIL



STAKING DETAIL

TREE STAKING DETAIL

Not to scale



1. Either Plastic or Wood Orange Snow Fencing Shall be Installed at or Beyond the Dripline, Unless More Substantial Fencing is Required.
2. Stakes Shall be Metal "T" Poles Spaced no Further than 5' on Center.
3. Fencing Shall not be Installed Closer to the Tree than the Dripline of Those Trees to be Saved. Special Circumstances Shall be Reviewed by the City.
4. Fencing Shall be Erected Prior to Construction. The City Shall be Notified Once the Fencing is Installed for Inspection.
5. Under no Circumstances Shall the Portective Fencing be Removed Without Proper Approval from the City.
6. No Person Shall Conduct any Activity Within Areas Proposed to Remain. This Shall Include, but not Limited to:
   a. No Solvents or Chemicals Within Protected Areas.
   b. No Building Materials or Construction Equipment Within Protected Areas.
   c. No Grade Changes, Including Fill, Within Protected Areas.
   d. No Removal of Vegetation from the Ground Up Without Permission from the Proper Reviewing Authority, Including the Woodlands Review Board.
   e. Any Required Swale Needs to be Directed Around the Protected Areas. Instances Where Swales are Approved Through a Protected Area, the Swales Need to be HAND DUG. Machinery of Any Kind is Prohibited.
7. Regulated Woodland or Regulated Trees Adjacent to the Property are Also Required to be Protected Whether or not they are Shown on the Plan.

TREE PROTECTION

Not to scale

ALLEN DESIGN
LAND PLANNING / LANDSCAPE ARCHITECTURE
557 CARPENTER • NORTHVILLE, MI 48167
248 467 4668 • Fax 248 349 0559
Email: jca@wideopenwest.com

Seal:

Title:

Landscape Details

Project:

Liberty Hill
Farmington, Michigan

Prepared for:

Boji Development
31000 Northwestern Highway, Suite 145
Farmington Hills, Michigan 48334
248.702.6919

Revision:	Issued:
Revised	June 11, 2018

Job Number:

17-049

Drawn By:	Checked By:
jca	jca

Know what's below. Call before you dig.

Sheet No.

L-3

ALLEN DESIGN
LAND PLANNING / LANDSCAPE ARCHITECTURE
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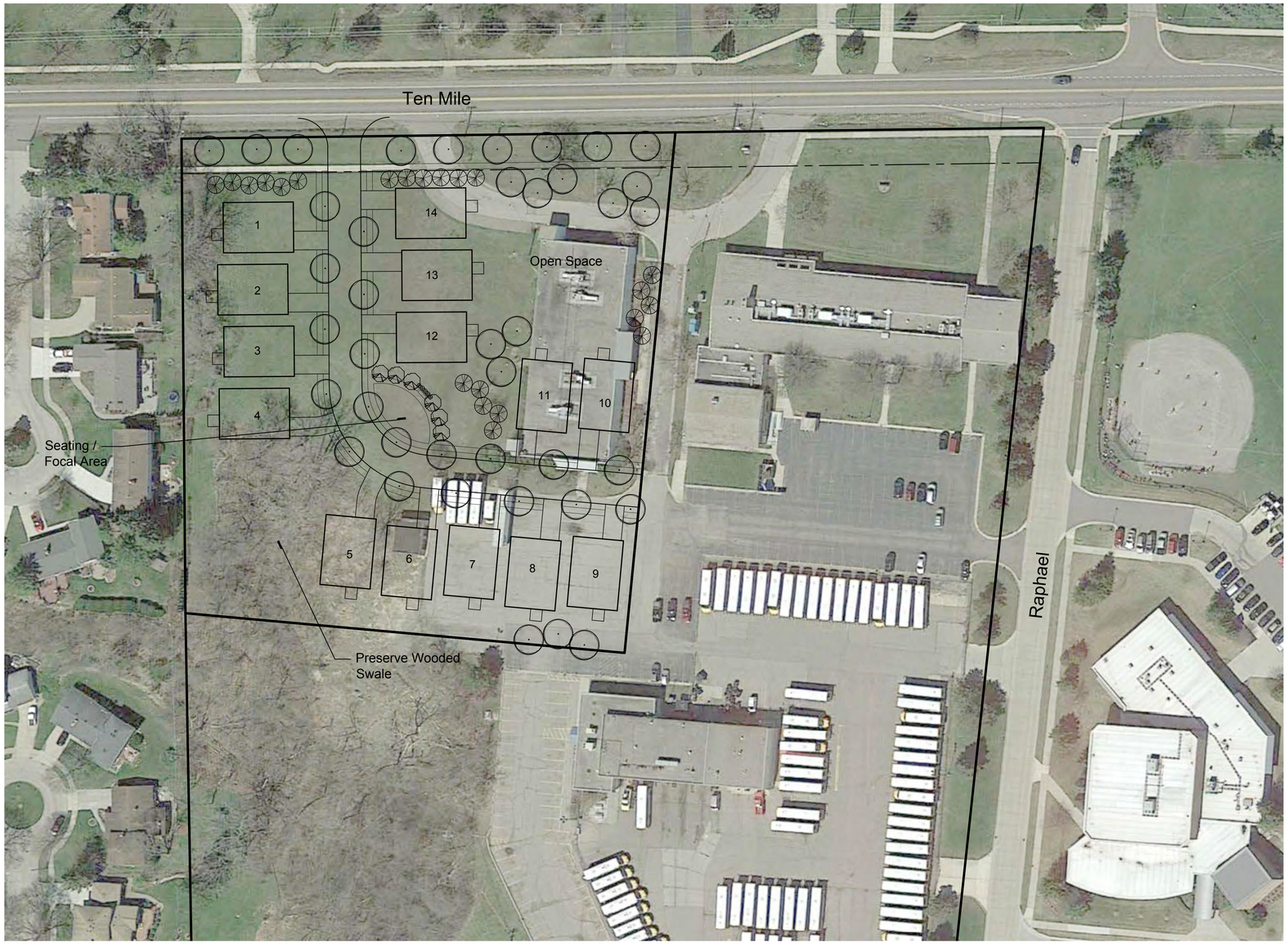

Site Summary

Existing Zoning	R-1
Proposed Zoning	PUD
Gross Site Area	3.88 Acres
Less ROW	0.29 Ac
Net Site Area	3.59 Acres
Front Yard Setback	30'
Side to Side Setback	10'
Rear Yard Setback	35'
Units Shown	14 Units
Density Shown	3.89 Du/Ac (14 / 3.59 Acres)
Unit Size	43' x 60'

Seal:

Title:

Concept Plan

Project:

Ten Mile Site
Farmington, Michigan

Prepared for:

Boji Development
31000 Northwestern Hoghway, Suite 145
Farmington Hills, Michigan 48334
248.702.6919

Revision:	Issued:
Review	September 6, 2017
Revised	September 11, 2017

Job Number:

17-049

Drawn By:	Checked By:
jca	jca

0' 25' 50'

NORTH
1"=50'

Sheet No.

SP-1

Site Summary

Existing Zoning		R-1
Proposed Zoning		PUD
Gross Site Area		3.88 Acres
Less ROW	0.29 Ac	
Net Site Area		3.59 Acres
Front Yard Setback		30'
Side to Side Setback		10'
Rear Yard Setback		35'
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Density Shown		3.89 Du/Ac (14 / 3.59 Acres)
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Seal:

Title:
Concept Plan

Project:
Ten Mile Site
Farmington, Michigan

Prepared for:
Boji Development
31000 Northwestern Highway, Suite 145
Farmington Hills, Michigan 48334
248.702.6919

Revision:	Issued:
Review	September 6, 2017
Revised	September 11, 2017

Job Number:
17-049

Drawn By:	Checked By:
jca	jca

0' 25' 50'
NORTH
1"=50'

Sheet No.
SP-1

Site Summary

Existing Zoning		R-1
Proposed Zoning		PUD
Gross Site Area		18.1 Acres ±
Less ROW	0.29 Ac	
Net Site Area		17.81 Acres
Front Yard Setback		30'
Side to Side Setback		10'
Rear Yard Setback		30'
Units Shown		51 Units
Density Shown		2.86 Du/Ac (51 / 17.81 Acres)
Unit Size		43' x 60'

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LAND PLANNING / LANDSCAPE ARCHITECTURE
557 CARPENTER • NORTHVILLE, MI 48167
248 467 4668 • Fax 248 349 0559
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Seal:

Title:
Concept Plan

Project:
Ten Mile Site
Farmington, Michigan

Prepared for:
Boji Development
31000 Northwestern Highway, Suite 145
Farmington Hills, Michigan 48334
248.702.6919

Revision:	Issued:
Review	September 6, 2017
Revised	September 11, 2017
Revised	September 12, 2017

Job Number:
17-049

Drawn By:	Checked By:
jca	jca

0' 15' 30' 60'

NORTH
1"=60'

Sheet No.
SP-1

Site Summary

Existing Zoning		R-1
Proposed Zoning		PUD
Gross Site Area		18.1 Acres +
Less ROW	0.29 Ac	
Net Site Area		17.81 Acres
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557 CARPENTER • NORTHVILLE, MI 48167
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Seal:

Title:
Concept Plan

Project:
Ten Mile Site
Farmington, Michigan

Prepared for:
Boji Development
31000 Northwestern Highway, Suite 145
Farmington Hills, Michigan 48334
248.702.6919

Revision:	Issued:
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Revised	September 11, 2017
Revised	September 12, 2017

Job Number:
17-049

Drawn By:	Checked By:
jca	jca

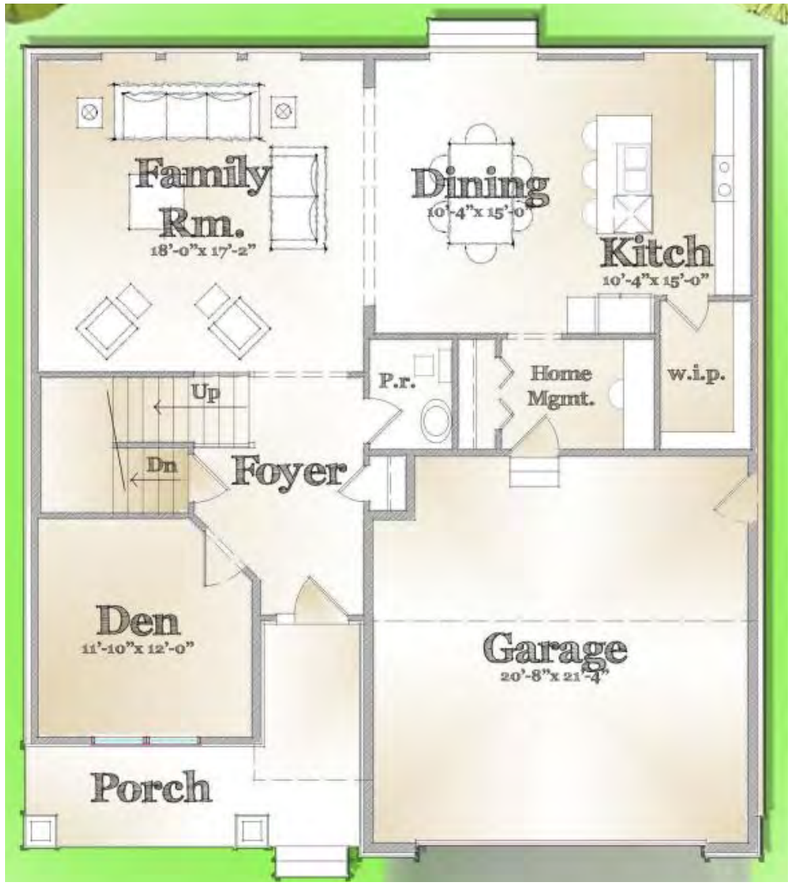
0' 15' 30' 60'

NORTH
1"=60'

Sheet No.
SP-1

CONCEPT HOME B

May 2017



Square Feet: 2467

Beds: 4

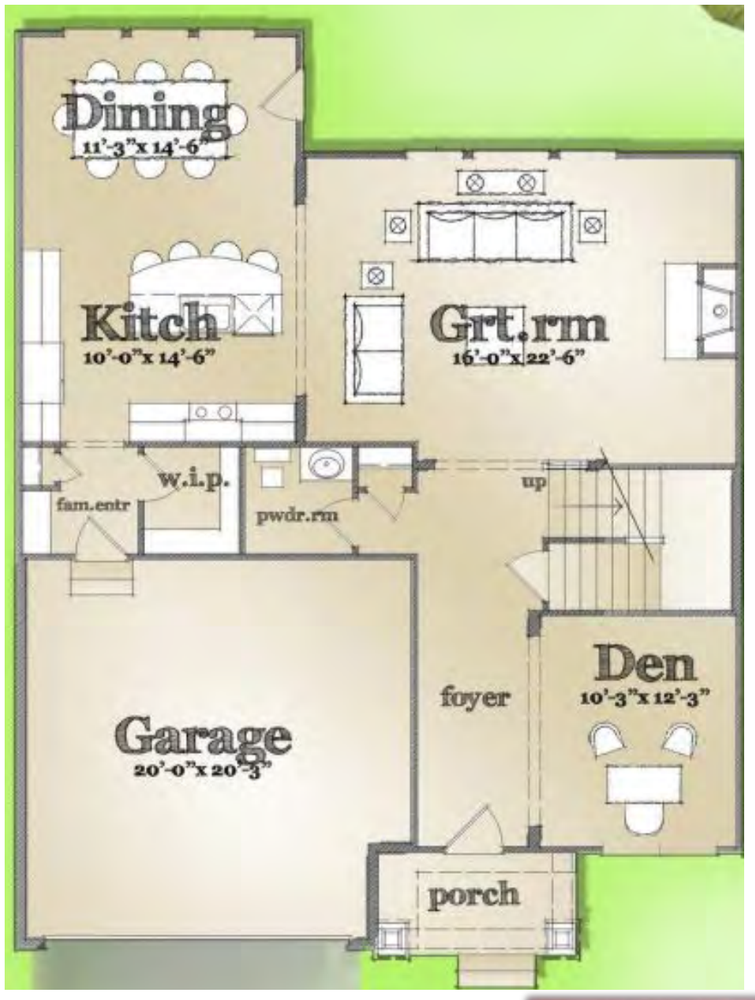
Baths: 2 1/2

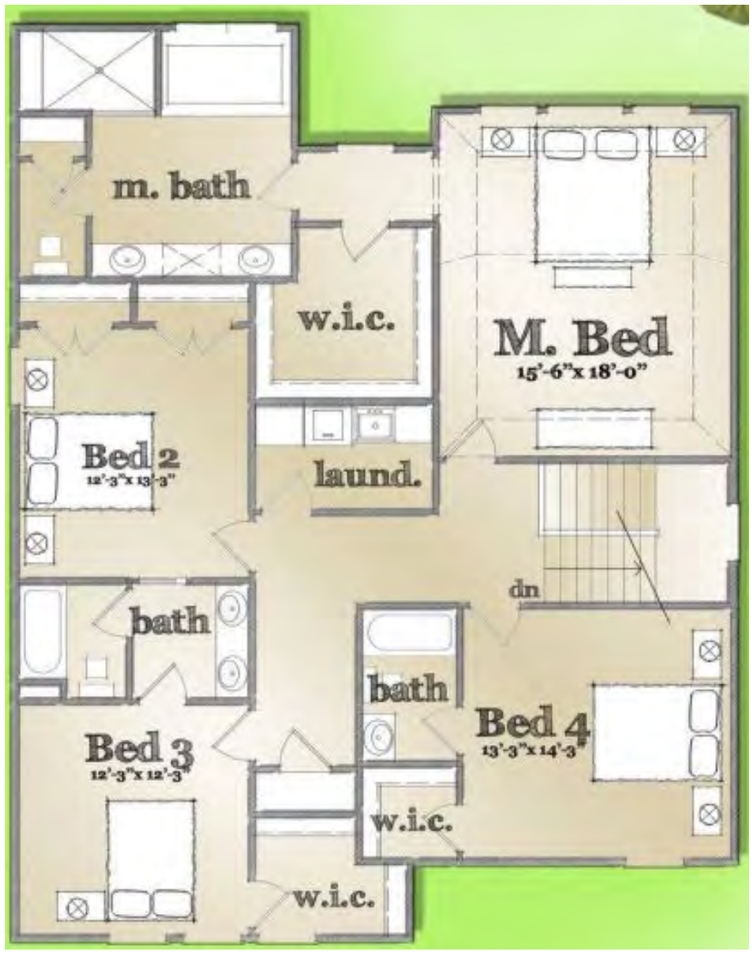
TK DESIGN & ASSOCIATES

BOJI HOME BUILDERS

CONCEPT HOME C

May 2017





Square Feet: 2739

Beds: 4

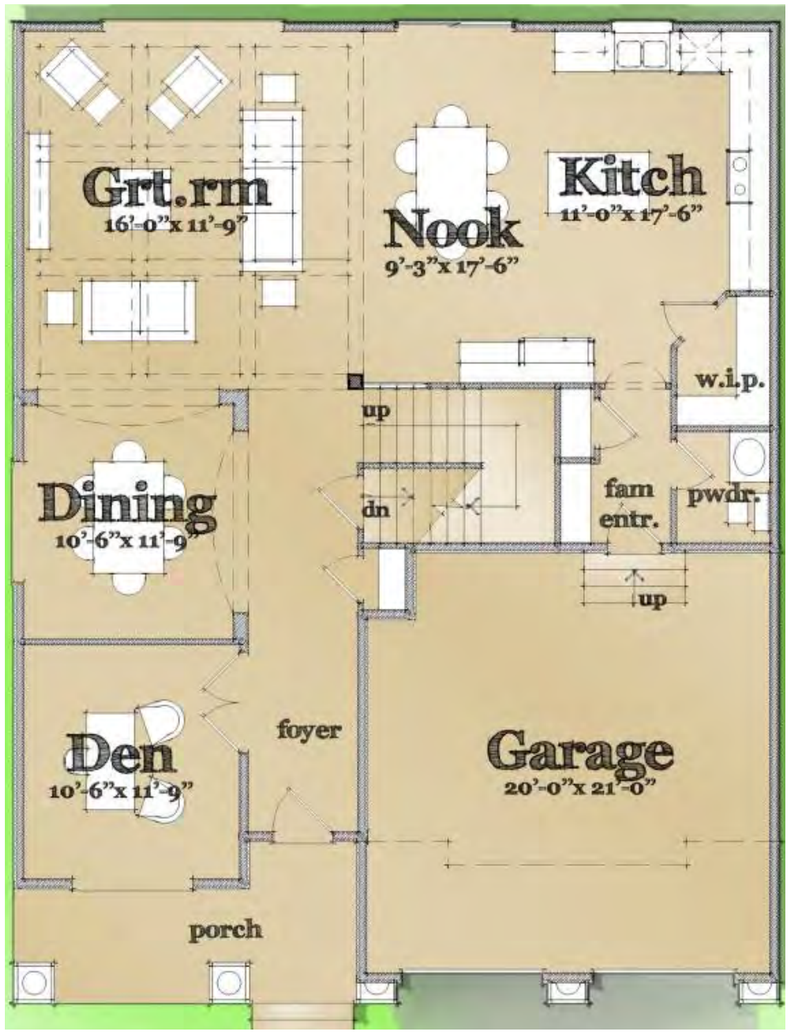
Baths: 3 1/2

TK DESIGN & ASSOCIATES

BOJI HOME BUILDERS

CONCEPT HOME D

May 2017



Square Feet: 2810

Beds: 4

Baths: 2 1/2

TK DESIGN & ASSOCIATES

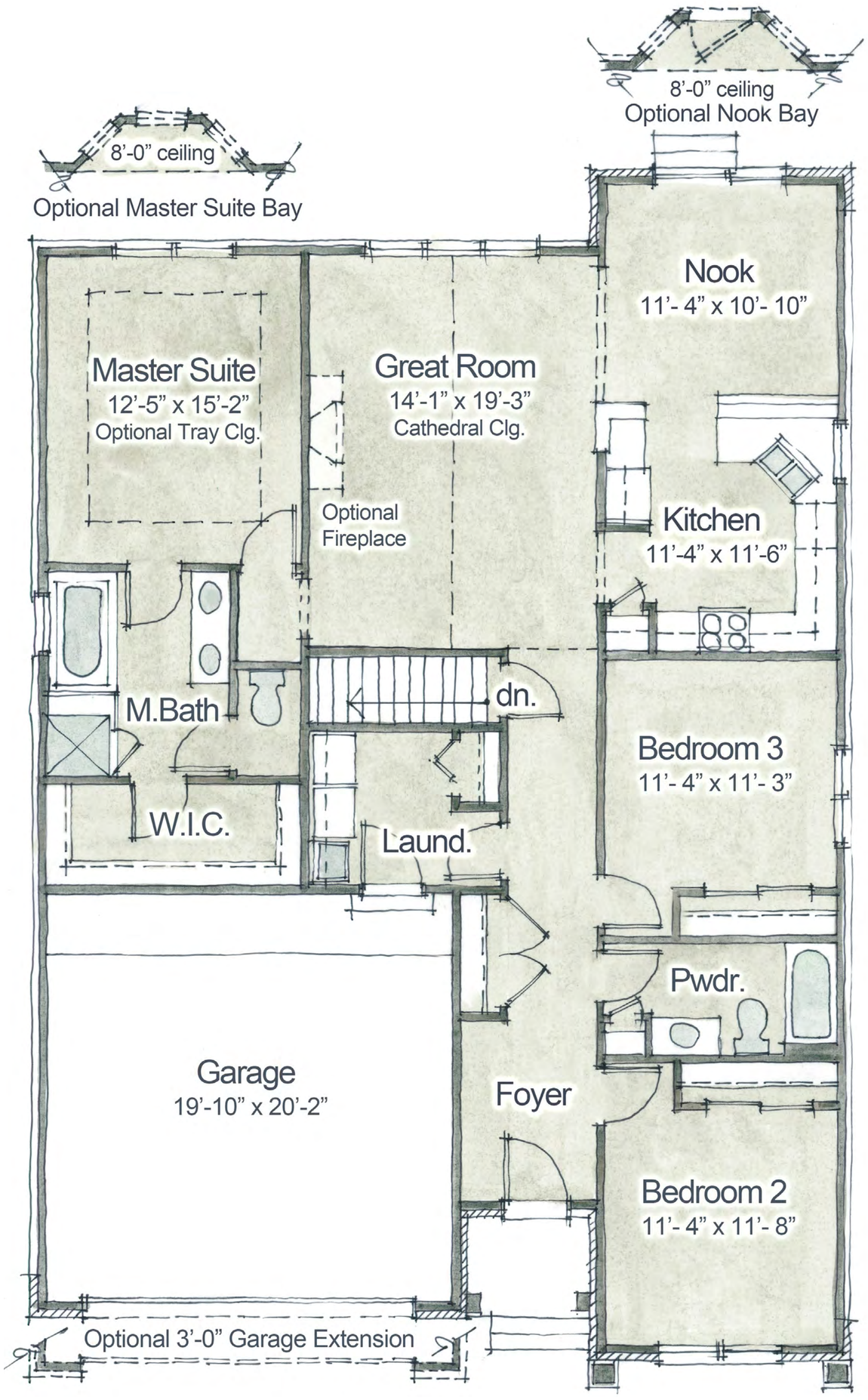
BOJI HOME BUILDERS

THE CHELSEA II

1,725 SQ FT

FEATURES

- 3 BEDROOMS
- 2 BATHROOMS
- 9'-0" FIRST FLOOR CEILINGS
- 2 CAR GARAGE
- OPEN KITCHEN & NOOK
- PANTRY CLOSET
- LARGE GREAT ROOM WITH CATHEDRAL CEILING
- PRIVATE & LUXURIOUS MASTER SUITE WITH SPACIOUS WALK IN CLOSET, SOAKING TUB, SEPARATE SHOWER & PRIVATE WATER CLOSET
- PLENTY OF CLOSET SPACE THROUGHOUT



First Floor

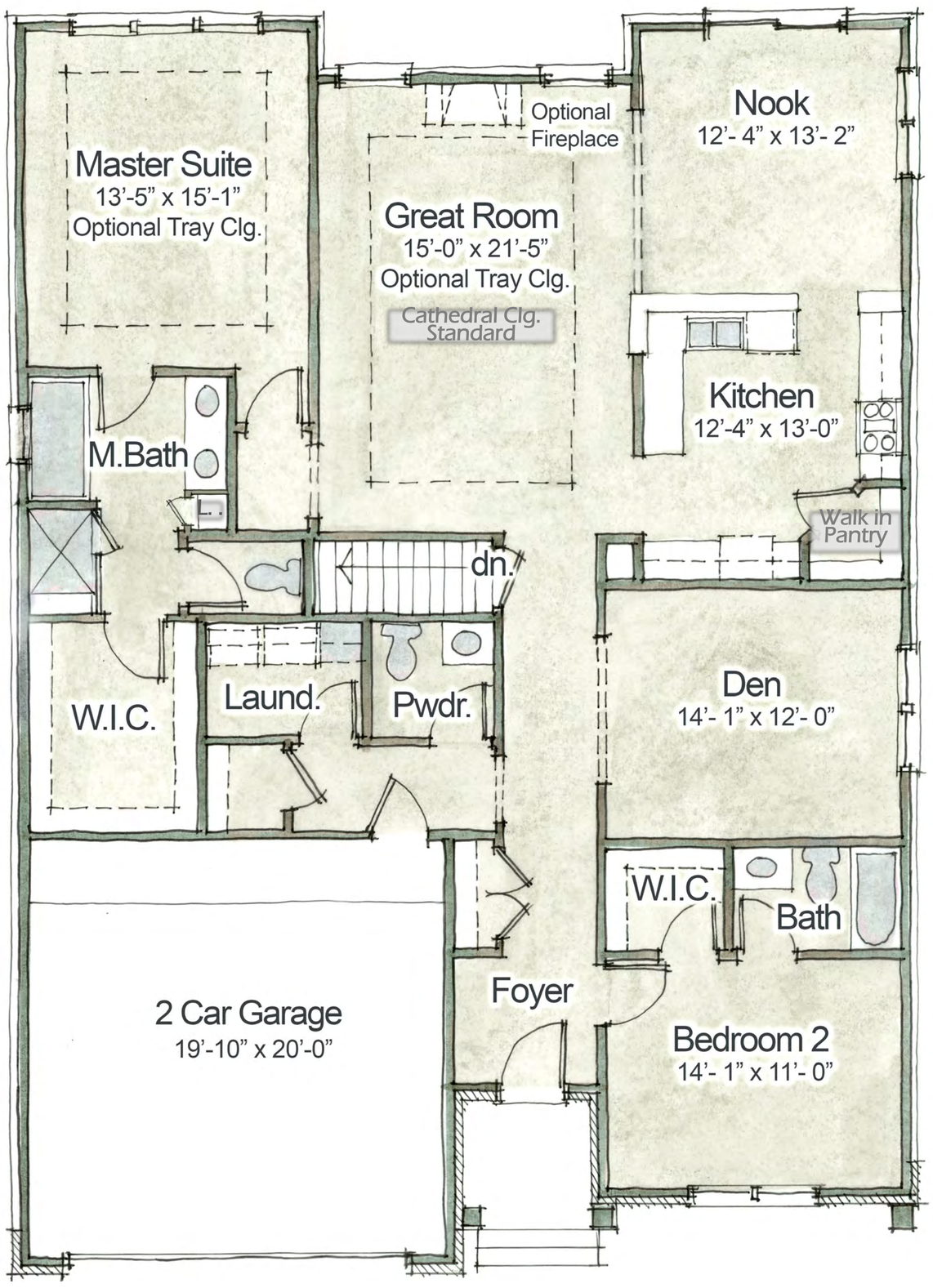
9'-0" Ceiling

THE DENTON

2,010 SQ FT

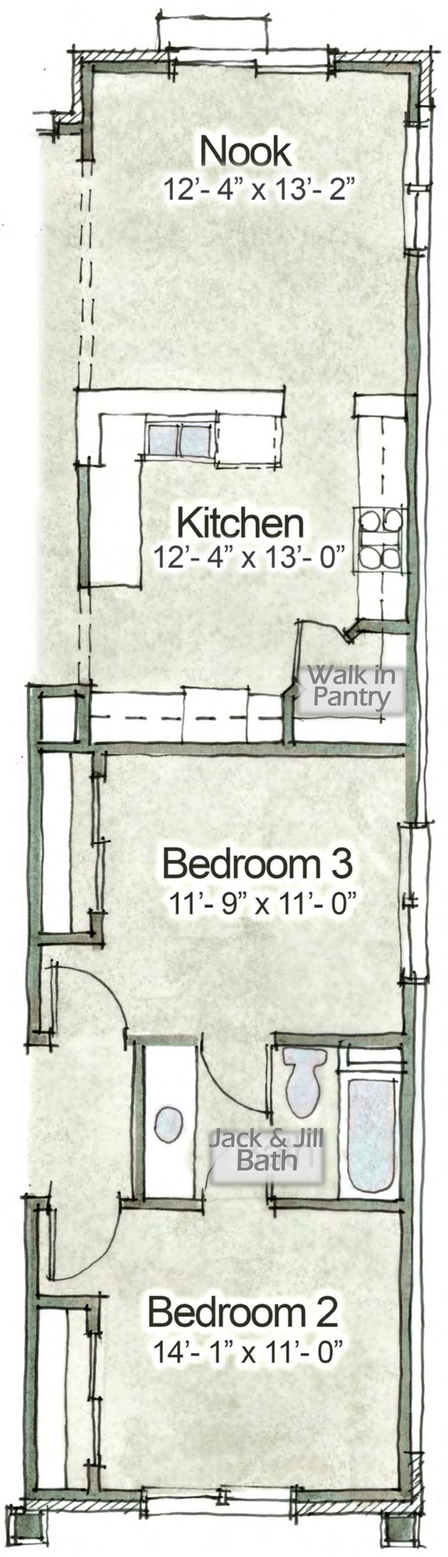
FEATURES

- 2 OR 3 BEDROOMS
- 2 1/2 BATHROOMS
- 9'-0" FIRST FLOOR CEILINGS
- 2 CAR GARAGE
- OPEN KITCHEN, NOOK & LARGE GREAT ROOM
- WALK-IN PANTRY
- PRIVATE & LUXURIOUS MASTER SUITE WITH SPACIOUS WALK IN CLOSET, SOAKING TUB, SEPARATE SHOWER & PRIVATE WATER CLOSET
- PLENTY OF CLOSET SPACE THROUGHOUT
- 3 LAYOUT OPTIONS AVAILABLE TO SUIT YOUR LIFESTYLE

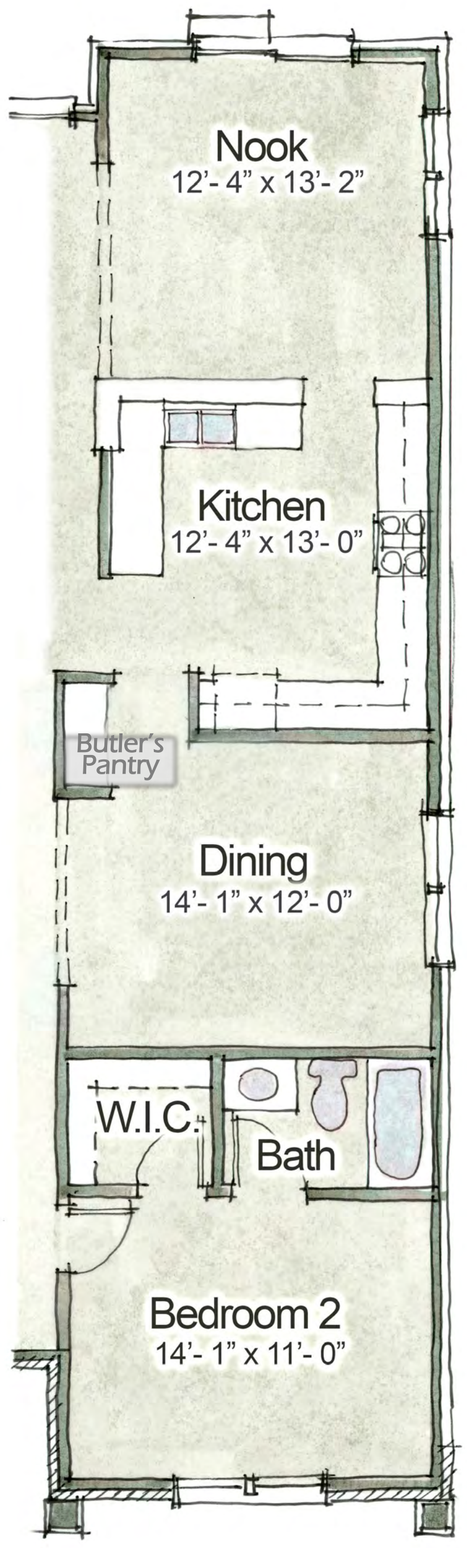


First Floor

9'-0" Ceiling



BEDROOM #3 OPTION



DINING ROOM OPTION

June 21, 2018

Kevin Christiansen
Economic & Community Development Director
City of Farmington
23600 Liberty Street
Farmington, MI 48335

RE: Liberty Hill – Final PUD Site Plan Review
Planning Review
32795 W. 10 Mile Road

Dear Mr. Christiansen:

Our office completed the PUD plan review of the plan set (revision date of June 11, 2018) for the proposed Liberty Hill Planned Unit Development (PUD) located at 32795 W. 10 Mile Road. The plans were prepared by Alpine Engineering, Inc., received by OHM Advisors on June 15, 2018, and were reviewed with respect to the City of Farmington's PUD Standards as well as the City's Zoning Ordinance. This review provides the Planning Commission with our previous review comments (Section A), as well as Final Site Plan comments (Section B), and recommendation for final site plan approval.

A. Applicant Response to Previous Recommendations. A conceptual planning review was provided on January 5, 2018 by this office. Below, we describe how this resubmittal reflects those changes:

1. ***Previous Comment:*** *The site is currently zoned as R-1 – Single Family Residential, where single-family dwelling units are permitted. The two-story residential concept is permitted and the Planning Commission will need to consider the total of 14 dwelling units versus the 12 (only 11 labeled) shown in the parallel plan.*
    - The current plan now shows the proposed 14 dwelling units with a full site plan design.
2. ***Previous Comment:*** *The benefit of proposing open space along 10 Mile Road allows for possible future expansion of the space and in general, doesn't place this area in a space that is difficult to utilize (steep slopes, etc.). In general we think that the open spaces that are shown should note the type of space this is intended to be and should include preliminary landscape plans to illustrate how these areas will look (e.g. pavilion, gazebo, play structure, etc.).*
    - The current plan does not show the intent of the open space areas, with the exception of a seating/focal area proposed between Lots 11 and 12. We also note that access to this area is not clearly defined. We feel this plan should have more detail. The details of this agreement are in good order; however, as the details are finalized during the final administrative reviews, the agreement may need to be modified between the applicant and City attorney's office.
3. ***Previous Comment:*** *A PUD agreement will need to be incorporated into future submittals so details on maintenance, ownership of roads, etc. is properly documented. A preliminary PUD agreement was not provided at this time for comment. This document will need to clearly outline the public benefit to offset the added density beyond what the parallel plan shows.*
    - The applicant/City provided this office with the draft PUD agreement.
4. ***Previous Comment:*** *Pedestrian-oriented design requirements state the following -*
An interconnected street and sidewalk network shall be provided to unify neighborhoods and provide more convenient access to adjacent properties; Sidewalks shall be a minimum of five (5) feet wide; If pedestrian-scale ornamental street lighting is proposed, this shall be noted on the plan set.

- The current plan now shows the interconnected street and sidewalk network within the proposed subdivision at a proposed width of five (5) feet. No pedestrian-scale ornamental street lighting has been shown on the plans. We feel that the sidewalk design will allow for future connection should this development move forward with future phases. This should be detailed in the PUD Agreement.

5. ***Previous Comment:*** *Dwelling unit details and other landscape design details (e.g. entrance sign, etc.) will need to be further developed for future submittals.*
    - The current plan now shows a detail for the proposed entrance sign (Sheet L-1). Additional dimensions should be provided on the plans as outlined in Section 25 of the Code of Ordinance.
    - The plans still need to show dwelling unit details as well as details for the proposed seating/focal area portion of the open space. This can also be outlined in the PUD Agreement.
6. ***Previous Comment:*** *The submittal may want to include an overall concept plan of how the site will work with the adjacent residential property to the west. Conversely, it will need to also function as a standalone site should no new redevelopment occur. Currently, it's not clear how traffic will circulate through the proposed Liberty Hill development to the property to the east.*
    - It is still recommended that an overall concept plan is provided for the possible future expansion of this subdivision. This is important to show that the scale/density of this phase works with the overall development.

B. Final Site Plan Review Comments. This section provides comments based on the final site plan provided, as well as with recommended conditions of approval:

1. **Landscaping.** Final landscaping plans shall be revised to meet the PUD Agreement once approved.
2. **Sample Building Material.** The final site plan should include details of the proposed dwelling units. We recommend that the applicant provide sample building materials for Planning Commission review.
3. **PUD Development Agreement Approval.** If approved by the Planning Commission, final site plan approval is contingent upon City Council review and approval of the PUD Development Agreement.

Final Site Plan Approval. It is recommended Planning Commission recommend final site plan approval contingent on the above comments and recommendations being addressed. Final detailed engineering and planning reviews will also be required prior to construction permits.

Next Steps. If the final site plan is approved by Planning Commission, the project will proceed through the following additional steps:

- City Council review and approval of PUD Development Agreement
- Finalize and execute the Development agreement
- Final Permitting Process

We look forward to reviewing this application at the June 25, 2018 Planning Commission meeting. Should you have any questions or comments, please don't hesitate to contact us.

Sincerely,
OHM Advisors

Matthew D. Parks, P.E.

for
Heather Bowden, Senior Planner

cc: John Koncsol, City of Farmington
Chuck Eudy, City of Farmington
BK Development Group, LLC., Owner, 31000 Northwestern Hwy, Ste. 145, Farmington Hills, MI 48334
Shiloh Dahlin, P.E., Engineer, Alpine Engineering, Inc., 46892 West Rd., Ste. 109, Novi, MI 48377
Jessica Howard, OHM Advisors, Engineer
File

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June 21, 2018

Kevin Christiansen
Economic & Community Development Director
City of Farmington
23600 Liberty Street
Farmington, MI 48335

RE: Liberty Hill – Final PUD Site Plan Review
Engineering Review
32795 W. 10 Mile Road

Dear Mr. Christiansen:

Our office completed the final Planned Unit Development (PUD) site plan review of the plans with a revision date of June 11, 2018, for the proposed Liberty Hill PUD located at 32795 W. 10 Mile Road. The plans were prepared by Alpine Engineering, Inc., received by OHM Advisors on June 15, 2018, and were reviewed with respect to the City of Farmington Engineering Standards and Design Specifications.

The applicant shall review and address our comments prior to future administrative submittals. A brief description of the project has been provided below; followed by our PUD site plan comments, preliminary detailed engineering comments, and a list of required permits/approvals that will eventually be required. Based on our review, none of these comments necessarily impact the intent, density, or layout of the site plan. At this time, we recommend final site plan approval and feel these items can be worked on and corrected administratively prior to issuance of construction permits and approval of the final PUD Agreement by City Council.

PROJECT AND SITE DESCRIPTION:

The applicant is proposing fourteen (14) single family homes on approximately 3.88-acres as a PUD. The development will also include an open space area, proposed road through the site that dead ends near the property line as well as storm water management, water main, and sanitary sewer. The site is accessed off the south side of 10 Mile Road between Farmington and Raphael Street. The existing site is mainly greenspace and abuts the existing Maxfield Education Center and parking lot. The existing site and adjacent site are currently Zoned R-1.

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ENGINEERING – FINAL PUD SITE PLAN COMMENTS:

It should be noted that previous reviews were completed for this parcel for other proposed developments and were also considered as part of this review. Most notably, the City completed major improvements to the Twin Valley Pump Station in 2015 to allow for the redevelopment of this area (Sub Area D in the Downtown Area Plan) to support additional density and more intense use than what exists today. This proposed development, while it adds single family residential units to the area, is much less intense than what was planned for and sized when making the pump station improvements. In general, the site will work with the existing infrastructure as proposed. It is recommended the applicant consider the following comments and address them as they may impact the PUD Agreement and/or timing of future permits.

The following comments shall be addressed by the applicant prior to future submittals.

1. The City of Farmington Hills will require the review and approval of all proposed work within the 10 Mile Road ROW including the proposed curb cut. While we don't take any exception to the location of the proposed drive approach, the City of Farmington Hills must review and approve this curb cut and approach.
2. The applicant shall clearly indicate on the plan set if the road is to be public or private. This will impact the PUD Agreement.
3. Based on the proposed depth of the 8-inch sanitary sewer, we recommend a minimum 25-foot wide easement, which is two times the depth plus the diameter of the pipe for installation. This will minimally impact Lots 2 and 3.
4. Notes shall be added to the plans outlining the intent for the proposed "T" turnaround and the planned future expansion of this subdivision to the east. The notes shall also include the continued sidewalk connection, and restoration of this area when future phases are approved.
5. The existing ditch in the southwest portion of the site must remain accessible for maintenance purposes.

PRELIMINARY DETAILED ENGINEERING COMMENTS:

The following comments are simply being provided for the benefit of the applicant to aid them for the future administrative detailed engineering submittal, but do not affect the site layout or our recommendation for approval by the Planning Commission. It should be noted that this is not an all-inclusive list and additional comments may be generated as new information is presented.

1. The proposed public water main alignment should be adjusted to follow the alignment of the proposed road, specifically at the proposed bend. The water main should remain in the ROW as to not impact the proposed plantings in the open space areas.
2. It appears many of the proposed trees are over both existing and proposed underground utilities (i.e. storm sewer, water main, sanitary sewer). The applicant shall review and revise so tree roots do not impact these utilities.
3. It appears the proposed water main diameter is noted as 8-foot and not 8-inch. The plans should be revised for the proposed 8-inch water main. In addition, the material type shall be included on the plans.
4. A stub is proposed for the proposed 8-inch water main for future connection/expansion of the subdivision. This extension past the hydrant shall be fully restrained. A restraint schedule shall be provided. In addition, no water services shall connect east of proposed Fire Hydrant #2.
5. Additional information will need to be provided for the existing ditch and the proposed check dams. Calculations should be provided for the increase in flow to ensure there is no negative impact downstream.
6. Additional storm water calculations and stabilization of the outlet ditch will likely be necessary. These details can be discussed prior to future submittals.
7. It appears there are existing catch basins and 10-inch storm sewer that are located in the northeast portion of the site. Clarification is needed if this will be removed or remain and utilized in the proposed open space area. It is shown on the topographic survey and landscaping plans but not shown on the other plan sheets.
8. It is recommended a catch basin be added (or proposed CB #12 be relocated) in between Lots 12 and 13 to provide drainage for Lot 12 and eliminate the need for the proposed easements of Lots 12 and 13. In addition, a manhole may need to be added in the open space to adjust this alignment.

9. A topographical survey showing existing conditions has been provided in the plan set; however, a minimum of two (2) benchmarks should be included with the survey and must comply with the North American Vertical Datum 1988 (NAVD '88). It appears only one benchmark is provided.

PERMITS/APPROVALS:

The following outside agency reviews and permits may be required for the project. Copies of any correspondence between the applicant and the review agencies, as well as the permit or waiver, shall be sent to both the City and this office.

- Final PUD Agreement will need to be reviewed and approved by City Council following all administrative reviews by the City and its consultants.
- A building permit will be required by the City of Farmington Building Department.
- An OCWRC soil erosion and sedimentation control permit will be required prior to starting this work.
- An Act 399 Permit will be required by the MDEQ for the proposed water main.
- A Part 41 Permit will be required by the MDEQ for the proposed sanitary sewer.
- The City of Farmington Hills will require review, approval, and permitting for all work proposed within the 10 Mile Road ROW.
- Any other permits necessary (through the City or other agency) shall be obtained prior to starting construction.

It shall be noted that additional comments may be generated from information presented in future submittals. If you have any questions, please feel free to contact us by phone at (734) 522-6711 or by email at matt.parks@ohm-advisors.com.

Sincerely,
OHM Advisors

Matthew D. Parks, P.E.

Jessica Howard

MDP/jlh

cc: John Koncsol, City of Farmington
Chuck Eudy, City of Farmington
BK Development Group, LLC., Owner, 31000 Northwestern Hwy, Ste. 145, Farmington Hills, MI 48334
Shiloh Dahlin, P.E., Engineer, Alpine Engineering, Inc., 46892 West Rd., Ste. 109, Novi, MI 48377
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