FINAL SITE PLAN / CONSTRUCTION PLAN

BELLAVISTA

A PLANNED UNIT DEVELOPMENT

PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

PROPRIETOR
PULTE HOMES OF MICHIGAN, LLC
100 BLOOMFIELD HILLS PARKWAY, SUITE 150
BLOOMFIELD HILLS, MICHIGAN 48034
PHONE: 248.249.4611
ATTN: JOE SKORE

SURVEYOR
DIFFIN—UMLOR
53115 GRAND RIVER AVE.
NEW HUDSON, MICHIGAN 48165
PHONE: 248.437.7803
ATTN: WES LEE O. UMLOR

ENGINEER/PLANNER
ATWELL, LLC
311 NORTH MAIN STREET
ANN ARBOR, MICHIGAN 48104
PHONE: 734.994.4000
ATTN: WILLIAM ANDERSON

LANDSCAPE ARCHITECT
FELINO PASCUAL & ASSOCIATES, INC.
24333 ORCHARD LAKE ROAD, SUITE G
FARMINGTON HILLS, MICHIGAN 48336
PHONE: 248.557.5588
ATTN: FELINO A. PASCUAL, RLA, CLARB

SITE DATA TABLE

PARCEL DATA

PARCEL ID #:	12-07-200-009, 12-07-300-002, 12-07-300-005
EXISTING ZONING	R-2 (LOW DENSITY MULTIPLE-FAMILY) & AG (AGRICULTURAL)
PROPOSED ZONING	PUD (PLANNED UNIT DEVELOPMENT)
EXISTING LAND USE	AGRICULTURAL
PROPOSED LAND USE	RESIDENTIAL

LAND AREA

GROSS SITE AREA	43.29 AC	±	1,885,886 SF	±
GROSS SITE AREA SINGLE FAMILY	22.34 AC	±	973,191 SF	±
GROSS SITE AREA DUPLEX	20.95 AC	±	912,695 SF	±
PUBLIC ROAD R.O.W.	2.15 AC	±	93,654 SF	±
WETLANDS	2.76 AC	±	120,226 SF	±
UTILITY EASEMENTS	0.76 AC	±	33,106 SF	±
NET SITE AREA TOTAL	37.62 AC	±	1,638,901 SF	±
NET SITE AREA SINGLE FAMILY	20.54 AC	±	894,705 SF	±
NET SITE AREA DUPLEX	18.10 AC	±	788,407 SF	±

PROPOSED DENSITY

		DENSITY (NET)
SINGLE-FAMILY	52 UNITS	2.53 DU / AC ±
DUPLEX UNITS	60 UNITS	3.32 DU / AC ±
TOTAL PROPOSED UNITS	112 UNITS	2.98 DU / AC ±
DENSITY (GROSS)	2.6 DU / AC ±	

PROPOSED COVERAGE CALCULATIONS

GROUND FLOOR AREA	237,998 SF	±
LOT COVERAGE (NET)	15 %	±
TOTAL FLOOR AREA	237,998 SF	±
FLOOR AREA RATIO (NET)	15%	±
IMPERVIOUS SURFACE	502,210 SF	±
IMPERVIOUS SURFACE RATIO	27 %	±

SINGLE-FAMILY

LOT SIZE (TYP.)	6,655 sf	(55' x 121')
GROUND FLOOR AREA	1,994 SF / UNIT ±	
INDIVIDUAL LOT COVERAGE	40 % (MAX) ±	
TOTAL FLOOR AREA	103,688 SF ±	
GROSS LOT AREA RATIO	11%	
NET LOT AREA RATIO	12%	
BUILDING HEIGHT (2 STORIES)	35 FT ±	
IMPERVIOUS SURFACE	222,250 SF ±	
IMPERVIOUS SURFACE RATIO	23 % ±	
SETBACKS		
FRONT	25'	
REAR	30' * Lot 11 to be 25'	
SIDE	5' MIN. / 15' TOTAL	
BLDG. TO BLDG.	10' MIN.	
TOTAL UNIT COUNT	52	

DUPLEX DATA

BEDROOMS	3 TO 4 BEDROOMS / UNIT	
GROUND FLOOR AREA	4,477 SF / BLDG ±	
LOT COVERAGE (NET)	17 % ±	
TOTAL FLOOR AREA	134,310 SF ±	
GROSS LOT AREA RATIO	15%	
NET LOT AREA RATIO	17%	
BUILDING HEIGHT (2 STORIES)	35 FT	
IMPERVIOUS SURFACE	279,960 SF ±	
IMPERVIOUS SURFACE RATIO	31 % ±	
SETBACKS		
FRONT	20'	
REAR	25'	
SIDE	20'	
SIDE TO SIDE (BLDG.)	20' MIN.	
REAR TO REAR (BLDG.)	40' MIN.	
SIDE TO REAR (BLDG.)	25' MIN.	
TOTAL UNIT COUNT	60 UNITS	30 BLDGS.

PROPOSED DEVIATIONS FROM R-1B ZONING

Single Family	Required	Provided	Deviations
Lot Area	10,000 SF	Average: 7900 SF Minimum: 6628 SF	Average: 2100 SF Maximum: 3372 SF
Lot Setbacks: Front	35 feet	25 feet	10 feet
Lot Setbacks: Back	35 feet	30 feet	5 feet

PROPOSED DEVIATIONS FROM REQUESTED 20' UTILITY SETBACK

Utility and Location	Provided	Deviations
Water main between SF units 25-26	15 feet (min.)*	5 feet
Storm sewer between SF units 31-32 and 41-42	10 feet (min.)	10 feet

* REVISED PER ENGINEERING REQUEST

ESTIMATED QUANTITIES

WATER	Quantity	Unit
8" D.I. CL. 54 Water Main	5,744	L.F.
Hydrant Assembly	12	EA.
8" Gate Valve in Well	18	EA.
16" Jack and Bore Casing Pipe	111	L.F.
Connection to Existing	4	EA.

SANITARY	Quantity	Unit
10" PVC Sanitary Main	4,383	L.F.
6" PVC Sanitary Lead	5,420	L.F.
Sanitary Manhole	25	EA.

STORM	Quantity	Unit
4" Sump Lead PVC	2,600	L.F.
6" Sump Collector	75	L.F.
12" C-76 RCP Storm Sewer	5,757	L.F.
15" C-76 RCP Storm Sewer	1,040	L.F.
18" C-76 RCP Storm Sewer	714	L.F.
24" C-76 RCP Storm Sewer	700	L.F.
30" C-76 RCP Storm Sewer	210	L.F.
36" C-76 RCP Storm Sewer	150	L.F.
48" C-76 RCP Storm Sewer	127	L.F.
12" Concrete Flared End Section	5	EA.
15" Concrete Flared End Section	1	EA.
24" Concrete Flared End Section	3	EA.
36" Concrete Flared End Section	1	EA.
48" Concrete Flared End Section	3	EA.
2' DIAMETER INLET	19	EA.
4' DIAMETER CB/MH	74	EA.
5' DIAMETERCB/MH	3	EA.
6' DIAMETER CB/MH	3	EA.
6" Underdrain	9,925	L.F.
Outlet Control Standpipe	2	EA.

PAVING	Quantity	Unit
Bituminous Surface Course (1.5")	15,600	S.Y.
Bituminous Base Course (3.5")	15,600	S.Y.
10" 21AA Aggregate Base	15,600	S.Y.
Concrete Curb & Gutter	9,925	L.F.
Concrete Sidewalk , 5' wide (4" conc.)	51,970	S.F.

R.O.W. ESTIMATED PAVING QUANTITIES

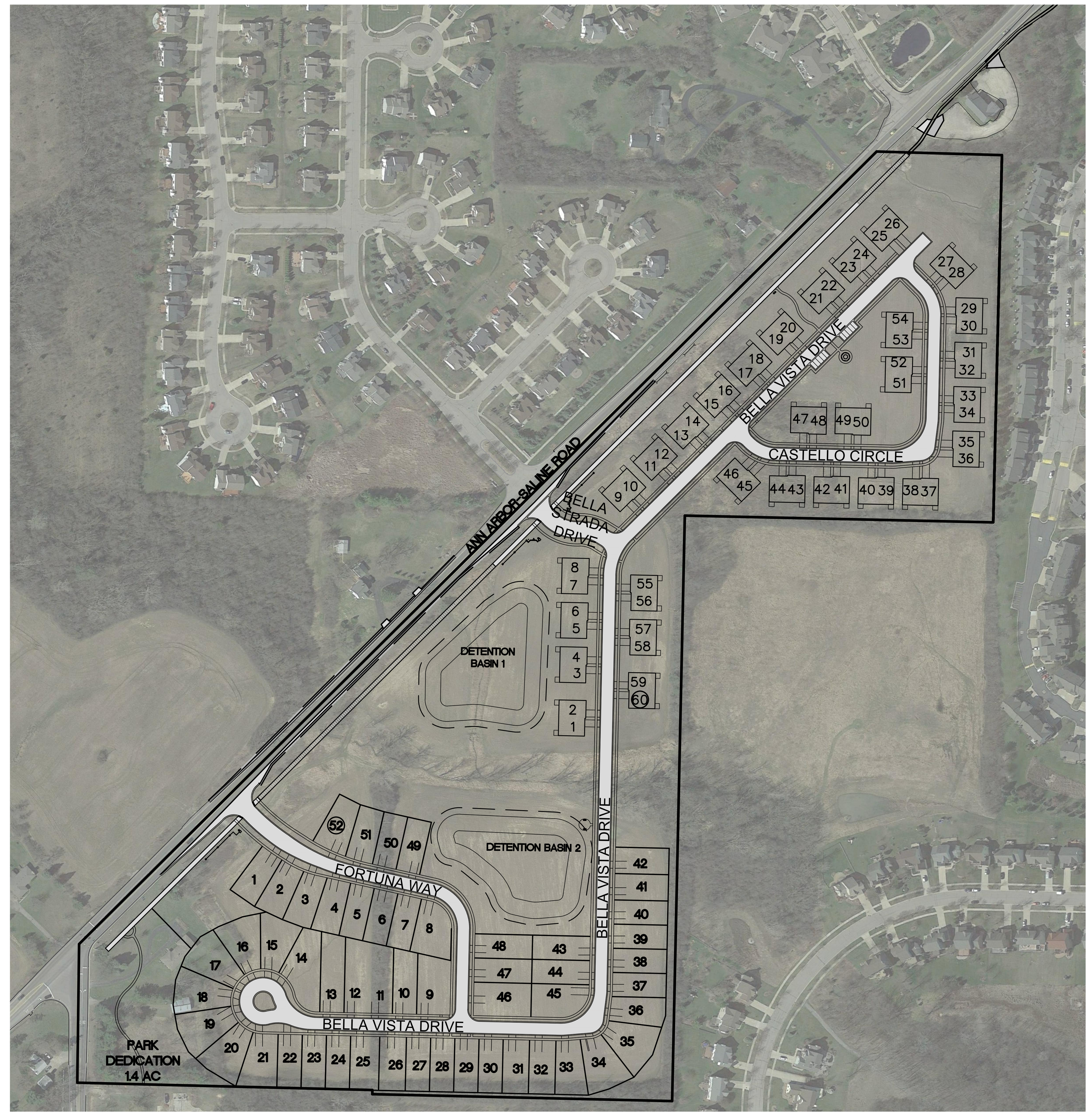
PAVING	Quantity	Unit
Bituminous Surface Course (1.5")	7,452	S.Y.
Bituminous Base Course (3.5")	1,665	S.Y.
10" 21AA Aggregate Base	1,665	S.Y.
Asphalt Sidewalk, 10' wide	1,750	S.Y.
6" 23A Limestone Aggregate Should (4' wide)	1,035	S.Y.
Curb and Gutter	370	L.F.
Pavement Markings	6,580	L.F.
Sawcut Pavement	2,450	L.F.
Pavement Removal	272	S.Y.
Concrete Sidewalk , 5' wide (4" conc.)	2,430	S.F.

PERMITS/APPROVALS

Permits and Approvals		
Agency	Status/Date Approved	Application/Permit Number
Pittsfield Township FSP	Under Review	CSPA 16-12
Pittsfield Township SESC	Under Review	
Washtenaw County Road Commission	Under Review	13083
Washtenaw County Water Resource Commission	2/4/2019	515
MDEQ Wetlands	Draft Issued	WRP015076 v.1
MDEQ Water Supply	Under Review	
MDEQ Waste water Collection	Under Review	
NPDES Construction Stormwater Discharge	Pending SESC	

Pittsfield Charter Township
Planning Department
Final Site Plan
APPROVED 6-24-19 (DATE)
Ben n Cn
TOWNSHIP PLANNER

Motion to approve at Planning Commission on May 2, 2019 with the following conditions:
1) To address ECT Wetland Comments
2) Property line adjustment and dedication to park property



OVERALL DEVELOPMENT MAP
1" = 200 FEET

DEVELOPMENT NARRATIVE

PULTE HOMES IS PROPOSING TO DEVELOP A HIGH QUALITY MIXED DENSITY RESIDENTIAL DEVELOPMENT ON THE ZAHN PARCEL, WHICH IS APPROXIMATELY 43 ACRES OF PROPERTY LOCATED ON ANN ARBOR SALINE ROAD JUST NORTH OF MAPLE ROAD. THE SITE IS CURRENTLY ZONED R-2 RESIDENTIAL AND AGRICULTURE AND IS MASTER PLANNED SUBURBAN RESIDENTIAL WITH A PROPOSED DENSITY OF UP TO 2.6 DU/AC. PER THE MASTER PLAN, UP TO 131 UNITS ARE RECOMMENDED FOR THE PARCEL. THE DEVELOPMENT PROCESS WILL UTILIZE PITTSFIELD TOWNSHIP'S PLANNED UNIT DEVELOPMENT PROCESS TO FACILITATE THE UNIQUE PRODUCT MIX PROPOSED FOR THE SITE.

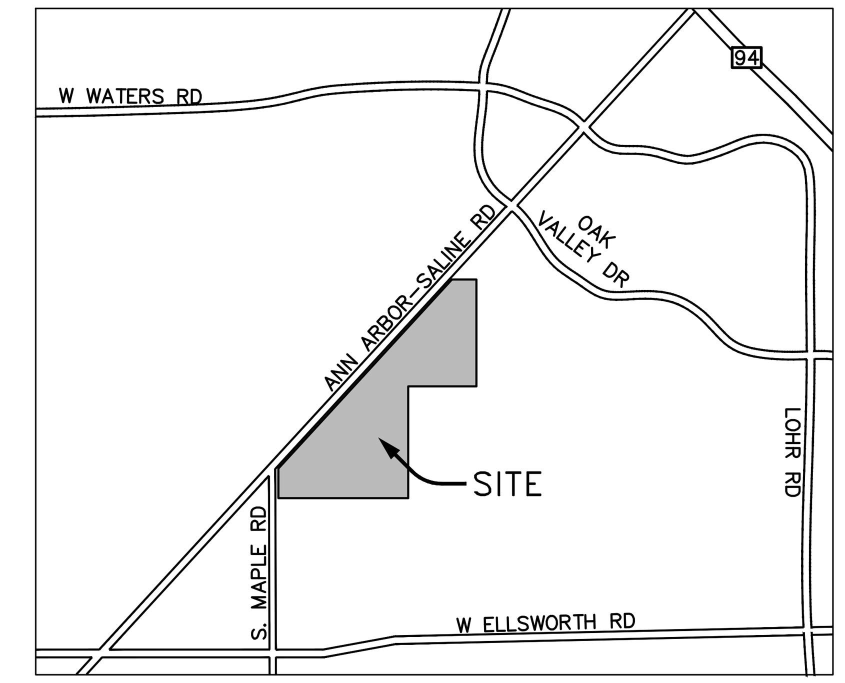
THE DEVELOPMENT WILL CONSIST OF A VARIETY OF FOR SALE RESIDENTIAL PRODUCT AS FOLLOWS:

- 52 SINGLE FAMILY LOTS THAT WILL CONTAIN HOUSES RANGING FROM 2,373 TO 2,875 SF IN SIZE
- 30 DUPLEX BUILDINGS (60 TOTAL UNITS RANGING FROM 1,682 TO 1,702 SF) THAT ARE HIGH QUALITY LUXURY DUPLEX HOMES WITH BOTH UNITS HAVING FRONT ENTRY GARAGES. THE HOMES WILL APPEAL TO EMPTY NESTERS. ALL UNITS WILL BE RANCHES OR CAPES, AND WILL OFFER MASTER BEDROOMS ON THE 1ST FLOOR. THESE UNITS CONTAIN QUALITY REAR ELEVATIONS AS WELL TO ADDRESS CONCERNS OF RELATIONSHIPS OF THE UNITS TO ADJACENT DEVELOPMENTS.
- SAMPLE REPRESENTATIVE ELEVATIONS OF ALL OF THE TYPES OF RESIDENCES ARE BEING PROVIDED FOR REVIEW ALONG WITH THIS PLAN SET AND WILL REFLECT THE USE OF QUALITY MATERIALS FOR THE FACADES.

THE EXISTING PARCEL CONTAINS A VARIETY OF NATURAL FEATURES THAT HAVE BEEN STRATEGICALLY INCORPORATED INTO THE LAYOUT TO ASSIST WITH THE TRANSITION BETWEEN UNIT TYPES. AN EXISTING NATURAL WATERCOURSE FLOWS THROUGH THE PARCEL AND THE SITE WAS DESIGNED TO MINIMIZE IMPACTS TO THIS WATERCOURSE AND ITS ASSOCIATED WETLANDS.

THREE PRIMARY OPEN SPACE / PARK AREAS ARE PROPOSED FOR THE DEVELOPMENT ALONG WITH THE INCLUSION OF THE 10' NON-MOTORIZED PATHWAY THAT IS PROPOSED TO BE PROVIDED ALONG THE ENTIRE EASTERN FRONTAGE OF THE ANN ARBOR SALINE ROAD RIGHT OF WAY. AN EXTENSIVE GREENBELT IS PROPOSED ALONG ANN ARBOR SALINE ROAD ADJACENT TO THE NON-MOTORIZED PATH THAT WILL BE ACCENTED WITH AN ABUNDANCE OF PROPOSED LANDSCAPING. THE TOWNSHIP HAS PROPERTY LOCATED DIRECTLY SOUTH OF THE PROPOSED DEVELOPMENT. APPROXIMATELY 1.4 ACRES OF OPEN SPACE IS PROVIDED IN THE SOUTHWEST CORNER OF THE PROPOSED DEVELOPMENT THAT WILL CONTAIN A RESIDENTIAL GATEWAY / PROPOSED CONNECTION TO THE NON-MOTORIZED PATH PROVIDING CONNECTIVITY TO THE TOWNSHIP PROPERTY. THE PROPERTY WILL BE DONATED TO THE TOWNSHIP AS PART OF THIS P.U.D.

THE DEVELOPMENT WILL CONTAIN PRIVATE ROADS DESIGNED TO THE TOWNSHIP'S RECENT ADOPTED 55' PRIVATE ROAD CROSS SECTION. THE SITE IS PROPOSED TO BE SERVICED WITH PUBLIC SEWER AND WATER, BOTH LOCATED ADJACENT AND ON THE PROPOSED DEVELOPMENT. STORMWATER MANAGEMENT IS PROPOSED TO BE ADDRESSED THROUGH THE CONSTRUCTION OF 2 DETENTION BASINS MEETING COUNTY DESIGN REQUIREMENTS AND ARE STRATEGICALLY LOCATED ADJACENT TO THE EXISTING WATERWAY.



VICINITY MAP
NOT TO SCALE

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*PAGE 6 OMITTED

WP 19-02
Bella Vista

Rec'd 2019-03-27

BELLA VISTA
R.Z. #16-06
C.S.P.A #16-12

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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

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.

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ATWELL
866.850.4200 www.atwell-group.com
311 NORTH MAIN STREET
ANN ARBOR, MI 48104
734.994.4000

SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN
BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
COVER SHEET

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 100 200
1" = 200 FEET

DR. CR	CH. SS
P.M. MB	
BOOK	N/A
JOB	15001948
SHEET NO.	01

K:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948FSP-01-CV.DWG 3/26/2019 2:36 PM BRETT RADABAUGH

SOIL TYPE AND BUILDABILITY

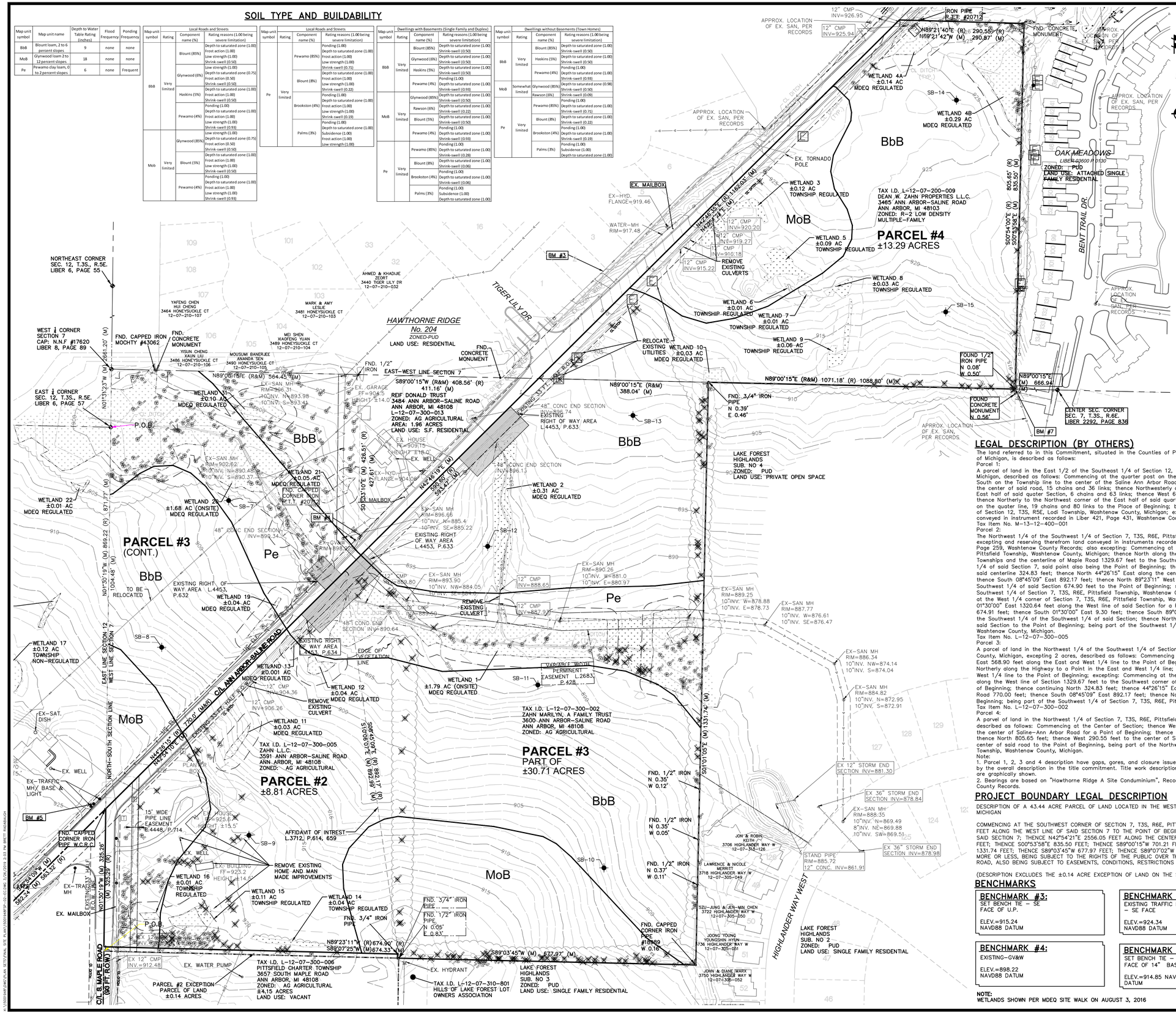
Map unit symbol	Map unit name	Depth to Water Table Rating (inches)	Flood Frequency	Ponding Frequency
BbB	Blount loam, 2 to 6 percent slopes	9	none	none
MoB	Glynwood loam 2 to 12 percent slopes	18	none	none
Pe	Pewamo clay loam, 0 to 2 percent slopes	6	none	Frequent

Map unit symbol	Rating	Local Roads and Streets: Component name (%)	Rating reasons (1.00 being severe limitation)
BbB	Very limited	Blount (85%)	Depth to saturated zone (1.00) Frost action (1.00) Low strength (1.00) Shrink-swell (0.50)
		Glynwood (6%)	Depth to saturated zone (0.75) Frost action (0.50) Shrink-swell (0.50)
		Haskins (5%)	Depth to saturated zone (1.00) Frost action (1.00) Shrink-swell (0.50)
		Pewamo (4%)	Ponding (1.00) Depth to saturated zone (1.00) Frost action (1.00) Low strength (1.00) Shrink-swell (0.93)
MoB	Very limited	Glynwood (85%)	Low strength (1.00) Depth to saturated zone (0.75) Frost action (0.50) Shrink-swell (0.50)
		Blount (5%)	Depth to saturated zone (1.00) Frost action (1.00) Low strength (1.00) Shrink-swell (0.50)
		Pewamo (4%)	Ponding (1.00) Depth to saturated zone (1.00) Frost action (1.00) Low strength (1.00) Shrink-swell (0.93)

Map unit symbol	Rating	Local Roads and Streets: Component name (%)	Rating reasons (1.00 being severe limitation)
Pe	Very limited	Pewamo (85%)	Ponding (1.00) Depth to saturated zone (1.00) Frost action (1.00) Low strength (1.00) Shrink-swell (0.71)
		Blount (8%)	Depth to saturated zone (1.00) Frost action (1.00) Low strength (1.00) Shrink-swell (0.22)
		Brookston (4%)	Ponding (1.00) Depth to saturated zone (1.00) Frost action (1.00) Low strength (1.00) Shrink-swell (0.19)
		Palms (3%)	Ponding (1.00) Subsidence (1.00) Frost action (1.00) Low strength (1.00)

Map unit symbol	Rating	Dwellings with Basements (Single Family and Duplex): Component name (%)	Rating reasons (1.00 being severe limitation)
BbB	Very limited	Blount (85%)	Depth to saturated zone (1.00) Shrink-swell (0.50)
		Glynwood (6%)	Depth to saturated zone (1.00) Shrink-swell (0.50)
		Haskins (5%)	Depth to saturated zone (1.00) Shrink-swell (0.50)
		Pewamo (4%)	Ponding (1.00) Depth to saturated zone (1.00) Shrink-swell (0.93)
MoB	Very limited	Glynwood (85%)	Depth to saturated zone (1.00) Shrink-swell (0.50)
		Rawson (6%)	Depth to saturated zone (1.00) Shrink-swell (0.22)
		Blount (5%)	Depth to saturated zone (1.00) Shrink-swell (0.50)
		Pewamo (4%)	Depth to saturated zone (1.00) Shrink-swell (0.93)
Pe	Very limited	Pewamo (85%)	Ponding (1.00) Depth to saturated zone (1.00) Shrink-swell (0.28)
		Blount (8%)	Depth to saturated zone (1.00) Shrink-swell (0.06)
		Brookston (4%)	Ponding (1.00) Depth to saturated zone (1.00) Shrink-swell (0.06)
		Palms (3%)	Ponding (1.00) Subsidence (1.00) Depth to saturated zone (1.00)

Map unit symbol	Rating	Dwellings without Basements (Town Homes): Component name (%)	Rating reasons (1.00 being severe limitation)
BbB	Very limited	Blount (85%)	Depth to saturated zone (1.00) Shrink-swell (0.50)
		Haskins (5%)	Depth to saturated zone (1.00) Shrink-swell (0.50)
		Pewamo (4%)	Ponding (1.00) Depth to saturated zone (1.00) Shrink-swell (0.93)
MoB	Somewhat limited	Glynwood (85%)	Depth to saturated zone (0.98) Shrink-swell (0.50)
		Rawson (6%)	Shrink-swell (0.09)
Pe	Very limited	Pewamo (85%)	Ponding (1.00) Depth to saturated zone (1.00) Shrink-swell (0.71)
		Blount (8%)	Depth to saturated zone (1.00) Shrink-swell (0.22)
		Brookston (4%)	Ponding (1.00) Depth to saturated zone (1.00) Shrink-swell (0.19)
		Palms (3%)	Ponding (1.00) Subsidence (1.00) Depth to saturated zone (1.00)



LEGEND

- EXISTING WETLAND BUFFER
- EXISTING CURB AND GUTTER
- BOUNDARY LINE
- EXISTING TREE LINE
- EXISTING EASEMENT
- SECTION LINE
- ADJACENT BOUNDARY
- 890 — EXISTING CONTOUR
- EXISTING STORM
- EXISTING WATER MAIN
- EXISTING SANITARY
- EXISTING GAS
- EXISTING UNDERGROUND ELECTRIC
- OHE — EXISTING OVERHEAD ELECTRIC
- EXISTING SIGN
- U.P. — EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- CATV — EXISTING CABLE MARKER/RISER
- T — EXISTING TELEPHONE RISER
- E — EXISTING ELECTRICAL RISER
- SECTION CORNER
- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN/INLET
- EXISTING WATER MANHOLE
- EXISTING WETLAND
- MoB — EXISTING SOIL TYPE BOUNDARY
- EXISTING SOIL TYPE
- EXISTING TREE
- EXISTING TREE TO BE REMOVED

LEGAL DESCRIPTION (BY OTHERS)

The land referred to in this Commitment, situated in the Counties of Pittsfield and Lodi, Township of Washtenaw, State of Michigan, is described as follows:

Parcel 1:

A parcel of land in the East 1/2 of the Southeast 1/4 of Section 12, T3S, R5E, Lodi Township, Washtenaw County, Michigan, described as follows: Commencing at the quarter post on the East side of said Section; thence running South on the Township line to the center of the Saline Ann Arbor Road, 13 chains and 17 links; thence Southwest along the center of said road, 15 chains and 36 links; thence Northwesterly on a line intersecting the Northwest corner of the East half of said quarter Section, 6 chains and 63 links; thence West 6 chains and 18 links to a stake in a picket fence; thence Northerly to the Northwest corner of the East half of said quarter Section; 18 chains and 21 links; thence East on the quater line, 19 chains and 80 links to the Place of Beginning; being a part of the East 1/2 of the Southeast 1/4 of Section 12, T3S, R5E, Lodi Township, Washtenaw County, Michigan; excepting and reserving therefrom land conveyed in instrument recorded in Liber 421, Page 431, Washtenaw County Records.

Tax Item No. M-13-12-400-001

Parcel 2:

The Northwest 1/4 of the Southwest 1/4 of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; excepting and reserving therefrom land conveyed in instruments recorded in Liber 362, Page 144, and in Liber 351, Page 259, Washtenaw County Records; also excepting: Commencing at the Southwest corner of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence North along the range line between Pittsfield and Lodi Townships and the centerline of Maple Road 1329.67 feet to the Southwest corner of the North 1/2 of the Southwest 1/4 of said Section 7, said point also being the Point of Beginning; thence continuing North along said range line and said centerline 324.83 feet; thence North 44°26'15" East along the centerline of Saline-Ann Arbor Road 770.00 feet; thence South 08°45'09" East 892.17 feet; thence North 89°23'11" West along the South line of the North 1/2 of the Southwest 1/4 of said Section 674.90 feet to the Point of Beginning; said parcel being part of the North 1/2 of the Southwest 1/4 of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; but excepting: Commnecing at the West 1/4 corner of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence South 01°30'00" East 1320.64 feet along the West line of said Section for a Place of Beginning; thence North 89°09'20" East 674.91 feet; thence South 01°30'00" East 9.30 feet; thence South 89°06'10" West 674.90 feet along the North line of the Southwest 1/4 of the Southwest 1/4 of said Section; thence North 01°30'00" West 9.93 feet along the West line of said Section to the Point of Beginning; being part of the Southwest 1/4 of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan.

Tax Item No. L-12-07-300-005

Parcel 3:

A parcel of land in the Northwest 1/4 of the Southwest 1/4 of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, excepting 2 acres, described as follows: Commencing at the West 1/4 post of said Section; thence East 568.90 feet along the East and West 1/4 line to the Point of Beginning; thence South 426.51 feet; thence Northerly along the Highway to a Point in the East and West 1/4 line; thence West 408.56 feet along the East and West 1/4 line to the Point of Beginning; excepting: Commencing at the Southwest Corner of said Section; thence North along the West line of Section 1329.67 feet to the Southwest corner of the North 1/2 of the Southwest 1/4 for a Point of Beginning; thence continuing North 324.83 feet; thence 44°26'15" East along the centerline of Saline-Ann Arbor Road 770.00 feet; thence South 08°45'09" East 892.17 feet; thence North 89°23'11" West 674.90 feet to the Point of Beginning; being part of the Southwest 1/4 of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan.

Tax Item No. L-12-07-300-002

Parcel 4:

A parcel of land in the Northwest 1/4 of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, described as follows: Commencing at the Center of Section; thence West 26.56 chains along the East-West 1/4 lines to the center of Saline-Ann Arbor Road for a Point of Beginning; thence East 16.23 chains along the East-West 1/4 line; thence North 805.65 feet; thence West 290.55 feet to the center of Saline-Ann Arbor Road; thence Southerly along center of said road to the Point of Beginning, being part of the Northwest 1/4 of Section 7, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan.

Note:

1. Parcel 1, 2, 3 and 4 description have gaps, gores, and closure issues which do not appear to have been addressed by the overall description in the title commitment. Title work description was not used for this survey and parcel 1 & 2 are graphically shown.
2. Bearings are based on "Hawthorne Ridge A Site Conduminium", Recored in Liber 3071, Page 781-839 of Washtenaw County Records.

PROJECT BOUNDARY LEGAL DESCRIPTION

DESCRIPTION OF A 43.44 ACRE PARCEL OF LAND LOCATED IN THE WEST 1/2 OF SECTION 7, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN

COMMENCING AT THE SOUTHWEST CORNER OF SECTION 7, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN; THENCE N01°30'19"W 1329.67 FEET ALONG THE WEST LINE OF SAID SECTION 7 TO THE POINT OF BEGINNING; THENCE CONTINUING N01°30'19"W 325.29 FEET ALONG THE WEST LINE OF SAID SECTION 7; THENCE N42°54'21"E 2556.05 FEET ALONG THE CENTERLINE OF ANN ARBOR-SALINE ROAD (VARIABLE WIDTH); THENCE N89°21'42"E 284.88 FEET; THENCE S00°53'58"E 835.50 FEET; THENCE S89°00'15"W 701.21 FEET ALONG THE EAST-WEST 1/4 LINE OF SAID SECTION 7; THENCE S01°01'05"E 1331.74 FEET; THENCE S89°03'45"W 677.97 FEET; THENCE S89°07'02"W 674.33 FEET TO THE POINT OF BEGINNING, CONTAINING 43.44 ACRES OF LAND, MORE OR LESS, BEING SUBJECT TO THE RIGHTS OF THE PUBLIC OVER THE NORTHWESTERLY PORTION THEREOF, AS OCCUPIED BY SAID ANN ARBOR-SALINE ROAD, ALSO BEING SUBJECT TO EASEMENTS, CONDITIONS, RESTRICTIONS AND EXCEPTIONS OF RECORD, IF ANY.

(DESCRIPTION EXCLUDES THE ±0.14 ACRE EXCEPTION OF LAND ON THE SOUTH END OF PARCEL #2)

BENCHMARKS

BENCHMARK #3:
SET BENCH TIE – SE FACE OF U.P.
ELEV.=915.24
NAVD88 DATUM

BENCHMARK #5:
EXISTING TRAFFIC POLE BASE – SE FACE
ELEV.=924.34
NAVD88 DATUM

BENCHMARK #4:
EXISTING-GV&W
ELEV.=898.22
NAVD88 DATUM

BENCHMARK #7:
SET BENCH TIE – NW FACE OF 14" BASSWOOD
ELEV.=914.85 NAVD88 DATUM

NOTE:
WETLANDS SHOWN PER MDEQ SITE WALK ON AUGUST 3, 2016

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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

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.

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ANN ARBOR, MI 48104
734.994.4000

SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
EXISTING CONDITIONS

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 50 100
1" = 100 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 02	

LOG OF SOIL BORING NO. 7

McDOWELL & ASSOCIATES
Geotechnical, Environmental, & Hydrogeologic Services
21355 Hatcher Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 899.0 DATE 2-19-16

Legend depth	Soil Description
0'–1'0"	Moist dark brown clayey TOPSOIL
1'0"–2'9"	Stiff moist brown silty CLAY with traces of sand and pebbles
2'9"–3'3"	Compact moist brown fine SAND with trace of gravel and occasional stones
3'3"–6'0"	Extremely stiff moist brown silty CLAY with sand and pebbles
6'0"–7'0"	Extremely stiff moist variegated silty CLAY with sand and pebbles
7'0"–12'0"	Extremely stiff moist brown silty CLAY with sand and pebbles
12'0"–20'6"	Stiff to very stiff moist blue silty CLAY with sand and pebbles

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	3, 4, 4	14.1		*	(3500)	
B UL	5	5, 10, 10	17.1	126	*	(9000+)	
C UL	7–8	6, 14, 15					
D UL	10	6, 10, 15					
E UL	15	4, 6, 7					
F UL	20	4, 7, 9					

Note: Used automatic hammer.

REMARKS: *Calibrated Penetrometer

TYPE OF SAMPLE: D. - DISTURBED; U.L. - UNDIST. LINER; S.T. - SHELBY TUBE; S.S. - SPLIT SPOON; R.C. - ROCK CORE; ( ) - PENETROMETER

Standard Penetration Test - Driving 2" OD Sampler 1' With 140# Hammer Falling 30": Count Made at 6" Intervals

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT FT. INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION FT. INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES None

LOG OF SOIL BORING NO. 8

McDOWELL & ASSOCIATES
Geotechnical, Environmental, & Hydrogeologic Services
21355 Hatcher Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 912.6 DATE 2-19-16

Legend depth	Soil Description
0'–0'7"	Moist dark brown clayey TOPSOIL
0'7"–2'0"	Moist brown silty CLAY with traces of sand and pebbles
2'0"–3'6"	Stiff to very stiff moist variegated silty CLAY with traces of sand and pebbles
3'6"–7'6"	Extremely stiff moist variegated silty CLAY with sand and pebbles and occasional stones
7'6"–8'6"	Extremely stiff moist brown silty CLAY with sand and pebbles and occasional stones
8'6"–12'0"	Extremely stiff moist brown silty CLAY with sand and pebbles and rouge streaks
12'0"–20'6"	Very stiff moist blue silty CLAY with sand and pebbles

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	4, 6, 8	14.2	128	*	(6000)	
B UL	5	7, 11, 14	13.3		*	(9000+)	
C UL	7–8	9, 13, 14					
D UL	10	5, 8, 14					
E UL	15	4, 7, 8					
F UL	20	4, 6, 7					

Note: Used automatic hammer.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT FT. INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION FT. INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES None

LOG OF SOIL BORING NO. 9

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 919.2 DATE 2-18-16

Legend depth	Soil Description
0'–0'8"	Moist dark brown clayey TOPSOIL
0'8"–4'3"	Very stiff to extremely stiff moist variegated silty CLAY with traces of vegetation, sand and pebbles
4'3"–7'0"	Extremely stiff moist variegated silty CLAY with traces of sand and pebbles
7'0"–12'6"	Extremely stiff moist brown silty CLAY with sand and pebbles
12'6"–17'4"	Very stiff moist blue silty CLAY with sand and pebbles
17'4"–17'6"	Wet fine SAND
17'6"–20'6"	Extremely stiff moist blue silty CLAY with sand and pebbles

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	5, 11, 13	12.5	137	*	(9000+)	
B UL	5	10, 11, 15	13.8	130	*	(9000+)	
C UL	7–8	9, 11, 18					
D UL	10	11, 13, 17					
E UL	15	5, 8, 9					
F UL	20	5, 8, 12					

Note: Used automatic hammer.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 17 FT. 4 INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION 17 FT. 4 INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES Medium

LOG OF SOIL BORING NO. 10

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 902.2 DATE 2-18-16

Legend depth	Soil Description
0'–0'5"	Frozen dark brown clayey TOPSOIL, fill
0'5"–1'8"	Moist brown silty CLAY with topsoil streaks fill
1'8"–2'4"	Stiff moist brown silty CLAY with traces of vegetation, sand and pebbles
2'4"–4'8"	Very stiff moist brown silty CLAY with sand and pebbles and occasional silt seams
4'8"–6'6"	Extremely stiff moist variegated silty CLAY with traces of sand and pebbles
6'6"–14'6"	Extremely stiff moist brown silty CLAY with sand and pebbles
14'6"–18'0"	Extremely stiff moist blue silty CLAY with sand and pebbles
18'0"–20'6"	Very stiff moist blue silty CLAY with sand and pebbles

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	3, 5, 8	16.6	127	*	(5500)	
B UL	5	8, 10, 12	13.5	135	*	(9000+)	
C UL	7–8	7, 12, 19					
D UL	10	7, 10, 14					
E UL	15	8, 10, 12					
F UL	20	4, 5, 8					

Note: Used automatic hammer.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT FT. INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION FT. INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES None

LOG OF SOIL BORING NO. 11

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 892.4 DATE 2-18-16

Legend depth	Soil Description
0'–0'3"	Moist dark brown clayey TOPSOIL with vegetation, fill
0'3"–1'10"	Moist brown silty CLAY with dark brown topsoil streaks, fill
1'10"–2'5"	Firm to stiff moist brown silty CLAY with traces of vegetation and sand and pebbles
2'5"–5'2"	Very stiff moist variegated silty CLAY with sand and pebbles
5'2"–8'6"	Extremely stiff moist brown silty CLAY with sand and pebbles
8'6"–13'6"	Extremely stiff moist brown silty CLAY with sand and pebbles and occasional fine sand seams
13'6"–20'6"	Very stiff to extremely stiff moist blue silty CLAY with sand and pebbles and occasional moist to wet fine sand seams

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	2, 7, 9	20.5	119	*	(7000)	
B UL	5	4, 7, 11	13.5		*	(8000)	
C UL	7–8	8, 10, 16					
D UL	10	6, 12, 15					
E UL	15	4, 8, 11					
F UL	20	5, 6, 10					

Note: Used automatic hammer.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 19 FT. 3 INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION Dry FT. INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES Light

LOG OF SOIL BORING NO. 12

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 892.8 DATE 2-18-16

Legend depth	Soil Description
0'–0'4"	Moist dark brown clayey TOPSOIL with trace of vegetation, fill
0'4"–1'2"	Moist brown silty CLAY with traces of vegetation, sand and pebbles and dark brown topsoil streaks, fill
1'2"–2'7"	Firm moist dark brown to black clayey TOPSOIL with some organics
2'7"–4'6"	Stiff moist variegated silty CLAY with traces of sand and pebbles
4'6"–8'8"	Extremely stiff moist variegated silty CLAY with sand and pebbles
8'8"–9'6"	Very stiff moist blue silty CLAY with sand and pebbles
9'6"–13'6"	Very compact wet gray silty SAND & GRAVEL with occasional stones
13'6"–20'6"	Very stiff moist blue silty CLAY with sand and pebbles and occasional stones

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	3, 3, 4	30.2	98			
B UL	5	7, 11, 13	15.3	133	*	(9000+)	
C UL	7–8	8, 12, 18					
D UL	10	6, 12, 7	9.0	121			
E UL	15	5, 7, 9					
F UL	20	5, 7, 12					

Notes:

1. Used automatic hammer.
2. Installed 1½" diameter PVC piezometer in boring with screen bottom at 15'0" ant 3'0" stick-up.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 9 FT. 6 INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION 3 FT. 0 INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES Heavy

LOG OF SOIL BORING NO. 13

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 902.9 DATE 2-18-16

Legend depth	Soil Description
0'–0'7"	Moist dark brown clayey TOPSOIL
0'7"–3'8"	Stiff moist brown silty CLAY with sand and pebbles and trace of vegetation and fine sand seams
3'8"–4'2"	Compact wet brown silty fine SAND with trace of gravel
4'2"–6'4"	Very stiff moist variegated silty CLAY with sand and pebbles
6'4"–11'6"	Extremely stiff moist brown silty CLAY with sand and pebbles
11'6"–16'6"	Extremely stiff moist blue silty CLAY with sand and pebbles
16'6"–20'6"	Very stiff moist blue silty CLAY with sand and pebbles

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	3, 4, 5	17.7	124	*	(3500)	
B UL	5	3, 6, 12	18.2	128	*	(7500)	
C UL	7–8	6, 11, 18					
D UL	10	6, 10, 15					
E UL	15	11, 12, 13					
F UL	20	5, 5, 9					

Notes:

1. Used automatic hammer.
2. Installed 1½" diameter PVC piezometer in boring with screen bottom at 4'6" ant 3'0" stick-up.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 3 FT. 10 INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION Dry FT. INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES Medium

LOG OF SOIL BORING NO. 14

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 926.8 DATE 2-18-16

Legend depth	Soil Description
0'–0'6"	Moist dark brown clayey TOPSOIL
0'6"–2'4"	Stiff moist brown silty CLAY with traces of sand and pebbles
2'4"–3'6"	Very stiff moist brown silty CLAY with traces of sand and pebbles and occasional silty fine sand lenses
3'6"–6'0"	Extremely stiff moist variegated silty CLAY with traces of sand and pebbles
6'0"–13'0"	Extremely stiff moist brown silty CLAY with sand and pebbles
13'0"–20'6"	Very stiff moist blue silty CLAY with sand and pebbles

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	4, 6, 8	20.3	122	*	(6000)	
B UL	5	8, 10, 13	13.3	132	*	(9000+)	
C UL	7–8	8, 10, 15					
D UL	10	8, 10, 14					
E UL	15	4, 7, 9					
F UL	20	4, 7, 9					

Note: Used automatic hammer.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT FT. INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION FT. INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES None

LOG OF SOIL BORING NO. 15

PROJECT: Soils Investigation
JOB NO. 16-035
LOCATION: Ann Arbor-Saline Road Parcel, Ann Arbor-Saline and Maple Roads, Pittsfield and Lodi Townships, Michigan
SURFACE ELEV. 915.0 DATE 2-18-16

Legend depth	Soil Description
0'–0'8"	Moist dark brown clayey TOPSOIL
0'8"–3'3"	Stiff to very stiff moist brown silty CLAY with little sand and pebbles
3'3"–9'2"	Extremely stiff moist brown silty CLAY with sand and pebbles and occasional silt seams
9'2"–13'0"	Extremely stiff moist blue silty CLAY with sand and pebbles
13'0"–17'9"	Stiff moist blue silty CLAY with traces of sand and pebbles
17'9"–20'6"	Very stiff moist blue silty CLAY with sand and pebbles and occasional wet fine sand lenses

Sample & Type	Depth	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
A UL	2–3	4, 6, 8	18.6	125	*	(6000)	
B UL	5	8, 12, 16	13.5		*	(9000+)	
C UL	7–8	10, 17, 22					
D UL	10	6, 13, 13					
E UL	15	3, 5, 6					
F UL	20	4, 6, 8					

Note: Used automatic hammer.

REMARKS: *Calibrated Penetrometer

GROUND WATER OBSERVATIONS: G.W. ENCOUNTERED AT 18 FT. 6 INS.; G.W. ENCOUNTERED AT FT. INS.; G.W. AFTER COMPLETION 18 FT. 6 INS.; G.W. AFTER HRS. FT. INS.; G.W. VOLUMES Light

---

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

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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.

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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT: PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

SOIL BORING LOGS

DATE: OCTOBER 17, 2018

REVISIONS
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

SCALE: NO SCALE
DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO. 03

K:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948FSP-02-EC.DWG 3/26/2019 2:03 PM BRETT RADABAUGH

WETLAND IMPACTS AND MITIGATION REQUIREMENTS

Wetland Area	Wetland Area (acre)	Wetland Buffer Area (acre)	Township Regulated	MDEQ Regulated	Impact Area (acre)	Estimated Cut Impact Volume (cubic yards)	Estimated Fill Impact Volume (cubic yards)	Estimated Total Impact Volume (cubic yards)	Impacts to Wetland Buffer Area (acre)
1	1.79	1.3	Yes	Yes	0.33	0	2845	2845	0.15
2	0.81	0.48	Yes	Yes	0.31	1014	122	1136	0.48
3	0.12	0.35	Yes	No	0.12	178	15	193	0.35
4A	0.14	0.19	Yes	Yes	0.03	0	4.37	4.37	0.02
4B	0.29	0.24	Yes	Yes	0	0	0	0	0.00
5	0.09	0.23	Yes	No	0.09	102	5	107	0.23
6	0.01	0.08	Yes	No	0.01	5	0	5	0.08
7	0.01	0.08	Yes	No	0.01	5	0	5	0.08
8	0.03	0.08	Yes	No	0.03	6	20	26	0.08
9	0.06	0.23	Yes	No	0.06	0	383	383	0.23
10	0.03	0.13	Yes	Yes	0.03	0.7	76	76.7	0.13
11	0.03	0.17	Yes	Yes	0	0	0	0	0.00
12	0.04	0.14	Yes	Yes	0.003	0	2.74	2.74	0.05
13	0.001	0.07	Yes	Yes	0.001	0	2.44	2.44	0.07
14	0.04	0.22	Yes	No	0.04	113	1	114	0.22
15	0.11	0.19	Yes	No	0.03	73	0	73	0.09
16	0.01	0.09	Yes	No	0	0	0	0	0.02
19	0.04	0.20	Yes	Yes	0.004	0	3.57	3.57	0.05
20	1.68	0.88	Yes	Yes	0.001	0	0.31	0.31	0.04
21	0.05	0.17	Yes	Yes	0	0	0	0	0.00
31	0.10	0.19	Yes	Yes	0	0	0	0	0.00
Total (MDEQ)	**4.50**	**4.16**	-	-	**0.709**	**1014.7**	**3056.43**	**4071.13**	**0.99**
Total (Township)	**4.98**	**5.71**	-	-	**1.099**	**1496.7**	**3480.43**	**4977.13**	**2.37**
MITIGATION RATIO					**1.5**	-	-	-	-
TOWNSHIP MITIGATION REQUIRED (1.5*TOTAL TOWNSHIP IMPACTS) (Acres)					**1.65**	-	-	-	-
MDEQ MITIGATION REQUIRED (1.5*TOTAL MDEQ IMPACTS) (Acres)					**1.06**	-	-	-	-
TOTAL MITIGATION REQUIRED (1.5*TOTAL IMPACTS) (Acres)					**1.65**	-	-	-	-
ON-SITE MITIGATION (Acres)					**1.75**	-	-	-	-

SOILS LEGEND

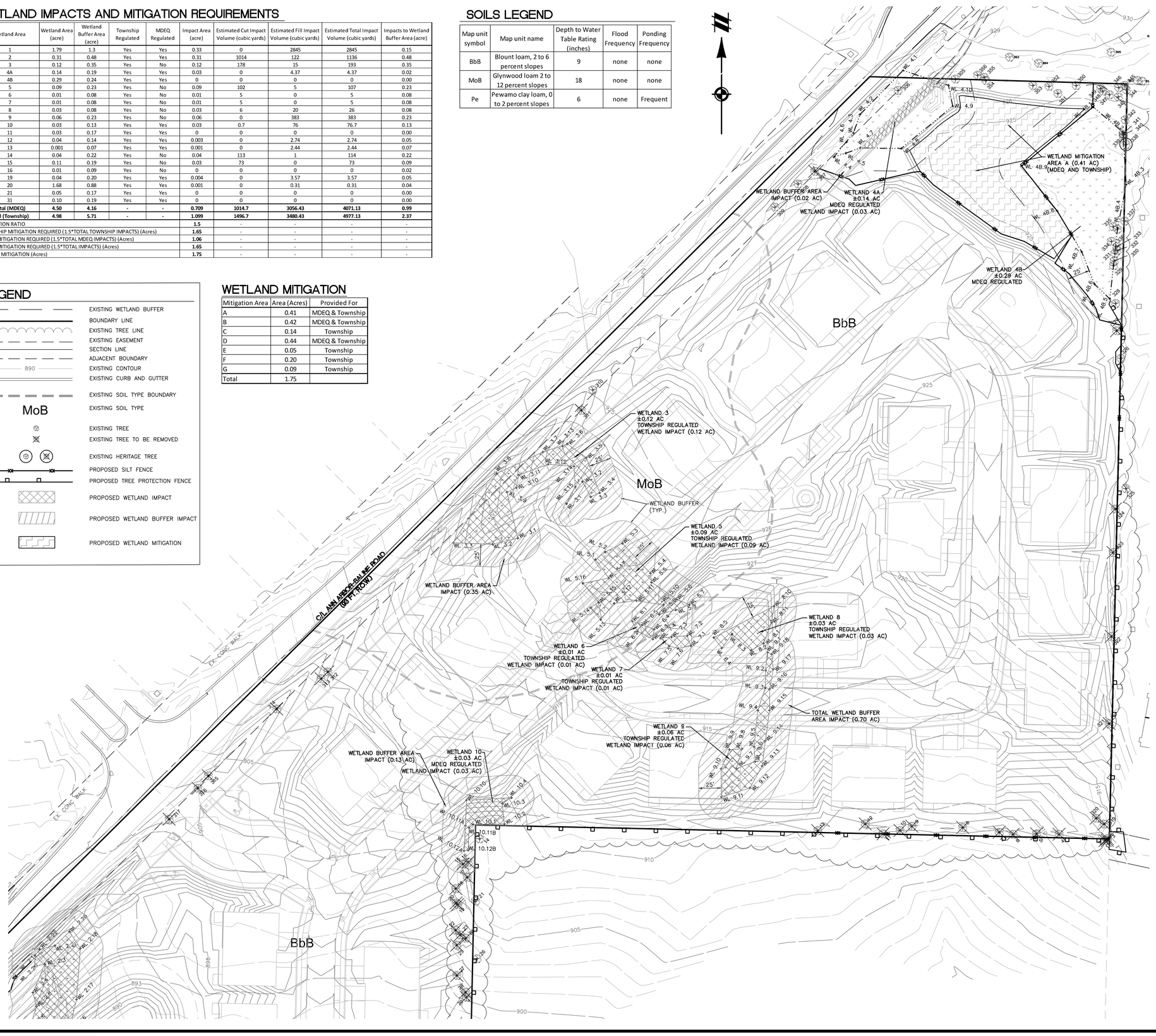
Map unit symbol	Map unit name	Depth to Water Table Rating (inches)	Flood Frequency	Ponding Frequency
BbB	Blount loam, 2 to 6 percent slopes	9	none	none
MoB	Glynwood loam 2 to 12 percent slopes	18	none	none
Pe	Pewamo clay loam, 0 to 2 percent slopes	6	none	Frequent

LEGEND

- EXISTING WETLAND BUFFER
- BOUNDARY LINE
- EXISTING TREE LINE
- EXISTING EASEMENT
- SECTION LINE
- ADJACENT BOUNDARY
- 890 EXISTING CONTOUR
- EXISTING CURB AND GUTTER
- EXISTING SOIL TYPE BOUNDARY
- MoB EXISTING SOIL TYPE
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- EXISTING HERITAGE TREE
- PROPOSED SILT FENCE
- PROPOSED TREE PROTECTION FENCE
- PROPOSED WETLAND IMPACT
- PROPOSED WETLAND BUFFER IMPACT
- PROPOSED WETLAND MITIGATION

WETLAND MITIGATION

Mitigation Area	Area (Acres)	Provided For
A	0.41	MDEQ & Township
B	0.42	MDEQ & Township
C	0.14	Township
D	0.44	MDEQ & Township
E	0.05	Township
F	0.20	Township
G	0.09	Township
Total	1.75	



ON-SITE SITE NATURAL FEATURES

Woodlands
Forested conditions and habitat types observed within the Subject Property consist primarily of young forest with a dense shrub understory. Most trees observed ranged from 2 to 6 inches diameter at breast height (dbh), with some trees occasionally reaching a range of 8 to 30 inches dbh. Tree species include common buckthorn, American elm, cottonwood, box-elder, and river-bank grape. The cottonwoods and elms were observed to have deeply furrowed and lightly exfoliating bark. Additionally, snags, dead and dying trees and trees with split trunks were observed. Trees with these types of conditions could potentially provide suitable roosting habitat for the Indiana bat and northern long-eared bat; however, the dense shrub layer of forested areas within the Subject Property are not typical preferred habitat of these bat species.

The original oak-hickory and beech maple forests that grew on the Subject Property were almost entirely cleared for agriculture. The only exceptions to this clearing may have been occasional trees along hedgerows or property boundaries. The Subject Property's forests are not original forests---rather, they have grown on land that was previously cleared, and these forests primarily contain young, adventive tree growth.

Characteristic of this young, adventive growth are lower quality, pioneer tree species (such as black cherry and cottonwood) and non-native species (such as white mulberry and crack willow). The understory of these forests is also comprised of lower quality, weedy and invasive species such as poison ivy, common buckthorn, and tall goldenrod. With these weedy and invasive plant species as dominant, the Subject Property's forests can be classified as low-quality from an ecological perspective. Note that some of the individual trees that remain scattered in the Subject Property's hedgerows, such as oaks and hickories, are higher quality native species. Although the Subject Property's forests are of low quality ecologically, some of these forests may still provide other environmental values as green areas, view screens, habitat for common wildlife.

The proposed site layout maximizes the avoidance of the forested areas as much as possible while still attempting to achieve the applicants development goals.

Wetlands
Scrub-shrub wetlands (Wetlands 5-10, 22-23, and 25-30) are present throughout the Subject Property, typically occurring along brushy hedgerows that receive overland flow from surrounding agricultural fields. In addition, fragmented scrub-shrub wetlands are scattered within old fields located towards the northeastern and southwestern corners of the Subject Property. Dominant species included common buckthorn (Rhamnus cathartica; FAC), sandbar willow (Salix interior; FACW), black willow (Salix nigra; OBL), American elm (Ulmus americana; FACW), cottonwood (Populus deltoides; FAC), and silver maple (Acer saccharinum; FACW). These wetlands also contain herbaceous species including reed canary grass (Phalaris arundinacea; FACW), grass-leaved goldenrod (Euthamia graminifolia; FACW), common reed (Phragmites australis; FACW), purple loosestrife (Lythrum salicaria; OBL), white panicled American-aster (Symphyotrichum lanceolatum; FAC), farewell-summer (Symphyotrichum lateriflorum; FACW). These wetlands appear to have been disturbed historically as part of agricultural practices. Due to this past disturbance and density of invasive species such as buckthorn, reed canary grass, common reed, and purple loosestrife they do not appear to be of the best quality when compared to wetlands that have not been disturbed historically.

Emergent wetlands (Wetlands 2, 4A-B, 11-13, 15-16, 18, and 21) within the Subject Property typically occur adjacent to bisecting watercourses and within low-lying field edges receiving drainage from the surrounding agricultural fields. These wetlands are largely dominated by reed canary grass, purple loosestrife, and common reed. Other species present within these wetlands include black bent (Agrostis gigantea; FACW), white panicled American-aster, common fox sedge (Carex vulpinoidea; FACW), peach-leaved willow (Salix amygdaloides; FACW), and gray dogwood (Cornus racemosa; FAC). As with the above discussed scrub-shrub wetlands, these emergent wetlands have been historically disturbed due to past agricultural practices. This past disturbance and dominants of invasive species indicate that they are not high quality in nature but still provide some natural functions such as water storage, filtration, and limited wildlife habitat.

The forested wetland (Wetland 20) within the Subject Property is located along Watercourse 1 and continues off-site to the north. Dominant species within this wetland includes common buckthorn, American elm, and cottonwood. Other species found throughout this wetland system included box-elder (Acer negundo; FAC), river-bank grape (Vitis riparia; FACW), and fowl manna grass (Glyceria striata; OBL). Water sources for this wetland appear to include overflow and/or flooding from Watercourse 1, precipitation, snowmelt and/or runoff from adjacent properties and developed areas. With these weedy and invasive plant species as dominant, the Subject Property's forests can be classified as low-quality from an ecological perspective

The remaining mixed-type wetlands (Wetlands 1, 3, 14, 19, and 24) occur primarily along Watercourses 1, 3, and 4, and along field edges. These wetlands ranged from low to fair quality. Dominant species within these wetlands includes common buckthorn, American elm, cottonwood, and reed canary grass. Other species found throughout these wetland systems includes box-elder, sandbar willow, gray dogwood, purple loosestrife, and common reed.

Watercourses
Watercourse 1, a tributary to the Pittsfield #1 Drain, is a perennial stream that runs in a general west-east direction through the Subject Property. The watercourse begins off-site to the north, traverses Wetland 20, and continues southeast through an approximately 48-inch diameter cement culvert underneath Ann Arbor Saline Road. The watercourse then continues east through Wetland 1 and passes under an existing drive through a 12-inch diameter culvert before exiting the Subject Property to the east. The watercourse meanders and did not appear to be channelized or straightened; although, it is possible that dredging has occurred in the past, particularly east of Ann Arbor Saline Road. The watercourse has a discernible channel width of 3-4 feet with approximately one foot of flowing water. The watercourse has a streambed substrate predominated by sand, gravel, and woody debris.

Watercourse 2 is an intermittent stream that runs north-south through a ditched portion of agricultural field within a wetland buffer strip of common reed (Wetland 2). The watercourse appears to flow from an off-site wetland or detention pond north of Ann Arbor Saline Road before continuing underneath the road through an approximately 48-inch diameter cement culvert. The watercourse continues flowing south underneath an existing drive through a 12-inch culvert before flowing into Watercourse 1. The watercourse has a discernible channel width of 4 feet with approximately 3 inches of flowing water. The watercourse appears to have been man-made between 1998 and 2005, and has a streambed substrate predominated by sand and gravel.

Watercourse 3, a tributary to the Pittsfield #1 Drain, is an intermittent stream that runs in a northwest-southeast general direction through the southwestern corner of the Subject Property. Watercourse 4 is a small branch totaling approximately 50 linear feet that connects to Watercourse 3. These watercourses appear to receive water from an off-site wetland associated with the golf course that borders the Subject Property to the west and flows in a general southeast direction entering the Subject Property. Watercourse 3 traverses Wetlands 24 and 28 before exiting the Subject Property to the south. Watercourse 4 has a discernible channel width of 1 foot with 4 inches of flowing water. Watercourse 3 has a discernible channel of 5 feet with approximately 4 inches of flowing water. These watercourses has a streambed substrate predominated by sand, gravel, and woody debris.

Steep Slopes
The site contains no steep slopes. Steep slopes are defined as naturally occurring slopes with a vertical change in elevation of six feet or more, a slope of 12% or greater, and a length of 50 feet or more.

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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

NATURAL FEATURES PROTECTION PLAN– NORTH

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET

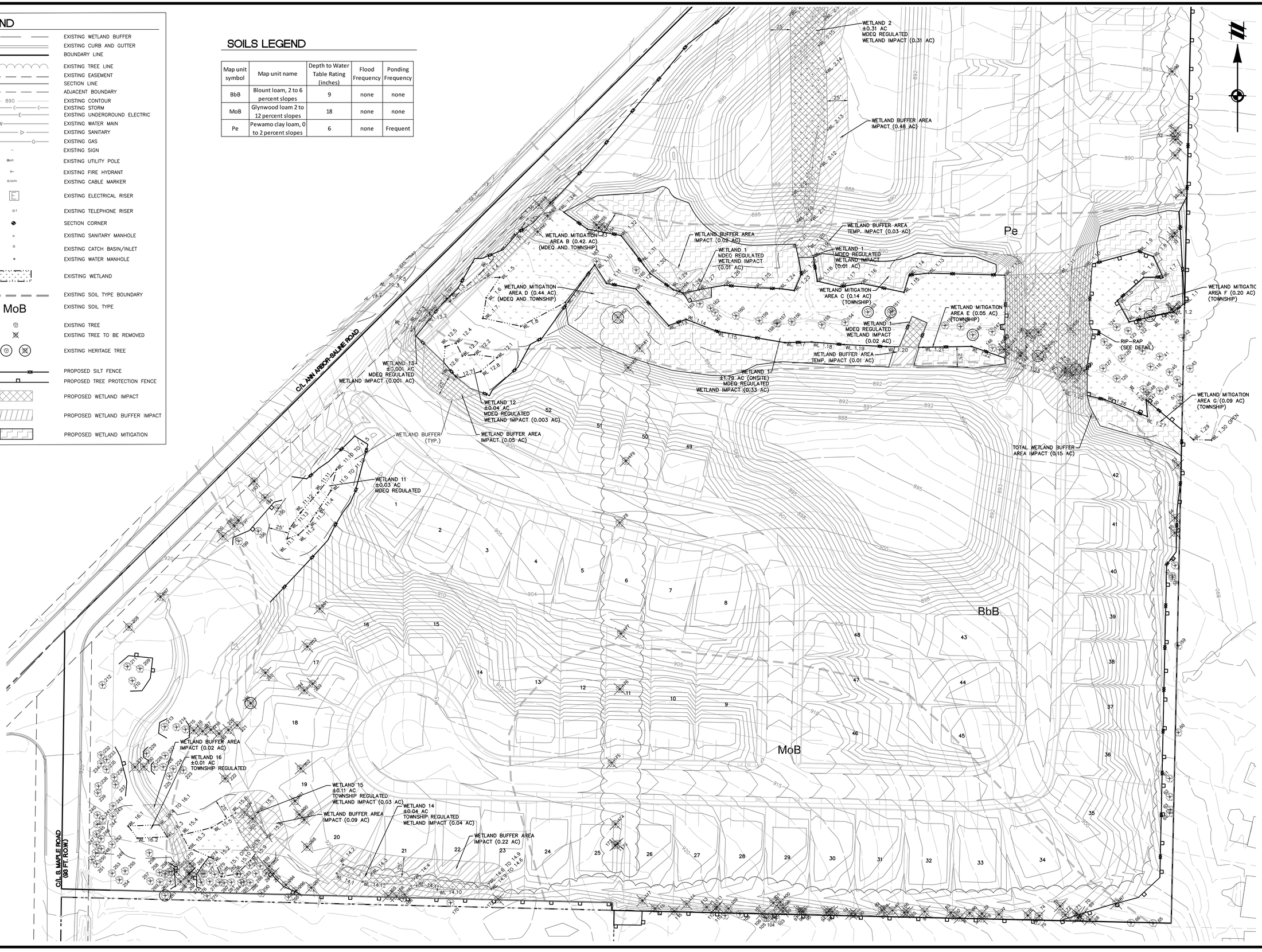
DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 04	

LEGEND

- EXISTING WETLAND BUFFER
- EXISTING CURB AND GUTTER
- BOUNDARY LINE
- EXISTING TREE LINE
- EXISTING EASEMENT
- SECTION LINE
- ADJACENT BOUNDARY
- 890 EXISTING CONTOUR
- EXISTING STORM
- EXISTING UNDERGROUND ELECTRIC
- EXISTING WATER MAIN
- EXISTING SANITARY
- EXISTING GAS
- EXISTING SIGN
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING CABLE MARKER
- EXISTING ELECTRICAL RISER
- EXISTING TELEPHONE RISER
- SECTION CORNER
- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN/INLET
- EXISTING WATER MANHOLE
- EXISTING WETLAND
- EXISTING SOIL TYPE BOUNDARY
- MoB EXISTING SOIL TYPE
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- EXISTING HERITAGE TREE
- PROPOSED SILT FENCE
- PROPOSED TREE PROTECTION FENCE
- PROPOSED WETLAND IMPACT
- PROPOSED WETLAND BUFFER IMPACT
- PROPOSED WETLAND MITIGATION

SOILS LEGEND

Map unit symbol	Map unit name	Depth to Water Table Rating (inches)	Flood Frequency	Ponding Frequency
BbB	Blount loam, 2 to 6 percent slopes	9	none	none
MoB	Glynwood loam 2 to 12 percent slopes	18	none	none
Pe	Pewamo clay loam, 0 to 2 percent slopes	6	none	Frequent



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SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

NATURAL FEATURES PROTECTION PLAN– SOUTH

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 05	

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive	Remove
1	Basswood	Tri 13", 13", 6"	Good	No	No	Yes
2	Basswood	Twin 7" , 10"	Fair	No	No	Yes
3	Basswood	11"	Good	No	No	Yes
4	Basswood	Tri 12", 12", 9"	Good	No	No	Yes
5	Yellow Birch	9"	Good	No	No	Yes
6	Hawthorne	Tri 6", 4", 4"	Good	No	No	Yes
7	Box Elder	Tri 10", 8", 7"	Good	No	Yes	Yes
8	Box Elder	Twin 8", 7"	Good	No	Yes	Yes
9	Box Elder	8"	Good	No	Yes	Yes
10	Yellow Birch	10"	Good	No	No	Yes
11	Box Elder	16"	Good	No	Yes	Yes
12	Yellow Birch	9"	Good	No	No	Yes
13	Maple	7"	Good	No	No	Yes
14	Box Elder	14"	Fair	No	No	No
15	Shag Bark Hick	7"	Good	No	No	Yes
16	Shag Bark Hick	9"	Good	No	No	Yes
17	Shag Bark Hick	9"	Good	No	No	Yes
18	Elm	12"	Poor	No	Yes	Yes
19	W. Poplar	8"	Poor	No	No	Yes
20	W. Poplar	9"	Good	No	No	Yes
21	Shag Bark Hick	22"	Good	No	No	No
22	Shag Bark Hick	7"	Good	No	No	Yes
23	W. Pine	7"	Good	No	No	Yes
24	Apple	9"	Good	No	No	Yes
25	Shag Bark Hick	Twin 6", 9"	Good	No	No	Yes
26	Shag Bark Hick	22"	Good	No	No	No
27	Shag Bark Hick	7"	Good	No	No	Yes
28	Shag Bark Hick	7"	Good	No	No	Yes
29	Shag Bark Hick	6"	Good	No	No	Yes
30	Apple	Twin 5", 8"	Good	No	No	Yes
31	Scotts Pine	6"	Good	No	No	Yes
32	Scotts Pine	10"	Good	No	No	Yes
33	Elm	7"	Good	No	Yes	Yes
34	Scotts Pine	9"	Fair	No	No	Yes
35	Apple	Multi 6"	Good	No	No	Yes
36	Pignut Hickory	6"	Good	No	No	Yes
37	Shag Bark Hick	7"	Good	No	No	Yes
38	Box Elder	9"	Good	No	Yes	No
39	Pignut Hickory	7"	Good	No	No	No
40	Box Elder	Twin 7", 16"	Good	No	Yes	No
41	Elm	6"	Good	No	No	No
42	Willow	Quad 28"	Poor	No	Yes	No
43	Elm	10"	Good	No	Yes	No
44	Shag Bark Hick	10"	Good	No	No	No
45	Elm	9"	Good	No	Yes	No
46	Box Elder	9"	Fair	No	Yes	No
47	Box Elder	Twin 7", 9"	Good	No	Yes	No
48	Box Elder	6"	Good	No	Yes	No
49	Elm	14"	Good	No	Yes	No
50	Box Elder	12"	Good	No	Yes	No
51	Elm	9"	Good	No	Yes	No
52	Willow	6 Trunk 20"- 24"	Fair	No	Yes	No
53	Black Cherry	Tri 10", 12" , 16"	Good	No	No	Yes
54	Elm	6"	Good	No	Yes	Yes
55	Elm	7"	Good	No	Yes	Yes
56	Elm	7"	Poor	No	Yes	No
57	Apple	8"	Good	No	No	No
58	Apple	Twin 8"	Good	No	No	No
59	Box Elder	8"	Good	No	Yes	No
60	Elm	8"	Good	No	Yes	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive	Remove
61	Elm	6"	Good	No	Yes	No
62	Elm	6"	Good	No	Yes	No
63	Elm	6"	Good	No	Yes	No
64	Elm	12"	Good	No	Yes	No
65	Apple	Tri 5", 7", 8"	Fair	No	No	No
66	Bass Wood	Twin 10", 12"	Good	No	No	No
67	Yellow Birch	6"	Good	No	No	Yes
68	Cherry	12"	Good	No	No	Yes
69	Bass Wood	10"	Good	No	No	Yes
70	Thorn Apple	8"	Poor	No	No	Yes
71	Bass Wood	Twin 5", 7"	Good	No	No	Yes
72	Thorn Apple	7"	Good	No	No	Yes
73	Yellow Birch	7"	Good	No	No	Yes
74	Thorn Apple	7"	Good	No	No	Yes
75	Black Cherry	7"	Good	No	No	No
76	Black Cherry	8"	Good	No	No	Yes
77	Thorn Apple	6"	Fair	No	No	Yes
78	Thorn Apple	6"	Good	No	No	Yes
79	Thorn Apple	7"	Good	No	No	Yes
80	Thorn Apple	Twin 6", 7"	Good	No	No	Yes
81	Black Cherry	9"	Fair	No	No	Yes
82	Bass Wood	Twin 7", 9"	Fair	No	No	Yes
83	Bass Wood	9"	Good	No	No	Yes
84	Bass Wood	7"	Good	No	No	Yes
85	Bass Wood	Twin 9", 12"	Good	No	No	Yes
86	Maple	7"	Good	No	No	Yes
87	Maple	12"	Fair	No	No	Yes
88	Yellow Birch	6"	Good	No	No	Yes
89	Bass Wood	8"	Good	No	No	Yes
90	Bass Wood	10"	Good	No	No	Yes
91	Bass Wood	12"	Good	No	No	Yes
92	Bass Wood	8"	Good	No	No	Yes
93	Bass Wood	Twin 16", 18"	Good	No	No	Yes
94	Bass Wood	10"	Good	No	No	Yes
95	Bass Wood	8"	Good	No	No	Yes
96	Bass Wood	16"	Good	No	No	Yes
97	Bass Wood	Tri 9", 14", 14"	Good	No	No	Yes
98	Bass Wood	6"	Good	No	No	Yes
99	Bass Wood	10"	Good	No	No	Yes
100	Bass Wood	6"	Good	No	No	Yes
101	Yellow Birch	8"	Good	No	No	Yes
102	Yellow Birch	8"	Good	No	No	No
103	Bass Wood	6"	Good	No	No	No
104	Bass Wood	8"	Good	No	No	No
105	Bass Wood	7"	Good	No	No	No
106	Bass Wood	Twin 8", 10"	Good	No	No	No
107	Bass Wood	6"	Good	No	No	Yes
108	Bass Wood	Twin 5", 7"	Good	No	No	No
109	Bass Wood	16"	Good	No	No	Yes
110	Elm	6"	Fair	No	Yes	No
111	Bass Wood	19"	Good	No	No	Yes
112	Bass Wood	22"	Good	No	No	Yes
113	Bass Wood	9"	Good	No	No	Yes
114	Bass Wood	21"	Fair	No	No	Yes
115	Bass Wood	10"	Good	No	No	Yes
116	Black Cherry	8"	Good	No	No	Yes
117	Black Cherry	7"	Good	No	No	Yes
118	Elm	7"	Fair	No	Yes	No
119	Elm	7"	Good	No	Yes	No
120	Cottonwood	24"	Good	Yes	Yes	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive
121	Elm	9"	Good	No	Yes
122	Willow	Twin 18", 30"	Poor-Good	No	Yes
123	Willow	Quad 26"	Fair	No	Yes
124	Elm	9"	Good	No	Yes
125	Elm	10"	Good	No	Yes
126	Willow	30"	Good	No	Yes
127	Willow	24"	Good	No	Yes
128	Elm	16"	Good	No	Yes
129	Cottonwood	Twin 14", 22"	Good	No	Yes
130	Cottonwood	24"	Good	Yes	Yes
131	Willow	22"	Good	No	Yes
132	Willow	11"	Good	No	Yes
133	Cottonwood	Twin 16", 18"	Good	No	Yes
134	Cottonwood	Twin 9", 16"	Good	No	Yes
135	Willow	20", 24"	Good	No	Yes
136	Willow	12"	Good	No	Yes
137	Cottonwood	30"	Good	Yes	Yes
138	Elm	8"	Good	No	Yes
139	Elm	10"	Good	No	Yes
140	Willow	Twin 18", 22"	Good	No	Yes
141	Elm	8"	Fair	No	Yes
142	Elm	11"	Good	No	Yes
143	Elm	9"	Good	No	Yes
144	Cottonwood	14"	Good	No	Yes
145	Cottonwood	Tri 7", 13", 18"	Good	No	Yes
146	Cottonwood	18"	Good	No	Yes
147	Willow	18", 20"	Good	No	Yes
148	Elm	18"	Good	Yes	Yes
149	Willow	Quad 18"	Poor	No	Yes
150	Willow	Tri 12", 16", 16"	Fair	No	Yes
151	Cottonwood	12"	Good	No	Yes
152	Cottonwood	24"	Good	Yes	Yes
153	Cottonwood	Twin 20", 24"	Good	Yes	Yes
154	Willow	24"	Good	No	Yes
155	Willow	Twin 22", 26"	Good	No	Yes
156	Willow	16"	Good	No	Yes
157	Willow	16"	Good	No	Yes
158	Willow	16"	Good	No	Yes
159	Willow	16"	Good	No	Yes
160	Willow	Twin 14", 18"	Good	No	Yes
161	Willow	8"	Fair	No	Yes
162	Willow	16"	Good	No	Yes
163	Willow	10"	Good	No	Yes
164	Willow	Twin 21", 24"	Good	No	Yes
165	Willow	Quad 18", 22", 30", 42"	Good	No	Yes
166	Black Cherry	Twin 5", 7"	Good	No	No
167	Yellow Birch	Multi 6"	Good	No	No
168	Cherry	6"	Good	No	No
169	Cherry	7"	Good	No	No
170	Cherry	8"	Good	No	No
171	Yellow Birch	Multi 3"-7"	Good	No	No
172	Yellow Birch	Tri 8", 8", 10"	Good	No	No
173	Yellow Birch	9"	Good	No	No
174	Black Cherry	Twin 6"	Good	No	No
175	Elm	6"	Good	No	Yes
176	Hawthorne	Tri 3", 4" 6"	Good	No	No
177	Hawthorne	Quad 4", 6" 4", 5"	Good	No	No
178	Box Elder	Twin 7", 9"	Poor	No	Yes
179	Elm	Twin 3", 8"	Good	No	Yes
180	Thorn Apple	Tri 8"	Good	No	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive
181	Yellow Birch	Tri 8"	Good	No	No
182	Cottonwood	24"	Good	Yes	Yes
183	Elm	14"	Good	No	Yes
184	Cottonwood	16"	Good	No	Yes
185	Cottonwood	10"	Good	No	Yes
186	Cottonwood	8"	Good	No	Yes
187	Elm	Twin 4", 8"	Good	No	Yes
188	Elm	8"	Good	No	Yes
189	Elm	9"	Good	No	Yes
190	Willow	Twin 16", 18"	Good	No	Yes
191	Cottonwood	10"	Good	No	Yes
192	Elm	8"	Good	No	Yes
193	Elm	12"	Good	No	Yes
194	Walnut	12"	Good	No	No
195	Elm	Tri 5", 6", 8"	Good	No	Yes
196	Pecan	16"	Good	No	No
197	Austrian Pine	10"	Poor	No	No
198	Blue Spruce	12"	Good	No	No
199	Blue Spruce	14"	Good	No	No
200	Blue Spruce	10"	Good	No	No
201	Maple	Twin 7"	Good	No	No
202	Maple	12"	Good	No	No
203	Apple	Multi 8"-12"	Good	No	No
204	Apple	9"	Good	No	No
205	Sweet gum	12"	Good	No	No
206	Maple	30"	Good	Yes	No
207	Blue Spruce	8"	Good	No	No
208	Locust	14"	Good	No	No
209	Blue Spruce	14"	Good	No	No
210	Blue Spruce	11"	Good	No	No
211	Blue Spruce	15"	Good	No	No
212	Locust	22"	Good	No	No
213	W. Pine	10"	Good	No	No
214	W. Pine	10"	Good	No	No
215	Scotts Pine	11"	Good	No	No
216	Scotts Pine	11"	Good	No	No
217	Scotts Pine	12"	Good	No	No
218	Scotts Pine	14"	Good	No	No
219	Scotts Pine	12"	Good	No	No
220	Scotts Pine	12"	Good	No	No
221	Scotts Pine	12"	Good	No	No
222	Maple	12"	Good	No	No
223	Austrian Pine	10"	Fair	No	No
224	Austrian Pine	8"	Good	No	No
225	Austrian Pine	14"	Fair	No	No
226	Austrian Pine	9"	Good	No	No
227	Maple	8"	Good	No	No
228	Austrian Pine	10"	Good	No	No
229	Maple	12"	Good	No	No
230	Austrian Pine	9"	Fair	No	No
231	Austrian Pine	10"	Good	No	No
232	Scotts Pine	16"	Good	No	No
233	Scotts Pine	10"	Good	No	No
234	Scotts Pine	9"	Good	No	No
235	Scotts Pine	16"	Good	No	No
236	White Pine	16"	Good	No	No
237	White Pine	10"	Good	No	No
238	Scotts Pine	9"	Good	No	No
239	Scotts Pine	12"	Good	No	No
240	Scotts Pine	9"	Good	No	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive
241	Scotts Pine	12"	Good	No	No
242	White Pine	18"	Good	No	No
243	White Pine	14"	Good	No	No
244	Scotts Pine	7"	Good	No	No
245	Scotts Pine	8"	Fair	No	No
246	Scotts Pine	14"	Good	No	No
247	Scotts Pine	9"	Good	No	No
248	Scotts Pine	11"	Good	No	No
249	White Pine	9"	Good	No	No
250	Elm	9"	Good	No	Yes
251	White Pine	10"	Good	No	No
252	White Pine	16"	Good	No	No
253	White Pine	14"	Good	No	No
254	Scotts Pine	16"	Good	No	No
255	White Pine	18"	Good	No	No
256	Maple	16"	Good	No	No
257	White Pine	10"	Good	No	No
258	Maple	10"	Good	No	No
259	Scotts Pine	7"	Good	No	No
260	Scotts Pine	8"	Good	No	No
261	Maple	Twin 20", 44"	Good	Yes	No
262	White Pine	9"	Good	No	No
263	Maple	7"	Good	No	No
264	Maple	7"	Good	No	No
265	Maple	9"	Good	No	No
266	White Pine	10"	Good	No	No
267	White Pine	8"	Good	No	No
268	Maple	7"	Good	No	No
269	Maple	7"	Good	No	No
270	Scotts Pine	9"	Good	No	No
271	Maple	10"	Good	No	No
272	White Pine	10"	Good	No	No
273	Scotts Pine	10"	Good	No	No
274	Scotts Pine	7"	Poor	No	No
275	Maple	16"	Good	No	No
276	White Pine	6"	Good	No	No
277	Scotts Pine	6"	Fair	No	No
278	White Pine	8"	Good	No	No
279	Maple	9"	Good	No	No
280	Maple	6"	Good	No	No
281	White Pine	8"	Good	No	No
282	White Pine	7"	Good	No	No
283	Maple	10"	Good	No	No
284	White Pine	7"	Fair	No	No
285	Maple	Tri 4", 7", 8"	Good	No	No
286	White Pine	11"	Good	No	No
287	Austrian Pine	10"	Good	No	No
288	Austrian Pine	8"	Good	No	No
289	Scotts Pine	10"	Good	No	No
290	Box Elder	Quad 8", 8" 12", 12"	Fair	No	Yes
291	Austrian Pine	8"	Good	No	No
292	Scotts Pine	10"	Good	No	No
293	Austrian Pine	10"	Good	No	No
294	White Pine	14"	Good	No	No
295	Box Elder	Twin 10"	Good	No	Yes
296	Elm	9"	Good	No	Yes
297	Yellow Birch	8"	Fair	No	No
298	Maple	8"	Good	No	No
299	Locust	6"	Good	No	No
300	Locust	8"	Good	No	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive	Remove
301	Blue Spruce	7"	Good	No	No	Yes
302	Ash	10"	Poor	No	Yes	Yes
303	Elm	7"	Good	No	Yes	Yes
304	Box Elder	7"	Good	No	Yes	Yes
305	Elm	11"	Good	No	Yes	No
306	Elm	10"	Good	No	Yes	No
307	Elm	Twin 4", 7"	Good	No	Yes	Yes
308	Elm	8"	Good	No	Yes	No
309	Elm	Twin 6", 10"	Good	No	Yes	No
310	Scotts Pine	14"	Good	No	No	No
311	Crab Apple	Tri 4", 4" 9"	Good	No	No	Yes
312	Box Elder	Tri 7", 8", 11"	Poor	No	Yes	Yes
313	Box Elder	7"	Good	No	Yes	Yes
314	Elm	7"	Good	No	Yes	Yes
315	Elm	8"	Good	No	Yes	Yes
316	Box Elder	7"	Good	No	Yes	Yes
317	Elm	8"	Good	No	Yes	Yes
318	Scotts Pine	12"	Good	No	No	No
319	Basswood	6"	Good	No	No	Yes
320	Basswood	7"	Good	No	No	Yes
321	Thorn Apple	Multi 6"	Good	No	No	Yes
322	Thorn Apple	Multi 6"	Good	No	No	Yes
323	Thorn Apple	Multi 6"-9"	Good	No	No	Yes
324	Thorn Apple	Mutli 4"-6"	Good	No	No	Yes
325	Box Elder	16"	Good	No	Yes	No
326	Hawthorne	7"	Good	No	No	No
327	Elm	14"	Good	No	Yes	Yes
328	Ash	10"	Poor	No	Yes	No
329	Willow	9"	Good	No	Yes	No
330	Willow	10"	Good	No	Yes	No
331	Willow	Twin 7"	Good	No	Yes	No
332	Elm	7"	Good	No	Yes	No
333	Willow	12"	Good	No	Yes	No
334	Willow	10"	Good	No	Yes	No
335	Willow	14"	Good	No	Yes	No
336	Elm	8"	Good	No	Yes	No
337	Elm	16"	Good	No	Yes	No
338	Elm	18"	Poor	Yes	Yes	No
339	Elm	14"	Good	No	Yes	No
340	Elm	10"	Good	No	Yes	No
341	Elm	7"	Good	No	Yes	No
342	Elm	9"	Good	No	Yes	No
343	Thorn Apple	9"	Good	No	No	No
344	Elm	10"	Good	No	Yes	No
345	Black Cherry	12"	Good	No	No	No
346	Elm	12"	Good	No	Yes	No
347	Elm	11"	Good	No	Yes	No
348	Elm	6"	Good	No	Yes	No
349	Elm	9"	Good	No	Yes	No
350	Hawthorne	Twin 7"	Good	No	No	No
351	Willow	Tri 8", 12", 14"	Good	No	Yes	No
352	Elm	Twin 11", 16"	Good	No	Yes	No
353	Elm	16"	Fair	No	Yes	No
354	Elm	9"	Good	No	Yes	No
355	Elm	Tri 5", 5", 7"	Good	No	Yes	No
356	Elm	9"	Good	No	Yes	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive	Remove
623	Elm	8"	Good	No	Yes	No
624	Apple	Twin 8", 10"	Good	No	No	No
625	Ash	Twin 6"	Poor	No	Yes	No
626	Apple	Twin 7'	Fair	No	No	No
627	Elm	9"	Good	No	Yes	No
628	White Poplar	14"	Good	No	No	No
629	Apple	16"	Fair	No	No	No
630	Apple	Tri 7"	Good	No	No	No
631	Apple	Tri 6", 8", 8"	Good	No	No	No
632	Elm	7'	Good	No	Yes	No
633	White Oak	16"	Good	No	No	No
634	Elm	6"	Good	No	Yes	No
635	Apple	8'	Good	No	No	No
636	Willow	6'	Good	No	Yes	No
637	Cottonwood	10"	Good	No	Yes	No
638	Elm	6"	Good	No	Yes	No
639	Cottonwood	12"	Good	No	Yes	No
640	Cottonwood	14"	Good	No	Yes	No
641	Box Elder	18"	Good	No	Yes	No
642	Elm	11"	Good	No	Yes	No
643	Cottonwood	9"	Good	No	Yes	No
644	White Oak	38"	Good	No	No	No
645	White Oak	Twin 5", 7"	Good	No	No	No
646	White Oak	7'	Good	No	No	No
647	Cottonwood	7'	Good	No	Yes	No
648	Box Elder	8"	Good	No	No	No
649	White Oak	Twin 5", 6"	Good	No	No	No
650	Elm	15'	Good	No	Yes	No
651	White Oak	Twin 4", 9"	Good	No	No	No
652	Elm	6"	Good	No	Yes	No
653	Willow	Twin16", 24"	Good	No	Yes	No
654	Willow	30"	Good	No	Yes	No
655	Elm	7"	Good	No	Yes	No
656	Elm	8"	Fair	No	Yes	No
657	Willow	Twin 11", 15"	Good	No	Yes	No
658	Black Cherry	11"	Fair	No	No	No
659	Elm	7"	Good	No	Yes	No
660	Elm	9"	Good	No	Yes	No
661	Cottonwood	24"	Good	Yes	Yes	No
662	Willow	Twin 9", 12"	Fair	No	Yes	No
663	Willow	Twin 16", 19"	Good	No	Yes	No
664	Black Cherry	9"	Good	No	No	No
665	Elm	9"	Good	No	Yes	No
666	Willow	Tri 17", 18", 19"	Good	No	Yes	No
667	Elm	7"	Fair	No	Yes	No
668	Elm	7"	Good	No	Yes	No
669	Ash	7"	Good	No	Yes	No
670	Elm	9"	Good	No	Yes	No
671	Elm	7"	Good	No	Yes	No
672	Elm	9'	Good	No	Yes	No
673	Elm	7'	Good	No	Yes	No
674	Cottonwood	12"	Good	No	Yes	No
675	Elm	7"	Good	No	Yes	No
676	Cottonwood	Twin 26", 30"	Good	Yes	Yes	No
677	Elm	6"	Good	No	Yes	No
678	Cottonwood	18'	Good	No	Yes	No
679	Elm	8"	Good	No	Yes	No
680	Elm	7"	Good	No	Yes	No
681	Elm	6"	Good	No	Yes	No
682	Willow	22"	Good	No	Yes	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive	Remove
683	Willow	Twin 12", 14"	Good	No	Yes	No
684	Austrian Pine	14"	Good	No	No	No
688	Austrian Pine	10"	Fair	No	No	No
689	Elm	9'	Good	No	Yes	No
722	Cottonwood	30"	Good	Yes	Yes	No
723	Cottonwood	14"	Good	No	Yes	No
724	Cottonwood	14"	Good	No	Yes	No
725	Cottonwood	18"	Good	No	Yes	No
726	Cottonwood	20"	Good	No	Yes	No
727	Cottonwood	14"	Good	No	Yes	No
728	Elm	10"	Good	No	Yes	No
729	Elm	12"	Good	No	Yes	No
730	Cottonwood	12"	Good	No	Yes	No
731	Cottonwood	16"	Good	No	Yes	No
732	Cottonwood	20"	Good	No	Yes	No
733	Elm	7"	Good	No	Yes	No
734	Yellow Birch	7"	Good	No	No	No
735	Elm	10"	Good	No	Yes	No
736	Elm	9'	Good	No	Yes	No
737	Cherry	7"	Good	No	No	No
738	Elm	7'	Good	No	Yes	No
739	White Oak	6"	Good	No	No	No
740	Elm	10"	Good	No	Yes	No
741	Willow	12'	Good	No	Yes	No
742	White Oak	12"	Good	No	No	No
743	Yellow Birch	8"	Good	No	No	No
744	Elm	11"	Good	No	Yes	No
745	Box Elder	10'	Good	No	Yes	No
746	Elm	10"	Good	No	Yes	No
747	Elm	7"	Good	No	Yes	No
748	Elm	6'	Good	No	Yes	No
749	Ash	8"	Fair	No	Yes	No
750	Ash	7"	Good	No	Yes	No
751	Elm	7"	Good	No	Yes	No
752	Elm	6"	Good	No	Yes	No
753	Elm	7"	Good	No	Yes	No
754	Elm	8"	Good	No	Yes	No
755	Elm	9'	Good	No	Yes	No
756	Ash	9"	Fair	No	Yes	No
757	Elm	6"	Good	No	Yes	No
758	Elm	7"	Good	No	Yes	No
759	Cedar	9'	Good	Yes	No	No
760	Elm	7'	Good	No	Yes	No
761	Ash	9'	Good	No	Yes	No
762	Black Cherry	7"	Good	No	No	No
763	Elm	7"	Good	No	Yes	No
764	Elm	7"	Good	No	Yes	No
765	Elm	7"	Good	No	Yes	No
766	Elm	7"	Good	No	Yes	No
767	Ash	6"	Fair	No	Yes	No
768	Elm	7"	Good	No	Yes	No
769	Elm	9"	Good	No	Yes	No
770	Elm	9"	Good	No	Yes	No
771	Elm	9"	Good	No	Yes	No
772	Elm	8"	Good	No	Yes	No
773	Elm	8"	Good	No	Yes	No
774	Elm	10"	Good	No	Yes	No
775	Elm	7"	Good	No	Yes	No
776	Elm	7"	Good	No	Yes	No
777	Elm	6"	Good	No	Yes	No

TAG #	Common Name	Size	Condition	Heritage Tree	Invasive	Remove
778	Elm	7"	Good	No	Yes	No
780	Elm	7"	Good	No	Yes	No
781	Elm	12"	Good	No	Yes	No
782	Box Elder	7"	Good	No	Yes	No
783	Box Elder	7"	Good	No	Yes	No
784	Yellow Birch	6'	Good	No	No	No
785	Hackberry	10"	Good	No	No	No
786	Elm	14'	Good	No	Yes	No
787	Elm	10"	Good	No	Yes	Yes
788	Elm	7'	Good	No	Yes	No
789	Yellow Birch	7'	Good	No	No	Yes
790	Elm	6"	Good	No	Yes	No
791	Elm	6"	Good	No	Yes	No
792	Elm	6"	Good	No	Yes	No
793	Elm	9"	Good	No	Yes	No
794	Elm	8"	Good	No	Yes	No
795	Elm	6"	Good	No	Yes	No
796	Yellow Birch	6"	Good	No	No	No
797	Cedar	14"	Good	Yes	No	No
798	Elm	7"	Good	No	Yes	No
799	Black Cherry	Twin 12"	Good	No	No	No
800	Black Cherry	Twin 10"	Good	No	No	No
801	Black Cherry	9"	Good	No	No	No
802	Elm	7"	Good	No	Yes	No
803	Ash	7"	Good	No	Yes	No
804	Ash	7"	Good	No	Yes	No
805	Elm	6"	Good	No	Yes	No
806	Ash	7"	Fair	No	Yes	No
807	Elm	6"	Good	No	Yes	No
808	Elm	8"	Good	No	Yes	No
809	Elm	9"	Good	No	Yes	No
810	Ash	6"	Good	No	Yes	No
811	Elm	6"	Good	No	Yes	No
812	Ash	6"	Fair	No	Yes	No

TOTAL TREES TO BE REMOVED	181
TOTAL HERATIGE TREES TO BE REMOVED	5
TOTAL REQUIRED REPLACEMENT DBH (INCHES)	1564

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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

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.

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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

TREE LIST AND REPLACEMENT CALCULATIONS

DATE
OCTOBER 17, 2018

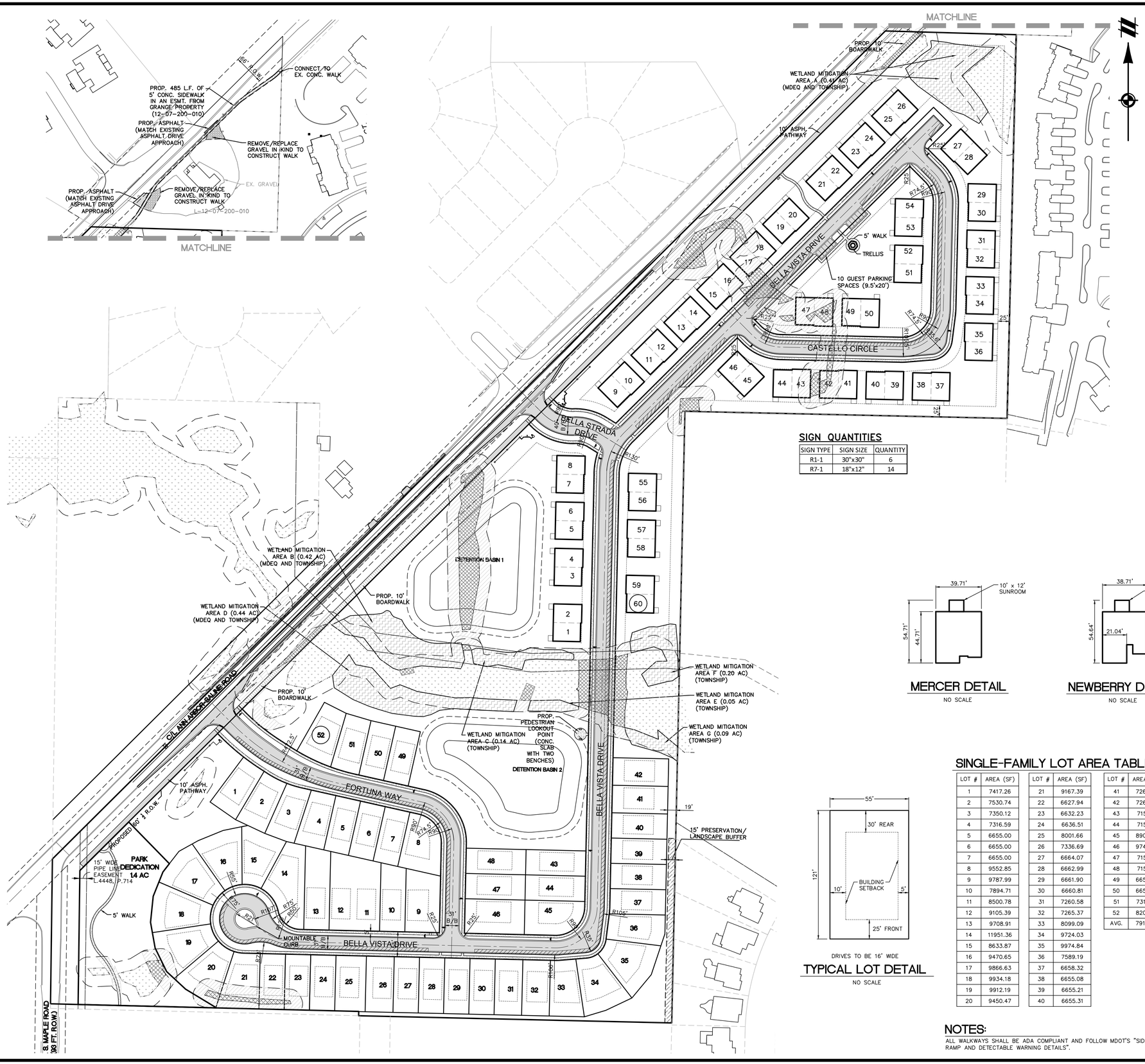
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 -- --
NO SCALE

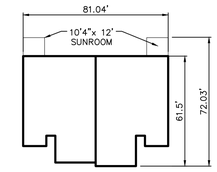
DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
07

K:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948FSP-02-EC.DWG 3/26/2019 2:05 PM BRETT RADABAUGH



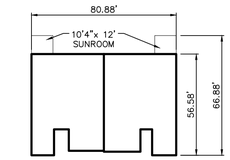
SIGN QUANTITIES

SIGN TYPE	SIGN SIZE	QUANTITY
R1-1	30"x30"	6
R7-1	18"x12"	14



BAYPORT DUPLEX UNIT DETAIL

NO SCALE

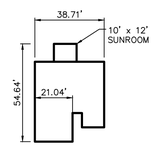


ABBEYVILLE DUPLEX UNIT DETAIL

NO SCALE

MERCER DETAIL

NO SCALE



NEWBERRY DETAIL

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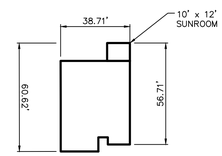

CONTINENTAL DETAIL

NO SCALE

DRIVES TO BE 16' WIDE

TYPICAL LOT DETAIL

NO SCALE

SINGLE-FAMILY LOT AREA TABLE

LOT #	AREA (SF)	LOT #	AREA (SF)	LOT #	AREA (SF)
1	7417.26	21	9167.39	41	7260.44
2	7530.74	22	6627.94	42	7260.56
3	7350.12	23	6632.23	43	7150.01
4	7316.59	24	6636.51	44	7150.01
5	6655.00	25	8001.66	45	8908.42
6	6655.00	26	7336.69	46	9745.84
7	6655.00	27	6664.07	47	7150.01
8	9552.85	28	6662.99	48	7150.01
9	9787.99	29	6661.90	49	6655.00
10	7894.71	30	6660.81	50	6655.00
11	8500.78	31	7260.58	51	7317.80
12	9105.39	32	7265.37	52	8202.52
13	9708.91	33	8099.09	AVG.	7914.32
14	11951.36	34	9724.03		
15	8633.87	35	9974.84		
16	9470.65	36	7589.19		
17	9866.63	37	6658.32		
18	9934.18	38	6655.08		
19	9912.19	39	6655.21		
20	9450.47	40	6655.31		

NOTES:

ALL WALKWAYS SHALL BE ADA COMPLIANT AND FOLLOW MDOT'S "SIDEWALK RAMP AND DETECTABLE WARNING DETAILS".

LEGEND

- EXIST. WETLAND LIMITS
- EXIST. CURB AND GUTTER
- EXIST. EASEMENT
- PROP. R.O.W. LINE
- PROP. ROAD CENTERLINE
- PROP. BACK/EDGE CURB
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- PROP. LOT LINE
- PROP. EASEMENT
- PROP. SETBACK LINE
- EXIST. WETLAND
- EXIST. WETLAND BUFFER
- SECTION CORNER
- PROP. LIGHT POLE
- PROP. ASPHALT
- PROP. WALK
- PROP. WETLAND BUFFER IMPACT
- PROP. WETLAND IMPACT
- AREAS OF ON-STREET PARKING
- PROP. WETLAND MITIGATION
- PROP. SIGN

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PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

LAYOUT PLAN– OVERALL

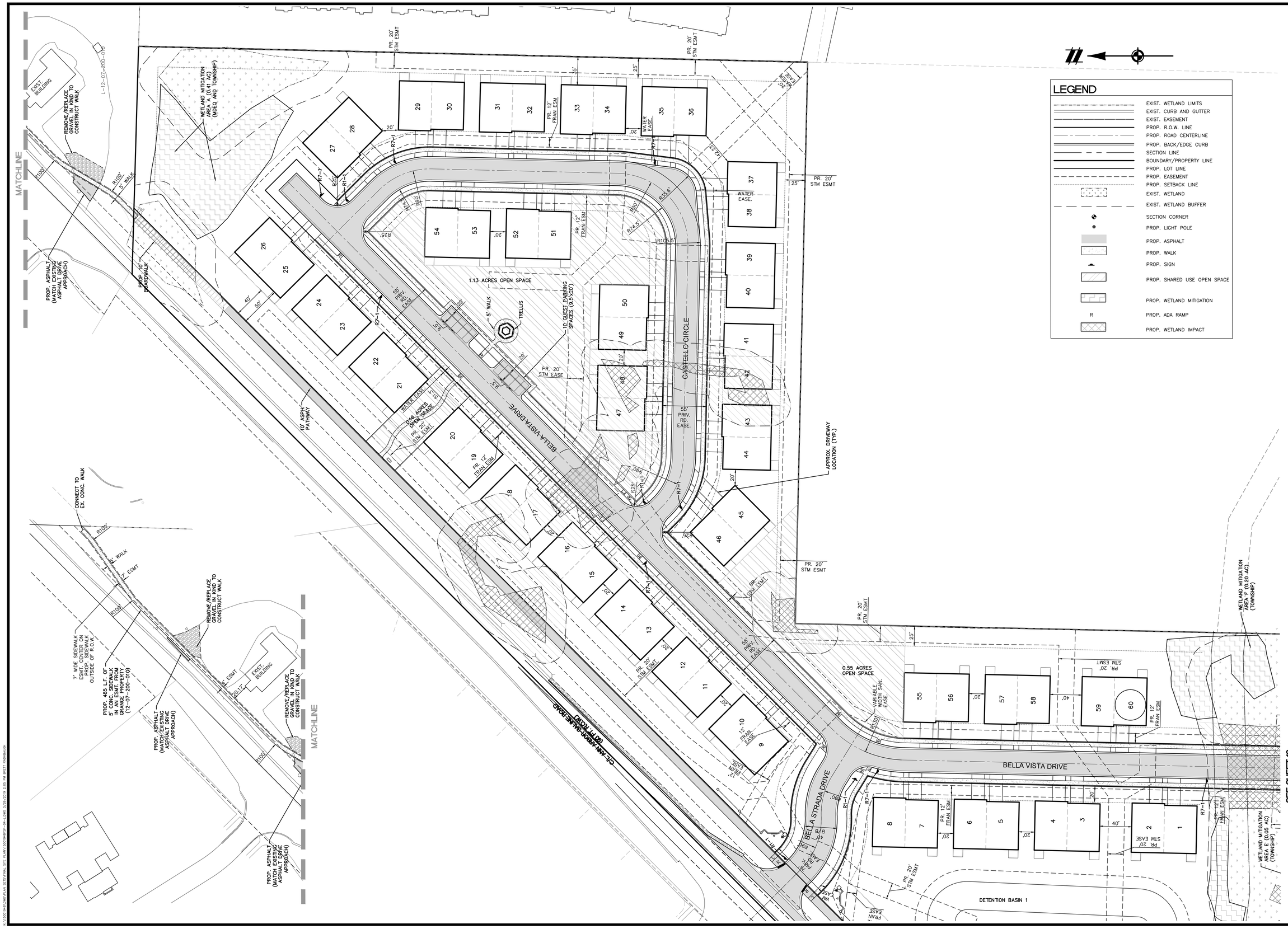
DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 50 100
1" = 100 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 08	



LEGEND

- EXIST. WETLAND LIMITS
- EXIST. CURB AND GUTTER
- EXIST. EASEMENT
- PROP. R.O.W. LINE
- PROP. ROAD CENTERLINE
- PROP. BACK/EDGE CURB
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- PROP. LOT LINE
- PROP. EASEMENT
- PROP. SETBACK LINE
- EXIST. WETLAND
- EXIST. WETLAND BUFFER
- SECTION CORNER
- PROP. LIGHT POLE
- PROP. ASPHALT
- PROP. WALK
- PROP. SIGN
- PROP. SHARED USE OPEN SPACE
- PROP. WETLAND MITIGATION
- R — PROP. ADA RAMP
- PROP. WETLAND IMPACT

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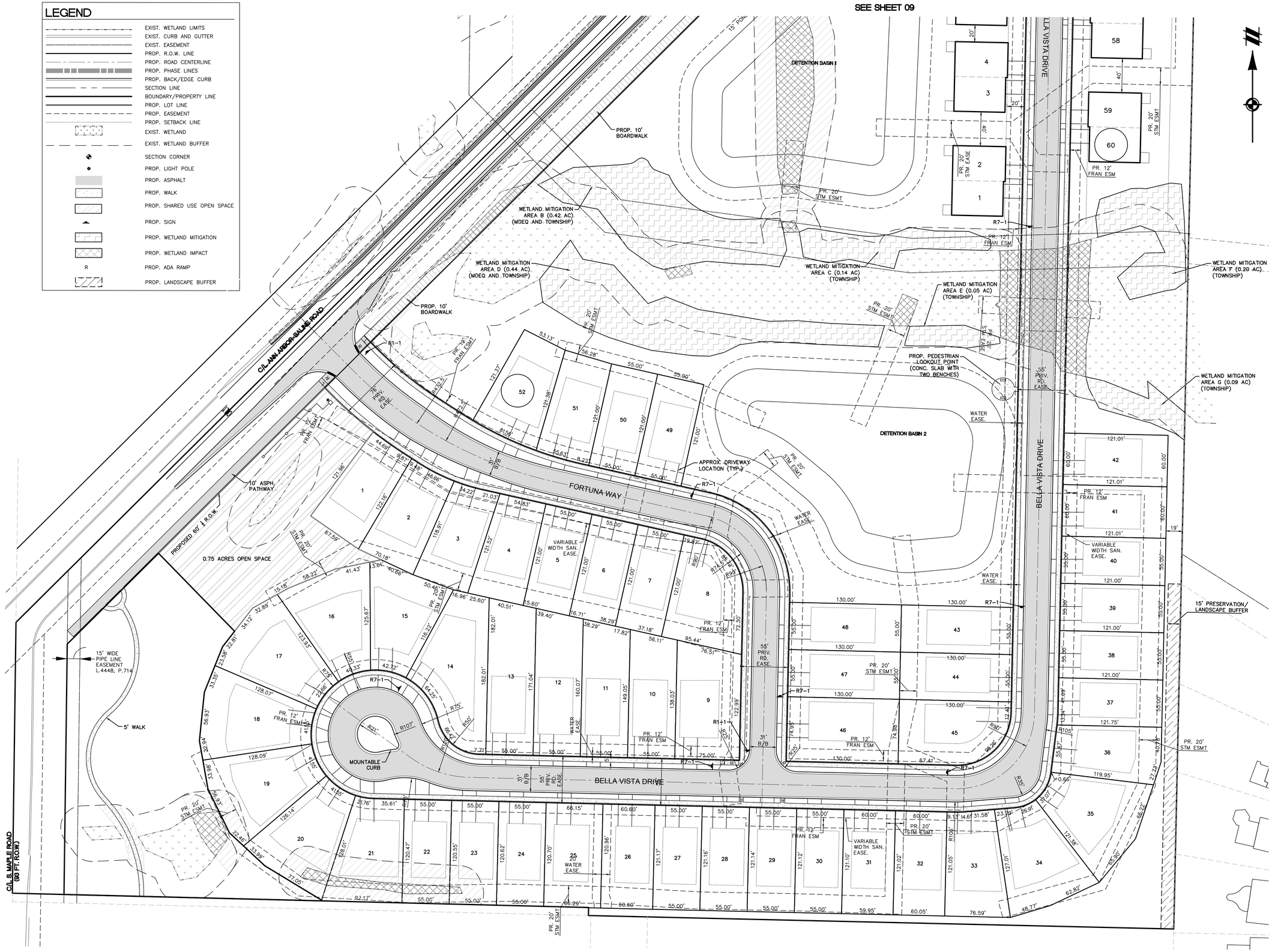
REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 09	

LEGEND

- EXIST. WETLAND LIMITS
- EXIST. CURB AND GUTTER
- EXIST. EASEMENT
- PROP. R.O.W. LINE
- PROP. ROAD CENTERLINE
- PROP. PHASE LINES
- PROP. BACK/EDGE CURB
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- PROP. LOT LINE
- PROP. EASEMENT
- PROP. SETBACK LINE
- EXIST. WETLAND
- EXIST. WETLAND BUFFER
- SECTION CORNER
- PROP. LIGHT POLE
- PROP. ASPHALT
- PROP. WALK
- PROP. SHARED USE OPEN SPACE
- PROP. SIGN
- PROP. WETLAND MITIGATION
- PROP. WETLAND IMPACT
- R PROP. ADA RAMP
- PROP. LANDSCAPE BUFFER



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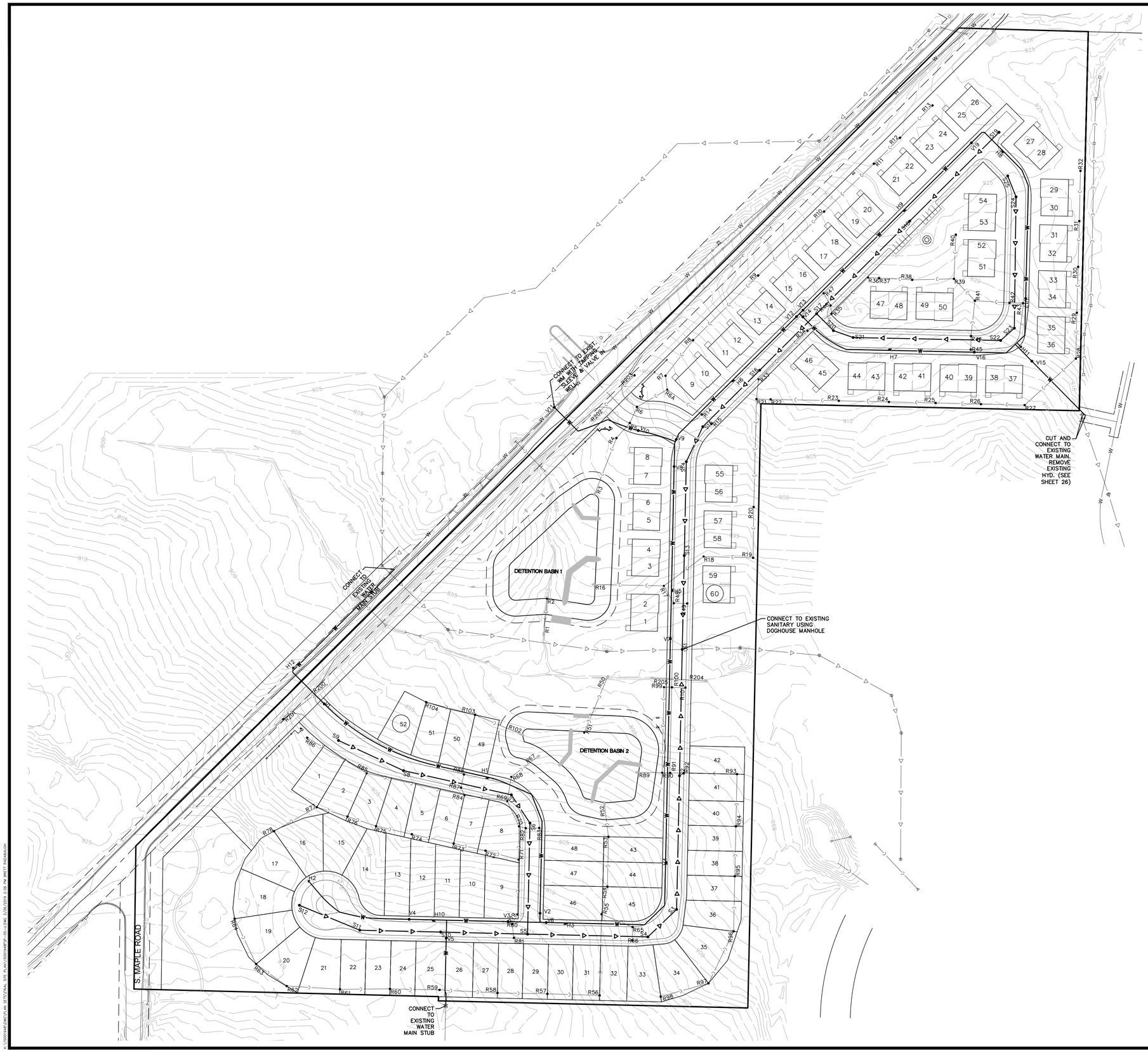
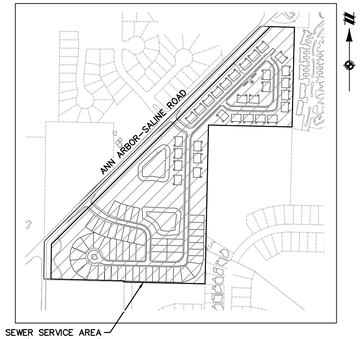
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 10	





SANITARY SEWER SERVICE DISTRICT

UTILITY BASIS OF DESIGN

Service Area= **37.62 Acres**

Residential

Multi-family:	60 units					
	1 units/E.R.U. x	60	units =	60	E.R.U.	
Single family:	52 units					
	1 units/E.R.U. x	52	units =	52	E.R.U.	
TOTAL =				**112**	**E.R.U.**	
Number of Persons per unit =				3.4	persons/ERU	
Design Population =	112 units	x	3.4 units =	381	people	

Average Discharge Rate

Average Discharge =	100	GPD/person
(People x 100 GPCPD)/(1440 min/day)(448.8 gpm/cfs)=	**0.059**	**cfs**
	0.038	**MGD**

Peak Discharge Rate

Peaking Factor = (18 + (Population/1000)$^{0.5}$)/(4 + (Population/1000)$^{0.5}$) =	4.03	
Peak Flow = Average Discharge x Peaking Factor =	**0.238**	**cfs**
	0.154	**MGD**

Capacity of 10 " pipe @ 0.40 %= 1.39 cfs > 0.238 cfs

NOTES:

1. ALL PROPOSED SANITARY SEWER SHALL BE 10" DIAMETER.
2. PROPOSED WATERMAIN SHALL BE 8" DIAMETER.
3. SANITARY & WATER SERVICE SHALL BE PROVIDED TO EVERY LOT AND EACH MULTI-FAMILY UNIT.
4. 10' SUMP LEADS SHOWN ON THIS PLAN. DUPLEX UNITS 1-6 SUMP LEADS TO DAYLIGHT AND DISCHARGE DIRECTLY INTO THE ADJACENT DETENTION POND VIA 6" PVC COLLECTION PIPES.

LEGEND

OHE OHE	EXISTING OVERHEAD ELECTRICAL LINE
OHT OHT	EXISTING OVERHEAD TELEPHONE LINE
	EXISTING CURB AND GUTTER
	BOUNDARY LINE
C C C	EXISTING STORM
W	EXISTING WATER MAIN
	EXISTING SANITARY
	PROPOSED TREE PROTECTION
	PROPOSED SILT FENCE
C C C	PROPOSED STORM SEWER
	PROPOSED SANITARY
W	PROPOSED WATER MAIN
	PROPOSED LOT
	PROPOSED R.O.W.
	PROPOSED BACK/EDGE CURB
	EXISTING WELL
	EXISTING SIGN
	EXISTING FIRE HYDRANT
	EXISTING SANITARY MANHOLE
	EXISTING CATCH BASIN/INLET
	EXISTING WATER MANHOLE
	PROPOSED CATCH BASIN/INLET
	PROPOSED OUTLET
	PROPOSED MANHOLE
	PROPOSED WATER VALVE IN WELL
	PROPOSED FIRE HYDRANT
	PROPOSED RIP-RAP

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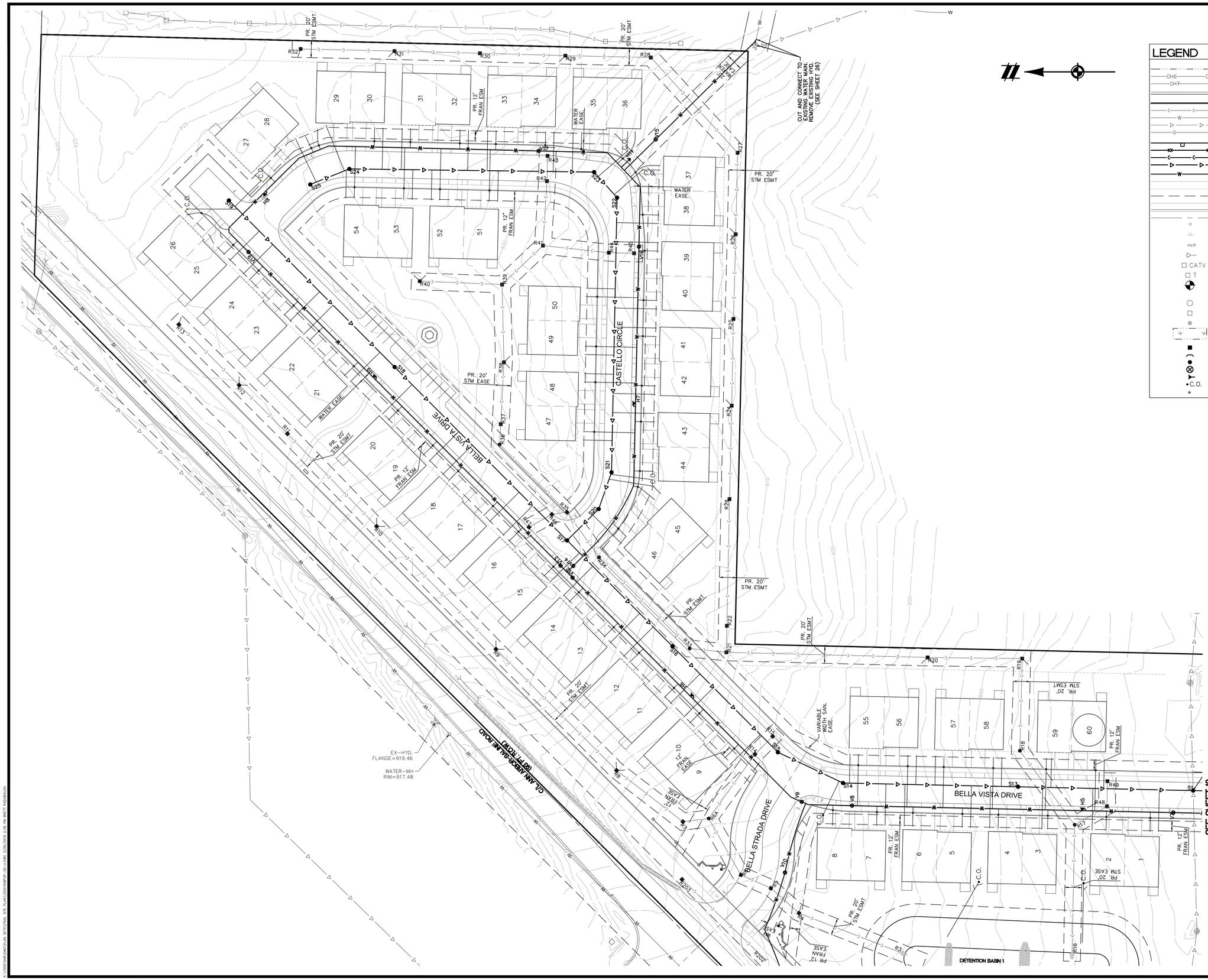
REVISIONS

SCALE 0 50 100
1" = 100 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 11	



LEGEND

	EXISTING WETLAND LINE
OHE	EXISTING OVERHEAD ELECTRICAL LINE
OHT	EXISTING OVERHEAD TELEPHONE LINE
	EXISTING CURB AND GUTTER
	BOUNDARY LINE
C	EXISTING STORM
W	EXISTING WATER MAIN
S	EXISTING SANITARY
G	EXISTING GAS
	PROPOSED TREE PROTECTION
	PROPOSED SILT FENCE
C	PROPOSED STORM SEWER
S	PROPOSED SANITARY
W	PROPOSED WATER MAIN
	PROPOSED LOT
	PROPOSED SETBACK
	PROPOSED EASEMENT
	PROPOSED R.O.W.
	PROPOSED BACK/EDGE CURB
	PROPOSED CENTERLINE
	EXISTING WELL
	EXISTING SIGN
U.P.	EXISTING UTILITY POLE
	EXISTING FIRE HYDRANT
CATV	EXISTING CABLE MARKER
T	EXISTING TELEPHONE RISER
	SECTION CORNER
	EXISTING SANITARY MANHOLE
	EXISTING CATCH BASIN/INLET
	EXISTING WATER MANHOLE
	EXISTING WETLAND
	PROPOSED CATCH BASIN/INLET
	PROPOSED OUTLET
	PROPOSED MANHOLE
	PROPOSED WATER VALVE IN WELL
	PROPOSED FIRE HYDRANT
C.O.	PROPOSED CLEANOUT
	PROPOSED CURB STOP

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SCALE 0 25 50
1" = 50 FEET

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P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 12	

SEE SHEET 12

LEGEND

	EXISTING WETLAND LINE
OHE / OHT	EXISTING OVERHEAD ELECTRICAL LINE / EXISTING OVERHEAD TELEPHONE LINE
	EXISTING CURB AND GUTTER
	BOUNDARY LINE
C	EXISTING STORM
W	EXISTING WATER MAIN
S	EXISTING SANITARY
G	EXISTING GAS
	PROPOSED TREE PROTECTION
	PROPOSED SILT FENCE
C	PROPOSED STORM SEWER
S	PROPOSED SANITARY
W	PROPOSED WATER MAIN
	PROPOSED LOT
	PROPOSED SETBACK
	PROPOSED EASEMENT
	PROPOSED R.O.W.
	PROPOSED BACK/EDGE CURB
	PROPOSED CENTERLINE
	EXISTING WELL
	EXISTING SIGN
U.P.	EXISTING UTILITY POLE
	EXISTING FIRE HYDRANT
CATV	EXISTING CABLE MARKER
T	EXISTING TELEPHONE RISER
	SECTION CORNER
	EXISTING SANITARY MANHOLE
	EXISTING CATCH BASIN/INLET
	EXISTING WATER MANHOLE
	EXISTING WETLAND
	PROPOSED CATCH BASIN/INLET
	PROPOSED OUTLET
	PROPOSED MANHOLE
	PROPOSED WATER VALVE IN WELL
	PROPOSED FIRE HYDRANT
C.O.	PROPOSED CLEANOUT
	PROPOSED CURB STOP

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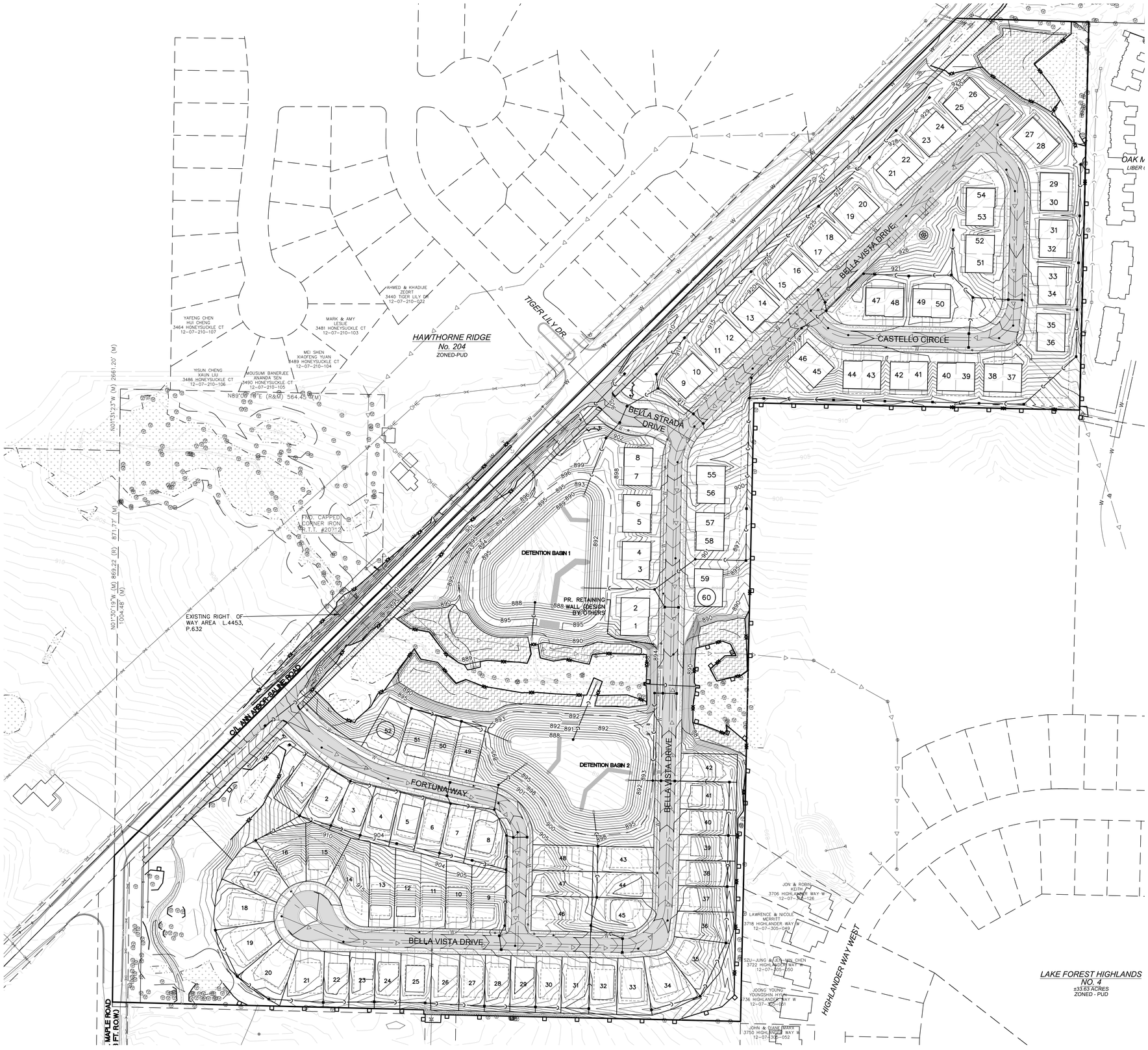
SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 13	



LEGEND

OHE	EXIST. OVERHEAD ELECTRIC
	EXIST. WETLAND LIMITS
W	EXIST. WATER MAIN
S	EXIST. SANITARY
G	EXIST. GAS
	BOUNDARY LINE
	PROP. WETLAND BUFFER
	PROP. LOT LINE
	EXISTING EASEMENT
	PROP. SETBACK LINE
	EXIST. CURB AND GUTTER
	PROP. R.O.W. LINE
	PROP. BACK/EDGE CURB
	PROP. SILT FENCE
C	PROP. STORM SEWER
S	PROP. SANITARY
W	PROP. WATER MAIN
	PROP. ROAD CENTERLINE
	PROP. TREE PROTECTION
	EXIST. SIGN
	EXIST. MANHOLE
	PROP. FIRE HYDRANT
	EXIST. WATER VALVE
	PROP. MANHOLE
	PROP. WATER VALVE IN WELL
	PROPOSED WETLAND MITIGATION

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SCALE 0 50 100
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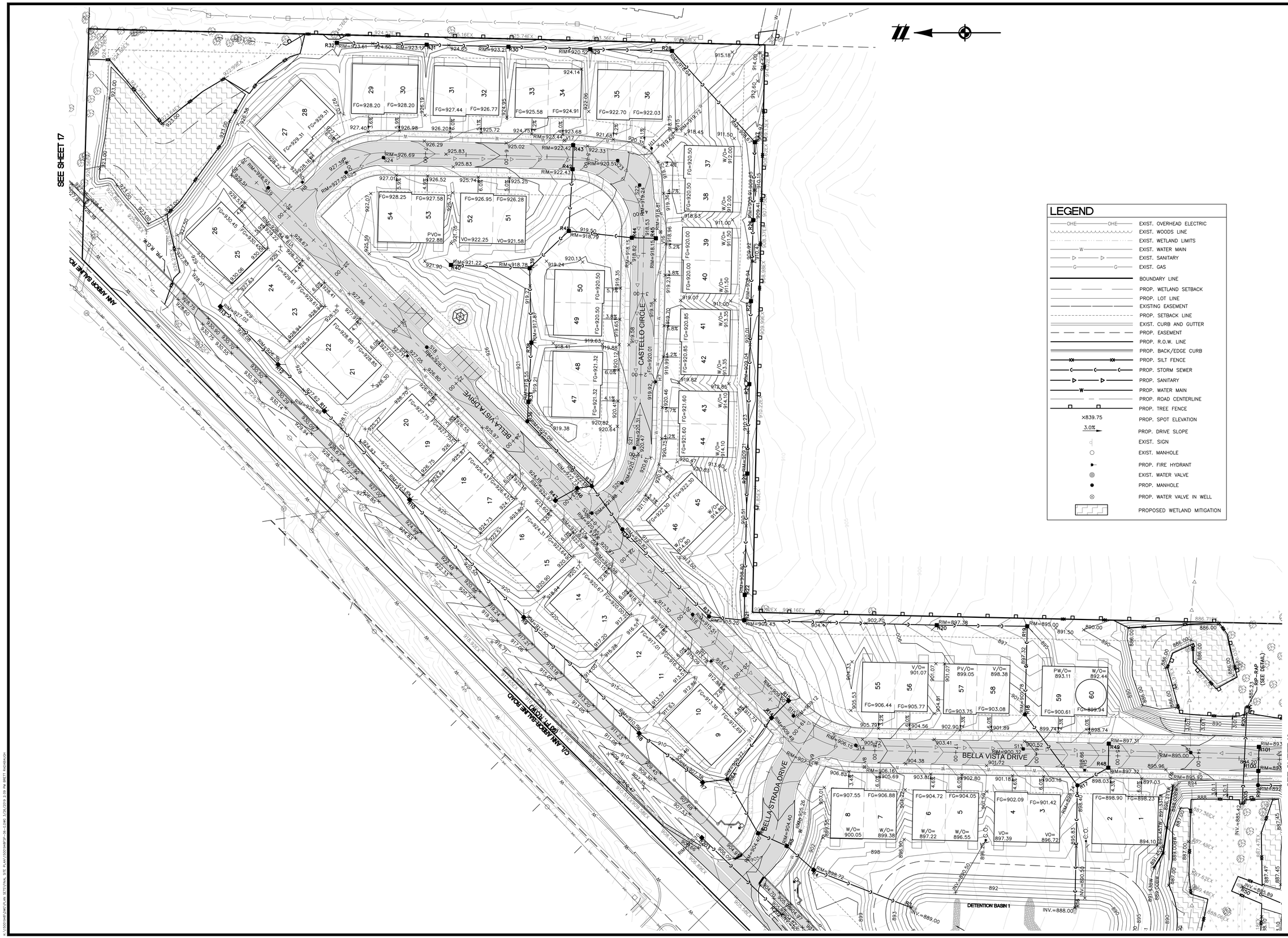
DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 14	

A:\15001948\DWG\PLAN SET\FINAL SITE PLAN\15001948PCP-06-GDNE 3/26/2019 2:29 PM BRETT RADBAUGH



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BOOK N/A	
JOB 15001948	
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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
GRADING PLAN – SOUTH

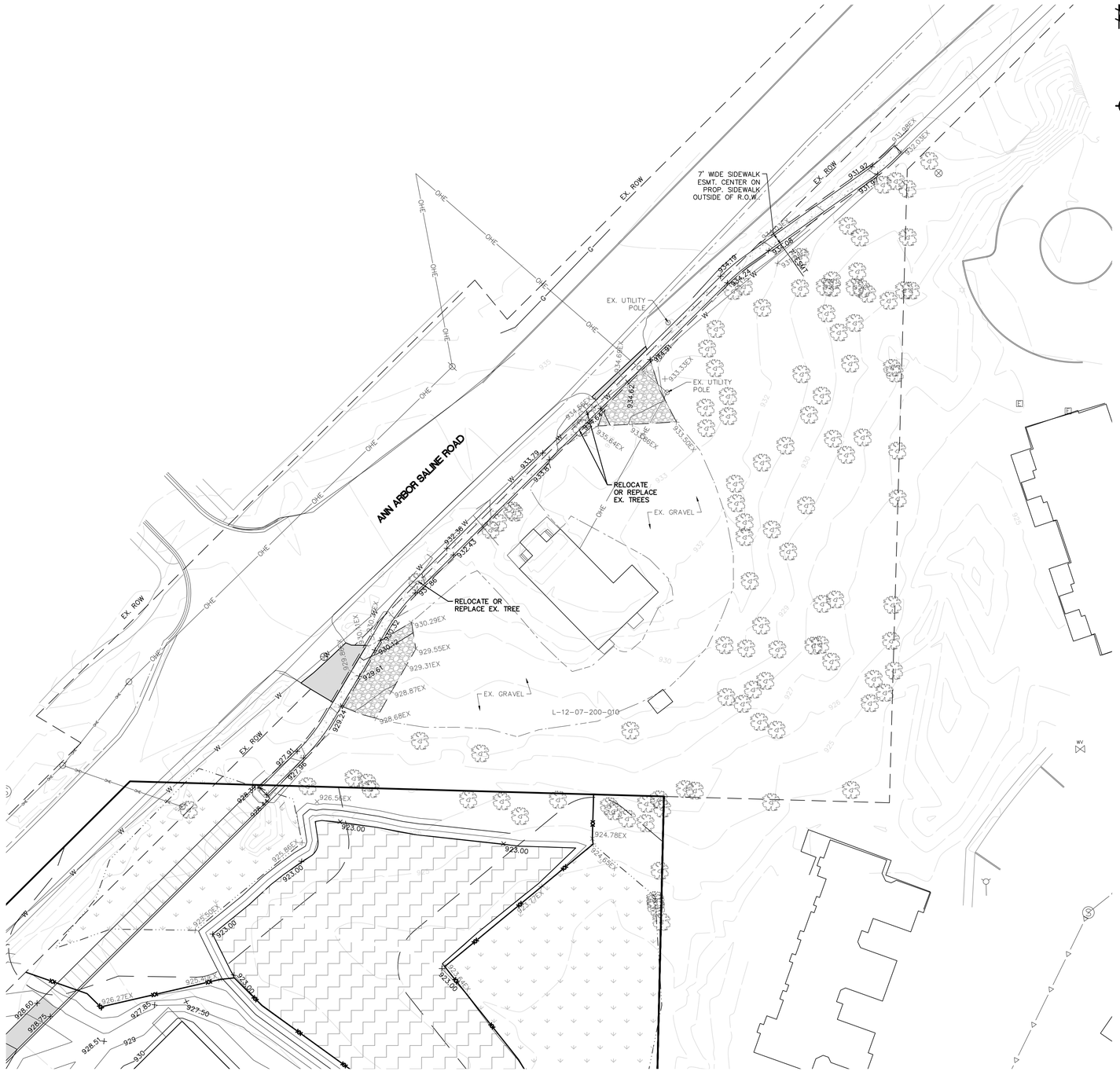
DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

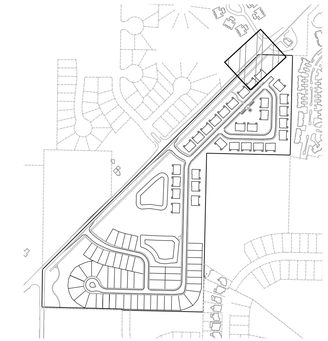
REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 16	



OFF SITE PATH GRADING



KEY MAP
1" = 600'

LEGEND

OHE	EXIST. OVERHEAD ELECTRIC
	EXIST. WETLAND LIMITS
	EXIST. GRAVEL
W	EXIST. WATER MAIN
S	EXIST. SANITARY
G	EXIST. GAS
	BOUNDARY LINE
	PROP. WETLAND SETBACK
	PROP. LOT LINE
	EXISTING EASEMENT
	PROP. SETBACK LINE
	EXIST. CURB AND GUTTER
	PROP. EASEMENT
	PROP. R.O.W. LINE
	PROP. BACK/EDGE CURB
	PROP. SILT FENCE
C	PROP. STORM SEWER
S	PROP. SANITARY
W	PROP. WATER MAIN
	PROP. ROAD CENTERLINE
X	PROP. FENCE
×839.75	PROP. SPOT ELEVATION
3.0%	PROP. DRIVE SLOPE
	EXIST. MANHOLE
	PROP. FIRE HYDRANT
	EXIST. WATER VALVE
	PROP. MANHOLE
	PROP. WATER VALVE IN WELL
	PROP. ASPHALT
	PROP. CONC. SIDEWALK
	PROP. GRAVEL
	PROP. BOARDWALK

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

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PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
OFFSITE GRADING

DATE
OCTOBER 17, 2018

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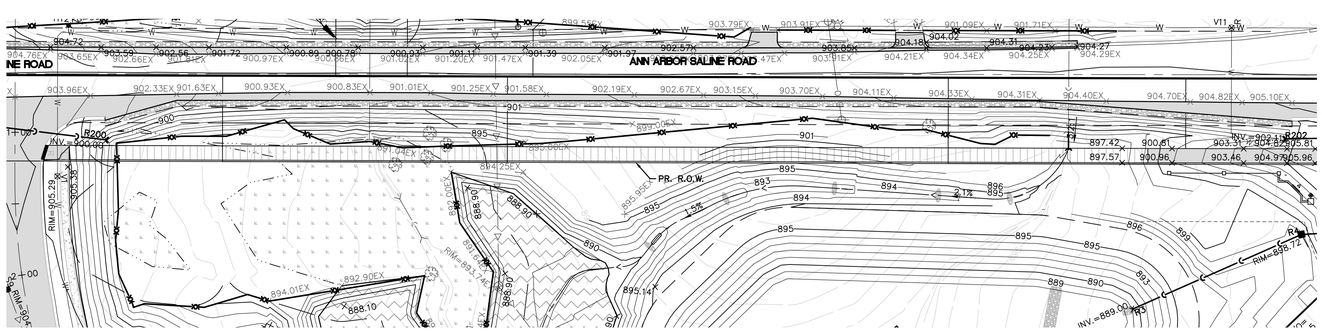
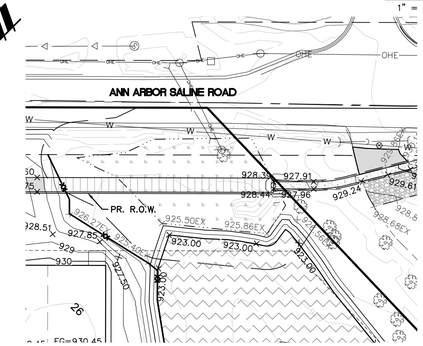
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

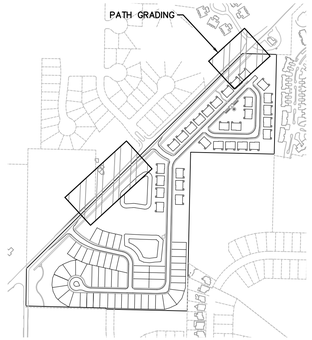
REVISIONS

SCALE 0 15 30
1" = 30 FEET

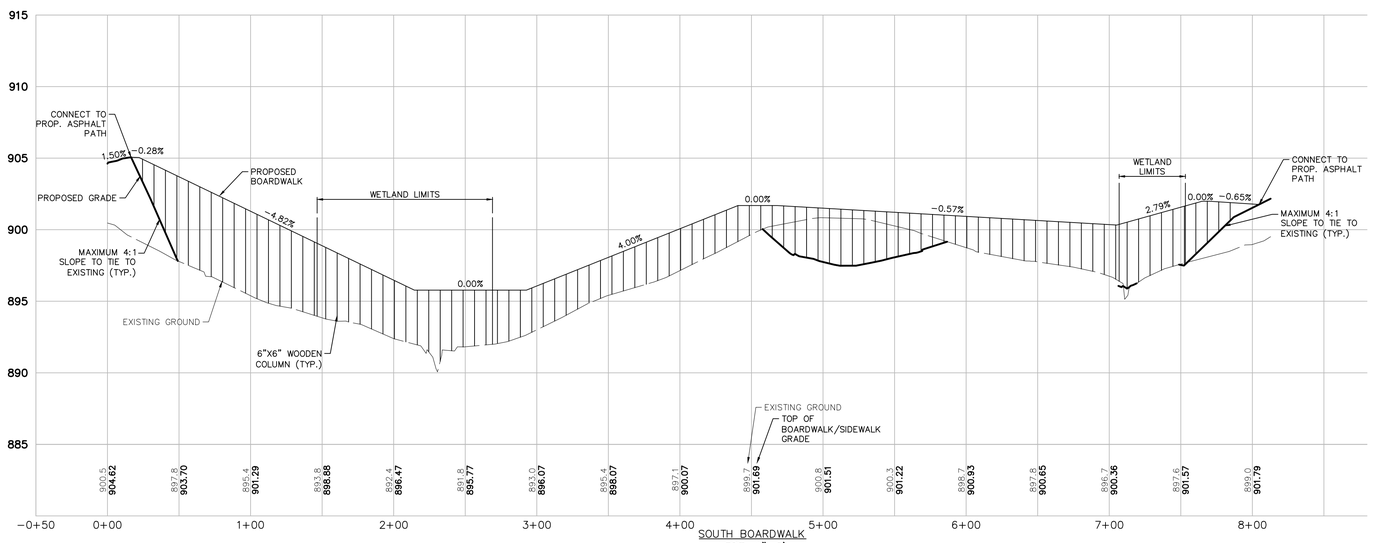
DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 17	



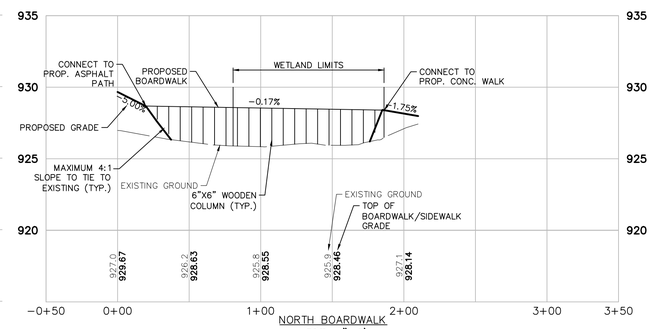




KEY MAP
1" = 600'



SOUTH BOARDWALK
VERT: 1"=5'
HORZ: 1"=50'



NORTH BOARDWALK
VERT: 1"=5'
HORZ: 1"=50'

NOTES

1. APPLICABLE EASEMENTS MUST BE OBTAINED FROM PROPERTY OWNER PRIOR TO CONSTRUCTION THE OFF-SITE PATHWAY AND BOARDWALK IMPROVEMENTS.
2. WCRC PERMIT REQUIRED FOR ANY WORK WITHIN THE ANN ARBOR-SALINE ROAD RIGHT-OF-WAY.
3. MDEQ PERMIT IS REQUIRED FOR ANY WETLANDS IMPACT ASSOCIATED WITH THE PATHWAY AND BOARDWALK IMPROVEMENTS.
4. BOARDWALK SHALL BE CONSTRUCTED WITH 2% MAXIMUM CROSS SLOPE AND 5% MAXIMUM LONGITUDINAL SLOPE.
5. RAMPS & SIDEWALK SHALL MEET ADA SPECIFICATIONS.
6. DETAILED DESIGN BY OTHERS WITH SHOP DRAWING SUBMITTAL PRIOR TO CONSTRUCTION.
7. THE CLEAR WIDTH OF THE BOARDWALK SHALL BE 12 FEET.

LEGEND

OHE OHE	EXIST. OVERHEAD ELECTRIC
	EXIST. WETLAND LIMITS
W	EXIST. WATER MAIN
▷ ▷	EXIST. SANITARY
G G	EXIST. GAS
	BOUNDARY LINE
	PROP. WETLAND SETBACK
	PROP. LOT LINE
	EXISTING EASEMENT
	PROP. SETBACK LINE
	EXIST. CURB AND GUTTER
	PROP. EASEMENT
	PROP. R.O.W. LINE
	PROP. BACK/EDGE CURB
	PROP. SILT FENCE
C C C	PROP. STORM SEWER
▷ ▷	PROP. SANITARY
W	PROP. WATER MAIN
	PROP. ROAD CENTERLINE
X X	PROP. FENCE
×839.75	PROP. SPOT ELEVATION
3.0%	PROP. DRIVE SLOPE
○	EXIST. MANHOLE
●	PROP. FIRE HYDRANT
◎	EXIST. WATER VALVE
●	PROP. MANHOLE
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PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

BOARDWALK GRADING

DATE
OCTOBER 17, 2018

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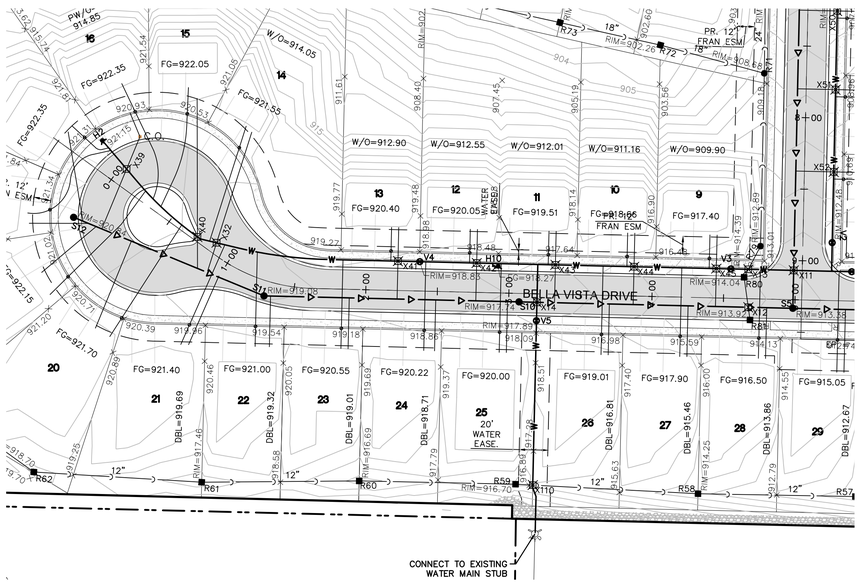
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

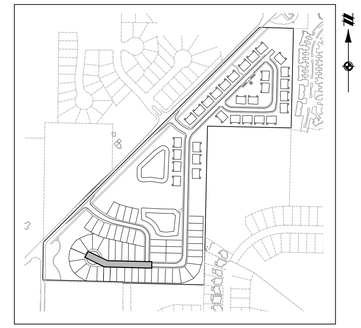
REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 18	

E:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948SP-06-G.DWG 3/26/2019 2:11 PM BRETT RADABAUGH





KEY MAP
1" = 600'

LEAD NO.	PIPE DIA.	LEAD LENGTH	PIPE MATERIAL	INVERT AT MAIN	INVERT AT END	RISER HEIGHT(FT)	SLOPE	FG	FOOTING	FFE	CLEAR
L9	6"	50'	PVC SDR 26	905.29	905.81	0	1.04%	917.40	909.57	917.90	3.26
L10	6"	50'	PVC SDR 26	906.16	906.68	0	1.04%	918.66	910.83	919.16	3.65
L11	6"	50'	PVC SDR 26	906.98	908.50	1	1.04%	919.51	911.68	920.01	2.67
L12	6"	50'	PVC SDR 26	907.75	908.27	0	1.04%	920.05	912.22	920.55	3.45
L13	6"	50'	PVC SDR 26	908.30	908.82	0	1.04%	920.40	912.57	920.90	3.25
L14	6"	101'	PVC SDR 26	909.76	910.81	0	1.04%	921.55	913.72	922.05	2.41
L15	6"	117'	PVC SDR 26	909.86	911.08	0	1.04%	922.05	914.22	922.55	2.64
L16	6"	106'	PVC SDR 26	910.22	911.32	0	1.04%	922.35	914.52	922.85	2.69
L17	6"	58'	PVC SDR 26	910.60	911.20	0	1.04%	922.35	914.52	922.85	2.81
L18	6"	60'	PVC SDR 26	910.46	911.09	0	1.04%	922.35	914.52	922.85	2.93
L19	6"	50'	PVC SDR 26	910.60	911.12	0	1.04%	922.15	914.32	922.65	2.70
L20	6"	68'	PVC SDR 26	910.32	911.03	0	1.04%	921.70	913.87	922.20	2.34
L21	6"	53'	PVC SDR 26	909.68	910.23	0	1.04%	921.40	913.57	921.90	2.83
L22	6"	36'	PVC SDR 26	909.19	909.56	0	1.04%	921.00	913.17	921.50	3.10
L23	6"	36'	PVC SDR 26	908.64	909.01	0	1.04%	920.55	912.72	921.05	3.20
L24	6"	36'	PVC SDR 26	908.09	908.46	0	1.04%	920.22	912.39	920.72	3.42
L25	6"	36'	PVC SDR 26	907.53	908.90	1	1.04%	920.00	912.17	920.50	2.76
L26	6"	36'	PVC SDR 26	906.40	907.77	1	1.04%	919.01	911.18	919.51	2.50
L27	6"	36'	PVC SDR 26	905.57	905.95	0	1.04%	917.90	910.07	918.40	3.62
L28	6"	36'	PVC SDR 26	904.75	905.12	0	1.04%	916.52	908.69	917.02	3.06

NOTE:
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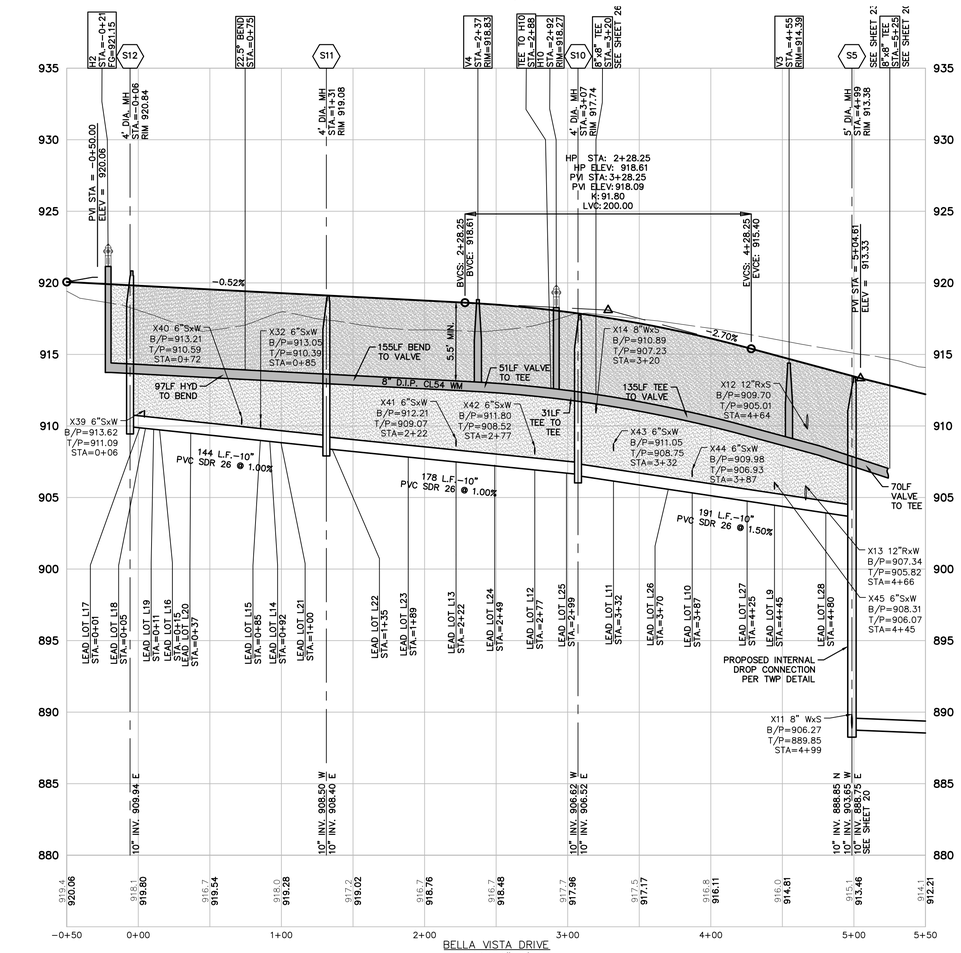
MAXIMUM WATER MAIN DEFLECTION OF 5° BETWEEN PIPE LENGTHS.



BELLA VISTA DRIVE
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES

8" D.I.P. CL54:	539 LF
8" VALVE IN WELL:	2 EA
HYDRANT ASSEMBLY:	2 EA
10" PVC:	513 LF
MANHOLE:	3 EA

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

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CLIENT
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BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
BELLA VISTA DRIVE PLAN &
PROFILE STA. 0+00 TO 5+00

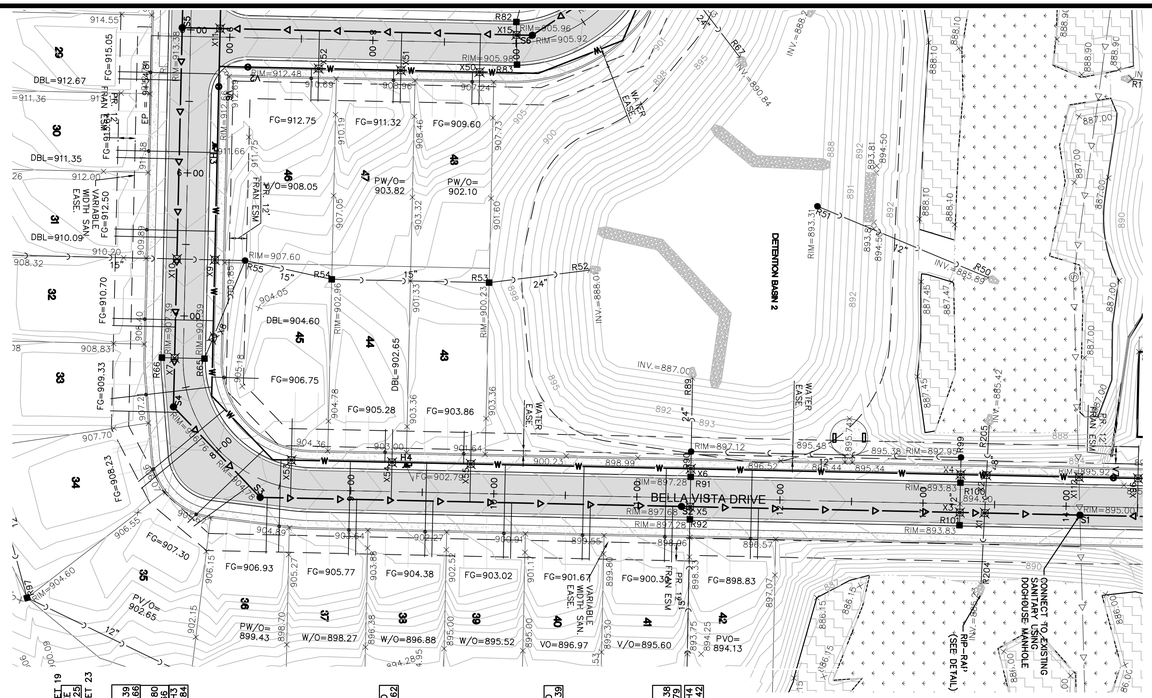
DATE
OCTOBER 17, 2018

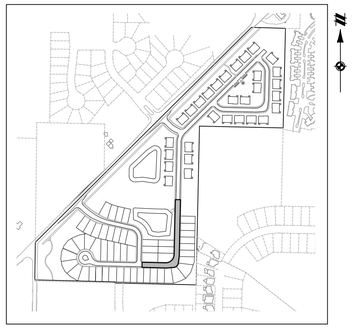
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 19	

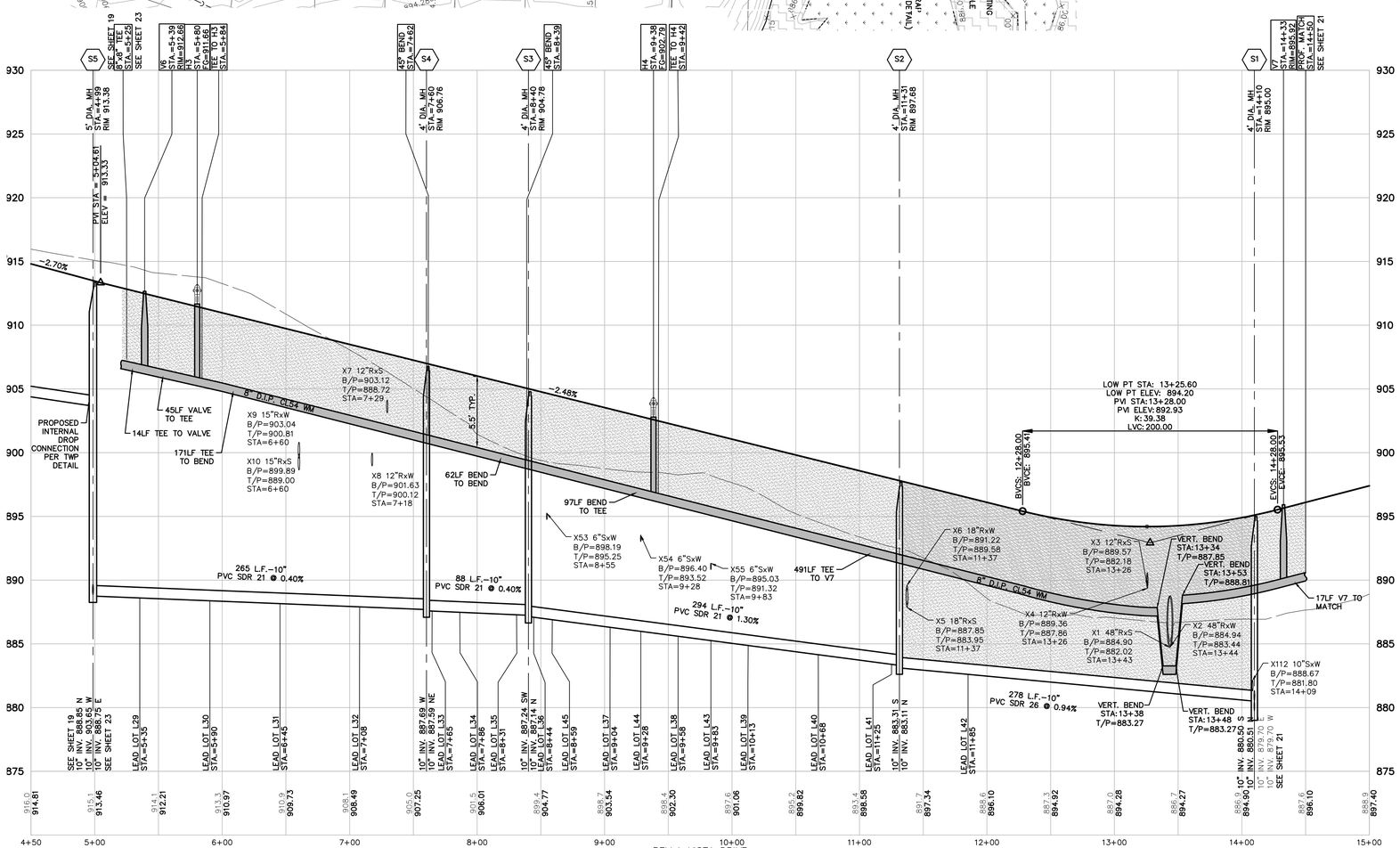




KEY MAP

1" = 600'

LEAD NO.	PIPE DIA.	LEAD LENGTH	PIPE MATERIAL	INVERT AT MAIN	INVERT AT END	RISER HEIGHT(FT)	SLOPE	FG	FOOTING	FFE	CLEAR
L29	6"	44'	PVC SDR 26	889.43	903.89	14	1.04%	915.05	907.22	915.55	2.83
L30	6"	44'	PVC SDR 26	889.21	902.17	12.5	1.04%	913.64	905.81	914.14	3.14
L31	6"	44'	PVC SDR 26	888.99	901.45	12	1.04%	912.50	904.67	913.00	2.72
L32	6"	44'	PVC SDR 26	888.77	899.23	10	1.04%	910.70	902.87	911.20	3.14
L33	6"	48'	PVC SDR 26	888.40	897.90	9	1.04%	909.33	901.50	909.83	3.10
L34	6"	56'	PVC SDR 26	888.30	896.88	8	1.04%	908.23	900.40	908.73	3.01
L35	6"	47'	PVC SDR 26	888.09	896.08	7.5	1.04%	907.30	899.47	907.80	2.89
L36	6"	39'	PVC SDR 26	887.79	895.70	7.5	1.04%	906.93	899.10	907.43	2.90
L37	6"	39'	PVC SDR 26	887.09	894.50	7	1.04%	905.78	897.94	906.28	2.95
L38	6"	39'	PVC SDR 26	886.38	893.28	6.5	1.04%	904.38	896.54	904.88	2.76
L39	6"	39'	PVC SDR 26	885.66	891.57	5.5	1.04%	903.03	895.19	903.53	3.13
L40	6"	39'	PVC SDR 26	884.95	890.35	5	1.04%	901.67	893.84	902.17	2.99
L41	6"	39'	PVC SDR 26	884.23	889.14	4.5	1.04%	900.30	892.47	900.80	2.83
L42	6"	36'	PVC SDR 26	883.44	887.81	4	1.04%	898.83	891.00	899.33	2.68
L43	6"	50'	PVC SDR 26	886.06	892.58	6	1.04%	903.86	896.03	904.36	2.94
L44	6"	50'	PVC SDR 26	886.77	893.79	6.5	1.04%	905.28	897.45	905.78	3.16
L45	6"	50'	PVC SDR 26	887.49	895.51	7.5	1.04%	906.75	898.92	907.25	2.90



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HORZ: 1"=50'

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MAXIMUM WATER MAIN DEFLECTION OF 5° BETWEEN PIPE LENGTHS.

QUANTITIES

8" D.I.P. CL54:	897 LF
8" VALVE IN WELL:	2 EA
HYDRANT ASSEMBLY:	2 EA
10" PVC:	925 LF
MANHOLE:	5 EA

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
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- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

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SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
BELLA VISTA DRIVE PLAN & PROFILE STA. 5+00 TO 14+00

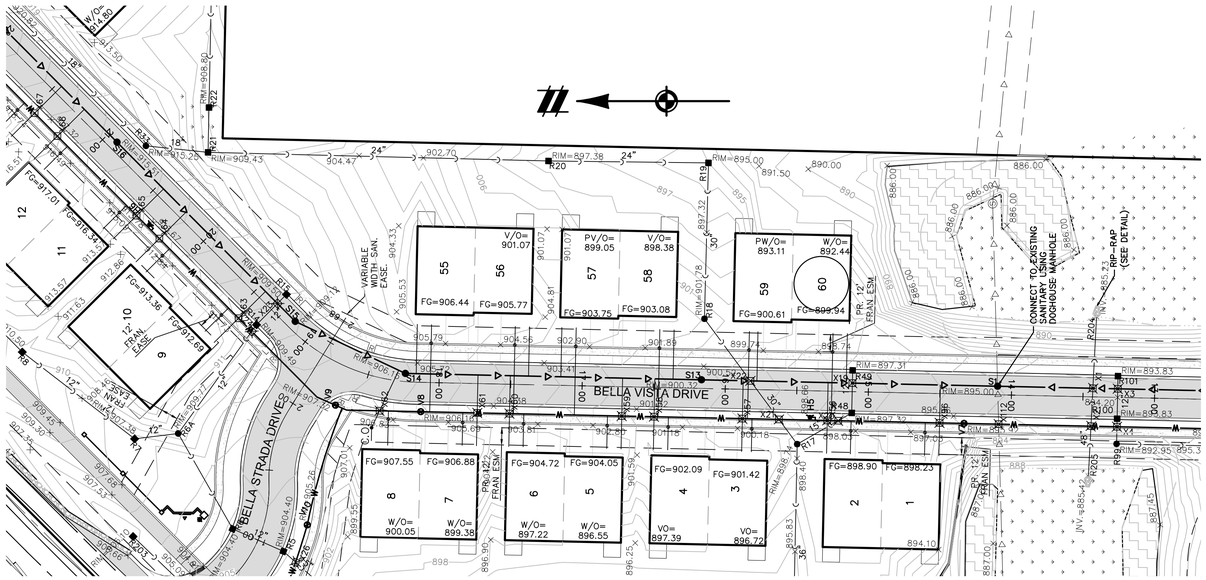
DATE
OCTOBER 17, 2018

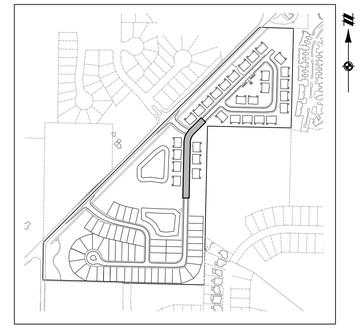
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET

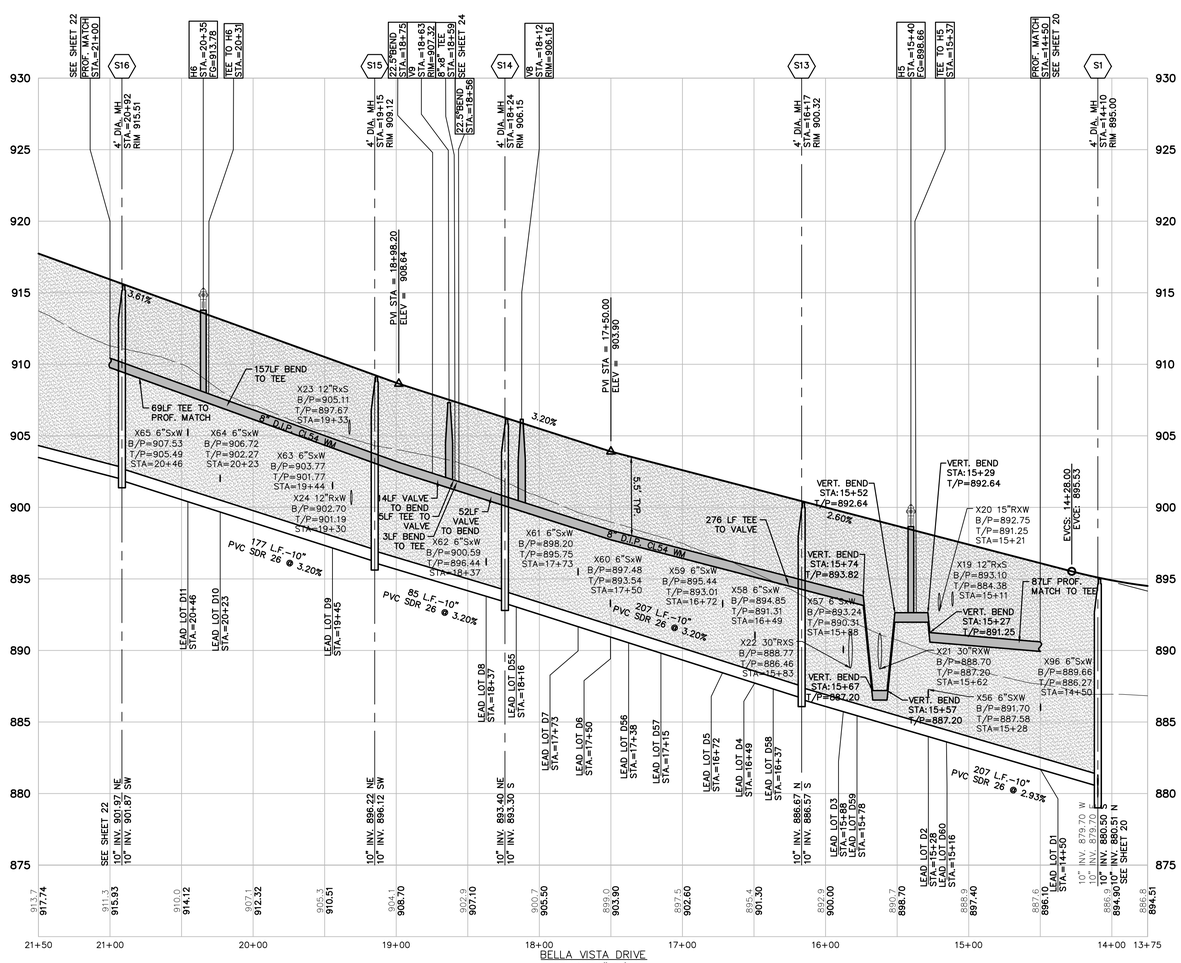
DR. CR CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
20





KEY MAP
1" = 600'

LEAD NO.	PIPE DIA.	LEAD LENGTH	PIPE MATERIAL	INVERT AT MAIN	INVERT AT END	RISER HEIGHT(FT)	SLOPE	FG	FOOTING	FFE	CLEAR
D1	6"	50'	PVC SDR 26	882.51	887.03	4	1.04%	898.23	890.40	898.73	2.87
D2	6"	50'	PVC SDR 26	884.83	887.85	2.5	1.04%	898.90	891.07	899.40	2.72
D3	6"	50'	PVC SDR 26	886.56	890.08	3	1.04%	901.42	893.59	901.92	3.01
D4	6"	50'	PVC SDR 26	888.56	891.08	2	1.04%	902.09	894.26	902.59	2.68
D5	6"	50'	PVC SDR 26	889.26	892.78	3	1.04%	904.05	896.22	904.55	2.93
D6	6"	50'	PVC SDR 26	891.79	893.31	1	1.04%	904.72	896.89	905.22	3.08
D7	6"	50'	PVC SDR 26	892.50	895.52	2.5	1.04%	906.88	899.05	907.38	3.03
D8	6"	58'	PVC SDR 26	894.64	896.24	1	1.04%	907.55	899.72	908.05	2.97
D9	6"	51'	PVC SDR 26	898.01	901.54	3	1.04%	912.69	904.86	913.19	2.82
D10	6"	50'	PVC SDR 26	900.51	902.03	1	1.04%	913.36	905.53	913.86	3.00
D11	6"	50'	PVC SDR 26	901.24	905.26	3.5	1.04%	916.34	908.51	916.84	2.75
D55	6"	35'	PVC SDR 26	893.90	895.27	1	1.04%	906.44	898.61	906.94	2.84
D56	6"	35'	PVC SDR 26	891.38	894.74	3	1.04%	905.77	897.94	906.27	2.70
D57	6"	35'	PVC SDR 26	890.64	892.50	1.5	1.04%	903.75	895.92	904.25	2.91
D58	6"	35'	PVC SDR 26	888.14	892.01	3.5	1.04%	903.08	895.25	903.58	2.74
D59	6"	35'	PVC SDR 26	886.26	889.13	2.5	1.04%	900.61	892.78	901.11	3.15
D60	6"	35'	PVC SDR 26	884.45	888.81	4	1.04%	899.94	892.11	900.44	2.80



NOTE:
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MAXIMUM WATER MAIN DEFLECTION OF 5° BETWEEN PIPE LENGTHS.

QUANTITIES

8" D.I.P. CL54:	664 LF
8" VALVE IN WELL:	2 EA
HYDRANT ASSEMBLY:	2 EA
10" PVC:	676 LF
MANHOLE:	4 EA

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
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- EXIST. GRAVEL
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- EXIST. WETLAND
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- EXIST. CULVERT
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- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
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- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
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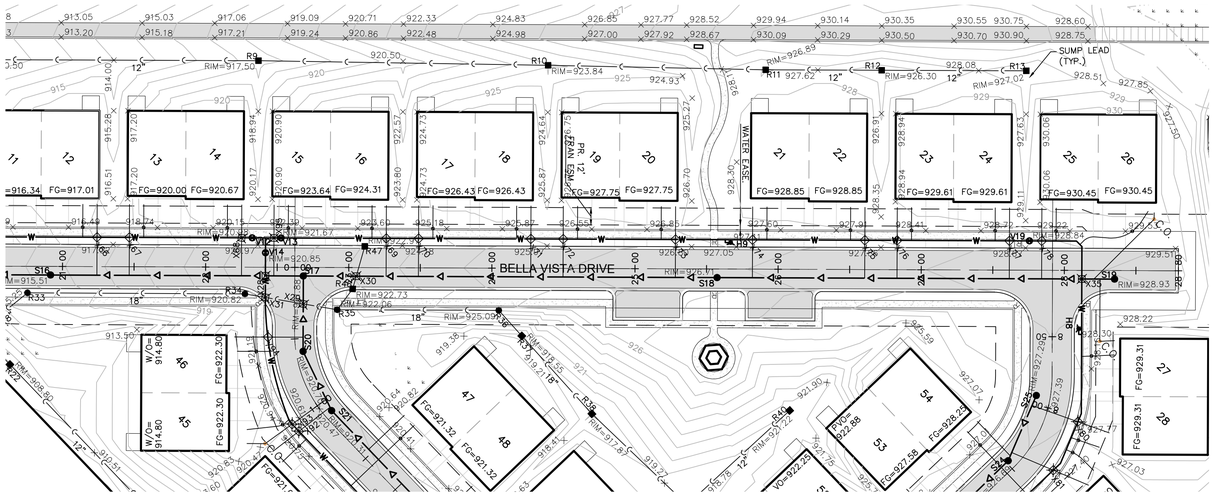
1" = 50 FEET

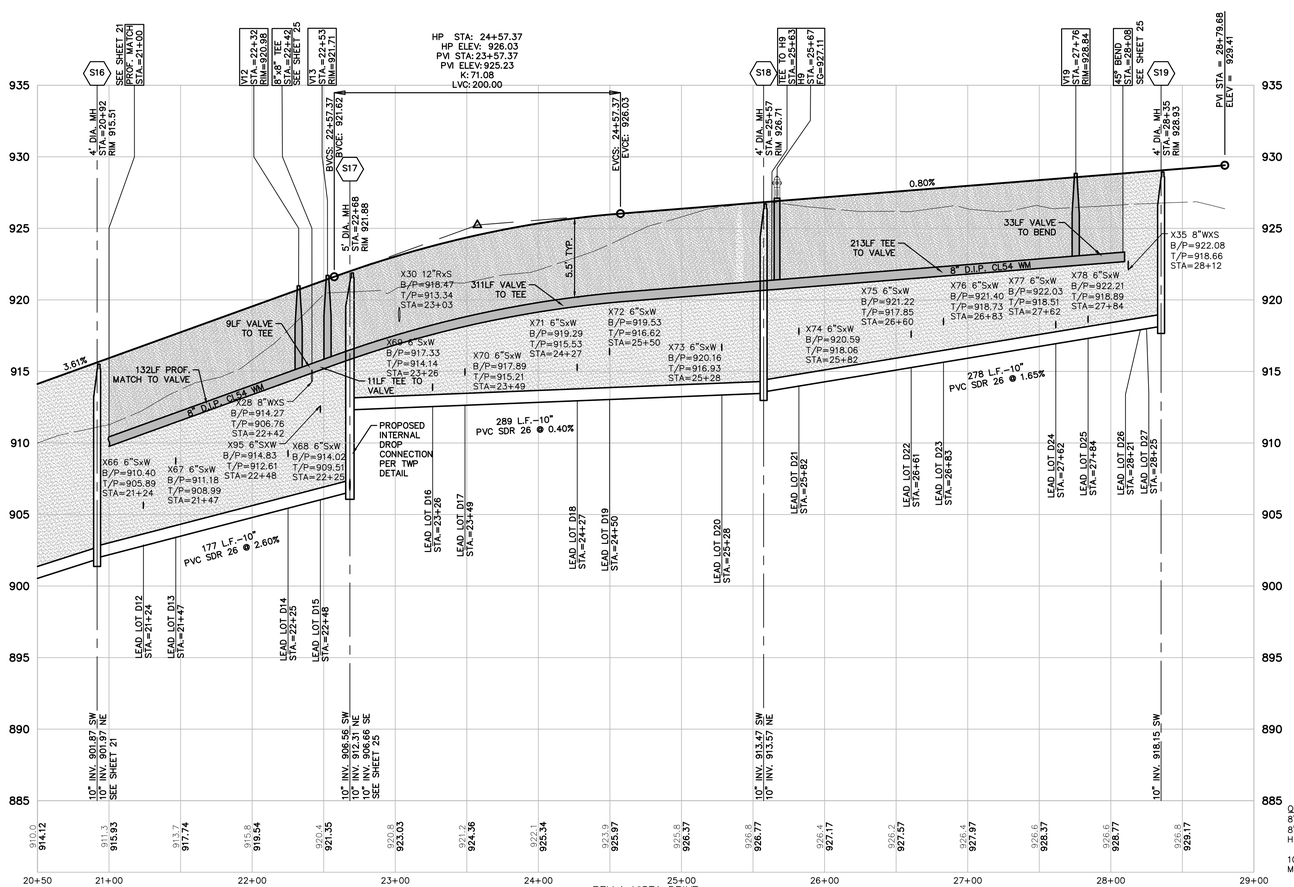
DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
21



KEY MAP
1" = 600'

LEAD NO.	PIPE DIA.	LEAD LENGTH	PIPE MATERIAL	INVERT AT MAIN	INVERT AT END	RISER HEIGHT(FT)	SLOPE	FG	FOOTING	FFE	CLEAR
D12	6"	50'	PVC SDR 26	903.63	905.65	1.5	1.04%	917.01	909.18	917.51	3.03
D13	6"	50'	PVC SDR 26	904.23	906.75	4	1.04%	920.00	912.17	920.50	2.92
D14	6"	50'	PVC SDR 26	906.26	909.28	2.5	1.04%	920.67	912.84	921.17	3.06
D15	6"	50'	PVC SDR 26	906.85	912.37	5	1.04%	923.64	915.81	924.14	2.93
D16	6"	50'	PVC SDR 26	913.37	913.89	0	1.04%	924.31	916.48	924.81	2.08
D17	6"	50'	PVC SDR 26	913.46	914.98	1	1.04%	926.43	918.60	926.93	3.12
D18	6"	50'	PVC SDR 26	913.78	915.30	1	1.04%	926.43	918.60	926.93	2.80
D19	6"	50'	PVC SDR 26	913.87	916.39	2	1.04%	927.75	919.92	928.25	3.03
D20	6"	50'	PVC SDR 26	914.18	916.70	2	1.04%	927.75	919.92	928.25	2.72
D21	6"	50'	PVC SDR 26	914.81	917.83	2.5	1.04%	928.85	921.02	929.35	2.69
D22	6"	50'	PVC SDR 26	916.10	917.62	1	1.04%	928.85	921.02	929.35	2.90
D23	6"	50'	PVC SDR 26	916.48	918.50	1.5	1.04%	929.61	921.78	930.11	2.78
D24	6"	50'	PVC SDR 26	917.76	918.28	0	1.04%	929.61	921.78	930.11	2.99
D25	6"	50'	PVC SDR 26	918.14	918.66	0	1.04%	930.45	922.62	930.95	3.45
D26	6"	64'	PVC SDR 26	918.74	919.40	0	1.04%	930.45	922.62	930.95	2.72
* D27	6"	53'	PVC SDR 26	918.82	919.37	0	1.04%	929.31	921.48	929.81	1.61

* LEAD DEPTH IS LESS THAN 10.5' BELOW FINISHED GRADE



BELLA VISTA DRIVE
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES

8" D.I.P. CL54:	709 LF
8" VALVE IN WELL:	3 EA
HYDRANT ASSEMBLY:	1 EA
10" PVC:	744 LF
MANHOLE:	3 EA

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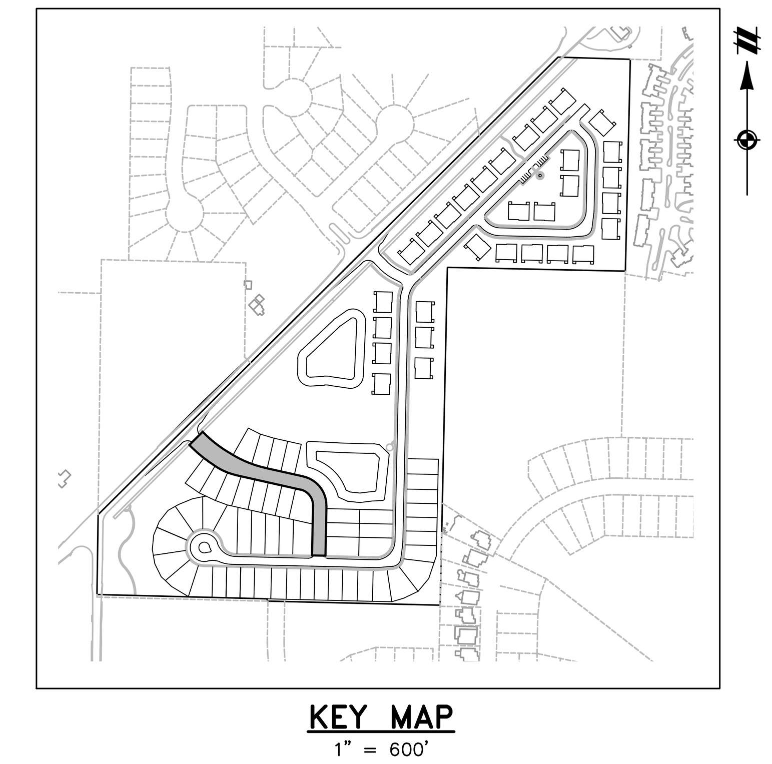
REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	

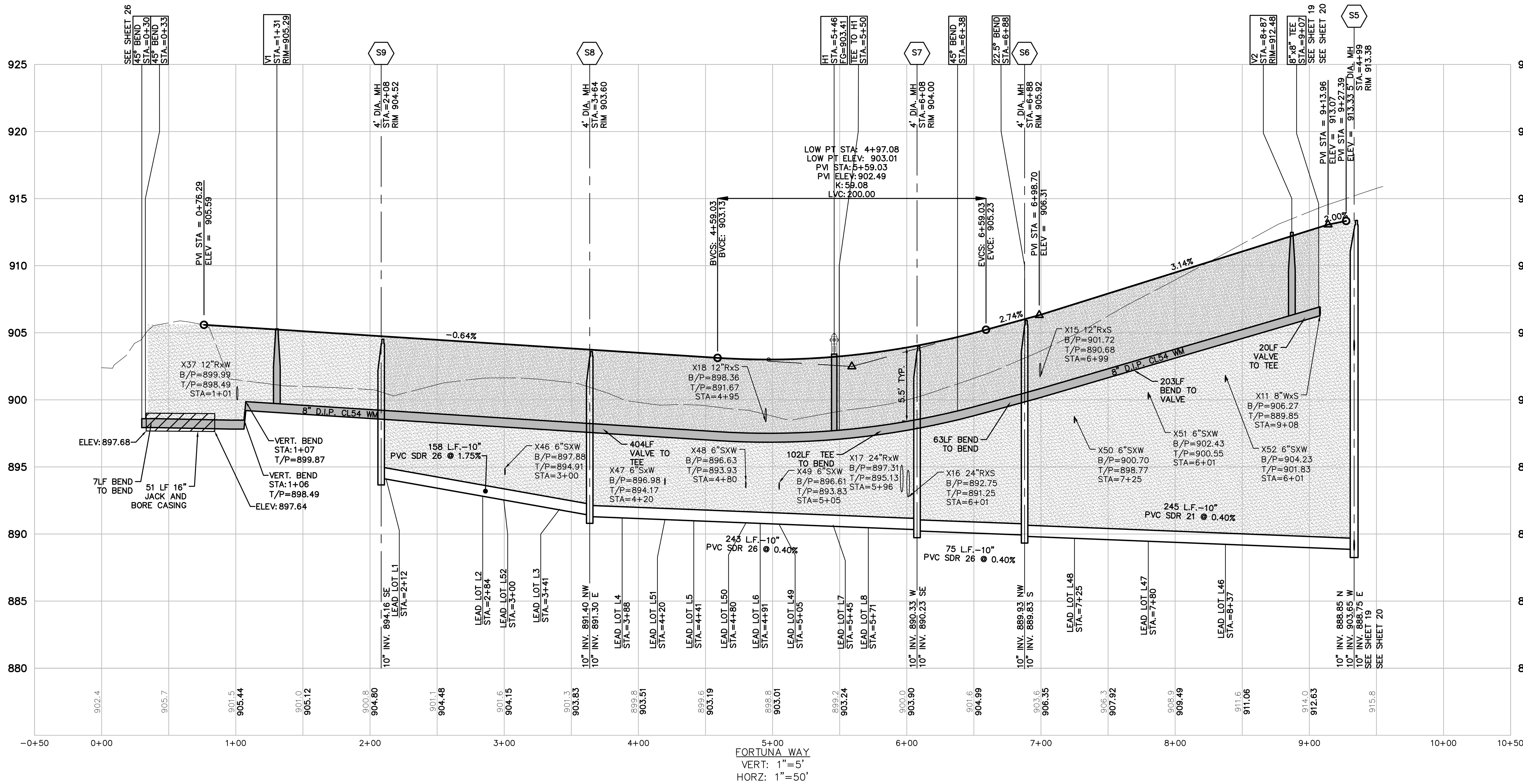
SHEET NO.
22



KEY MAP

1" = 600'

LEAD NO.	PIPE DIA.	LEAD LENGTH	PIPE MATERIAL	INVERT AT MAIN	INVERT AT END	RISER HEIGHT(FT)	SLOPE	FG	FOOTING	FFE	CLEAR
L1	6"	43'	PVC SDR 26	894.63	895.07	0	1.04%	906.36	898.53	906.86	2.95
L2	6"	46'	PVC SDR 26	893.65	894.13	0	1.04%	906.07	898.24	906.57	3.61
L3	6"	49'	PVC SDR 26	892.67	894.68	1.5	1.04%	905.83	898.00	906.33	2.82
L4	6"	47'	PVC SDR 26	892.03	894.02	1.5	1.04%	905.41	897.58	905.91	3.06
L5	6"	46'	PVC SDR 26	891.82	893.79	1.5	1.04%	905.01	897.18	905.51	2.88
L6	6"	46'	PVC SDR 26	891.62	893.60	1.5	1.04%	904.60	896.76	905.10	2.67
L7	6"	45'	PVC SDR 26	891.40	893.37	1.5	1.04%	904.85	897.02	905.35	3.15
L8	6"	45'	PVC SDR 26	891.30	894.26	2.5	1.04%	905.35	897.52	905.85	2.75
L46	6"	50'	PVC SDR 26	890.07	901.59	11	1.04%	912.75	904.92	913.25	2.83
L47	6"	50'	PVC SDR 26	890.29	900.31	9.5	1.04%	911.32	903.49	911.82	2.68
L48	6"	50'	PVC SDR 26	890.51	898.53	7.5	1.04%	909.60	901.77	910.10	2.74
L49	6"	50'	PVC SDR 26	891.56	893.58	1.5	1.04%	904.65	896.82	905.15	2.73
L50	6"	50'	PVC SDR 26	891.66	893.68	1.5	1.04%	904.70	896.87	905.20	2.68
L51	6"	50'	PVC SDR 26	891.90	893.92	1.5	1.04%	905.16	897.33	905.66	2.90
L52	6"	53'	PVC SDR 26	892.61	894.67	1.5	1.04%	905.75	897.92	906.25	2.75



FORTUNA WAY
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES

8" D.I.P. CL54:	890 LF
8" VALVE IN WELL:	2 EA
HYDRANT ASSEMBLY:	1 EA
10" PVC:	721 LF
MANHOLE:	4 EA

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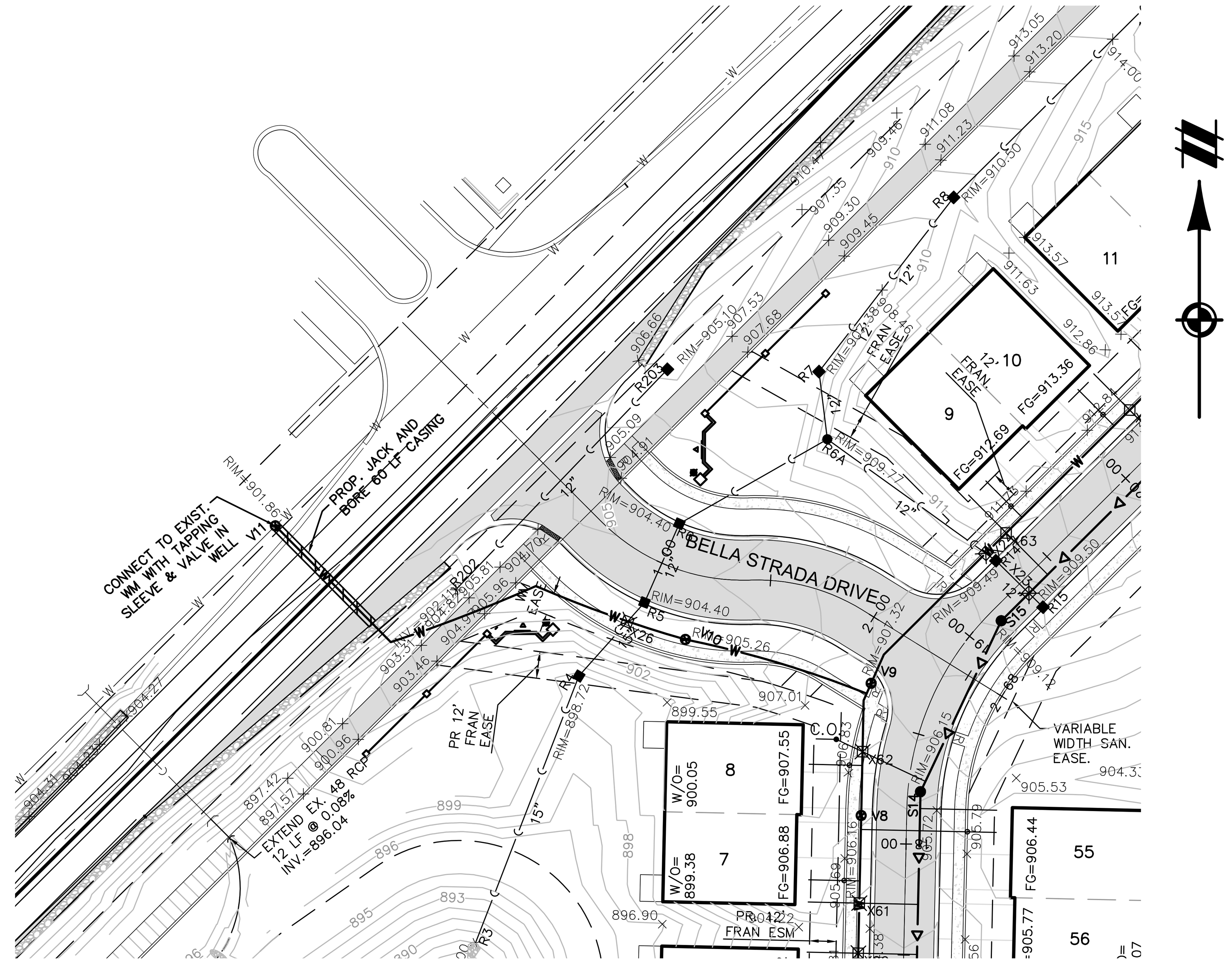
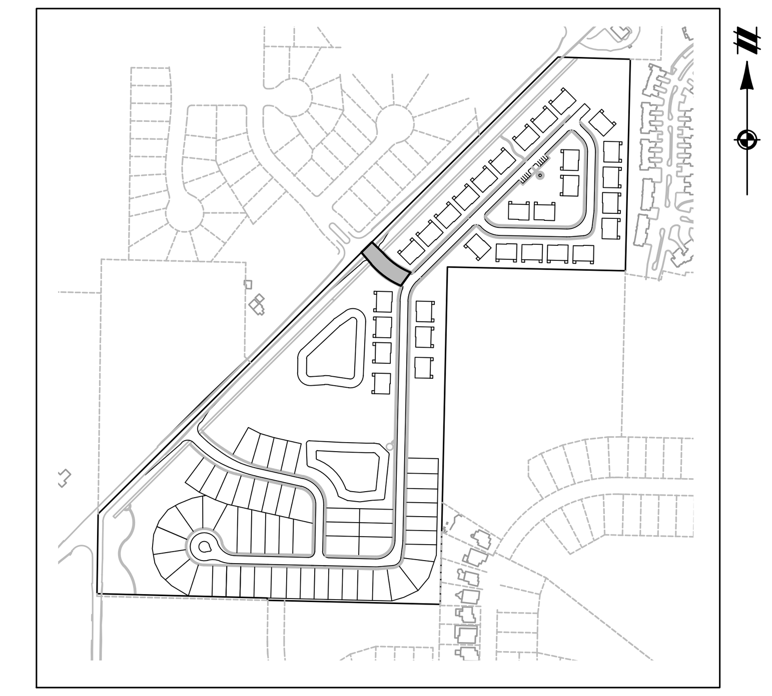
REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK	N/A
JOB	15001948
SHEET NO.	23

K:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948FSP-07-PRD.DWG 3/26/2019 2:15 PM BRETT RADABAUGH





KEY MAP
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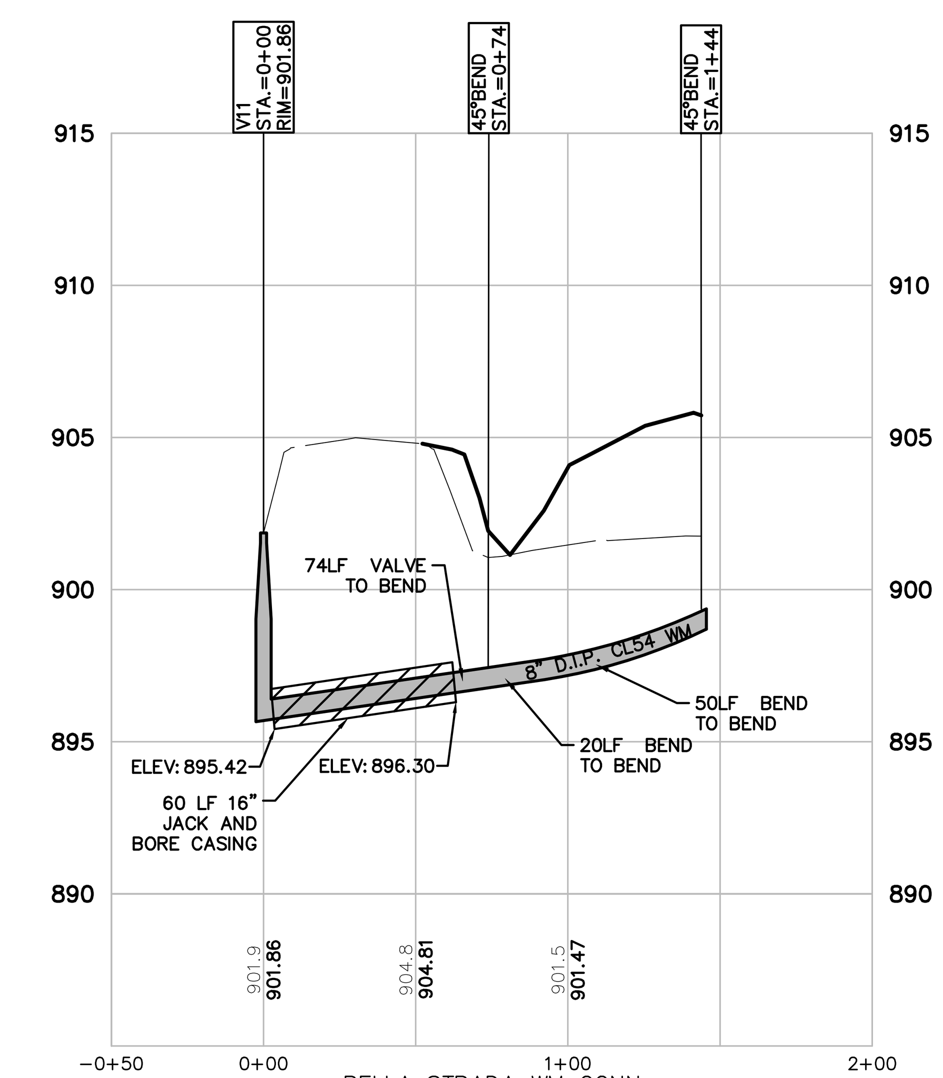
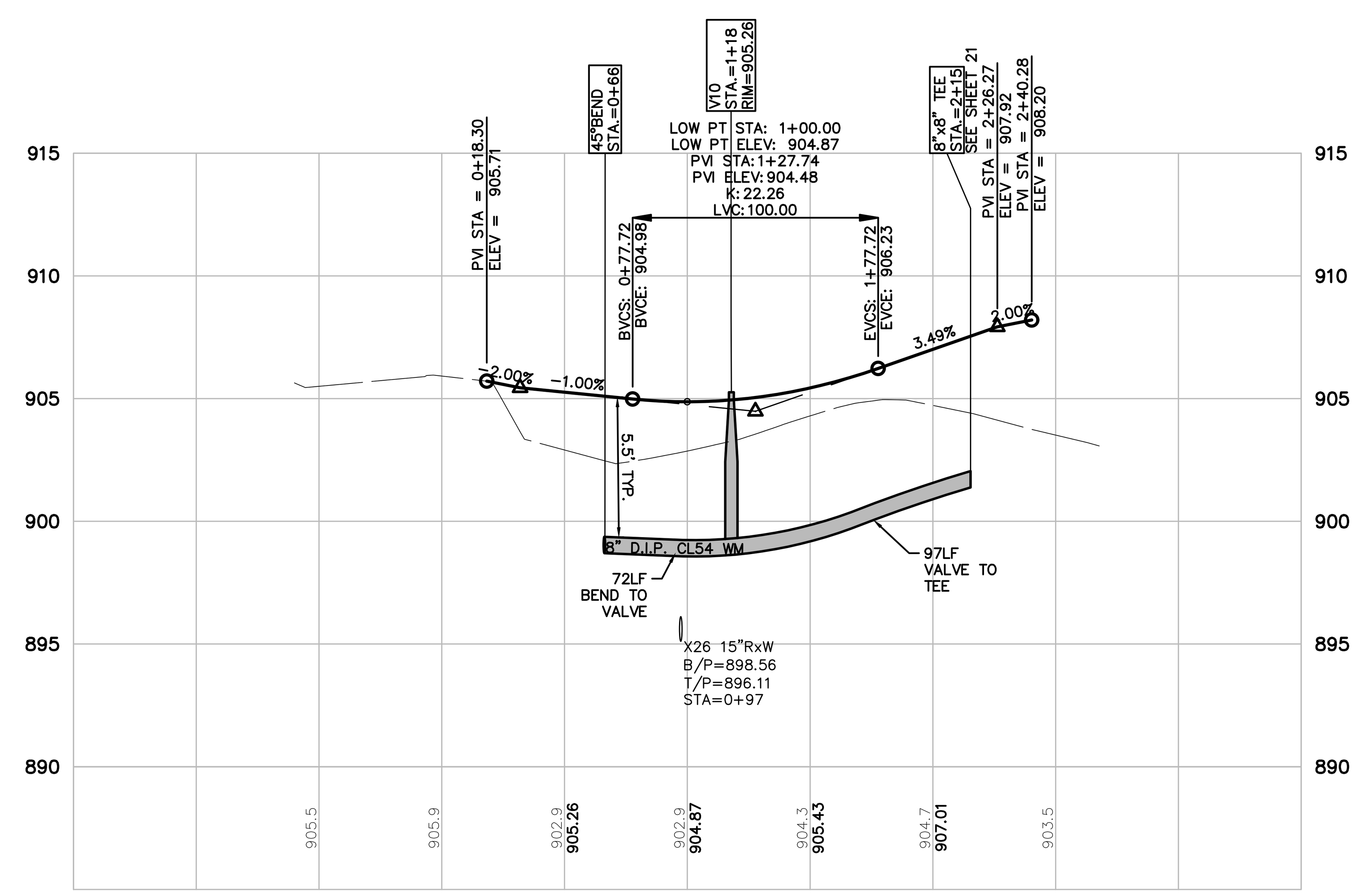


BELLA STRADA WM CONN
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES
8" D.I.P. CL54: 144 LF
8" VALVE IN WELL: 1 EA



BELLA STRADA DRIVE
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES
8" D.I.P. CL54: 149 LF
8" VALVE IN WELL: 1 EA

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MAXIMUM WATER MAIN DEFLECTION OF 5° BETWEEN PIPE LENGTHS.

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
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- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
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- PROP. PARKING STRIPE
- PROP. BACK OF CURB
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- PROP. LOT LINE
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- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
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- PROP. MANHOLE

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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

BELLA STRADA DRIVE PLAN & PROFILE

DATE
OCTOBER 17, 2018

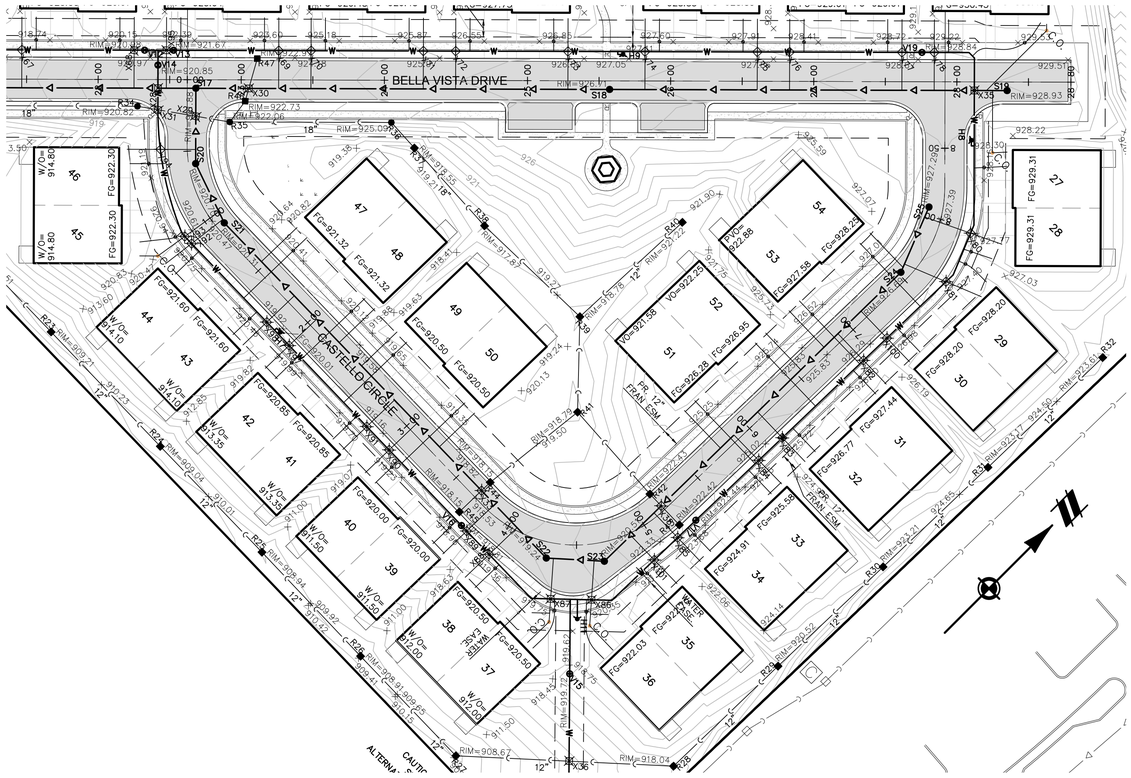
12–14–18 PER WCWRC & TWP
01–15–19 PER WCWRC & WCRC
02–01–19 PER TWP
02–08–19 PER TWP
03–01–19 PER WCRC
03–07–19 PER WCRC
03–26–19 PER SESC SUBMITTAL

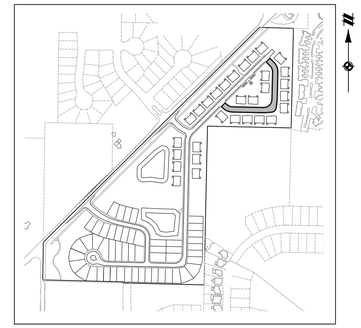
REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 24	

K:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948FSP-07-PRD.DWG 3/26/2019 2:16 PM BRETT RADABAUGH



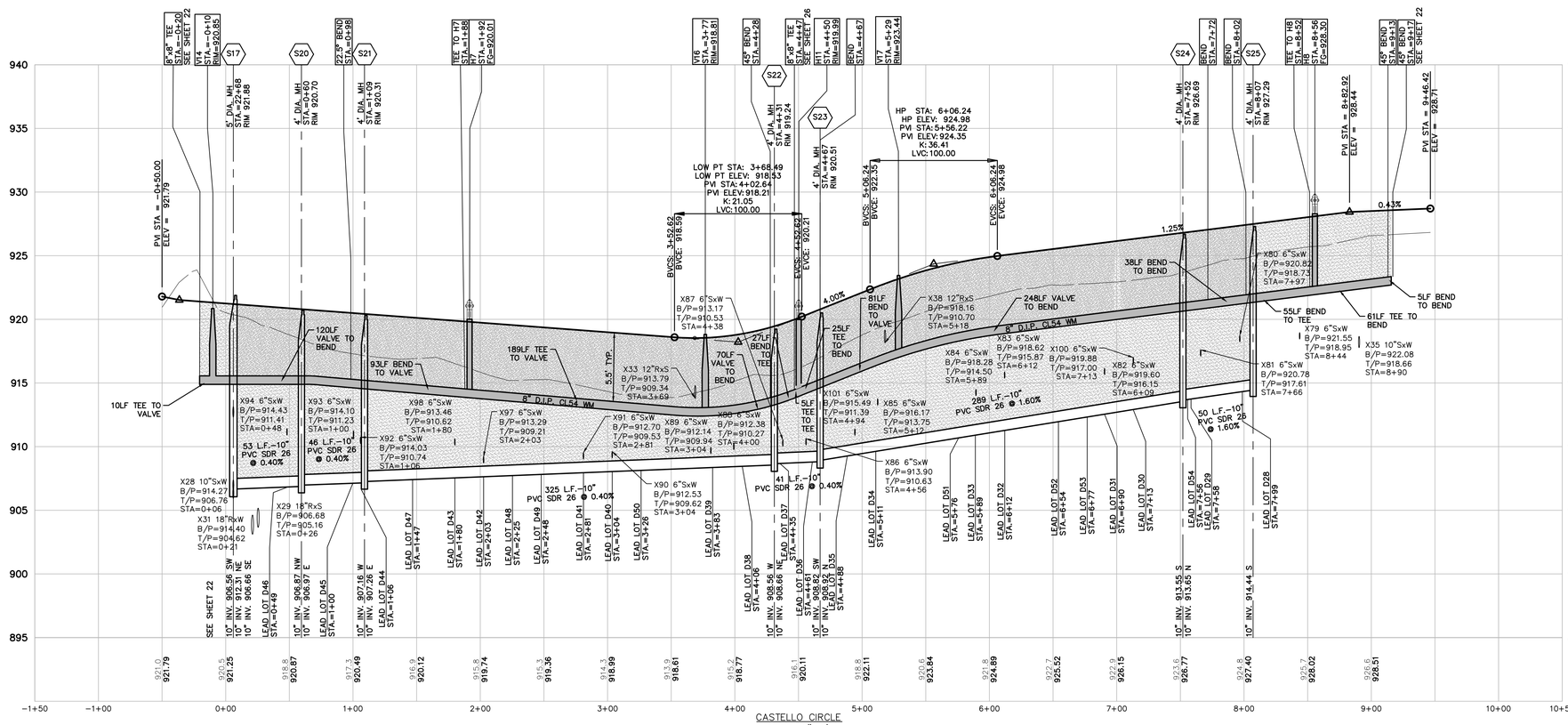


KEY MAP

1" = 600'

LEAD NO.	PIPE DIA	LEAD LENGTH	PIPE MATERIAL	INVERT AT MAIN	INVERT AT END	RISER HEIGHT(FT)	SLOPE	FG	FOOTING	FFE	CLEAR
D28	6"	58'	PVC SDR 26	914.89	918.50	3	1.04%	929.31	921.48	929.81	2.48
D29	6"	58'	PVC SDR 26	914.81	917.42	2	1.04%	928.20	920.37	928.70	2.45
D30	6"	50'	PVC SDR 26	913.25	916.77	3	1.04%	928.20	920.37	928.70	3.10
D31	6"	50'	PVC SDR 26	912.90	915.92	2.5	1.04%	927.44	919.61	927.94	3.19
D32	6"	50'	PVC SDR 26	911.63	915.65	3.5	1.04%	926.77	918.94	927.27	2.78
D33	6"	50'	PVC SDR 26	911.27	914.29	2.5	1.04%	925.58	917.75	926.08	2.96
D34	6"	50'	PVC SDR 26	910.02	913.54	3	1.04%	924.91	917.08	925.41	3.04
D35	6"	55'	PVC SDR 26	909.80	911.38	1	1.04%	922.70	914.87	923.20	2.99
D36	6"	88'	PVC SDR 26	909.73	910.65	0	1.04%	922.03	914.20	922.53	3.05
* D37	6"	89'	PVC SDR 26	909.62	910.55	0	1.04%	920.50	912.67	921.00	1.62
* D38	6"	55'	PVC SDR 26	909.50	910.08	0	1.04%	920.50	912.67	921.00	2.09
* D39	6"	50'	PVC SDR 26	909.18	909.70	0	1.04%	920.00	912.17	920.50	1.97
D40	6"	50'	PVC SDR 26	908.86	909.38	0	1.04%	920.00	912.17	920.50	2.29
D41	6"	50'	PVC SDR 26	908.77	909.29	0	1.04%	920.85	913.02	921.35	3.22
D42	6"	50'	PVC SDR 26	908.46	908.98	0	1.04%	920.85	913.02	921.35	3.54
D43	6"	50'	PVC SDR 26	908.37	910.39	1.5	1.04%	921.60	913.77	922.10	2.88
D44	6"	51'	PVC SDR 26	907.97	910.50	2	1.04%	921.60	913.77	922.10	2.76
D45	6"	53'	PVC SDR 26	907.95	911.00	2.5	1.04%	922.30	914.47	922.80	2.97
D46	6"	48'	PVC SDR 26	907.66	911.16	3	1.04%	922.30	914.47	922.80	2.81
D47	6"	35'	PVC SDR 26	908.24	910.10	1.5	1.04%	921.32	913.49	921.82	2.89
D48	6"	35'	PVC SDR 26	908.55	909.91	1	1.04%	921.32	913.49	921.82	3.07
D49	6"	35'	PVC SDR 26	908.64	909.01	0	1.04%	920.50	912.67	921.00	3.16
D50	6"	35'	PVC SDR 26	908.95	909.32	0	1.04%	920.50	912.67	921.00	2.85
D51	6"	35'	PVC SDR 26	911.06	914.92	3.5	1.04%	926.28	918.45	926.78	3.02
D52	6"	35'	PVC SDR 26	912.32	915.69	3	1.04%	926.95	919.12	927.45	2.93
D53	6"	35'	PVC SDR 26	912.67	916.54	3.5	1.04%	927.58	919.75	928.08	2.71
D54	6"	33'	PVC SDR 26	914.54	917.38	2.5	1.04%	928.25	920.42	928.75	2.53

* LEAD DEPTH IS LESS THAN 10.5' BELOW FINISHED GRADE



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MAXIMUM WATER MAIN DEFLECTION OF 5° BETWEEN PIPE LENGTHS.

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- PROP. WATER MAIN
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- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

QUANTITIES

8" D.I.P. CL54:	1027 LF
8" VALVE IN WELL:	3 EA
HYDRANT ASSEMBLY:	3 EA
10" PVC:	804 LF
MANHOLE:	6 EA

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WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
CASTELLO CIRCLE PLAN & PROFILE

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
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03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 25	

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MAXIMUM WATER MAIN DEFLECTION OF 5° BETWEEN PIPE LENGTHS.

LEGEND

	BOUNDARY LINE
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	SECTION LINE
	BOUNDARY/PROPERTY LINE
	EXIST. SETBACK
923	EXIST. CONTOUR
	EXIST. TREE LINE
	EXIST. CURB AND GUTTER
X X	EXIST. FENCE
	EXIST. GRAVEL
	EXIST. BUILDING
	EXIST. WETLAND
3533	EXIST. TREE
	EXIST. WETLAND BUFFER
OHE OHE	EXIST. OVERHEAD ELEC. LINE
OHT OHT	EXIST. OVERHEAD TELE. LINE
TV TV	EXIST. CABLE LINE
U U	EXIST. UNSPECIFIED UTILITIES
G G	EXIST. GAS
C C	EXIST. STORM
W	EXIST. WATER MAIN
S S	EXIST. SANITARY
	EXIST. UNSPECIFIED UTILITY
	EXIST. CULVERT
	EXIST. CATCH BASIN/INLET
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	PROP. ASHPALT
	PROP. LOT LINE
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923	PROP. CONTOUR
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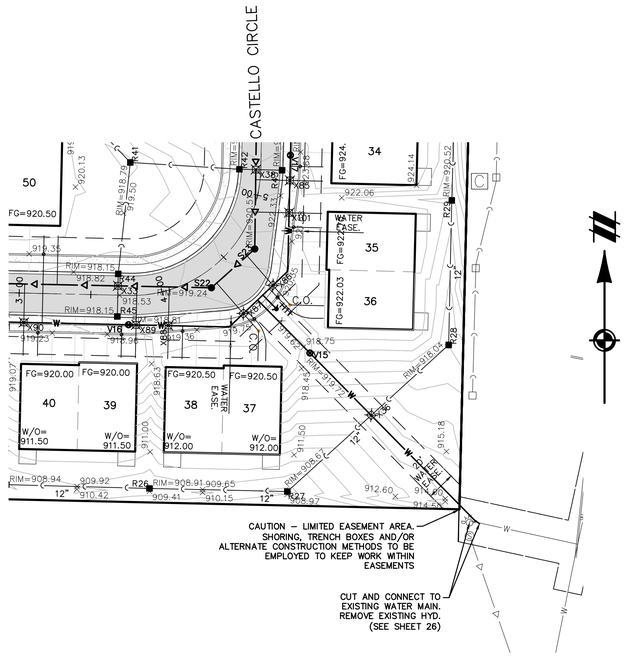
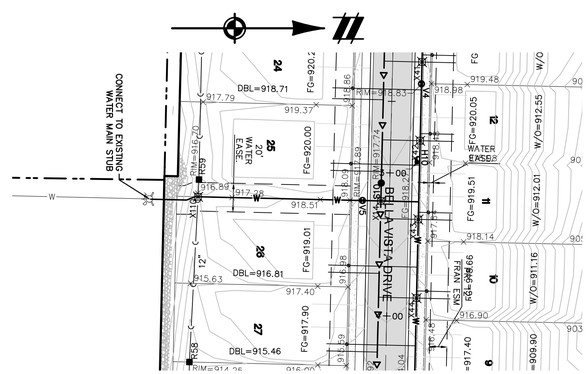
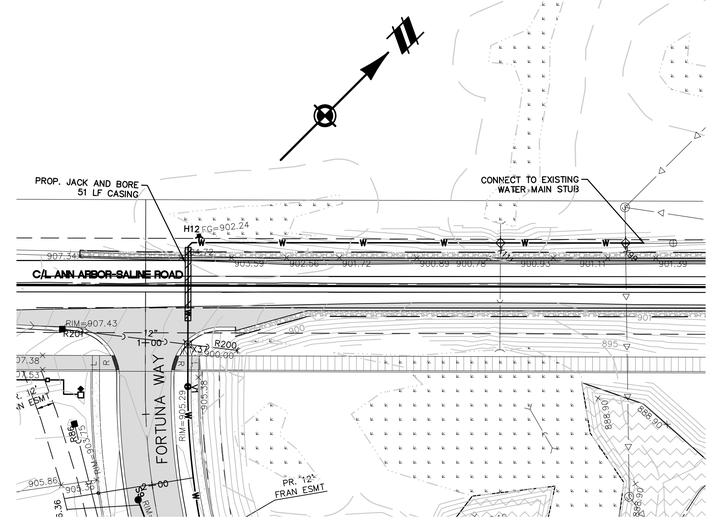
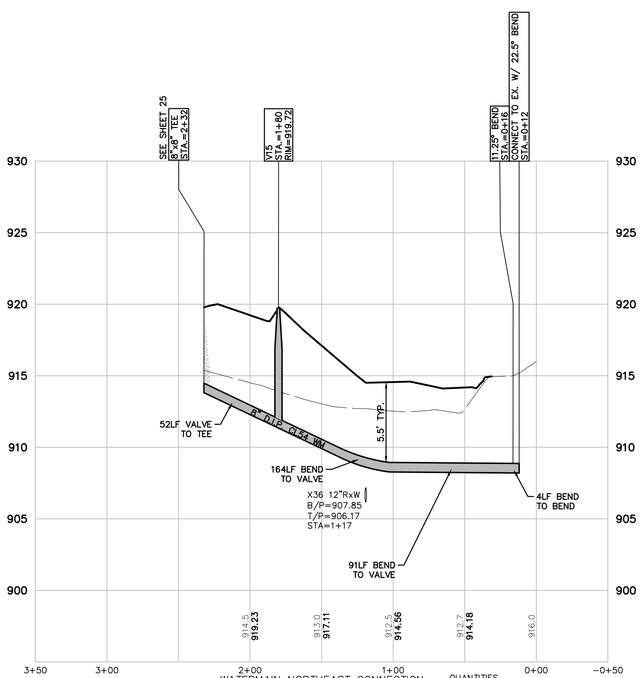
	PROP. SANITARY
	PROP. WATER MAIN
	PROP. END SECTION
	PROP. CATCH BASIN/INLET
	PROP. WATER VALVE
	PROP. FIRE HYDRANT
	PROP. MANHOLE

KEY MAP
1" = 600'



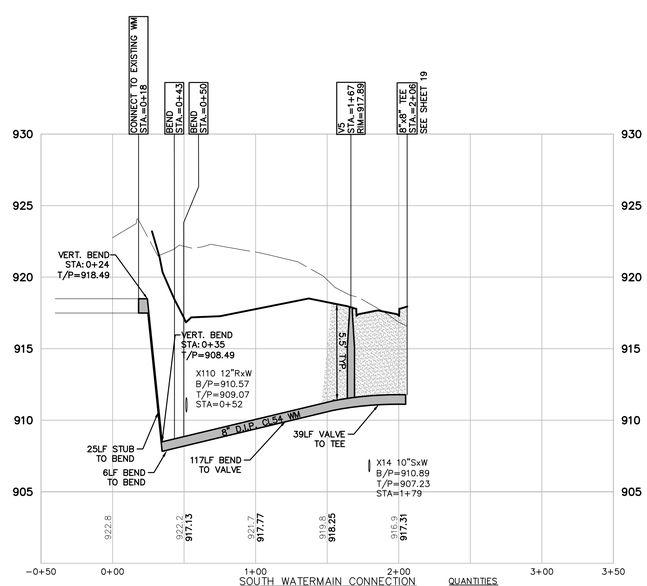






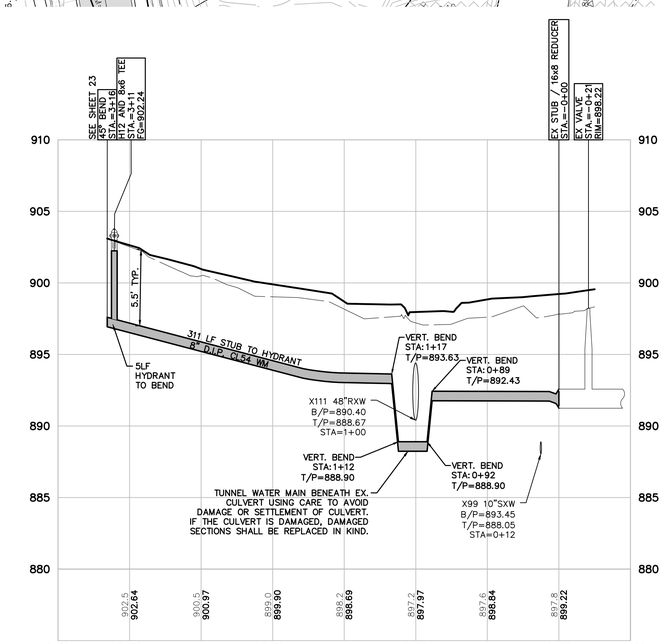
WATERMAIN NORTHEAST CONNECTION
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES
8" D.I.P. CL54: 220 LF
8" VALVE IS WELL: 1 EA



SOUTH WATERMAIN CONNECTION
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES
8" D.I.P. CL54: 187 LF
8" VALVE IN WELL: 1 EA



WM ALONG A.A.S. RD
VERT: 1"=5'
HORZ: 1"=50'

QUANTITIES
8" D.I.P. CL54: 316 LF
HYDRANT ASSEMBLY: 1 EA

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BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
WATERMAIN CONNECTIONS PLAN & PROFILE

DATE
OCTOBER 17, 2018

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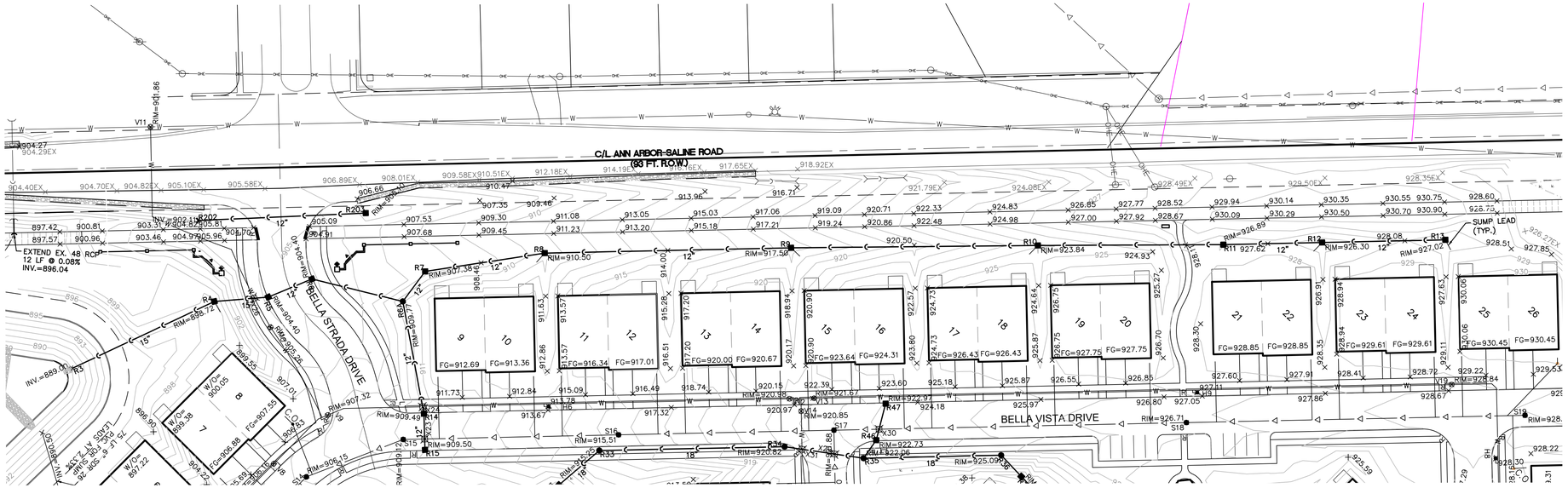
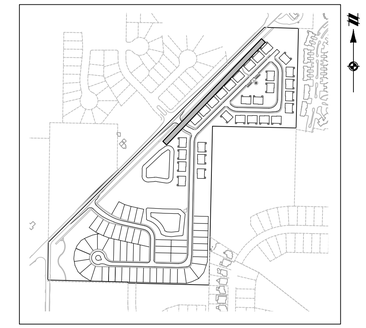
REVISIONS

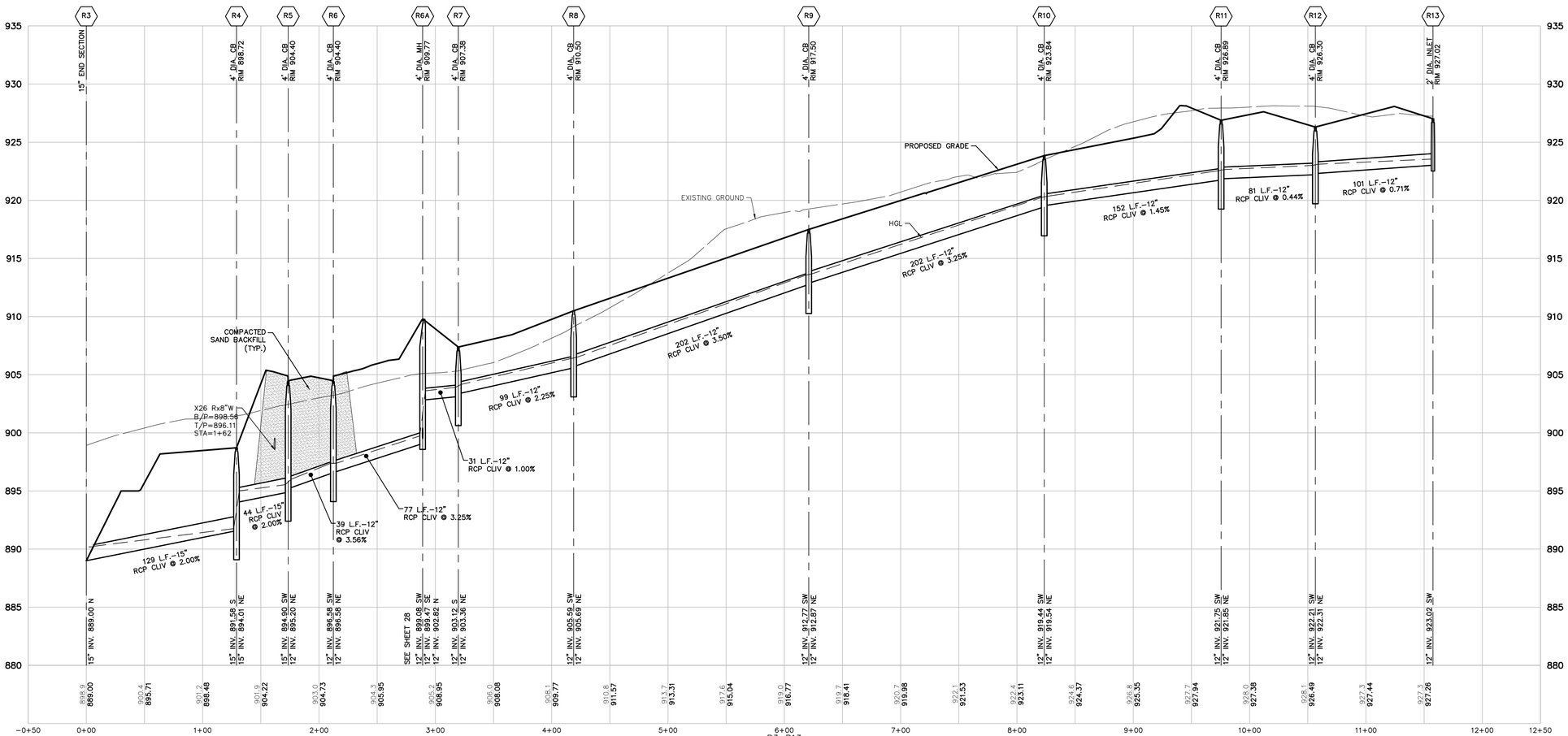
SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 26	





KEY MAP
1" = 600'



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BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

STORMWATER PLAN & PROFILE 1

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OCTOBER 17, 2018

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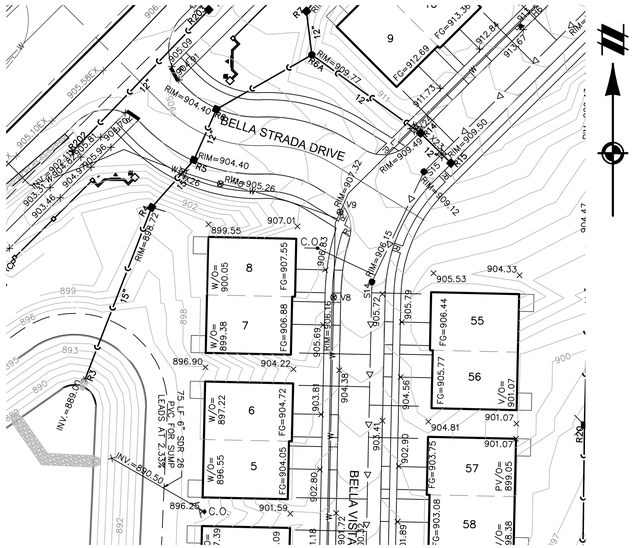
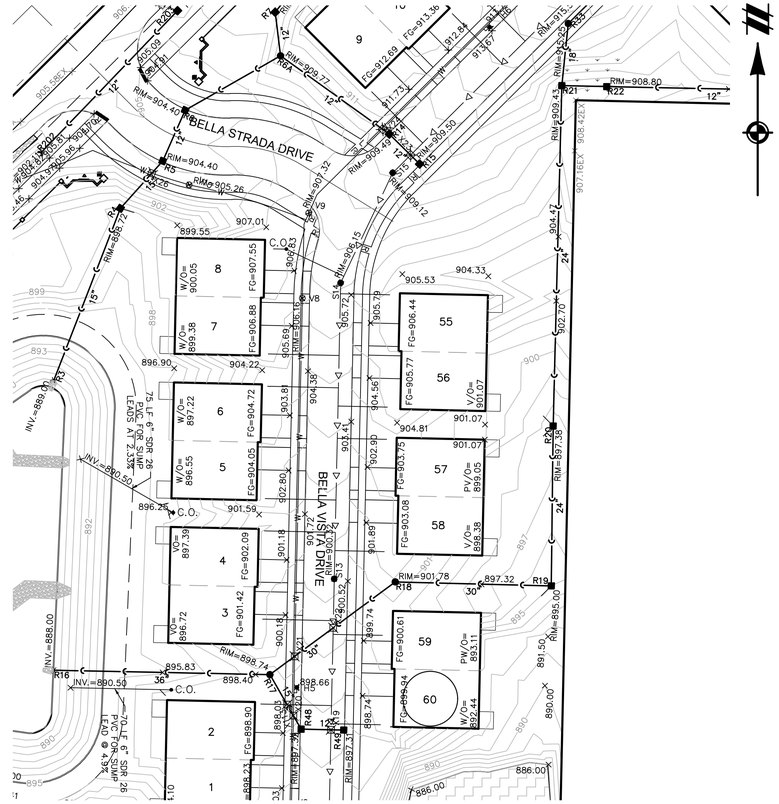
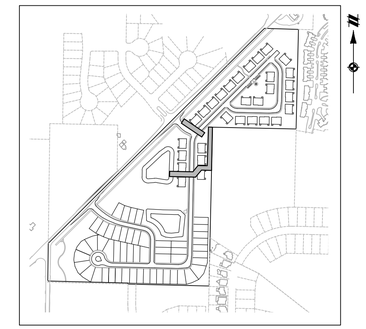
JOB 15001948	
SHEET NO. 27	

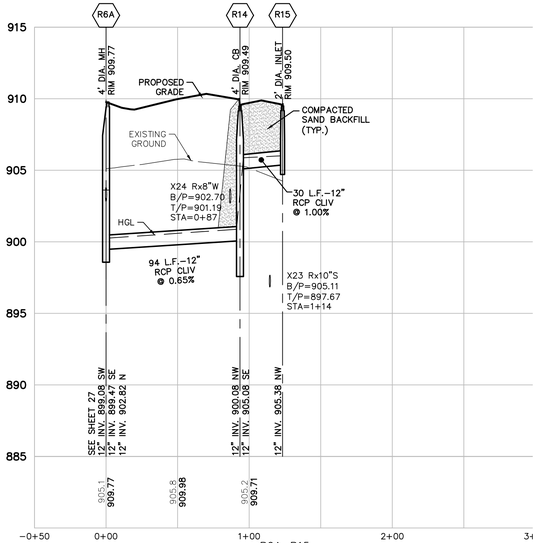




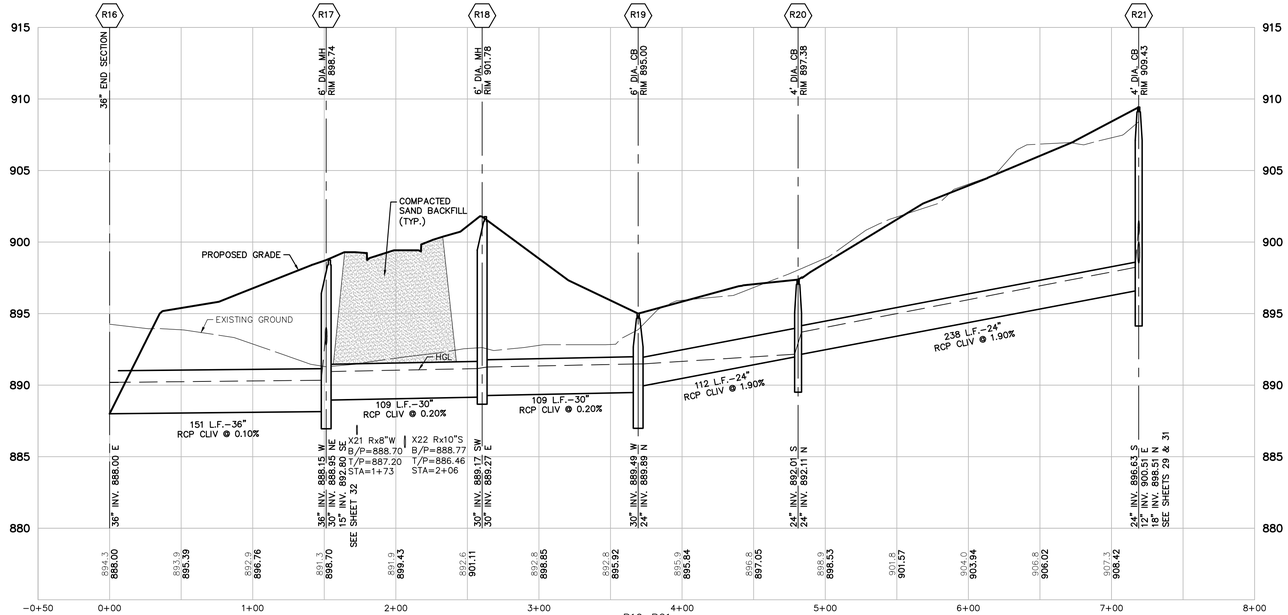


KEY MAP
1" = 600'

NOTE:
COMPACTION OF TRENCHES IS REQUIRED IN ROADWAY CORRIDORS (CLASS II GRANULAR BACKFILL AT 95% COMPACTION). ROADWAY CORRIDORS CONSTITUTE FRONT OF HOUSE TO FRONT OF HOUSE IN RESIDENTIAL DEVELOPMENTS.



R6A–R15
VERT: 1"=5'
HORZ: 1"=50'



R16–R21
VERT: 1"=5'
HORZ: 1"=50'

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

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

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SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

STORMWATER PLAN & PROFILE 2

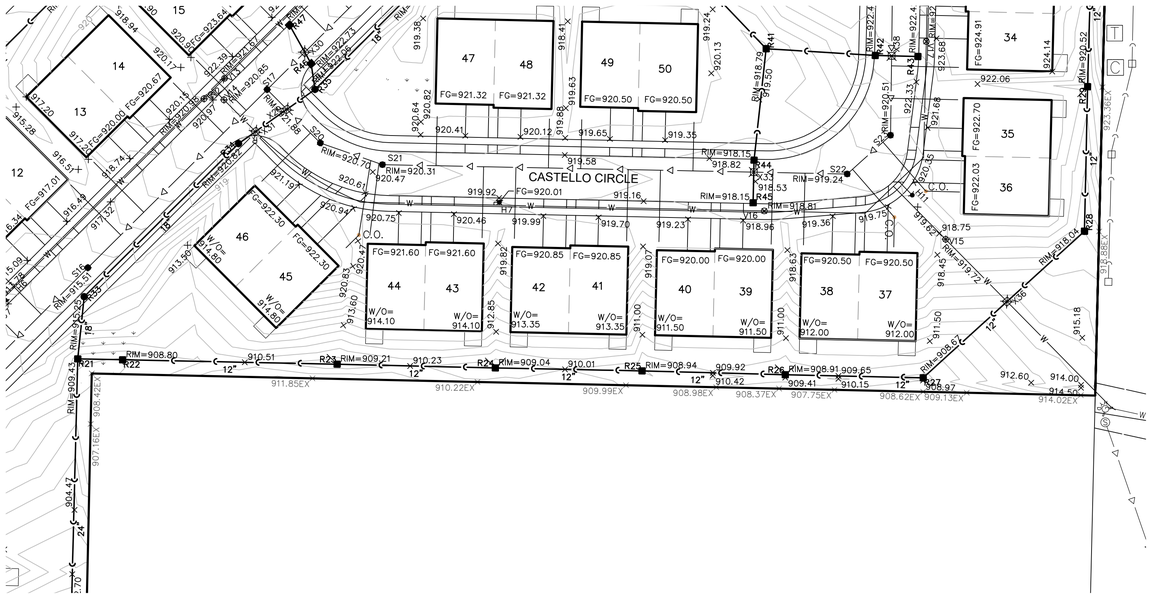
DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET
DR. CR CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
28

M:\15001948\DWG\PLAN SET\FINAL SITE PLAN\15001948P-05-HS.DWG 3/26/2019 2:36 PM STEVE BILLS



KEY MAP
1" = 600'

NOTE:
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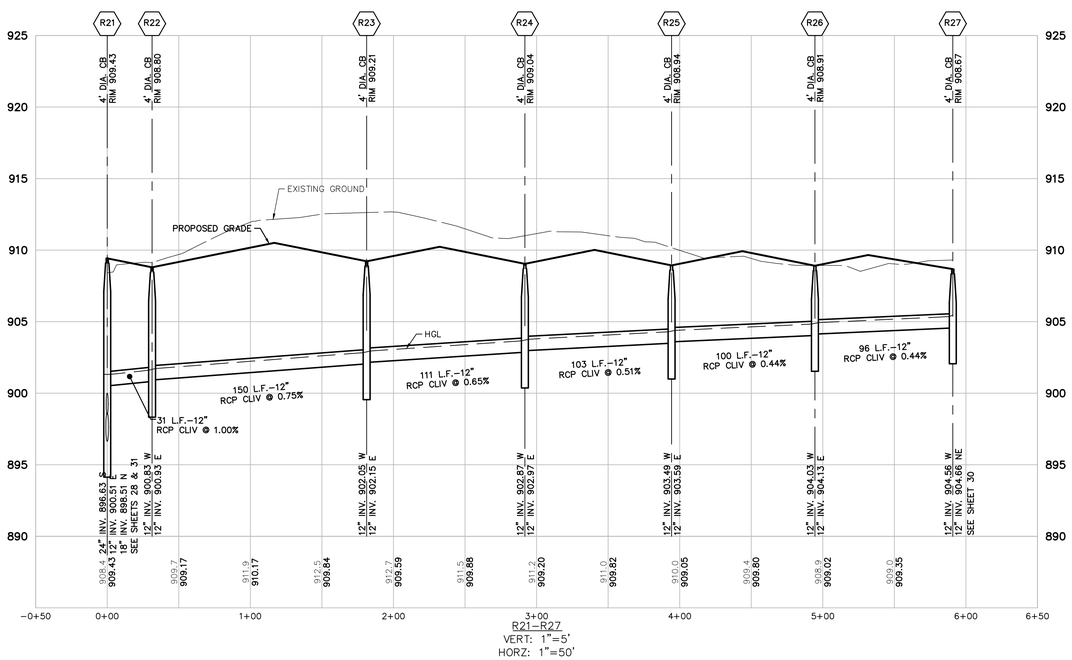

R21-R27
VERT: 1"=5'
HORZ: 1"=50'

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
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- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
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- PROP. MANHOLE

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CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

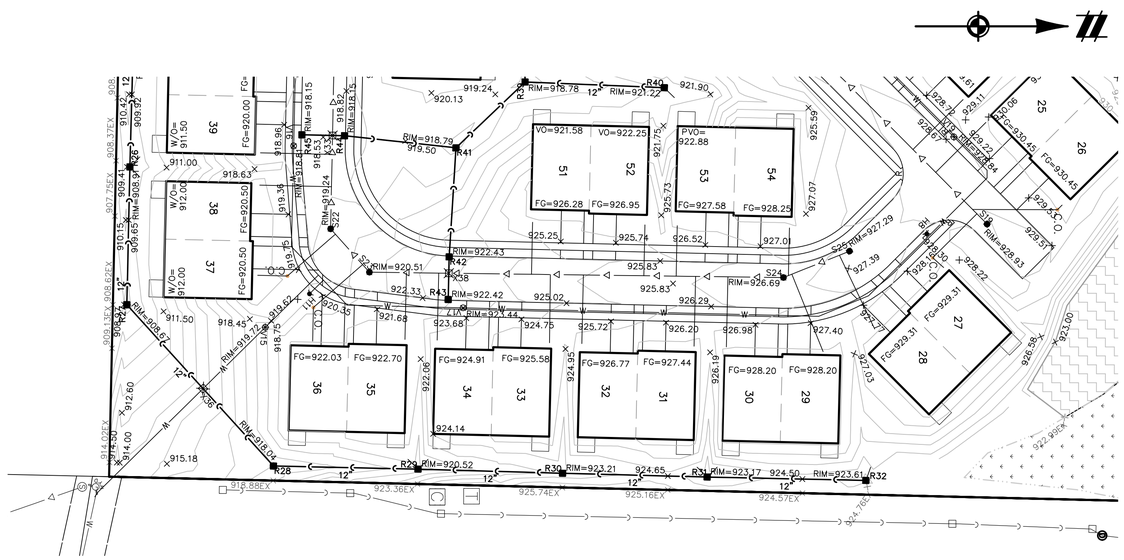
STORMWATER PLAN & PROFILE 3

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET
DR. CR CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
29



R27–R32
VERT: 1"=5'
HORZ: 1"=50'

KEY MAP
1" = 600'

NOTE:
COMPACTION OF TRENCHES IS REQUIRED IN ROADWAY CORRIDORS (CLASS II GRANULAR BACKFILL AT 95% COMPACTION). ROADWAY CORRIDORS CONSTITUTE FRONT OF HOUSE TO FRONT OF HOUSE IN RESIDENTIAL DEVELOPMENTS.

LEGEND

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- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
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- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
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BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

STORMWATER PLAN & PROFILE 4

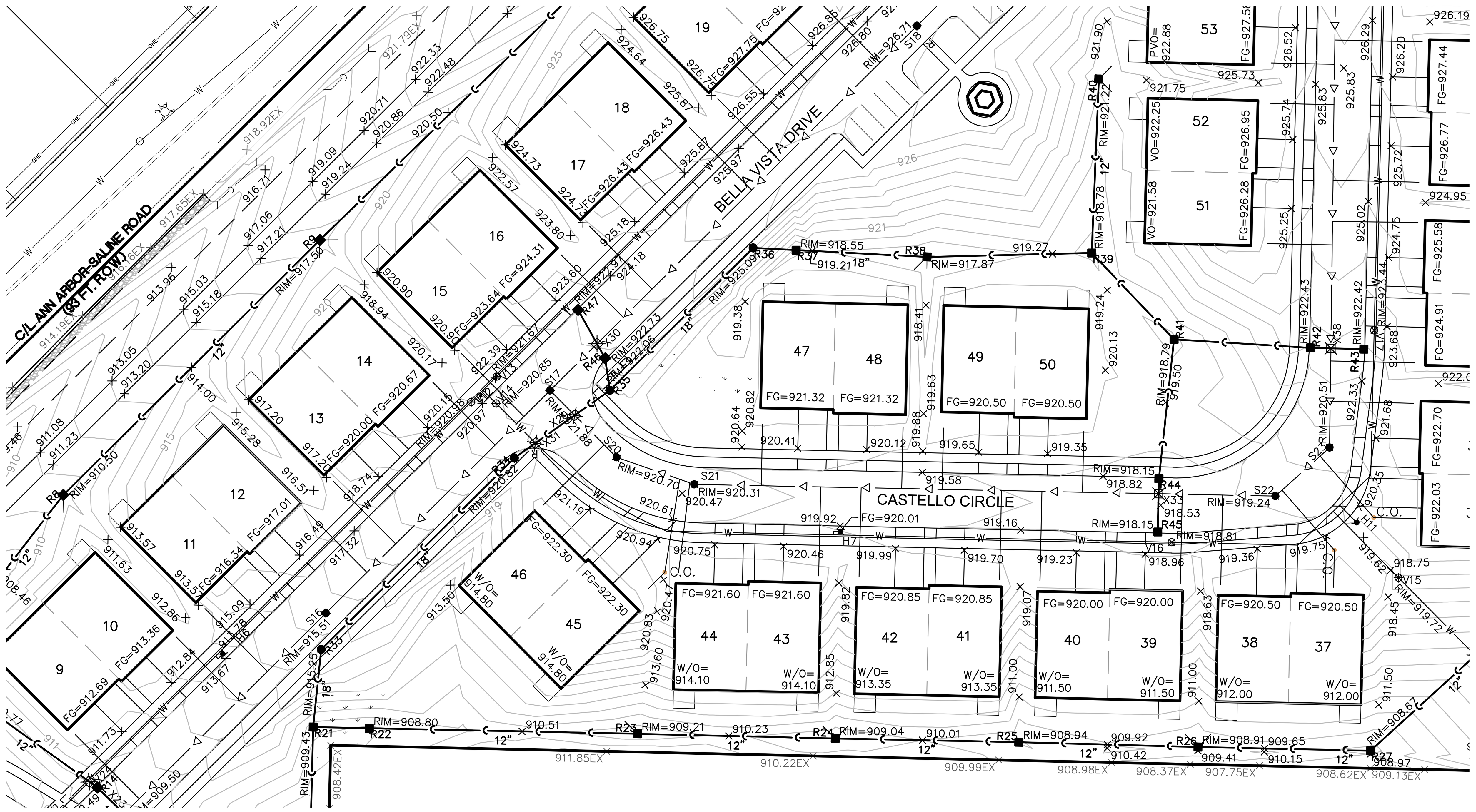
DATE
OCTOBER 17, 2018

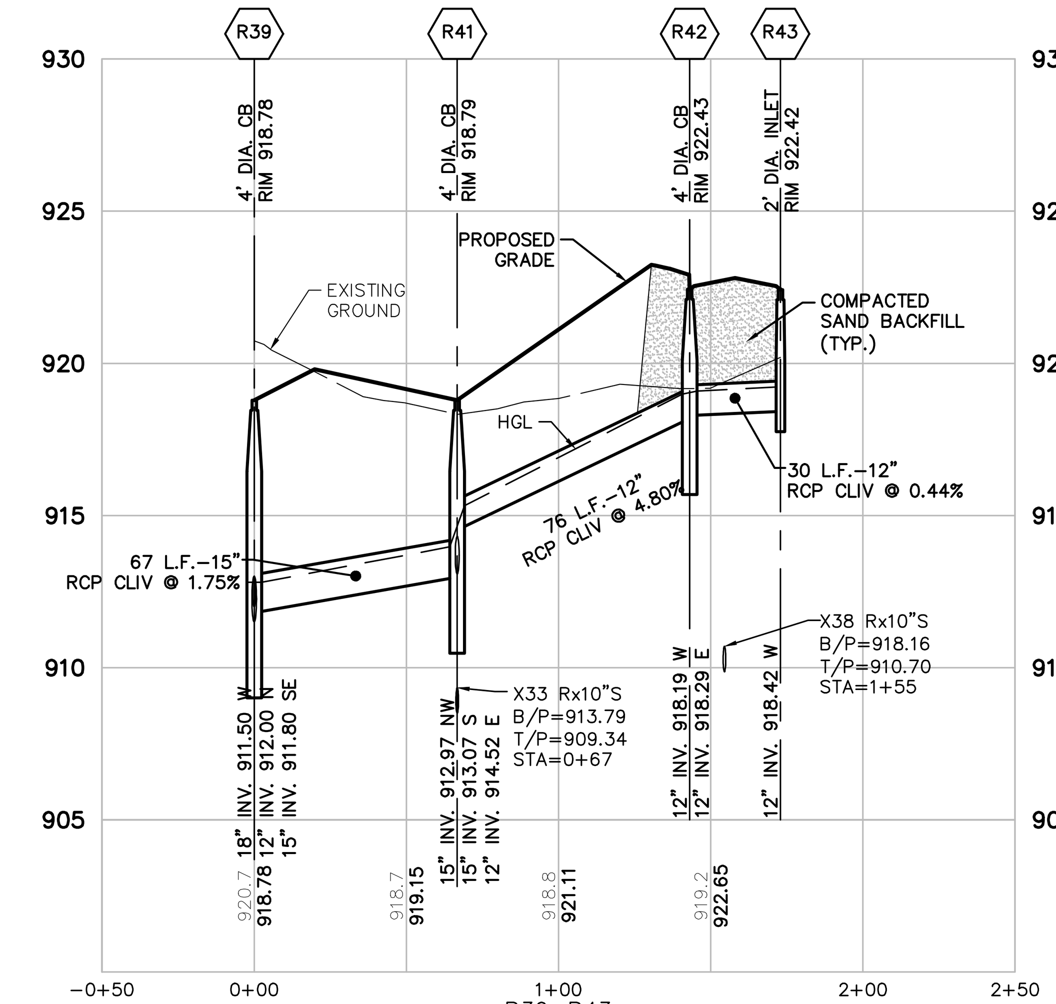
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

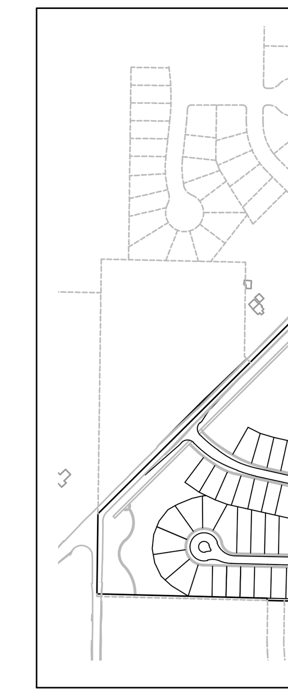
SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 30	

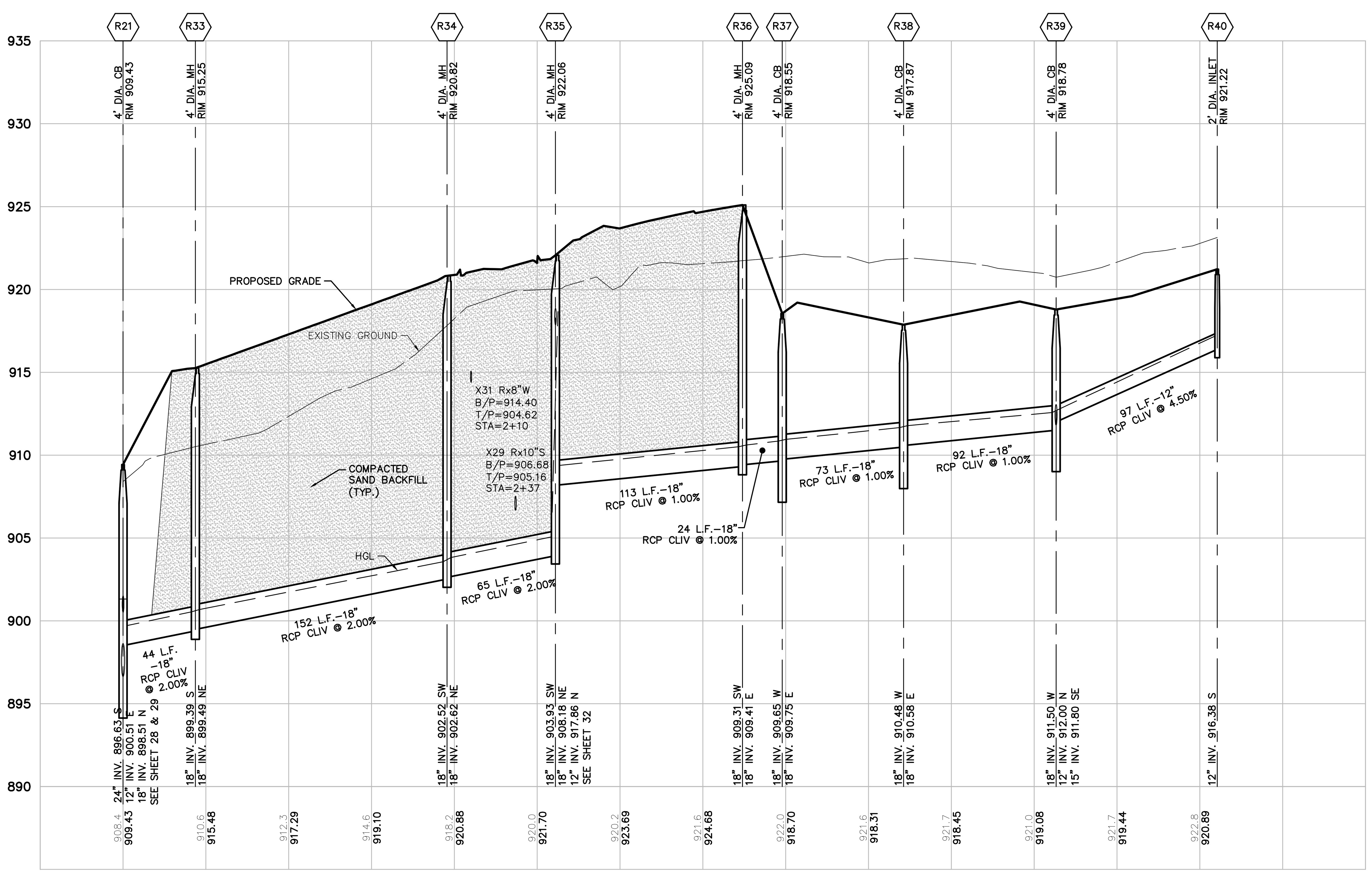




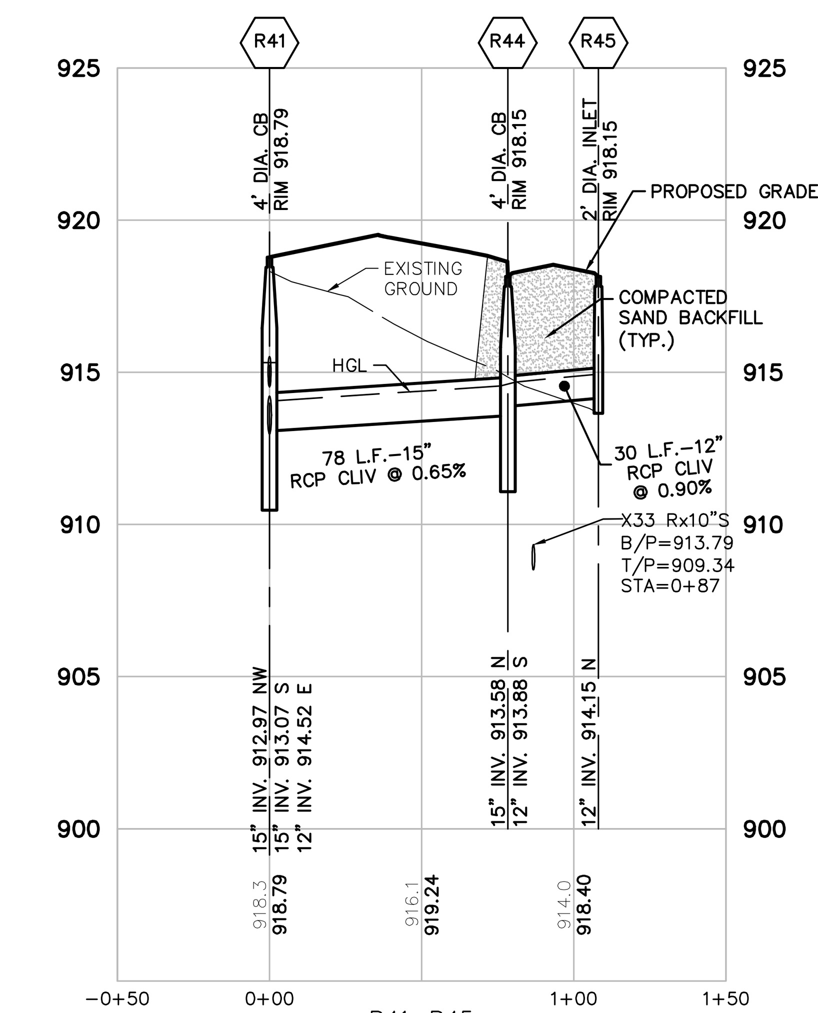
R39–R43
VERT: 1"=5'
HORZ: 1"=50'



KEY MAP
1" = 600'



R21–R40
VERT: 1"=5'
HORZ: 1"=50'



R41–R45
VERT: 1"=5'
HORZ: 1"=50'

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LEGEND

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- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
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- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
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- PROP. MANHOLE

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WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

STORMWATER PLAN & PROFILE 5

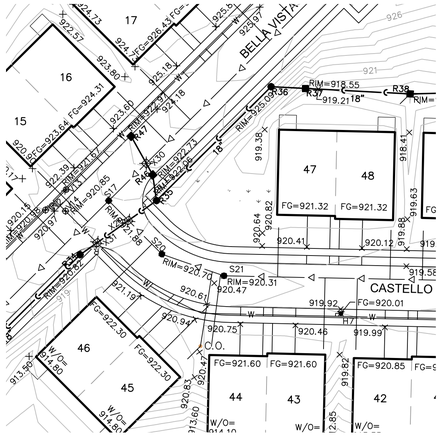
DATE
OCTOBER 17, 2018

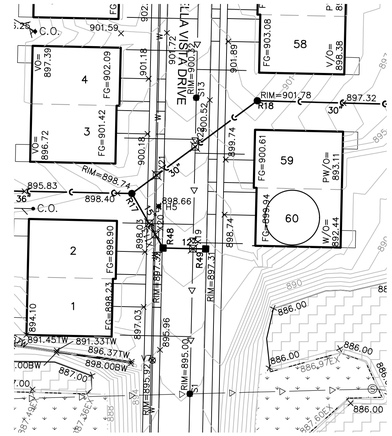
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

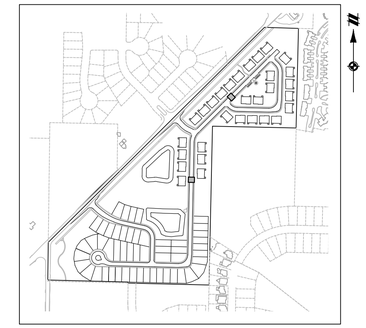
REVISIONS

SCALE 0 25 50
1" = 50 FEET

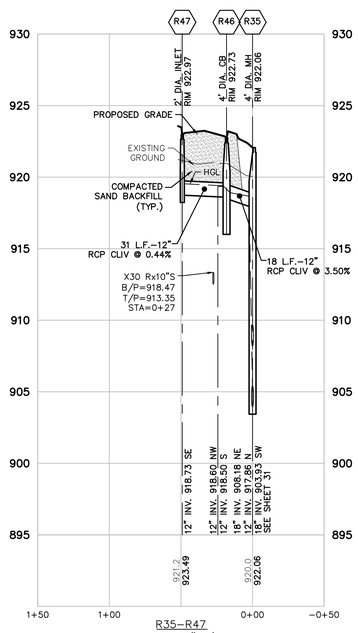
DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 31	



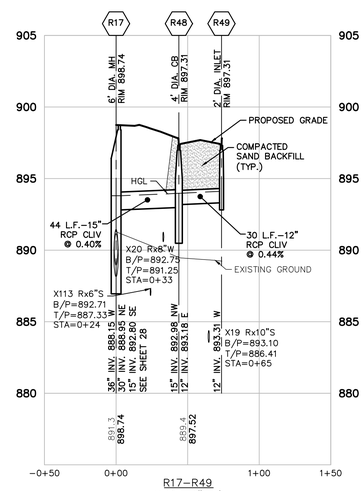




KEY MAP
1" = 600'



R35-R47
VERT: 1"=5'
HORZ: 1"=50'



R17-R49
VERT: 1"=5'
HORZ: 1"=50'

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LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- 923 EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- X X EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- 3533 EXIST. TREE
- EXIST. WETLAND BUFFER
- OHE OHE EXIST. OVERHEAD ELEC. LINE
- OHT OHT EXIST. OVERHEAD TELE. LINE
- TV TV EXIST. CABLE LINE
- U U EXIST. UNSPECIFIED UTILITIES
- G G EXIST. GAS
- C C C EXIST. STORM
- W EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- 923 PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- W PROP. WATER MAIN
- PROP. END SECTION
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811
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WASHTENAW COUNTY, MICHIGAN

CLIENT
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BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

STORMWATER PLAN & PROFILE 6

DATE
OCTOBER 17, 2018

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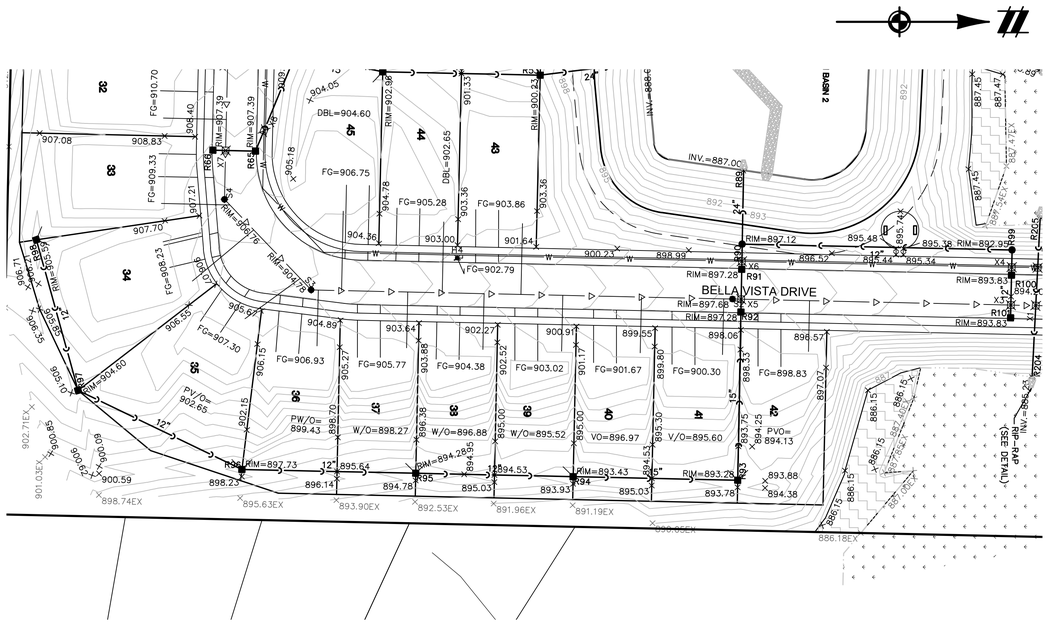
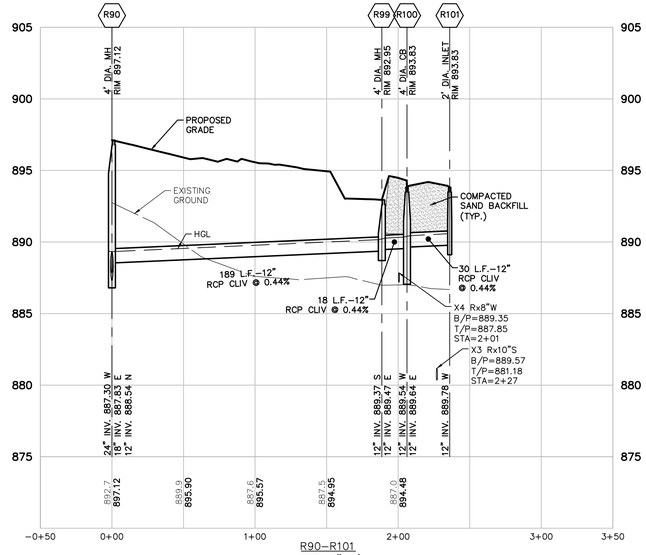
REVISIONS

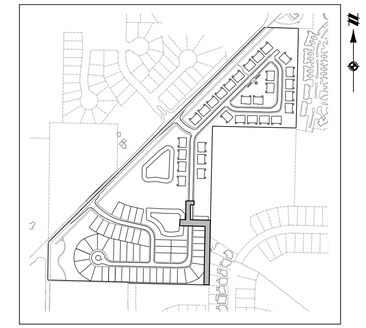
SCALE 0 25 50
1" = 50 FEET

DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
32

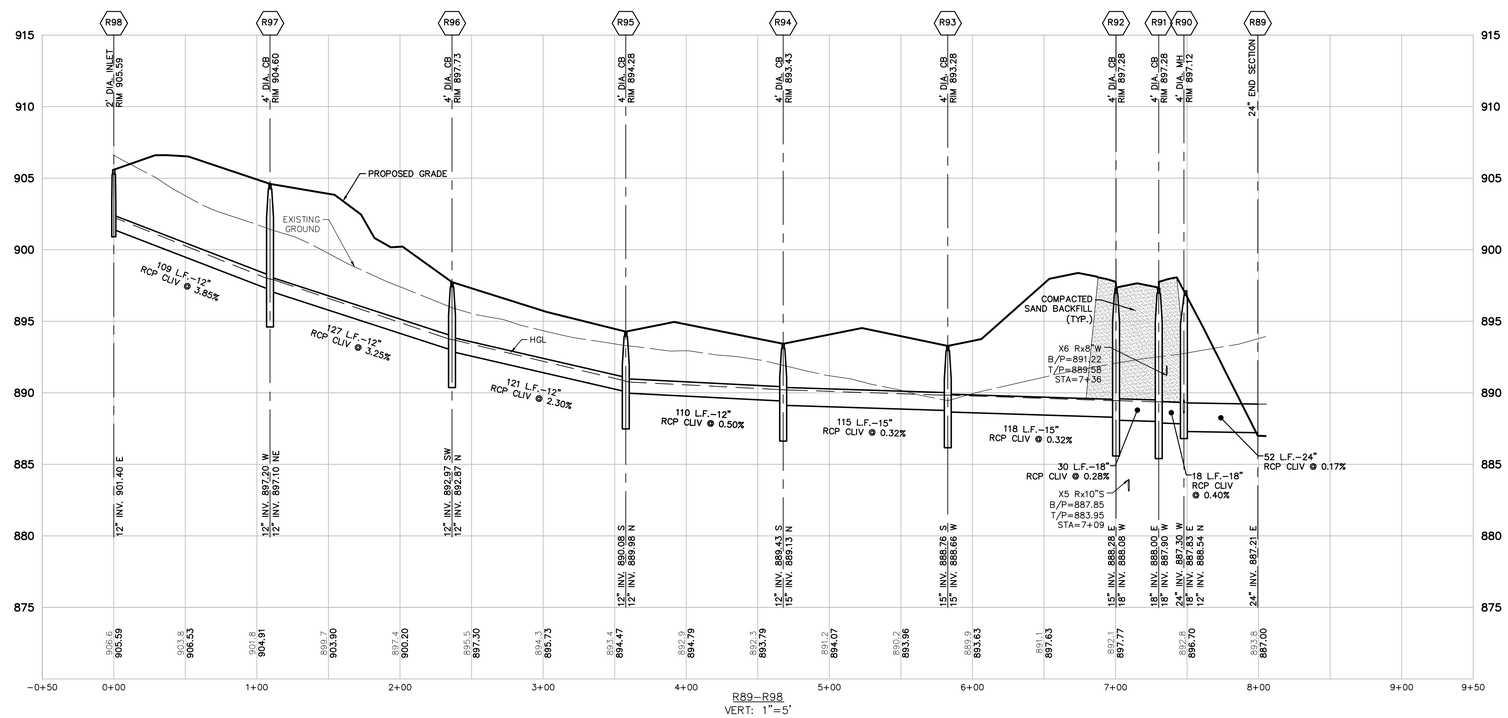




R90–R101
VERT: 1"=5'
HORZ: 1"=50'



KEY MAP
1" = 600'



R89–R98
VERT: 1"=5'
HORZ: 1"=50'

NOTE:
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LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

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Call before you dig.

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TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

STORMWATER PLAN & PROFILE 7

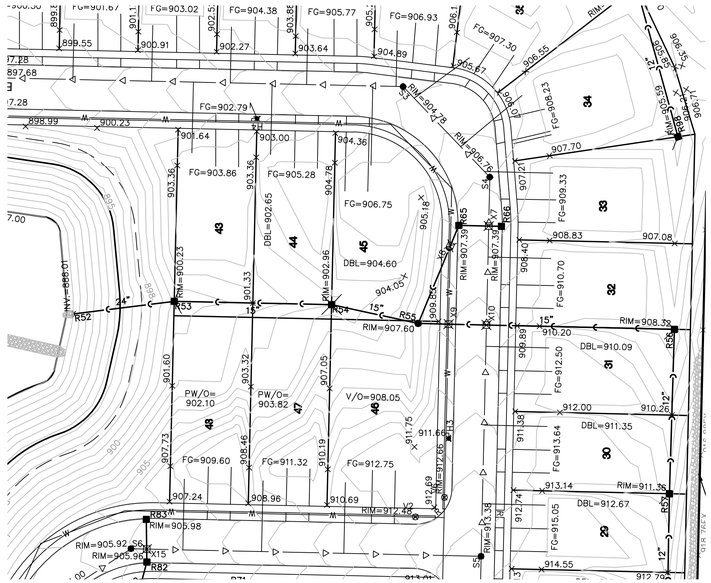
DATE
OCTOBER 17, 2018

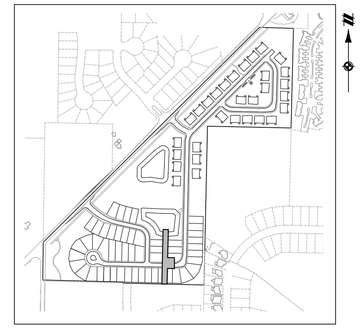
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

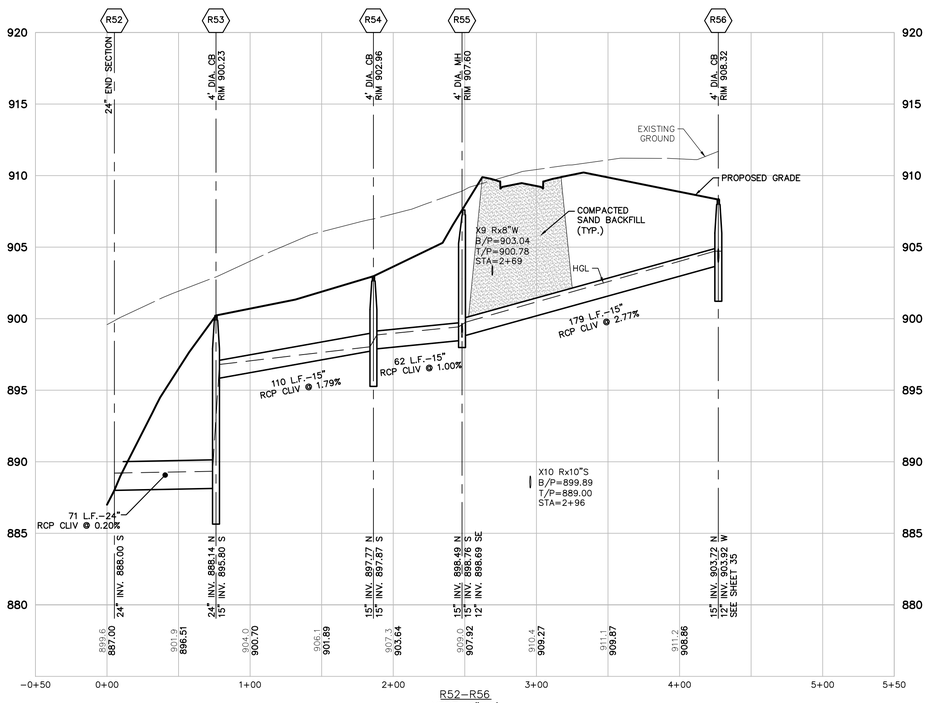
SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 33	

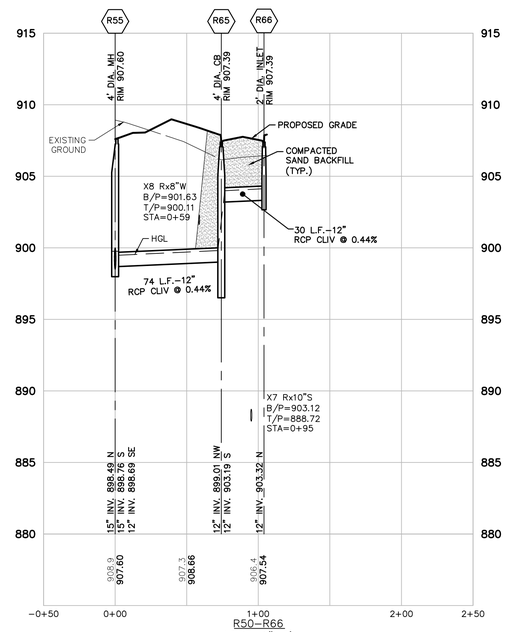




KEY MAP
1" = 600'



R52–R56
VERT: 1"=5'
HORZ: 1"=50'



R50–R66
VERT: 1"=5'
HORZ: 1"=50'

NOTE:
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- EXIST. TREE
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- EXIST. GAS
- EXIST. STORM
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BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

STORMWATER PLAN & PROFILE 8

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
34

KEY MAP
1" = 600'

NOTE:
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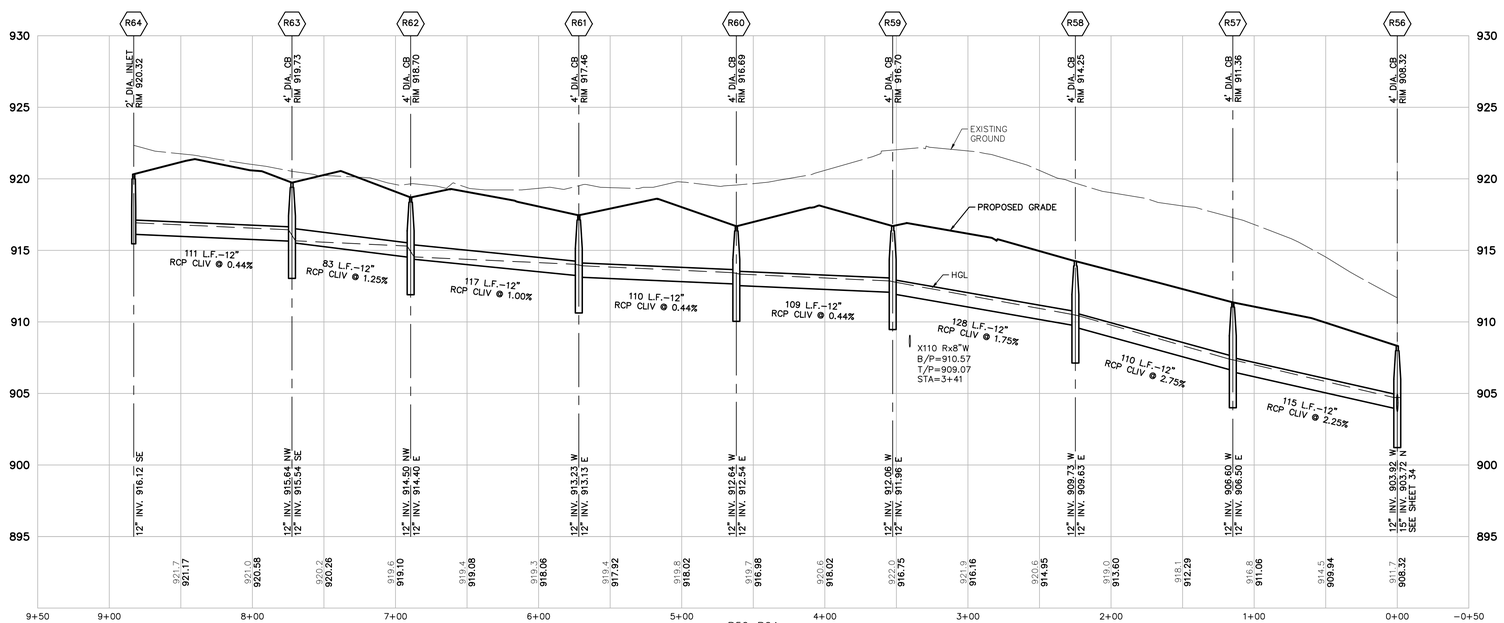

R56–R64
VERT: 1"=5'
HORZ: 1"=50'

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
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811
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STORMWATER PLAN & PROFILE 9

DATE
OCTOBER 17, 2018

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02-01-19 PER TWP
02-08-19 PER TWP
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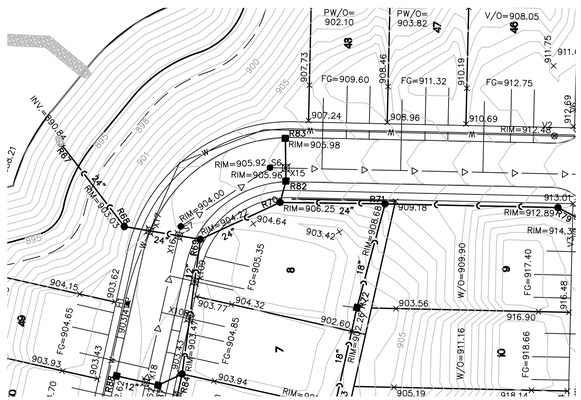
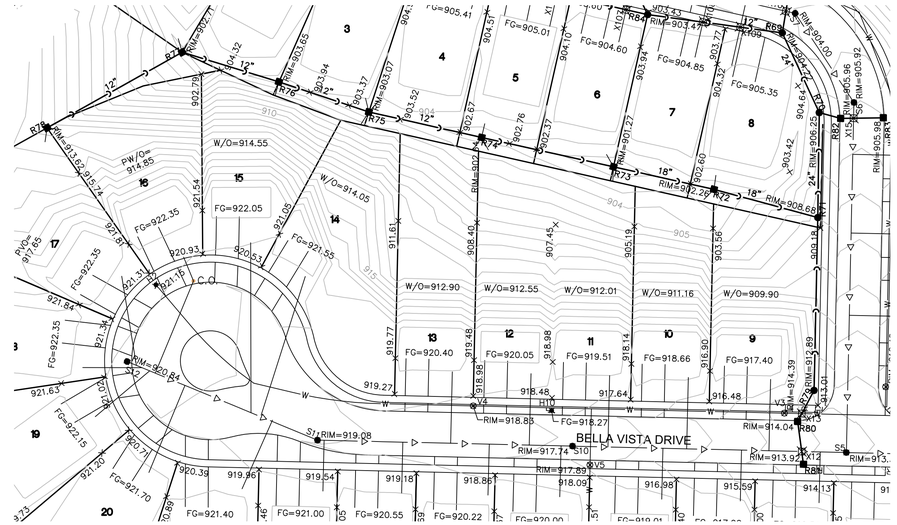
03-26-19 PER SESC SUBMITTAL

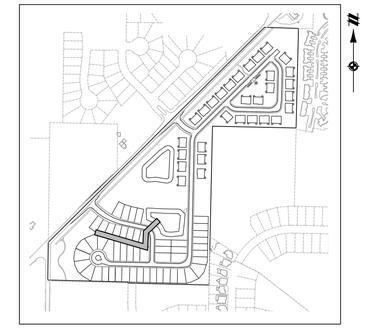
REVISIONS

SCALE 0 25 50
1" = 50 FEET
DR. CR CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
35

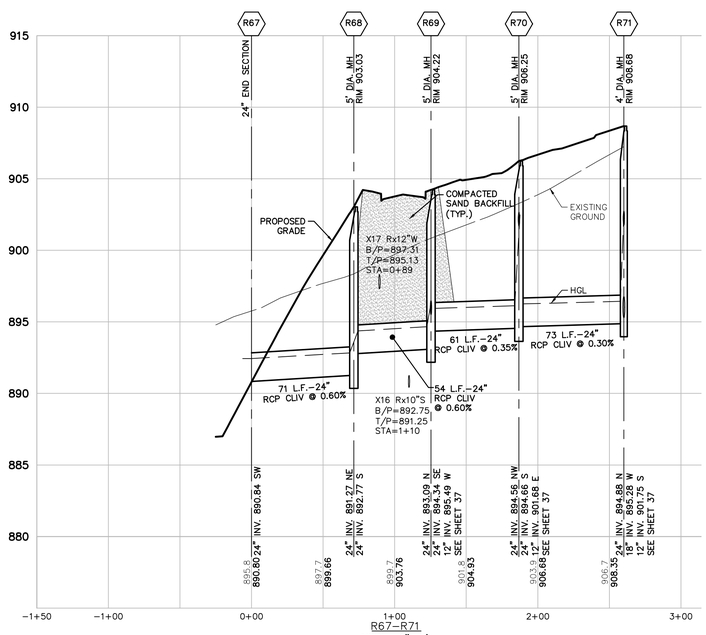
A:\15001948\CAD\PLAN SET\FINAL SITE PLAN\15001948SP-08-PR.DWG 3/26/2019 2:10 PM STEVE SILLS



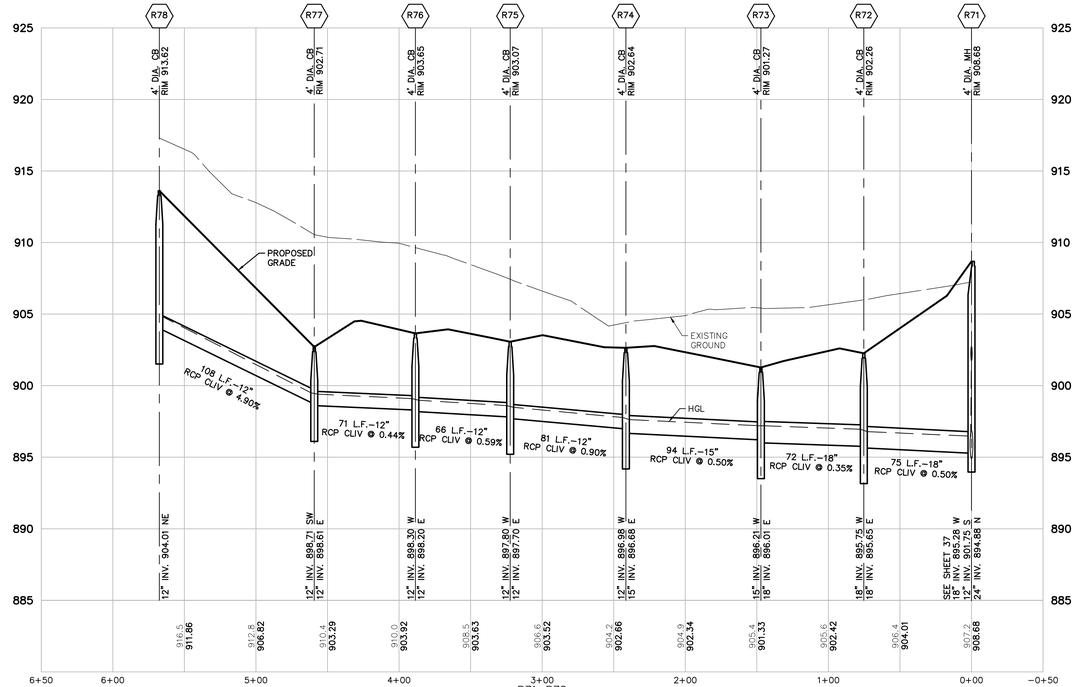




KEY MAP
1" = 600'



R67–R71
VERT: 1"=5'
HORZ: 1"=50'



R71–R78
VERT: 1"=5'
HORZ: 1"=50'

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- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
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- EXIST. GAS
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- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
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STORMWATER PLAN & PROFILE 10

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REVISIONS

SCALE 0 25 50
1" = 50 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	

SHEET NO.
36

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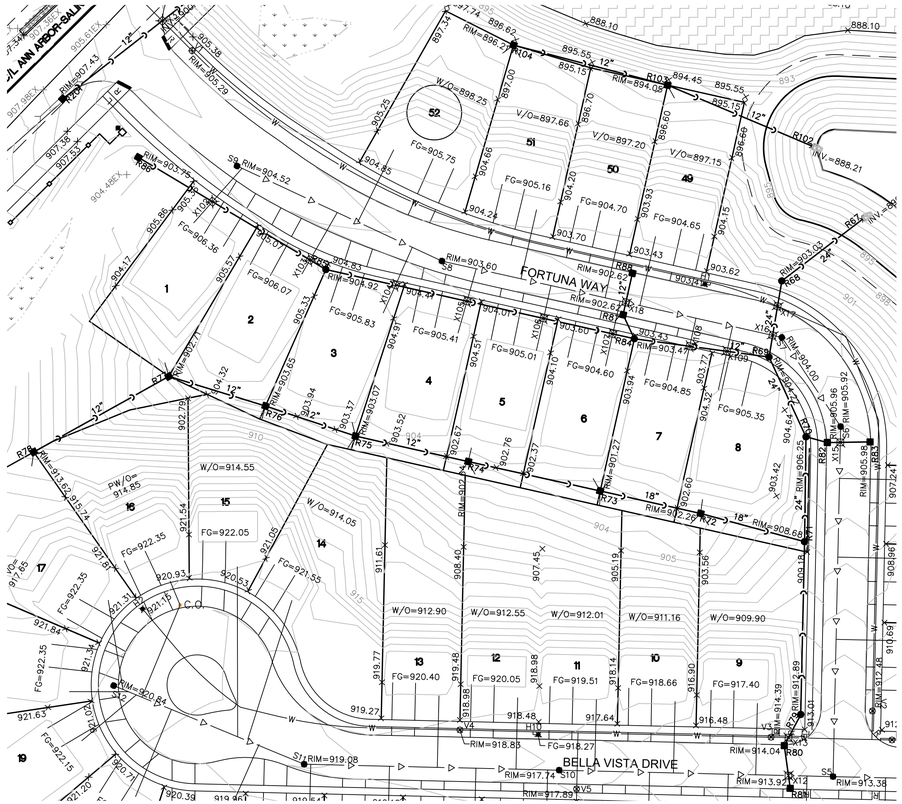
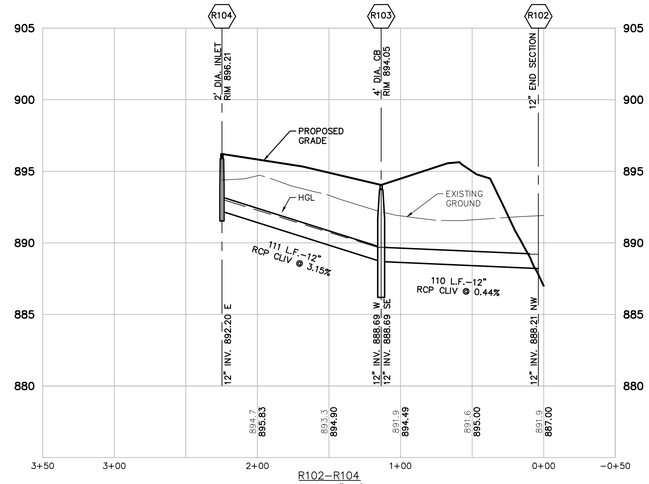
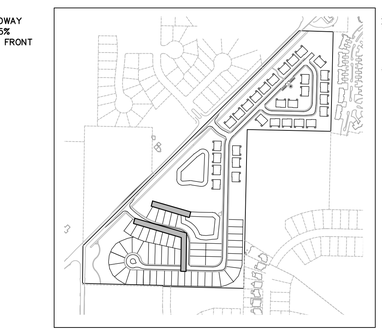
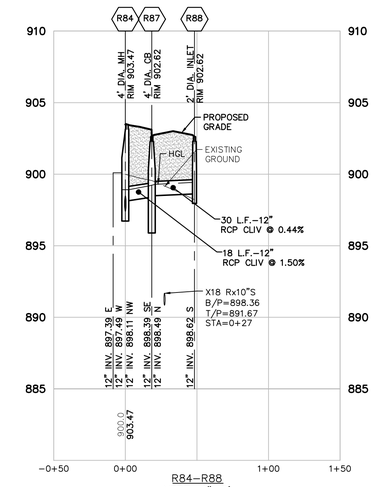




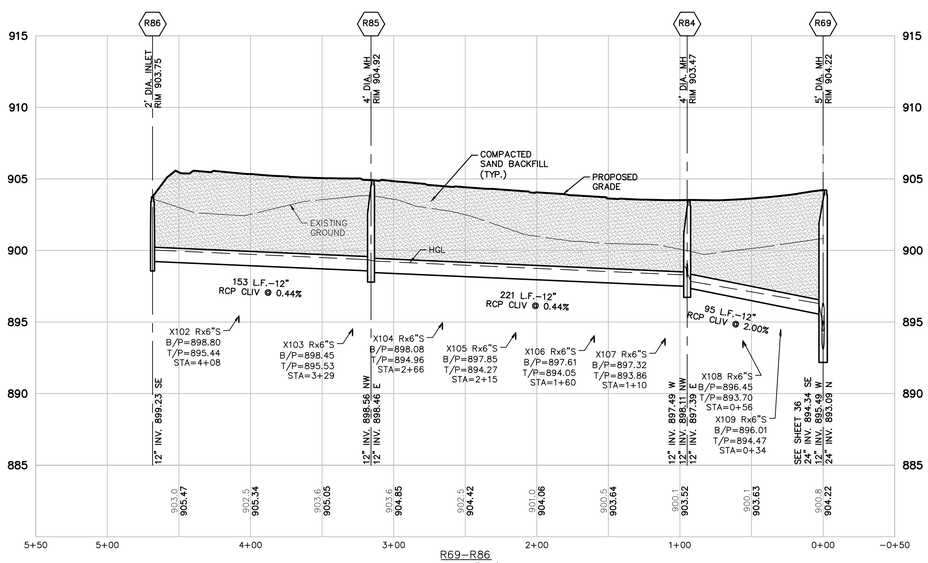
R102–R104
VERT: 1"=5'
HORZ: 1"=50'



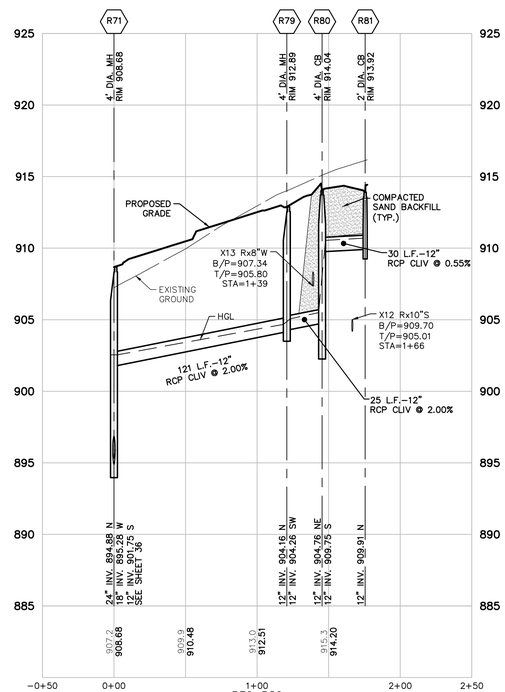
KEY MAP
1" = 600'



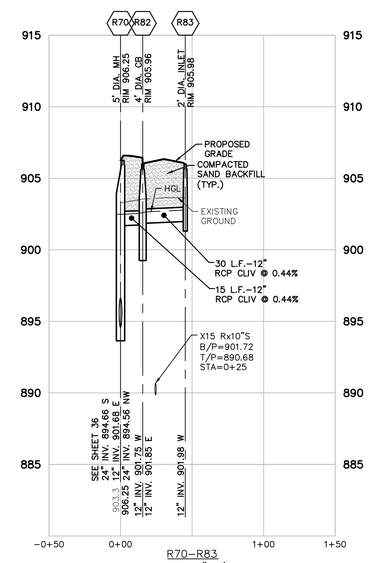
R84–R88
VERT: 1"=5'
HORZ: 1"=50'



R69–R86
VERT: 1"=5'
HORZ: 1"=50'



R76–R86
VERT: 1"=5'
HORZ: 1"=50'



R70–R83
VERT: 1"=5'
HORZ: 1"=50'

LEGEND

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811
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SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

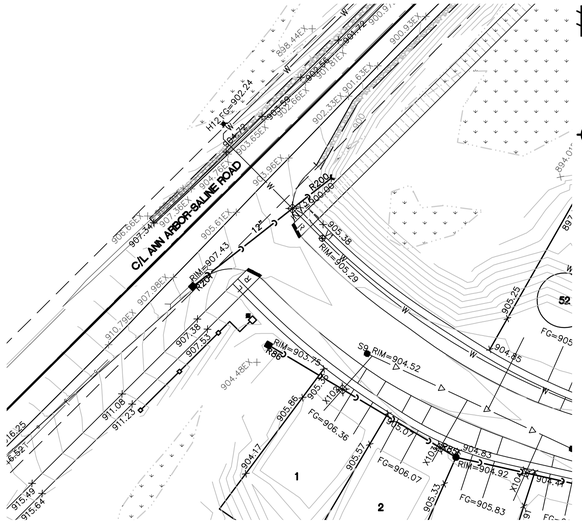
BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
STORMWATER PLAN & PROFILE 11

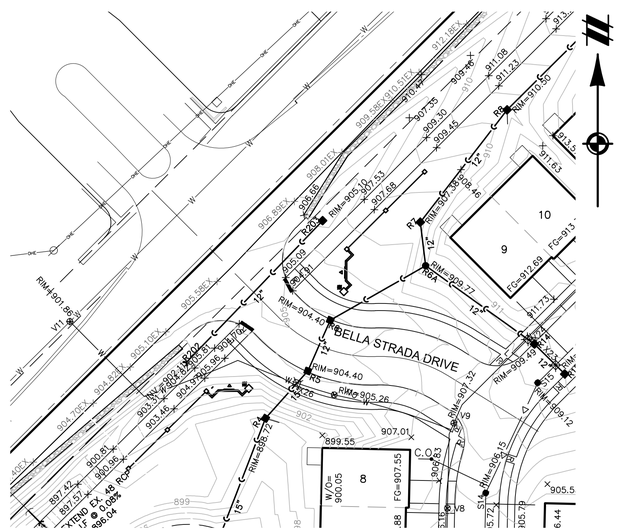
DATE
OCTOBER 17, 2018

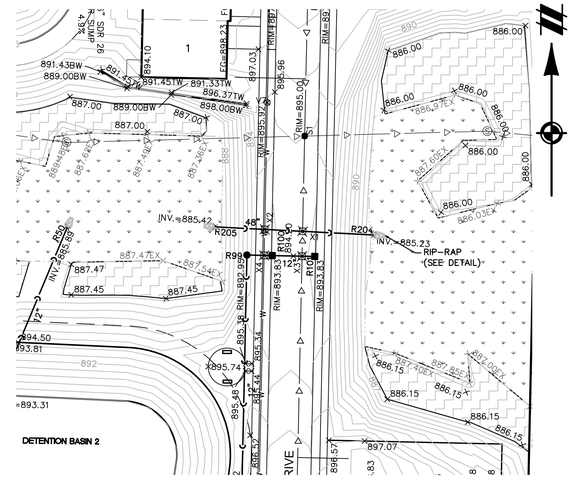
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

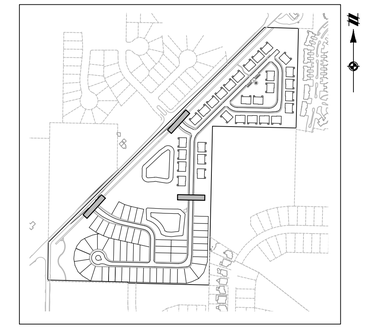
REVISIONS

SCALE 0 25 50
1" = 50 FEET
DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
37



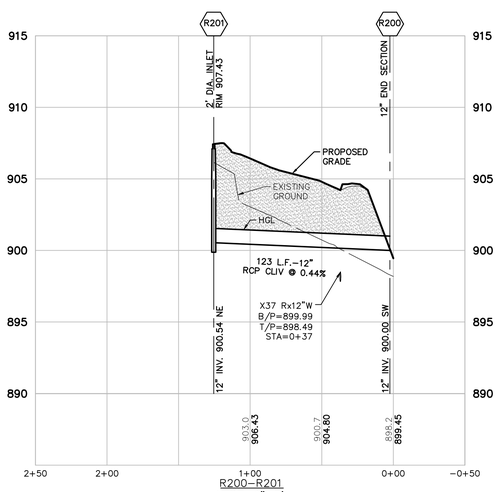




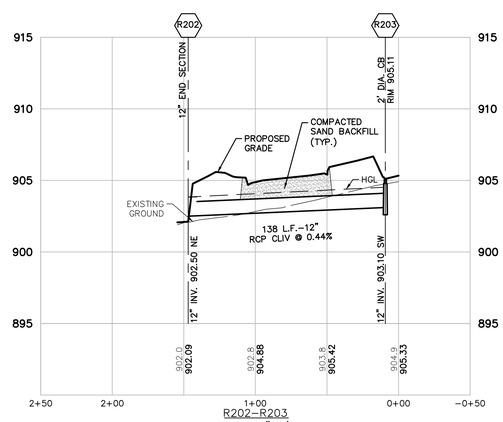


KEY MAP
1" = 600'

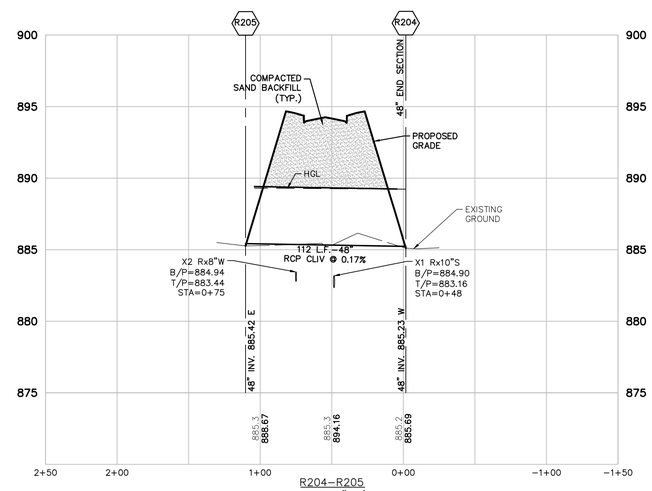
NOTE:
COMPACTION OF TRENCHES IS REQUIRED IN ROADWAY CORRIDORS (CLASS II GRANULAR BACKFILL AT 95% COMPACTION). ROADWAY CORRIDORS CONSTITUTE FRONT OF HOUSE TO FRONT OF HOUSE IN RESIDENTIAL DEVELOPMENTS.



R200-R201
VERT: 1"=5'
HORZ: 1"=50'



R202-R203
VERT: 1"=5'
HORZ: 1"=50'



R204-R205
VERT: 1"=5'
HORZ: 1"=50'

LEGEND

- BOUNDARY LINE
- EXIST. EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXIST. SETBACK
- EXIST. CONTOUR
- EXIST. TREE LINE
- EXIST. CURB AND GUTTER
- EXIST. FENCE
- EXIST. GRAVEL
- EXIST. BUILDING
- EXIST. WETLAND
- EXIST. TREE
- EXIST. WETLAND BUFFER
- EXIST. OVERHEAD ELEC. LINE
- EXIST. OVERHEAD TELE. LINE
- EXIST. CABLE LINE
- EXIST. UNSPECIFIED UTILITIES
- EXIST. GAS
- EXIST. STORM
- EXIST. WATER MAIN
- EXIST. SANITARY
- EXIST. UNSPECIFIED UTILITY
- EXIST. CULVERT
- EXIST. CATCH BASIN/INLET
- EXIST. HYDRANT
- EXIST. VALVE
- EXIST. SANITARY SEWER
- PROP. SETBACK
- PROP. BUILDING
- PROP. BUILDING INTERIOR
- PROP. WALL
- PROP. PARKING STRIPE
- PROP. BACK OF CURB
- PROP. ASHPALT
- PROP. LOT LINE
- PROP. PARKING STRIPE
- PROP. CONTOUR
- PROP. INLET FILTER
- PROP. SILT FENCE
- PROP. STORM SEWER
- PROP. SANITARY
- PROP. WATER MAIN
- PROP. END SECTION
- PROP. CATCH BASIN/INLET
- PROP. WATER VALVE
- PROP. FIRE HYDRANT
- PROP. MANHOLE

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REVISIONS

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1" = 50 FEET

DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
38

I:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948PSP-05-PROFILE 3/26/2019 2:13 PM STEVE SELLS

STORMWATER CONVEYANCE CALCULATIONS

I = B/(T+D)^E B = 175.0 D = 25.0 E = 1
C = varies
T = 15 (min.)

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 3.0 FPS GIVEN "D" (%)	ACTUAL HG (%)	VEL. FLOW FULL (FT./ SEC.)	TIME OF FLOW (MIN.)	H.G.L. ELEV. UPPER END	H.G.L. ELEV. LOWER END	GROUND ELEV. UPPER END	GROUND ELEV. LOWER END	INVERT ELEV. UPPER END	INVERT ELEV. LOWER END
BASIN 1																							
R13	R12	0.23	0.47	0.11	0.11	15.00	4.38	0.46	3.00	12	101	0.71	0.02	0.44	0.44	3.8	0.4	923.55	923.11	927.02	926.30	923.02	922.31
R12	R11	0.23	0.47	0.11	0.21	15.40	4.33	0.92	2.36	12	81	0.44	0.07	0.44	0.44	3.0	0.4	923.00	922.65	926.30	926.89	922.21	921.85
R11	R10	0.16	0.43	0.07	0.28	15.80	4.29	1.21	4.29	12	152	1.45	0.12	0.44	0.44	5.5	0.5	922.55	920.34	926.89	923.84	921.75	919.54
R10	R9	0.27	0.44	0.12	0.40	16.30	4.24	1.70	6.42	12	202	3.25	0.23	0.44	0.44	8.2	0.4	920.24	913.67	923.84	917.50	919.44	912.87
R9	R8	0.41	0.44	0.18	0.58	16.70	4.20	2.45	6.67	12	202	3.50	0.47	0.44	0.47	8.5	0.4	913.57	906.49	917.50	910.50	912.77	905.69
R8	R7	0.41	0.44	0.18	0.76	17.10	4.16	3.18	5.34	12	99	2.25	0.80	0.44	0.80	6.8	0.2	906.39	904.16	910.50	907.38	905.59	903.36
R7	R6A	0.19	0.45	0.09	0.85	17.30	4.14	3.52	3.56	12	31	1.00	0.98	0.44	0.98	4.5	0.1	903.92	903.62	907.38	909.77	903.12	902.82
R6A	R6	0.00	0.00	0.00	1.51	17.40	4.13	6.24	6.42	12	77	3.25	3.07	0.44	3.07	8.2	0.2	899.74	897.38	909.77	904.40	899.08	896.58
R6	R5	0.29	0.42	0.12	1.63	17.60	4.11	6.72	6.72	12	39	3.56	3.55	0.44	3.55	8.6	0.1	897.38	896.00	904.40	904.40	896.58	895.20
R5	R4	0.15	0.58	0.09	1.72	17.70	4.10	7.06	9.14	15	44	2.00	1.19	0.32	1.19	7.4	0.1	895.54	895.01	904.40	898.72	894.90	894.01
R4	R3	0.09	0.25	0.02	1.74	17.80	4.09	7.13	9.14	15	129	2.00	1.22	0.32	1.22	7.4	0.3	891.76	890.19	898.72	890.67	891.58	889.00
R15	R14	0.23	0.77	0.18	0.18	15.00	4.38	0.79	3.56	12	30	1.00	0.05	0.44	0.44	4.5	0.1	906.01	905.88	909.50	909.49	905.38	905.08
R14	R6A	0.61	0.79	0.48	0.66	15.10	4.36	2.88	2.88	12	94	0.65	0.65	0.44	0.65	3.7	0.4	900.88	900.27	909.49	909.77	900.08	899.47
R32	R31	0.17	0.31	0.05	0.05	15.00	4.38	0.22	3.98	12	111	1.25	0.00	0.44	0.44	5.1	0.4	920.24	918.86	923.61	923.17	919.44	918.06
R31	R30	0.17	0.48	0.08	0.13	15.40	4.33	0.57	3.98	12	101	1.25	0.03	0.44	0.44	5.1	0.3	918.76	917.49	923.17	923.21	917.96	916.69
R30	R29	0.14	0.46	0.06	0.20	15.70	4.30	0.85	3.98	12	101	1.25	0.06	0.44	0.44	5.1	0.3	917.39	916.13	923.21	920.52	916.59	915.33
R29	R28	0.17	0.48	0.08	0.28	16.00	4.27	1.19	3.98	12	101	1.25	0.11	0.44	0.44	5.1	0.3	916.03	914.77	920.52	918.04	915.23	913.97
R28	R27	0.13	0.55	0.07	0.35	16.30	4.24	1.49	2.36	12	152	0.44	0.18	0.44	0.44	3.0	0.8	906.12	905.46	918.04	908.67	905.33	904.66
R27	R26	0.40	0.30	0.12	0.47	17.10	4.16	1.96	2.36	12	96	0.44	0.30	0.44	0.44	3.0	0.5	905.35	904.93	908.67	908.91	904.56	904.13
R26	R25	0.14	0.54	0.07	0.55	17.60	4.11	2.24	2.36	12	100	0.44	0.40	0.44	0.44	3.0	0.6	904.83	904.39	908.91	908.94	904.03	903.59
R25	R24	0.17	0.48	0.08	0.63	18.20	4.05	2.54	2.54	12	103	0.51	0.51	0.44	0.51	3.2	0.5	904.29	903.77	908.94	909.04	903.49	902.97
R24	R23	0.18	0.46	0.09	0.71	18.70	4.00	2.85	2.87	12	111	0.65	0.64	0.44	0.64	3.7	0.5	903.66	902.95	909.04	909.21	902.87	902.15
R23	R22	0.16	0.37	0.06	0.77	19.20	3.96	3.06	3.09	12	150	0.75	0.74	0.44	0.74	3.9	0.6	902.83	901.73	909.21	908.80	902.05	900.93
R22	R21	0.29	0.39	0.11	0.88	19.80	3.91	3.45	3.56	12	31	1.00	0.94	0.44	0.94	4.5	0.1	901.61	901.31	908.80	909.43	900.83	900.51
R21	R20	0.01	0.25	0.00	4.31	19.90	3.90	16.82	31.18	24	238	1.90	0.55	0.17	0.55	9.9	0.4	898.23	893.71	909.43	897.38	896.63	892.11
R20	R19	0.74	0.30	0.23	4.54	20.30	3.86	17.54	31.18	24	112	1.90	0.60	0.17	0.60	9.9	0.2	892.16	891.49	897.38	895.00	892.01	889.89
R19	R18	0.27	0.40	0.11	4.65	20.50	3.85	17.87	18.34	30	109	0.20	0.19	0.13	0.19	3.7	0.5	891.48	891.27	895.00	901.78	889.49	889.27
R18	R17	0.00	0.00	0.00	4.65	21.00	3.80	17.87	18.34	30	109	0.20	0.19	0.13	0.19	3.7	0.5	891.16	890.95	901.78	898.74	889.17	888.95
R17	R16	0.00	0.00	0.00	5.53	21.50	3.76	20.83	21.09	36	151	0.10	0.10	0.10	0.10	3.0	0.8	890.34	890.19	898.74	891.67	888.15	888.00
R45	R44	1.01	0.73	0.74	0.74	15.00	4.38	3.23	3.38	12	30	0.90	0.82	0.44	0.82	4.3	0.1	914.93	914.68	918.15	918.15	914.15	913.88
R44	R41	0.61	0.69	0.42	1.16	15.10	4.36	5.06	5.21	15	78	0.65	0.61	0.32	0.61	4.2	0.3	914.55	914.07	918.15	918.79	913.58	913.07
R41	R39	0.18	0.25	0.05	1.97	15.40	4.33	8.54	8.55	15	67	1.75	1.75	0.32	1.75	7.0	0.2	913.97	912.80	918.79	918.78	912.97	911.80
R39	R38	0.31	0.50	0.16	2.25	15.60	4.31	9.70	10.50	18	92	1.00	0.85	0.25	0.85	5.9	0.3	912.57	911.78	918.78	917.87	911.50	910.58
R38	R37	0.40	0.42	0.17	2.42	15.90	4.28	10.35	10.50	18	73	1.00	0.97	0.25	0.97	5.9	0.2	911.66	910.95	917.87	918.55	910.48	909.75
R37	R36	0.13	0.33	0.04	2.46	16.10	4.26	10.47	10.50	18	24	1.00	0.99	0.25	0.99	5.9	0.1	910.85	910.61	918.55	925.09	909.65	909.41
R36	R35	0.00	0.00	0.00	2.46	16.20	4.25	10.47	10.50	18	113	1.00	0.99	0.25	0.99	5.9	0.3	910.51	909.38	925.09	922.06	909.31	908.18
R35	R34	0.00	0.00	0.00	3.43	16.50	4.22	14.46	14.85	18	65	2.00	1.89	0.25	1.89	8.4	0.1	905.06	903.82	922.06	920.82	903.93	902.62
R34	R33	0.00	0.00	0.00	3.43	16.60	4.21	14.46	14.85	18	152	2.00	1.89	0.25	1.89	8.4	0.3	903.56	900.69	920.82	915.25	902.52	899.49
R33	R21	0.00	0.00	0.00	3.43	16.90	4.18	14.46	14.85	18	44	2.00	1.89	0.25	1.89	8.4	0.1	900.54	899.71	915.25	909.43	899.39	898.51
R43	R42	0.67	0.74	0.50	0.50	15.00	4.38	2.17	2.36	12	30	0.44	0.37	0.44	0.44	3.0	0.2	919.22	919.09	922.42	922.43	918.42	918.29
R42	R41	0.37	0.74	0.27	0.77	15.20	4.35	3.34	7.81	12	76	4.80	0.88	0.44	0.88	9.9	0.1	918.99	915.32	922.43	918.79	918.19	914.52
R40	R39	0.33	0.37	0.12	0.12	15.00	4.38	0.53	7.56	12	97	4.50	0.02	0.44	0.44	9.6	0.2	917.18	912.80	921.22	918.78	916.38	912.00
R47	R46	0.89	0.46	0.41	0.41	15.00	4.38	1.80	2.36	12	31	0.44	0.26	0.44	0.44	3.0	0.2	919.53	919.40	922.97	922.73	918.73	918.60
R46	R35	0.39	1.42	0.56	0.97	15.20	4.35	4.22	6.67	12	18	3.50	1.40	0.44	1.40	8.5	0.0	918.92	918.66	922.73	922.06	918.50	917.86
R49	R48	0.59	0.76	0.45	0.45	15.00	4.38	1.96	2.36	12	30	0.44	0.30	0.44	0.44	3.0	0.2	894.11	893.98	897.31	897.31	893.31	893.18
R48	R17	0.55	0.80	0.44	0.89	15.20	4.35	3.86	4.09	15	44	0.40	0.36	0.32	0.36	3.3	0.2	893.96	893.80	897.31	898.74	892.98	892.80
BASIN 2																							
R64	R63	0.16	0.25	0.04	0.04	15.00	4.38	0.18	2.36	12	111	0.44	0.00	0.44	0.44	3.0	0.6	916.92	916.44	920.32	919.73	916.12	915.64
R63	R62	0.23	0.54	0.12	0.16	15.60	4.31	0.70	3.98	12	83	1.25	0.04	0.44	0.44	5.1	0.3	915.66	915.30	919.73	918.70	915.54	914.50
R62	R61	0.11	0.46	0.05	0.21	15.90	4.28	0.90	3.56	12	117	1.00	0.06	0.44	0.44	4.5	0.4	914.54	914.03	918.70	917.46	914.40	913.23
R61	R60	0.29	0.55	0.16	0.37	16.30	4.24	1.58	2.36	12	110	0.44	0.20	0.44	0.44	3.0	0.6	913.92	913.44	917.46	916.69	913.13	912.64
R60	R59	0.24	0.62	0.15	0.52	16.90	4.18	2.18	2.36	12	109	0.44	0.37	0.44	0.44	3.0	0.6	913.34	912.86	916.69	916.70	912.54	912.06
R59	R58	0.22	0.56	0.12	0.64	17.50	4.12	2.65	4.71	12	128	1.75	0.55	0.44	0.55	6.0	0.4	912.76	910.53	916.70	914.25	911.96	909.73
R58	R57	0.27	0.58	0.15	0.80	17.90	4.08	3.25	5.91	12	110	2.75	0.83	0.44	0.83	7.5	0.2	910.43	907.40	914.25	911.36	909.63	906.60
R57	R56	0.30	0.55	0.16	0.96	18.10	4.06	3.90	5.34	12	115	2.25	1.20	0.44	1.20	6.8	0.3	907.30	904.72	911.36	908.32	906.50	903.92
R56	R55	0.35	0.50	0.18	1.14	18.40	4.03	4.58	10.75	15	179	2.77	0.50	0.32	0.50	8.8	0.3	904.72	899.76	908.32	907.60	903.72	898.76
R55	R54	0.00	0.00	0.00	1.53	18.70	4.00	6.14	6.46	15	62	1.00	0.90	0.32	0.90	5.3	0.2	899.42	898.87	907.60	902.96	898.49	897.87
R54	R53	0.38	0.48	0.18	1.72	18.90	3.99	6.84	8.63	15	110	1.79	1.12	0.32	1.12	7.0	0.3	898.04	896.80	902.96	900.23	897.77	895.80
R53	R52	0.48	0.62	0.30	2.01	19.20	3.96	7.97	10.12	24	71	0.20	0.12	0.17	0.17	3.2	0.4	889.33	889.21	900.23	890.50	888.14	888.00
R66	R65	0.32	0.82	0.27	0.27	15.00	4.38	1.17	2.36	12	30	0.44	0.11	0.44	0.44	3.0	0.2	904.12	903.99	907.39	907.39	903.32	903.19
R65	R55	0.17	0.77	0.13	0.40	15.20	4.35	1.73	2.36	12	74	0.44	0.23	0.44	0.44	3.0	0.4	899.81	899.49	907.39	907.60	899.01	898.69
R78	R77	0.57	0.41	0.23	0.23	15.00	4.38	1.01	7.89	12	108	4.90	0.08	0.44	0.44	10.0	0.2	904.81	899.51	913.62	902.71	904.01	898.71
R77	R76	0.61	0.40	0.24	0.47	15.20	4.35	2.05	2.36	12	71	0.44	0.33	0.44	0.44	3.0	0.4	899.40	899.10	902.71	903.65	898.61	898.30
R76	R75	0.24	0.63	0.15	0.62	15.60	4.31	2.67	2.74	12	66	0.59	0.56	0.44	0.56	3.5	0.3	898.98	898.60	903.65	903.07	898.20	897.80
R75	R74	0.29	0.56	0.16	0.78	15.90	4.28	3.34	3.38	12	81	0.90	0.88	0.44	0.88	4.3	0.3	898.49	897.78	903.07	902.64	897.70	896.98
R74	R73	0.50	0.47	0.24	1.02	16.20	4.25	4.31	4.57	15	94	0.50	0.45	0.32	0.45	3.7	0.4	897.63	897.21	902.64	901.27	896.68	896.21
R73	R72	0.72	0.59	0.42	1.44	16.60	4.21	6.05	6.21	18	72	0.35	0.33	0.25	0.33	3.5	0.3	897.19	896.95	901.27	902.26	896.01	895.75
R72	R71	0.38	0.49	0.18	1.62	16.90	4.18	6.77	7.43	18	75	0.50	0.42	0.25	0.42	4.2	0.3	896.79	896.48	902.26	908.68	895.65	895.28
R71	R70	0.00	0.00	0.00	2.70	17.20	4.15	11.22	12.39	24	73	0.30	0.25	0.17	0.25	3.9	0.3	896.44	896.26	908.68	906.25	894.88	894.66
R70	R69	0.00	0.00	0.00	2.99	17.50	4.12	12.32	13.38	24	61	0.35	0.30	0.17	0.30	4.3	0.2	896.12	895.94	906.25	904.22	894.56	894.34
R69	R68	0.00	0.00	0.00	4.09	17.70	4.10	16.74	17.52	24	54	0.60	0.55	0.17	0.55	5.6	0.2	894.66	894.37	904.22	903.03	893.09	892.77
R68	R67	0.00	0.00	0.00	4.09	17.90	4.08	16.74	17.52	24	71	0.60	0.55	0.17	0.55	5.6	0.2	892.83	892.44	903.03	893.40	891.27	890.84
R81	R80	0.82	0.71	0.58	0.58	15.00	4.38	2.53	2.64	12	30	0.55	0.50	0.44	0.50	3.4	0.1	910.70	910.55	913.92	914.04	909.91	909.75
R80	R79	0.72	0.70	0.51	1.08	15.10	4.36	4.73	5.04	12	25	2.00	1.76	0.44	1.76	6.4	0.1	905.50	905.06	914.04	912.89	904.76	904.26
R79	R71	0.00	0.00	0.00	1.08	15.20	4.35	4.73	5.04	12	121	2.00	1.76	0.44	1.76	6.4	0.3	904.67	902.55	912.89	908.68	904.16	901.75
R83	R82	0.23	0.80	0.18	0.18	15.00	4.38	0.79	2.36	12	30	0.44	0.05	0.44	0.44	3.0	0.2	902.78	902.65	905.98	905.96	901.98	901.85
R82	R70	0.16	0.66	0.11	0.29	15.20	4.35	1.25	2.36	12	15	0.44	0.12	0.44	0.44	3.0	0.1	902.54	902.48	905.96	906.25	901.75	901.68
R86	R85	0.46	0.25	0.12	0.12	15.00	4.38	0.51	2.36	12	153	0.44	0.02	0.44	0.44	3.0	0.8	900.03	899.36	903.75	904.92	899.23	898.56
R85	R84	0.00	0.00	0.00	0.12	15.80	4.29	0.51	2.36	12	221	0.44	0.02	0.44	0.44	3.0	1.2	899.26	898.29	904.92	903.47	898.46	897.49
R84	R69	0.00	0.00	0.00	1.09	17.00	4.17	4.56	5.04	12	95	2.00	1.64	0.44	1.64	6.4	0.2	897.84	896.29	903.47	904.22	897.39	895.49
R88	R87	0.62	0.71	0.44	0.44	15.00	4.38	1.91	2.36	12	30	0.44	0.29	0.44	0.44	3.0	0.2	899.42	899.29	902.62	902.62	898.62	898.49
R87	R84	0.71	0.76	0.54	0.98	15.20	4.35	4.26	4.36	12	18	1.50	1.43	0.44	1.43	5.6	0.1	899.17	898.91	902.62	903.47	898.39	898.11
R98	R97	0.32	0.52	0.17	0.17	15.00	4.38	0.74	6.99	12	109	3.85	0.04	0.44	0.44	8.9	0.2	902.20	898.00	905.59	904.60	901.40	897.20
R97	R96	0.26	0.38	0.10	0.27	15.20	4.35	1.17	6.42	12	127	3.25	0.11	0.44	0.44	8.2	0.3	897.90	893.77	904.60	897.73	897.10	892.97
R96	R95	0.21	0.51	0.11	0.38	15.50	4.32	1.63	5.40	12	121	2.30	0.21	0.44	0.44	6.9	0.3	893.67	890.88	897.73	894.28	892.87	890.08
R95	R94	0.30	0.65	0.20	0.58	15.80	4.29	2.47	2.52	12	110	0.50	0.48	0.44	0.48	3.2	0.6	890.75	890.23	894.28	893.43	889.98	889.43
R94	R93	0.24	0.61	0.15	0.72	16.40	4.23	3.06	3.65	15	115	0.32	0.22	0.32	0.32	3.0	0.6	890.20	889.83	893.43	893.28	889.13	888.76
R93	R92	0.22	0.65	0.14	0.87	17.00	4.17	3.62	3.65	15	118	0.32	0.31	0.32	0.32	3.0	0.7	889.83	889.45	893.28	897.28	888.66	888.28
R92	R91	0.59	0.78	0.46	1.33	17.70	4.10	5.45	5.56	18	30	0.28	0.27	0.25	0.27	3.1	0.2	889.45	889.37	897.28	897.28	888.08	888.00
R91	R90	0.35	0.80	0.28	1.61	17.90	4.08	6.57	6.64	18	18	0.40	0.39	0.25	0.39	3.8	0.1	889.37	889.30	897.28	897.12	887.90	887.83
R90	R89	0.00	0.00	0.00	1.99	18.00	4.07	8.11	9.33	24	52	0.17	0.13	0.17	0.17	3.0	0.3	889.30	889.21	897.12	889.78	887.30	887.21
R101	R100	0.27	0.71	0.19	0.19	15.00	4.38	0.83	2.36	12	30	0.44	0.05	0.44	0.44	3.0	0.2	890.58	890.44	893.83	893.83	889.78	889.64
R100	R99	0.27	0.71	0.19	0.38	15.20	4.35	1.66	2.36	12	18	0.44	0.22	0.44	0.44	3.0	0.1	890.34	890.27	893.83	892.95	889.54	889.47
R99	R90	0.00	0.00	0.00	0.38	15.30	4.34	1.66	2.36	12	189	0.44	0.22	0.44	0.44	3.0	1.0	890.16	889.34	892.95	897.12	889.37	888.54
R104	R103	0.17	0.51	0.09	0.09	15.00	4.38	0.38	6.32	12	111	3.15	0.01	0.44	0.44	8.1	0.2	893.00	889.69	896.21	894.05	892.20	888.69
R103	R102	0.35	0.63	0.22	0.31	15.20	4.35	1.34	2.36	12	110	0.44	0.14	0.44	0.44	3.0	0.6	889.69	889.21	894.05	889.90	888.69	888.21

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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

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.

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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
STORMWATER CONVEYANCE CALCULATIONS

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 -- --
NO SCALE

DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO. 39

W:\15001948\DWG\PLAN SET\FINAL SITE PLAN\15001948SP-09-CALCS.DWG 3/26/2019 2:13 PM STEVE SILLS

STORM STRUCTURE SCHEDULE

Structure Name	Northing	Easting	Rim	Inner Dia.	Type	Casting	Inverts	Depth	Sump
R1	15264.0823'	14780.5529'	892.72		End Section		12" INV. 887.67 N		
R2	15339.7616'	14787.3196'	893.91	48"	MH		12" INV. 888.00 S	13.91	N
R3	15573.3470'	14893.5765'	890.67		End Section		15" INV. 889.00 N		
R4	15707.7118'	14946.4146'	898.75	48"	CB	EJIW 1040Z with 1040 N 7"	15" INV. 891.89 S 15" INV. 891.99 NE	6.86	N
R5	15768.1539'	14988.6422'	904.40	48"	CB	EJIW 7045	15" INV. 893.44 SW 12" INV. 896.64 NE	10.96	N
R6	15795.5056'	15016.1496'	904.40	48"	CB	EJIW 7045	12" INV. 898.00 SW 12" INV. 898.00 E	6.40	N
R6A	15800.4139'	15052.1251'	908.69	48"	MH	EJIW 1040Z, Type A Cover	12" INV. 899.07 W 12" INV. 902.81 N 12" INV. 899.46 SE	9.62	
R7	15825.8794'	15044.5102'	907.38	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 903.12 S 12" INV. 903.36 NE	4.26	N
R8	15909.3374'	15109.0281'	910.50	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 905.59 SW 12" INV. 905.69 NE	4.91	N
R9	16051.8238'	15252.3249'	917.50	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 912.76 SW 12" INV. 912.86 NE	4.74	N
R10	16192.7890'	15397.5350'	923.84	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 919.44 SW 12" INV. 919.54 NE	4.40	N
R11	16298.1723'	15507.1659'	926.89	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 921.75 SW 12" INV. 921.85 NE	5.14	N
R12	16355.3000'	15564.6185'	926.30	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 922.20 SW 12" INV. 922.30 NE	4.10	N
R13	16426.5432'	15636.2669'	927.02	24"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 923.02 SW	4.00	N
R14	15745.7388'	15128.0620'	909.42	48"	CB	EJIW 7045	12" INV. 900.07 NW 12" INV. 905.07 SE	9.35	N
R15	15724.8064'	15149.2682'	909.50	24"	INLET	EJIW 7045	12" INV. 905.37 NW	4.13	N
R16	15371.0297'	14893.3656'	891.67		End Section		36" INV. 888.00 E		
R17	15367.9186'	15044.6766'	898.74	72"	MH	EJIW 1040Z, Type A Cover	36" INV. 888.15 W 30" INV. 888.95 NE 15" INV. 892.80 SE	10.59	N
R18	15432.7226'	15132.2879'	900.09	72"	MH	EJIW 1040Z, Type A Cover	30" INV. 889.17 SW 30" INV. 889.27 E	10.92	N
R19	15429.9080'	15241.2396'	895.00	72"	CB	EJIW 1040Z with 1040 N 7"	30" INV. 889.49 W 24" INV. 889.89 N	5.51	N
R20	15541.6621'	15242.5746'	897.38	48"	CB	EJIW 1040Z with 1040 N 7"	24" INV. 892.01 S 24" INV. 892.11 N	5.37	N
R21	15779.5621'	15248.6224'	909.43	48"	CB	EJIW 1040Z with 1040 N 7"	24" INV. 896.63 S 12" INV. 900.51 E 18" INV. 898.51 N	12.80	N
R22	15778.9131'	15279.9493'	908.80	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 900.83 W 12" INV. 900.93 E	7.97	N
R23	15775.8072'	15429.8583'	909.21	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 902.05 W 12" INV. 902.15 E	7.16	N
R24	15773.1834'	15540.3511'	909.04	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 902.87 W 12" INV. 902.97 E	6.08	N
R25	15771.1276'	15642.8704'	908.94	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 903.49 W 12" INV. 903.59 E	5.45	N
R26	15768.4433'	15742.9668'	908.91	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 904.03 W 12" INV. 904.13 E	4.88	N
R27	15766.3080'	15839.2817'	908.67	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 904.56 W 12" INV. 904.66 NE	4.11	N
R28	15868.7329'	15951.9443'	918.04	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 905.33 SW 12" INV. 913.97 N	12.71	N
R29	15969.7745'	15954.1395'	920.52	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 915.23 S 12" INV. 915.33 N	5.29	N
R30	16070.7497'	15957.0064'	923.21	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 916.59 S 12" INV. 916.69 N	6.62	N
R31	16171.7553'	15959.6543'	923.17	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 917.96 S 12" INV. 918.06 N	5.21	N
R32	16282.6874'	15962.0280'	923.61	24"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 919.44 S	4.17	N
R33	15822.9697'	15253.1308'	915.26	48"	MH	EJIW 1040Z with 1040 N 7"	18" INV. 899.39 S 18" INV. 899.49 NE	15.87	N
R34	15929.9790'	15360.9892'	920.82	48"	MH	EJIW 1040Z, Type A Cover	18" INV. 902.52 SW 18" INV. 902.62 NE	18.30	N
R35	15967.8284'	15414.3847'	922.06	48"	MH	EJIW 1040Z, Type A Cover	18" INV. 903.93 SW 18" INV. 908.18 NE 12" INV. 917.86 N	18.13	N
R36	16047.4273'	15494.4363'	925.15	48"	MH	EJIW 1040Z, Type A Cover	18" INV. 909.31 SW 18" INV. 909.41 E	15.84	N
R37	16046.1790'	15518.4275'	919.03	48"	CB	EJIW 1040Z with 1040 N 7"	18" INV. 909.65 W 18" INV 909.75 E	9.38	N
R38	16042.3742'	15591.5566'	917.87	48"	CB	EJIW 1040Z with 1040 N 7"	18" INV. 910.48 W 18" INV. 910.58 E	7.39	N
R39	16044.5798'	15683.5681'	918.79	48"	CB	EJIW 1040Z with 1040 N 7"	18" INV. 911.50 W 12" INV. 912.00 N 15" INV. 911.80 SE	7.28	N
R40	16141.8190'	15687.5497'	921.22	24"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 916.38 S	4.84	N
R41	15996.2661'	15729.5577'	918.79	48"	CB	EJIW 1040Z with 1040 N 7"	15" INV. 912.97 NW 15" INV. 913.07 S 12" INV. 914.52 E	5.82	N
R42	15991.5345'	15805.7982'	922.43	48"	CB	EJIW 7045	12" INV. 918.19 W 12" INV. 918.29 E	4.24	N
R43	15990.8288'	15835.5857'	922.42	24"	INLET	EJIW 7045	12" INV. 918.42 W	4.00	N
R44	15918.4258'	15721.1297'	918.15	48"	CB	EJIW 7045	15" INV. 913.58 N 12" INV. 913.88 S	4.57	N
R45	15888.6400'	15720.4735'	918.15	24"	INLET	EJIW 7045	12" INV. 914.15 N	4.00	N
R46	15985.7459'	15411.6977'	922.73	48"	CB	EJIW 7045	12" INV. 918.60 NW 12" INV. 918.50 S	4.23	N
R47	16012.7711'	15396.6130'	922.97	24"	INLET	EJIW 7045	12" 918.73 SE	4.24	N
R48	15329.8276'	15066.4676'	897.31	48"	CB	EJIW 7045	15" INV. 892.98 NW 12" INV. 893.18 E	4.33	N
R49	15329.1817'	15096.2495'	897.31	24"	INLET	EJIW 7045	12" INV. 893.31 W	4.00	N
R50	15164.3863'	14919.4027'	888.87		End Section		12" INV. 885.89 SW		
R51	15044.4910'	14869.3256'	893.31	48"	MH		12" INV. 886.46 NE	6.85	N
R52	14885.5296'	14913.9242'	890.50		End Section		24" INV. 888.00 S		
R53	14815.0823'	14922.7013'	900.23	48"	CB	EJIW 1040Z with 1040 N 7"	24" INV. 888.14 N 15" INV. 895.80 S	12.09	N
R54	14705.1063'	14920.3939'	902.96	48"	CB	EJIW 1040Z with 1040 N 7"	15" INV. 897.77 N 15" INV. 897.87 S	5.19	N
R55	14644.6089'	14907.2544'	907.60	48"	MH	EJIW 1040Z with 1040 N 7"	15" INV. 898.49 N 15" INV. 898.76 S 12" INV. 898.69 SE	9.11	N
R56	14465.5768'	14903.1442'	908.32	48"	CB	EJIW 1040Z with 1040 N 7"	15" INV. 903.72 N 12" INV. 903.92 W	4.60	N
R57	14469.0763'	14788.2368'	911.36	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 906.60 W 12" INV. 906.50 E	4.86	N
R58	14471.0470'	14678.2530'	914.25	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 909.73 W 12" INV. 909.63 E	4.62	N
R59	14477.7013'	14550.7768'	916.70	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 912.06 W 12" INV. 911.96 E	4.74	N
R60	14480.0058'	14441.5225'	916.69	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 912.64 W 12" INV. 912.54 E	4.15	N
R61	14479.0949'	14331.4683'	917.46	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 913.23 W 12" INV. 913.13 E	4.33	N
R62	14486.2111'	14214.1871'	918.70	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 914.50 NW 12" INV. 914.40 E	4.30	N
R63	14534.5798'	14146.8405'	919.73	48"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 915.64 NW 12" INV. 915.54 SE	4.19	N
R64	14634.4748'	14099.4233'	920.32	24"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 916.12 SE	4.20	N
R65	14616.2074'	14975.7899'	907.39	48"	CB	EJIW 7045	12" INV. 899.01 NW 12" INV. 903.19 S	8.38	N
R66	14586.4154'	14975.0966'	907.39	24"	INLET	EJIW 7045	12" INV. 903.32 N	4.07	N
R67	14990.4529'	14765.4727'	893.40		End Section		24" INV. 890.84 SW		
R68	14947.0223'	14708.6913'	903.03	60"	MH	EJIW 1040Z, Type A Cover	24" INV. 891.27 NE 24" INV. 892.77 S	11.76	N
R69	14893.8725'	14699.7656'	904.22	60"	MH	EJIW 1040Z, Type A Cover	24" INV. 893.09 N 24" INV. 894.34 SE 12" INV. 895.49 W	11.13	N
R70	14838.1297'	14725.5916'	906.25	60"	MH	EJIW 1040Z, Type A Cover	24" INV. 894.56 NW 24" INV. 894.66 S 12" INV. 901.68 E	11.69	N
R71	14764.8154'	14724.5673'	908.68	48"	MH	EJIW 1040Z, Type A Cover	24" INV. 894.88 N 18" INV. 895.28 W 12" INV. 901.75 S	13.80	N
R72	14784.5357'	14651.9766'	902.26	48"	CB	EJIW 1040Z with 1040 N 7"	18" INV. 895.75 W 18" INV. 895.65 E	6.61	N
R73	14800.2859'	14581.8142'	901.27	48"	CB	EJIW 1040Z with 1040 N 7"	15" INV. 896.21 W 18" INV. 896.01 E	5.26	N
R74	14820.7902'	14489.6881'	902.64	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 896.98 W 15" INV. 896.68 E	5.96	N
R75	14838.6131'	14410.8803'	903.07	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 897.80 W 12" INV. 897.70 E	5.37	N
R76	14859.6415'	14348.0353'	903.65	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 898.30 W 12" INV. 898.20 E	5.45	N
R77	14880.3348'	14280.4713'	902.71	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 898.71 SW 12" INV. 898.61 E	4.10	N
R78	14827.4794'	14186.0671'	913.62	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 904.01 NE	9.61	N
R79	14644.0583'	14721.9564'	912.89	48"	MH	EJIW 1040Z, Type A Cover	12" INV. 904.16 N 12" INV. 904.26 SW	8.73	N
R80	14622.3136'	14710.4476'	914.05	48"	CB	EJIW 7045	12" INV. 904.76 NE 12" INV. 909.75 S	9.28	N
R81	14592.4782'	14714.5674'	913.92	24"	CB	EJIW 7046	12" INV. 910.04 N	3.88	N
R82	14834.1224'	14740.5322'	905.96	48"	CB	EJIW 1040Z, Type M1 Cover	12" INV. 901.75 W 12" INV. 901.85 E	4.21	N
R83	14834.5457'	14770.3356'	905.98	24"	INLET	EJIW 1040Z, Type M1 Cover	12" INV. 901.98 W	4.00	N
R84	14906.6391'	14605.6886'	903.47	48"	MH	EJIW 1040Z, Type A Cover	12" INV. 897.39 E 12" INV. 897.49 W 12" INV. 898.11 NW	6.08	N
R85	14955.0122'	14390.2006'	904.92	48"	MH	EJIW 1040Z, Type A Cover	12" INV. 898.56 NW 12" INV. 898.46 E	6.46	N
R86	15033.3748'	14259.2043'	903.75	24"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 899.23 SE	4.52	N
R87	14923.3724'	14597.8304'	902.62	48"	CB	EJIW 7045	12" INV. 898.39 SE 12" INV. 898.49 N	4.23	N
R88	14952.4392'	14604.3559'	902.62	24"	INLET	EJIW 7045	12" INV. 898.62 S	4.00	N
R89	14957.2378'	14989.1649'	889.78		End Section		24" INV. 887.21 E		
R90	14956.2489'	15040.7793'	897.12	48"	MH	EJIW 1040Z, Type A Cover	24" INV. 887.30 W 18" INV. 887.83 E 12" INV. 888.54 N	9.82	N
R91	14955.9117'	15058.3761'	897.28	48"	CB	EJIW 7045	18" INV. 887.90 W 18" INV. 888.00 E	9.38	N
R92	14955.3409'	15088.1707'	897.28	48"	CB	EJIW 7045	15" INV. 888.28 E 18" INV. 888.08 W	9.20	N
R93	14953.1004'	15205.7476'	893.28	48"	CB	EJIW 1040Z with 1040 N 7"	15" INV. 888.76 S 15" INV. 888.66 W	4.62	N
R94	14838.1273'	15203.2617'	893.43	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 889.43 S 15" INV. 889.13 N	4.30	N
R95	14728.1530'	15200.8839'	894.28	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 890.08 S 12" INV. 889.98 N	4.30	N
R96	14606.7045'	15198.2580'	897.73	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 892.97 SW 12" INV. 892.87 N	4.86	N
R97	14492.2413'	15142.9609'	904.60	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 897.20 W 12" INV. 897.10 NE	7.50	N
R98	14463.1021'	15037.7394'	905.59	24"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 901.40 E	4.19	N
R99	15144.7873'	15044.8557'	892.95	48"	MH	EJIW 1040Z, Type A Cover	12" INV. 889.37 S 12" INV. 889.47 E	3.58	N
R100	15144.4069'	15062.4516'	893.83	48"	CB	EJIW 7045	12" INV. 889.54 W 12" INV. 889.64 E	4.29	N
R101	15143.7627'	15092.2446'	893.83	24"	INLET	EJIW 7045	12" INV. 889.78 W	4.05	N
R102	15041.1841'	14730.0549'	889.91		End Section		12" INV. 888.21 NW		
R103	15083.8640'	14628.8750'	894.05	48"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 890.03 W 12" INV. 888.69 SE	5.36	N
R104	15111.8547'	14521.2343'	896.21	24"	INLET	EJIW 1040Z with 1040 N 7"	12" INV. 892.15 E	4.06	N
R200	15150.1573'	14303.2042'	903.37		End Section		12" INV. 900.00 SW		
R201	15074.2950'	14206.3226'	907.43	24"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 900.54 NE	6.89	N
R202	15760.5689'	14905.8585'	902.50		End Section		12" INV. 902.84 NE		
R203	15868.2088'	15017.8944'	905.11	24"	CB	EJIW 1040Z with 1040 N 7"	12" INV. 903.52 SW	1.59	N
R204	15158.7839'	15133.8450'	889.81		End Section		48" INV. 885.06 W		
R205	15164.4650'	15022.0403'	890.00		End Section		48" INV. 885.25 E		

Note: Shop drawings for each of the strucutres will be provided prior to construction. Approved alternates may be considered.

SANITARY STRUCTURE SCHEDULE

Structure Number	Easting	Northing	Rim	Dia.	Invert	Depth
S1	15085.1594'	15227.9020'	895.00	60.00"	10" INV. 880.50 S 10" INV. 880.51 N 10" INV. 879.70 E 10" INV. 879.70 W	15.30
S2	15079.1400'	14949.4975'	897.68	48.00"	10" INV. 883.31 S 10" INV. 883.11 N	14.57
S3	15072.7751'	14655.1192'	904.78	48.00"	10" INV. 887.24 SW 10" INV. 887.14 N	17.64
S4	15009.5033'	14594.5254'	906.76	48.00"	10" INV. 887.69 W 10" INV. 887.59 NE	19.07
S5	14744.5205'	14600.6276'	913.38	60.00"	10" INV 888.85 N 10" INV 903.65 W 10" INV 888.75 E	24.63
S6	14749.8095'	14845.2472'	905.92	48.00"	10" INV. 889.93 NW 10" INV. 889.83 S	16.09
S7	14708.7563'	14907.5657'	904.00	48.00"	10" INV. 890.33 W 10" INV. 890.23 SE	13.77
S8	14471.2593'	14960.9008'	903.60	48.00"	10" INV 891.40 NW 10" INV. 891.30 E	12.30
S9	14328.1595'	15027.3866'	904.52	48.00"	10" INV. 894.16 SE	10.36
S10	14553.1926'	14605.1217'	917.74	48.00"	10" INV. 906.62 W 10" INV. 906.52 E	11.22
S11	14375.0144'	14609.3069'	919.08	48.00"	10" INV. 908.51 W 10" INV. 908.41 E	10.67
S12	14242.0039'	14664.2104'	920.84	48.00"	10" INV. 909.94 E	10.90
S13	15089.6326'	15434.7882'	900.32	48.00"	10" INV. 886.57 S 10" INV. 886.67 N	13.75
S14	15094.1057'	15641.6744'	906.15	48.00"	10" INV. 893.29 S 10" INV. 893.39 NE	12.86
S15	15130.4681'	15718.6578'	909.13	48.00"	10" INV. 896.12 SW 10" INV. 896.22 NE	13.01
S16	15255.7131'	15843.1944'	915.51	48.00"	10" INV. 901.97 NE 10" INV. 901.87 SW	13.64
S17	15380.9581'	15967.7310'	921.88	60.00"	10" INV. 906.56 SW 10" INV. 912.31 NE 10" INV. 906.66 SE	15.32
S18	15585.9520'	16171.5656'	926.71	48.00"	10" INV. 913.47 SW 10" INV. 913.57 NE	13.24
S19	15782.8961'	16367.3959'	928.93	48.00"	10" INV. 918.15 SW	10.78
S20	15418.0912'	15930.3867'	920.70	48.00"	10" INV. 906.97 E 10" INV. 906.87 NW	13.83
S21	15461.5161'	15915.2405'	920.31	48.00"	10" INV. 907.25 E 10" INV. 907.15 W	13.16
S22	15786.2161'	15908.7005'	919.24	48.00"	10" INV. 908.65 NE 10" INV. 908.55 W	10.69
S23	15816.5025'	15935.8114'	920.51	48.00"	10" INV. 908.92 N 10" INV. 908.82 SW	11.69
S24	15820.2336'	16225.1094'	926.69	48.00"	10" INV. 913.65 N 10" INV. 913.55 S	13.14
S25	15801.8337'	16271.2520'	927.29	48.00"	10" INV. 914.44 S	12.85

NOTE: ALL SANITARY MANHOLE CASTINGS TO BE EJIW 1040 Z BOLT DOWN FRAME WITH 1040 AGS COVER, PER TOWNSHIP STANDARD DETAIL

WATER STRUCTURE SCHEDULE

Structure Name	Northing	Easting	FG	Casting
V1	15107.8943'	14296.7477'	905.29	EJIW 1040 A
V2	14646.5016'	14772.0209'	912.48	EJIW 1040 A
V3	14628.1313'	14701.2413'	914.39	EJIW 1040 A
V4	14633.2028'	14483.8795'	918.83	EJIW 1040 A
V5	14591.9799'	14565.3664'	917.89	EJIW 1040 A
V6	14626.1868'	14785.6793'	912.66	EJIW 1040 A
V7	15251.3436'	15059.1624'	895.92	EJIW 1040 A
V8	15630.9540'	15067.3701'	906.16	EJIW 1040 A
V9	15690.5094'	15071.8849'	907.32	EJIW 1040 A
V10	15710.2437'	14988.2444'	905.26	EJIW 1040 A
V11	15761.4357'	14803.5232'	901.86	EJIW 1040 A
V12	15961.2458'	15336.8526'	920.98	EJIW 1040 A
V13	15974.6830'	15350.3793'	921.67	EJIW 1040 A
V14	15960.5022'	15350.7752'	920.85	EJIW 1040 A
V15	15863.0747'	15855.0028'	919.72	EJIW 1040 A
V16	15882.8627'	15728.2884'	918.81	EJIW 1040 A
V17	16001.2966'	15841.4394'	923.44	EJIW 1040 A
V19	16344.1781'	15721.9629'	928.84	EJIW 1040 A
H1	14944.7763'	14654.9128'	903.41	
H2	14717.8831'	14262.0695'	921.15	
H3	14623.2742'	14826.8568'	911.66	
H4	14757.1250'	15050.4862'	902.79	
H5	15358.9878'	15063.4903'	898.66	
H6	15820.4608'	15198.1033'	913.78	
H7	15888.9376'	15543.1656'	920.01	
H8	16325.2008'	15789.7431'	928.30	
H9	16195.5513'	15575.3272'	927.11	
H10	14629.9904'	14538.6094'	918.27	
H11	15885.7262'	15835.4995'	919.62	
H12	15187.9349'	14227.7995'	902.24	

CROSSING TABLE

CROSSING	CROSSING PIPE 1				CROSSING PIPE 2				Clearance	NOTES
1	10 "	SAN	T/P=	882.02	48 "	ST	B/P=	884.90	2.88	
2	48 "	ST	B/P=	884.94	8 "	WM	T/P=	883.44	1.50	DIP WATER MAIN
3	10 "	SAN	T/P=	882.18	12 "	ST	B/P=	889.57	7.39	
4	12 "	ST	B/P=	889.35	8 "	WM	T/P=	887.85	1.50	DIP WATER MAIN
5	10 "	SAN	T/P=	883.95	18 "	ST	B/P=	887.85	3.90	
6	18 "	ST	T/P=	889.58	8 "	WM	B/P=	891.22	1.64	
7	10 "	SAN	T/P=	888.72	12 "	ST	B/P=	903.12	14.40	
8	12 "	ST	T/P=	900.11	8 "	WM	B/P=	901.63	1.52	
9	15 "	ST	T/P=	900.78	8 "	WM	B/P=	903.04	2.26	
10	10 "	SAN	T/P=	888.99	15 "	ST	B/P=	899.89	10.90	
11	10 "	SAN	T/P=	889.85	8 "	WM	B/P=	906.27	16.43	
12	10 "	SAN	T/P=	905.01	12 "	ST	B/P=	909.70	4.69	
13	12 "	ST	T/P=	905.80	8 "	WM	B/P=	907.34	1.54	
14	10 "	SAN	T/P=	907.22	8 "	WM	B/P=	910.89	3.67	
15	10 "	SAN	T/P=	890.67	12 "	ST	B/P=	901.72	11.04	
16	10 "	SAN	T/P=	891.24	24 "	ST	B/P=	892.75	1.51	
17	24 "	ST	T/P=	895.13	8 "	WM	B/P=	897.31	2.18	
18	10 "	SAN	T/P=	891.66	12 "	ST	B/P=	898.36	6.70	
19	10 "	SAN	T/P=	884.38	12 "	ST	B/P=	893.10	8.73	
20	15 "	ST	B/P=	892.75	8 "	WM	T/P=	891.25	1.50	DIP WATER MAIN
21	30 "	ST	B/P=	888.70	8 "	WM	T/P=	887.20	1.50	DIP WATER MAIN
22	10 "	SAN	T/P=	886.46	30 "	ST	B/P=	888.77	2.30	
23	10 "	SAN	T/P=	897.67	12 "	ST	B/P=	905.12	7.44	
24	12 "	ST	B/P=	899.87	8 "	WM	T/P=	898.37	1.50	DIP WATER MAIN
26	15 "	ST	T/P=	896.11	8 "	WM	B/P=	898.56	2.45	
28	10 "	SAN	T/P=	906.77	8 "	WM	B/P=	914.27	7.50	
29	10 "	SAN	B/P=	906.68	18 "	ST	T/P=	905.16	1.52	
30	10 "	SAN	T/P=	913.35	12 "	ST	B/P=	918.47	5.12	
31	18 "	ST	T/P=	904.62	8 "	WM	B/P=	914.40	9.78	
32	8 "	WM	T/P=	913.05	6 "	SAN	T/P=	910.39	2.66	Lead to unit L21
33	10 "	SAN	T/P=	909.34	12 "	ST	B/P=	913.79	4.45	
35	10 "	SAN	T/P=	918.67	8 "	WM	B/P=	922.08	3.42	
36	12 "	ST	T/P=	906.17	8 "	WM	B/P=	907.85	1.68	
37	12 "	ST	B/P=	899.99	8 "	WM	T/P=	898.49	1.50	DIP WATER MAIN
38	10 "	SAN	T/P=	910.70	12 "	ST	B/P=	918.16	7.46	
39	8 "	WM	B/P=	913.62	6 "	SAN	T/P=	911.08	2.54	Lead to unit L16
40	8 "	WM	B/P=	913.21	6 "	SAN	T/P=	910.58	2.63	Lead to unit L15
41	8 "	WM	B/P=	912.21	6 "	SAN	T/P=	909.06	3.15	Lead to unit L13
42	8 "	WM	B/P=	911.80	6 "	SAN	T/P=	908.51	3.28	Lead to unit L12
43	8 "	WM	B/P=	911.05	6 "	SAN	T/P=	908.75	2.30	Lead to unit L11
44	8 "	WM	B/P=	909.98	6 "	SAN	T/P=	906.92	3.06	Lead to unit L10
45	8 "	WM	B/P=	908.31	6 "	SAN	T/P=	906.06	2.25	Lead to unit L9
46	8 "	WM	B/P=	897.88	6 "	SAN	T/P=	894.90	2.98	Lead to unit L52
47	8 "	WM	B/P=	896.98	6 "	SAN	T/P=	894.17	2.81	Lead to unit L51
48	8 "	WM	B/P=	896.63	6 "	SAN	T/P=	893.93	2.71	Lead to unit L50
49	8 "	WM	B/P=	896.61	6 "	SAN	T/P=	893.83	2.78	Lead to unit L49
50	8 "	WM	B/P=	900.70	6 "	SAN	T/P=	898.76	1.94	Lead to unit L48
51	8 "	WM	B/P=	902.43	6 "	SAN	T/P=	900.54	1.88	Lead to unit L47
52	8 "	WM	B/P=	904.23	6 "	SAN	T/P=	901.82	2.41	Lead to unit L46
53	8 "	WM	B/P=	898.19	6 "	SAN	T/P=	895.75	2.44	Lead to unit L45
54	8 "	WM	B/P=	896.40	6 "	SAN	T/P=	894.02	2.38	Lead to unit L44
55	8 "	WM	B/P=	895.03	6 "	SAN	T/P=	892.82	2.22	Lead to unit L43
56	8 "	WM	B/P=	891.70	6 "	SAN	T/P=	888.08	3.62	Lead to unit D2
57	8 "	WM	B/P=	893.24	6 "	SAN	T/P=	890.31	2.93	Lead to unit D3
58	8 "	WM	B/P=	894.85	6 "	SAN	T/P=	891.31	3.54	Lead to unit D4
59	8 "	WM	B/P=	895.44	6 "	SAN	T/P=	893.02	2.42	Lead to unit D5
60	8 "	WM	B/P=	897.48	6 "	SAN	T/P=	893.55	3.93	Lead to unit D6
61	8 "	WM	B/P=	898.20	6 "	SAN	T/P=	895.75	2.45	Lead to unit D7
62	8 "	WM	B/P=	900.59	6 "	SAN	T/P=	896.44	4.14	Lead to unit D8
63	8 "	WM	B/P=	903.77	6 "	SAN	T/P=	901.77	2.00	Lead to unit D9
64	8 "	WM	B/P=	906.72	6 "	SAN	T/P=	902.27	4.44	Lead to unit D10
65	8 "	WM	B/P=	907.53	6 "	SAN	T/P=	905.50	2.03	Lead to unit D11
66	8 "	WM	B/P=	910.40	6 "	SAN	T/P=	905.90	4.50	Lead to unit D12
67	8 "	WM	B/P=	911.18	6 "	SAN	T/P=	909.00	2.18	Lead to unit D13
68	8 "	WM	B/P=	914.02	6 "	SAN	T/P=	909.51	4.50	Lead to unit D14
69	8 "	WM	B/P=	917.33	6 "	SAN	T/P=	914.14	3.19	Lead to unit D16
70	8 "	WM	B/P=	917.89	6 "	SAN	T/P=	915.22	2.68	Lead to unit D17
71	8 "	WM	B/P=	919.29	6 "	SAN	T/P=	915.53	3.75	Lead to unit D18
72	8 "	WM	B/P=	919.53	6 "	SAN	T/P=	916.62	2.90	Lead to unit D19
73	8 "	WM	B/P=	920.16	6 "	SAN	T/P=	916.94	3.22	Lead to unit D20
74	8 "	WM	B/P=	920.59	6 "	SAN	T/P=	918.07	2.53	Lead to unit D21
75	8 "	WM	B/P=	921.22	6 "	SAN	T/P=	917.85	3.37	Lead to unit D22
76	8 "	WM	B/P=	921.40	6 "	SAN	T/P=	918.73	2.67	Lead to unit D23
77	8 "	WM	B/P=	922.03	6 "	SAN	T/P=	918.52	3.51	Lead to unit D24
78	8 "	WM	B/P=	922.21	6 "	SAN	T/P=	918.90	3.31	Lead to unit D25
79	8 "	WM	B/P=	921.55	6 "	SAN	T/P=	919.79	1.76	Lead to unit D27
80	8 "	WM	B/P=	920.82	6 "	SAN	T/P=	918.74	2.09	Lead to unit D28
81	8 "	WM	B/P=	920.78	6 "	SAN	T/P=	917.62	3.16	Lead to unit D29
82	8 "	WM	B/P=	919.60	6 "	SAN	T/P=	916.15	3.45	Lead to unit D31
83	8 "	WM	B/P=	918.62	6 "	SAN	T/P=	915.88	2.74	Lead to unit D32
84	8 "	WM	B/P=	918.28	6 "	SAN	T/P=	914.50	3.78	Lead to unit D33
85	8 "	WM	B/P=	916.17	6 "	SAN	T/P=	913.75	2.42	Lead to unit D34
86	8 "	WM	B/P=	913.90	6 "	SAN	T/P=	910.63	3.27	Lead to unit D36
87	8 "	WM	B/P=	913.17	6 "	SAN	T/P=	910.53	2.64	Lead to unit D37
88	8 "	WM	B/P=	912.38	6 "	SAN	T/P=	910.27	2.10	Lead to unit D38
89	8 "	WM	B/P=	912.14	6 "	SAN	T/P=	909.94	2.20	Lead to unit D39
90	8 "	WM	B/P=	912.53	6 "	SAN	T/P=	909.62	2.90	Lead to unit D40
91	8 "	WM	B/P=	912.70	6 "	SAN	T/P=	909.53	3.16	Lead to unit D41
92	8 "	WM	B/P=	914.03	6 "	SAN	T/P=	910.74	3.29	Lead to unit D44
93	8 "	WM	B/P=	914.10	6 "	SAN	T/P=	911.24	2.86	Lead to unit D45
94	8 "	WM	B/P=	914.43	6 "	SAN	T/P=	911.41	3.01	Lead to unit D46
95	8 "	WM	B/P=	914.83	6 "	SAN	T/P=	912.61	2.22	Lead to unit D15
96	8 "	WM	B/P=	889.66	6 "	SAN	T/P=	887.27	2.39	Lead to unit D1
97	8 "	WM	B/P=	913.29	6 "	SAN	T/P=	909.22	4.07	Lead to unit D42
98	8 "	WM	B/P=	913.46	6 "	SAN	T/P=	910.63	2.83	Lead to unit D43
99	8 "	WM	B/P=	893.45	10 "	EXSAN	T/P=	885.05	8.40	Lead to unit D44
100	8 "	WM	B/P=	919.88	6 "	SAN	T/P=	917.00	2.87	Lead to unit D30
101	8 "	WM	B/P=	915.49	6 "	SAN	T/P=	911.40	4.10	Lead to unit D46
102	12 "	ST	B/P=	898.80	6 "	SAN	T/P=	895.44	3.36	Lead to unit L1
103	12 "	ST	B/P=	898.45	6 "	SAN	T/P=	894.53	3.92	Lead to unit L2
104	12 "	ST	B/P=	898.08	6 "	SAN	T/P=	894.96	3.12	Lead to unit L3
105	12 "	ST	B/P=	897.85	6 "	SAN	T/P=	894.27	3.58	Lead to unit L4
106	12 "	ST	B/P=	897.61	6 "	SAN	T/P=	894.05	3.56	Lead to unit L5
107	12 "	ST	B/P=	897.32	6 "	SAN	T/P=	893.85	3.47	Lead to unit L6
108	12 "	ST	B/P=	896.45	6 "	SAN	T/P=	893.61	2.84	Lead to unit L7
109	12 "	ST	B/P=	895.92	6 "	SAN	T/P=	894.48	1.45	Lead to unit L8
110	12 "	ST	B/P=	910.57	8 "	WM	T/P=	909.07	1.50	
111	48 "	ST	B/P=	890.40	8 "	WM	T/P=	888.67	1.73	DIP WATER MAIN
112	10 "	SAN	T/P=	881.80	8 "	WM	B/P=	888.67	6.87	
113	15 "	ST	B/P=	892.71	6 "	SAN	T/P=	888.14	4.57	Lead to unit D2

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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

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.

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TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

UTILITY TABLES

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 -- --
NO SCALE

DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
40

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W1 Determining Post-Development Cover Types, Areas, Curve Numbers and runoff coefficients

Total Contributing Drainage Area = 15.9 Acres

Rational Method Variables

Cover Type	Soil Type	Area (sf)	Area (ac)	Runoff Coef	(c)(Area)
Paved Parking Lots, roofs, driveways	D	268,490	6.16	0.95	255,066
Water Surfaces	D	41,000	0.94	1.00	41,000
Developed Open Space, Good Condition	D	383,114	8.80	0.50	191,557
			15.9		
			Total - Sum (c)(Area) =		487,623
			Area Total (sf)=		692,604
			Weighted C-Sum(c)(Area)/Sum(ac) or Sum(sf)=		**0.70**

NRCS Variables

Pervious Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN)(Area)
Developed Open Space	D	383,114	8.80	80	30,649,120
			0.00		0
			0.00		0
			8.80		
Total - Sum (CN)(Area) =					30,649,120
Area Total - Sum(ac) of Sum(sf)=					383,114
Weighted CN-Sum(CN)(Area)/Sum(ac) or Sum(sf)=					**80**

NRCS Variables

Impervious Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN)(Area)
Paved Parking Lots, roofs, driveways	D	268,490	6.16	98	26,312,020
Impervious, Ponds	D	41,000	0.94	98	4,018,000
			0.00		0
			7.10		
Total - Sum (CN)(Area) =					30,330,020
Area Total - Sum(ac) of Sum(sf)=					309,490
Weighted CN-Sum(CN)(Area)/Sum(ac) or Sum(sf)=					**98**

W2 First Flush Runoff Calculations (Vff)

A.	Vff = (1") (1/12) (43560/1) (C) AC =		**40,402**	cf

W3 Predevelopment Bankfull Runoff Calculations (Vbf-pre)

A.	2 year/24 hour storm event	P =	2.35	in
B.	Pervious Cover CN *(pasture, grassland or range, fair)*	CN =	78	
C.	S = (1000/CN)-10	S =	2.82	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	0.69	in
E.	Pervious Cover Area	Area =	692,604	sf
F.	V_{bf-pre} = Q(1/12)Area	V_{bf-pre} =	**39,963**	cf

W4 Pervious Cover Post-development Bankfull Runoff Calculations (Vbf-per-post)

A.	2 year/24 hour storm event	P =	2.35	in
B.	Pervious Cover CN	CN =	80	
C.	S = (1000/CN)-10	S =	2.50	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	0.79	in
E.	Pervious Cover Area	Area =	383,114	sf
F.	$V_{bf-per-post}$ = Q(1/12)Area	$V_{bf-per-post}$ =	**25,119**	cf

W5 Impervious Cover Post-development Bankfull Runoff Calculations (Vbf-imp-post)

A.	2 year/24 hour storm event	P =	2.35	in
B.	Impervious Cover CN	CN =	98	
C.	S = (1000/CN)-10	S =	0.20	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	2.12	in
E.	Pervious Cover Area	Area =	309,490	sf
F.	$V_{bf-imp-post}$ = Q(1/12)Area	$V_{bf-imp-post}$ =	**54,720**	cf

W6 Pervious Cover Post-development 100-year Storm Runoff Calculations (V100-per-post)

A.	100 year storm event	P =	5.11	in
B.	Pervious Cover CN	CN =	80	
C.	S = (1000/CN)-10	S =	2.50	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	2.99	in
E.	Pervious Cover Area	Area =	383,114	sf
F.	$V_{100-imp-post}$ = Q(1/12)Area	$V_{100-imp-post}$ =	**95,429**	cf

W7 Impervious Cover Post-development 100-year Storm Runoff Calculations (V100-imp-post)

A.	100 year storm event	P =	5.11	in
B.	Pervious Cover CN	CN =	98	
C.	S = (1000/CN)-10	S =	0.20	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	4.87	in
E.	Pervious Cover Area	Area =	309,490	sf
F.	$V_{100-imp-post}$ = Q(1/12)Area	$V_{100-imp-post}$ =	**125,679**	cf

W8 Determine Time of Concentration (Tc-hrs)

User specified; assume 20 minutes

Total Time of Concentration (hrs) = 0.33

W9 Runoff Summary & Onsite Infiltration Requirement

A. Runoff Summary from Previous Worksheets

V_{ff} =	**40,402**	cf*			
V_{bf-pre} =	39,963	cf			
$V_{bf-per-post}$ =	25,119	cf	**Total BF Volume ($V_{bf-post}$)**		
$V_{bf-imp-post}$ =	54,720	cf		79,839	cf
$V_{100-per-post}$ =	95,429	cf	**Total 100-year Volume (V_{100})**		
$V_{100-imp-post}$ =	125,679	cf		221,107	cf

B. Determine Onsite Infiltration Requirement

$V_{bf-post}$ =	79,839	cf
V_{bf-pre} =	39,963	cf
Bankfull Volume Difference =	**39,876**	**cf**

Onsite Infiltration Requirement (V_{inf}) = **40,402** cf

W10 Detention / Retention Requirement

A.	Q_p = 238.6 (T_c) ^ -0.82	587.37	cfs/in-mi^2
B.	Total Site Area	15.9	ac
C.	Q_{100} = $Q_{100-per}$ + $Q_{100-imp}$	7.86	in
D.	Peak Flow (PF) = ($Q_p \cdot Q_{100} \cdot A$)/640	114.726	cfs
E.	Delta = PF - 0.15A	112.341	cfs
F.	V_{det} = (Delta/PF) x V_{100} - V_{inf}*	**216,511**	cf

* V_{inf} refers to total infiltration provided per worksheet W11

W11 Determine Applicable BMPs and Associated Volume Credits

Proposed BMP	Area (ft²)	Storage Depth (ft)	Storage Volume (ft³)	Ave. Design Infil. Rate (in/hr)*	Infil. During Storm (ft³)	Total Volume Reduction (ft³)
NA	0	0.0	0	0	0	0

Total Volume Reduction Credit by Proposed Structural BMPs (Vinf) = **0** cf

W12 Infiltration / Detention Summary

Total Infiltration Required per WCWRC Rules:	40,402	cf
Total Infiltration Provided:	0	cf
Difference:	(40,402)	cf
% Deficiency:	100.0%	
Pro-Rated 20% Detention Penalty:	**20.0%**	
Total Detention Required	216,511	cf
Total Detention Required w/ Pro-Rated Penalty	**259,813**	cf
Total Detention Provided:	259,813	cf

Elevation	Area (ft²)	Volume (cf)	Total Volume (cf)
888	32,070		
889	35,882	33,976	33,976
890	39,850	37,866	71,842
891	43,976	41,913	113,755
892	48,259	46,118	159,873
893	52,700	50,480	210,352
894	57,297	54,999	265,351
895	62,050	59,674	325,024

Total Detention Provided: **325,024** cf

Vff Elev.=	889.17
Vbf Elev.=	890.19
V100 Elev.=	893.91
Freeboard=	1.09

Forebay Sizing

Required Volume (Vfb)=0.05*V100	**11,055 cf**
North Forebay Required Volume	**2,051 cf**
South Forebay Required Volume	**9,005 cf**

North Forebay Stage-Storage Summary:

Elev.	Area	Avg. Area	Depth	Volume
889.0	2,525	2,183	1.0	2,183
888.0	1,840			0
			Vfb Elev.=	888.94

South Forebay Stage-Storage Summary:

Elev.	Area	Avg. Area	Depth	Volume
890.0	6,715	6,155	1.0	11,235
889.0	5,595	5,080	1.0	5,080
888.0	4,565			0
			Vfb Elev.=	889.64

Outlet Control Structure Sizing

1. Standpipe outlet holes sizing - "first flush" runoff
First Flush discharge should be detained for 24 hours

Qff = Vff / 24 hrs / 3600 sec	Qff=	0.468	cfs	
hff(ave) = 2/3 x (Xff - Xo)	hff(ave) =	0.78	ft	
Aff(required) = Qff / 0.62 x sqrt(2*32.2*h)	A(required) =	0.1064	sf	
Selected Orifice Diameter =	=	2	in	
Area of each orifice =		0.0218	sf	
Number of orifice holes required =	=	4	holes at elev.	888.00
Check First Flush discharge release time				
Aff(actual) =		0.0873	ft²	
Qff = A x 0.62 x sqrt(2*32.2*h) =		0.3834	cfs	
Tff = Vff / (Qff x 3600)		29.3	hrs	O.K.

2. Standpipe outlet holes sizing - "Bankfull flood" discharge
Bankfull should discharge within 36 to 48 hours

Check release from first flush holes only				
hbf(ave) = 2/3 x (Xbf - Xo)	hbf(ave) =	1.46	ft	
Qbf = A x 0.62 x sqrt(2*32.2*h) =	Qbf =	0.525	cfs	
Tbf = Vbf / (Qbf x 3600) =	Tbf =	42.3	hrs	
Add holes at to decrease storage time				
The first flush volume will discharge in Tff	=	29.3	hrs	
Additional volume between Xbf and Xff = Vbf - Vff	=	39,437	cf	
Target Bankfull Discharge Time =		42.0	hrs	
Vbf = Target Discharge Time - Tff	=	12.7	hrs	
Qbf - Qff = (Vbf - Vff) / ((42-Tff) x 3600)	=	0.86	cfs	
Hff=(2/3)(Xbf-Xff)+(Xff-Xo)	=	1.85	ft	
Q_1=A_{ff}(.62)(SQRT(2gh)	=	0.59	cfs	
V_1=$T_{rem}Q_1$	=	27,070	cf	
V_2=V_{rem}-V_1	=	12,367	cf	
Q_2=V_2/T_{rem}	=	0.27	cfs	
H_{bf}=(2/3)(X_{bf}-X_{ff})	=	0.68	ft	
A_{bf}(required)	=	0.0657	sf	
Selected Orifice Diameter =		2	in	
Area of each orifice =		0.0218	sf	
Number of orifice holes required =	=	3	holes at elev.	889.17

3. Standpipe outlet holes sizing - "100-yr flood" discharge

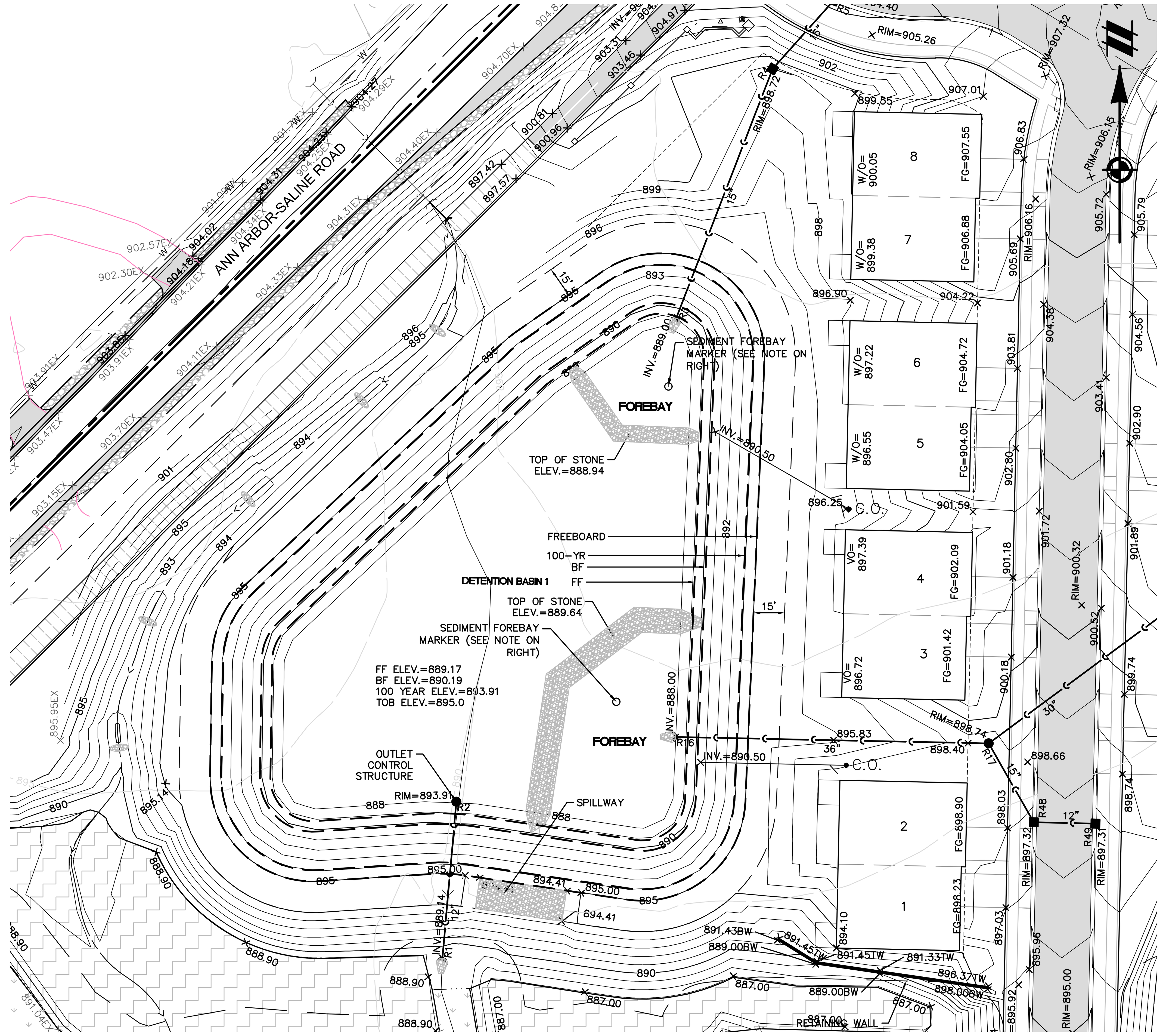
Q100 = Qa = 0.15 x Drainage Area	Q100 =	2.385	cfs	
Release from above holes				
hff = (Xprovided-Xo)	hff =	5.91	ft	
hbf = (Xprovided-Xff)	hbf =	4.74	ft	
Q = A x 0.62 x sqrt(64.4*hff) + A x 0.62 x sqrt(64.4*hbf) =		1.764	cfs	
Remaining flow =	Q100-Q=	0.621	cfs	
A = Q100 /(.62 x sqrt(2*32.2*h))	A(required) =	0.0573	sf	
Selected Orifice Diameter =		2	in	
Area of each orifice =		0.0218	sf	
Number of orifice holes required =	=	2	holes at elev.	890.19
Check that the actual flow rate does not exceed the allowable flow rate				
Qff=.62 x #ff holes x A x sqrt(2 x 32.2 x (X100-Xbot))	=	1.055	cfs	
Qbf=.62 x #bf holes x A x sqrt(2 x 32.2 x (X100-Xff))	=	0.709	cfs	
Qmax=Qff+Qbf+(.62 x #100 holes x sqrt(2 x 32.2 x (X100-Xbf))	=	2.183	cfs	O.K.
Check "100-yr discharge" holes discharge release time				
hall(ave) = 2/3 x (X100 - Xbf) + (Xbf - Xo) =	hall(ave) =	4.67	ft	
Qall = .62 x #ff holes x A x sqrt(2 x 32.2 x h) =	Qall =	0.938	cfs	
hbf(ave) = 2/3 x (X100 - Xbf) +(Xbf - Xff) =	hbf(ave) =	3.50	ft	
Qbf+100 = A x 0.62 x #bf holes x sqrt(2 x 32.2 x h) =	Qbf+100 =	0.609	cfs	
h100(ave) = 2/3 x (X100 - Xbf) =	h100(ave) =	2.48	ft	
Q100 = A x 0.62 x #100 holes x sqrt(2 x 32.2 x h) =	Q100(ave) =	0.342	cfs	
Vrem = V100-Vbf =	Vrem =	179,974	cf	
T100 = Tbf + ((Vrem)/(Qboth+Q100ave)) =	T100 =	68.7	hrs	O.K.

4. Riser Outlet Pipe Design
Outlet pipe designed to handle the 100-year restricted flow

100-year restricted flow =	Q =	2.39	cfs
Choose outflow pipe diameter =	d =	12	in
Choose outflow pipe slope =	S =	0.44	%
Assume roughness factor	n =	0.013	
Flow velocity at 100-yr restricted flow (Manning's) =	V =	3.01	fps
Design Pipe Capacity =	=	2.36	cfs

Basin Overflow Weir

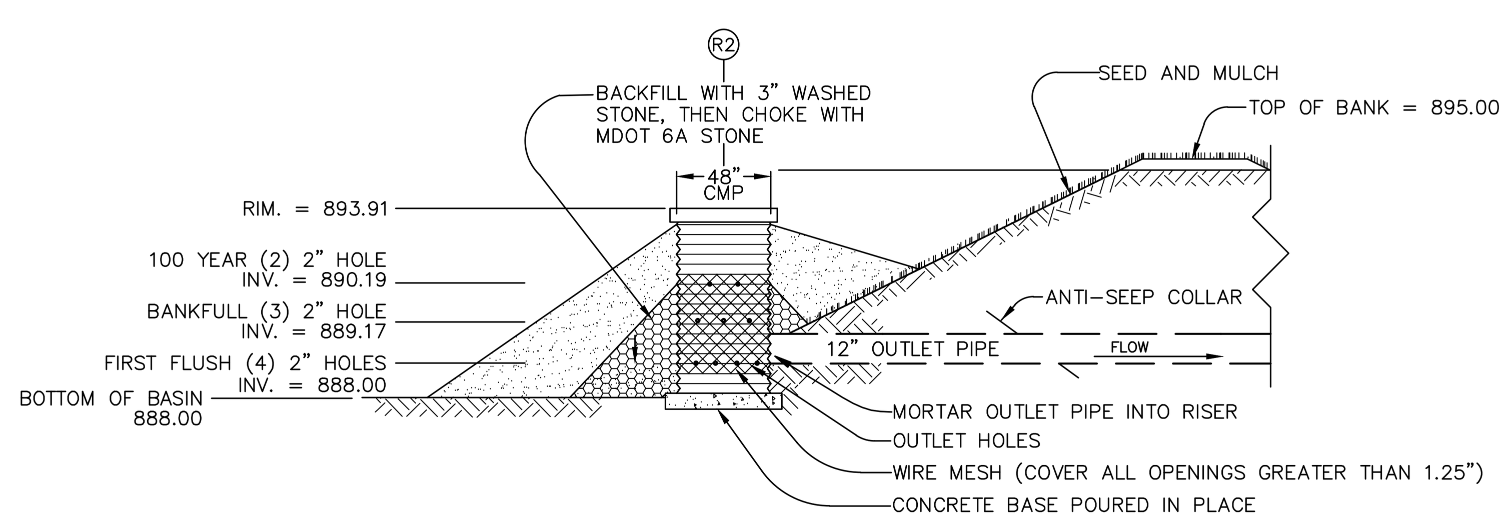
Drainage Area, A =		15.9	ac
C-Factor (C) =		0.70	
Time of Conc. (T) =		21.9	min
Intensity (I)	I = 275/(T+25)	5.86	in/hr
Design Flow (Q) =	C x I x A	65.26	cfs
Weir Coef (C)=		3.367	
Invert of Weir =		894.41	ft
Height of Weir (H) =		0.6	ft
Min. Width of Weir (B) =		42.5	ft



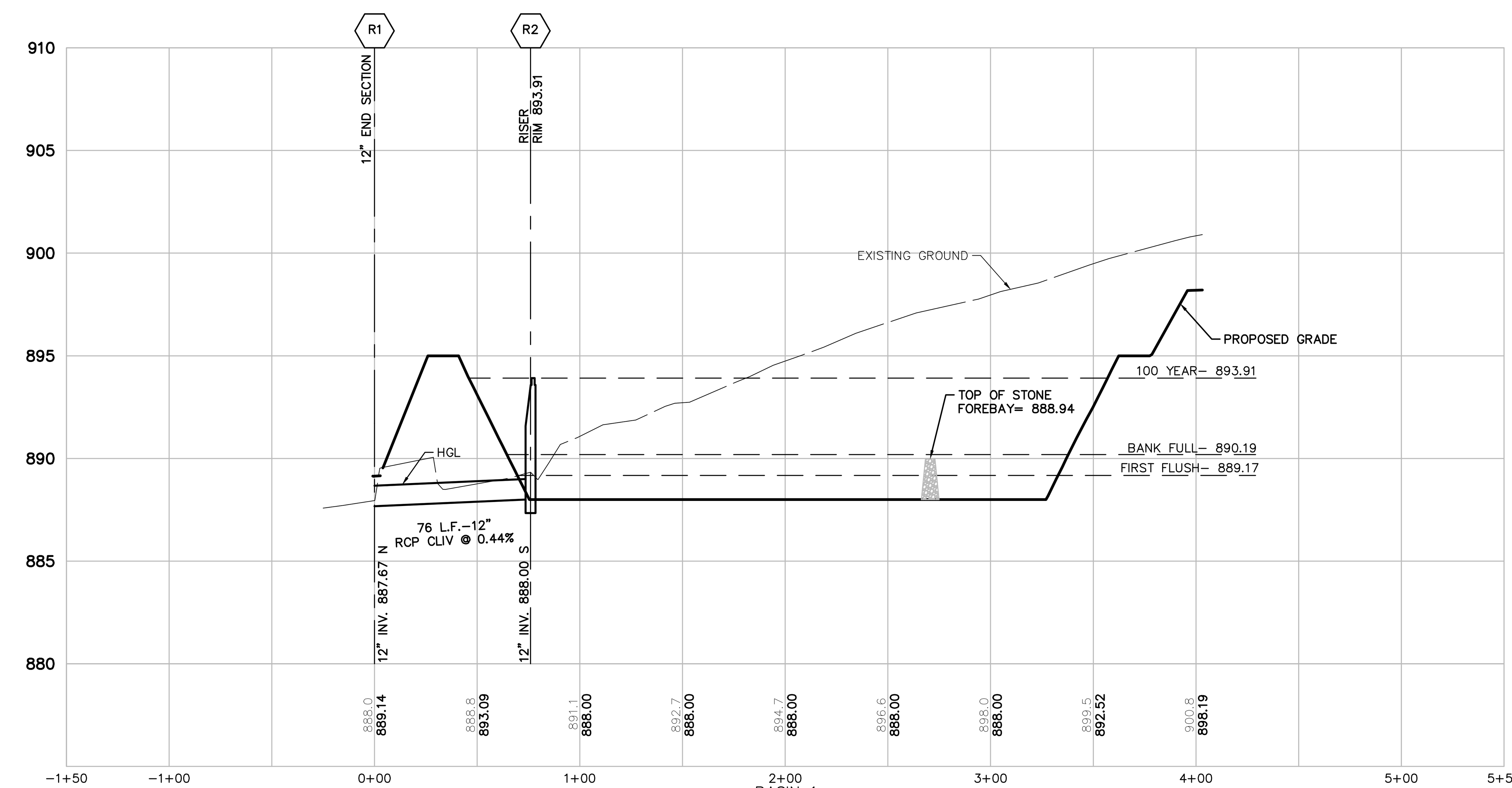
LEGEND

— · · · —	EXISTING WETLAND LINE
—OHE—	EXISTING OVERHEAD ELECTRICAL LINE
—OHT—	EXISTING OVERHEAD TELEPHONE LINE
—X—	EXISTING FENCE
	EXISTING CURB AND GUTTER
	BOUNDARY LINE
	EXISTING STORM
—W—	EXISTING WATER MAIN
	EXISTING SANITARY
—G—	EXISTING GAS
	PROPOSED STORM SEWER
	PROPOSED LOT
	PROPOSED SETBACK
	PROPOSED EASEMENT
	PROPOSED R.O.W.
	PROPOSED BACK/EDGE CURB
	PROPOSED CENTERLINE
	EXISTING WELL
	EXISTING SIGN
U.P.	EXISTING UTILITY POLE
	EXISTING FIRE HYDRANT
CATV	EXISTING CABLE MARKER
T	EXISTING TELEPHONE RISER
	SECTION CORNER
	EXISTING SANITARY MANHOLE
	EXISTING CATCH BASIN/INLET
	EXISTING WATER MANHOLE
	EXISTING WETLAND
	PROPOSED RIPRAP
	PROPOSED CATCH BASIN/INLET
	PROPOSED OUTLET
	PROPOSED MANHOLE

NOTE:
PROVIDE PERMANENT VERTICAL DEPTH MARKER (NON-CORROSIVE) TO MEASURE SEDIMENT DEPOSITION WITHIN FOREBAY. PLACE HORIZONTAL MARKING AT ELEV. 888.05 (LESSER OF 12-INCH DEPTH AND 5% STORAGE VOLUME) TO INDICATE SEDIMENT REMOVAL IS NECESSARY.



BASIN 1 OUTLET STRUCTURE DETAIL
NO SCALE



BASIN 1
VERT: 1"=5'
HORZ: 1"=50'

811
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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

BASIN 1 DESIGN

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 20 40
1" = 40 FEET

DR. CR	CH. SS
P.M. MB	
BOOK	N/A
JOB	15001948
SHEET NO.	**41**

W1 Determining Post-Development Cover Types, Areas, Curve Numbers and runoff coefficients

Total Contributing Drainage Area = 16.22 Acres

Rational Method Variables

Cover Type	Soil Type	Area (sf)	Area (ac)	Runoff Coef	(c)(Area)
Paved Parking Lots, roofs, driveways	D	228,504	5.25	0.95	217,079
Water Surfaces	D	36,000	0.83	1.00	36,000
Developed Open Space, Good Condition	D	442,039	10.15	0.50	221,020
			16.2		
				Total - Sum (c)(Area) =	474,098
				Area Total (sf)=	706,543
				Weighted C-Sum(c)(Area)/Sum(ac) or Sum(sf)=	**0.67**

NRCS Variables

Pervious Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN)(Area)
Developed open space	D	442,039	10.15	80	35,363,136
			0.00		0
			0.00		0
			10.15		
	Total - Sum (CN)(Area) =				35,363,136
	Area Total - Sum(ac) of Sum(sf)=				442,039
	Weighted CN-Sum(CN)(Area)/Sum(ac) or Sum(sf)=				**80**

NRCS Variables

Impervious Cover Type	Soil Type	Area (sf)	Area (ac)	Curve Number	(CN)(Area)
Paved Parking Lots, roofs, driveways	D	228,504	5.25	98	22,393,392
Impervious, Ponds	D	36,000	0.83	98	3,528,000
			0.00		0
			6.07		
	Total - Sum (CN)(Area) =				25,921,392
	Area Total - Sum(ac) of Sum(sf)=				264,504
	Weighted CN-Sum(CN)(Area)/Sum(ac) or Sum(sf)=				**98**

W2 First Flush Runoff Calculations (Vff)

A. Vff = (1") (1/12) (43560/1) (C) AC = **39,449** cf

W3 Predevelopment Bankfull Runoff Calculations (Vbf-pre)

A.	2 year/24 hour storm event	P =	2.35	in
B.	Pervious Cover CN *(pasture, grassland or range, fair)*	CN =	78	
C.	S = (1000/CN)-10	S =	2.82	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	0.69	in
E.	Pervious Cover Area	Area =	706,543	sf
F.	$V_{bf\text{-}pre}$ = Q(1/12)Area	$V_{bf\text{-}pre}$ =	**40,767**	cf

W4 Pervious Cover Post-development Bankfull Runoff Calculations (Vbf-per-post)

A.	2 year/24 hour storm event	P =	2.35	in
B.	Pervious Cover CN	CN =	80	
C.	S = (1000/CN)-10	S =	2.50	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	0.79	in
E.	Pervious Cover Area	Area =	442,039	sf
F.	$V_{bf\text{-}per\text{-}post}$ = Q(1/12)Area	$V_{bf\text{-}per\text{-}post}$ =	**28,982**	cf

W5 Impervious Cover Post-development Bankfull Runoff Calculations (Vbf-imp-post)

A.	2 year/24 hour storm event	P =	2.35	in
B.	Impervious Cover CN	CN =	98	
C.	S = (1000/CN)-10	S =	0.20	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	2.12	in
E.	Pervious Cover Area	Area =	264,504	sf
F.	$V_{bf\text{-}imp\text{-}post}$ = Q(1/12)Area	$V_{bf\text{-}imp\text{-}post}$ =	**46,766**	cf

W6 Pervious Cover Post-development 100-year Storm Runoff Calculations (V100-per-post)

A.	100 year storm event	P =	5.11	in
B.	Pervious Cover CN	CN =	80	
C.	S = (1000/CN)-10	S =	2.50	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	2.99	in
E.	Pervious Cover Area	Area =	442,039	sf
F.	$V_{100\text{-}imp\text{-}post}$ = Q(1/12)Area	$V_{100\text{-}imp\text{-}post}$ =	**110,106**	cf

W7 Impervious Cover Post-development 100-year Storm Runoff Calculations (V100-imp-post)

A.	100 year storm event	P =	5.11	in
B.	Pervious Cover CN	CN =	98	
C.	S = (1000/CN)-10	S =	0.20	in
D.	Q = (P-0.2S)^2/(P+0.8S)	Q =	4.87	in
E.	Pervious Cover Area	Area =	264,504	sf
F.	$V_{100\text{-}imp\text{-}post}$ = Q(1/12)Area	$V_{100\text{-}imp\text{-}post}$ =	**107,411**	cf

W8 Determine Time of Concentration (Tc-hrs)

User specified; assume 20 minutes

Total Time of Concentration (hrs) = 0.33

W9 Runoff Summary & Onsite Infiltration Requirement

A. Runoff Summary from Previous Worksheets

V_{ff} =	**39,449**	cf*		
$V_{bf\text{-}pre}$ =	40,767	cf		
$V_{bf\text{-}per\text{-}post}$ =	28,982	cf	**Total BF Volume ($V_{bf\text{-}post}$)**	
$V_{bf\text{-}imp\text{-}post}$ =	46,766	cf	75,748	cf
$V_{100\text{-}per\text{-}post}$ =	110,106	cf	**Total 100-year Volume (V_{100})**	
$V_{100\text{-}imp\text{-}post}$ =	107,411	cf	217,517	cf

B. Determine Onsite Infiltration Requirement

$V_{bf\text{-}post}$ =	75,748	cf
$V_{bf\text{-}pre}$ =	40,767	cf
Bankfull Volume Difference =	**34,981**	**cf**

Onsite Infiltration Requirement (V_{inf}) = **39,449** **cf**

W10 Detention / Retention Requirement

A.	Q_p = 238.6 (T_c) ^-0.82	587.37	cfs/in-mi^2
B.	Total Site Area	16.22	ac
C.	$Q_{100} = Q_{100\text{-}per} + Q_{100\text{-}imp}$	7.86	in
D.	Peak Flow (PF) = ($Q_p \cdot Q_{100} \cdot A$)/640	117.035	cfs
E.	Delta = PF - 0.15A	114.602	cfs
F.	V_{det} = (Delta/PF) x V_{100} - V_{inf}*	**212,995**	**cf**

* V_{inf} refers to total infiltration provided per worksheet W11

W11 Determine Applicable BMPs and Associated Volume Credits

Proposed BMP	Area (ft²)	Storage Depth (ft)	Storage Volume (ft³)	Ave. Design Infil. Rate (in/hr)*	Infil. During Storm (ft³)	Total Volume Reduction (ft³)
NA	0	0.0	0	0	0	0

Total Volume Reduction Credit by Proposed Structural BMPs (Vinf) = **0** **cf**

W12 Infiltration / Detention Summary

Total Infiltration Required per WCWRC Rules:	39,449	cf
Total Infiltration Provided:	0	cf
Difference:	(39,449)	cf
% Deficiency:	100.0%	
Pro-Rated 20% Detention Penalty:	**20.0%**	
Total Detention Required	212,995	cf
Total Detention Required w/ Pro-Rated Penalty	**255,594**	**cf**
Total Detention Provided:	255,594	cf

Elevation	Area (ft²)	Volume (cf)	tal Volume (cf)
886.5	0		
887	27,000	6,750	6,750
888	30,700	28,850	35,600
889	34,500	32,600	68,200
890	38,480	36,490	104,690
891	42,600	40,540	145,230
892	46,900	44,750	189,980
893	51,340	49,120	239,100
894	55,940	53,640	292,740
894.5	58,300	28,560	321,300

Total Detention Provided: **321,300** **cf**

Vff Elev.=	888.12
Vbf Elev.=	889.21
V100 Elev.=	893.31
Freeboard =	1.19

Forebay Sizing

Total Required Volume (Vfb)=0.05*V100				**10,876 cf**
East Forebay Required Volume				**5,819 cf**
West Forebay Required Volume				**5,056 cf**

East Forebay Stage-Storage Summary:

Elev.	Area	Avg. Area	Depth	Volume
888.0	7,290	6,718	1.0	6,718
887.0	6,145			0
			Vfb Elev.=	887.87

West Forebay Stage-Storage Summary:

Elev.	Area	Avg. Area	Depth	Volume
888.0	6,100	5,450	1.0	5,450
887.0	4,800			0
			Vfb Elev.=	887.93

Outlet Control Structure Sizing

1. Standpipe outlet holes sizing - "first flush" runoff

First Flush discharge should be detained for 24 hours

Qff = Vff / 24 hrs / 3600 sec	Qff=	0.457	cfs	
hff(ave) = 2/3 x (Xff - Xo)	hff(ave) =	1.08	ft	
Aff(required) = Qff / 0.62 x sqrt(2*32.2*h)	A(required) =	0.0884	sf	
Selected Orifice Diameter =	=	2	in	
Area of each orifice =		0.0218	sf	
Number of orifice holes required =	=	4	holes at elev.	886.50

Check First Flush discharge release time

Aff(actual) =	0.0873	ft²	
Qff = A x 0.62 x sqrt(2*32.2*h) =	0.4510	cfs	
Tff = Vff / (Qff x 3600)	24.3	hrs	O.K.

2. Standpipe outlet holes sizing - "Bankfull flood" discharge

Bankfull should discharge within 36 to 48 hours

Check release from first flush holes only

hbf(ave) = 2/3 x (Xbf - Xo)	hbf(ave) =	1.80	ft
Qbf = A x 0.62 x sqrt(2*32.2*h) =	Qbf =	0.583	cfs
Tbf = Vbf / (Qbf x 3600) =	Tbf =	36.1	hrs

Add holes at to decrease storage time

The first flush volume will discharge in Tff	=	24.3	hrs	
Additional volume between Xbf and Xff = Vbf - Vff	=	36,299	cf	
Target Bankfull Discharge Time =		36.0	hrs	
Vbf = Target Discharge Time - Tff	=	11.7	hrs	
Qbf - Qff = (Vbf - Vff) / ((42-Tff) x 3600)	=	0.86	cfs	
Hff=(2/3)(Xbf-Xff)+(Xff-Xo)	=	2.34	ft	
$Q_1=A_{ff}(.62)$(SQRT(2gh)	=	0.66	cfs	
$V_1=T_{rem}Q_1$	=	28,002	cf	
$V_2=V_{rem}-V_1$	=	8,297	cf	
$Q_2=V_2/T_{rem}$	=	0.20	cfs	
$H_{bf}=(2/3)(X_{bf}-X_{ff})$	=	0.73	ft	
A_{bf}(required)	=	0.0465	sf	
Selected Orifice Diameter =		2	in	
Area of each orifice =		0.0218	sf	
Number of orifice holes required =	=	2	holes at elev.	888.12

3. Standpipe outlet holes sizing - "100-yr flood" discharge

Q100 = Qa = 0.15 x Drainage Area	Q100 =	2.433	cfs	
Release from above holes				
hff = (Xprovided-Xo)	hff =	6.81	ft	
hbf = (Xprovided-Xff)	hbf =	5.19	ft	
Q = A x 0.62 x sqrt(64.4*hff) + A x 0.62 x sqrt(64.4*hbf) =		1.627	cfs	
Remaining flow =	Q100-Q=	0.806	cfs	
A = Q100 /(.62 x sqrt(2*32.2*h))	A(required) =	0.0711	sf	
Selected Orifice Diameter =		2	in	
Area of each orifice =		0.0218	sf	
Number of orifice holes required =	=	3	holes at elev.	889.21

Check that the actual flow rate does not exceed the allowable flow rate

Qff=.62 x #ff holes x A x sqrt(2 x 32.2 x (X100-Xbot))	=	1.133	cfs	
Qbf=.62 x #bf holes x A x sqrt(2 x 32.2 x (X100-Xff))	=	0.495	cfs	
Qmax=Qff+Qbf+(.62 x #100 holes x sqrt(2 x 32.2 x (X100-Xbf))	=	2.287	cfs	O.K.

Check "100-yr discharge" holes discharge release time

hall(ave) = 2/3 x (X100 - Xbf) + (Xbf - Xo) =	hall(ave) =	5.44	ft	
Qall = .62 x #ff holes x A x sqrt(2 x 32.2 x h) =	Qall =	1.013	cfs	
hbf(ave) = 2/3 x (X100 - Xbf) +(Xbf - Xff) =	hbf(ave) =	3.82	ft	
Qbf+100 = A x 0.62 x #bf holes x sqrt(2 x 32.2 x h) =	Qbf+100 =	0.424	cfs	
h100(ave) = 2/3 x (X100 - Xbf) =	h100(ave) =	2.73	ft	
Q100 = A x 0.62 x #100 holes x sqrt(2 x 32.2 x h) =	Q100(ave) =	0.538	cfs	
Vrem = V100-Vbf =	Vrem =	179,846	cf	
T100 = Tbf + ((Vrem)/(Qboth+Q100ave)) =	T100 =	61.4	hrs	O.K.

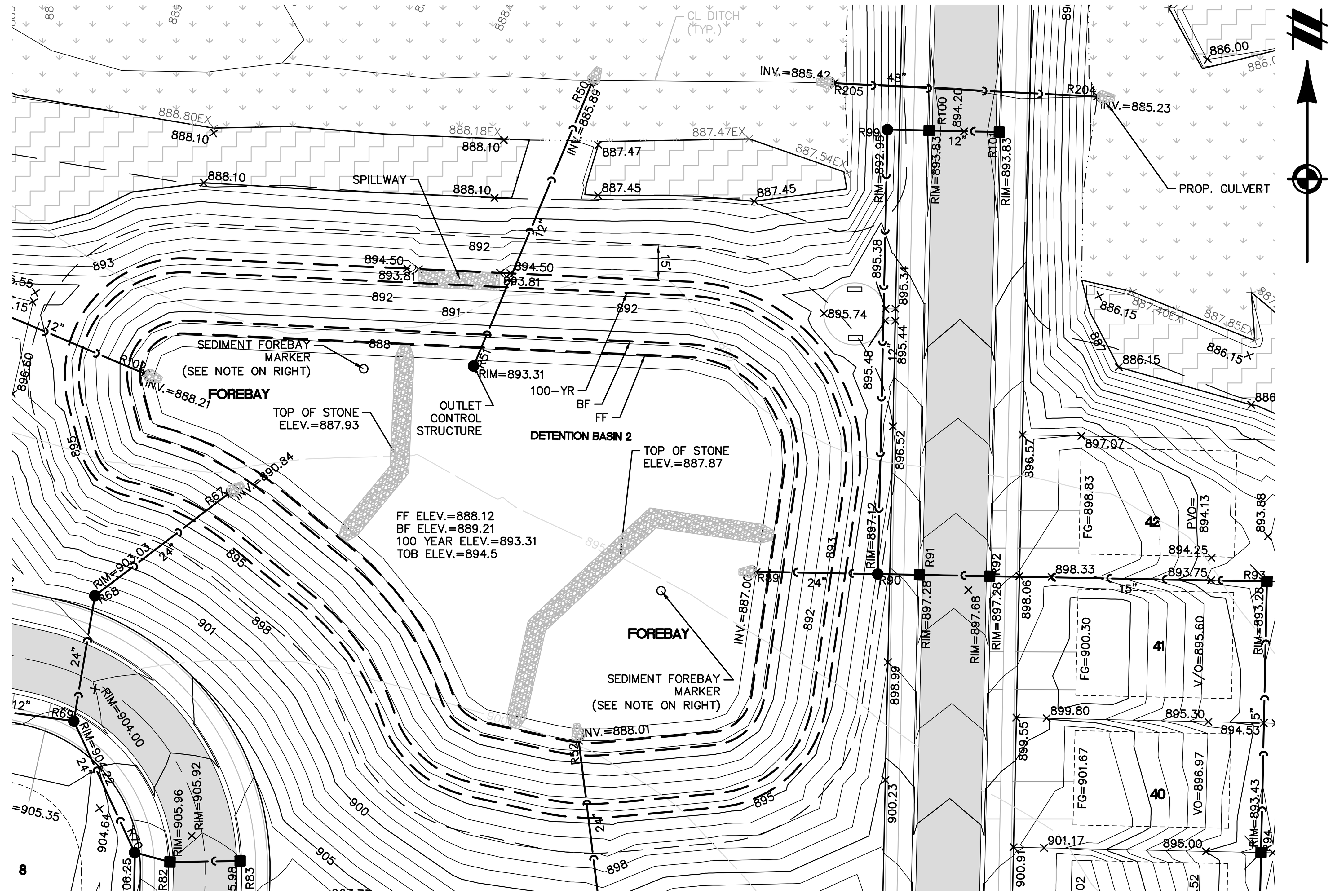
4. Riser Outlet Pipe Design

Outlet pipe designed to handle the 100-year restricted flow

100-year restricted flow =	Q =	2.43	cfs
Choose outflow pipe diameter =	d =	12	in
Choose outflow pipe slope =	S =	0.44	%
Assume roughness factor	n =	0.013	
Flow velocity at 100-yr restricted flow (Manning's) =	V =	3.01	fps
Design Pipe Capacity =	=	2.36	cfs

Basin Overflow Weir

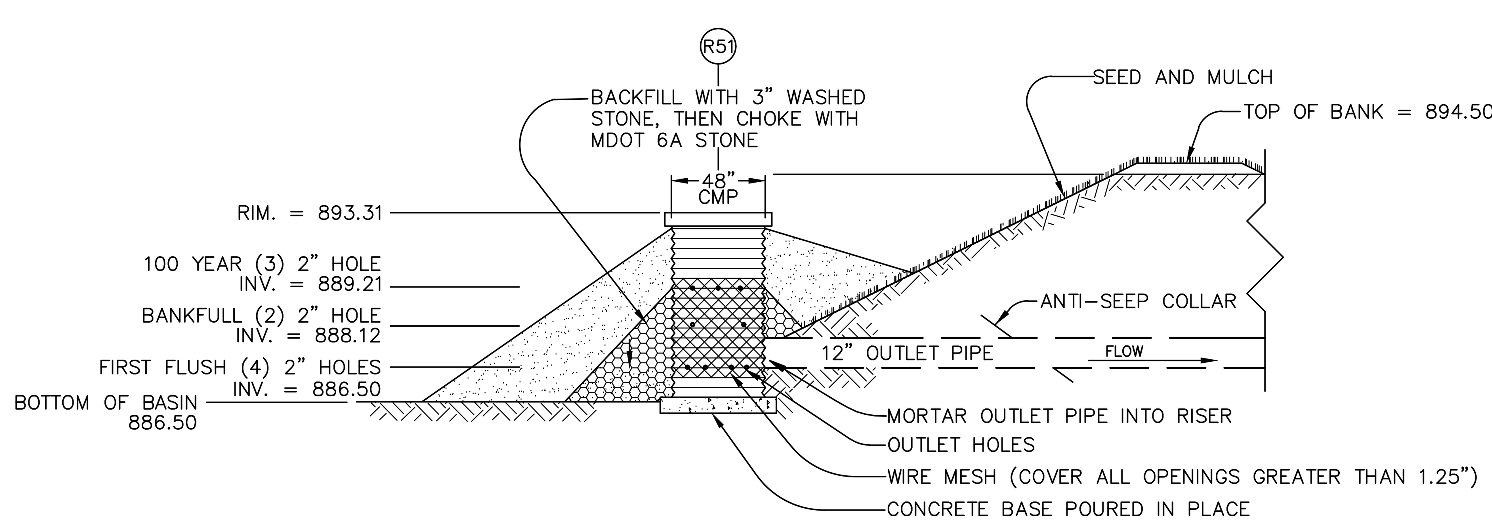
Drainage Area, A =		16.2	ac
C-Factor (C) =		0.67	
Time of Conc. (T) =		19.7	min
Intensity (I)	I = 275/(T+25)	6.15	in/hr
Design Flow (Q) =	C x I x A	66.86	cfs
Weir Coef (C)=		3.367	
Invert of Weir =		**893.81**	ft
Height of Weir (H) =		0.7	ft
Min. Width of Weir (B) =		**34.5**	**ft**
L = Q/(C x H^(3/2))			



LEGEND

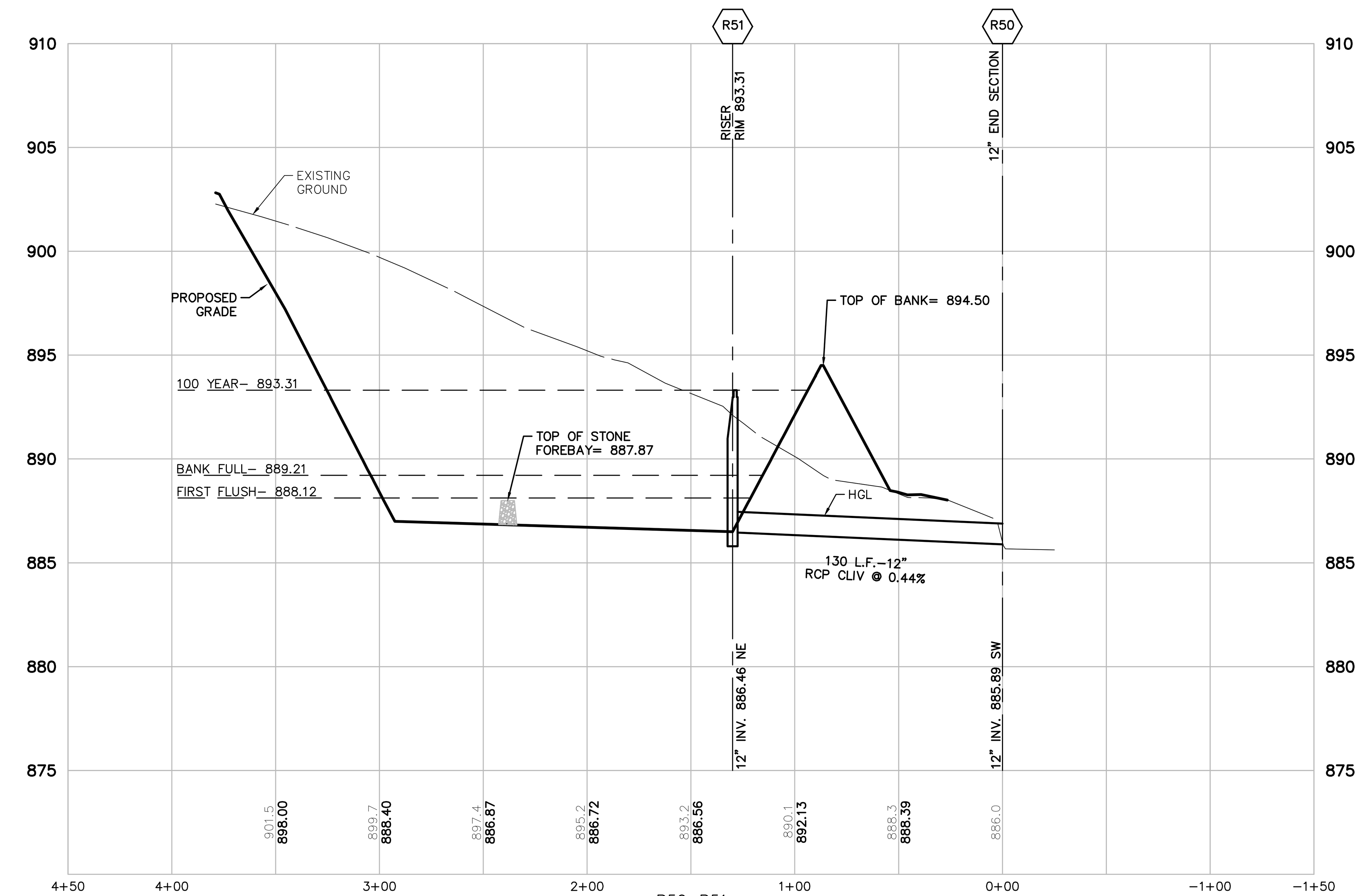
- EXISTING WETLAND LINE
- EXISTING OVERHEAD ELECTRICAL LINE
- EXISTING OVERHEAD TELEPHONE LINE
- EXISTING FENCE
- EXISTING CURB AND GUTTER
- BOUNDARY LINE
- EXISTING STORM
- EXISTING WATER MAIN
- EXISTING SANITARY
- EXISTING GAS
- PROPOSED STORM SEWER
- PROPOSED LOT
- PROPOSED SETBACK
- PROPOSED EASEMENT
- PROPOSED R.O.W.
- PROPOSED BACK/EDGE CURB
- PROPOSED CENTERLINE
- EXISTING WELL
- EXISTING SIGN
- EXISTING UTILITY POLE
- EXISTING FIRE HYDRANT
- EXISTING CABLE MARKER
- EXISTING TELEPHONE RISER
- SECTION CORNER
- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN/INLET
- EXISTING WATER MANHOLE
- EXISTING WETLAND
- PROPOSED RIPRAP
- PROPOSED CATCH BASIN/INLET
- PROPOSED OUTLET
- PROPOSED MANHOLE

NOTE:
PROVIDE PERMANENT VERTICAL DEPTH MARKER (NON-CORROSIVE) TO MEASURE SEDIMENT DEPOSITION WITHIN FOREBAY. PLACE HORIZONTAL MARKING AT ELEV. 887.04 (LESSER OF 12-INCH DEPTH AND 5% STORAGE VOLUME) TO INDICATE SEDIMENT REMOVAL IS NECESSARY.



BASIN 2 OUTLET STRUCTURE DETAIL

NO SCALE



R50-R51
VERT: 1"=5'
HORZ: 1"=50'

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REVISIONS

SCALE 0 20 40
1" = 40 FEET

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P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. **42**	

K:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948FSP-10-STRM.DWG 3/26/2019 2:15 PM STEVE SILLS

LEGEND

- EXISTING WETLAND LIMIT
- EXISTING OVERHEAD LINE
- EXISTING CURB AND GUTTER
- EXISTING STORM
- EXISTING EASEMENT
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXISTING RAILROAD
- PROPOSED STORM SEWER
- PROPOSED FRANCHISE EASEMENT
- PROPOSED STORM EASEMENT
- PROPOSED SANITARY EASEMENT
- PROPOSED WATER EASEMENT
- PROPOSED R.O.W.
- PROPOSED BACK/EDGE CURB
- PROPOSED CENTERLINE
- DRAINAGE AREA
- PROPOSED SILT FENCE
- SECTION CORNER
- EXISTING WETLAND
- PROPOSED CATCH BASIN/INLET
- PROPOSED OUTLET
- DRAINAGE ARROW

STORMWATER NARRATIVE:

EXISTING CONDITIONS

THE SITE IS PREDOMINANTLY OPEN FARM FIELDS WITH AREAS OF POCKETED WETLANDS. THE TERRAIN GENERALLY FALLS TOWARDS A LINEAR DITCH AND ITS ASSOCIATED WETLAND COMPLEX THAT BI-SECTS THE SITE AND FLOWS FROM WEST TO EAST.

THE STORM WATER RUNOFF FROM THE SITE CURRENTLY DRAINS VIA OVERLAND FLOW TO THIS DITCH SYSTEM WHICH EVENTUALLY DRAINS TO THE LAKE FOREST HIGHLANDS DEVELOPMENT DOWNSTREAM AND SOUTHEAST OF THE SUBJECT SITE.

THERE ARE TWO EXISTING 48" CULVERTS BENEATH ANN ARBOR-SALINE ROAD THAT CONVEY DRAINAGE FROM WEST TO EAST. THERE IS ALSO AN EXISTING 36" CULVERT BENEATH HIGHLANDER WAY WEST WHERE THE 48" CULVERTS AND ON-SITE DITCH EVENTUALLY DISCHARGE TO.

REFER TO THE DRAIN MAP AND THE EXISTING CONDITIONS PLAN FOR ADDITIONAL DETAILS.

PROPOSED STORM WATER MANAGEMENT SYSTEM

IN CONJUNCTION WITH THE DEVELOPMENT OF THE SITE, THE STORM WATER MANAGEMENT FACILITY IMPROVEMENTS ARE TO COMPLY WITH THE CURRENT RULES OF THE WASHTENAW COUNTY WATER RESOURCE COMMISSIONER (WCWRC).

A PRE-APPLICATION MEETING WAS HELD WITH THE WCWRC ON APRIL 4, 2016. A SOIL INVESTIGATION REPORT AND INFILTRATION STUDY REPORT WAS PREPARED BY MCDOWELL & ASSOCIATES. IN ACCORDANCE WITH THE INFILTRATION STUDY REPORT BY OTHERS, DUE TO THE PRESENCE OF PREDOMINANTLY CLAY SOIL TYPES AND/OR SATURATED GRANULAR SOILS AT THE TEST PIT LOCATIONS, THE SITE WOULD NOT BE FAVORABLE FOR GROUNDWATER INFILTRATION.

REFER TO THE SOILS INVESTIGATION REPORT PREPARED BY MCDOWELL AND ASSOCIATES, DATED FEBRUARY 24, 2016 AND THE INFILTRATION STUDY PREPARED BY MCDOWELL AND ASSOCIATES, DATED MAY 18, 2016.

THE PROPOSED STORM WATER RUNOFF WILL BE COLLECTED AND CONVEYED VIA STORM SEWER TO ONE OF TWO DETENTION BASINS PROPOSED ON THE SITE. THESE BASINS HAVE BEEN SIZED USING THE WCWRC METHOD TO TREAT AND DETAIN THE STORM WATER FOR A 100-YEAR STORM EVENT PLUS THE 20 PERCENT PENALTY ENFORCED DUE TO NOT BEING ABLE TO INFILTRATE ON-SITE. A FLOW RESTRICTOR WILL BE PROVIDED VIA A PERFORATED RISER OUTLET STRUCTURES IN ORDER TO REGULATE THE RATE OF DISCHARGE AT OR BELOW THE ALLOWABLE BANK FULL AND 100-YEAR RATES. STONE WALLS DELINEATING THE FOREBAY AREAS WILL BE PROVIDED WITHIN THE BASINS AT THE INLETS TO THE PONDS TO PROMOTE SETTLING OF SUSPENDED SOLIDS AND SEDIMENT FOR THE MORE FREQUENT RAIN EVENTS.

THE OUTLETS FROM THE BASINS WILL BE DISCHARGING AT RESTRICTED RATES TO THE EXISTING WETLAND COMPLEX DIRECTLY ADJACENT TO AND ASSOCIATED WITH THE DITCH BISECTING THE SITE. REFER TO THE PLANS FOR ADDITIONAL DETAILS.

A DOWNSTREAM DRAINAGE CAPACITY STUDY HAS BEEN COMPLETED TO ENSURE THE PROPOSED CONDITIONS WILL NOT INCREASE FLOW RATES LEAVING THE SITE. THE ANALYSIS WAS PERFORMED AT THE EXISTING 36" CULVERT LOCATED AT ELLSWORTH ROAD AND DEMONSTRATES THERE IS ADEQUATE CAPACITY DOWNSTREAM TO SUPPORT THE DEVELOPMENT. THIS STUDY AND ASSOCIATED ENGINEER'S CERTIFICATION OF OUTLET WAS SUBMITTED TO AND APPROVED BY THE WCWRC.

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PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

DRAINAGE AREA PLAN

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 50 100
1" = 100 FEET

DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO. 43

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MAINTENANCE TASKS AND SCHEDULE DURING CONSTRUCTION

TO BE PERFORMED BY CONTRACTOR

TASKS	COMPONENTS								SCHEDULE
	Storm Sewer System	Catch Basin Inlet Filters	Silt Fence	Ditches and Swales	Outflow Control Structure	Rip-Rap	Forebay Areas	Storm Detention Areas	
Inspect for sediment, floatables, and debris	X	X	X	X	X	X	X	X	Weekly / Within 24 hrs after a Rain Event
Removal of sediment, floatables, and debris	X	X	X	X	X	X	X	X	As Needed
Inspection for erosion				X	X	X	X	X	Weekly / Within 24 hrs after a Rain Event
Re-establish permanent vegetation on eroded slopes				X	X	X	X	X	As needed
Replacement of stone					X				At turnover

NOTE: "As Needed" refers to when sediment has accumulated to a maximum of one foot depth and/or visually apparent debris exists

PERMANENT MAINTENANCE TASKS AND SCHEDULE

TO BE PERFORMED BY THE ASSOCIATION

TASKS	COMPONENTS						SCHEDULE	Annual Cost
	Storm Sewer System	Ditches and Swales	Outflow Control Structure	Rip-Rap	Forebay Areas	Storm Detention Areas		
Inspect for sediment, floatables, and debris	X	X	X		X	X	Quarterly	$ 100.00
Removal of sediment, floatables, and debris	X	X	X		X	X	As Needed	$ 200.00
Inspection for erosion		X	X	X	X	X	Quarterly	$ 100.00
Re-establish permanent vegetation on eroded slopes		X	X	X	X	X	As needed	$ 300.00
Replacement of stone		X	X	X			Every 3-5 years	$ 100.00
Mowing		X					1-2 times per year	$ 400.00
Inspect Stormwater system components during wet weather and compare to as-built plans	X	X	X	X	X	X	Annually	$ 100.00
Make adjustments as determined by annual inspection	X	X	X	X	X	X	As needed	$ 50.00

NOTE: "As Needed" refers to when sediment has accumulated to a maximum of one foot depth, visually apparent debris exists, or at any ownership turnover

NOTE: No Chemicals are allowed in stormwater features or buffer zones with the following exception: Invasive species may be treated with chemicals by a certified applicator.

SOIL EROSION AND SEDIMENTATION CONTROL NOTES:

1. THE CONDOMINIUM ASSOCIATION SHALL BE FIRST IN LINE OF RESPONSIBILITY FOR MAINTAINING ALL OF ROAD STORM SEWERS AND DETENTION BASINS.
2. A CHAPTER 18 DRAINAGE DISTRICT WILL BE ESTABLISHED FOR THE ENTIRE PROJECT GIVING THE WCWRC STATUTORY AUTHORITY FOR ULTIMATE RESPONSIBILITY.
3. SILT SACKS TO BE USED FOR ALL EXISTING AND PROPOSED CATCH BASINS. BEAVER DAMS ARE TO BE USED IN ADDITION TO SILT SACKS FOR ALL CURB–STYLE CATCH BASINS. STORM SEWER CATCH BASINS ARE TO BE PROTECTED WITH THE FOLLOWING PRODUCT OR APPROVED EQUAL:
   - 3.1. REGULAR FLOW SILTSACK (FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN–OFF).
   - 3.2. HI–FLOW SILTSACK (FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN–OFF).
   - 3.3. OIL–ABSORBANT SILTSACK (FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN–OFF OR SPILLS).
4. DETENTION BASINS SHALL BE SEEDED AND STABILIZED IMMEDIATELY UPON ACHIEVING FINAL GRADE AND FOLLOWING WCWRC APPROVED SPECIFICATIONS.
5. RESTORATION AND STABILIZATION OF ALL DISTURBED AREAS, INCLUDING PLACEMENT OF TOPSOIL, SOIL, SEED, FERTILIZER AND MULCH AND/OR SOD SHALL BE COMPLETED WITHIN FIVE (5) DAYS OF THE COMPLETION OF FINAL GRADE.
6. IF SOIL STOCKPILING IS NECESSARY AND/OR CREATED, SILT FENCE SHALL BE INSTALLED AND MAINTAINED AROUND THE PERIMETER OF THE STOCKPILE IF THE STOCKPILE WILL BE ON–SITE FOR AN EXTENDED PERIOD OF TIME.
7. EROSION CONTROL BLANKET TO BE UTILIZED ON ALL DISTURBED SLOPES WITH A FINISHED GRADE STEEPER THAN 4:1.
8. THE SMALLEST PRACTICAL AREA OF LAND SHALL BE EXPOSED AT ANY ONE TIME DURING DEVELOPMENT.
9. WHEN LAND IS EXPOSED DURING DEVELOPMENT, THE EXPOSURE SHALL BE KEPT TO THE SHORTEST PERIOD OF TIME.
10. TEMPORARY VEGETATION AND/OR MULCHING SHALL BE BE USED TO PROTECT CRITICAL AREAS EXPOSED DURING DEVELOPMENT.
11. THE PERMANENT FINAL VEGETATION AND STRUCTURES SHALL BE INSTALLED AS SOON AS PRACTICAL IN DEVELOPMENT.
12. ALL EROSION AND SEDIMENT CONTROL WORK SHALL CONFORM TO THE STANDARDS AND SPECIFICATIONS OF THE TOWNSHIP AND THE WASHTENAW COUNTY DRAIN COMMISSIONER.
13. DAILY INSPECTIONS SHALL BE MADE BY THE CONTRACTOR. PERIODIC INSPECTIONS MAY BE MADE BY THE OWNER/PROJECT ENGINEER/TOWNSHIP TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENTATION CONTROL MEASURES. ANY NECESSARY CORRECTIONS SHALL BE MADE WITHOUT DELAY BY THE ONSITE RESPONSIBLE INDIVIDUAL.
14. EROSION AND ANY SEDIMENTATION FROM WORK ON THIS SITE SHALL BE CONTAINED ON THE SITE AND NOT ALLOWED TO COLLECT ON ANY OFF–SITE AREAS OR IN WATERWAYS. WATERWAYS INCLUDE NATURAL AND MAN–MADE OPEN DITCHES, STREAMS, STORM DRAINS, LAKES AND PONDS.
15. EROSION AND ANY SEDIMENTATION CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CONSTRUCTION. SEDIMENT CONTROL PRACTICES WILL BE APPLIED AS A PERIMETER DEFENSE AGAINST ANY TRANSPORTING OF SILT OFF THE SITE.
16. A WATER TRUCK SHALL BE AVAILABLE TO WATER DOWN THE SITE ON A DAILY BASIS FOR DUST CONTROL.
17. ALL MUD/DIRT TRACKED ONTO EXISTING COUNTY ROADS FROM THIS SITE, DUE TO CONSTRUCTION, SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR/BUILDER, AS DIRECTED BY THE TOWNSHIP. MUD MAT DAILY MAINTENANCE WILL INCLUDE THE ADDITION OF EXTRA LAYERS OF STONE AS NECESSARY.
18. DURING CONSTRUCTION OF THE STORM SEWER SYSTEM, STRAW BALES, STONE FILTERS OR OTHER APPROVED MEANS, WILL PROTECT THE ENDS OF ALL OPEN PIPES.
19. PROMPTLY UPON THE BACKFILLING OF STORM STRUCTURES, INLET FILTERS WILL BE PLACED AROUND THE STRUCTURE PER DETAILS.
20. ANY REMAINING DENUDED AREA SHALL BE SEEDED AND MULCHED WITHIN 5 DAYS AFTER COMPLETION OF FINAL GRADING. SEED MIX AND APPLICATION RATES SHALL BE PER MDOT CLASS A SEED.
21. SHOULD DEWATERING BE NECESSARY, DISCHARGE SHALL BE ROUTED THROUGH A SEDIMENT FOREBAY, FILTER BAG OVER A WELL VEGETATED AREA OR OTHER APPROVED FILTERING MECHANISM PRIOR TO BEING DISCHARGED FROM THE SITE. DISCHARGE MUST BE LIMITED TO A NON–EROSIVE VELOCITY.
22. SOIL EROSION WILL BE CONTROLLED DURING AND AFTER CONSTRUCTION TO PROTECT ADJACENT PROPERTIES OR FACILITIES.
23. ALL EXISTING AND PROPOSED CULVERTS AND STORM PIPES ALONG ANN ARBOR–SALINE ROAD MUST BE KEPT FREE OF SEDIMENT.
24. SEED AND STABILIZE DETENTION BASINS IMMEDIATELY UPON ACHIEVING FINAL GRADE, AND FOLLOW WASHTENAW COUNTY WATER RESOURCE COMMISSION (WCWRC) APPROVED SPECIFICATIONS.
25. STEEP SLOPES THAT DO NOT TAKE UPON INITIAL SEEDING MUST BE RE–SEEDED AND STABILIZED WITH EROSION CONTROL BLANKET.
26. WHERE EXCAVATION HAS BEEN THROUGH LAWN AREAS, THE CONTRACTOR SHALL RESTORE THE DISTURBED AREA BY PLACING TOPSOIL AND SEEDING OR SODDING OVER THE FINAL BACKFILL MATERIAL.
27. IF DEWATERING IS NECESSARY, A DEWATERING PLAN MUST BE SUBMITTED PRIOR TO CONSTRUCTION.
28. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THE SOIL EROSION CONTROL MEASURES AS SHOWN ON THE SESC PLANS AT ALL TIMES DURING CONSTRUCTION ON THIS PROJECT. ANY MODIFICATIONS OR ADDITIONS TO THE SOIL EROSION CONTROL MEASURE DUE CONSTRUCTION OR CHANGED CONDITIONS, SHALL BE COMPLIED WITH AS REQUIRED OR DIRECTED BY THE OWNER, PROJECT ENGINEER, OR PITTSFIELD CHARTER TOWNSHIP.
29. ALL SOIL EROSION AND SEDIMENTATION CONTROL WORK SHALL CONFORM TO THE PERMIT REQUIREMENTS OF PITTSFIELD CHARTER TOWNSHIP AND THE LAWS OF THE STATE OF MICHIGAN.
30. A NPDES CONSTRUCTION ACTIVITY PERMIT IS REQUIRED FOR ALL SITES GREATER THAN FIVE (5) ACRES.
31. CONSTRUCTION OPERATIONS SHALL BE SCHEDULED AND PERFORMED SO THAT PREVENTATIVE SOIL EROSION CONTROL MEASURES ARE IN PLACE PRIOR TO EXCAVATION IN CRITICAL AREAS, AND TEMPORARY STABILIZATION MEASURES ARE IN PLACE IMMEDIATELY FOLLOWING BACKFILLING OPERATIONS
32. SPECIAL PRECAUTIONS WILL BE TAKEN IN THE USE OF CONSTRUCTION EQUIPMENT TO PREVENT SITUATIONS THAT PROMOTE EROSION.
33. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND REMOVAL OF SOME UPON AUTHORIZED COMPLETION OF PROJECT. COMPLETION OF PROJECT WILL NOT BE AUTHORIZED UNTIL ALL SITE WORK, HOME BUILDING, ROAD WORK, AND UTILITY CONSTRUCTION IS COMPLETE AND ALL SOILS ARE STABILIZED.
34. THE CONTRACTOR SHALL NOT GRADE IN EXISTING WETLAND OR CONSERVATION AREAS TO BE PROTECTED. SILT FENCE SHALL BE INSTALLED AND MAINTAINED ADJACENT TO EXISTING WETLAND AND CONSERVATION AREAS TO PREVENT GRADING, EROSION, AND SEDIMENTATION INTO THEM.
35. TREE PROTECTION FENCING MUST REMAIN INTACT UNTIL RESTORATION OF THE SITE IS COMPLETE.
36. SEED OR SOD IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
37. ALL AREAS OF DISTURBED EARTH THAT ARE NOT TO BE PAVED OR SODDED SHALL HAVE 4 INCHES OF TOPSOIL, SEED, FERTILIZER AND MULCH.
38. IMMEDIATELY AFTER SEEDING, MULCH ALL SEEDED AREAS WITH UNWEATHERED SMALL GRAIN STRAW (PREFERABLY WHEAT) OR HAY SPREAD. SPREAD UNIFORMLY AT THE RATE OF 1–1/2 TO 2 TONS OR 100 POUNDS (2 TO 3 BALES) PER 1,000 SQUARE FOOT. THIS MULCH SHOULD BE ANCHORED WITH A DISC–TYPE MULCH–ANCHORING TOOL.
39. ANY DISTURBED AREA NOT PAVED, SEEDED OR MULCHED, SODDED OR BUILT UPON ON OR AFTER NOVEMBER 15TH, IS TO BE MULCHED IN THE MANNER AS SPECIFIED ABOVE, IN ORDER TO PROVIDE SOIL EROSION PROTECTION DURING THE WINTER AND EARLY SPRING.
40. ALL EROSION AND SEDIMENTATION CONTROL PREVENTION PROCEDURES AND STRUCTURES ARE TO COMPLY WITH THE STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENTATION CONTROL FOR THE WASHTENAW COUNTY SOIL CONSERVATION DISTRICT.
41. DURING CONSTRUCTION, ALL ROADS SHALL BE PROTECTED FROM UNVEGETATED AREAS WASHING ONTO ROAD SURFACES BY PLACEMENT OF SILT FENCE BEHIND CURB OR A 10–FOOT WIDE STRAW MULCH BANK BEHIND THE CURB OR OTHER APPROVED METHOD AND/OR AS SHOWN ON THE PLANS.
42. DURING CONSTRUCTION OF ANY PORTION OF THE PROJECT, ROADS SHALL BE MAINTAINED FREE OF DIRT, SILT, AND CONSTRUCTION.

NOTE: NO WORK WITHIN REGULATED WETLANDS UNTIL MDEQ PERMIT IS ISSUED

POTENTIAL SOILS LOSS CALCULATIONS

County:	Washtenaw	
Site	Bella Vista	
Soil:	Blount Loam	
Soil Symbol:	BbB	
Slope:	11%	
Slope Length:	75	Ft.
Mulch Type:	Straw/Hay	
Mulch Rate:	1.5	(tons/acre)
Acreage:	30.48	Acres

Calculated Soil Loss:

Erosion Factors: R = 100, K = 0.43, LS = 0.3, C = 0.12, P = 1

Tolerable Soil Loss: T = 3.00 tons/acre/year

Calculated Soil Loss (total): A = 1.55 tons/acre

Potential Soil Loss (total): 47.18 (tons/year)

County:	Washtenaw	
Site	Bella Vista	
Soil:	Glynwood Loam	
Soil Symbol:	MoB	
Slope:	3%	
Slope Length:	205	Ft.
Mulch Type:	Straw/Hay	
Mulch Rate:	1.5	(tons/acre)
Acreage:	8.9	Acres

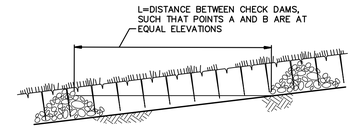
Calculated Soil Loss:

Erosion Factors: R = 100, K = 0.43, LS = 0.5, C = 0.12, P = 1

Tolerable Soil Loss: T = 3.00 tons/acre/year

Calculated Soil Loss (total): A = 2.58 tons/acre

Potential Soil Loss (total): 22.96 (tons/year)



CHECK DAMS

NO SCALE

SOIL EROSION CONSTRUCTION SEQUENCE

1. NOTIFY SOIL EROSION OFFICE 48 HOURS BEFORE WORK IS TO BEGIN. A FIELD PRE–CONSTRUCTION MEETING MUST BE HELD WITH THE SESC INSPECTOR PRIOR TO ANY EARTH CHANGE ACTIVITY.
2. PRIOR TO CONSTRUCTION, INSTALL TEMPORARY STONE ACCESS DRIVES AT ENTRANCE, PERIMETER SILT FENCE, SNOW FENCE, AND EROSION CONTROL MEASURES ON EXISTING STORM INLETS AS DESIGNATED ON THE SESC PLAN.
3. INSTALL UNDERGROUND UTILITIES (I.E. SANITARY, STORM, AND WATER MAIN.). INSTALL INLET FILTER PROTECTION ON PROPOSED STORM SEWER STRUCTURES. (4/1/19 – 120 DAYS)
4. PAVING ACTIVITIES. REMOVE STONE ACCESS DRIVE WHEN COMPLETE. (8/15/19 – 30 DAYS)
5. INSTALL PUBLIC UTILITIES (ELECTRIC, TELEPHONE, AND CABLE T.V.). (9/15/19 – 30 DAYS)
6. FINAL GRADING AND INSTALLATION OF LANDSCAPING. ESTABLISH PERMANENT VEGETATION FOR REMAINING DISTURBED AREAS. (10/15/19 – 45 DAYS)
7. CLEAN OUT STORM SEWER SYSTEM INCLUDING WATER QUALITY STRUCTURES AND STORAGE FACILITIES. (MAY 2020 – 15 DAYS)
8. CALL SOIL EROSION OFFICE FOR FINAL INSPECTION. REMOVE TEMPORARY SOIL EROSION MEASURES UPON APPROVAL. (JULY 2020)

SITE INFORMATION

SITE LOCATION: SOUTHWEST 1/4 OF SECTION 07, PITTSFIELD TOWNSHIP, MICHIGAN.

ULTIMATE RECEIVING WATER: PITTSFIELD #1 DRAIN

1. SITE SOILS INFORMATION: PER THE NRCS WEB SURVEY FOR WASHTENAW COUNTY; BbB, MoB, Pe
2. APPROXIMATE AREA OF DISTURBANCE: 39.5± ACRES

LEGEND

- EXISTING WETLAND LIMIT
- EXISTING CURB AND GUTTER
- EXISTING STORM
- EXISTING EASEMENT
- BOUNDARY/PROPERTY LINE
- PROPOSED STORM SEWER
- PROPOSED R.O.W.
- PROPOSED BACK/EDGE CURB
- PROPOSED SILT FENCE
- PROPOSED TREE FENCE
- PROPOSED INLET FILTER
- PROPOSED CATCH BASIN/INLET
- PROPOSED END SECTION
- PROPOSED RIP–RAP
- PROPOSED TRACKING MAT
- PROPOSED EROSION CONTROL BLANKET
- PROPOSED LIMIT OF DISTURBANCE

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

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NOTICE:
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SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
SOIL EROSION AND SEDIMENT CONTROL PLAN

DATE
OCTOBER 17, 2018

12–14–18 PER WCWRC & TWP
01–15–19 PER WCWRC & WCRC
02–01–19 PER TWP
02–08–19 PER TWP
03–01–19 PER WCRC
03–07–19 PER WCRC
03–26–19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 50 100
1" = 100 FEET

DR. CR	CH. SS
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BOOK N/A	
JOB 15001948	
SHEET NO. 44	

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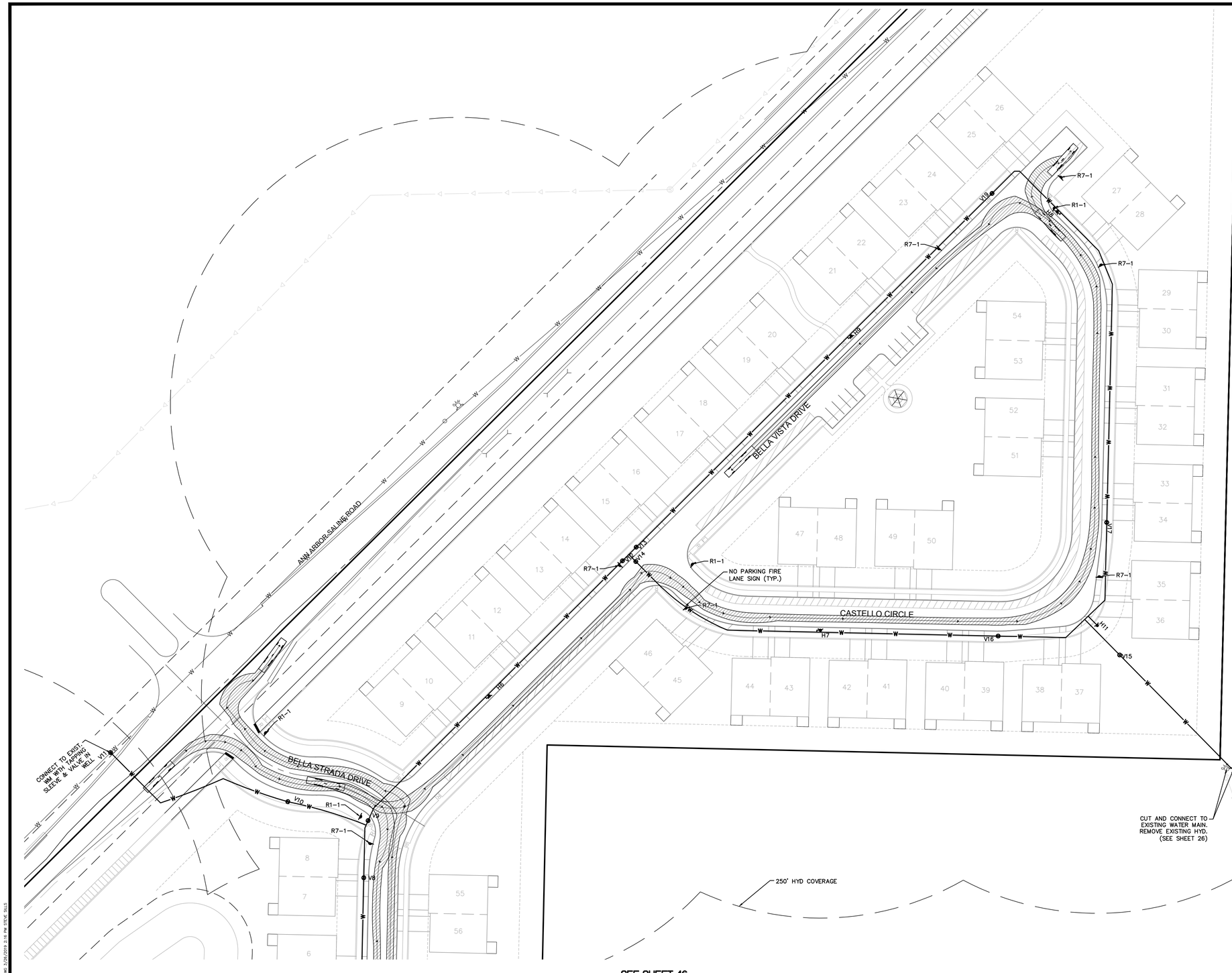
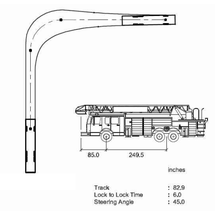


BUILDING HEIGHTS

SINGLE FAMILY	±40'
DUPLEX	±45'



T-2 FIRETRUCK DETAIL

NOT TO SCALE

LEGEND

	EXISTING WETLAND LINE
OHE OHE	EXISTING OVERHEAD ELECTRICAL LINE
OHT OHT	EXISTING OVERHEAD TELEPHONE LINE
	EXISTING CURB AND GUTTER
	BOUNDARY LINE
C C C	EXISTING STORM
W	EXISTING WATER MAIN
	EXISTING SANITARY
G G	EXISTING GAS
	PROPOSED TREE PROTECTION
	PROPOSED SILT FENCE
C C C	PROPOSED STORM SEWER
	PROPOSED SANITARY
W	PROPOSED WATER MAIN
	PROPOSED LOT
	PROPOSED SETBACK
	PROPOSED EASEMENT
	PROPOSED R.O.W.
	PROPOSED BACK/EDGE CURB
	PROPOSED CENTERLINE
	EXISTING WELL
	EXISTING SIGN
U.P.	EXISTING UTILITY POLE
	EXISTING FIRE HYDRANT
CATV	EXISTING CABLE MARKER
T	EXISTING TELEPHONE RISER
	EXISTING SANITARY MANHOLE
	EXISTING CATCH BASIN/INLET
	EXISTING WATER MANHOLE
	PROPOSED CATCH BASIN/INLET
	PROPOSED OUTLET
	PROPOSED MANHOLE
	PROPOSED WATER VALVE IN WELL
	PROPOSED FIRE HYDRANT
	AREAS OF ON-STREET PARKING

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WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

FIRE PROTECTION PLAN – NORTH

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
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1" = 50 FEET

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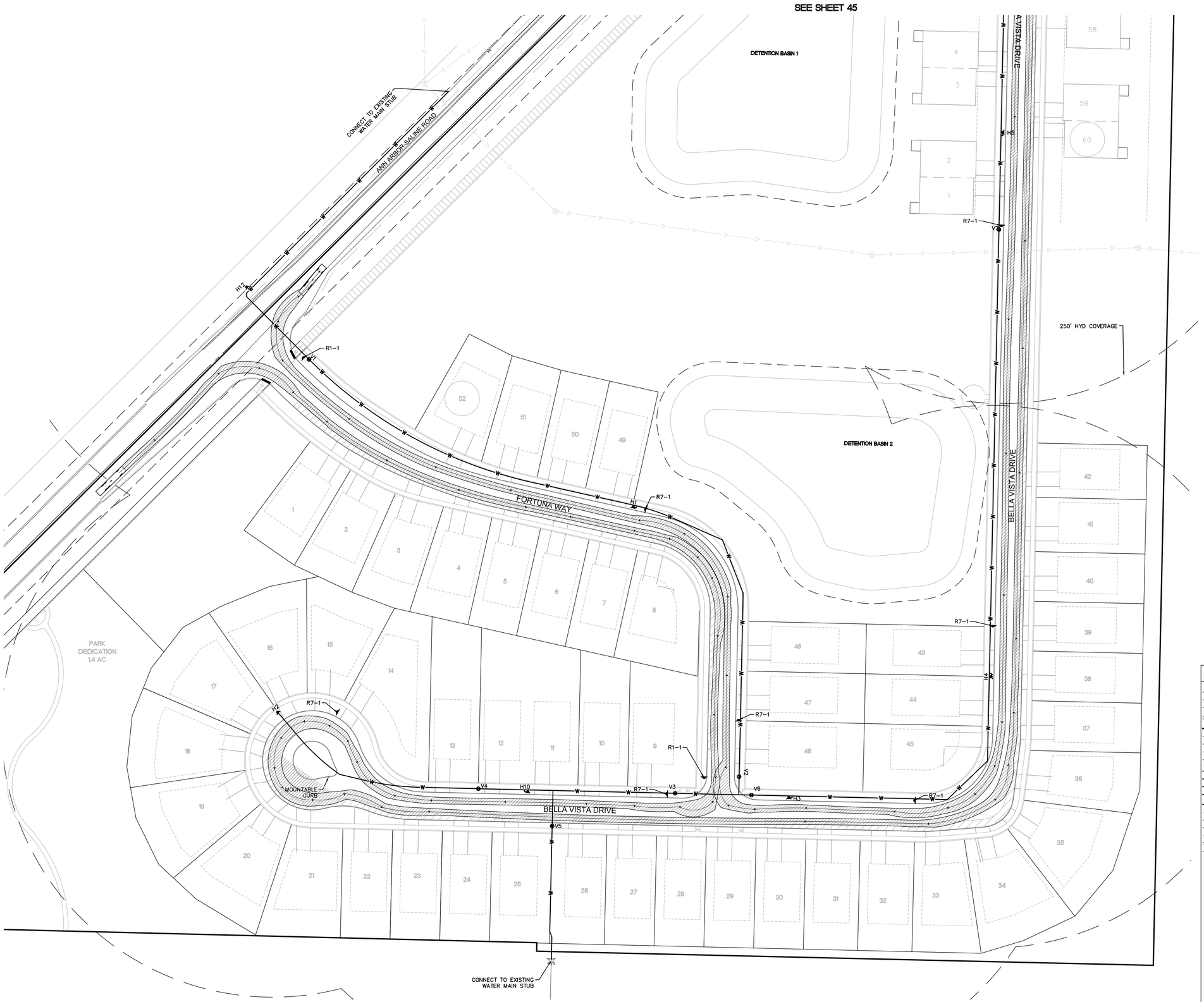

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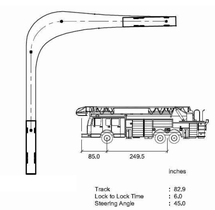

T-2 FIRETRUCK DETAIL
NOT TO SCALE

LEGEND

- EXISTING WETLAND LINE
- EXISTING OVERHEAD ELECTRICAL LINE
- EXISTING OVERHEAD TELEPHONE LINE
- EXISTING CURB AND GUTTER
- BOUNDARY LINE
- EXISTING STORM
- EXISTING WATER MAIN
- EXISTING SANITARY
- EXISTING GAS
- PROPOSED TREE PROTECTION
- PROPOSED SILT FENCE
- PROPOSED STORM SEWER
- PROPOSED SANITARY
- PROPOSED WATER MAIN
- PROPOSED LOT
- PROPOSED SETBACK
- PROPOSED EASEMENT
- PROPOSED R.O.W.
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- PROPOSED CENTERLINE
- EXISTING WELL
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- EXISTING UTILITY POLE
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- EXISTING CABLE MARKER
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- EXISTING SANITARY MANHOLE
- EXISTING CATCH BASIN/INLET
- EXISTING WATER MANHOLE
- PROPOSED CATCH BASIN/INLET
- PROPOSED OUTLET
- PROPOSED MANHOLE
- PROPOSED WATER VALVE IN WELL
- PROPOSED FIRE HYDRANT
- AREAS OF ON-STREET PARKING

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FIRE PROTECTION PLAN – SOUTH

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12-14-18 PER WCWRC & TWP
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02-01-19 PER TWP
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1" = 50 FEET

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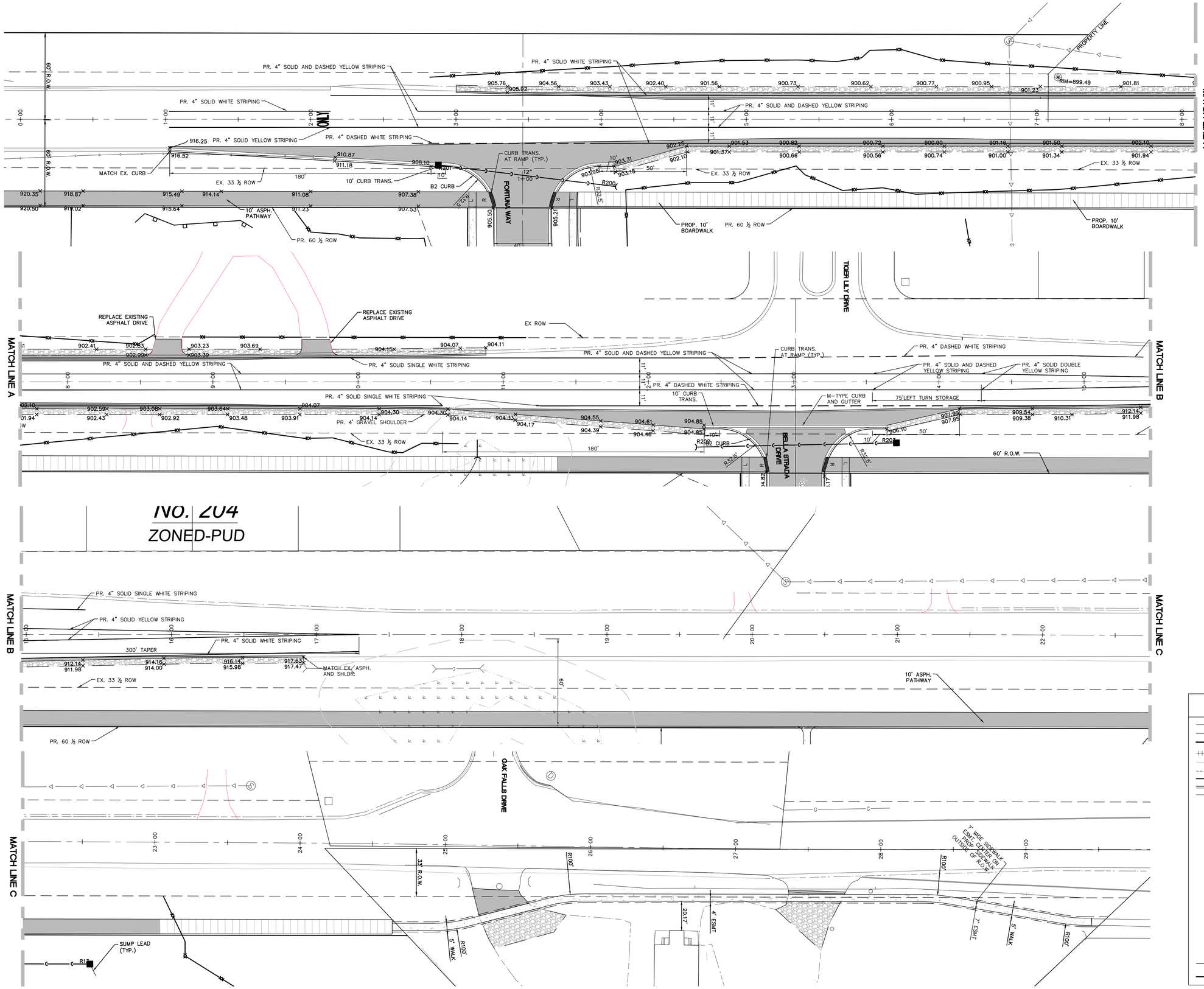
JOB 15001948	
SHEET NO. 46	



NOTES:
1. ALL PAVEMENT MARKINGS AND ROAD STRIPING SHALL BE PER CURRENT EDITIONS OF THE MICHIGAN MANUAL TRAFFIC CONTROL DEVICES (AS UPDATED)

LEGEND

- EXISTING CURB
- SECTION LINE
- BOUNDARY/PROPERTY LINE
- EXISTING RAILROAD
- PROPOSED LOT
- PROPOSED SETBACK
- PROPOSED R.O.W.
- PROPOSED BACK/EDGE CURB
- PROPOSED CENTERLINE
- EXISTING SIGN
- U.P. EXITING UTILITY POLE
- EXITING FIRE HYDRANT
- CATV EXISTING CABLE MARKER
- T EXISTING TELEPHONE RISER
- SECTION CORNER
- EXISTING MANHOLE
- EXISTING CATCH BASIN/INLET
- EXISTING WATER VALVE IN WELL
- EXISTING WETLAND
- PROPOSED GRAVEL SHOULDER
- PROPOSED WALK
- PROPOSED STRIPING
- PROPOSED SAWCUT

Know what's below. Call before you dig.

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SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

ANN ARBOR-SALINE ROAD
STRIPING PLAN

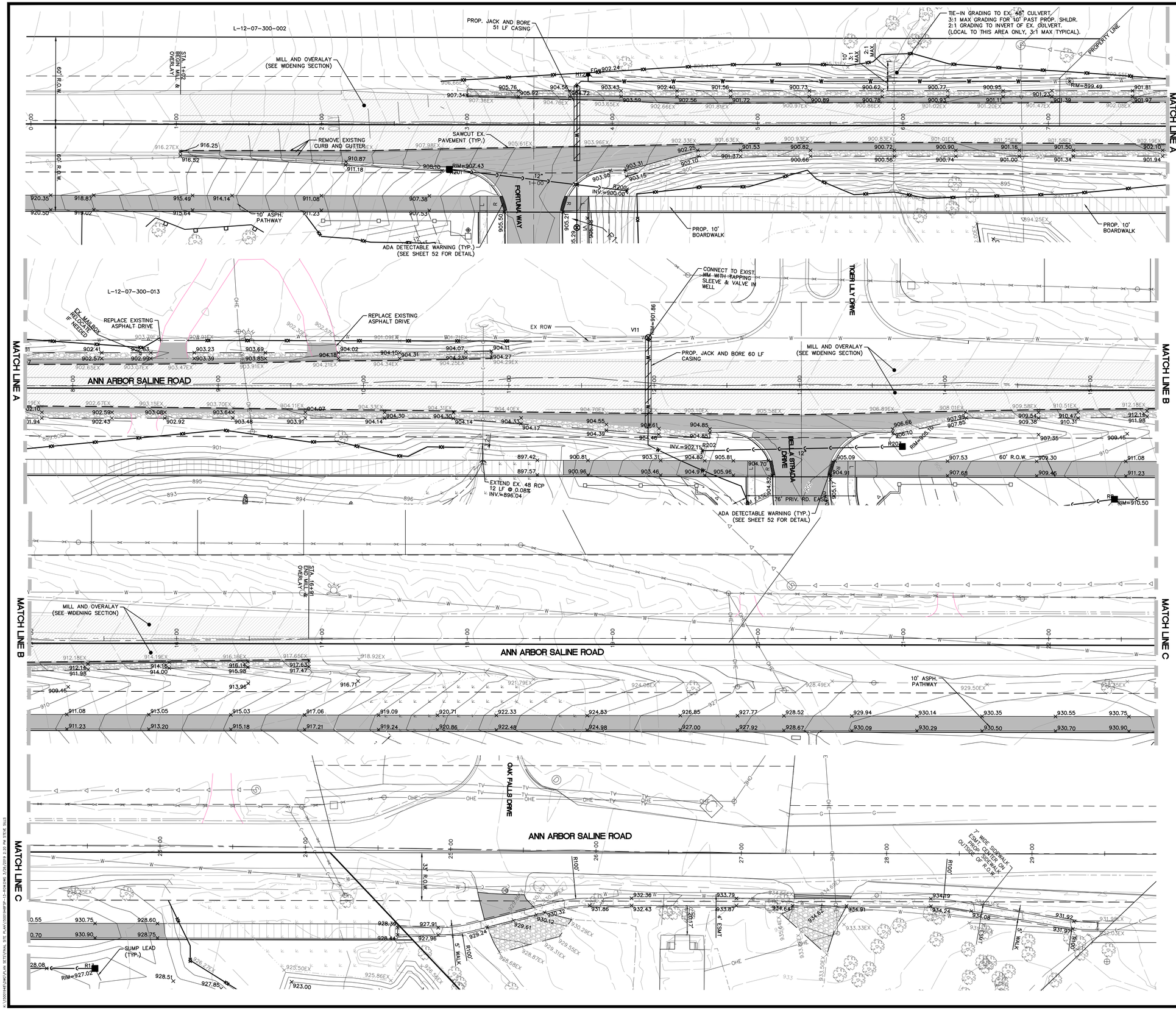
DATE
OCTOBER 17, 2018

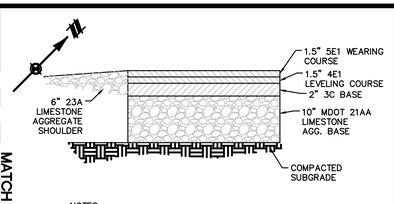
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 15 30
1" = 30 FEET

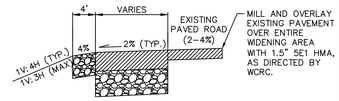
DR.	CR
CH.	SS
P.M.	MB
BOOK	N/A
JOB	15001948
SHEET NO.	47



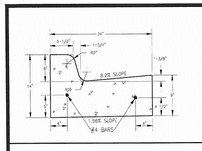


NOTES:
1. MAXIMUM R.A.P. CONTENT TO BE 25%
2. THE HMA THICKNESS SHALL MATCH THE EXISTING HMA THICKNESS IF GREATER THAN 5"

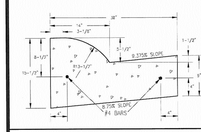
ASPHALT PAVING SECTION
(FOR PAVEMENT WITHIN COUNTY ROW)
NOT TO SCALE



TYPICAL WIDENING SECTION
NOT TO SCALE



MDOT F4 BARRIER CONCRETE CURB & GUTTER, REQUIRES MDOT 'K' CASTING
EJIW 7845 OR IEEIAW R-3851-B
CASTING TO STATE THE INSCRIPTION: "DUMP NO WASTE! DRAINS TO RIVERS".



MDOT B2 MOUNTABLE CONCRETE CURB & GUTTER, REQUIRES MDOT 'C' CASTING
EJIW 7865 OR IEEIAW R-3838-A
CASTING TO STATE THE INSCRIPTION: "DUMP NO WASTE! DRAINS TO RIVERS".

1) JOINTS SHALL BE PLACED AT RIGHT ANGLES TO THE EDGE OF CONCRETE CURB & GUTTER.

HOT MIX ASPHALT (HMA) PAVING
2) PLACE ½" FIBER JOINT FILLER AT 400' MAXIMUM INTERVALS.
3) PLACE ½" FIBER JOINT FILLER AT SPRING POINTS OR INTERSECTING STREETS.
4) PLACE ½" FIBER JOINT FILLER IN ADJACENT CONTRACTION JOINTS EACH SIDE OF INLETS AND CATCH BASINS.
5) PLACE CONTRACTION JOINTS AT 10' INTERVALS.

PORTLAND CEMENT CONCRETE (PCC) PAVING
6) PLACE ½" FIBER JOINT FILLER OPPOSITE ALL TRANSVERSE CONTRACTION JOINTS IN PAVEMENT.
7) PLACE 1/2" FIBER JOINT FILLER IN ADJACENT CONTRACTION JOINTS ON EACH SIDE OF INLETS AND CATCH BASINS.
8) PLACE CONTRACTION JOINTS OPPOSITE ALL TRANSVERSE CONTRACTION JOINTS IN THE PAVEMENT.
9) B2 CURB & GUTTER SHALL BE USED FOR ALL ENTRANCES TO THE EXISTING ROAD, AND END AT THE INTERNAL SPRING POINT.

TYPICAL CURB & GUTTER CROSS-SECTION DETAILS & NOTES

SCALE: N.T.S.

REV: 03-14-04

LEGEND

	EXISTING CURB
	SECTION LINE
	BOUNDARY/PROPERTY LINE
	EXISTING RAILROAD
	PROPOSED LOT
	PROPOSED SETBACK
	PROPOSED R.O.W.
	PROPOSED BACK/EDGE CURB
	PROPOSED CENTERLINE
G	EXISTING GAS LINE
TV	EXISTING CABLE LINE
W	EXISTING WATER MAIN
OHE	EXISTING OVERHEAD LINE
	EXISTING SIGN
U.P.	EXITING UTILITY POLE
	EXITING FIRE HYDRANT
CATV	EXISTING CABLE MARKER
T	EXISTING TELEPHONE RISER
	SECTION CORNER
	EXISTING MANHOLE
	EXISTING CATCH BASIN/INLET
	EXISTING WATER VALVE IN WELL
	EXISTING WETLAND
	EXISTING UP/TORNADO POLE
C	EXISTING CABLE RISER
	PROPOSED ASPHALT
	PROPOSED ASPHALT MILL AND OVERLAY
	PROPOSED GRAVEL
	PROPOSED BOARDWALK
	PROPOSED WALK
	PROPOSED STRIPING
R	SIDEWALK RAMP
L	SIDEWALK LANDING

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

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WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
ANN ARBOR-SALINE ROAD IMPROVEMENTS PLAN

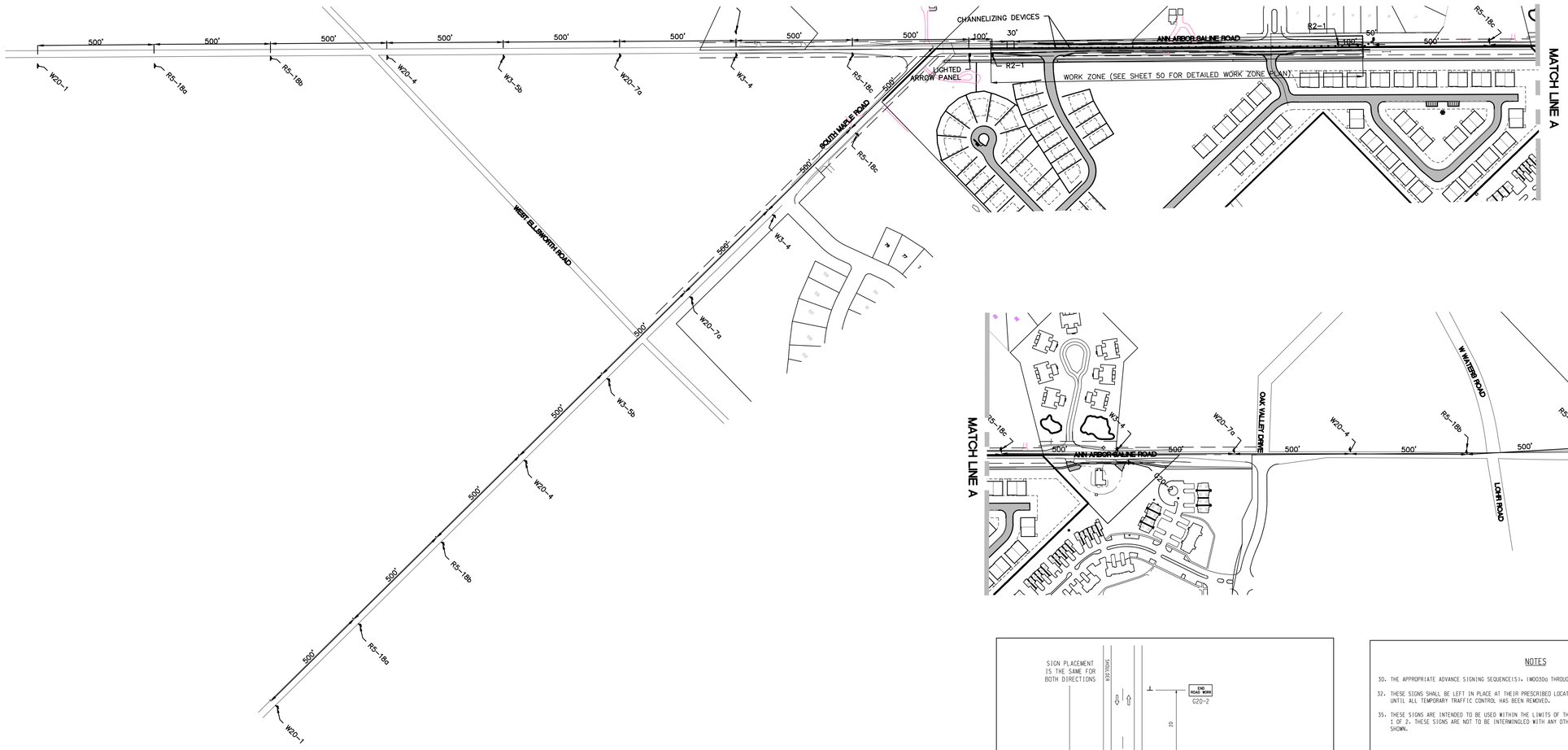
DATE
OCTOBER 17, 2018

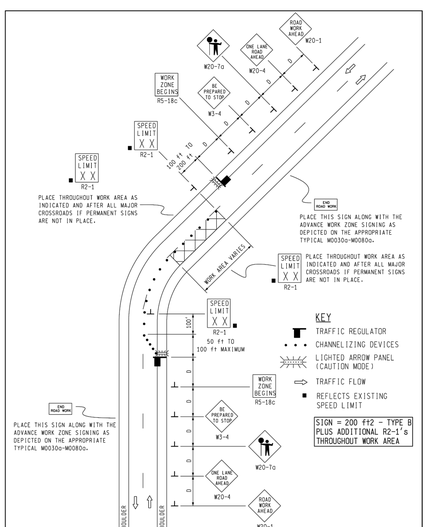
12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 15 30
1" = 30 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 48	





MDOT Michigan Department of Transportation — TRAFFIC AND SAFETY — MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS. NO SPEED REDUCTION

DRAWN BY: CDN(AE)djf	OCTOBER 2011	M0140a	SHEET
CHECKED BY: BMM(CRB)	PLAN DATE:		1 OF 2
FILE: P:\ RD/TS/Typicals/Signs/WT NON FWY/M0140a.dgn REV. 10/04/2011			

NOT TO SCALE

NOTES

1H. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS SEE **M0020a** FOR "D" VALUES.

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4A. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES IN THE TAPER AREA(S) SHOULD BE 15 FEET AND SHOULD BE EQUAL IN FEET TO TWICE THE POSTED SPEED IN MILES PER HOUR IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

9. ALL TRAFFIC REGULATORS SHALL BE PROPERLY TRAINED AND SUPERVISED.

9A. IN ANY OPERATION INVOLVING MORE THAN ONE TRAFFIC REGULATOR, ONE PERSON SHOULD BE DESIGNATED AS HEAD TRAFFIC REGULATOR.

10. ALL TRAFFIC REGULATORS' CONDUCT, THEIR EQUIPMENT, AND TRAFFIC REGULATING PROCEDURES SHALL CONFORM TO THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) AND THE CURRENT EDITION OF THE MDOT HANDBOOK ENTITLED "TRAFFIC REGULATORS INSTRUCTION MANUAL."

11. WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS, APPROPRIATE LIGHTING SHALL BE PROVIDED TO SUFFICIENTLY ILLUMINATE THE TRAFFIC REGULATOR'S STATIONS.

12E. THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS SHALL BE NO MORE THAN 2 MILES IN LENGTH UNLESS RESTRICTED FURTHER IN THE SPECIAL PROVISIONS FOR MAINTAINING TRAFFIC. ALL SEQUENCES OF MORE THAN 2 MILES IN LENGTH WILL REQUIRE WRITTEN PERMISSION FROM THE ENGINEER BEFORE PROCEEDING.

13. WHEN INTERSECTING ROADS OR SIGNIFICANT TRAFFIC GENERATORS (SHOPPING CENTERS, MOBILE HOME PARKS, ETC.) OCCUR WITHIN THE ONE-LANE TWO-WAY OPERATION, INTERMEDIATE TRAFFIC REGULATORS AND APPROPRIATE SIGNING SHALL BE PLACED AT THESE LOCATIONS.

14. ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W3-4 SIGNS.

15. THE HAND HELD (PADDLE) SIGNS REQUIRED BY THE MMUTCD TO CONTROL TRAFFIC WILL BE PAID FOR AS PART OF FLAG CONTROL.

28E. THE TRAFFIC REGULATORS SHOULD BE POSITIONED AT OR NEAR THE SIDE OF THE ROAD SO THAT THEY ARE SEEN CLEARLY AT A MINIMUM DISTANCE OF 500 FEET. THIS MAY REQUIRE EXTENDING THE BEGINNING OF THE LANE CLOSURE TO OVERCOME VIEWING PROBLEMS CAUSED BY HILLS AND CURVES.

SIGN SIZES

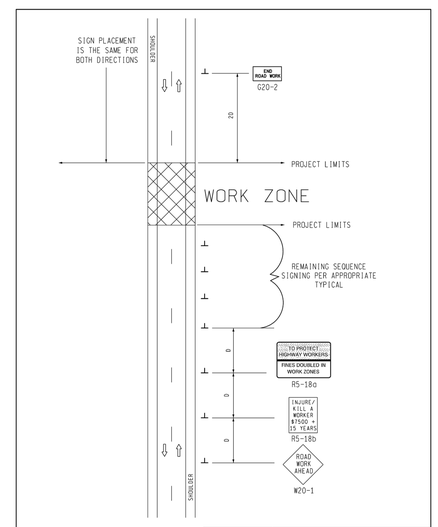
DIAMOND WARNING - 48" x 48"
R2-1 REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"

MDOT Michigan Department of Transportation — TRAFFIC AND SAFETY — MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS. NO SPEED REDUCTION

DRAWN BY: CDN(AE)djf	OCTOBER 2011	M0140a	SHEET
CHECKED BY: BMM(CRB)	PLAN DATE:		2 OF 2
FILE: P:\ RD/TS/Typicals/Signs/WT NON FWY/M0140a.dgn REV. 10/04/2011			

NOT TO SCALE



SIGN = 68 ft2 - TYPE B FOR ONE DIRECTION OF TRAFFIC W20-1 QUANTITY INCLUDED WITH APPROPRIATE TYPICAL FOR SEQUENCE SIGNING

MDOT Michigan Department of Transportation — TRAFFIC AND SAFETY — MAINTAINING TRAFFIC TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR LONG, INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS OF LESS THAN TWO MILES IN LENGTH WHERE TRAFFIC CONTROL DEVICES MAY REMAIN AT END OF WORK DAY ON AN UNDIVIDED TWO-WAY ROADWAY

DRAWN BY: CDN(AE)djf	OCTOBER 2011	M0040a	SHEET
CHECKED BY: BMM(CRB)	PLAN DATE:		1 OF 2
FILE: P:\ RD/TS/Typicals/Signs/WT NON FWY/M0040a.dgn REV. 10/13/2011			

NOT TO SCALE

NOTES

30. THE APPROPRIATE ADVANCE SIGNING SEQUENCE(S), (M0030a THROUGH M0080a) SHALL BE USED ON ALL PROJECTS.

32. THESE SIGNS SHALL BE LEFT IN PLACE AT THEIR PRESCRIBED LOCATIONS FOR THE DURATION OF THE PROJECT AND UNTIL ALL TEMPORARY TRAFFIC CONTROL HAS BEEN REMOVED.

35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.

SIGN SIZES

G20-2	-	48" x 24"
R5-18a	-	96" x 60"
R5-18b	-	48" x 60"
W20-1	-	48" x 48"

MDOT Michigan Department of Transportation — TRAFFIC AND SAFETY — MAINTAINING TRAFFIC TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR LONG, INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS OF LESS THAN TWO MILES IN LENGTH WHERE TRAFFIC CONTROL DEVICES MAY REMAIN AT END OF WORK DAY ON AN UNDIVIDED TWO-WAY ROADWAY

DRAWN BY: CDN(AE)djf	OCTOBER 2011	M0040a	SHEET
CHECKED BY: BMM(CRB)	PLAN DATE:		2 OF 2
FILE: P:\ RD/TS/Typicals/Signs/WT NON FWY/M0040a.dgn REV. 10/13/2011			

NOT TO SCALE

LEGEND

	EXISTING CURB		PROPOSED ASPHALT
	SECTION LINE		PROPOSED ASPHALT MILL AND OVERLAY
	BOUNDARY/PROPERTY LINE		PROPOSED GRAVEL
	PROPOSED SETBACK		PROPOSED BOARDWALK
	PROPOSED R.O.W.		PROPOSED WALK
	PROPOSED BACK/EDGE CURB		PROPOSED STRIPING
	PROPOSED CENTERLINE		
	CONSTRUCTION SIGN		
⊙U.P.	EXITING UTILITY POLE		
	EXISTING WETLAND		

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BELLA VISTA P.U.D.
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OVERALL M.O.T. PLAN

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OCTOBER 17, 2018

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02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 125 250
1"=250'

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 49	

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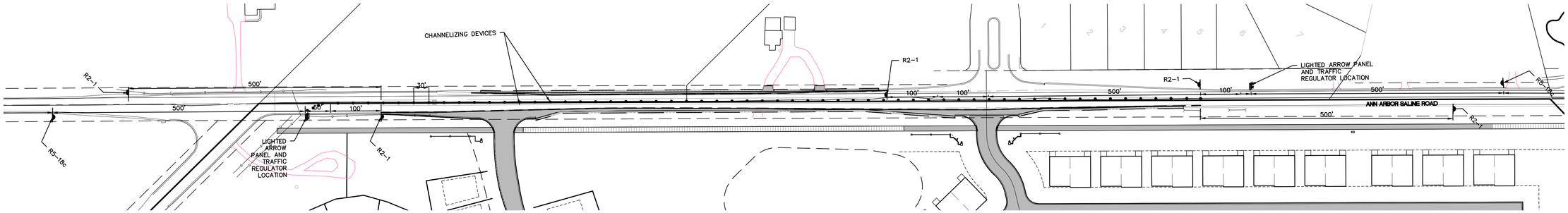
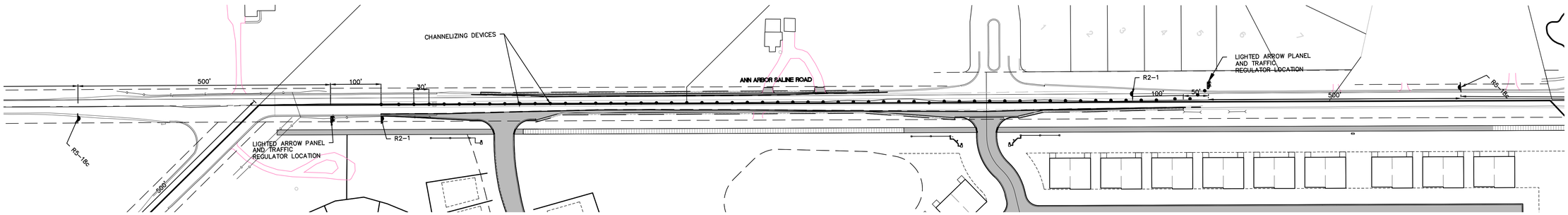


NORTHBOUND WORK ZONE PLAN (SEE SHEET 49 FOR OVERALL M.O.T. SIGNAGE)



SOUTHBOUND WORK ZONE PLAN (SEE SHEET 49 FOR OVERALL M.O.T. SIGNAGE)

LEGEND

EXISTING CURB	PROPOSED ASPHALT
SECTION LINE	
BOUNDARY/PROPERTY LINE	PROPOSED ASPHALT OVERLAY
PROPOSED SETBACK	
PROPOSED R.O.W.	PROPOSED GRAVEL
PROPOSED BACK/EDGE CURB	
PROPOSED CENTERLINE	PROPOSED BOARDWALK
CONSTRUCTION SIGN	
EXITING UTILITY POLE	PROPOSED WALK
EXISTING WETLAND	PROPOSED STRIPING

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CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

WORK ZONE M.O.T. PLAN

DATE
OCTOBER 17, 2018

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01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 50 100
1" = 100 FEET

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 50	

K:\15001948\DWG\PLAN SETS\FINAL SITE PLAN\15001948SP-15-SETOUR-ADE.DWG 3/26/2019 2:20 PM STEVE SILLS

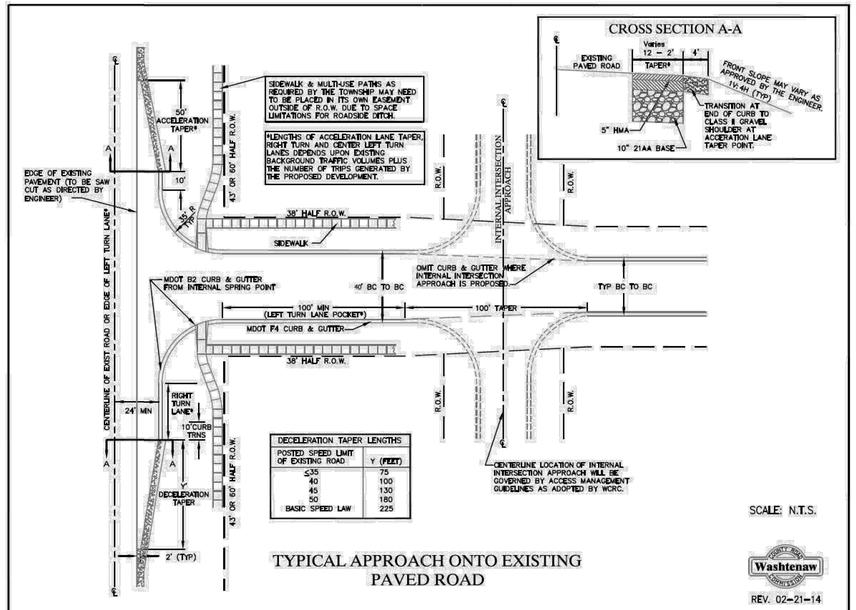
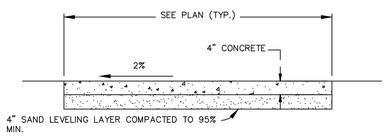
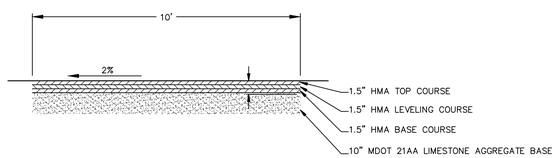


Figure 9: Typical Residential Approach Onto Existing Paved Road



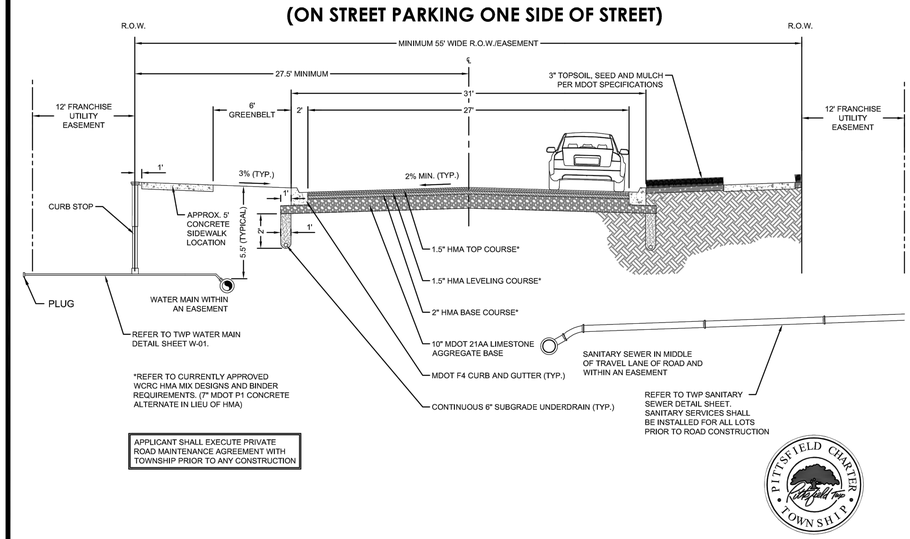
CONCRETE SIDEWALK DETAIL
NO SCALE



10' ASPHALT PATH DETAIL
NO SCALE

RESIDENTIAL PRIVATE PAVED SURFACE WITH CURB AND GUTTER CROSS SECTION 55' R.O.W.

(ON STREET PARKING ONE SIDE OF STREET)



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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

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.

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ANN ARBOR, MI 48104
734.994.4000

SECTION 7
TOWN 03 S., RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN
DETAIL SHEET

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

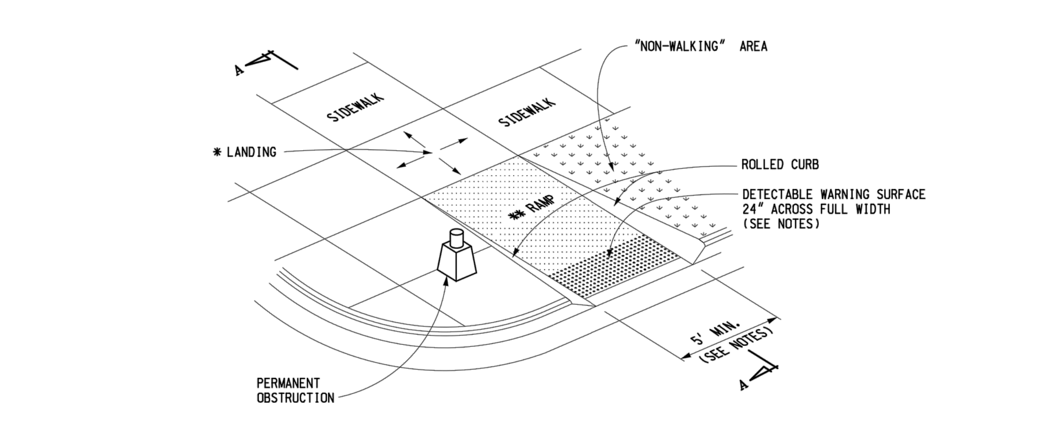
SCALE 0

DR. CR	CH. SS
P.M. MB	
BOOK N/A	
JOB 15001948	
SHEET NO. 51	

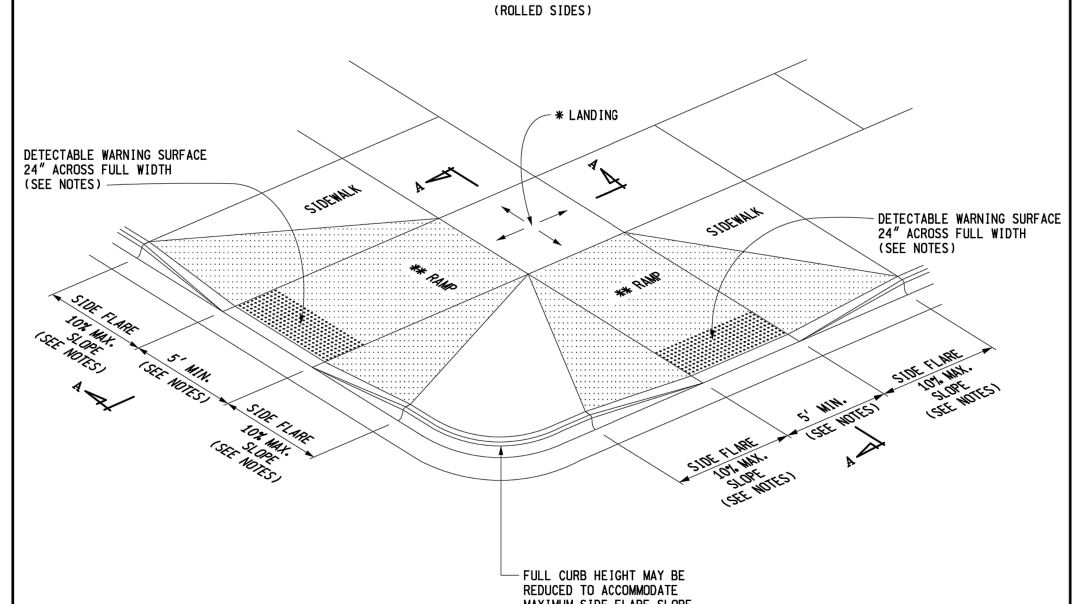
W:\15001948\DWG\PLAN SET\FINAL SITE PLAN\15001948SP-XX-01.DWG 3/26/2019 2:20 PM STEVE BELS

* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. 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)

MDOT Michigan Department of Transportation
PREPARED BY DESIGN DIVISION
DRAWN BY: B.L.T.
CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY: ______ DIRECTOR, BUREAU OF FIELD SERVICES
APPROVED BY: ______ DIRECTOR, BUREAU OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL | 3-31-2017 PLAN DATE | R-28-J | SHEET 1 OF 7

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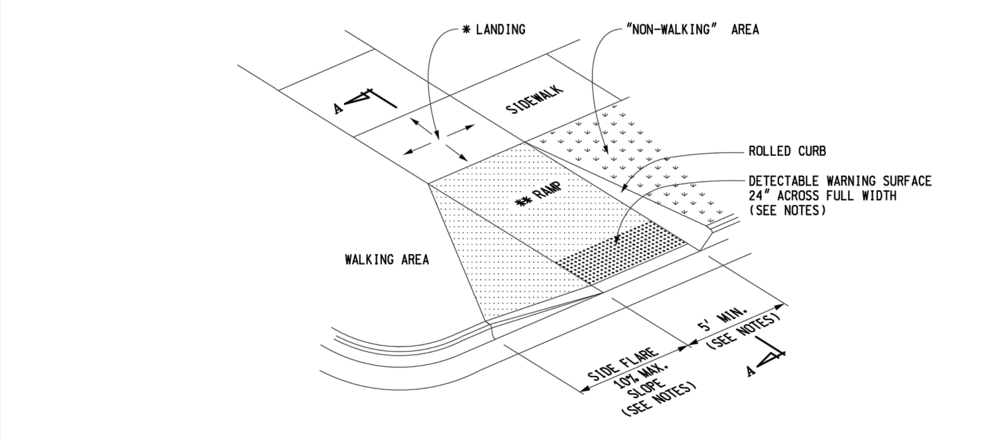
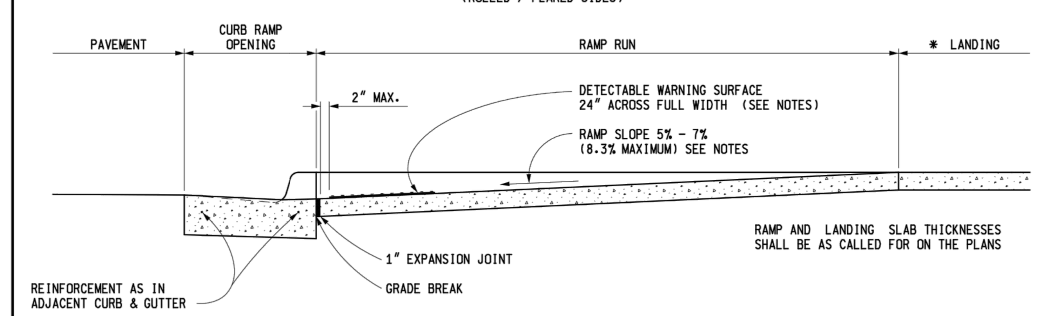
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

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



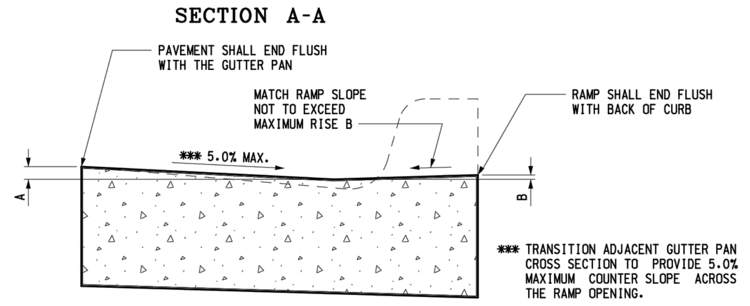
SIDEWALK RAMP TYPE RF
(ROLLED / FLARED SIDES)



SECTION A-A

CURB TYPE	MAXIMUM RISE (INCHES) A	MAXIMUM RISE (INCHES) B
B1	3/4	1
B2	3/4	1
B3	3/4	1
D1	3/4	1
D2	3/4	1
D3	3/4	1
C1	1/2	1/2
C2	1/2	1/2
C3	3/4	1/2
C4	3/4	1/2
C5	1	1/2
C6	1	1/2
F1	1/2	1/2
F2	1/2	1/2
F3	3/4	1/2
F4	3/4	1/2
F5	1	1/2
F6	1	1/2

FOR CURB TYPES SEE STANDARD PLAN R-30-SERIES



SECTION THROUGH CURB RAMP OPENING
(TYPICAL ALL RAMP TYPES)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL | 3-31-2017 PLAN DATE | R-28-J | SHEET 2 OF 7

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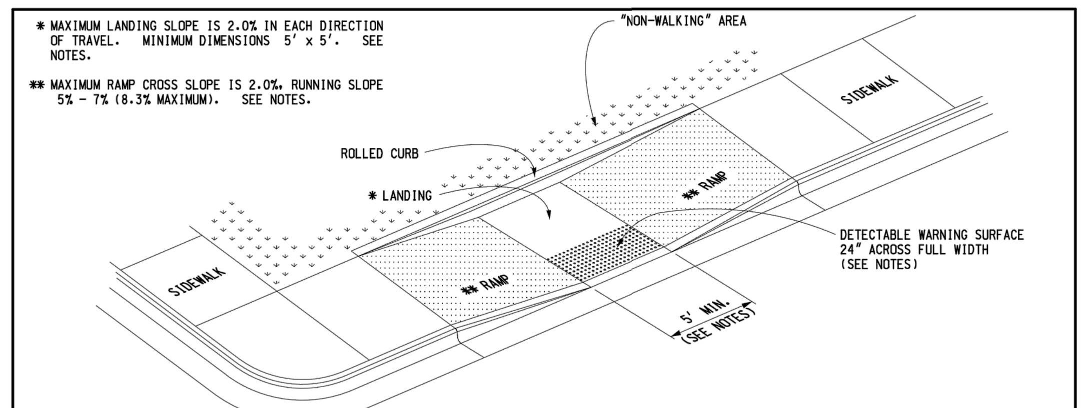
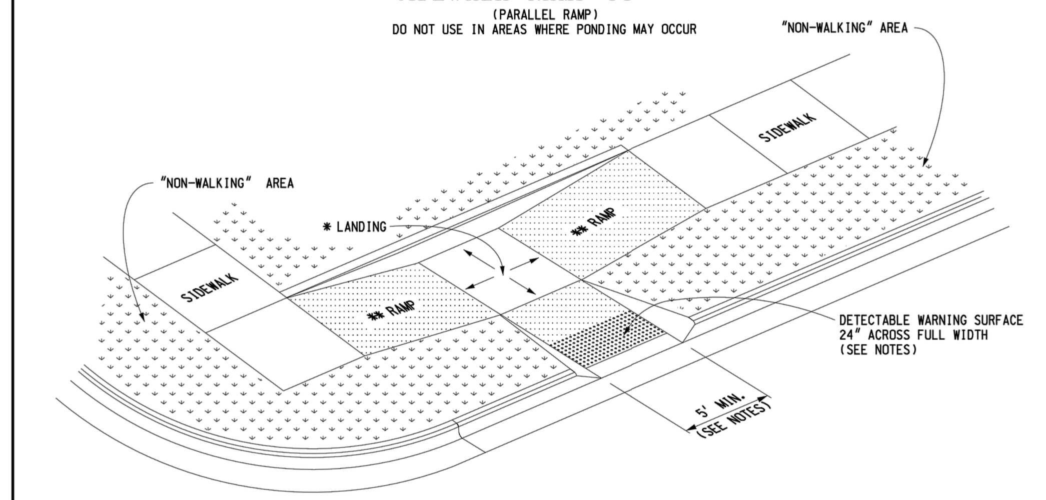
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

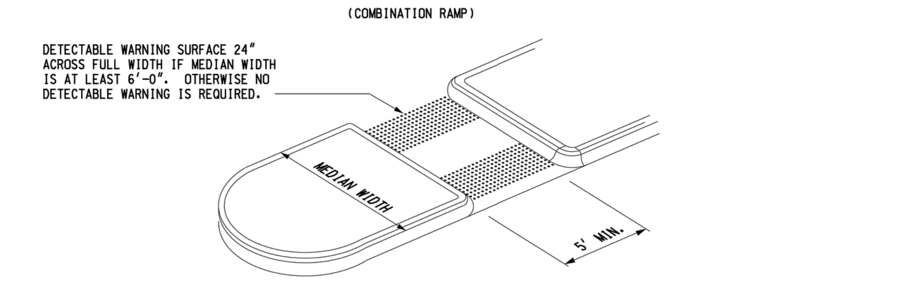
** MAXIMUM RAMP CROSS SLOPE IS 2.0%, RUNNING SLOPE 5% - 7% (8.3% MAXIMUM). SEE NOTES.



SIDEWALK RAMP TYPE P
(PARALLEL RAMP)
DO NOT USE IN AREAS WHERE PONDING MAY OCCUR



SIDEWALK RAMP TYPE C
(COMBINATION RAMP)



SIDEWALK RAMP TYPE M
(MEDIAN ISLAND)

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL | 3-31-2017 PLAN DATE | R-28-J | SHEET 3 OF 7

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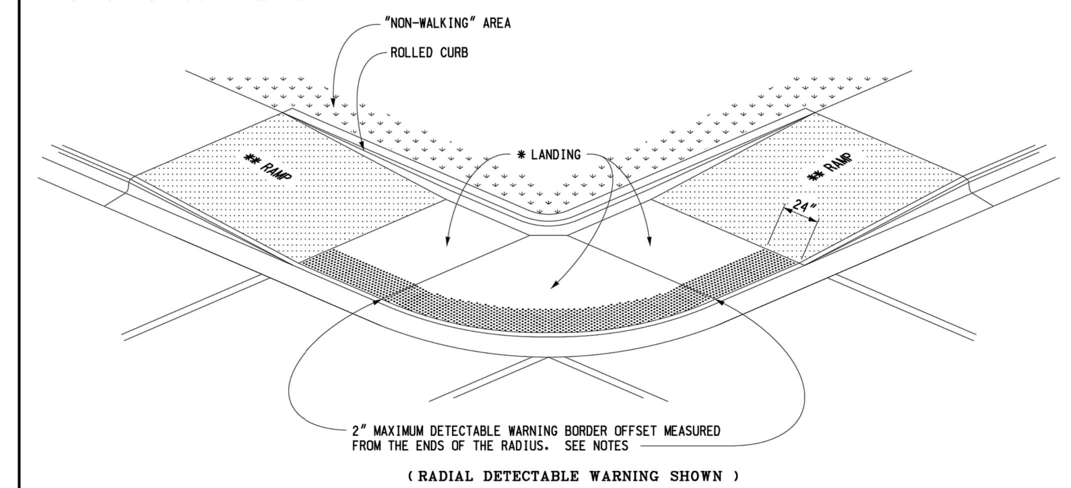
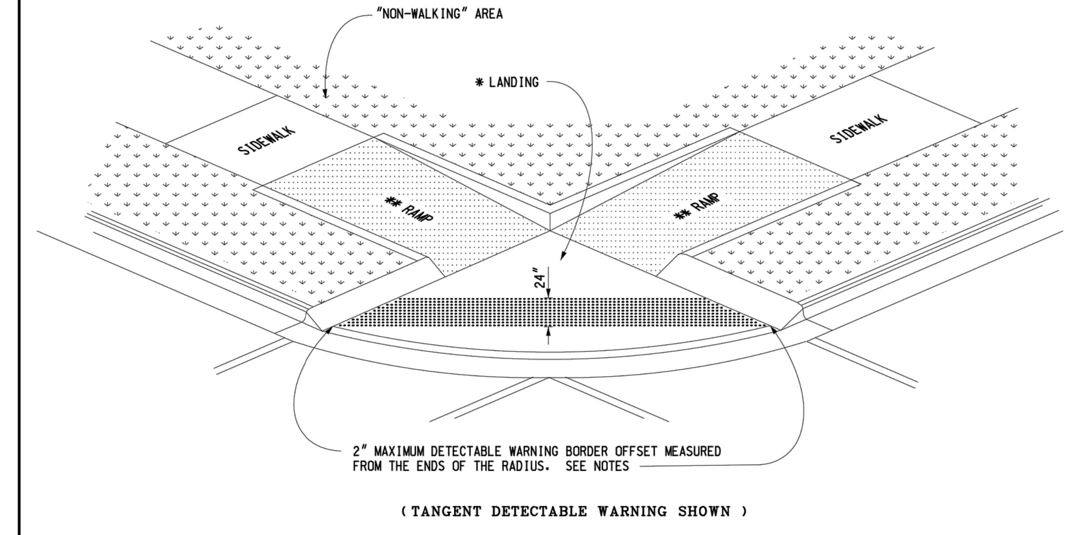
* MAXIMUM LANDING SLOPE IS 2.0% IN EACH DIRECTION OF TRAVEL. MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

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



(RADIAL DETECTABLE WARNING SHOWN)



(TANGENT DETECTABLE WARNING SHOWN)

SIDEWALK RAMP TYPE D
(DEPRESSED CORNER)
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL | 3-31-2017 PLAN DATE | R-28-J | SHEET 4 OF 7

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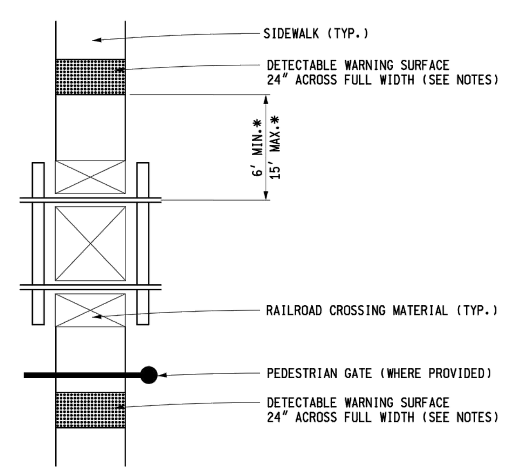
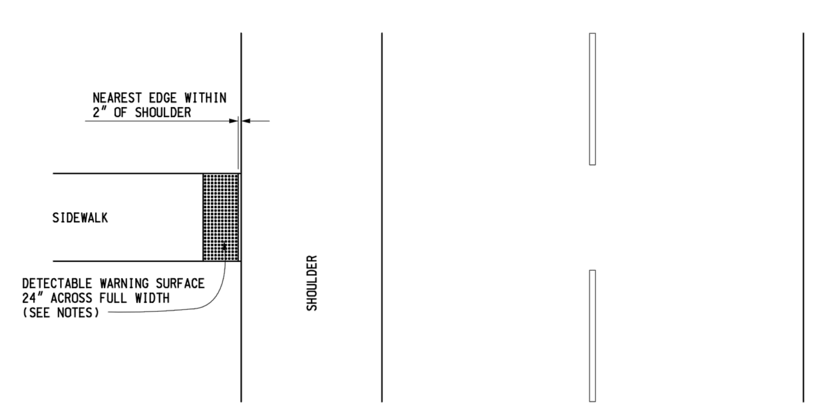
* THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE NEAREST THE RAIL CROSSING IS 6' MINIMUM AND 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.



DETECTABLE WARNING AT RAILROAD CROSSING

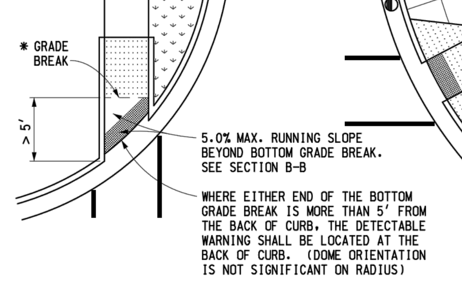


DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

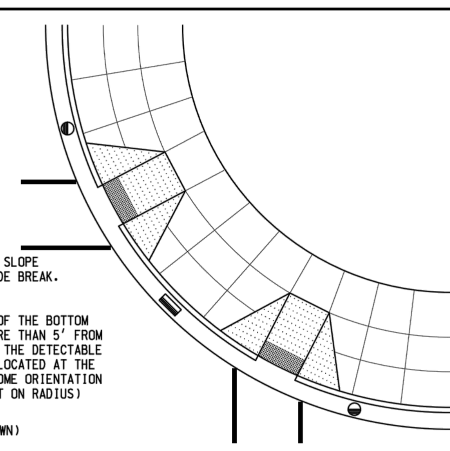
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

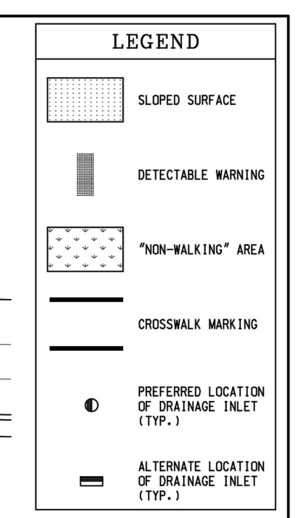
F.H.W.A. APPROVAL | 3-31-2017 PLAN DATE | R-28-J | SHEET 5 OF 7

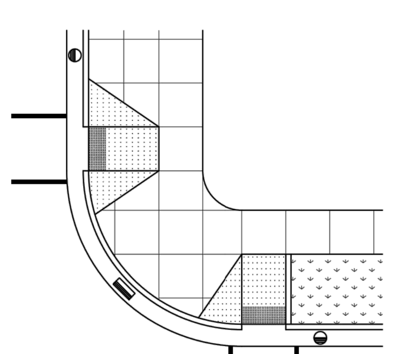


SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK OFFSET GREATER THAN 5')

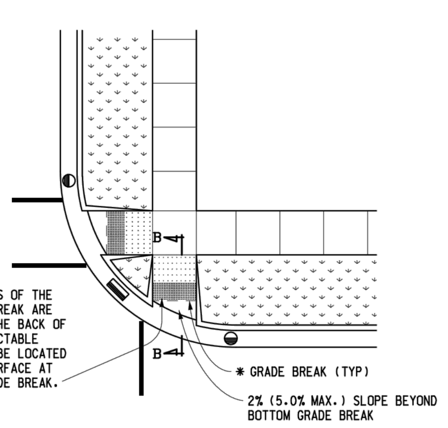


SIDEWALK RAMP PERPENDICULAR TO RADIAL CURB (TYPE F SHOWN)
(USE WITH RADIAL CURB WHEN THE CROSSWALK AND SIDEWALK RAMP ARE NOT ALIGNED)





SIDEWALK RAMP PERPENDICULAR TO TANGENT CURB
(TYPE F AND TYPE RF SHOWN)

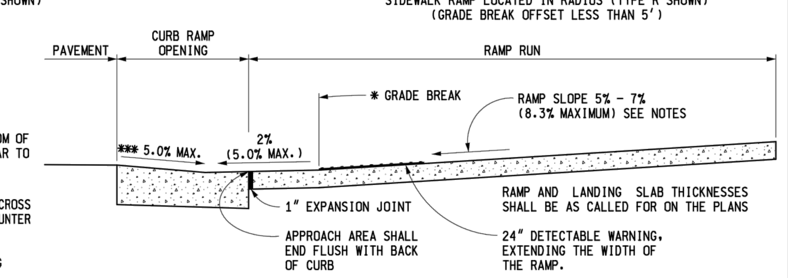


SIDEWALK RAMP LOCATED IN RADIUS (TYPE R SHOWN)
(GRADE BREAK OFFSET LESS THAN 5')

* GRADE BREAKS AT THE TOP AND BOTTOM OF CURB RAMPS SHALL BE PERPENDICULAR TO THE DIRECTION OF TRAVEL.

*** TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

SEE SHEET 2 FOR CURB RAMP OPENING DETAILS.



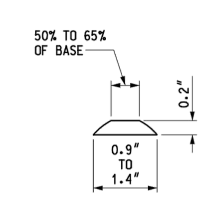
SECTION B-B

SIDEWALK RAMP ORIENTATION

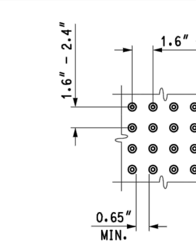
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

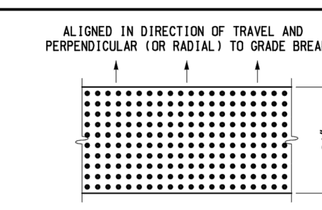
F.H.W.A. APPROVAL | 3-31-2017 PLAN DATE | R-28-J | SHEET 6 OF 7



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'.

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.

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 1/2". 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".

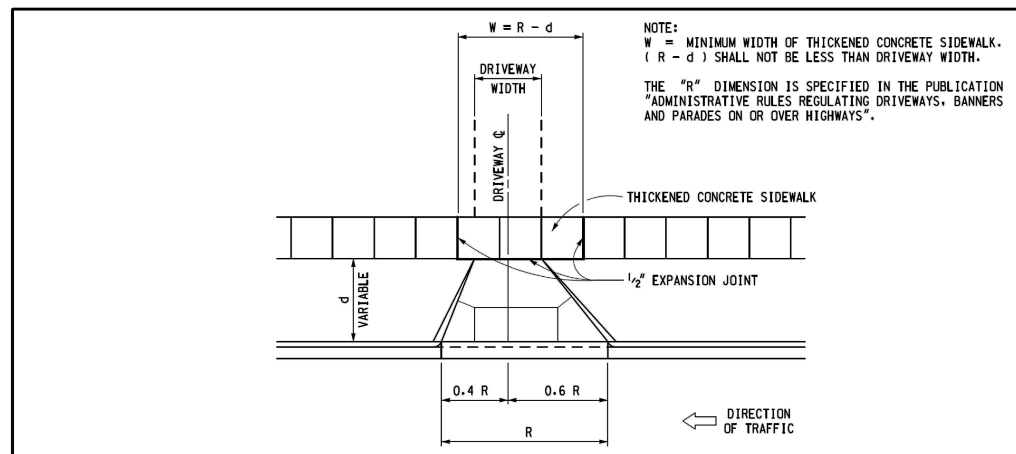
FLARED SIDES WITH A SLOPE OF 10% MAXIMUM, MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNOBSTRUCTED CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BORDERED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS. WHERE THEY 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 HEAVING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

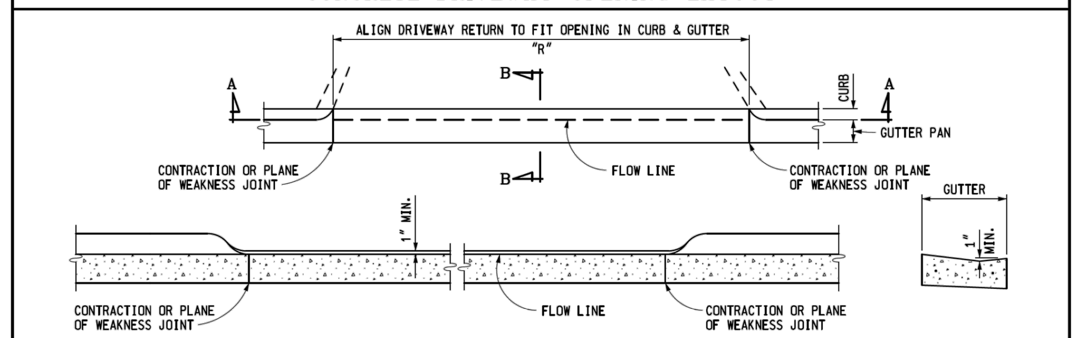
F.H.W.A. APPROVAL | 3-31-2017 PLAN DATE | R-28-J | SHEET 7 OF 7



NOTE:
W = MINIMUM WIDTH OF THICKENED CONCRETE SIDEWALK. (R - d) SHALL NOT BE LESS THAN DRIVEWAY WIDTH.

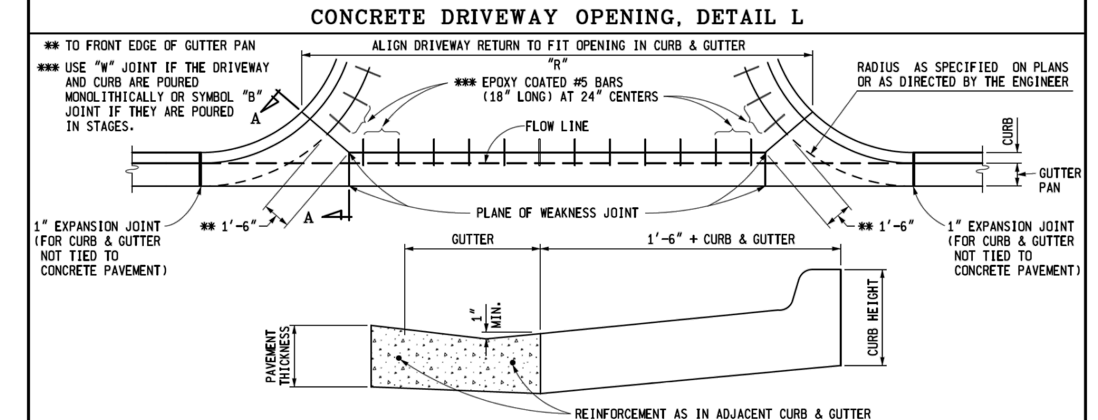
THE "R" DIMENSION IS SPECIFIED IN THE PUBLICATION "ADMINISTRATIVE RULES REGULATING DRIVEWAYS, BANNERS AND PARADES ON OR OVER HIGHWAYS".

CONCRETE DRIVEWAY OPENING LAYOUT



SECTION A - A
SECTION B - B

CONCRETE DRIVEWAY OPENING, DETAIL L



SECTION A - A

CONCRETE DRIVEWAY OPENING, DETAIL M

NOTE:
FOR ROADWAYS WITH CONCRETE PAVEMENTS, LONGITUDINAL LANE TIES WILL BE CONTINUOUS THROUGH THE DRIVEWAY OPENING AND THE SPACING OF THE #5 BARS IN CONCRETE DRIVEWAYS SHALL BE ADJUSTED TO AVOID CONFLICT WITH THE LONGITUDINAL LANE TIES.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRIVEWAY OPENINGS & APPROACHES, AND CONCRETE SIDEWALK

9-30-2014 F.H.W.A. APPROVAL | 7-1-2014 PLAN DATE | R-29-I | SHEET 2 OF 4

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

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. 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.

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.

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SECTION 7
TOWN 03 S, RANGE 06 E
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

CLIENT
PULTE HOMES OF MICHIGAN

BELLA VISTA P.U.D.
FINAL SITE/CONSTRUCTION PLAN

MDOT DETAILS

DATE
OCTOBER 17, 2018

12-14-18 PER WCWRC & TWP
01-15-19 PER WCWRC & WCRC
02-01-19 PER TWP
02-08-19 PER TWP
03-01-19 PER WCRC
03-07-19 PER WCRC
03-26-19 PER SESC SUBMITTAL

REVISIONS

SCALE 0 -- --
NO SCALE

DR. CR | CH. SS
P.M. MB
BOOK N/A
JOB 15001948
SHEET NO.
52

Earthwork

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall perform all excavation and backfilling necessary to complete the work. This shall include the excavation of earth and rock, the removal and disposal of unsuitable material, dewatering, placement of suitable fill and backfill material, pipe boring and jacking, all quality assurance testing, and the restoration and final grading for all earth surfaces.

1.02 WORK WITHIN RIGHTS-OF-WAY

A. Where the governmental bodies having jurisdiction of the streets or rights-of-way have specific specifications relating to the requirements for work within their jurisdiction, such requirements must be met as a minimum requirement, and if these Specifications impose further limitation on the work, they shall also be met as the required work standard.

B. During all operations of the CONTRACTOR in the streets and roadways, the CONTRACTOR shall maintain barricades, lights, and warning signs as required by the agency having jurisdiction.

1.03 WORK WITHIN EASEMENTS

A. During construction within any easements, the CONTRACTOR shall confine himself to the limits shown on the Plans. He shall notify property owners in advance of moving equipment on easements and use of the access routes which will be designated by the OWNER. The OWNER will cooperate in working out the details of access. The topsoil over the trench shall be removed and carefully replaced upon completion of the work. The backfill of the trench in the easement may be left slightly high to provide for any slight residual settlement. Any trees, shrubs, or bushes removed shall be replaced to the satisfaction of the property owner.

1.04 SOIL BORINGS

A. Soil boring results, if taken on a site, are appended to these Specifications with locations noted. Boring logs are shown to be generally representative of the site and to assist in the design and construction of the work.

2.00 PRODUCTS

2.01 BACKFILL MATERIAL

A. For areas not requiring "granular backfill" material, backfill shall be of the excavated material, with the exception that materials such as soft clay, topsoil, muck, cinders, vegetable matter, refuse, boulders and other objectionable and non-packing earth shall be excluded from the backfill and removed from the site. Stone larger than 3 inches in any dimension shall be excluded from the backfill and removed from the site by the CONTRACTOR.

B. Where "granular material" backfill is required as specified herein, backfill material shall be defined as a material meeting granular material Class II as defined in 2003 MDOT 902.08.

C. All utilities within road right-of-way corridor (existing or proposed) shall be backfilled with MDOT CL II granular material compacted to 95% maximum unit weight.

D. All utilities shall be installed with 2 NS sand bedding or better.

2.02 ENCASING PIPE

A. Steel encasing pipe for boring and jacking shall conform to the requirements of either, ASTM A53, Type E or S, Grade B or ASTM A139, Grade B.

B. Steel encasing pipe used under channels and highways shall meet the requirements of the governmental agency having jurisdiction and the following minimum requirements:

Nominal Diameter (Inches)	Maximum Wall Thickness
Under 13	0.188 inches
13-24	0.250 inches
25-36	0.312 inches
42	0.438 inches
48	0.500 inches
54	0.563 inches

C. Steel encasing pipe used under railroads shall meet the requirements of the railroad and the following minimum requirements:

	Minimum Wall Thickness (inches)	
Nominal Diameter (Inches)	Coated or Cathodically Protected	Uncoated & Unprotected
Under 14	0.180	0.251
14-16	0.219	0.282
18	0.250	0.313
20	0.281	0.344
22	0.312	0.375
24	0.344	0.407
26	0.375	0.438
28-30	0.406	0.469
32	0.438	0.501
34-36	0.469	0.532
38-42	0.500	0.563
48	0.563	0.626

D. Casing pipe joints shall be welded to form a leak-proof continuous casing.

E. The inside diameter of casing pipe shall be at least 2 inches greater than the largest outside diameter of the carrier pipe joints or couplings for carrier pipe less than 6 inches in diameter, and at least 4 inches greater than the largest outside diameter of the carrier pipe joints for carrier pipe 6 inches and over in diameter, unless otherwise shown on the Plans.

F. The steel casing pipe shall be of smooth interior and shall be placed accurately to line and grade, allowing for the encased pipe thickness and supports under each length of encased pipe.

3.00 EXECUTION

3.01 GENERAL EXCAVATION

A. Excavation shall be performed by any practicable method consistent with the integrity and protection of the work and neighboring structures, workmen, and the public. Topsoil shall be separately removed and stockpiled for reuse.

B. All excavation, except where necessary to tunnel, bore or jack under roads, railroads, tree roots and other obstructions within the limits indicated on the Plans, may be open cut from the surface. Tunneling or boring under trees shall be considered as incidental to construction and will not be considered as cause for request for additional payment.

C. Foreign material or unsuitable foundation material encountered such as wood, boulders, etc., which obstruct the excavation, shall be removed. Such materials found at the bottom of the excavation shall be removed and the foundation restored with approved materials.

D. If excess excavation is made or the material becomes disturbed so as to require removal beyond the prescribed limits, the resulting space shall be filled with selected material solidly tamped into place, in not more than 6-inch layers to the satisfaction of the ENGINEER, before the construction work proceeds. At the direction of the ENGINEER, the excess excavation may be filled with 2000 psi concrete at the CONTRACTOR's expense.

E. The excavation shall be kept dry during the work. Where water is encountered in the excavation, it shall be removed by pumping or well points. All necessary precautions shall be taken to prevent damage to existing wells and to completed or partially completed structures. The CONTRACTOR shall be responsible for all damages caused by him due to inadequate or improper protection.

F. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction areas, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental the Contract work.

G. Any excavation not backfilled at the end of each day must be clearly marked and surrounded by appropriate safety fencing as directed by the ENGINEER. If directed by the ENGINEER, the CONTRACTOR shall cover the open excavation with a steel plate and light the excavated area.

3.02 EXCAVATION FOR SEWERS AND WATER MAINS

A. Trenches shall be excavated to the depth required with allowance for bedding the pipe. The trench shall be cut wider and deeper at each pipe joint location to provide for properly completing the pipe joint and to relieve the joint of all loadings.

B. The width of the trench at the top of a rigid pipe shall be sufficient to allow the pipe to be laid and jointed properly and shall provide for a minimum net clearance of 6 inches and a maximum net clearance of 12 inches on each side of the barrel of the pipe and to allow the backfill to be placed and properly compacted.

C. The width of trench at the top of a flexible pipe backfill when using concrete bedding shall be sufficient to allow the pipe to be laid and jointed properly with the minimum net clearance of 12 inches and a maximum net clearance of 18 inches on each side of the barrel of the pipe.

D. Where the conditions of the ground require or where the work is in close proximity of existing structures, the sides of excavation shall be securely held by bracing and/or sheeting which may be removed in units when the level of the backfill has reached a point where it is safe to pull the sheeting without disturbing the protected feature. No sheeting, bracing, or other timber shall be left in the excavation upon the completion of the main or other structures, except with the specific review and direction of the ENGINEER.

E. Other underground mains, sewers or structures encountered in the excavation shall be adequately supported during the CONTRACTOR's operations, and before backfilling, shall be given permanent support as directed by the ENGINEER to meet the standards or requirements of the owning utility or agency.

F. Water, sewer, gas and other utility services disturbed by the CONTRACTOR in his operations shall be repaired or replaced in a manner equal to the original condition by the CONTRACTOR at his own expense. Where these services are encountered and are undamaged, they shall be supported and/or protected by the CONTRACTOR at his expense against later settlement and/or damage after backfill. The CONTRACTOR shall consult the agency or the utility firm having jurisdiction over any duct line, gas main, etc., which may cross the excavation to determine method of supporting such duct or pipe.

G. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve manhole covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clean, or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed except as otherwise provided for herein on a temporary basis.

3.03 EXCAVATION FOR STRUCTURES

A. Excavation for structures shall be extended sufficiently beyond the limits of the structure to provide ample room for form construction and for practicable construction methods to be followed.

B. Requirements for excavation of sewers and water mains shall also apply to this Section.

3.04 EXCAVATION FOR PAVED SURFACES

A. In excavating around manholes and catch basins or inlets, care shall be exercised to avoid removing the casings and pushing dirt into the structures. Dirt pushed into manholes, catch basins or inlets by the CONTRACTOR's operations shall be immediately removed so that the dirt will not be carried into the sewer by the flow of sewage or storm water.

B. The CONTRACTOR shall take ample precautions to protect all trees and ornamental shrubbery not within the limits of the construction area, or within the construction areas shown on the Plans to be retained from injury by workmen, equipment, or any other agencies connected with the work, including subcontractors. Such protection shall be provided during the progress of the excavation, grading, or other phases of the work as necessary. Such trees or shrubbery shall be surrounded by protective posts or fencing before construction begins, when in the judgment of the ENGINEER, such precautionary measures are necessary. If, as a result of any phase of the work, trees are damaged or it is necessary to remove limbs in the way of construction, the repair of the damage and such limb removal shall be done by the CONTRACTOR as directed by the ENGINEER. All costs for the protective work shall be borne by the CONTRACTOR as incidental to the Contract work.

3.05 ROCK EXCAVATION

A. Rock excavation shall consist of excavating igneous, metamorphic and sedimentary rock which cannot be excavated without continuous drilling and blasting or drilling and splitting to fracture the rock. Blasting shall be permitted only after it has been shown that other methods of excavation are impractical. All rock excavation shall be carried to a minimum depth of 8 inches below the pipe or manhole bottom and to the bottom of all footings. The width of the rock excavation shall not exceed the diameter of the pipe plus 12 inches on either side or the edge of the foundation footing.

B. When the use of explosives is necessary for the progression of the work, the CONTRACTOR shall comply with all laws, ordinances and applicable safety code requirements and regulations relative to the handling, storage and use of explosives and protection of life and property. A person competent and experienced in the use of explosives shall be employed to supervise the work. The CONTRACTOR shall schedule all blasting for a definite hour of the day and shall so notify all residents and businesses in the area as to the scheduled day and hour for such blasting operations. Explosive materials shall not be stockpiled and stored in residential areas. Explosives and initiating devices shall not be carried in the same vehicle.

C. Suitable weighted plank coverings or timber mats shall be provided to confine all materials lifted by blasting within the limits of the excavation of trench. Excessive blasting or overshooting shall not be permitted. Any material outside of the authorized excavation cross section which may be shattered or loosened shall be removed at the CONTRACTOR's expense. The CONTRACTOR shall be responsible for all damage resulting from the use of explosives.

3.06 PIPE BORING AND JACKING

A. The CONTRACTOR shall obtain all necessary permits for jacking the encasing pipe under channels, highways and/or railroads and shall notify the governmental agency and/or company having jurisdiction 48 hrs before work at any crossing is started. The CONTRACTOR shall pay all costs for an inspector and/or flagmen required by a railroad or governmental agency.

B. A suitable approach trench shall be opened, adjacent to the toe of the slope of the embankment. The approach trench shall be long enough to accommodate the length of pipe units to be placed, and wide enough to provide sufficient working room. Guide timbers or rails for keeping the pipe on-line and grade shall be installed in the bottom of the trench and heavy timber backstop supports installed at the rear of the trench to take the thrust of the jacks. A timber bearing a "pushing frame" shall be built and furnished to fit or match the end of the pipe to be jacked, so that the pressure of the jacks will be evenly distributed over the end of the pipe. Two (2) hydraulic jacks of sufficient power shall be used to apply pushing or jacking pressure. For firm ground, excavation shall be carried on from inside the pipe, not to exceed twelve (12) inches ahead of the lead pipe. For unstable ground, the lead pipe shall precede the auger. Excavation at the top and sides shall be accurately cut to line and grade. Adjoining sections of steel pipe shall be welded. Pipe shall be jacked on successive shifts until completed to guard against the "freezing of the line" due to settlement and compaction of surrounding soil.

C. The sheeting of pits along any road will be required if the leading edge of all work pits will be closer to the pavement edge than the shoulder point or ten (10) ft, which ever distance is greater, or on curb and gutter sections, at least five (5) ft from back of curb.

D. Upon completion of the installation of the steel pipe encasement, the contractor shall furnish and install a bolted style casing spacer as described below on the carrier pipe. Casing spacers shall be placed a maximum of seven (7) feet apart along the length of the carrier pipe with one casing spacer within 2-1/2 feet of each side of a pipe joint and the rest evenly spaced. Wood skids are not an acceptable method of supporting the carrier pipe.

1. Casing spacers for carrier pipes from 4" - 24" shall be made of a molded, segmented high density polyethylene plastic with 304 stainless steel connecting nuts and bolts. Minimum spacer width shall be 5.2" for carrier pipes from 4" - 12" and 7.0" for carrier pipes 14" - 24". Each casing spacer shall have at least six (6) integrally molded skids extending 1" beyond the bell or mechanical joint of the carrier pipe. The casing spacers shall be equal to the PSI Ranger as manufactured by Pipeline Seal and Insulator, Inc., Houston, TX.

2. Casing spacers for carrier pipes larger than 24" shall be a PVC fusion bonded coated (10-16 mils) steel shell (minimum 14 gauge steel) with a 90 mil PVC inner liner and 2" wide 30% glass reinforced polyester runners (minimum compressive strength = 18,000 psi) (polyethylene is not an acceptable runner material) attached by 3/8" coated steel studs welded to the steel shell. All bolts and nuts used to fasten the shell to the carrier pipe shall be cadmium plated steel. Where riser are required under the runners they shall be a minimum 10 gauge steel welded to the shell and coated as specified for the shell (epoxy is not an acceptable coating for the shell riser). The casing spacers shall be equal to the PSI Model C as manufactured by Pipeline Seal and Insulator, Inc., Houston, Texas.

E. Boring shall be performed by accepted and recognized methods which will provide adequate safety and protection at all times to workmen employed in the work and to inspectors and others involved in the construction.

F. If voids should develop around the outside of the encasing pipe, grouting or other methods approved by the ENGINEER shall be employed to fill such voids.

G. After the pipes are tested satisfactorily, the remaining space between the carrier pipe and the encasing pipe shall be pressure grouted or otherwise filled with concrete. The carrier pipe shall be adequately braced to prevent floating or movement of the pipe.

3.07 SHORING, SHEETING AND BRACING

A. Where sheet piling, shoring, sheeting, bracing, or other supports are necessary, they shall be furnished, placed, maintained, and except as shown or specified otherwise, removed by the CONTRACTOR.

B. All sheet piling, shoring, sheeting and bracing shall be designed by a professional engineer engaged by the CONTRACTOR with demonstrated competence and experience in such work. The sheeting system shall be designed to prevent bottom failure and hydrostatic uplift within the excavation. Provision shall also be made in the design for lateral pressures due to side slope and construction equipment or other surcharge loads, as applicable.

C. The CONTRACTOR shall provide to the ENGINEER for his review, design calculation and arrangement drawings of the sheeting system prior to ordering any materials for bracing, sheeting, etc., and prior to the commencement of the excavation.

D. All materials, except as otherwise specified, used for sheeting and sheet piling, lagging, braces, shores, and stringers, or waling strips shall be of approved quality and dimensions throughout.

E. Materials for sheeting systems shall be furnished and driven or set in place by the CONTRACTOR, where necessary or wherever ordered by the ENGINEER, whether the same is or is not considered necessary by the CONTRACTOR. If, in the opinion of the ENGINEER, the materials furnished by the CONTRACTOR are not of proper quality or sufficient size or not properly placed to ensure the safety of the work or of adjacent structures and property, the CONTRACTOR shall, upon notice from the ENGINEER to that effect, forthwith procure, furnish and set in place or drive other and satisfactory materials, or place the material in a satisfactory manner; and if he shall fail or neglect to do so, the ENGINEER may order all or any part of the work to be stopped until such materials so used are furnished and placed; and the CONTRACTOR shall not be entitled to claim, demand, or receive any compensation for larger size or better quality or different disposal of materials ordered by the ENGINEER, nor any compensation for allowance of any kind whatsoever for or on account of any damage or delay resulting from such stoppage of work.

F. Steel sheet piling may be either new or used. It shall be of adequate strength, straight and properly braced. Steel sheet piling shall be of the interlocking type. Friction in the interlocks shall not be assumed to contribute to the strength of the sheet piling.

G. The design, planning, installation and removal, if required, of all sheet piling, shoring, sheeting, and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of the soils below and adjacent to the excavation.

H. Steel sheet piling for the excavation shall be driven straight and in-line. The piling shall be supported above ground, before driving, by a guide frame at least 20 ft high which will keep the piling accurately in the required position and vertical. Each piece of piling shall be driven only a few feet at a time and driving shall proceed continuously around the perimeter so that the piles shall reach their full penetration together.

I. Walers and bracing shall be supplied and installed as required to complete the sheeting system. Walers and braces shall be of adequate strength for the load imposed. Splices in walers shall develop the full strength of the member in bending, shear, and axial compression.

J. If bracing members are to be removed during construction, the timing and procedure for removal shall not induce excessive stresses in the permanent structures or in steel sheet piling and bracing members.

K. If the construction sequence of structures requires the transfer of bracing to the completed portions of any structure, the CONTRACTOR shall secure written acceptance of the ENGINEER prior to the installation of such bracing.

L. In trenching operations the use of horizontal strutting below the barrel of pipe or the use of the pipe as support for trench racing will not be permitted. The use of a traveling shield for sewer construction shall require that the device be approved for use by a professional engineer. Sheet piling and timbers in trench excavations shall be withdrawn in a manner so as to prevent subsequent settlement of the pipe or additional backfill loadings which might overload the pipe.

M. The neglect, failure, or refusal of the ENGINEER to order the use of sheeting, or sheet piling or steel, or to order the same to be left in place, or the giving or failure to give of any order or directions as to the manner or methods of driving or placing sheeting, sheet piling, bracing, shores, etc., shall not in any way relieve the CONTRACTOR of any or all obligations under this Contract. Sheeting left in place shall be cut off one (1) ft below existing grade.

N. The rules of the OSHA and the State Department of Labor with respect to excavation and construction shall at all times be strictly observed.

3.08 GENERAL BACKFILLING

A. For all areas, unless otherwise noted, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum density.

B. Under pavements, curb, paved driveways, and sidewalks, and where pipe is within a one on one influence of pavement, compaction testing shall be performed by an independent testing laboratory. Testing shall be performed at intervals of one test per lift per 50 feet of trench or as determined necessary by the ENGINEER.

C. In residential developments, all backfill within the road corridor shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be as such to obtain 95% of the maximum unit density as determined at the optimum moisture content. For purposes of this section, the road corridor is defined as front of house to front of house, including right-of-way and adjacent easements and setbacks.

3.09 BACKFILLING FOR SEWERS AND WATER MAINS

A. Backfilling shall consist of placement of the prescribed materials from a level 12 inches above the crown of the pipe. Placement shall be as follows:

1. Under gravel driveways, gravel roads and shoulders, the backfill shall be granular material which shall be solidly compacted by mechanical tamps in layers of not more than 12 inches loose thickness with backfilling carried up to within 12 inches of finished grade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

2. Under pavements, curb, paved driveways, and sidewalks, the backfill shall be granular material compacted in layers not to exceed 12 inches loose thickness with backfilling carried up to subgrade. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content. After a period of about 60 days or less, if the backfill compaction is satisfactory to the ENGINEER, to provide for any slight settlement, the CONTRACTOR shall retrim neatly any broken edges of pavement and replace the top surface of the backfill within the pavement area with pavement surface equal to that surface which was removed. The pavement shall be replaced in accordance with the standard specifications of the agency having jurisdiction.

3. Backfill around lift stations, or buried underground structures shall be granular material compacted in 12-inch lifts. Compaction of backfill shall be such as to obtain 95% of the maximum unit density as determined at the optimum moisture content.

4. For all other areas, backfilling shall consist of placing excavated material as defined in Paragraph 2.01.A. of this Section, in 12-inch lifts to finish grade. Compaction of backfill shall be such as to obtain 90% of the maximum unit density as determined at the optimum moisture content.

3.10 FILLING AND BACKFILLING FOR STRUCTURES

A. Embankments underlying structural footings, streets and drives, sidewalks and around structures shall be granular material meeting the requirements of the Michigan Department of Transportation for granular material compacted to 95% density.

B. In all other areas, material required for embankments and backfilling shall be soil or soil-rock mixture free of organic and other deleterious matter and shall contain no more than 15% rocks or lumps larger than 2-1/2 inches in the greatest dimension, compacted to 90% density.

C. Under all interior and exterior floor slabs, an 8-inch thick granular cushion shall be placed. This material shall be clean mineral aggregate meeting the following gradation requirements:

Passing the No. 4 Sieve	100%
Passing the No. 200 Sieve	0-3%

D. Where embankment material is placed to achieve a new surface elevation, the top 4 inches shall be approved topsoil either salvaged from the site or hauled in by the CONTRACTOR.

3.11 FILLING AND BACKFILLING FOR PAVED SURFACES

A. Embankments, including sand cushions and granular fills, shall be placed in successive layers not more than 6 inches in depth the full width of the cross section, each layer to be thoroughly compacted by means of vibratory compactors or by an approved pneumatic-tired roller or combination thereof, as required by the ENGINEER. Each layer shall be compacted to not less than 95% of the maximum unit density as determined at the optimum moisture content. All parts of the embankment shall be uniformly compacted and the CONTRACTOR shall so direct all earthmoving equipment used in the work so that the same shall be attained. Embankment or fill outside the limits of the subgrade where sand or gravel is not required shall be made with suitable material which is free from perishable organic matter, rubbish, stones, broken concrete, roots, or other foreign materials, at no additional compensation. Before any embankments are begin, the base shall be made firm and cleared of topsoil, sod or other perishable material. The sides of the embankment shall be neatly and evenly dressed to the slope shown on the Plans, or such other slope as the ENGINEER may direct.

B. Upon completion of the placing of the curbs, and after the concrete has cured sufficiently, forms shall be removed and the excavated space behind the curb shall be backfilled with a good quality of surface soil, free of rubbish, stone, broken concrete, roots or other foreign material. Where adequate acceptable material for backfill behind the curb is not available, granular fill conforming to 2003 MDOT 8.02.06, Class II, shall be used. Where the area behind the curb is in cut, it shall be trimmed from the top of the curb on the slope shown on the Plans. If the area is in embankment or fill, an earth berm shall be placed immediately adjacent to the top of the curb and then the embankment of fill shall be finished to the slope shown on the Plans. All trimming and finishing shall be done in a neat, workmanlike manner. All excess concrete and debris shall be removed from the excavation behind the curb line before backfilling begins.

C. In construction of non-rigid pavements, backfilling back of curb and gutter shall be completed before placement and compaction of the base course of the roadway.

3.12 PREPARATION OF SUBGRADE FOR ROADWAY SURFACES

A. The bottom of the excavation for the pavement or top of the fill shall be known as the pavement subgrade and shall be smoothed, trimmed and compacted to the required line, grade and cross section to receive the road metal. It shall be thoroughly compacted by rolling with a roller of approved type weighing not less than 8 tons. The subgrade shall be compacted to at least 95% of the maximum density as designated by the test method AASHTO T-180. Inaccessible areas, where rolling is not practical, shall be thoroughly compacted by mechanical tampers capable of striking a blow equivalent to at least 250 foot-pounds per square foot. The subgrade thus formed shall be maintained in a smooth and compacted condition until the pavement has been placed. No base course, surfacing, curb, or curb and gutter, shall be placed until the subgrade has been reviewed by the ENGINEER. The subgrade shall be finished in an acceptable condition at least one day in advance of the pavement construction at all times. Six inches of compacted depth of granular material shall be used where uncompactable soil is encountered. The granular fill shall conform to the 2003 MDOT 9.02.08., Class II, compacted to 95% of its density.

B. Immediately prior to placing the pavement, the subgrade shall be tested for conformity with the cross section shown on the Plans by means of an approved template riding on the curb and gutter sections or on side forms. If necessary, materials shall be removed or added, as required, to bring all portions of the subgrade to the correct elevation. Corrected portions shall then be thoroughly compacted and again tested with the template. Pavement material shall not be placed at any portion of the subgrade which has not been tested for correct elevation.

C. The finished subgrade shall be maintained in a smooth and compacted condition until the pavement is placed. No storage piles of fine or coarse aggregate shall be placed directly upon the finished subgrade. Should the subgrade become rutted or disturbed in any manner, it shall be reshaped and recompacted.

3.13 GRADING

A. The CONTRACTOR shall grade the site to achieve the elevations as shown on the Plans. All disturbed areas beyond the grading limits shall be restored to prior condition.

B. Surplus excavated material not needed for embankment shall be disposed of by the CONTRACTOR. Headwalls, culverts, drains, sewers and appurtenances filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, repaired, or replaced at his expense.

C. All temporary earth changes shall be in conformance with the Soil and Erosion Control Act.

3.14 RESTORATION

A. Headwalls, culverts, and drainage systems filled or damaged by the CONTRACTOR during the course of his operations shall be cleaned, relaid or rebuilt with new materials to a condition equal to the original state, and of thickness equal to the original structure and to the original line and grade at the CONTRACTOR's expense.

B. Where the excavation is located beside a ditch and/or where an existing ditch is filled or disturbed in the CONTRACTOR's operations, the CONTRACTOR shall clean, repair, or replace the ditch with properly pitched bottom and side slopes and of section and capacity not less than the original section.

C. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

D. The CONTRACTOR shall remove excess dirt and other construction material from the site of the work and leave the site in a condition equal to its original state.

E. The final condition of the streets and roadways shall be subject to the approval of the governmental body having jurisdiction thereof, as well as review by the ENGINEER.

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Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
EARTHWORK SPECIFICATIONS

Project No. 2075001300

Scale NOT TO SCALE

Revision

STORM SEWER AND DRAINAGE STRUCTURES

1.00 GENERAL

1.01 DESCRIPTION

A. Furnish all labor, tools, equipment and materials to construct all storm sewers, and drainage structures as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

1. The CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed or just prior to placing the line in service providing the sewer pipe has been installed for not less than 30 days.

B. Test for Alignment

1. All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

C. Material Tests

1. The CONTRACTOR shall have tests of pipe strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

D. Submittals

1. The CONTRACTOR shall submit shop drawings, or data sheets for all castings, steps and manhoies.

2. The CONTRACTOR shall submit certification letters for all pipes. All letters must contain the following: Contractors name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 PIPE

A. Reinforced concrete pipe and manhole tees shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Proposal.

B. Concrete pipe shall have tongue and groove gasketed premium joints.

C. Corrugated steel pipe shall meet the requirements of AASHO M-190 for coated pipe latest revision. Minimum gage thickness shall be as shown on the Plans.

2.02 REINFORCED CONCRETE MANHOLES

A. Manholes shall conform to the current ASTM Specifications for precast reinforced concrete Manhole Sections, serial designation C478. Manhole section joints shall conform to ASTM Designation C990. All cones shall be eccentric with an offset step configuration. Concrete adjustment rings or riser rings shall not be used for adjusting the height of the structure.

B. All manhole component parts shall have the name of the manufacturer stenciled on the inside. The lettering or logo shall be a minimum of 4 inches high.

2.03 MORTAR FOR MANHOLES

A. Mortar for plastering manholes and drainage structures shall be made of one part Portland cement and two parts fine aggregate.

2.04 BRICK AND BLOCK

A. Brick for brick and mortar structures shall conform to the current ASTM Specification C32. Block for block and mortar structures shall conform to the current ASTM Specification C135.

B. The concrete block masonry used to construct manhole and catch basin walls shall be solid curved blocks with the inside and outside surfaces curved to the required radii. The blocks shall have tongue and groove or other approved type of joint at the ends so that the units interlock to form a strong, rigid structure. Curved blocks shall have the inside and outside surfaces parallel.

C. The block shall not exceed 18 inches in length or 8 inches in depth (height). No block shall be less than 6 inches in width (thickness). All blocks in one structure shall be of the same height dimension. The blocks shall be designed for length so that only full-length or half-length blocks are required to lay the circular wall of any one course.

D. Blocks intended for use in the cones or tops of manholes and catch basins shall have such shape as may be required to form the structure as shown on the Plans with inside and outside joint not to exceed 1/4-inch in thickness.

2.05 STRUCTURE FRAMES AND COVERS

A. Structures frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each solid manhole cover shall be marked Storm Sewer with letters integrally cast into the cover.

B. Frames and Covers shall be as follows:

1. For use on manholes: East Jordan 1040Z, with Type B cover lettered "STORM SEWER", or equal. Structures 24-inches in diameter shall have the 1045 Z frame.
2. For use on drainage structures in paved areas: East Jordan 1040Z, with Type M1 cover, with "DUMP NO WASTE" lettering and trout logo.
3. For use on drainage structures in curbed areas: East Jordan 7045 or 7065, with "DUMP NO WASTE" lettering and trout logo.
4. For use on drainage structures in landscaped areas: East Jordan 1040Z, with 1040 N 7", with "DUMP NO WASTE" lettering and trout logo.

C. All frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

D. All covers for drainage structures shall have storm drain markers affixed to the nearest available flat surface. The storm drain markers shall be manufactured by Das Manufacturing and shall be #SDR "No Dumping. Drains to River." The storm drain markers shall be installed per the manufacturer's recommendations.

2.06 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF for precast manholes, PS1-B for block manholes, or equal.

2.07 DRAINAGE STRUCTURES

A. All manholes and catch basins shall be precast unless otherwise specified.

B. Manhole and catch basin bottoms shall be concrete and top of slab shall have a troweled finish.

C. Upon approval by the ENGINEER, the manhole and catch basin walls may be constructed of concrete block masonry or concrete manhole pipe conforming to the requirements of the specifications previously listed. Construction shall be in accordance with the details for Catch Basin and Storm Sewer Manhole shown on the Plans.

D. A plaster coat of mortar 1/2-inch in thickness shall be applied to the inside and outside surface of all manholes and catch basins constructed with concrete block masonry or sewer brick. The inside coat of mortar shall be applied in a smooth, neat workmanlike manner.

E. Final adjustment of the top of manholes and catch basins, so that the manhole or catch basin cover is at finished elevations as shown on the Plans or meets the finished surface, may be accomplished with sewer brick conforming to the previously listed Specifications. The total height of brick for this purpose shall not exceed 9 inches. The total chimney height shall not exceed 18 inches.

F. All block and brick masonry units shall be laid in a full bed of mortar. The inside joints of the block masonry construction shall be tooled in a neat and workmanlike manner.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill 12 inches above the crown of pipe shall conform to Section 2.04, Earthwork of these specifications.

B. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within four pipe lengths behind pipe laying.

3.02 BEDDING

A. Concrete pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches. Where indicated on the Plans or required by the ENGINEER, concrete encasement or cradle shall be used.

B. For all pipes, compacted aggregate material shall be placed at the sides of the pipe in 12-inch lifts and cover not less than 12 inches above the crown of the pipe.

C. "Granular Material" shall be MDOT class II, placed in not more than 6-inch layers and compacted to not less than 90% standard density.

3.03 PIPE INSTALLATION

A. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress, shall be kept dry, and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.

B. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.

C. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities or structures. Any change in location or alignment of piping, which may be found more feasible or practicable as the work progresses, shall be made by the CONTRACTOR, as the ENGINEER may direct.

D. All pipe shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the concrete pipe will be considered cause for rejection.

E. All cutting of the pipe shall be done in a neat workmanlike manner with the least amount of waste and without damage to existing or new lines. A fine toothsaw, tubing cutter or similar tool may be used to cut concrete pipe. Cuts must be square. Ragged edges shall be removed with a cutting tool or file.

F. Breaks in pipe or joints shall be repaired to the satisfaction of the ENGINEER and at the expense of the CONTRACTOR.

3.04 CONNECTIONS TO EXISTING MANHOLES

A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cored into the manhole.

B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.

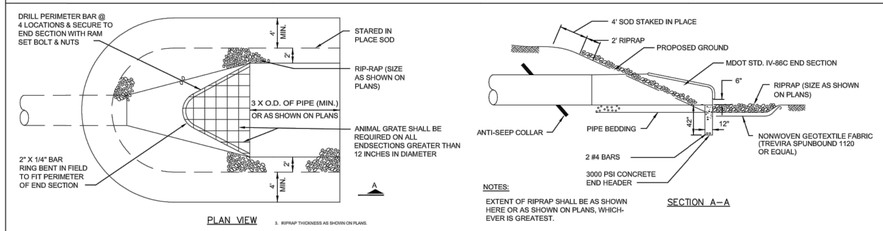
C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. Reinforcing steel shall not be cut out shall be bent and replaced in the area that is to be patched. A form shall be constructed over the area of pipe penetration. The formed area shall then be filled with concrete.

D. Closure of the manhole wall shall be made watertight using concrete.

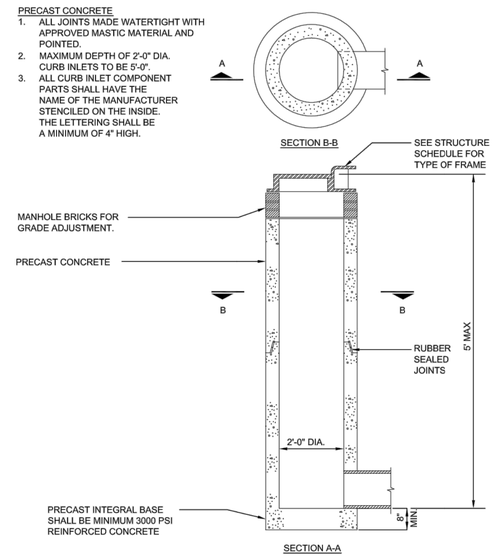
3.05 ANIMAL GRATES

A. Animal grates shall be required on all endsections greater than 12-inch diameter.

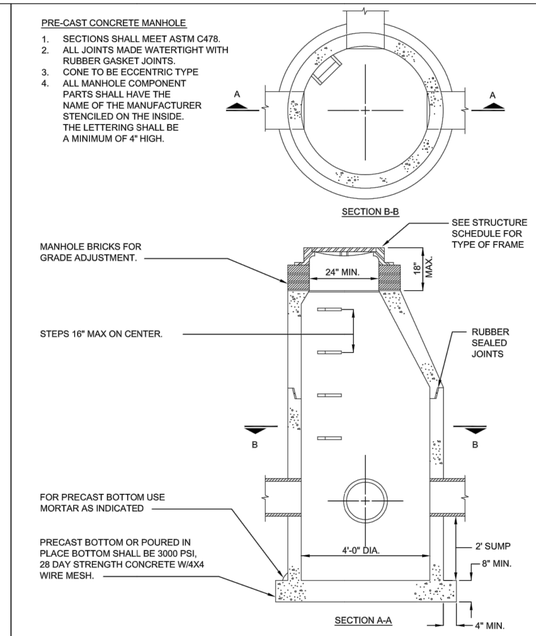
PCT February 2008



END SECTION AND RIPRAP DETAIL



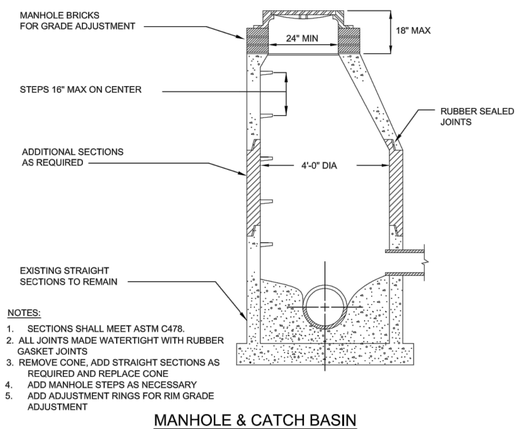
2' DIAMETER INLET



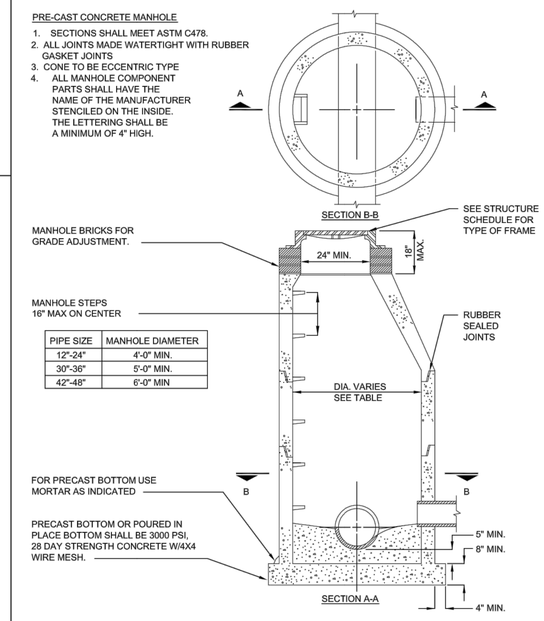
4' DIAMETER CATCH BASIN

AFFIX TO SURFACE ON OR NEAR ALL DRAINAGE COVERS.

STORM DRAIN MARKER

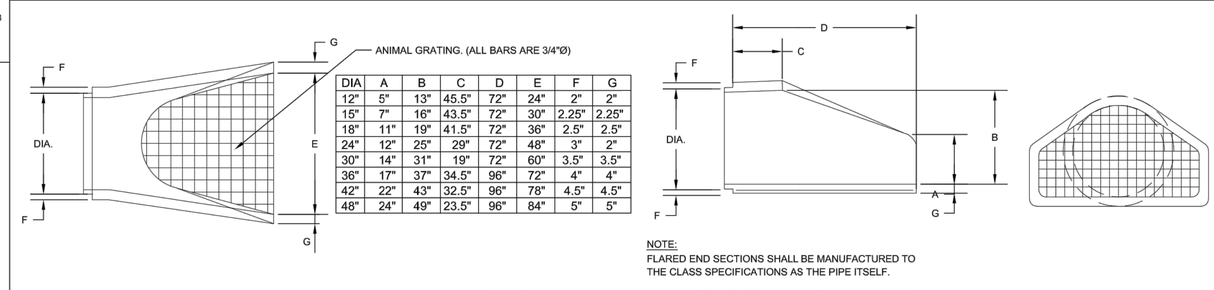


MANHOLE & CATCH BASIN RECONSTRUCTION DETAIL



PIPE SIZE	MANHOLE DIAMETER
12"-24"	4'-0" MIN.
30"-36"	5'-0" MIN.
42"-48"	6'-0" MIN

STORM SEWER MANHOLE



DIA	A	B	C	D	E	F	G
12"	5"	13"	45.5"	72"	24"	2"	2"
15"	7"	16"	43.5"	72"	30"	2.25"	2.25"
18"	11"	19"	41.5"	72"	36"	2.5"	2.5"
24"	12"	25"	29"	72"	48"	3"	2"
30"	14"	31"	19"	72"	60"	3.5"	3.5"
36"	17"	37"	34.5"	96"	72"	4"	4"
42"	22"	43"	32.5"	96"	78"	4.5"	4.5"
48"	24"	49"	23.5"	96"	84"	5"	5"

NOTE:
FLARED END SECTIONS SHALL BE MANUFACTURED TO THE CLASS SPECIFICATIONS AS THE PIPE ITSELF.

STANDARD END SECTIONS FOR PRECAST CONCRETE

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108–9721
48108–9721
Tel. 734.822.3101
www.pittsfield–mi.gov

Revision	By	Appd.	YY.MM.DD
UPDATES	MRH	DRW	14.01.24
TWP REV	BWA	DRW	12.08.09
TWP REV	BWA	DRW	11.04.27
UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: ST–01	TTN	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

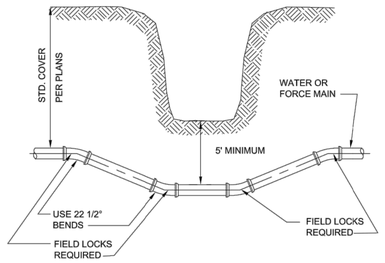
Pittsfield Township, Michigan

Title
STORM SEWER DETAILS AND SPECIFICATIONS

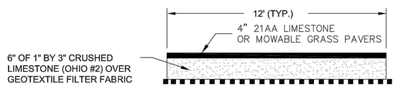
Project No. 2075001300

Scale NOT TO SCALE

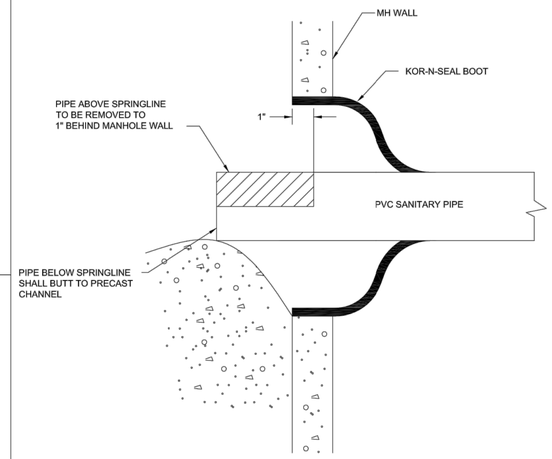
Revision



DITCH & STREAM CROSSING



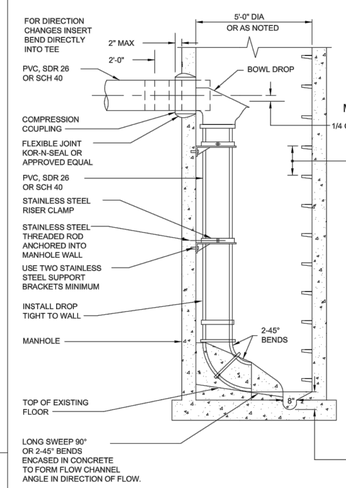
SANITARY SEWER ACCESS PATH

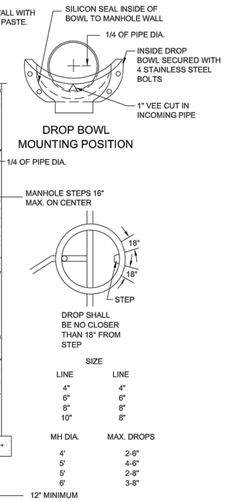


SANITARY PIPE PENETRATION

NOTES:

1. SECURE DROP PIPE TO MANHOLE WALL WITH RELINER-DURAN, INC STAINLESS STEEL ADJUSTABLE CLAMPING BRACKETS OR EQUAL.
2. ATTACH THE DROP BOWL & EACH CLAMPING BRACKET TO THE MANHOLE WALL WITH 3/8" x 3 3/4" RAMSET/RED HEAD BOLTS HELD INPLACE WITH 2 STAGE EPOXY PASTE.





SIZE

LINE	LINE
4"	4"
6"	6"
8"	8"
10"	8"

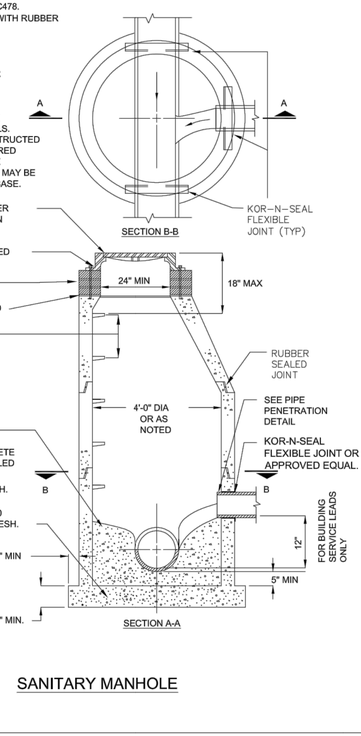
MH DIA.	MAX. DROPS
4'	2-6"
5'	4-6"
5'	2-8"
6'	3-8"

NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

INTERIOR DROP SANITARY MANHOLE

PRE-CAST CONCRETE MANHOLE

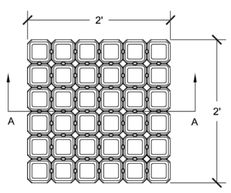
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
5. PROVIDE INTEGRAL BASE WITH PRECAST CONCRETE CHANNELS.
6. WHERE MANHOLES ARE CONSTRUCTED OVER EXISTING SEWERS, POURED IN PLACE OR PRECAST COOKIE AND DOGHOUSE STRUCTURES MAY BE USED IN PLACE OF INTEGRAL BASE.



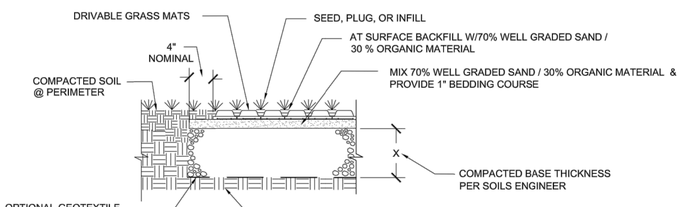
NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK

SANITARY MANHOLE

NOTE:
FOR STORMWATER MANAGEMENT APPLICATIONS INCLUDING STORAGE AND INFILTRATION, ALTERNATE INFILLS, BASE MATERIAL, AND DRAINAGE MAY BE REQUIRED

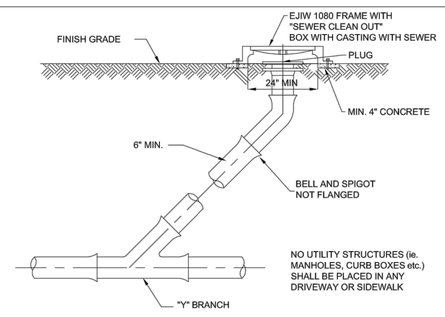


PLAN VIEW

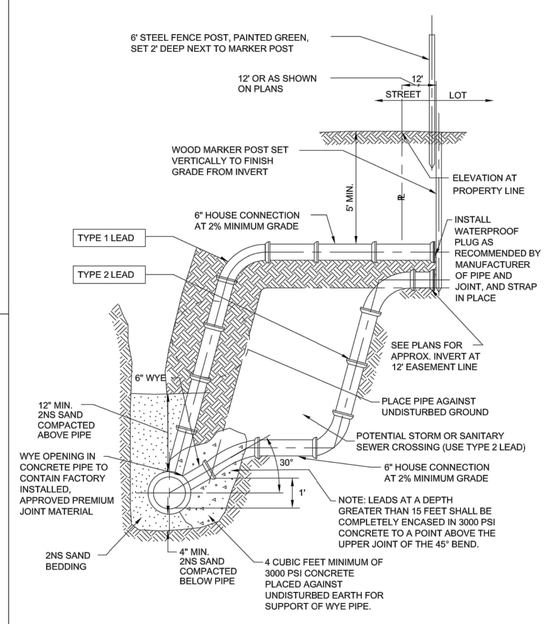


SECTION A-A

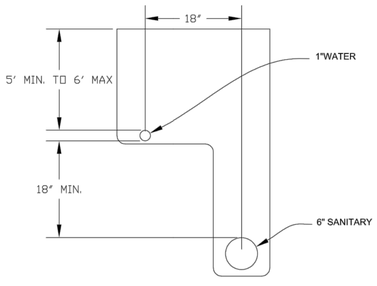
TYPICAL HEAVY TRAFFIC DRIVABLE GRASS DETAIL



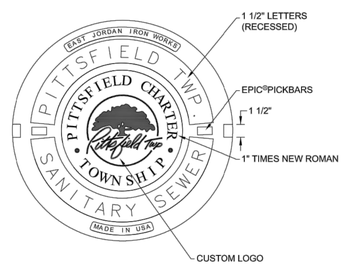
SANITARY SEWER CLEANOUT



SANITARY SEWER SERVICE & RISER CONNECTION DETAIL

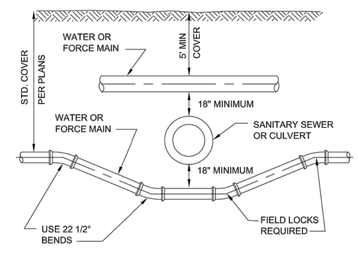


TYPICAL L TRENCH DETAIL HOUSE LEADS



EAST JORDAN IRON WORKS 1040 Z BOLT DOWN FRAME
EAST JORDAN IRON WORKS 1040 AGS COVER

COVER DETAIL



SEWER OR CULVERT CROSSING

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

Revision	By	Appd.	YY.MM.DD
COVER DETAIL UPDATE	MRH	DRW	14.01.24
TWP REV	BWA	DRW	11.04.27
MANHOLE UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: SS-01	BWA	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SANITARY SEWER DETAILS

Project No. 2075001300

Scale NOT TO SCALE

Revision

SANITARY SEWER AND MANHOLES

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, tools, equipment and materials to construct all sanitary sewers, manholes and necessary appurtenant work as herein specified. No sewers shall be accepted until the sewer system has passed the system acceptance tests.

1.02 TESTING

A. General

1. The CONTRACTOR shall furnish all equip\-ment and personnel to conduct system acceptance tests as specified herein on all completed sewers. All tests shall be conducted under the supervision of the ENGINEER. No acceptance tests shall be conducted until the entire sewer system is constructed and has been installed for not less than 30 days.

2. The CONTRACTOR may desire to make an air test prior to backfill for his own purposes but the line acceptance tests shall be conducted after backfilling or extensions.

3. All sewer lines shall be televised while running enough water through the line to be visible at the next downstream manhole.

4. All sewer lines shall be checked for alignment.

5. All manholes shall be tested for leakage. All PVC lines shall be tested for deflection.

6. Sewer pipe 30 inches and smaller shall be air tested. Sewer pipe larger than 30 inches shall be tested by either infiltration or exfiltration and shall be tested in lengths of 1600 feet or less.

7. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair rejected section and retest until it is within specified allowance.

B. Test for Leakage - Air Test

1. Section 33-95 (pg 30-6) 2004-Ten State Standards.

2. After a manhole-to-manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs inflated to 35 psig internal pressure. The design of the pneumatic plugs shall be such that they will hold against the line test pressure without requiring external blocking or bracing.

3. There shall be three (3) hose connections to the pneumatic plug. One hose shall be used only for inflation of the pneumatic plug. The second hose shall be used for continuously reading the air pressure rise in the sealed line. The third hose shall be used only for introducing low pressure air into the sealed line.

4. There shall be a 0-30 psig gauge for reading the internal pressure of the line being tested. Calibrations from the 1-10 psig range shall be in tenths of lbs (not ounces) and this 0-10 portion shall cover 90% of the complete dial range.

5. Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of any ground water pressure that may be over the pipe. At least two (2) minutes shall be allowed for the air pressure to stabilize. After the stabilization period, the third hose shall be disconnected.

6. The portion of line being tested shall be accepted if the portion under test meets the following conditions.

a. DI, and RCP Pipes

(1) The time requirement for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time given in the following table:

Pipe	Min. Holding Time Seconds/100 ft. Pipe
4-inch	18
6-inch	42
8-inch	72
10-inch	90
12-inch	108
15-inch	126
18-inch	144
21-inch	180
24-inch	216
27-inch	252
30-inch	288

(2) In areas where ground water is known to exist, the CONTRACTOR shall install a 1/2-inch diameter capped pipe nipple, approximately 10 inches long, through the manhole wall on top of one of the sewer lines entering the manhole. This shall be done at the time the sewer line is installed. Immediately prior to the performance of the line acceptance test, the ground water level shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the pipe nipple. The hose shall be held vertically and a measurement of the height in feet of water shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.3 to establish the lbs of pressure that will be added to all readings. For example, if the height of water is 11-1/2 ft, then the added pressure will be 5 psig. This makes the 3.5 psig to be 8.5 psig, and the 2.5 psig to be 7.5 psig. The 1 lb allowable drop and the timing remains the same.

a. PVC Pipe

(1) The time requirement for the pressure to decrease from 3.5 to 3.O psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than that shown in the following table:

(inches) Pipe Size	Holding Time (seconds)	Minimum Holding Time (seconds)
4-inch	0.190xL	113
6-inch	0.427xL	170
8-inch	0.760xL	227
10-inch	1.187xL	283
12-inch	1.709xL	340
15-inch	2.671xL	425
18-inch	3.846xL	512

(2) If any section of the sewer fails to meet this requirement, the CONTRACTOR shall perform a television inspection of the faulty section and repair or replace at his own expense all defective materials and/or workmanship to the satisfaction of the ENGINEER. The test procedure shall be repeated until the results are acceptable.

C. Test for Infiltration

1. Sewer pipe over 18 inches shall be tested to measure the infiltration of ground water. If the measured leakage exceeds 100 gallons per inch diameter per mile of pipe per 24 hr period, the CONTRACTOR shall locate the points of excessive leakage and make the necessary repairs at his own expense.

2. In the event the line does not pass the infiltration test as stated above, the test shall be repeated after suitable repairs have been completed.

D. Test for Exfiltration

1. Where the ground water provides less than a 2 ft head on the sewer, an exfiltration test shall be conducted by filling the sewer with water to a 4 ft head or 4 ft above the ground water level, whichever is greater. The allowable water loss shall be 100 gal/in./mi/day as calculated above for infiltration.

2. After the sewer has been filled with water, 4 hrs time shall be allowed for water absorption by the pipe before exfiltration tests are initiated.

3. For the purpose of establishing the 4 ft test head, the head shall be measured from the center of the sewer pipe at the midpoint of the test section length. This procedure shall be used for both infiltration and exfiltration tests.

E. Test for Manhole Leakage

1. All manholes shall be tested for leakage by using plugs on inleting-outleting sewers, and filling the manholes with water to the top of the man\-hole. Four hours shall be allowed for water absorption by the manhole before testing is initiated. Allowable exfiltration for 48-inch diameter manholes shall be 2 gallons per foot of depth per day.

F. Test for Alignment

1. All sewers shall be laid accurately to the line and grade designed by the ENGINEER. The sewers will be tested for alignment by shining a light through the pipe at a manhole and viewing the light from an adjacent manhole. Any section of sewer in which a light cannot be seen from one manhole to the next shall be corrected to the satisfaction of the ENGINEER to pass this test.

G. Test for Deflection of PVC Pipe

1. PVC pipe sewers shall be installed in such a manner that the initial deflection of the conduit shall conform to the latest revision of ASTM D-3034.

2. Deflection of PVC pipe shall be tested by pulling a rigid pig or equivalent through the pipe. The pig shall be constructed in accordance with the following table of maximum outside diameters and shall be submitted to the ENGINEER for review before testing is initiated.

Pipe I.D.	Pig O.D.
6 inches	5.33 inches
8 inches	7.11 inches
10 inches	8.87 inches
12 inches	10.55 inches
15 inches	12.90 inches
18 inches	15.74 inches

3. The pig shall be drawn by hand through the pipe from manhole to manhole. Any portion of pipe through which the pig passes freely shall be deemed to have passed the deflection test. Sections of pipe through which the pig does not pass shall be located, un\-covered and the pipe zone bedding improved and backfilled by the CONTRACTOR at his own expense. The pipe shall then be retested before acceptance is granted.

H. Material Tests

1. The CONTRACTOR shall have tests of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of sewer pipe per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturer's certificate of compliance to the Specifications.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, and valves. The Contractor shall submit certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, township name, current date, certification of pipe provided and letterhead of the certifying company.

2.00 PRODUCTS

2.01 SEWER PIPE

A. Pipe for sewer 24-inch diameter and smaller shall be polyvinyl chloride (PVC). Pipe for 30-inch diameter and larger shall be PVC truss pipe. Ductile iron pipe and reinforced concrete pipe shall be used as specified by the ENGINEER.

B. Pipe for service leads 4 though 8 inches in diameter shall be polyvinyl chloride (PVC).

C. Reinforced concrete pipe shall be no less than the latest revision of ASTM C76, with the class designation as shown on the Plans or in the Prol\-posal.

D. PVC pipe 4 inches through 15 inches in diameter shall meet or exceed all of the requirements of the current ASTM D-3034 SDR-26 polyvinyl chloride sewer pipe and fittings. 18-inch diameter PVC pipe shall meet or exceed all the requirements of the current ASTM F-794 SDR 26 polyvinyl chloride sewer pipe and fittings. Samples of pipe and physical and chemical data sheets shall be submitted to the ENGINEER for review. Approval shall be obtained before pipe is purchased.

E. If the sewer pipe is greater than 15 feet deep PVC pipe shall be SDR 21.

F. Truss pipe shall meet or exceed all of the requirements of the current ASTM D2680.

G. Ductile iron pipe shall meet or exceed all the requirements of ANSI A21.50 with a cement lining.

2.02 SEWER PIPE FITTINGS

A. Fittings shall be of the same material as the pipe, and in no case shall the walls be thinner than that of the pipe furnished.

B. Wye and tee fittings for PVC pipe shall be reviewed by the ENGINEER before purchasing.

C. The dry fit of all fittings must be snug. If the fit is such that it is loose, the pipe or fitting will be rejected as faulty and of improper size.

2.03 SEWER PIPE JOINTS

A. Concrete pipe joints shall be made of a resilient material conforming to the latest revision of ASTM Designation C443. Proper lubricant shall be furnished by the joint manufacturer.

B. Concrete pipe for use with rubber joints shall be smooth and precisely formed to provide a uniform annular space for joint materials.

C. PVC pipe shall be jointed with ring gusseted bell ends. (ASTM-D3212) Jointing materials shall be applied to the bell end of the pipe at the point of manufacture in such a manner that a tight uniform joint will be achieved and such that when the joint is made up in the field, the joint material will not roll or tear from the pipe. A proper joint lubricant shall be furnished by the pipe manufacturer.

2.04 REINFORCED CONCRETE MANHOLES

A. Manholes shall conform to the current ASTM specifications for precast reinforced concrete manhole sections, serial designation C478. Manhole section joints shall conform to ASTM C990-96. Cone sections shall be straight side type, with an offset step configuration.

B. All manhole component parts shall have the name of the manufacturer stenciled on the inside. The lettering or logo shall be a minimum of 4-inches high.

C. Manholes constructed over an existing sewer line shall have a doghouse mudded to an 8-inch thick cookie. The bottom of the existing pipe shall be the channel. All other manholes shall have precast integral base sections with pre-formed concrete channels.

D. All channels shall be constructed to the full flow depth of the pipe.

2.05 MORTAR FOR MANHOLES

A. Mortar for plastering manholes shall be made of one part Portland cement and two parts fine aggregate.

2.06 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitably notched for convenient removal of the cover. Each cover shall be marked with the Pittsfield Township logo and the letters, PITTSFIELD TWP SANITARY SEWER integrally cast into the cover.

B. Covers shall be of the "self-sealing" design having a continuous gasket glued in a machined groove and a concealed pickhole. Frames and covers shall be East Jordan 1040Z, with Type AGS cover.

C. All manhole frames and covers shall be coated by the manufacturer with coal tar pitch varnish or other asphaltum coating reviewed by the ENGINEER.

2.07 MANHOLE STEPS

A. Steps shall be plastic coated steel. They shall be M.A. Industries PS1-PF or PS1-B, or approved equal.

2.08 MANHOLE CONNECTIONS

A. Sewer pipe (6-inch to 24-inch) to manhole connections shall be through: 1) a flexible rubber boot which shall be securely clamped into a core-drilled pipe port. Pipe ports shall be core-drilled at the point of manhole manufacturer and shall be accurately located within 1/2-inch of proposed sewer centerline (Kor-N-Seal); or, 2) a self-adjusting mechanical pipe to manhole seal which provides a resilient flexible and infiltration-proof joint (Res-seal); or, 3) a flexible rubber wedge firmly rammed into a rubber gasket which is cast into the manhole (Press Wedge II), or equal. All flexible pipe to manhole connections shall be installed per the manufacturers specifications.

B. Neoprene rubber for the manhole boot shall meet ASTM Specification C443 and shall have a minimum thickness of 3/8-inch. Pipe clamp bands shall be of corrosion-resistant steel.

C. Sewer pipe over 24 inches to manhole connections shall be in accordance with details shown on the Plan.

2.09 SANITARY MANHOLE ADJUSTMENTS

A. All final grade adjustment of manhole covers and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by LADTECH, INC. or approved equal. The adjustment rings shall be manufactured from polyethylene plastic as identified in ASTM Designation D 1248.

B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.

C. Each adjustment ring shall be sealed with a 3/16 to ¼ inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet ASTM specification C-990.

D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Redhead concrete anchors or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

2.10 MANHOLE DROPS

A. Manhole drop connections shall be interior drops using the drop bowl as produced by Reliner-Duran Inc. or approved equal.

B. Drop bowl model A-4" shall be used for all lines up through full 6-inch inlets. Drop bowl model A-6" shall be used for all 8-inch inlets. Drop bowl model B-6" shall be used for all 10-inch inlets. Lines larger than 10 inches shall be as directed by the ENGINEER.

C. The force line hood shall be attached on models A-4" and A-6" when the incoming line is from a force main or the slope is 3 percent or greater.

D. The drop pipe shall be secured to the manhole wall with Reliner-Duran, Inc. stainless steel adjustable clamping brackets or approved equal.

E. The drop bowl and each clamping bracket shall be attached to the manhole wall with 3/8-inch x 3 3/4-inch bolts.

F. The incoming pipe shall be trimmed such that it protrudes 2 inches into the manhole .

G. A 1-inch V shaped notch shall be cut into the bottom edge of the incoming pipe.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill above a line 12 inches above the crown of the pipe shall conform to Section 2.04, Earthwork, of these Specifications.

3.02 BEDDING

A. Reference Section 33.83a of 10 State Standards.

B. Reference Section 33.83b of 10 State Standards.

C. Ductile iron, and concrete pipes shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 3 inches for 24-inch and smaller pipe and not less than 4 inches for pipe larger than 24-inch conforming to Class B bedding as shown on the Plans. Where shown on the Plans or required by the ENGINEER, concrete encasement or concrete cradle shall be used.

D. PVC pipe shall be laid on a compacted granular material placed on the bottom of the trench to a depth of not less than 4 inches conforming to Class B bedding as shown on the Plans. Where shown on the Plans, or where the pipe passes under a road with less than 4 ft of cover, the pipes shall be encased.

E. For all pipes, compacted granular material shall be placed at the sides of the pipe and cover not less than 12 inches above the crown of the pipe.

F. "Granular Material" shall be class 2NS sand, pea gravel or crushed stone conforming to ASTM C33 Size No. 67 placed in not more than 6-inch layers and com\-pacted to not less than 95% standard density for PVC and 90% standard density for reinforced concrete.

G. Pea gravel or crushed stone used for bedding shall be separated from the sand backfill with a non-woven geotextile fabric. The fabric shall be Amoco 4551, or approved equal.

3.03 PIPE INSTALLATION

A. Installation of PVC pipe shall be in confor\-mance with ASTM D2321-89.

B. All pipe shall be laid true to the required lines and grades. All trenches when pipe laying is in progress shall be kept dry; and all pipes and fittings shall be uniformly supported on a properly trimmed bedding with holes at each joint to receive bells. All pipe shall be laid with bells uphill.

C. All joints shall be made up in accordance with the manufacturer's instructions using materials and equipment especially prepared for the type of joint to be used.

D. The grade as shown on the profiles is that of the pipe invert and that to which the work must conform. The grade shall be kept by levels, laser or other tools which shall be furnished by the CONTRACTOR at his expense. Each pipe shall be laid accurately to the line and grade as shown on the Plans and in such manner as to form a close concentric joint with the adjoining pipe and prevent sudden offsets of the invert. The interior of sewers shall, as the work progresses, be cleaned of all dirt, cement, debris and other superfluous materials of every description. Bulkheads shall be used to keep foreign materials out of the open end of the sewer when work is not in progress.

E. The location of the piping as shown on the Plans has been determined to avoid, insofar as possible, interference with trees or structures or fixtures above ground and other underground mains, services, utilities, or structures. Any change in location or alignment of piping which may be found more feasible or practicable as the work progresses shall be made by the CONTRACTOR, as the ENGINEER may direct.

F. All pipe and fittings shall be carefully lowered and moved into position in trench or vault in a controlled manner such as will prevent damage to the pipe and any coatings or lining. An excessive amount of scratching on the surface of the PVC pipe will be considered cause for rejection.

G. The trench shall be backfilled closely behind the pipe laying. Unless otherwise directed or permitted by the ENGINEER, the backfilling shall follow and be completed to the top of the trench within two pipe lengths behind pipe laying.

H. All cutting of the pipe shall be done in a neat workmanlike manner with the least amount of waste and without damage to existing or new lines. A fine tooth saw, tubing cutter or similar tool may be used to cut PVC pipe. Cuts must be square. Ragged edges shall be removed with a cutting tool or file.

I. After cutting bell and spigot or socket pipe, a stop mark shall be made with a pencil or crayon using dimensions as shown by the manufacturer's instructions or by using another pipe in the field as a guide.

J. Breaks in pipe or joints shall be repaired to the satisfaction of the ENGINEER and at the expense of the CONTRACTOR.

3.04 CONNECTIONS TO EXISTING MANHOLES AND OTHER RIGID STRUCTURES

A. When a sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be cut into the manhole.

B. If the existing manhole is of brick construction, a single rowlock of brick shall be turned over the new pipe and the existing manhole brick work shall be cleaned, pointed and given a 1/2-inch mortar coat on the outside surface.

C. For connections to existing precast reinforced concrete manholes, a hole shall be cored into the concrete manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be clamped into the cored hole and used to make the connection.

D. For connections to existing fiberglass manholes, a hole shall be cored into the manhole wall to receive the pipe. A Kor-N-Seal boot or engineer approved equal shall be installed using fiberglass reinforced pipe stubout for Kor-N-Seal boot sealing surface.

3.05 STREAM AND RIVER CROSSING

A. Whenever a pipe is required to cross a stream or river, all work shall be in accordance with the provisions of Act 346, the Inland Lakes and Streams Act of 1962, and the rules and regulations promulgated thereunder. Stream crossings and all restoration required shall be completed within five days of the construction.

B. The CONTRACTOR shall utilize such con\-struction methods as are feasible and practicable to divert or stop stream flow to lay the pipe in the dry. Pipe shall be ductile iron, mechanical joint, or compression gasket joint pipe with joints at transition to other types of sewer pipe encased with no less than 1 cu yd of concrete, placed at a minimum of 6 inches thickness around the pipe. After the sewer is properly laid, jointed and encased, the stream-channel shall be cleaned of dirt and debris resulting from the CONTRACTOR's operations.

C. After the crossing is made, heavy riprap and sodding shall be placed to protect the banks from corrosion as shown on the Plans.

PCT July 2008

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

TWP REV	BWA	DRW	11.04.27
UPDATES	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20
Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD

File Name: SS-02	BWA	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

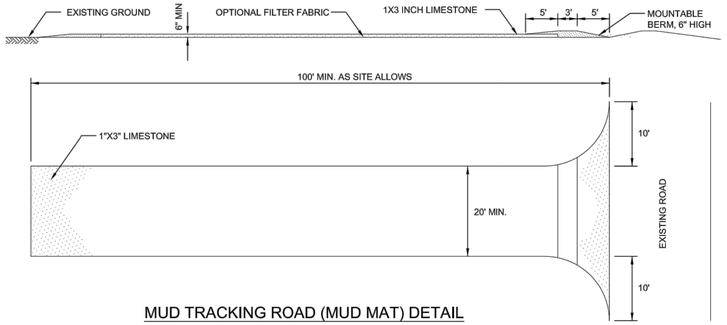
Pittsfield Township, Michigan

Title
SANITARY SEWER SPECIFICATIONS

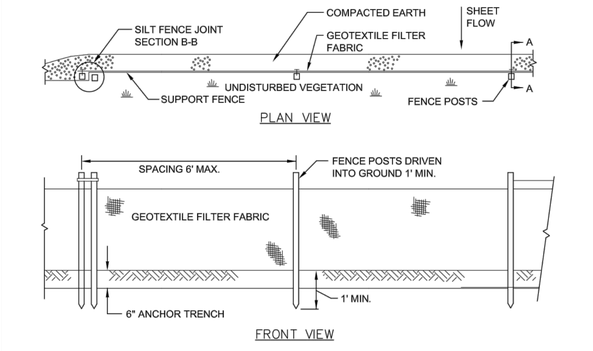
Project No.
2075001300

Scale
NOT TO SCALE

Revision

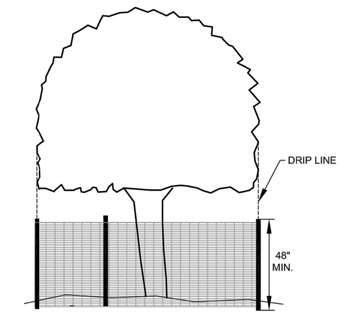


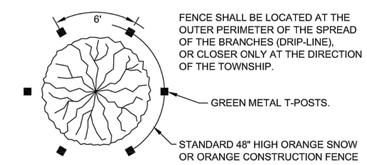
MUD TRACKING ROAD (MUD MAT) DETAIL



SILT FENCE

NOT TO SCALE





NOTES:

1. ALL TREES TO BE REMOVED WILL BE IDENTIFIED BY RED FLAGGING.
2. TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION AND GRADING IS COMPLETE.
3. ALL DEBRIS, FILL, EQUIPMENT OR MATERIAL IS TO BE KEPT CLEAR OF AREA WITHIN PROTECTIVE FENCE. NO CLEANING OF EQUIPMENT OR MATERIAL OR STORAGE OR DISPOSAL OF ANY MATERIAL WITHIN THE DRIP LINE OF ANY TREES TO BE SAVED.

TREE PROTECTION FENCE DETAIL

NOT TO SCALE

PITTSFIELD CHARTER TOWNSHIP
SOIL EROSION AND SEDIMENTATION CONTROL NOTES

GENERAL

1. The contractor shall implement and maintain the soil erosion control measures as shown on the plans at all times during construction on this project. Any modifications or additions to the soil erosion control measures due to construction or changed conditions, shall be complied with as required or directed by the owner, project engineer or Pittsfield Township.
2. All soil erosion and sedimentation control work shall conform to the permit requirements of Pittsfield Township and the laws of the State of Michigan.
3. A NPDES construction activity permit is required for all sites greater than 5 acres.
4. Daily inspections shall be made by the contractor. Periodic inspections may be made by the owner/project engineer/Township to determine the effectiveness of erosion and sedimentation control measures. Any necessary corrections shall be made without delay.
5. Erosion and sedimentation from work on the site shall be contained on the site and not be allowed to collect on any off-site areas or in waterways.
6. All mud/dirt tracked onto roads from the site due to construction, shall be promptly removed by the contractor.
7. Restoration of all disturbed areas, including placement of topsoil, seed, fertilizer and mulch and/or sod shall be done within 5 days of the completion of final grade.
8. Construction operations shall be scheduled and performed so that preventative soil erosion control measures are in place prior to excavation in critical areas and temporary stabilization measures are in place immediately following backfilling operations.
9. Special precautions will be taken in the use of construction equipment to prevent situations that promote erosion.
10. Proper dust control shall be maintained during construction by use of water trucks and/or chloride as required.
11. The contractor shall be responsible for maintaining all temporary soil erosion control measures and removal of some upon authorized completion of project. Completion of project will not be authorized until all site work, home building, road work and utility construction is complete and all soils are stabilized.
12. The contractor shall not grade in existing wetland or conservation areas to be protected. Silt fence shall be installed and maintained adjacent to existing wetland and conservation areas to prevent grading, erosion and sedimentation into them.
13. Tree protection fencing must remain intact until restoration of the site is complete.

SEQUENCE OF CONSTRUCTION

1. Install sediment fence and tree protection fencing prior to any grading operation.
2. Install mud-tracking pad.
3. Construct temporary sediment/detention basin.
4. Place topsoil, fertilizer, seed and mulch over the entire detention basin area.
5. Rough grade site, stockpile topsoil and begin building construction.
6. Install storm drainage system including riprap and parking lot inlet filters and detention basin standpipe.
7. Maintain erosion and sedimentation control measures, as required.
8. Install sanitary sewer and water systems.
9. Bring pavement areas to sub-base grade, place sub-base and bituminous pavement.
10. Install franchised utilities.
11. Finish grade, redistribute topsoil, seed and mulch all disturbed areas.
12. Remove any accumulated sediment within the detention basin and replace clean washed stone around standpipe.
13. Complete construction of site.
14. Insure all soil is stabilized. Remove all temporary soil erosion control measures.

SEEDING/SOD

1. Seed or sod in accordance with project specifications.
2. All areas of disturbed earth that are not to be paved or sodded shall have 4 inches of topsoil, seed, fertilizer and mulch.
3. Immediately after seeding, mulch all seeded areas with unweathered small grain straw (preferably wheat) or hay spread. Spread uniformly at the rate of 1 ½ to 2 tons or 100 pounds (2 to 3 bales) per 1,000 square foot. This mulch should be anchored with a disc-type mulch-anchoring tool.
4. Any disturbed area not paved, seeded or mulched, sodded or built upon by November 15, is to be mulched in the manner as specified above, in order to provide soil erosion protection during the winter and early spring.
5. All erosion and sedimentation control prevention procedures and structures are to comply with the Standards and Specifications for soil erosion and sediment control of the Washtenaw County Soil Conservation District.
6. Drainage ditches and slopes steeper than 1:4 (25%) shall be stabilized with erosion control blankets.
7. Steep slopes that do not take upon initial seeding must be re-seeded and stabilized with erosion control blankets.
8. Where excavation has been through lawn areas, the CONTRACTOR shall restore the disturbed area by placing topsoil and seeding or sodding over the final backfill material.

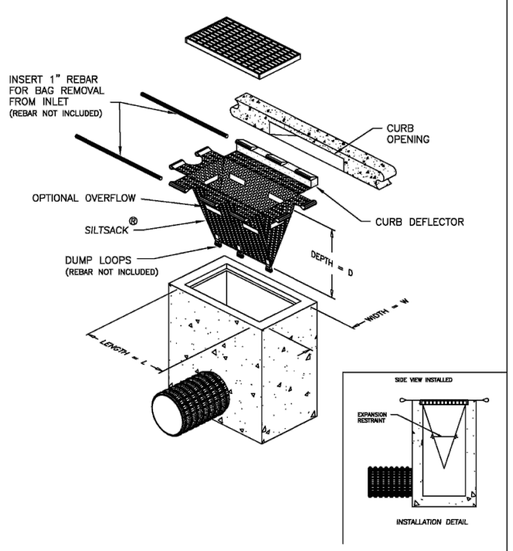
CATCH BASIN/MANHOLE PROTECTION

1. Protect storm sewer catch basins with Siltsack. or approved equivalent as follows:

ROADS

1. During construction, all roads shall be protected from unvegetated areas washing onto road surfaces by placement of silt fence behind curb or a 10 foot wide straw mulch bank behind the curb or other approved method and/or as shown on the plans.
2. During construction of any portion of the project, roads shall be maintained free of dirt, silt and construction debris.

Pittsfield SEC 9/22/2009



DETAIL OF INLET SEDIMENT CONTROL DEVICE
TYPE B – WITH CURB DEFLECTOR

ACF Environmental
Your Complete Source for Geosynthetic Solutions

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2831 Cardwell Rd.
Richmond, Virginia 23234
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SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK®
(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH	ASTM D-4632		300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632		20 %
PUNCTURE	ASTM D-4833		120 LBS
MULLEN BURST	ASTM D-3786		800 PSI
TRAPEZOID TEAR	ASTM D-4533		120 LBS
UV RESISTANCE	ASTM D-4355		80 %
APPARENT OPENING SIZE	ASTM D-4751		40 US SIEVE
FLOW RATE	ASTM D-4491		40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491		0.55 SEC -1

* HI-FLOW SILTSACK®
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH	ASTM D-4632		265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632		20 %
PUNCTURE	ASTM D-4833		135 LBS
MULLEN BURST	ASTM D-3786		420 PSI
TRAPEZOID TEAR	ASTM D-4533		45 LBS
UV RESISTANCE	ASTM D-4355		90 %
APPARENT OPENING SIZE	ASTM D-4751		20 US SIEVE
FLOW RATE	ASTM D-4491		200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491		1.5 SEC -1

OIL-ABSORBANT SILTSACK®
(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK® CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK® WITH A WOVEN PILLOW INSERT.

SILTSACK DISTRIBUTORS:
PRICE & COMPANY
(www.priceandcompany.com)

METRO GRAND RAPIDS, MI
425 36TH STREET SW
WYOMING, MI 49548-2108
1-800-248-8230

METRO DETROIT, MI
29165 WALL STREET
WIXOM, MI 48393-3525
1-866-960-4300

(* HI-FLOW SILT SACK SHALL BE USED FOR ALL APPLICATIONS WITHIN PITTSFIELD TOWNSHIP)

SILTSACK

NOT TO SCALE

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108-9721
48108-9721
Tel. 734.822.3101
www.pittsfield-mi.gov

Revision	By	Appd.	YY.MM.DD
SILTSACK	BWA	DRW	12.01.03
TWP REV	BWA	DRW	11.04.27
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: SE-01	TTN	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

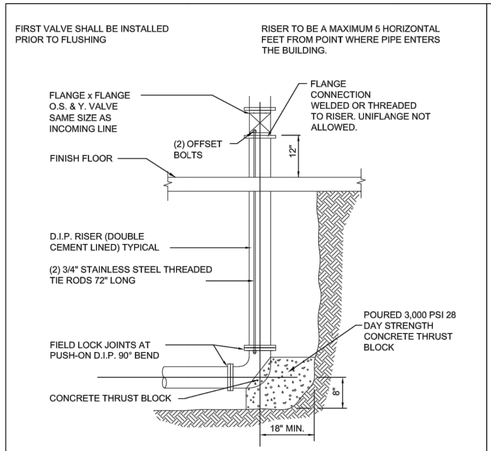
Pittsfield Township, Michigan

Title
SOIL EROSION DETAILS AND NOTES

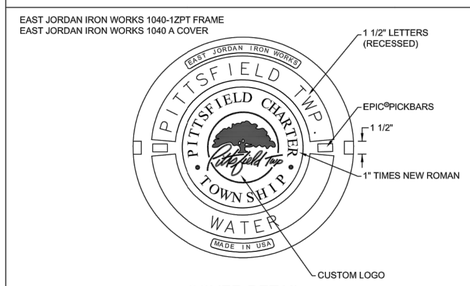
Project No. 2075001300

Scale **NOT TO SCALE**

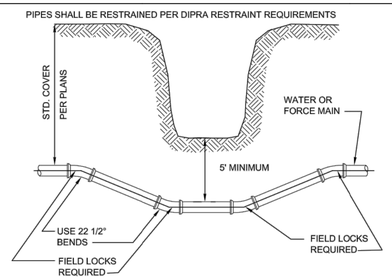
Revision



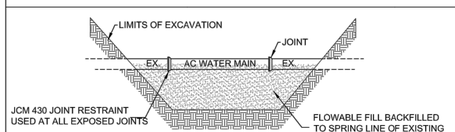
FIRE PROTECTION RISER DETAIL



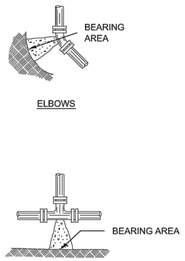
COVER DETAIL



DITCH & STREAM CROSSING



ASBESTOS CEMENT (AC) WATER MAIN



ELBOWS					
PIPE DIA. INCHES		BEARING AREA SQUARE FEET			
		90°	45°	22 1/2°	11 1/4°
4		2.1	1.1	0.6	0.3
6		4.1	2.2	1.1	0.6
8		6.8	3.7	1.9	0.9
10		10.1	5.5	2.8	1.4
12		14.1	7.6	3.9	2.0
16		24.2	13.0	6.7	3.3
18		30.0	16.3	8.3	4.2
20		36.8	19.9	10.1	5.1

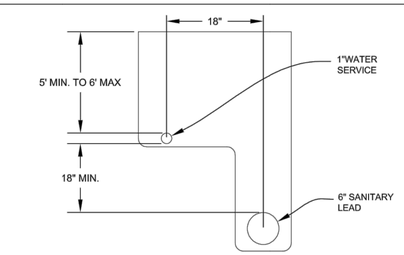
TEES, CROSSES & HYDRANTS		
PIPE DIA. INCHES		BEARING AREA SQUARE FEET
4		1.5
6		2.9
8		4.8
10		7.1
12		10.0
16		17.1
18		21.0
20		26.0

NOTES:
1. CONCRETE FOR ALL THRUST BLOCKS SHALL BE 3000 PSI, 28 DAY STRENGTH MIN.
2. ALL THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH
3. BOLTS, FITTINGS & JOINTS SHALL BE KEPT CLEAR OF CONCRETE
4. A BEARING CAPACITY OF 2000# PER FOOT WAS USED IN DETERMINING THE MINIMUM "BEARING AREAS" IN THE ABOVE TABLE
5. THE CROSS SECTION OF THE THRUST BLOCKS SHALL BE SQUARE
6. IN ADDITION TO THRUST BLOCKS, ALL PIPE JOINTS SHALL BE RESTRAINED WITH LOCKING GASKETS PER DIPRA'S STANDARDS.

SOIL CHARACTERISTICS	FACTOR
(A) LOOSE COARSE OR MEDIUM SAND; COMPACT FINE SAND; COMPACT SAND-CLAY SOILS; STIFF CLAY	0.33
(B) FIRM FINE SAND; COMPACT INORGANIC SILT; FIRM SAND-CLAY SOILS; MEDIUM CLAY	0.50
(C) LOOSE FINE SAND; FIRM INORGANIC SILT	0.67
(D) LOOSE SAND-CLAY SOILS; LOOSE INORGANIC SILT SOFT CLAY	1.00

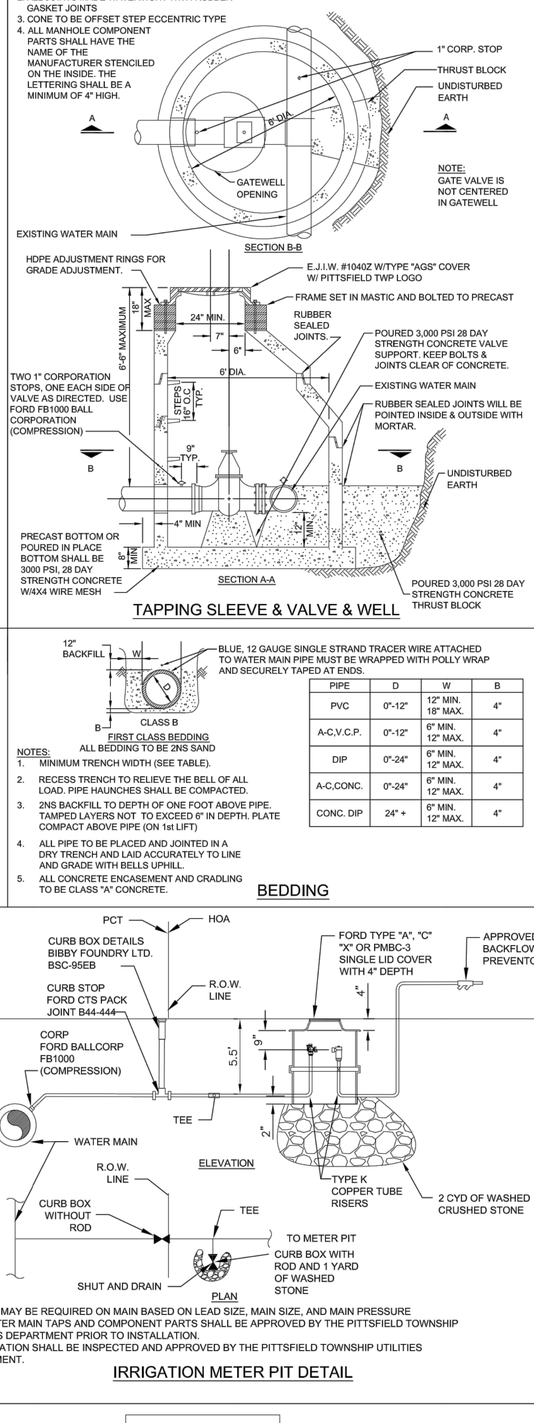
"BEARING AREA" x FACTOR = ACTUAL BEARING AREA
2.1 x .5 = 1.05 SQ. FT.
BASED UPON 150# TEST PRESSURE

THRUST BLOCK



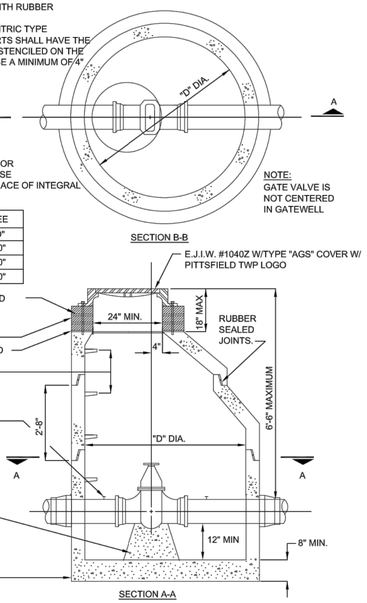
TYPICAL L TRENCH DETAIL HOUSE LEADS

PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



TAPPING SLEEVE & VALVE & WELL

PRE-CAST CONCRETE MANHOLE
1. SECTIONS SHALL MEET ASTM C478.
2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
5. PROVIDE INTEGRAL BASE.
6. KOR-N-SEAL BOOTS OR APPROVED EQUAL TO BE INSTALLED AT PIPE PENETRATIONS.
7. WHERE GATE WELLS ARE CONSTRUCTED OVER EXISTING WATERMAIN, POURED IN PLACE OR PRECAST COOKIE AND DOGHOUSE STRUCTURES MY BE USED IN PLACE OF INTEGRAL BASE.



STRAIGHT THRU		TEE
VALVE SIZE	"D"	"D"
8"	5'-0"	6'-0"
12"	5'-0"	6'-0"
16"	6'-0"	6'-0"

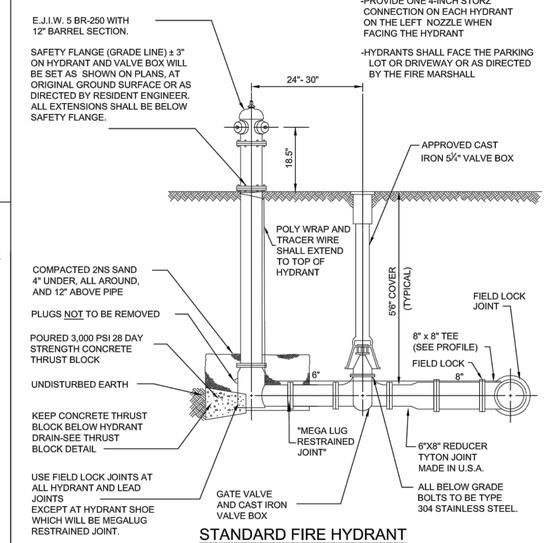
STANDARD GATE VALVE & WELL

NOTES:
1. MINIMUM TRENCH WIDTH (SEE TABLE).
2. RECESS TRENCH TO RELIEVE THE BELL OF ALL LOAD. PIPE HAUNCHES SHALL BE COMPACTED.
3. 2NS BACKFILL TO DEPTH OF ONE FOOT ABOVE PIPE. TAMPED LAYERS NOT TO EXCEED 6" IN DEPTH. PLATE COMPACT ABOVE PIPE (ON 1st LIFT)
4. ALL PIPE TO BE PLACED AND JOINTED IN A DRY TRENCH AND LAID ACCURATELY TO LINE AND GRADE WITH BELLS UPHILL.
5. ALL CONCRETE ENCASEMENT AND CRADLING TO BE CLASS "A" CONCRETE.

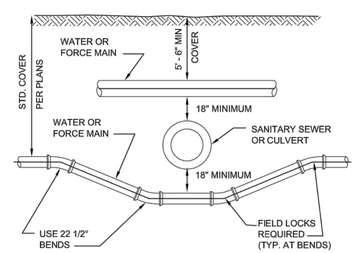
PIPE	D	W	B
PVC	0"-12"	12" MIN. 18" MAX.	4"
A-C,V.C.P.	0"-12"	6" MIN. 12" MAX.	4"
DIP	0"-24"	6" MIN. 12" MAX.	4"
A-C,CONC.	0"-24"	6" MIN. 12" MAX.	4"
CONC. DIP	24" +	6" MIN. 12" MAX.	4"

BEDDING

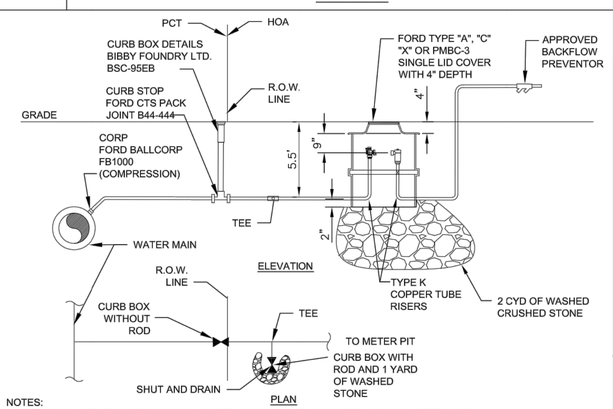
NOTES:
-PROVIDE ONE 4-INCH STORZ CONNECTION ON EACH HYDRANT ON THE LEFT NOZZLE WHEN FACING THE HYDRANT
-HYDRANTS SHALL FACE THE PARKING LOT OR DRIVEWAY OR AS DIRECTED BY THE FIRE MARSHALL



STANDARD FIRE HYDRANT

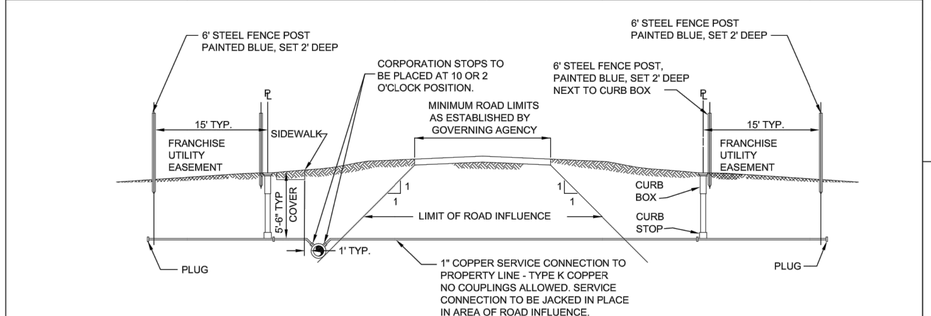


SEWER OR CULVERT CROSSING

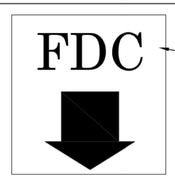


NOTES:
1. SADDLE MAY BE REQUIRED ON MAIN BASED ON LEAD SIZE, MAIN SIZE, AND MAIN PRESSURE
2. ALL WATER MAIN TAPS AND COMPONENT PARTS SHALL BE APPROVED BY THE PITTSFIELD TOWNSHIP UTILITIES DEPARTMENT PRIOR TO INSTALLATION.
3. INSTALLATION SHALL BE INSPECTED AND APPROVED BY THE PITTSFIELD TOWNSHIP UTILITIES DEPARTMENT.

IRRIGATION METER PIT DETAIL

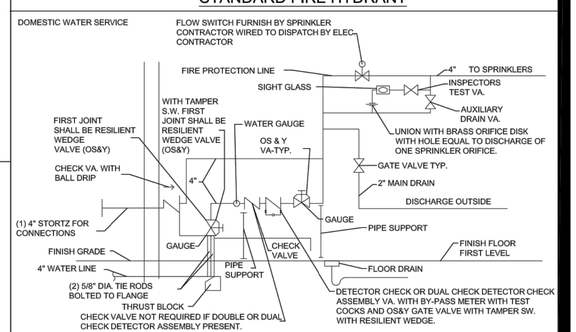


WATER MAIN CONNECTION



RED "REFLECTIVE" LETTERS WITH WHITE "REFLECTIVE" BACKGROUND. LETTERS WILL BE A MINIMUM OF 8" TALL BY 4" WIDE WITH 2" GIRTH, WITH AN 8" TALL 4" WIDE RED ARROW UNDER LETTERS POINTING DIRECTLY AT THE CONNECTION. TALLER BUILDINGS MAY REQUIRE LARGER LETTERING. SIGN SIZE AND LOCATION DETERMINED BY FIRE MARSHALL

FIRE DEPARTMENT CONNECTION LABEL DETAIL



METER ROOM DETAIL

Pittsfield Charter Township
6201 W. Michigan Ave.
Ann Arbor, MI 48108–9721
48108–9721
Tel. 734.822.3101
www.pittsfield–mi.gov

Revision	By	Appd.	YY.MM.DD
UPDATES	MRH	DRW	14.01.24
FDC UPDATE	BWA	DRW	11.09.13
TWP REV	BWA	DRW	11.04.27
HYDRANT, MANHOLE UPDATE	BWA	DRW	10.10.25
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD
File Name: W–01	BWA	DRW	07.10.01
	Dwn.	Chkd.	Dsgn. YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
WATER MAIN DETAILS

Project No. 2075001300

Scale NOT TO SCALE

Revision

1.00 GENERAL

1.01 DESCRIPTION

A. The CONTRACTOR shall furnish all labor, materials, and equipment required to construct a water main and necessary appurtenant work as herein specified. The water main shall be installed in the locations as shown on the Plans and shall meet all acceptance tests.

1.02 NOTIFICATION

A. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department at (734) 882-2110, 24 hours prior to flushing or chlorination of the water main.

B. CONTRACTOR shall schedule bacteriological testing with the ENGINEER 48 hours prior.

C. CONTRACTOR shall notify the ENGINEER and the Pittsfield Township Utilities Department 48 hours prior to connecting to an existing water main.

1.03 SUBMITTALS

A. The CONTRACTOR shall submit shop drawings or data sheets for all pipe, manholes, manhole castings, pipe to manhole connections, valves, hydrants and the B-1 Poly Pig. The Contractor shall submit a certification letter for all pipe proposed on the project. The letters shall contain the following: Contractor name, project name, Township name, current date, certification of pipe provided and letterhead of the certifying company.

1.04 TESTING

A. General

1. CONTRACTOR shall furnish all equipment and personnel to conduct system acceptance tests as specified herein. All tests shall be conducted under the supervision of the ENGINEER. All water mains, branches and valves shall be subject to cleaning with a poly-pig, hydrostatic pressure testing, disinfection and bacteriological testing. No acceptance tests shall be conducted until the water main has been installed and backfilled for not less than 30 days. A copy of all test results shall be furnished to the ENGINEER.

2. Hydrostatic pressure testing must be performed in accordance with ANSI/AWWA C600. Disinfection and bacteriological testing must be performed in accordance with ANSI/AWWA C651.

3. CONTRACTOR shall furnish all material and labor to provide for an acceptable full size blow-off to flush the poly-pigs out of the main at the far end of the project not connected to the existing system.

4. Should the results of any test fail to meet the criteria established in this Specification, the CONTRACTOR shall, at his own expense, locate and repair the rejected section and retest until it is within the specified allowance.

5. Only Pittsfield Township personnel or the CONTRACTOR under direct supervision of Pittsfield Township personnel may fill or flush lines.

B. Preparation

1. After the pipe has been laid and backfilled as specified, the CONTRACTOR shall fill the line, or a valve section thereof, to be tested with water in such a manner as to expel all air from the pipe. This may be done through fire hydrants at the high points; or, if no hydrant is available at such point, the CONTRACTOR shall make the taps necessary to accomplish the expulsion of all air. At the close of the test, all taps shall be satisfactorily plugged with brass plugs.

C. Sequence

1. All water mains connected to an existing water system shall be flushed, swabbed, chlorinated and bacteriological tested prior to pressure testing. The sequence for acceptance testing shall be:

   a. Flushing with approved B-1 Poly-Pig
   b. Chlorination
   c. Flushing
   d. Bacteriological Testing
   e. Pressure Testing

2. Where mains can be totally isolated from the existing water system with airgaps, pressure testing shall precede chlorination and bacteriological testing. The sequence for acceptance testing shall be:

   a. Pressure Testing
   b. Connect to System
   c. Flushing with approved B-1 Poly Pig
   d. Chlorination
   e. Flushing
   f. Bacteriological Testing

3. If a hydrostatic pressure test fails, the chlorination and flushing process must be repeated after repairs to the system are completed.

D. Flushing

1. All flushing will be conducted by the TOWNSHIP with clean potable water until the water runs clear.

E. Chlorination

1. All new mains and pipe or any existing mains contaminated by the CONTRACTOR shall be chlorinated to a minimum residual chlorine concentration of fifty (50) parts per million with commercial liquid chlorine solution or approved equal. The chlorinated water shall be allowed to stand in the mains for 24 hours. The end of the 24-hour period the chlorinated water at all parts of the mains shall show a free available chlorine residual of not less than twenty-five (25) parts per million. If less than twenty-five (25) parts per million residual is shown at the end of the first 24 hours period, additional chlorine shall be added until a residual of not less than twenty-five (25) parts per million at all parts of the system is shown after a subsequent 24 hour period. The chlorinated water shall then be removed from the mains and the mains flushed with potable water for bacteriological testing. No flushing shall take place between the two required bacteriological testing.

F. Bacteriological Testing

1. The Pittsfield Township Utilities Department will take bacteriological samples of the water in the mains for analysis at two different times. The first samples will be taken 24 hours after the mains have been satisfactorily chlorinated, flushed and filled with potable water. The second sample will be taken 24 hours later. Each sample will be incubated for 48 hours. No flushing shall be done during or between tests, unless supervised and approved by ENGINEER. Two sets of safe consecutive bacteriological samples, collected at least 24 hours apart, must be obtained before placing the water main in service.

2. The CONTRACTOR shall provide a sufficient number of corporation cocks and copper tubing for taking samples. Samples shall not be collected from hoses or fire hydrants.

3. Bacteriological testing must begin on Mondays to allow Pittsfield Township personnel and the testing laboratory a full work week to conduct the testing.

G. Hydrostatic Pressure Testing

1. The CONTRACTOR shall pressure test sections of water main as sections of 2,000 feet or less unless otherwise authorized by the ENGINEER. When permitted to test lengths in excess of 2,000 feet, only the allowable leakage for 2,000 feet will be permitted.

2. All water mains shall be subjected to a hydrostatic pressure of 150 psi based on the elevation of the lowest point in the system. The main shall be maintained under the test pressure for a minimum continuous period of two (2) hours by pumping potable water into the line at frequent intervals. The volume of water so added shall be measured and considered to represent the leakage from the main. No pipeline installed will be accepted until the leakage measured is less than 0.092 gallons per inch diameter of the pipe per 1 hour per 1,000 feet.

3. In the event that the leakage exceeds the specified amount, the main shall be carefully inspected for leaks and repaired as necessary. Any cracked or defective pipe, fittings, valves or hydrants discovered shall be removed and replaced with sound material and the test repeated to the satisfaction of the ENGINEER.

4. If the CONTRACTOR chooses to pressure test against an existing valve he assumes the responsibility of meeting the leakage requirements. The CONTRACTOR may at his discretion provide a physical break and cutting in sleeve for pressure testing.

5. Temporary connections (jumpers) between existing water mains and the newly constructed system for testing purposes, shall include a reduced zone backflow preventer to prevent backflow and possible contamination of the public water.

H. Material Tests

1. The CONTRACTOR shall have test of pipe and strength made by an independent testing laboratory. Tests of up to 4 lengths of water main per hundred lengths may be required to show compliance with the Specifications. All pipe delivered to the job site shall be accompanied with a manufacturers certificate of compliance to the specifications.

2.00 PRODUCTS

A. All products shall be consistent with the current component part submittal sheet posted on the Township website.

2.01 PIPE AND FITTINGS

A. Ductile-iron pipe water main shall meet all the requirements of the latest revision of ANSI/AWWA C151/A21.51. Pipe shall be furnished in eighteen-foot or twenty-foot lengths, unless otherwise required. All joints, to include joints for fittings, valves and hydrants, must be of the push on joint type and compatible tyton joint gaskets. Ductile iron pipe must be designed in accordance with the latest revision of ANSI/AWWA C150/A21.50 to meet requirements for Pressure Class 350.

B. Ductile iron pipe and fittings shall be double-cement lined with an approved bituminous seal coat in accordance with ANSI/AWWA C104/A21.4.

C. Ductile iron fittings shall meet all the requirements of the latest revision of ANSI/AWWA C110/A21.10 for full body fittings and ANSI/AWWA C153/A21.53 for compact fittings for a minimum working pressure of 250 psi and be of the push-on joint type. Plugs, where shown on the plans, shall be solid mechanical joint plug type.

D. Restrained mechanical joints of the wedge action type shall use a follower gland and shall include a restraining mechanism which, when activated, impart multiple wedging action against the pipe, increasing its resistance as the pressure increases. Twist off nuts shall be used to insure proper actuating of the restraining device. Restrained mechanical joints for ductile iron pipe shall be Megalug, Series 1100, or approved equal. Mechanical joints shall be in conformity with the requirements of the latest revision of the ANSI AWWA C111/A21.11. Bolts and nuts must be type 304 stainless steel.

E. Push-on joints shall meet all requirements of ANSI/AWWA C111/A21.11. Push-on joints shall consist of a ductile-iron bell provided with a recess to receive a circular molder rubber gasket to effect the joint seal. A rubber gasket and sufficient lubricant to assemble the joint shall be furnished with each joint. The lubricant shall have no deleterious effect upon the color, taste or odor of potable water and shall not be corrosive to either the pipe or gasket. Pipe furnished with push-on type joints shall be equal in strength and leak tightness to pipe furnished with mechanical joints as specified when installed under identical conditions, and shall meet all other requirements of these specifications. In addition to the above requirements, the gasket and lubricant shall conform to the latest revision of ANSI/AWWA C111/A21.11. When it is necessary to utilize a locking mechanism for a push-on joint upstream or downstream of a restrained mechanical joint, field-lok gaskets or equal shall be utilized and shall be used in conformance with DIPRA Standards for restraint distance from a restrained mechanical joint fitting.

F. All pipe and fittings shall be manufactured in the United States of America.

G. The ENGINEER shall witness the delivery and unloading of all pipe and collect the appropriate manufacturer's certificate of compliance per Section 1.04 of this Specification.

2.02 VALVES

A. All valves installed under this Specification shall conform to the applicable requirements of ANSI/AWWA C500, C504 and C509 standards governing construction materials and workmanship. Each valve shall carry the name or trademark of the manufacturer. All valves shall have operating nuts that turn to the right (clockwise) to open.

B. Resilient-Seated Gate Valves

1. Resilient seated gate valves shall conform to the applicable requirements of ANSI/AWWA C515. Valves shall have a minimum working pressure of 250 psi. The gate shall be ductile iron encased in a bonded synthetic rubber to form resilient seating surfaces. Stem shall be bronze with a non-rising design and double o-ring packing. Joints shall be push-on type.

2. Resilient Seated Gate Valves shall be manufactured by American Flow Control or Clow.

C. Tapping Sleeves and Valves

1. Tapping sleeves shall be full length of heavy-duty stainless steel construction designed for use with the type of pipe to be tapped. Tapping sleeve flange and body shall be type 304 stainless steel. Bolts and nuts shall be 304 stainless steel. Gasket shall be full circumferential SBR compounded for water service. Tapping sleeve shall contain a test plug to assure seal prior to tapping. Tapping sleeve shall be JCM Industries 432; Romac Industries SST, Ford FAST, Powerseal 3490AS; Dresser 630 or equal.

2. Tapping valves shall meet the specifications for gate valves except that the valve shall have a flange compatible with the tapping sleeve.

3. The tapping sleeves and valves shall be subjected to a hydrostatic pressure of 200 psi. The sleeves and valves shall be maintained under pressure for a minimum continuous period of 5 minutes by pumping potable water into the sleeve. Upon any visual leakage observed by the ENGINEER, the tapping sleeve and valve shall be removed and replaced, and the test repeated at the CONTRACTOR's expense to the satisfaction of the ENGINEER.

D. Corporation Stops

1. Corporation stops used for insertion into mains shall be ball valve type. All stops shall have no lead brass bodies, keys, stem washers and nuts. Inlet threads shall conform to the latest revision of AWWA C800. The outlet connection shall be of the compression type to receive copper service pipe.

E. Valve Boxes

1. Valves boxes shall be 5-1/4-inch and be of cast-iron construction. They shall be of three-piece, screw-type adjustment design. All valve boxes shall be installed flush with the top of the proposed site grade. Cover shall be designed to be removed easily to provide access to the valve. The base shall not rest upon the valve assembly. Valve boxes shall be Tyler 6860 Item DD with number 6 base, or equal.

F. Valve Extensions

1. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem. The length of the extension stem shall reach within 6.5 feet of the ground surface. Details of the extension system and method of installation shall be approved by the ENGINEER prior to installation.

G. Post Indicators and Valves

1. Post indicators, when specified, shall be American Flow Control series A240 or Clow series 2945A with aluminum plates indicating OPEN and SHUT. Post indicators shall open left.

2. Post indicator valves shall be American Flow Control Model 2500 or Clow model F-6120. All valves shall open left.

3. Post indicators and their corresponding valves must be made by the same manufacturer.

4. Bollards must be placed to protect post indicators, except as specified by the ENGINEER.

5. Bollards shall be 4-inch diameter galvanized schedule 40 steel posts 36 to 48 inches high with minimum depth of 24 inches. The posts shall be set in and filled with 3000 psi concrete. Bollards protecting hydrants and PIVs shall be painted red.

2.03 GATEWELLS

A. Gatewells shall conform to the latest revision of ASTM C478 for Precast Reinforced Concrete Manhole Sections. Section joints shall be rubber gasketed and shall conform to ASTM C990. Cone sections shall be eccentric, with an offset step configuration.

B. All gatewell components shall have the name of the manufacturer stenciled on the inside. The lettering shall be a minimum of 4-inches high.

C. Gatewells constructed over an existing water main shall have a doghouse mudded to an 8-inch thick cookie. All other gatewells shall have precast integral base sections.

D. Mortar for masonry or plastering outside of gatewells shall be made of one part of Portland Cement to two parts fine aggregate. Mortar materials and mixing shall correspond, in general, to those for concrete. All openings in gate wells shall be closed with brick and mortar in a manner that will make them watertight.

E. Gatewell steps shall be reinforced polypropylene coated steel. They shall be M.A. Industries models PS1-PF or PS1-B, or approved equal.

2.04 GATEWELL FRAMES AND COVERS

A. Gatewell frames and covers shall weigh not less than 350 lbs. Each frame and cover shall have machined bearing surfaces and shall be suitable notched for convenient removal of the cover.

B. Frames and covers shall be East Jordan Iron Works Model 1040Z frame with 1040 A cover. Each cover shall have the Pittsfield Township logo and the letters "PITTSFIELD TWP WATER" cast integrally into the cover.

C. All frames and covers shall be coated at the place of manufacturer with coal tar pitch varnish or other asphaltum coating approved by the ENGINEER.

2.05 GATEWELL CONNECTIONS

A. Water pipe to gate well connections shall be through a watertight flexible pipe-to-manhole connector, which shall be securely clamped into a core-drilled port. Pipe ports shall be core-drilled at the point of manufacturer and shall be accurately located within 1/2-inch of the proposed water main centerline. Flexible pipe-to-manhole connectors shall meet the requirements of ASTM C923 and shall be NPC, Kor-N-Seal, or equal.

B. All non-rubber components including wedges, bands and pipe clamps shall be stainless steel.

2.06 GATEWELL ADJUSTMENTS

A. All final grade adjustment of gatewell cover and frame assemblies shall be completed utilizing injection molded High Density Polyethylene (HDPE) adjustment rings as manufactured by Ladtech, Inc., or approved equal. The adjustment rings shall be manufactured from polyethylene plastic meeting the requirements of ASTM D4976. Brick adjustments are not acceptable.

B. All adjustment for matching road grade shall be made utilizing a molded indexed slope ring.

C. Each adjustment ring shall be sealed with a 3/16 to 1/4-inch bead of butyl rubber sealant per the manufacturer's instructions. Sealant shall meet the requirements of ASTM C990.

D. All castings and adjustment rings shall be securely fastened to the cone of the structure with four 3/8-inch threaded rods. The rods shall be galvanized or stainless steel anchored to the structure with Redhead Trubolt concrete anchors, or equal. Stainless steel or galvanized nuts and washers shall be used to attach the casting.

E. When the depth of the gate well requires an adjustment greater than the maximum allowed, the CONTRACTOR shall provide additional pre-cast gate well barrel sections required to maintain acceptable chimney heights.

2.07 HYDRANTS

A. Fire hydrants shall comply with the latest revision of ANSI/AWWA C502. Hydrants shall be compression type to open with the pressure. They shall have a 5-1/4" valve opening and 6" mechanical joint inlet. Hydrants shall have two 3-1/2" (4.05" O.D.) pumper connections with National Standard 7-1/2 threads per inch. All hydrants shall have City of Ann Arbor standard thread pattern.

B. Fire hydrants shall have an inside barrel dimension of not less than 7.375" I.D. from top to bottom. The 1-1/8" pentagon operating nut shall open left (counter clockwise).

C. All nozzles shall be on a removable head with a flange so that they may be rotated by changing the position of the flange.

D. Hydrant shall be fully bronze mounted, including top of the operating stem where it passes through the double o-ring seal in the bronze packing gland. The forged operating stem in the base and the valve seat shall also be of bronze. The molded valve shall be of composition rubber and the cast iron valve clamps shall be packed with o-ring seals and held tight to the stem by a threaded bronze hex retainer ring and threaded bronze locknut, anchored with set screws.

E. Hydrant shall be designed for 150 psi working pressure and tested to 300 psi. Those portions of the hydrant above grade shall have two coats of red enamel. All unpainted surfaces shall have two coats of coal tar pitch varnish.

F. The hydrants shall be EJIW WaterMaster 5BR-250 with mechanical joint connections and break flange barrel with standard head.

G. Hydrant bolts located below grade shall be type 304 stainless steel

H. All hydrants shall have a 4" Harrington Integral Hydra-Storz (HIHS) adaptor. The HIHS shall meet the requirements of AWWA C502 regarding material and pressure testing. Stortz nozzle shall have a brass metal face and hard anodized ramps and lugs. The aluminum finish shall be hardcoat anodized to Mil-A-8625f, type 3 dark gray. The adapter shall be made from forged or extruded 6061-T6 aluminum.

I. The blind cap shall have hard anodized aluminum Storz ramps and lugs, made of forged or extruded 6061-T6 aluminum. the cap shall be equipped with suction seal. The cap shall be connected to the adapter or the hydrant with 0.125 vinyl coated aircraft cable.

J. Fire hydrant extensions shall be manufactured by the hydrant manufacturer for use with the model hydrant being installed.

K. Hydrants adjacent to truck routes on commercial developments shall be protected by bollards.

2.08 SERVICE LEADS

A. Pipe for service leads 1-inch to 2-inch shall be soft annealed Type K copper. Service leads 4-inch to 8-inch shall be Pressure Class 350 Ductile Iron, Double cement lined.

B. Curb Stops

1. Curb stops used for service connections shall be ball valve type. All parts shall be no lead brass. Both the inlet and outlet connections shall be of the compression type to receive copper service pipe. Curb stops shall be consistent with the most current shop drawing checklist posted on the Township website.

C. Curb Boxes

1. Curb boxes shall be the Bibby Screw Style V010 with S169 top, V201 bottom, V223 extention, and V240 water cover . All curb boxes shall be coated inside and out with a tar base enamel. The minimum bury shall be 5'-0" (60") and the maximum 6' (72"). Curb boxes shall be consistent with the most current shop drawing checklist posted on the Township website.

D. Couplings

1. Couplings used for service connections shall be located outside the pavement and more than 10 feet from any building wherever possible. They shall have a three part union, and both connections shall be of the compression type to receive copper service pipe. All parts shall be no lead brass..

2. All service connections between two copper service pipes (two-inch or less in diameter) located under the pavement or within 10 feet of a building shall be connected using wrought copper, solder-sweat type couplings conforming to ASME B16.18 or ASME B16.22. Fittings shall bear made in USA labels. Joining of copper piping shall be a solder-sweat connection using lead free Silfos. The use of 95-5, Tin-Antimony or equivalent solders will not be allowed.

2.09 TRACER WIRE

A. Tracer wire to be used on open cut pipe shall be AWG #12 single strand copper with blue 30 mil HDPE insulation. Connections shall be made using 3M DBR-6 wire connectors, or equal.

2.10 POLYETHYLENE ENCASEMENT

A. All ductile iron pipe and fittings must be polyethylene encased. In addition, the initial 24-inches of copper service lead must be encased from the corporation stop. Polyethylene encasement must be manufactured in accordance with the requirements of the latest revision of ANSI/AWWA C105/A21.5.

B. Polyethylene Encasement shall be black linear low-density polyethylene with a minimum thickness of 8 mils.

C. The wrap shall overlap the joint by 12 inches to either side and be secured to the pipe with polyethylene adhesive tape.

3.00 EXECUTION

3.01 EXCAVATION AND BACKFILL

A. All excavation and backfill shall conform to the Earthwork specification.

3.02 PIPE INSTALLATION

A. The installation of ductile iron water main must conform to the requirements of ANSI/AWWA C600.

B. Any pipe damaged in transport or handling shall be rejected and removed from the site of the work.

C. Before lowering in the trench, and while suspended, each pipe and fitting shall be inspected for defects. Defective, damaged or unsound pipe shall immediately be removed from the construction site. The interior of each pipe shall be inspected for cleanness and cleared of all dirt and foreign matter before being lowered into the trench.

D. In handling and placing ductile iron pipe and fittings, no metal shall be used in contact with the inside of the pipe to fit or support the pipe. The pipe shall be moved only through the use of belt slings or automatic release type pipe tongs. Care shall be taken not to injure the pipe or pipe coating, and no damaged or imperfect pipe shall be used in the work except that minor damage to pipe coating may be repaired subject to the review of the ENGINEER.

E. Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying. After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the adjacent pipe; the pipe shoved into position and brought to a true alignment. It will then be secured with sand backfill tamped under and on each side of the pipe, except at bell holes. No earth or other foreign matter shall be allowed to enter the joint space.

F. All excavation and backfill above the pipe shall conform to specifications under Earthwork and as shown on the Drawings.

G. A minimum of 18-inches vertical clearance shall be provided between the water main and any existing underground facility, unless otherwise approved by the ENGINEER. Whenever a main is installed under any existing utility line such as gas, buried electric power, telephone line, sewer or water, provisions shall be made to properly support or distribute any concentrated load to avoid settlement and possible failure of either main. Such provisions shall consist of concrete bedding of the main, complete concrete encasement, or some other method as shown on the plans. Water mains passing under sewers, in addition, shall be protected by providing:

1. A vertical separation of at least 18-inches between the bottom of the sewer and the top of the water main.

2. Adequate structural support for the sewer to prevent excessive deflection of joints and settlement of the sewer about the water main; i.e., a concrete saddle under the pipe with a span length extending to undistributed earth bearing.

H. Water mains shall be installed at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsoil treatment system. The distance shall be measured edge to edge.

I. In assembly of push-on or shove type joints, the bell socket recess and the gasket shall be wiped clean and the gasket placed properly in position. A thin film of lubricant shall then be applied to the surface of the gasket to come into contact with the entering pipe. The plain end of the entering pipe shall be cleaned and then entered and forced home to the base of the socket.

J. Where necessary to cut pipe, cutting shall be done with approved tools and cut ends of pipe shall be square and regular. Cutting shall be done in a manner to avoid damage to lining and coating. Minor damage may be repaired subject to review of the ENGINEER.

K. To prevent trench water from entering the pipe, joints, which for any reason may not be completed as the pipe is laid, shall be thoroughly packed with approved material, in a manner to make them watertight. Open ends of fittings shall be tightly closed with approved plugs and well packed, as shall the end of the last pipe laid whenever work is not in progress.

L. Each pipe shall be laid accurately to the line and grade shown on the Plans. Wherever deflections at joints are required by changes in grade or alignment or to plumb valve stems, the deflection at any bell and spigot joint shall not exceed that which will cause the spigot end of pipe to be away from home in the bell of the adjacent pipe a distance of 1/4 inch at the point of greatest opening.

M. The deflection at any mechanical joint shall not exceed three-quarters of the maximum deflection recommended by the manufacturer or 3 degrees, whichever is more conservative of the joint used.

N. The CONTRACTOR shall not be entitled to any additional compensation because depth is more than specified at certain locations or due to clearances at manholes, or due to unforeseen obstacles, or occasioned in order to avoid undue changes in grade.

O. Pipe shall be laid at depths to provide minimum cover of 5' - 6" over the top of the pipe unless otherwise noted on the Drawings or elsewhere in these specifications.

3.03 GATE VALVES AND WELLS

A. All pre-cast section joints and lift holes shall be pointed and plugged, inside and outside, with mortar.

B. Gate valves shall be of the size and installed at the location as shown on the plans. They shall be set square with the line of the main, and unless otherwise directed by the Township ENGINEER, all gate valves shall be set with stems plumb. At each side of gate valve, the CONTRACTOR shall furnish and install a 1-inch corporation stop on the main as shown on the Standard Details.

C. All gate valves with operating nuts at a distance greater than 6.5 feet below ground surface shall be provided with an extension stem.

3.04 HYDRANTS

A. Fire hydrants shall be constructed in accordance with the details shown on the plans. Finish grade level to center of nozzle caps shall measure between 24 and 30 inches. A maximum of one hydrant barrel extension and one operating stem extension may be used to accommodate changes in grade. Under no conditions shall extended hydrant have more than one coupling in the operating stem. Pumper connections shall point toward the street.

B. Fire hydrants shall be installed with barrel vertical and properly based. Concrete thrust blocks shall be placed behind the hydrant, tee, and every bend. Care should be taken to insure the drain holes on the hydrant are not plugged by the thrust blocks. Hydrant shall be set in 1 yard of coarse gravel for drainage purposes. If ground water is encountered, the drain hole shall be plugged as directed by the manufacturer. The backfill shall be sand thoroughly tamped around the hydrant and valve box in 1 ft layers.

C. Fire hydrant and gate valve shall be set apart 24 inches. Gate valves and valve box shall be as specified under the valve paragraphs of this section.

D. Hydrant leads shall have a minimum of 5.5 feet of cover in all areas, including crossings through ditch sections.

E. Hydrants shall be carefully plumbed, braced and backfilled so they remain plumb.

F. All grade, facing, and vertical alignment adjustment of hydrants shall be completed prior to pressure testing and charging of the hydrants.

G. All hydrants shall be cleaned and painted with a rust inhibitive, oil base paint such as "rustoleum" or approved equal to the Township's color code prior to acceptance.

H. The lubricant reservoirs in all hydrants having such construction shall be filled with a lubricant acceptable to the Michigan Department of Environmental Quality and recommended by the hydrant manufacturer.

I. Backfilling around fire hydrants shall be carefully tamped sand in 12-inch layers from the centerline of the lead main to a height of 1-foot below finished grade.

J. CONTRACTOR shall place burlap sack or equivalent material over the hydrant nozzles after installation.

K. Fire hydrant nozzles shall be aligned as required by the Township Fire Marshal.

L. Fire hydrant extensions shall be provided as necessary so that the safety flange is located at or above surface grade.

3.05 TRACER WIRE

A. Tracer wire shall be installed along the top of all water mains. For directional drilling, the tracer wire shall be installed at the same time as the pipe. For open cut construction, the tracer wire shall be installed at a height of not more than 6 inches above the main line pipe or service leads. Wire shall be extended to all hydrants, blow-offs, dead ends, service leads and post indicator valves. Tracer wire shall be brought to grade, leaving enough excess material to avoid loss or damage to the wire during construction and subsequent activities. Wire shall be trimmed to finish grade following completion of the landscaping.

B. When tracer wire is to be run along short offsets (less than 20 feet), a loop of wire shall be utilized to loop to the end of the offset, bring the loop to grade and terminate it in an approved manner. For service leads and offsets of more than 20 feet in length, or installed by directional drilling method, a splice may be utilized to make the connection at the main. The tracer wire shall then be installed and terminated in an approved manner.

C. Tracer wire terminations shall be made by one of the following methods:

1. Tracer wire shall be terminated at hydrants by tying off the wire at the head flange, leaving excess material for future trimming following landscape activities.

2. Terminations at valve/curb boxes, post indicators, valves and blow-offs shall be made with 2 wraps of wire at grade around the box or pipe, leaving excess material for future trimming following landscaping.

3. Gatewell terminations shall be made by running the tracer wire through the pipe opening in the wall, down to and across the floor to the steps, up the wall and secure to the top step leaving the stub accessible at the casting. Wire shall be run through the gatewell such that it does not create a hazard.

4. Terminations at existing water mains without tracer wire shall be made at the nearest hydrant or gate well as outlined above. If no hydrant or gatewell is available, an upper section of valve box shall be installed with the tracer wire stubbed up inside

D. When connections are made to existing water mains which do not have tracer wire, the following method most applicable to field conditions shall be used.

1. When connection is made at/near a valve or hydrant, the connection shall be made in the same manner as the termination at said structures in Item C(2) above.

2. When connection takes place in a gatewell, the same procedure shall be used as in termination at a gatewell (see Item C(3) above).

3. If no valve or hydrant is available, the upper section only of a valve box shall be set with the tracer wire stubbed up inside.

3.06 POLYETHYLENE ENCASEMENT

A. The polyethylene encasement must be installed in accordance with the specifications and requirements of ANSI/AWWA C105/A21.5. For open cut applications a single wrap is required, and for directional drill applications a double wrap is required.

B. The polyethylene encasement must be taped and overlapped at pipe joints and must be taped in a spiral configuration along the length of the pipe.

3.07 CONNECTION TO EXISTING MAINS

A. All connections to existing water mains shall be made at the locations as shown on the plans.

B. All valves shall be operated by the Pittsfield Township Utilities Department.

C. Prior to beginning construction of the final connections, the CONTRACTOR shall provide sequence of all final connections to the existing system and coordinate a meeting between the ENGINEER, OWNER and CONTRACTOR in the field to review the procedure.

D. When making a dry connection to an existing main, the existing main to which a connection is to be made shall be isolated by the closing of the necessary existing valves, and the water from the existing main shall then be pumped out or removed by other means so the connection may be made in the dry. After the connection has been acceptably made, the portion of the new line to the nearest valve shall be satisfactorily tested and disinfected, along with the drained portion of the existing water main, before the isolated existing main is placed back in service, except as the ENGINEER may otherwise direct. In as much as residents served by this isolated main will be temporarily out of water during this period, the work shall be executed as rapidly as possible, and the time of, and the procedure in, making such connections shall be subject to the review of the ENGINEER. Such work may be required to be done at night in order to minimize inconvenience of water users. The CONTRACTOR shall not be entitled to any additional compensation because of night work or other special requirements in work under this section.

E. The CONTRACTOR shall make particular effort, prior to bidding, to ascertain whether or not valves in the existing mains to be connected to the new mains are so located as to provide isolation. If valves are not found to be adequate, then the CONTRACTOR shall utilize other means to make the connections with a minimum of interruption to service.

F. When making a wet tap connection to an existing main, a tapping sleeve designed for the type of pipe being tapped shall be utilized and the tap shall be made in accordance with the manufacturer of the tapping equipment.

G. Wherever adapters are required to properly connect the pipe with existing pipe or other material or manufacturer, the nominal I.D. of adapters shall be the same size as the nominal diameter of pipe connected thereto. Adapters shall also be furnished and used as required by the manufacturer for connection to fittings.

3.08 BEDDING

A. Ductile iron pipes shall be fully enclosed in polywrap and laid on a compacted sand cushion, 4 inches thick. Sand shall conform to fine aggregate 2NS as defined in 2003 MDOT, Section 902.

B. 2NS sand bedding material shall be placed around and above the main to a height of 12 inches above the main.

C. Sand shall be compacted on top of the 12-inches of sand above the pipe to not less than 95 percent of the maximum unit density as determined at optimum moisture content.

PITTSFIELD CHARTER TOWNSHIP

Pittsfield Charter Township
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Tel. 734.822.3101
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Revision	By	Appd.	YY.MM.DD
SPEC. UPDATES	MRH	DRW	14.01.24
TWP REV	BWA	DRW	11.04.27
SPEC. UPDATES	BWA	DRW	10.10.25
SPEC. UPDATES	TTN	DRW	10.01.19

Issued	By	Appd.	YY.MM.DD
File Name: W-02	BWA	DRW	07.10.01
Permit-Seal	Dwn.	Chkd.	Dsgn. YY.MM.DD

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
WATER MAIN SPECIFICATIONS

Project No. 2075001300

Scale

Revision

landscape overview plan for:

"Bella Vista" a planned residential community

Pittsfield Township, Michigan

north

scale: 0' 80' 160' 320' 480'

1"= 160'-0"

landscape requirements:

greenbelt (Ann Arbor-Saline Road)	REQUIRED	PROVIDED
TOTAL LIN. FT. OF R.O.W. FRONTAGE (LESS DRIVES)	2,436'±	
ONE (1) 3" DECIDUOUS TREE or EVERGREEN TREE PER 30 LIN. FT.	81	165 ('A')

street trees (interior Road)	REQUIRED	PROVIDED
TOTAL LIN. FT. OF INTERIOR ROAD	8090±	
ONE (1) 3" DECIDUOUS TREE PER 50 LIN. FT.	162	189 ('A')

tree replacement summary

TOTAL NO. OF TREES REMOVED	177
REGULATED TREES REMOVED	174
HERITAGE TREES REMOVED	3
TOTAL NO. OF CALIPER INCHES OF REPLACEMENT TREES REQUIRED	1,815" ('B')
TOTAL NO. OF CALIPER INCHES OF REPLACEMENT TREES PROVIDED	1,901"

REPLACEMENT TREES IN SUPPLEMENTAL STREET TREE PLANTINGS

27- 3" CANOPY TREES	81"

REPLACEMENT TREES IN SUPPLEMENTAL GREENBELT PLANTINGS

29- 8' HIGH EVERGREEN TREES (EQ. 3 1/2"-CALIPER)	101.5"
55- 10' HIGH EVERGREEN TREES (EQ. 4 1/2"-CALIPER)	247.5"
TOTAL	349"

REPLACEMENT TREES IN GENERAL PLANTINGS

165- 3" CANOPY TREES	495"
122-8' HIGH EVERGREEN TREES (EQ. 3 1/2"-CALIPER)	427"
72- 10' HIGH EVERGREEN TREES (EQ. 4 1/2"-CALIPER)	324"
75- 10' ARBORVITAE (EQ. 3"-CALIPER)	225"
TOTAL	1471"

FOOT NOTES:

('A') SUPPLEMENTAL PLANTINGS IN THE GREENBELT AND STREET TREES TO BE CREDITED TOWARDS TREE REPLACEMENT REQUIREMENTS

('B') SEE TREE SURVEY PREPARED BY ATWELL FOR TREE LIST, REMOVAL AND REPLACEMENT CALCULATION

sheet index

LS-1 OVERALL PLAN VIEW
LS-2 PLANTING DETAIL PLAN
LS-3 PLANTING DETAIL PLAN
LS-4 ENTRY PLANTING DETAIL
LS-5 DETENTION POND
LS-6 PLANT MATERIAL
LS-7 SITE AMENITY PLAN
LS-8 ENTRY MONUMENT
LS-9 ENTRY MONUMENT DETAILS

landscape legend

deciduous trees
(Maples, Celtis occidentalis, Zelkova serrata, Oaks, Lindens, Nyssa sylvatica, etc...)

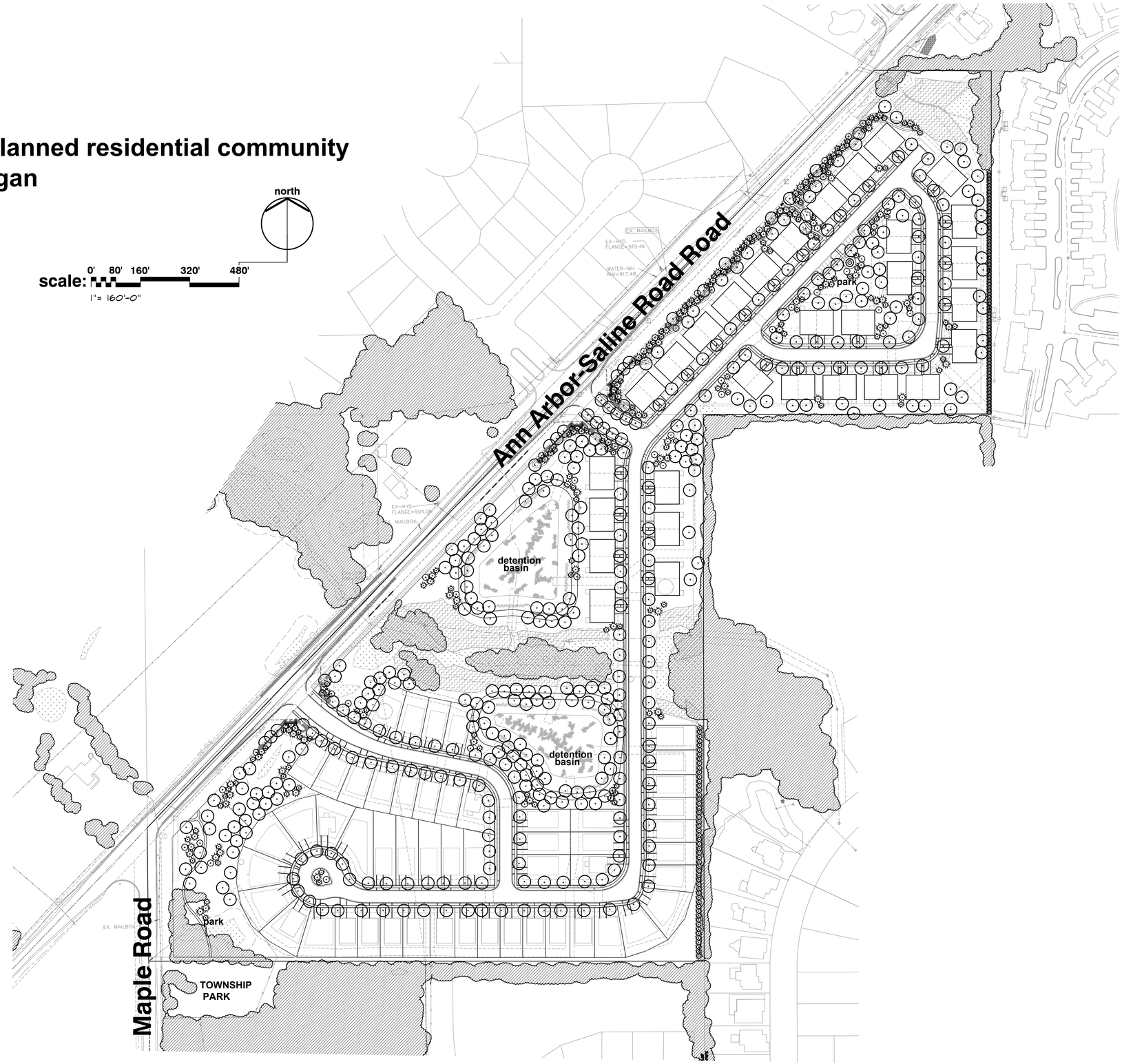
ornamental trees
(Eastern Redbud, Crabs, Hawthorn, Serviceberry, etc...)

evergreen trees
(White Pine, Austrian Pine, Spruces)

deciduous shrubs
(viburnum, forsythia,burning bush,cotoneaster dogwood,etc.)

evergreen shrubs
(junipers, yews, hollies, arborvitae, boxwood,etc.)

perennials and/or seasonal flowers
(Daylily, Sedum, Ornamental Grasses, Black Eyed Susan, etc...)



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Farmington Hills, MI 48336
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seal:

FELINO A. PASCUAL LANDSCAPE ARCHITECT No. 1433

client:

PULTE HOMES

100 Bloomfiled Hills Parkway,Suite 150, Bloomfield Hills, Michigan 48304

project:

BELLA VISTA
A proposed residential community

project location:

PITTSFIELD TWP, MI

S. MAPLE RD. AND ANN ARBOR-SALINE RD.

sheet title:

STREET TREE PLANTING

job no./issue/revision date:

LS16.051.05	REVIEW	5-19-2016
LS16.051.09	PSA	9-8-2016
LS16.051.11	PSA	11-8-2016
LS16.051.11A	PSA	11-15-2016
LS17.107.09	PSA	9-11-2017
LS17.107.10	PSA	10-16-2017
LS18.132.12	SPA	12-12-2018
LS19.010.01	SPA	1-9-2019
LS19.010.02	SPA	2-8-2019

drawn by: JP, Km

checked by: FP

date: 2-5-2019

notice:
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3 WORKING DAYS BEFORE YOU DIG CALL MISS DIG 1-800-482-7171
For free location of public utility lines

The location and elevations of existing underground utilities as shown on this drawing are only approximate. no guarantee is either expressed or implied as to the completeness of accuracy. contractor shall be exclusively responsible for determining the exact location and elevation prior to the start of construction

project no: LS19.010.02

sheet no: LS-1 of 9

landscape legend

deciduous trees
(Maples, Celtis occidentalis, Zelkova serrata, Oaks, Lindens, Nyssa sylvatica, etc...)

ornamental trees
(Eastern Redbud, Crabs, Hawthorn, Serviceberry, etc...)

evergreen trees
(White Pine, Austrian Pine, Spruces)

deciduous shrubs
(viburnum, forsythia,burning bush,cotoneaster dogwood,etc.)

evergreen shrubs
(junipers, yews, hollies, arborvitae, boxwood,etc.)

perennials and/or seasonal flowers
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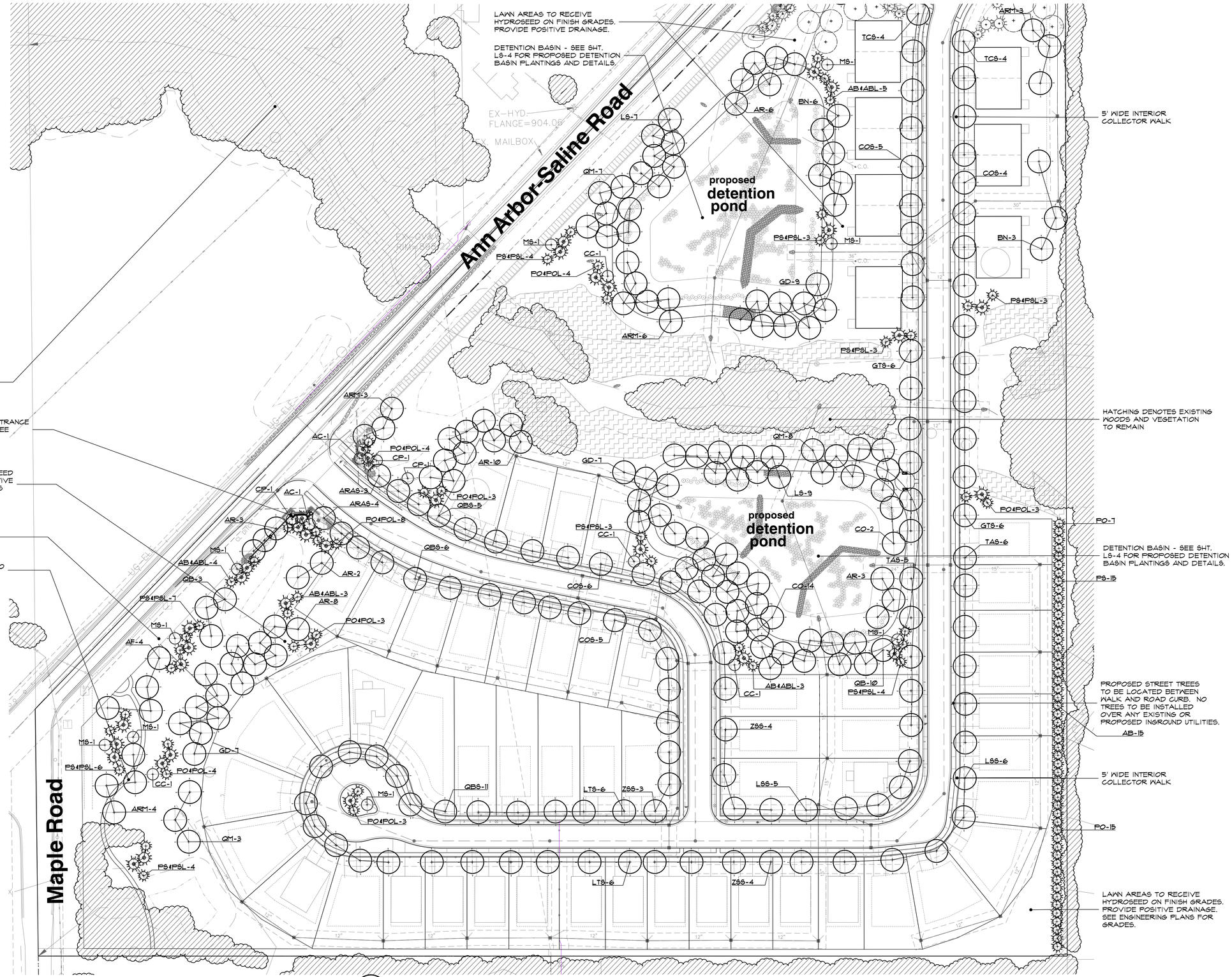

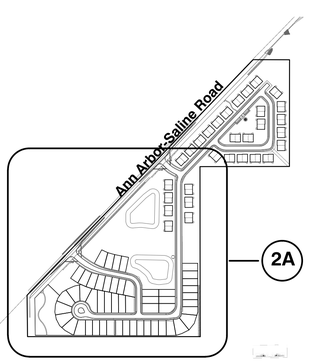

reference location map

NO SCALE

2A general landscape planting detail

SCALE: 1" =60' - 0"

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fax. (248) 557-5416

seal:

STATE OF MICHIGAN FELINO A. PASCUAL LANDSCAPE ARCHITECT No. 01435 REGISTERED LANDSCAPE ARCHITECT

client:

PULTE HOMES

100 Bloomfiled Hills Parkway,Suite 150, Bloomfield Hills, Michigan 48304

project:

BELLA VISTA
A proposed residential community

project location:

PITTSFIELD TWP, MI

S. MAPLE RD. AND ANN ARBOR-SALINE RD.

sheet title:

LANDSCAPE PLANTING DETAIL

job no./issue/revision date:

LS16.051.05	REVIEW	5-19-2016
LS16.051.09	PSA	9-8-2016
LS16.051.11	PSA	11-8-2016
LS16.051.11A	PSA	11-15-2016
LS17.107.09	PSA	9-11-2017
LS17.107.10	PSA	10-16-2017
LS18.132.12	SPA	12-12-2018
LS19.010.01	SPA	1-9-2019
LS19.010.02	SPA	2-8-2019

drawn by: **JP, Km**

checked by: **FP**

date: **2-5-2019**

notice:

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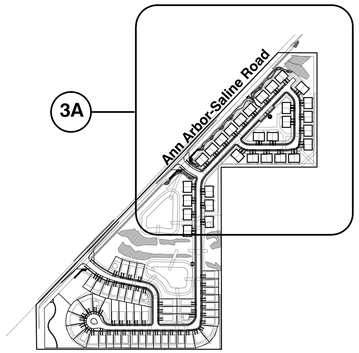
project no: **LS19.010.02**

sheet no: **LS-2 of 9**



reference location map

NO SCALE

landscape legend

deciduous trees
(Maples, Celtis occidentalis, Zelkova serrata, Oaks, Lindens, Nyssa sylvatica, etc...)

ornamental trees
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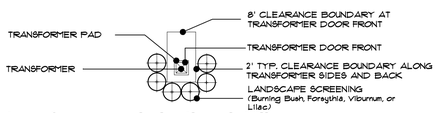
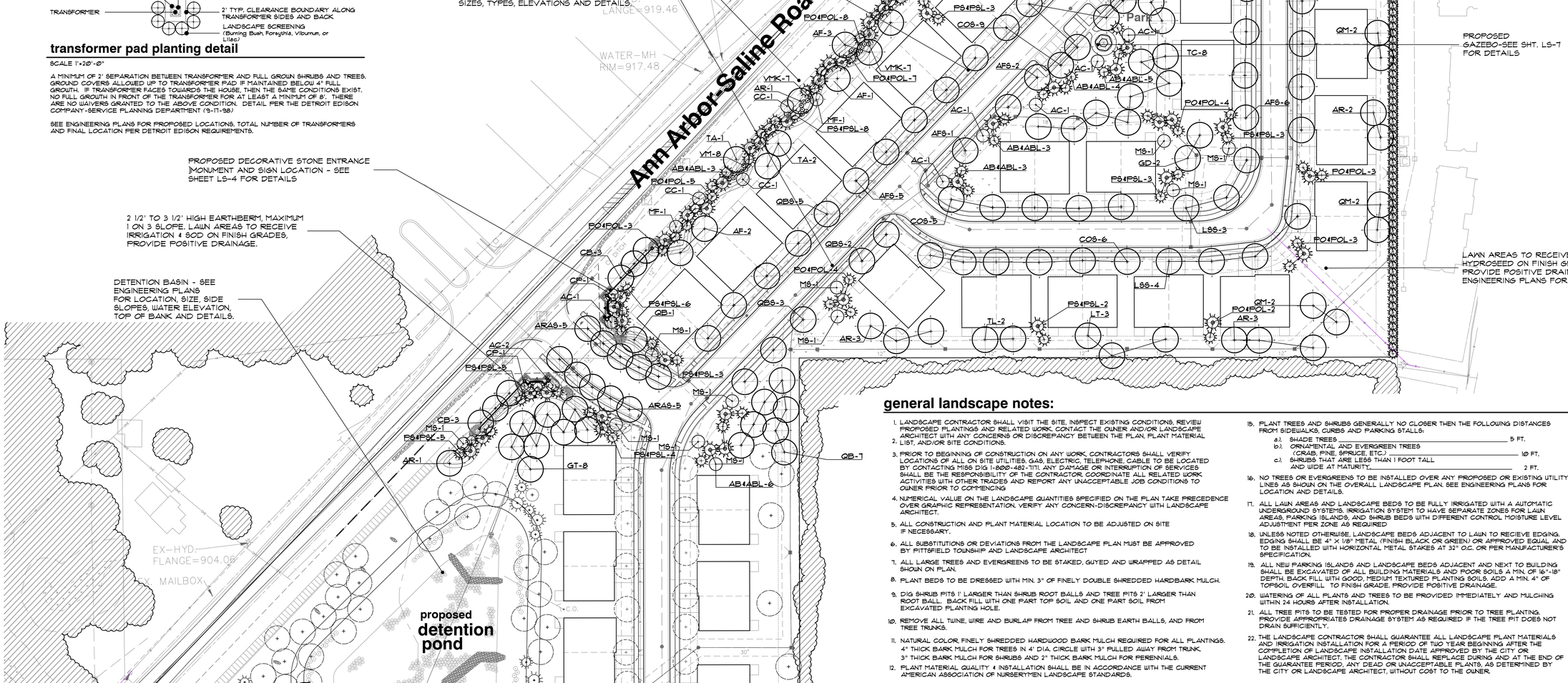


transformer pad planting detail

SCALE 1"=20'-0"

A MINIMUM OF 2' SEPARATION BETWEEN TRANSFORMER AND FULL GROWN SHRUBS AND TREES. GROUND COVERS ALLOWED UP TO TRANSFORMER PAD IF MAINTAINED BELOW 4" FULL GROWTH. IF TRANSFORMER FACES TOWARDS THE HOUSE, THEN THE SAME CONDITIONS EXIST. NO FULL GROWTH IN FRONT OF THE TRANSFORMER FOR AT LEAST A MINIMUM OF 8'. THERE ARE NO WAIVERS GRANTED TO THE ABOVE CONDITION. DETAIL PER THE DETROIT EDISON COMPANY-SERVICE PLANNING DEPARTMENT (9-11-98)

SEE ENGINEERING PLANS FOR PROPOSED LOCATIONS, TOTAL NUMBER OF TRANSFORMERS AND FINAL LOCATION PER DETROIT EDISON REQUIREMENTS.



3A general landscape planting detail

SCALE: 1" =60' - 0"

general landscape notes:

1. LANDSCAPE CONTRACTOR SHALL VISIT THE SITE, INSPECT EXISTING CONDITIONS, REVIEW PROPOSED PLANTINGS AND RELATED WORK CONTACT THE OWNER AND/OR LANDSCAPE ARCHITECT WITH ANY CONCERNS OR DISCREPANCY BETWEEN THE PLAN, PLANT MATERIAL
2. LIST, AND/OR SITE CONDITIONS.
3. PRIOR TO BEGINNING OF CONSTRUCTION ON ANY WORK CONTRACTORS SHALL VERIFY LOCATIONS OF ALL ON SITE UTILITIES, GAS, ELECTRIC, TELEPHONE, CABLE TO BE LOCATED BY CONTACTING MISS DIG 1-800-482-1171. ANY DAMAGE OR INTERRUPTION OF SERVICES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. COORDINATE ALL RELATED WORK ACTIVITIES WITH OTHER TRADES AND REPORT ANY UNACCEPTABLE JOB CONDITIONS TO OWNER PRIOR TO COMMENCING
4. NUMERICAL VALUE ON THE LANDSCAPE QUANTITIES SPECIFIED ON THE PLAN TAKE PRECEDENCE OVER GRAPHIC REPRESENTATION. VERIFY ANY CONCERN-DISCREPANCY WITH LANDSCAPE ARCHITECT.
5. ALL CONSTRUCTION AND PLANT MATERIAL LOCATION TO BE ADJUSTED ON SITE IF NECESSARY.
6. ALL SUBSTITUTIONS OR DEVIATIONS FROM THE LANDSCAPE PLAN MUST BE APPROVED BY PITTSFIELD TOWNSHIP AND LANDSCAPE ARCHITECT
7. ALL LARGE TREES AND EVERGREENS TO BE STAKED, GUYED AND WRAPPED AS DETAIL SHOWN ON PLAN.
8. PLANT BEDS TO BE DRESSED WITH MIN. 3" OF FINELY DOUBLE SHREDDED HARDBARK MULCH.
9. DIG SHRUB PITS 1' LARGER THAN SHRUB ROOT BALLS AND TREE PITS 2' LARGER THAN ROOT BALL. BACK FILL WITH ONE PART TOP SOIL AND ONE PART SOIL FROM EXCAVATED PLANTING HOLE.
10. REMOVE ALL TWINE, WIRE AND BURLAP FROM TREE AND SHRUB EARTH BALLS, AND FROM TREE TRUNKS.
11. NATURAL COLOR, FINELY SHREDDED HARDWOOD BARK MULCH REQUIRED FOR ALL PLANTINGS. 4" THICK BARK MULCH FOR TREES IN 4' DIA. CIRCLE WITH 3" PULLED AWAY FROM TRUNK. 3" THICK BARK MULCH FOR SHRUBS AND 2" THICK BARK MULCH FOR PERENNIALS.
12. PLANT MATERIAL QUALITY & INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT AMERICAN ASSOCIATION OF NURSERYMEN LANDSCAPE STANDARDS.
13. PROVIDE PEAT SOD FOR ALL NEW AND DISTURBED LAWN AREAS UNLESS NOTED OTHERWISE.
14. ALL PLANTING AREAS TO BE PREPARED WITH APPROPRIATE SOIL MIXTURES AND FERTILIZER BEFORE PLANT INSTALLATION.
15. PLANT TREES AND SHRUBS GENERALLY NO CLOSER THEN THE FOLLOWING DISTANCES FROM SIDEWALKS, CURBS AND PARKING STALLS:
    a.) SHADE TREES ____ 5 FT.
    b.) ORNAMENTAL AND EVERGREEN TREES (CRAB, PINE, SPRUCE, ETC.) ____ 10 FT.
    c.) SHRUBS THAT ARE LESS THAN 1 FOOT TALL AND WIDE AT MATURITY ____ 2 FT.
16. NO TREES OR EVERGREENS TO BE INSTALLED OVER ANY PROPOSED OR EXISTING UTILITY LINES AS SHOWN ON THE OVERALL LANDSCAPE PLAN. SEE ENGINEERING PLANS FOR LOCATION AND DETAILS.
17. ALL LAWN AREAS AND LANDSCAPE BEDS TO BE FULLY IRRIGATED WITH A AUTOMATIC UNDERGROUND SYSTEMS. IRRIGATION SYSTEM TO HAVE SEPARATE ZONES FOR LAWN AREAS, PARKING ISLANDS, AND SHRUB BEDS WITH DIFFERENT CONTROL MOISTURE LEVEL ADJUSTMENT PER ZONE AS REQUIRED
18. UNLESS NOTED OTHERWISE, LANDSCAPE BEDS ADJACENT TO LAWN TO RECIEVE EDGING. EDGING SHALL BE 4" X 1/8" METAL FINISH BLACK OR GREEN) OR APPROVED EQUAL AND TO BE INSTALLED WITH HORIZONTAL METAL STAKES AT 32" O.C. OR PER MANUFACTURER'S SPECIFICATION.
19. ALL NEW PARKING ISLANDS AND LANDSCAPE BEDS ADJACENT AND NEXT TO BUILDING SHALL BE EXCAVATED OF ALL BUILDING MATERIALS AND POOR SOILS A MIN. OF 16"-18" DEPTH. BACK FILL WITH GOOD, MEDIUM TEXTURED PLANTING SOILS. ADD A MIN. 4" OF TOPSOIL OVERFILL TO FINISH GRADE. PROVIDE POSITIVE DRAINAGE.
20. WATERING OF ALL PLANTS AND TREES TO BE PROVIDED IMMEDIATELY AND MULCHING WITHIN 24 HOURS AFTER INSTALLATION.
21. ALL TREE PITS TO BE TESTED FOR PROPER DRAINAGE PRIOR TO TREE PLANTING. PROVIDE APPROPRIATES DRAINAGE SYSTEM AS REQUIRED IF THE TREE PIT DOES NOT DRAIN SUFFICIENTLY.
22. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL LANDSCAPE PLANT MATERIALS AND IRRIGATION INSTALLATION FOR A PERIOD OF TWO YEAR BEGINNING AFTER THE COMPLETION OF LANDSCAPE INSTALLATION DATE APPROVED BY THE CITY OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL REPLACE DURING AND AT THE END OF THE GUARANTEE PERIOD, ANY DEAD OR UNACCEPTABLE PLANTS, AS DETERMINED BY THE CITY OR LANDSCAPE ARCHITECT, WITHOUT COST TO THE OWNER.

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LS16.051.11A	PSA	11-15-2016
LS17.107.09	PSA	9-11-2017
LS17.107.10	PSA	10-16-2017
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drawn by: JP, Km
checked by: FP
date: 2-5-2019

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

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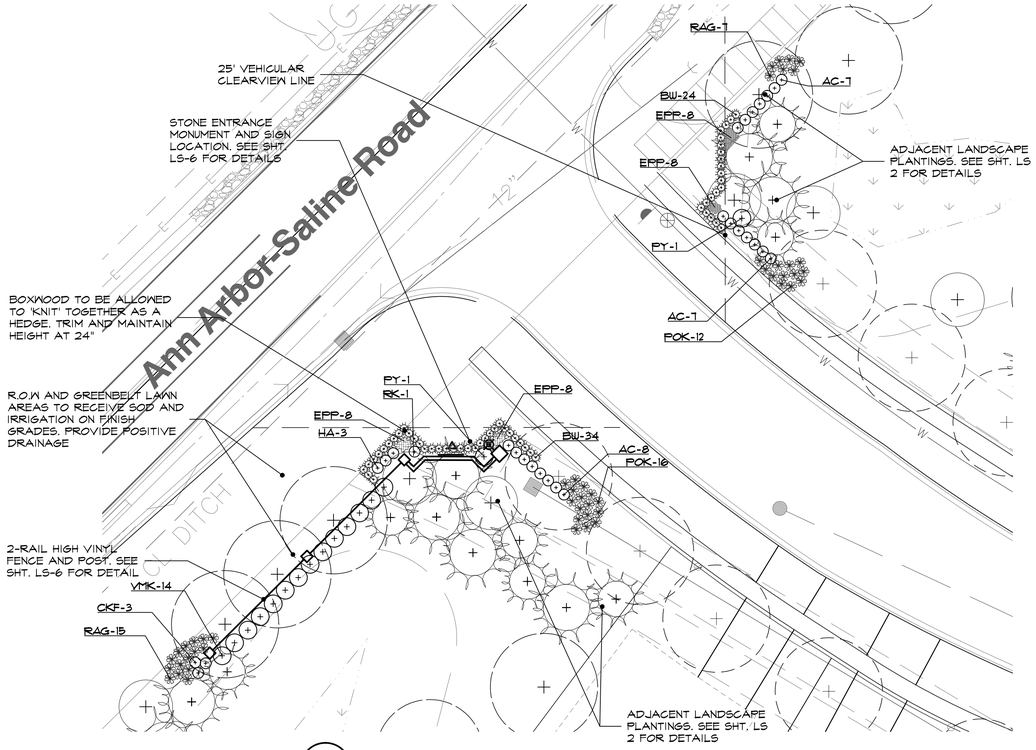
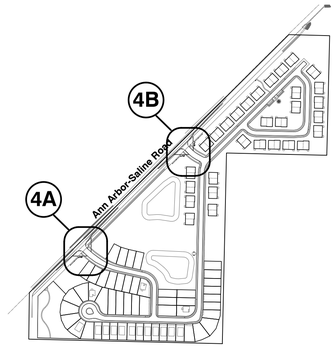
project no: LS19.010.02

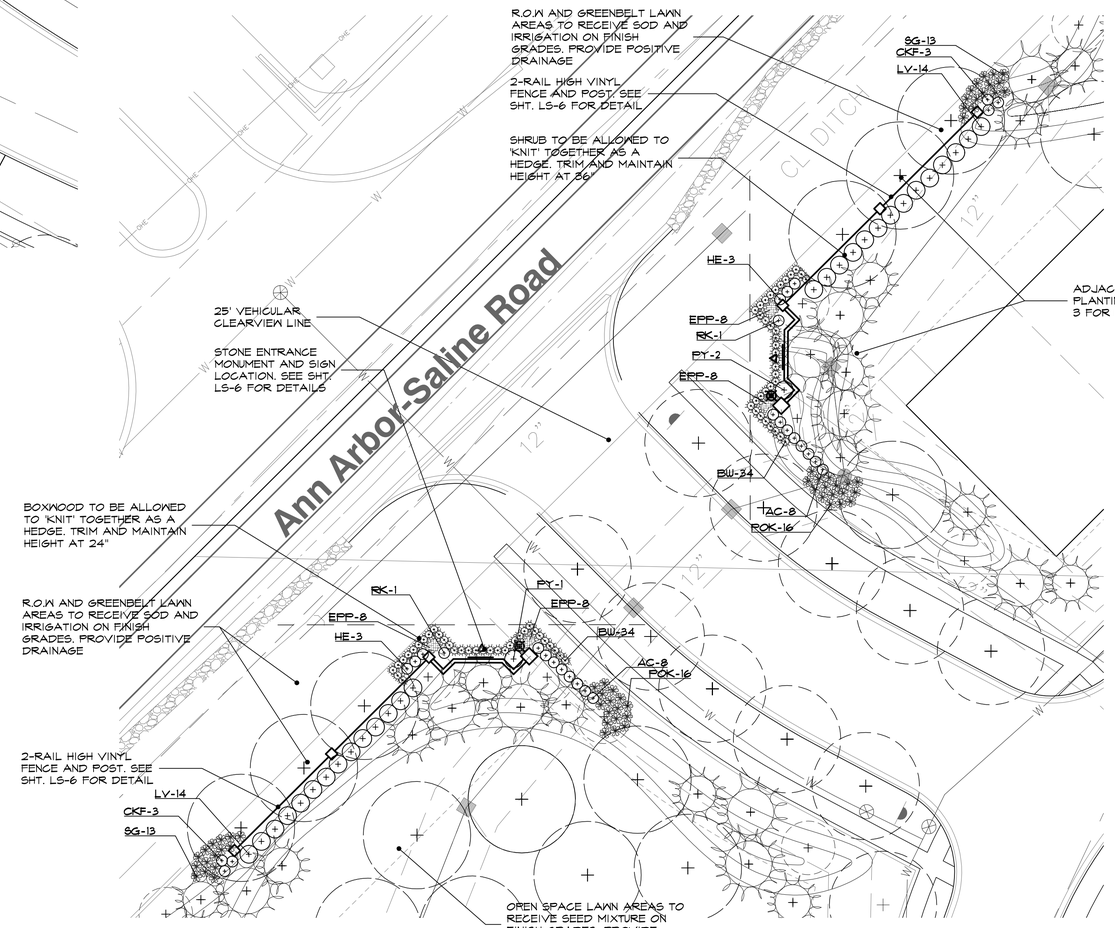
sheet no: LS-3 of 9



4A entry planting detail
SCALE: 1" =30' - 0"



reference location map
NO SCALE



4B entry planting detail
SCALE: 1" =30' - 0"

plant material list entry landscape

key	quant. 4A	quant. 4B	botanical name	common name	size	comments
			SHRUBS			
AC	16	16	TAXUS X.M. 'SEBIAN'	SEBIAN YEW	36" BB	36" O.C. SPACING
BW	58	68	BUXUS 'GREEN VELVET'	GREEN VELVET BOXWOOD	18" BB	24" O.C. SPACING
RK	1	2	ROSA X. 'DOUBLE RED"	OSA EASY DOUBLE RED ROSE	#5 CONT	
HA	3	-	HYDRANGEA ANNEBELLE	ANNABELLE HYDRANGEA	#5 CONT	
PY	2	2	PYRACANTHA COCCINEA 'YUKON BELLE'	YUKON BELLE SCARLET FIRETHORN	#5 CONT	
HE	-	6	HYDRANGEA M. 'ALPENGLUHEN'	GLOWING EMBERS HYDRANGEA	#5 CONT.	
LV	-	28	LIGUSTRUM X. VICARY'	GOLDEN VICARY PRIVET	#5 CONT.	
SG	-	26	SPIRAEA J. 'GOLD MOUND'	GOLD MOUND SPIREA	#5 CONT.	
VMK	14	-	VIBURNUM X.B 'MOHAWK	MOHAWK VIBURNUM	3 1/2' B.B.	
RAG	22	-	RHUS AROMATICA 'GRO-LOW'	GRO-LOW FRAGRANT SUMAC	#5 CONT.	
			PERENNIALS AND GRASSES			
CKF	3	6	CALAMAGROSTIS ACUTIFLORA 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	#3 CONT.	
POK	28	32	PENNISETUM ALOPECUROIDES 'KARLEY ROSE'	KARLEY ROSE ORIENTAL FOUNTAIN GRASS	#3 CONT.	
EPP	32	32	ECHINACEA PURPUREA 'POWWOW WILD BERRY'	POWWOW BERRY PURPLE CONEFLOWER	#3 CONT.	
PAC	-	-	PACHYSANDRA TERMINALIS	JAPANESE PACHYSANDRA	5Ø / FLAT	

FPA
FELINO A. PASCUAL and ASSOCIATES
Community Land Planner and registered Landscape Architect
24333 Orchard Lake Rd, Suite G
Farmington Hills, MI 48336
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fax. (248) 557-5416

seal:

STATE OF MICHIGAN
FELINO A. PASCUAL
LANDSCAPE ARCHITECT
No. 14336
REGISTERED LANDSCAPE ARCHITECT

client:

PULTE HOMES

100 Bloomfiled Hills Parkway,Suite 150, Bloomfield Hills, Michigan 48304

project:

BELLA VISTA
A proposed residential community

project location:
PITTSFIELD TWP, MI

S. MAPLE RD. AND ANN ARBOR-SALINE RD.

sheet title:
ENTRY PLANT DETAIL AND MATERIAL LIST

job no./issue/revision date:

LS16.051.05	REVIEW	5-19-2016
LS16.051.09	PSA	9-8-2016
LS16.051.11	PSA	11-8-2016
LS16.051.11A	PSA	11-15-2016
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LS17.107.10	PSA	10-16-2017
LS18.132.12	SPA	12-12-2018
LS19.010.01	SPA	1-9-2019
LS19.010.02	SPA	2-8-2019

drawn by:
JP, Km
checked by:
FP
date:
2-5-2019

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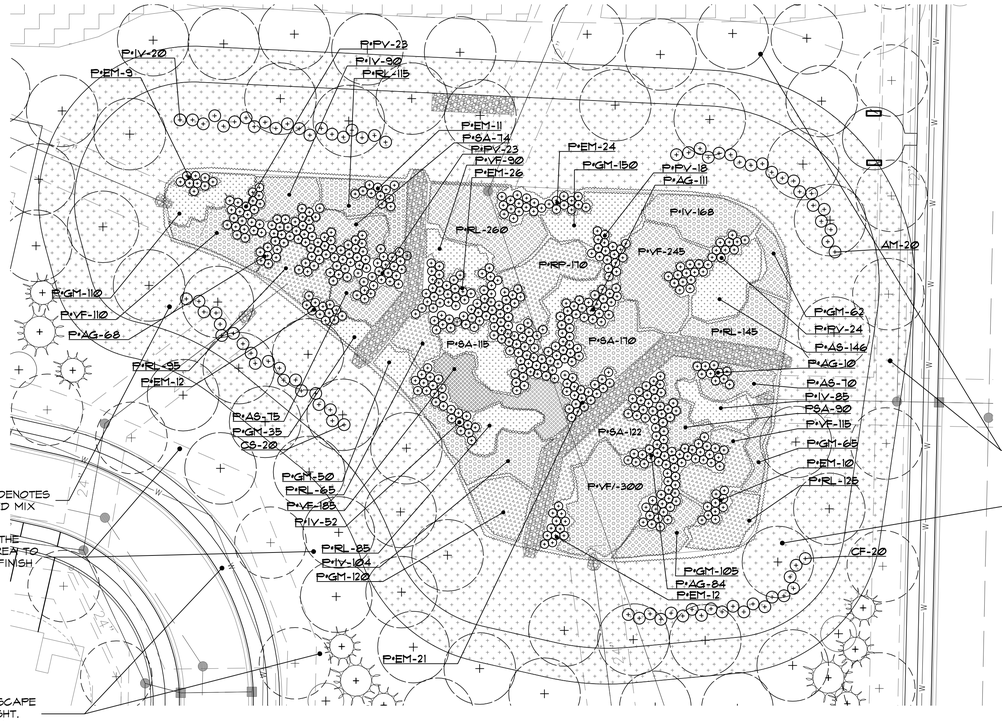
LS-4 of 9



CROSS PATTERN DENOTES UPLAND ZONE SEED MIX

AREAS BEYOND THE UPLAND ZONE AREA TO BE SEEDED ON FINISH GRADES

ADJACENT LANDSCAPE PLANTINGS. SEE SHT. LS-2 FOR DETAILS

AREAS BEYOND THE UPLAND ZONE AREA TO BE SEEDED ON FINISH GRADES

CROSS PATTERN DENOTES UPLAND ZONE SEED MIX

5A detention basin plantings

SCALE: 1" =30' - 0"

basin vegetation notes

A [illegible]

Ed[illegible]

U[illegible]

basin construction notes

[illegible]

IF DETENTION BASIN ARE COM□ACTED□T□E SLO□ES MUST BE ROTOTILLED□□" □FOUR□OF COM□OST OR TO□SOIL MUST BE ADDED

"NO MOW □ONE" SI□NS MUST BE □LACED AROUND T□E BASIN

DETENTION BASIN □LANTIN□S TO BE □ERFORMED IN EARLY S□RIN□ OR LATE FALL□ A□UATIC □LANTS S□OULD BE INSTALLED IN T□E SUMMER AFTER T□E COVER CRO□ □AS ESTABLIS□ED

basin maintenance notes

M[illegible]

Add[illegible]

I[illegible]

I[illegible]

I[illegible]

C[illegible]

I[illegible]

C[illegible]

R[illegible]

C[illegible]

R[illegible]

E[illegible]

I[illegible]

[illegible]

M[illegible]

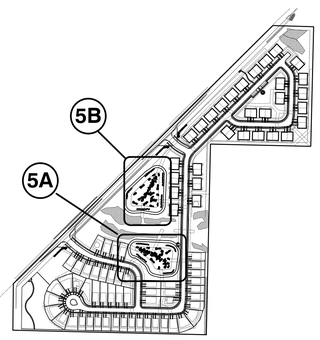
[illegible]

D[illegible] TWO

B[illegible]

note:

A WCWRC LANDSCAPE REVIEWER MUST BE PRESENT AT THE TIME OF PLANT AND SEED DELIVERY. THE QUANTITY AND SPECIES DELIVERED MUST BE REVIEW ON SITE. CONTACT CATIE WYTYCHAK AT WYTYCHAC@WASHTENAW.ORG OR (734) 222-6813 TO COORDINATE.



reference location map

NO SCALE

detention basin plant material list

key	quant. 5A	quant. 5B	botanical name	common name	size	comments
			DETENTION BASIN SHRUBS			
AM	20	20	ARONIA MELANOCARPA	BLACK CHOKEBERRY	#3 CONT.	60" OC. SPACING
IV	20	-	ILEX VERTICILLATA	MICHIGAN HOLLY	#3 CONT.	60" OC. SPACING
CS	20	40	CORNUS STOLONIFERA	REDTWIG DOGWOOD	#3 CONT.	60" OC. SPACING
CF	-	4	CORNUS S. 'FLAVIRAMEA'	YELLOWTWIG DOGWOOD	#3 CONT.	60" OC. SPACING
			PERENNIAL, FORBS & GRASSES			
P-AG	273	84	ANDROPOGON GERARDII	BIG BLUESTEM	PLUG	24" OC. SPACING
P-EC	-	54	ELYMUS CANADENSIS	CANADA WILD RYE	PLUG	24" OC. SPACING
P-RP	170	-	ROSA PALUSTRIS	SWAMP ROSE	#1 POT	24" OC. SPACING
P-RL	650	914	RUDBECKIA LACINIATA	CUTLEAF CONEFLOWER	#1 POT	24" OC. SPACING
P-VF	1050	762	VERNONIA FASCICULATA	COMMON IRONWEED	PLUG	24" OC. SPACING
P-AS	291	486	ASTER SIMPLEX	PANICLED ASTER	PLUG	24" OC. SPACING
P-IV	494	380-	IRIS VIRGINICA VAR. SHREVEI	SHREVE IRIS	#1 POT	24" OC. SPACING
P-PV	88	507	PANICUM VIRGATUM	SWITCHGRASS	#1 POT	24" OC. SPACING
P-GM	697	725	GERANIUM MACULATUM	WILD GERANIUM	#1 POT	24" OC. SPACING
P-EM	125	155	EUPATORIUM MACULATUM	JOE-PYE WEED	#1 POT	24" OC. SPACING
P-SA	456	956	SPIRAEA ALBA	MEADOWSWEET	PLUG	24" OC. SPACING
P-VH	-	225	VERBENA HASTATA	BLUE VERVAIN	PLUG	24" OC. SPACING

upland zone area seed mix:

Sedge Meadow Mix: *(Edge Zone)*
A mix of sedges, grasses and wildflowers recommended for soils that are saturated during most of the growing season. Use just above the normal waterline in the capillary zone in our Lake Edge Enhancement System.

Sedge Meadow Mix oz/acre

Carex comosa (Bristly Sedge)	1
Carex cristatella (Crested Sedge)	1
Carex frankii (Frank's Sedge)	2
Carex hystericina (Porcupine Sedge)	1
Carex lurida (Lurid Sedge)	3
Carex stipata (Awl-Fruited Sedge)	4
Carex tribuloides (Pointed Oval Sedge)	3
Carex vulpinoidea (Fox Sedge)	2
Elymus virginicus (Virginia Wild Rye)	2
Glyceria striata (Fowl Manna Grass)	2
Leersia oryzoides (Rice Cut Grass)	1
Panicum virgatum (Switchgrass)	2
Scirpus atrovirens (Dark Green Bulrush)	2
Alisma subcordatum (Water plantain)	1
Angelica atropurpurea (Angelica)	1
Aster novae-angliae (New England Aster)	1
Aster puniceus (Swamp Aster)	1
Aster umbellatus (Flat-topped Aster)	3
Cassia hebecarpa (Wild Senna)	2
Eupatorium maculatum (spotted Joe-Pye Weed)	2
Eupatorium perfoliatum (Boneset)	2
Helenium autumnale (Autumn Sneezeweed)	2
Liatris spicata (Dense Blazing Star)	1
Lobelia cardinalis (Cardinal Flower)	1
Lobelia siphilitica (Great Blue Lobelia)	2
Penstemon digitalis (Foxglove Beardtongue)	1
Pycnanthemum virginianum (Mountain Mint)	3
Rudbeckia fulgida speciosa (Showy Black-Eyed Susan)	4
Rudbeckia hirta (Black-Eyed Susan)	3
Rudbeckia subtomentosa (Sweet Black-Eyed Susan)	2
Silphium integrifolium (Rosinweed)	2
Silphium perfoliatum (Cupplant)	2
Silphium terebinthinaceum (Prairie Dock)	1
Solidago patula (Swamp Goldenrod)	2
Solidago riddellii (Riddell's Goldenrod)	2
Verbena hastata (Blue Vervain)	2
Vernonia fasciculata (Smooth Ironweed)	1
Veronicastrum virginicum (Culver's Root)	1
Zizia aurea (Golden Alexanders)	48

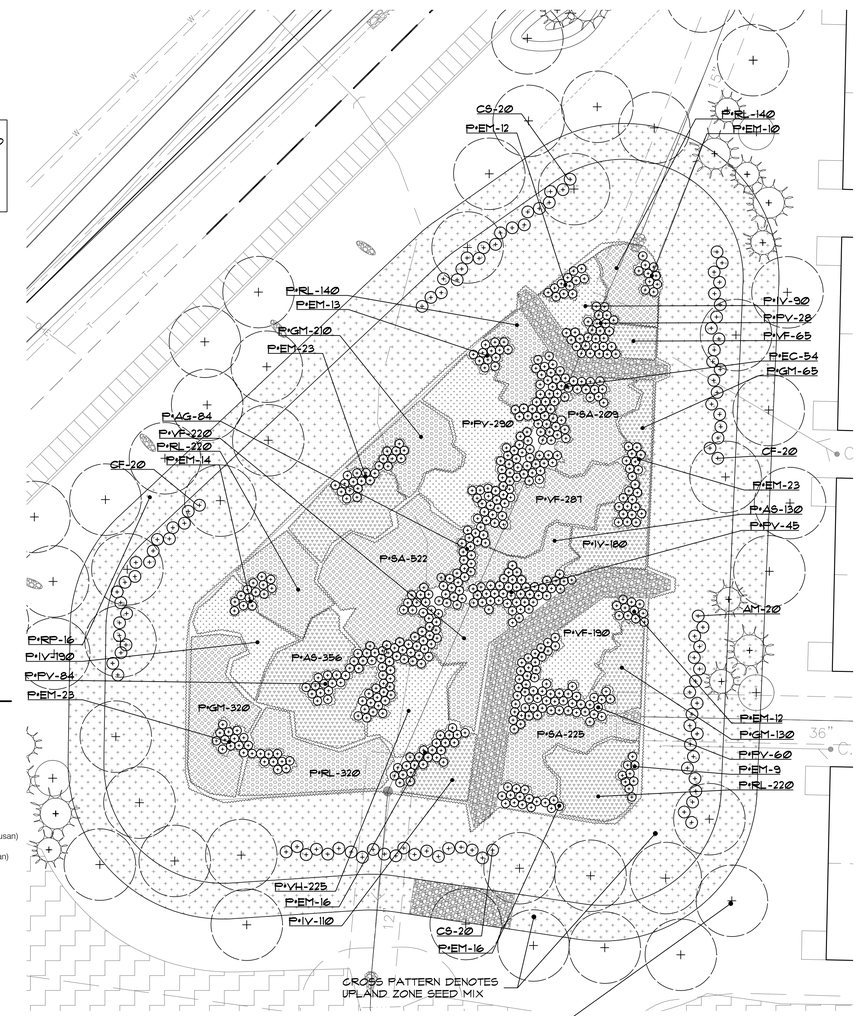
Components per acre
6 lbs grasses and sedges, 3 lbs forbes

(Edge, Upland & Dry Upland Zones)

50% Temporary Grasses; will contain two of the following species.

Seed Oats	*Avena sativa*
Annual Rye	*Lolium multiflorum*
Winter Wheat	*Triticum aestivum*
American Slough Grass	*Beckmannia syzigachne*

SOURCE:
NATIVESCAPE L.L.C
P.O. BOX 122
MANCHESTER, MICHIGAN 48158
ph: 517.456.7696
www.nativescape.net



CROSS PATTERN DENOTES UPLAND ZONE SEED MIX

ADJACENT LANDSCAPE PLANTINGS. SEE SHT. LS-2 FOR DETAILS

5A detention basin plantings

SCALE: 1" =30' - 0"

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seal:

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100 Bloomfiled Hills Parkway,Suite 150,
Bloomfield Hills, Michigan 48304

project:
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A proposed residential community

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JP, Km
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project no:
LS19.010.02

sheet no:
LS-5 of 9

street tree plant material list

key	quantities SHT.L-2	SHT.L-3	botanical name	common name	size	comments
			DECIDUOUS TREES			
LTS	11	-	LIRIODENDRON TULIPIFERA	TULIPTREE	3" BB	
GTS	12	-	GLEDITSIA TRI. INERMIS 'SKYCOLE'	SKYLINE LOCUST	3" BB	
TAS	11	-	TILIA AMERICANA 'BOULEVARD'	BOULEVARD LINDEN	3" BB	
COS	20	20	CELTIS OCCIDENTALIS	NORTHERN HACKBERRY	3" BB	
TCS	8	-	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	3" BB	
QBS	22	14	QUERCUS 'BICOLOR'	SWAMP WHITE OAK	3" BB	
AFS	-	21	ACER RUBRUM 'JEFFERSRED'	AUTUMN BLAZE RED MAPLE	3" BB	
ARAS	7	10	ACER RUBRUM 'ARMSTRONG'	ARMSTRONG RED MAPLE	4" BB	
ZSS	11	-	ZELKOVA SERRATA 'GREEN VASE'	GREEN VASE ZELKOVA	3" BB	
LSS	11	11	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	3" BB	

plant material list

key	quant. SHT.L-2	quant. SHT.L-3	botanical name	common name	size	comments
			LARGE AND SMALL DECIDUOUS TREES			
GT	-	7	GLEDITSIA TRI. INERMIS 'SKYCOLE'	SKYLINE LOCUST	3" BB	
AF	7	8	ACER X FREEMANII 'JEFFERSRED'	AUTUMN BLAZE RED MAPLE	3" BB	
TC	-	8	TILIA CORDATA 'GREENSPIRE'	GREENSPIRE LINDEN	3" BB	
AC	2	10	AMELANCHIER CANADENSIS	SHADBLOW SERVICEBERRY	10' BB	(MULTI-STEM)
MF	-	3	MALUS FLORIBUNDA	JAPANESE FLOWERING CRABAPPLE	2" BB	
CB	-	6	CARPINUS BETULUS 'FASTIGIATA'	PYRAMIDAL EUROPENAN HORNBEAN	3" BB	
QB	13	8	QUERCUS 'BICOLOR'	SWAMP WHITE OAK	3" BB	
AR	29	9	ACER R. 'FRANKSRED'	RED SUNSET RED MAPLE	3" BB	
ARM	16	9	ACER R. 'ARMSTRONG'	ARMSTRONG RED MAPLE	3" BB	
GD	19	3	GYMNOCLADUS DIOICUS	KENTUCKY COFFEETREE	3" BB	
QM	18	6	QUERCUS MACROCARPA	BUR OAK	3" BB	
CO	16	-	CELTIS OCCIDENTALIS	HACKBERRY	3" BB	
LS	16	3	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	3" BB	
BN	9	-	BETULA NIGRA	RIVER BIRCH	10' BB	(MULTI-STEM)
MS	9	13	MALUS 'SNOWDRIFT'	SNOWDRIFT CRABAPPLE	2" BB	
CC	4	6	CERCIS CANADENSIS	EASTERN REDBUD	10' BB	(MULTI-STEM)
CP	3	2	CRATAEGUS PHAENOPYRUM	WASHINGTON HAWTHORN (MULTI-STEM)	10' BB	
TA	-	6	TILA AMERICANA	AMERICAN BASSWOOD	3" BB	
AS	-	6	ACER SACCHARUM	SUGAR MAPLE	3" BB	
LT	-	5	LIRIODENDRON TULIPIFERA	TULIP TREE	3" BB	
			SHRUBS			
POS	-	12	PHYSOCARPUS OPULIFOLIUS 'SEWARD'	SUMMER WINE NINEBARK	#5 CONT.	
VM	-	21	VIBURNUM P.T. 'MARIESSI	MARIESSI VIBURNUM	3' BB	48" O.C. SPACING
VMK	-	21	VIBURNUM 'MOHAWK'	MOHAWK VIBURNUM	3' BB	48" O.C. SPACING
			LARGE AND SMALL EVERGREENS			
PO	40	28	PICEA OMORIKA	SERBIAN SPRUCE	8' BB	
POL	14	18	PICEA OMORIKA	SERBIAN SPRUCE	10' BB O	
PS	37	32	PINUS STROBUS	EASTERN WHITE PINE	8' BB	
PSL	15	25	PINUS STROBUS	EASTERN WHITE PINE	10' BB O	
AB	24	33	ABIES CONCOLOR	CONCOLOR WHITE FIR	8' BB	
ABL	6	24	ABIES CONCOLOR	CONCOLOR WHITE FIR	10' BB O	
TO	-	75	THUJA STANISH X PLICATA 'GREEN GIANT'	GREEN GIANT WESTERN ARBORVITAE	10' BB	

Planting landscape notes:

GENERAL NOTES:

1) PLANT MATERIALS TO BE INSTALLED ACCORDING TO THE PITTSFIELD TWP. AND CURRENT AMERICAN ASSOCIATION OF NURSERYMEN'S STANDARDS.

2) PLANT MATERIALS TO BE GUARANTEED FOR 2 YEARS. REPLACE FALLING MATERIAL WITHIN 1 YEAR, OR THE NEXT APPROPRIATE PLANTING PERIOD.

3) PLANT MATERIALS TO BE OF PREMIUM QUALITY, NO. 1 GRADE NORTHERN NURSURY GROWN, IN HEALTHY CONDITION, FREE OF PESTS AND DISEASES.

4) MULCH IS TO BE NATURAL COLORED, FINELY SHREDDED HARDWOOD BARK OFF 4" THICK BARK MULCH FOR TREES IN 4' DIA. CIRCLE W/5" PULLED AWAY FROM TRUNK, 3" THICK BARK MULCH FOR SHRUBS AND 2" THICK BARK MULCH FOR PERRENIALS.

5) CALL MISS DIG AT 1-800-482-7171 PRIOR TO ANY CONSTRUCTION.

6) DATE OF INTENDED LANDSCAPE INSTALLATION TO BE SPRING 2020.

DECIDUOUS & EVERGREEN TREE:

1) TREE SHALL BE INSTALLED SAME RELATIONSHIP 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.
2) DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR BROKEN BRANCHES.
3) REMOVE ALL TAGS, STRING, PLASTICS AND OTHER MATERIALS THAT ARE UNSLIGHTLY AND COULD CAUSE GIRDLING.
4) REMOVE TREE STAKES, GUY WIRES AND TREE WRAP AFTER ONE WINTER SEASON.

SHRUB:

1) SHRUB SHALL BE INSTALLED SAME RELATIONSHIP 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.
2) DO NOT PRUNE TERMINAL LEADER. PRUNE ONLY DEAD OR BROKEN BRANCHES.
3) REMOVE ALL TAGS, STRING, PLASTICS AND OTHER MATERIALS THAT ARE UNSLIGHTLY AND COULD CAUSE GIRDLING.

TREE PROTECTION:

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 PROTECTIVE FENCING BE REMOVED WITHOUT PROPER APPROVAL FROM THE CITY.
6) NO PERSON SHALL CONDUCT ANY ACTIVITY WITHIN THE AREAS PROPOSED TO REMAIN. THIS SHALL INCLUDE, BUT NOT LIMITED TO:
   a. NO SOLVENTS OR CHEMICALS WITHIN THE PROTECTED AREAS.
   b. NO BUILDING MATERIALS OR CONSTRUCTION EQUIPTMENT WITHIN THE PROTECTED AREAS.
   c. NO GRADE CHANGES, INCLUDING FILL, WITHIN THE 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. IN INSTANCES WHERE SWALES ARE APPROVED THRU A PROTECTED AREA, THE SWALES NEED TO BE HAND DUG. MACHINERY OF ANY KIND IS PROHIBITED.
7) REGULATED WOODLANDS OR REGULATED TREES ADJACENT ADJACENT TO THE PROPERTY ARE ALSO REQUIRED TO BE PROTECTED WHETHER OR NOT THEY ARE SHOWN ON THE PLAN.

landscape maintenance notes:

LANDSCAPE MAINTENANCE PROCEDURES AND FREQUENCIES TO BE FOLLOWED SHALL BE SPECIFIED ON THE LANDSCAPE PLAN, ALONG WITH THE MANNER IN WHICH THE EFFECTIVENESS, HEALTH AND INTENDED FUNCTIONS OF THE VARIOUS LANDSCAPE AREAS ON THE SITE WILL BE ENSURED.

1. LANDSCAPING SHALL BE KEPT IN A NEAT, ORDERLY AND HEALTHY GROWING CONDITION, FREE FROM DEBRIS AND REFUSE.

2. PRUNING SHALL BE MINIMAL AT THE TIME OF INSTALLATION, ONLY TO REMOVE DEAD OR DISEASED BRANCHES. SUBSEQUENT PRUNING SHALL ASSURE PROPER MATURATION OF PLANTS TO ACHIEVE THEIR APPROVED PURPOSE.

3. ALL DEAD OR DISEASED PLANT MATERIAL SHALL BE REMOVED AND REPLACED WITHIN SIX (6) MONTHS AFTER IT DIES OR IN THE NEXT PLANTING SEASON, WHICHEVER OCCURS FIRST. THE PLANTING SEASON FOR DECIDUOUS PLANTS SHALL BE BETWEEN MARCH 15 AND NOVEMBER 15 OR UNTIL THE PREPARED SOIL BECOMES FROZEN. THE PLANTING SEASON FOR EVERGREEN PLANTS SHALL BE BETWEEN MARCH 1 AND JUNE 1. PLANT MATERIAL INSTALLED TO REPLACE DEAD OR DISEASED MATERIAL SHALL BE AS CLOSE AS PRACTICAL TO THE SIZE OF THE MATERIAL IT IS INTENDED TO REPLACE.

4. THE APPROVED LANDSCAPE PLAN SHALL BE CONSIDERED A PERMANENT RECORD AND INTEGRAL PART OF THE SITE PLAN APPROVAL, UNLESS OTHERWISE APPROVED IN ACCORDANCE WITH THE AFOREMENTIONED PROCEDURES, ANY REVISIONS TO, OR REMOVAL OF, PLANT MATERIALS WILL PLACE THE PARCEL IN NON-CONFORMITY WITH THE APPROVED LANDSCAPE PLAN, AND SHALL BE VIEW AS A VIOLATION OF THIS ORDINANCE AND THE AGREED UPON TERMS OF THE FINAL SITE PLAN APPROVAL.

native wildflower seed mix:

A widely adaptable mix recommended for areas of medium soil texture in full sun and partial shade conditions. The best mix to use to replace large lawn areas in commercial landscaping. This mix has a combination of plants that are adapted to moist conditions, but will tolerate drought once established.

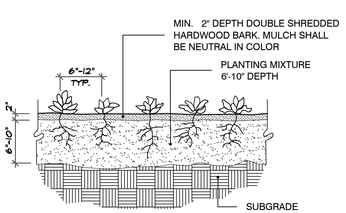
30% Native Grasses and Sedges: will contain at least four of the following species.
Andropogon gerardii (Big Bluestem)
Carex bicknellii (Copper Oval Sedge)
Elymus canadensis (Canada Wild Rye)
Panicum virgatum (Switchgrass)
Schizachyrium scoparium (Little Bluestem)
Sorghastrum nutans (Indian Grass)

20% Native Wildflowers: will contain at least fourteen of the following species.
Aster novae-angliae (New England Aster)
Aster pilosus (Heath Aster)
Coreopsis tripteris (Tall Coreopsis)
Baptisia leucantha (White False Indigo)
Echinacea purpurea (Purple Cornflower)
Eryngium yuccifolium (Rattlesnake Master)
Heliopsis helianthoides (Ox Eye Sunflower)
Liatris aspera (Rough Blazing Star)
Liatris spicata (Dense Blazingstar)
Monarda fistulosa (Bergamot)
Physostegia virginiana (Obedient Plant)
Pycnanthemum virginianum (Mountain Mint)
Ratibida pinnata (Yellow Cornflower)
Rudbeckia hirta (Black-Eyed Susan)
Rudbeckia laciniata (Green-headed Coneflower)
Silphium terebinthinaceum (Prairie Dock)
Solidago altissima (Tall Goldenrod)
Solidago graminifolia (Lance-leaved Goldenrod)
Solidago rigida (Stiff Goldenrod)
Tradescantia ohioensis (Spiderwort)
Verbena urticifolia (White Vervain)

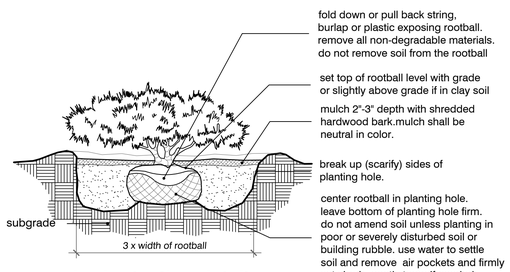
50% Temporary Grasses: will contain the following species.
Avena sativa (Seed Oats)
Lolium multiflorum (Annual Rye)

Recommended Seed Rate: 30lb/acre

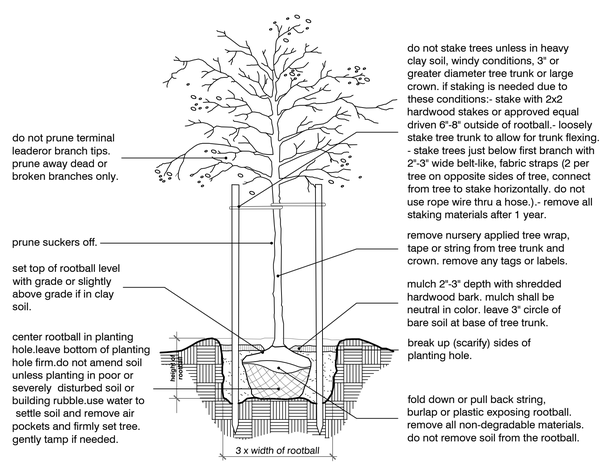
SOURCE:
NATIVESCAPE LLC
P.O. BOX 122
MANCHESTER, MI 48158
ph: 517.456.9646
www.nativescape.net



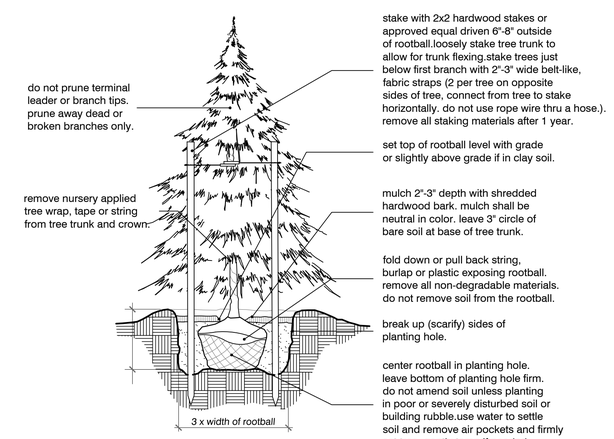
perennial planting detail
no scale



shrub planting detail
no scale



tree planting detail
no scale



evergreen planting detail
no scale

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Community Land Planner and registered Landscape Architect
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ph. (248) 557-5588
fax. (248) 557-5416

seal:

client:
PULTE HOMES
100 Bloomfiled Hills Parkway,Suite 150, Bloomfield Hills, Michigan 48304

project:
BELLA VISTA
A proposed residential community

project location:
PITTSFIELD TWP, MI

S. MAPLE RD. AND ANN ARBOR-SALINE RD.

sheet title:
PLANT DETAIL AND MATERIAL LIST

job no./issue/revision date:

LS16.051.05	REVIEW	5-19-2016
LS16.051.09	PSA	9-8-2016
LS16.051.11	PSA	11-8-2016
LS16.051.11A	PSA	11-15-2016
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LS18.132.12	SPA	12-12-2018
LS19.010.01	SPA	1-9-2019
LS19.010.02	SPA	2-8-2019

drawn by: JP, Km
checked by: FP
date: 2-5-2019

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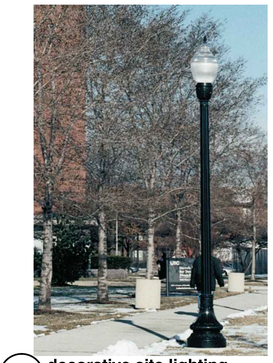
project no: LS19.010.02

sheet no: **LS-6** of 9



7A decorative site lighting

(2-CONDITIONS)

MANUFACTURER:
HOLOPHANE OR EQUAL

GRANVILLE BUSINESS PARK, BLDG. A
3825 COLUMBUS ROAD
GRANVILLE, OHIO 43023

PH. 866-759-1577

FINISH: BLACK

7B park bench seating

(2-CONDITIONS)

6' WIDE BENCH SEAT BY DUMOR, INC. MODEL NO. 34-6060D (5-2) RECYCLED PLASTIC POLYESTER POWER-COATED FRAME OR EQUAL

MANUFACTURER:
DUMOR SITE FURNISHINGS
P.O. BOX 142, MIFFLINTOWN, PA 17059
WEB: WWW.DUMOR.COM
PH. 800-598-4018

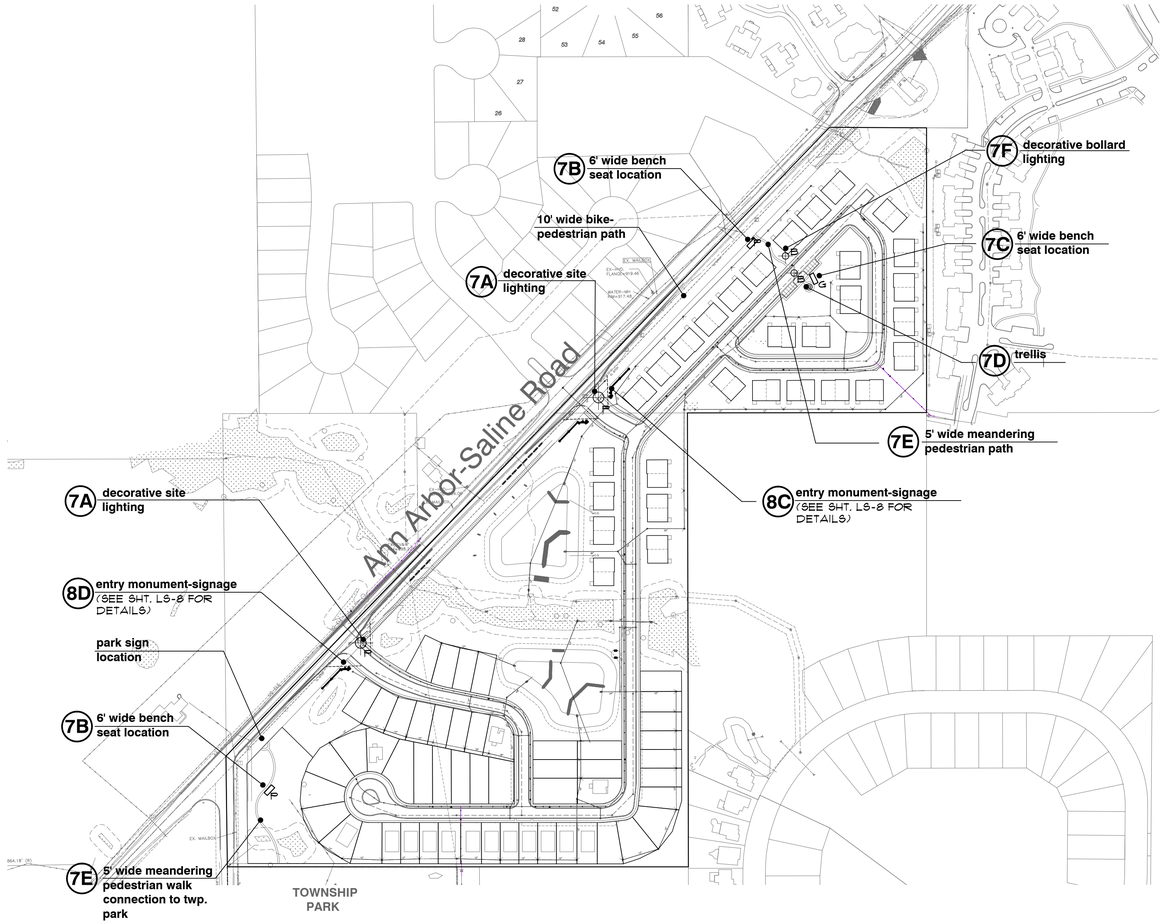
7C gazebo bench seating

(1-CONDITIONS)

MANUFACTURER:
DUMOR SITE FURNISHINGS
P.O. BOX 142, MIFFLINTOWN, PA 17059
WEB: WWW.DUMOR.COM
PH. 800-598-4018

MODEL No. BENCH 57 (57PL) OR EQUAL
SLATS: RECYCLED PLASTIC

LENGTH: 6'-0"
FINISH: BLACK



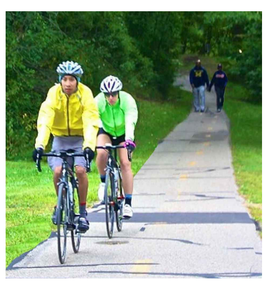
site amenity reference location map

NO SCALE

7D trellis

(1 CONDITION)

STICK BUILT OR KIT FORM



7E pedestrian walk

7F decorative bollard light

(2-CONDITIONS)

MODEL: HADCO-30 RLLD274HAD
OR EQUAL

30" HIGH X 6" DIAMETER

PHILIPS NORTH AMERICA CORPORTION
3000 MINUTEMAN ROAD, MS/109
ANDOVER, MA 01810
PH. 866- 954-4489

amenity legend

- B — Bollard Light Fixture
- P — Decorative Pole Light Fixture
- G — Bench Seating (Gazebo)
- P — Park Bench Seat
- Trellis

FPA
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Community Land Planner and registered Landscape Architect
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fax. (248) 557-5416

seal:

STATE OF MICHIGAN — FELINO A. PASCUAL — LANDSCAPE ARCHITECT — No. 01433 — REGISTERED LANDSCAPE ARCHITECT

client:

PULTE HOMES

100 Bloomfiled Hills Parkway,Suite 150,
Bloomfield Hills, Michigan 48304

project:

BELLA VISTA
A proposed residential community

project location:

PITTSFIELD TWP, MI

S. MAPLE RD. AND ANN ARBOR-SALINE RD.

sheet title:

SITE AMENITY PLAN

job no./issue/revision date:

LS16.051.05	REVIEW	5-19-2016
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LS16.051.11	PSA	11-8-2016
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LS18.132.12	SPA	12-12-2018
LS19.010.01	SPA	1-9-2019
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drawn by:
JP, Km

checked by:
FP

date:
2-5-2019

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project no:
LS19.010.02

sheet no:
LS-7 of 9

entry wall monument / pier/ signage / notes:

1. LOCATE AND STAKE ALL EXISTING AND PROPOSED UTILITIES PRIOR TO CONSTRUCTION. COORDINATE ANY ADJUSTMENTS WITH ARCHITECT.

2. ALL ENTRY WALL LIGHTING SHALL BE CONTROLLED WITH A 'PHOTO-EYE' SWITCH. ALL LIGHTING SHALL BE SHIELDED FROM PUBLIC R.O.W.'S AND ADJACENT PROPERTIES.

3. SEE LANDSCAPE PLAN FOR PROPOSED PLANTINGS ADJACENT TO PROPOSED ENTRY SIGN MONUMENTS, PIERS & FENCES.

4. VERIFY SOIL BEARING CAPACITY PRIOR TO TO ENTRY SIGN MONUMENT & PIER CONSTRUCTION. IF SOIL BEARING CAPACITY FALLS BELOW STANDARD REQUIREMENTS, CONSULT STRUCTURAL ENGINEER FOR RECOMMENDATION OF FINAL ENTRY MONUMENT & PIER FOOTING DESIGN.

5. SIGNAGE TEXT AND LOGO TO BE METAL PRISMATIC DIMENSIONAL LETTERS. PRIOR TO SIGN INSTALLATION, PERMITS TO BE OBTAINED PER PITTSFIELD TOWNSHIP REQUIREMENTS AND APPROVALS.

6. ALL INFORMATION CONTAINED HEREIN IS SUBJECT TO APPROVAL, AND PERMITS PERMITS TO BE OBTAINED PRIOR TO CONSTRUCTION.

7. CAST STONE WALL, PIER CAPS & TRIM BY ROYAL STONE LLC • 3014 DIETZ ROAD, WILLIAMSTON, MI 48895
PHONE: 517-655-5158
WEBSITE: WWW.ROYALSTONEINC.COM OR EQUAL

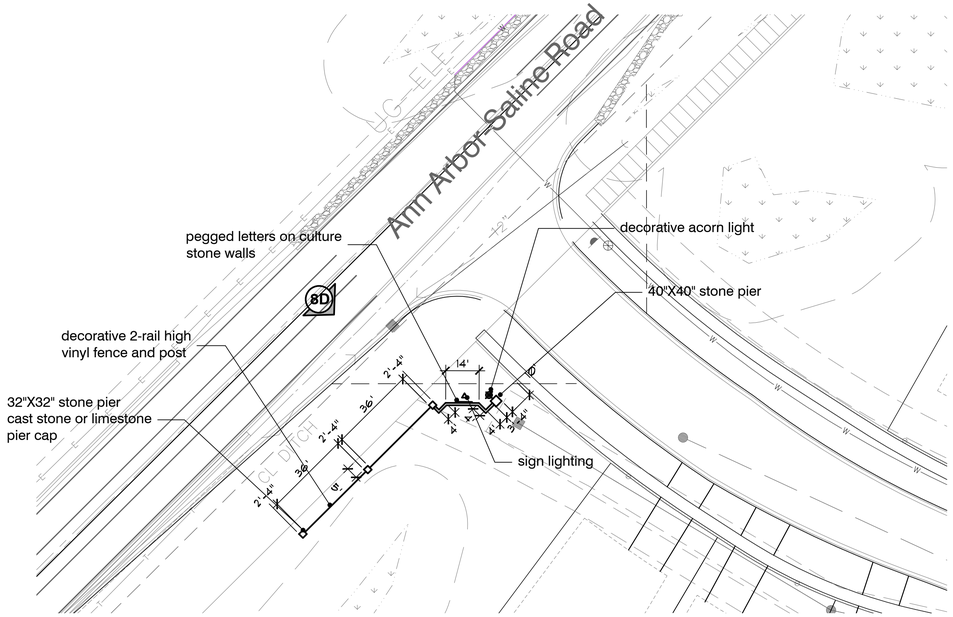
8. FOOTINGS SHALL BEAR ON FIRM, UNDISTURBED SOIL WITH AN ASSUMED SAFE BEARING CAPACITY OF 2000 P.S.I. IF SOIL OF THIS CAPACITY IS NOT FOUND AT THE ELEVATIONS INDICATED, FOOTINGS SHALL BE ENLARGED OR LOWERED AT THE DIRECTION OF THE ARCHITECT. VERIFY FOUNDATION SOIL BEARING PRESSURE IN FIELD BY SOILS ENGINEER.

9. MINIMUM CONCRETE STRENGTH TO BE 3000 P.S.I. @ 28 DAYS, U.O.N.± SLABS SHALL BE 3500 P.S.I. MIN. U.O.N.± EXPOSED CONCRETE SHALL BE 4000 P.S.I. WITH 6% ± 1% ENTRAINED AIR U.O.N.

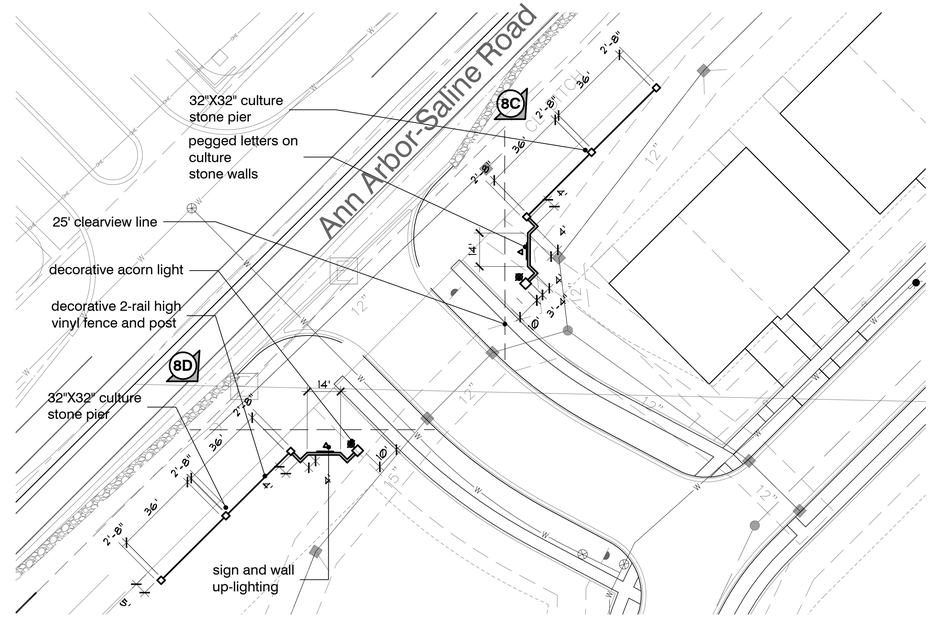
10. ALL CONCRETE WORK AND PLACEMENT SHALL CONFORM TO THE LATEST RECOMMENDATIONS OF A.C.I.

11. PROVIDE DOWELS INTO FOUNDATION TO MATCH SIZE AND SPACING OF VERTICAL REINFORCEMENT AT ALL WALLS, UNLESS OTHERWISE NOTED.

12. PROVIDE MINIMUM 3" CONCRETE COVER FOR REINFORCEMENT BARS BELOW GRADE AND MINIMUM 2" CONCRETE COVER FOR REINFORCEMENT BARS ABOVE GRADE.

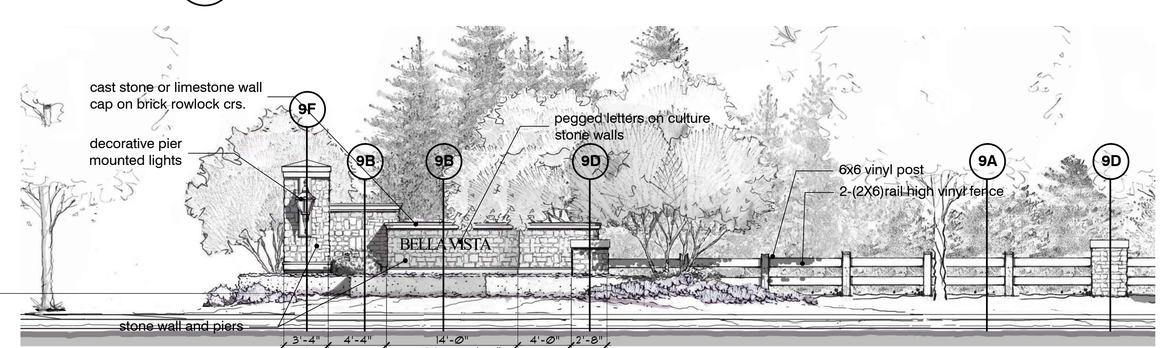


8A entry monument site plan
scale: 30'=1' - 0"



8B entry monument site plan
scale: 30'=1' - 0"

8C Ann Arbor-Saline Road entry monument elevation
scale 3/16=1'-0"



8D Ann Arbor-Saline Road entry monument elevation
scale 3/16=1'-0"

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BELLA VISTA
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S. MAPLE RD. AND ANN ARBOR-SALINE RD.

sheet title:
ENTRY SIGN MONUMENT

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LS19.010.02	SPA	2-8-2019

drawn by: **JP, Km**
checked by: **FP**
date: **2-5-2019**

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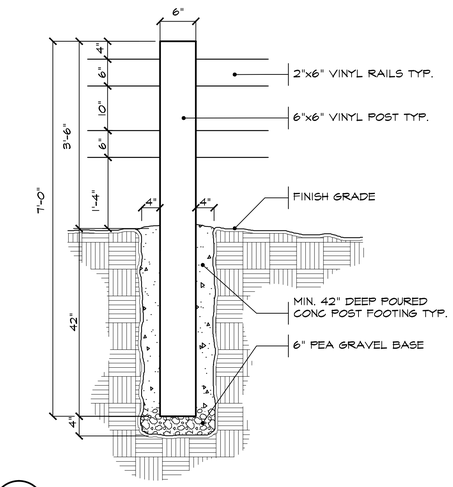
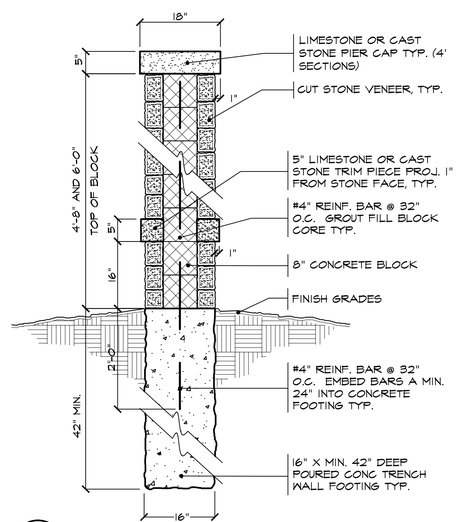


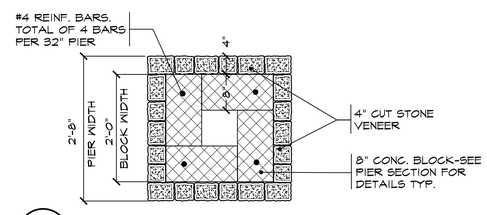
9A fence detail

SCALE: 3/4"= 1'-0"



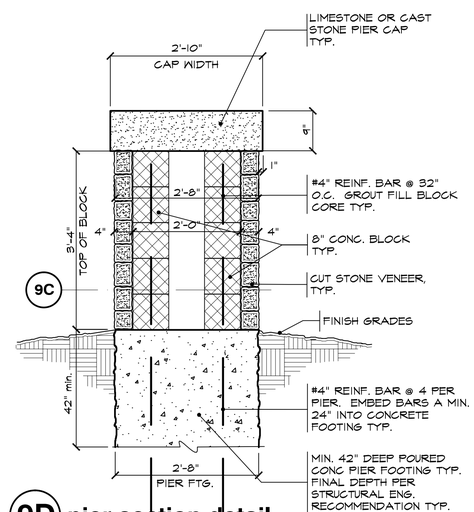
9B wall section detail

SCALE: 3/4"= 1'-0"



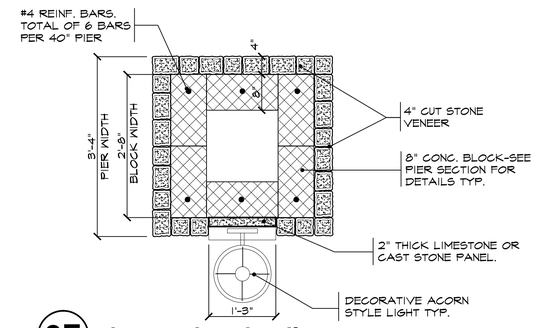
9C pier section detail

SCALE: 3/4"= 1'-0"



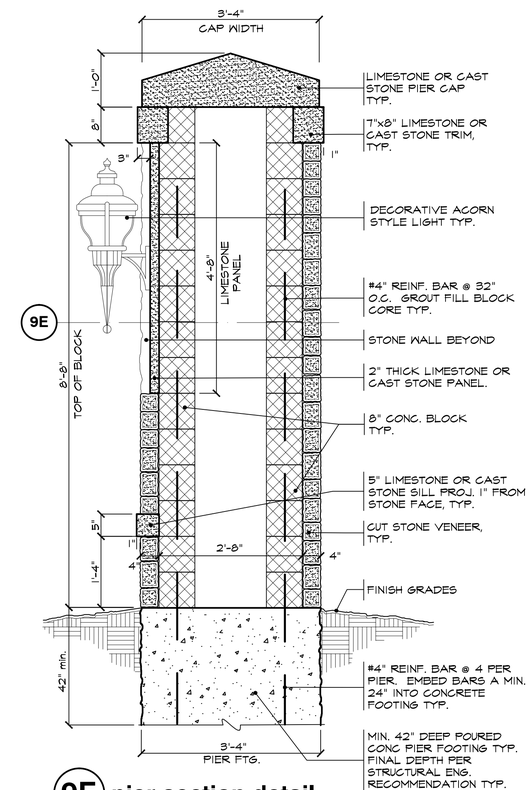
9D pier section detail

SCALE: 3/4"= 1'-0"



9E pier section detail

SCALE: 3/4"= 1'-0"



9F pier section detail

SCALE: 3/4"= 1'-0"

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seal:

STATE OF MICHIGAN
FELINO A. PASCUAL
LANDSCAPE ARCHITECT
REG. NO. 01433
REGISTERED LANDSCAPE ARCHITECT

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sheet no:
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