
PITTSFIELD TOWNSHIP PLANNING COMMISSION AGENDA

- 1.0 Call Meeting to Order at 6:30 p.m. / Determination of a Quorum**
- 2.0 Pledge of Allegiance**
- 3.0 Approval of Agenda** 1-2
- 4.0 Approval of Prior Minutes** 3-8
- 5.0 Public Comment I**
- If there is a member of the public that wishes to address the Planning Commission, please step forward.
- 6.0 Public Hearings**
- 7.0 Old Business**
- 8.0 New Business**
- 8.1 CSPA 19-17 Monarch Estates** 9-46
Submitted for Final Site Plan Approval
5662 Platt Road (L -12-22-400-024), Section 22
- 9.0 Planner's Report**
- 9.1 Open Space Preservation Development Option Discussion** 47-60
- 10.0 Chairperson's Report**
- 11.0 Commissioner's Report**
- 12.0 Public Comment II**
- 13.0 Adjournment**

Please Note: This meeting is being recorded

In compliance with Governor of Michigan's Executive Order, the Pittsfield Township Planning Commission will conduct its June 18, 2020 meeting electronically. Public participation at the June 18, 2020 Planning Commission meeting will be via teleconference and videoconference in order to reduce the risk of exposure to persons with the COVID-19 virus and to comply with Executive Order's restrictions on in-person governmental functions.

To participate as a member of the public:

- For videoconferencing go to:
- <https://zoom.us/j/93729229076?pwd=TGdURzlGQXJkaVpkWUtPUnNVN01pdz09>
Password: Pittsfield
- Or iPhone one-tap :
US: +13126266799,,93729229076#,,1#,326284# or
+19292056099,,93729229076#,,1#,326284#
- Or Telephone:
Dial (for higher quality, dial a number based on your current location):

US: +1 312 626 6799 or +1 929 205 6099 or +1 301 715 8592 or +1 346 248 7799
or +1 669 900 6833 or +1 253 215 8782 or 877 853 5257 (Toll Free) or 888 475 4499
(Toll Free)

- Webinar ID: 937 2922 9076
- International numbers available: <https://zoom.us/j/93729229076>
- If you are a member of the public and cannot connect, please call (734) 216-9347.

Further instructions on participating in public comment will be provided once the meeting has been called to order in order to ensure two-way communication between the Planning Commission and the members of the public.

Written comments will be received at zoning@pittsfield-mi.gov until 3:00 p.m. the day of the hearing.

Any person who wishes to contact members of the Planning Commission to provide input or ask questions on any business coming before the Planning Commission on June 18, 2020 may do so by calling 734-216-9347 or emailing zoning@pittsfield-mi.gov prior to the meeting. Reasonable auxiliary aids and services can be provided at the meeting to individuals with disabilities by contacting the Clerk's Office at (734) 822-3120 or via email at clerk@pittsfield-mi.gov at least three business days in advance.

This notice is posted in compliance with PA 267 of 1976 (as amended) Open Meetings Act, MCL 125.3103 and 125.3502 and the Americans with Disabilities Act (ADA). Individuals with disabilities requiring auxiliary aids or services should contact the Pittsfield Charter Township Clerk's Office 3 business days prior to the meeting. The Clerk's Office can be reached at 734-822-3120 or via email clerk@pittsfield-mi.gov.

PITTSFIELD TOWNSHIP PLANNING COMMISSION MINUTES

Members Present: Stanley Young, Deborah Williams, Roland Kibler, George Ralph, Ann Harris, Mike Petraszko, Matthew Payne

Members Absent: None

Others Present: Belinda Kingsley, Corey & Michelle Weaver, Dave Brewer, Gregory Heim, Ted Hirsch, Adrian Cipleu, Michael Drozdowski, Christina Lirones, Benjamin Carlisle, Township Planning Consultant, Annette Pascarelli, Typographer, and Zoe Crowley, Recording Clerk.

1.0 Call Meeting to Order at 6:30 p.m. / Determination of a Quorum

Chairperson Payne called the meeting to order at 6:30 p.m. A quorum was present.

2.0 Pledge of Allegiance

Chairperson Payne led the Pledge of Allegiance.

3.0 Approval of Agenda

Motion to approve the agenda as recommended.

Motion by Commissioner Williams, supported by Commissioner Harris, to approve the agenda as recommended.

MOTION CARRIED

4.0 Approval of Prior Minutes

4.1 Regular Minutes of May 21, 2020

Motion by Commissioner Williams, supported by Commissioner Kibler, to approve the Regular Meeting Minutes of May 21, 2020.

MOTION CARRIED

5.0 Public Comment I

None.

6.0 Public Hearings

None.

7.0 Old Business

7.1 CUP 20-02 and CSPA 20-05 Zippy Car Wash

Submitted for Preliminary Site Plan and Conditional Use Resolution of Approval
3952 Bestech Drive, (L-12-23-110-002)
Section 23

Chairman Payne noted that there was unanimous support for staff to draft a resolution of approval at the May 21, 2020 Planning Commission meeting.

Mr. Carlisle stated the resolution was in the June 4, 2020 Planning Commission meeting packet. He indicated that the Planning Commission had stipulated several conditions at the May 21, 2020 meeting for the applicant to meet. The applicant will come back to the Commission for final site plan approval with those conditions met.

Motion by Commissioner Williams, supported by Commissioner Harris, to approve CSPA 20-05 Zippy Car Wash Site Plan and approve CUP 20-02 Zippy Car Wash Resolution of Approval, with the following conditions:

1. **Provide tree mitigation on site or request relief from Planning Commission to pay into tree fund;**
2. **Address wetland review comments by ECT;**
3. **Provide detailed landscape plan;**
4. **Provide dumpster enclosure detail;**
5. **Submit photometric plan that is compliant with Section 13.05**

ROLL CALL

**YES: HARRIS, PETRASZKO, YOUNG, PETRASZKO,
KIBLER, RALPH, PAYNE**

NO: None

ABSENT: None

ABSTAIN: None

MOTION CARRIED

7.2 CUP 19-01 and CSPA 19-27 MMA Group

Submitted for Preliminary Site Plan and Conditional Use Resolution of Approval
4130 E. Morgan Road, (L-12-24-200-057) Section 24

Mr. Carlisle summarized his review. The applicant is requesting a Conditional Use to allow a truck terminal at 4130 E. Morgan Road. The applicant is proposing to provide twelve (12) tractor and trailer parking spaces. The property currently operates a minor vehicle repair shop (previously approved conditional use) and a warehouse for light manufacturing (permitted use). The conditional use permit is being requested to allow for the short-term storage/parking of trucks at the southeast corner of the property. Truck terminals are a conditional use in the General Industrial zoning district. On February 6, 2020, the Planning Commission

held a public hearing to consider the truck terminal use. There was lengthy discussion on access, storm water maintenance, and pavement. Fundamentally the Planning Commission was not opposed to the use of facility in part as a truck terminal facility; however the applicant was required to obtain a variance to not have to pave the site. The Planning Commission postponed action to allow the applicant to be considered by the Zoning Board of Appeals. In addition, the Planning Commission requested that the applicant replace the removed stormwater forebay and prove the satisfaction that storm water management on the site is sufficient. On April 27, 2020, the Zoning Board of appeals held a public hearing. At the same meeting, the Zoning Board of Appeals granted a variance to provide relief for the applicant to not have to pave the portion of the site with the proposed truck terminal use. He noted there is a resolution for approval in the June 4, 2020 meeting packet.

Motion by Commissioner Williams, supported by Commissioner Young, to approve CSPA 19-27 MMA Group Site Plan and approve CUP 19-01 MMA Resolution of Approval:

ROLL CALL

**YES: KIBLER, PAYNE, WILLIAMS, HARRIS,
PETRASZKO, YOUNG, RALPH**
NO: None
ABSENT: None
ABSTAIN: None

MOTION CARRIED

7.3

CSPA 19-11 & CUP 19-05 Royal Granite

Submitted for Preliminary Site Plan and Conditional Use Resolution of Approval
4995 Carpenter Road, (L-12-13-300-009) Section 13

Mr. Carlisle summarized his review. The applicant is requesting a Conditional Use to allow a truck terminal at 4995 Carpenter Road. The applicant is proposing to provide outdoor parking for five (5) semi-trucks on-site. Truck terminals are a conditional use in the General Industrial zoning district. The applicant was required to obtain a variance from the Zoning Board of Appeals. The variance would not require them to pave a section of the site. The applicant was granted a variance with a few conditions. These conditions included providing better access to the site, as well as providing additional screening. The applicant was also required to put a series of electrical outlets on the site, as opposed to running extension cords across it. He noted there was a resolution in the June 4, 2020 packet.

Discussion was held on:

1. Number and size of trucks
2. Electrical permits

Motion by Commissioner Williams, supported by Commissioner Ralph, to approve CSPA 19-11 Royal Granite Site Plan and approve CUP 19-05 Royal Granite Resolution of Approval, with the following condition:

1. Applicant to obtain the necessary electrical building permit

ROLL CALL

YES: WILLIAMS, HARRIS, RALPH, KIBLER,
YOUNG, PAYNE, PETRASZKO
NO: None
ABSENT: None
ABSTAIN: None

MOTION CARRIED

8.0 New Business

None.

9.0 Planner's Report

9.1 Open Space Preservation Development Option Discussion

Mr. Carlisle referenced the sustainability workshops the Planning Commission has undergone. The first revised ordinance to review is the Open Space Preservation

Development Option (OSPDO). Attached is a revised OSPDO ordinance with track changes.

Significant changes include:

1. Require that an OSPDO maintain a minimum of thirty percent (30%) of the gross area of the site as dedicated open space held in common ownership. Open space between 30 to 49% would require a conditional use. Open space 50% and over would be a permitted use.
2. Permitting OSPDO for multiple family development. Currently the ordinance doesn't permit OSPDO developments for multiple family (R-2, and R-3) districts. There may be opportunities to require/encourage OSPDO developments for multiple family developments.
3. Reducing minimum lot area from 5 acres to 1 acre. Requiring 5 acres is a high burden. Reducing the minimum size of a site may encourage smaller, infill OSPDOs in more urban portions of the township.
4. Eliminate requirement that OSPDO has to be in non-urban service areas. Currently OSPDO developments are only permitted in the rural, non-utility portions of the township. By removing this requirement, OSPDO can be developed in all portions of the township.
5. To establish density for OSPDO in urban areas, the applicant shall provide a "parallel" plan. A parallel plan is a plan showing the number of dwelling units developable in the zoning district in which the proposed development is located, developed with a conventional layout and all applicable ordinances and laws observed. The parallel plan will establish the base density for the OSPDO.
6. Giving authority to the Planning Commission to waiver dimensional requirements (setbacks, lot coverage, etc) if applicants can demonstrate innovative and creative site and building designs and solutions, which would otherwise be unfeasible or unlikely to be achieved absent this provision.

Questions for the Planning Commission to consider:

1. Is allowing OPSDO development in urban service areas appropriate?
2. Is allowing OPSDO development for multiple family residential uses appropriate?
3. 3. Is providing a 20% density bonus appropriate to encourage the use of the Open Space Preservation Development Option?
4. 4. Does the Planning Commission want the authority to allow for deviations from dimensional (setbacks, lot coverage, etc) requirements?

Discussion was held on:

1. Planning Commission authority
2. Open space within the urban service area, not just well and sceptic
3. Multifamily districts
4. Holistic view compared to singular issues
5. Balancing flexibility with abuse
6. 20% density bonus with discretionary approval
7. Building height ordinance standards and caps

Mr. Carlisle indicated he would bring the Zoning Ordinance Amendments back to the June 18, 2020 Planning Commission meeting for discussion. If the Commission is comfortable, he will then proceed with a Public Hearing.

Chairperson Payne concurred with the proposed schedule.

10.0 Chairperson's Report

Chairperson Payne asked for an update on Superior Lawn Care and KBK Garden Center. He inquired about whether or not staff had done a recent site inspection on either properties. He asked if Mr. Fink has been able to coordinate with the State of Michigan yet.

Mr. Carlisle stated that he and Belinda Kingsley, Zoning and Code Enforcement Administrator, visited Superior Lawn Care on May 22, 2020. They also visited adjacent properties. He noted that the property was cleaner. There were, however, still numerous, ongoing violations. Ms. Kingsley is currently putting together a list, including pictures, for the Planning Commission. There is currently no date set or Superior to return to the Planning Commission. Similarly, staff has visited KBK and documented additional work on the site. Staff is preparing a list, which will include pictures. Staff has reached out to the Department of Agriculture for a meeting, which will take place the following week. He indicated that while the Right to Farm issue is important, it does not pertain to the Conditional Use Permit itself.

11.0 Commissioner's Report

None.

12.0 Public Comment II

Christina Lirones, 151 E. Textile Road, commented on the Open Space Ordinance. She recalled that the State of Michigan required every Township to adopt an Open Space Ordinance. This served as a template, and each Township adopted the same ordinance. She noted that this language was handed down from the State. The language was not altered, because Pittsfield Township already had a Planned United Development ordinance. She stated that the ordinance covered everything that was in the Open Space ordinance. She noted that the advantage of the Open Space ordinance is that it is permitted by right. It allows clustering without having to go through the Planned Unit Development ordinance. Density has never been incentivized in the Township. She clarified, stating that if a developer is building a Planned Unit Development, bargaining for density has not been permitted. She stated she is concerned about any incentives. She believes the more control, the better. She is concerned about the clarity, and that it may lead to miscommunications.

13.0 Adjournment

Motion by Commissioner Harris, seconded by Commissioner Ralph, to adjourn the meeting.

Chairperson Payne adjourned the meeting at 7:33 pm.

Deborah Williams, Secretary

June 18, 2020

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Monarch Estates



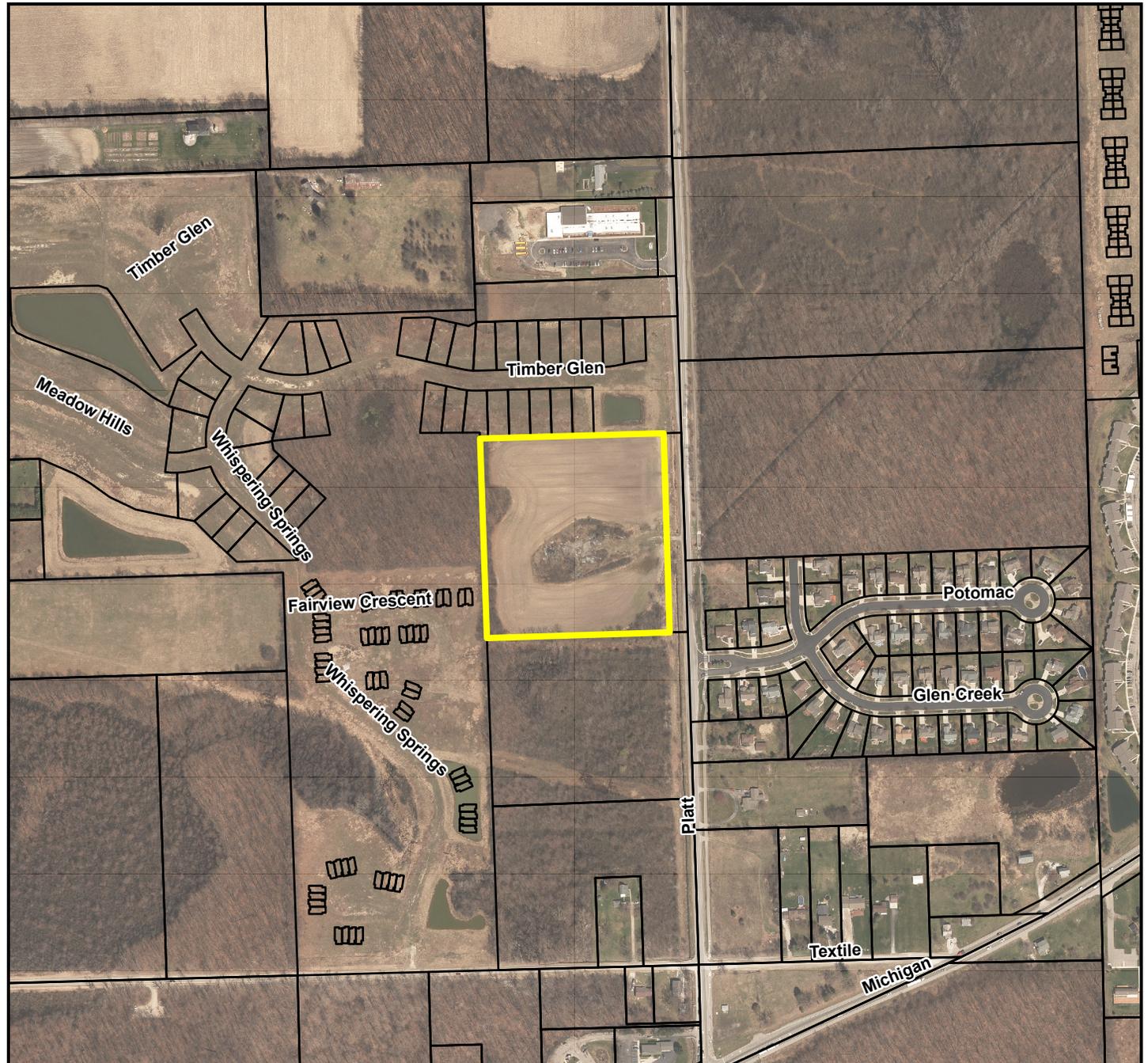
Meeting Date:
June 18, 2020

Project:
CSPA 19-17

Applicant:
Diverse Realestate LLC

Action:
Commercial Site Plan
Approval

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36



0 600 1,000 Feet





Pittsfield Charter Township
 Department of Utilities & Municipal Services
 6201 West Michigan Avenue, Ann Arbor, MI 48108
 Phone: (734) 822-3130 Fax: (734) 944-1103
 Website: www.pittsfield-mi.gov Email: planning@pittsfield-mi.gov

Commercial Site Plan Approval Application

Applicant Requirement Checklist

- Project Fees** (must be paid by cash or check when application is submitted)
Administrative Fee is non-refundable
- Completed Application Form**
- Ten (10) sets of the proposed site plan.** Three (3) full size plan sets, and seven (7) reduced (11x17) plan sets (N/A with Engineering Plan Submittal)
- A CD or USB Drive** containing the entire plan set

:: OFFICE USE ::

CSPA # 19-17
 ZP App Fee 1200-
 Escrow Fee \$ 7884.50 *
 Total \$ 9084.50

Submittal Information

This application and site plan is being submitted for the following consideration:

- Preliminary Site Plan
- Combined Preliminary/Final Site Plan
- Administrative Review
- Final Site Plan
- Amendment of Approved Plan
- Engineering Plan

Date of Plan: 07-26-2019

Number of Sheets: 10

Name of Proposed Development: Monarch Estates

Total Number of: Lots: 22 Units: _____ Units/Buildings: _____

Total Floor Area Proposed (Sq. Ft.): N/A Estimated Cost of Site Work: \$200,000

Estimated Cost of Vertical Building: N/A Proposed Date of Construction: May 2020

Property Information

General Location of Site _____ Or 5662 Platt Road
 Street Number Street Name
 Parcel I.D. # 12-22 - 400 - 016 Gross Acreage of Site: 10.12 Net Acreage: 8.98

Applicant Information

(Please Print)

Diverse Real Estate LLC Cosimo Lombardo
 Company Name (If Applicable) Applicant's Name
13001 23 Mile Road, Suite 200 MI 48315
 Address City State Zip
(586) 232-9098 _____ cosimo@lombardohomes.com
 Contact Number Fax Number Email Address

Applicant's Compliance Agreement

The applicant(s) represents that they are the owner(s) of the subject property or are acting on behalf of the above listed owner, and herewith file thirteen (13) copies of the identified drawing of the property or site plan and all supporting material. The applicant also acknowledges that the filing of this application grants permission for Township staff and/or officials to enter the property to determine the accuracy of the submitted information including existing conditions. If the applicant is not the owner, the owner must fill out the owner affidavit.

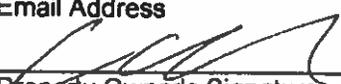
[Signature]
 Applicant's Signature
7/23/19
 Date

Cosimo Lombardo
 Applicant's Name (Please Print)

* PAID 1.5% (of \$200,000) ENGINEERING FEES + \$500 ENG APP FEE.

:: Office Use ::		Time Stamp
Received By:	<u>SS</u>	<u>8/9/19</u>
(Initials)		

Escrow Information (To be filled out if different than the applicant information)			
(Please Print)			
Company Name		Contact Name	
Address	City	State	Zip
()	()		
Contact Number	Fax Number	Email Address	

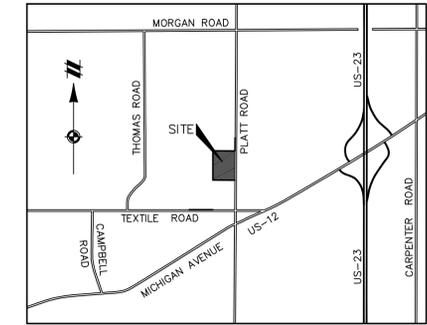
Property Owner Information			
(Please Print)			
SE Michigan Land Development LLC		(586) 232-9098	
Property Owner's Name		Contact Number	
13001 23 Mile Road, Suite 200	Shelby Twp	MI	48315
Address	City	State	Zip
cosimo@lombardohomes.com		()	
Email Address		Fax Number	
		7/23/19	
Property Owner's Signature		Date	

Site Planner/Engineer			
(Please Print)			
Atwell, LLC		John Ackerman	
Company Name		Contact Name	
Two Towne Square, Suite 700	Southfield	MI	48076
Address	City	State	Zip
(248) 447-2000	(248) 447-2001	jackerman@atwell-group.com	
Contact Number	Fax Number	Email Address	

Submittal by the application deadline does not guarantee placement on the agenda for the meeting date indicated on the meeting schedule.

Monarch Estates

PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN
 SINGLE-FAMILY RESIDENTIAL SITE CONDOMINIUM
 PHASE I FINAL SITE PLANS



LOCATION MAP
NOT TO SCALE

PROJECT CONTACTS

DEVELOPER / APPLICANT
 DIVERSE REAL ESTATE, LLC
 13001 23 MILE ROAD, SUITE 200
 SHELBY TOWNSHIP, MI 48315
 PHONE: (586) 781-2364
 CONTACT:
 GREG WINDINGLAND
 EMAIL: GWINDINGLAND@LOMBARDOHOMES.COM

ENGINEER
 ATWELL, LLC
 TWO TOWNE SQUARE, SUITE 700
 SOUTHFIELD, MICHIGAN 48076
 PHONE: (248) 447-2000
 CONTACT:
 MR. ERIC LORD, P.E.
 EMAIL: ELORD@ATWELL-GROUP.COM
 MR. JOHN ACKERMAN, RLA
 EMAIL: JACKERMAN@ATWELL-GROUP.COM

LANDSCAPE ARCHITECT
 ALLEN DESIGN
 557 CARPENTER
 NORTHVILLE, MICHIGAN 48167
 PHONE: (248) 467-4668
 CONTACT:
 MR. JAMES ALLEN
 EMAIL: JCA@WIDEOPENWEST.COM

LEGAL DESCRIPTION

DESCRIPTION OF A 9.206 ACRE PARCEL OF LAND BEING A PART OF THE SOUTHEAST 1/4 OF SECTION 22, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN.

COMMENCING AT THE EAST 1/4 CORNER OF SECTION 22, T3S, R6E, PITTSFIELD TOWNSHIP, WASHTENAW COUNTY, MICHIGAN; THENCE S01°01'55"W 912.87 FEET (RECORDED AS 912.0 FEET) ALONG THE EAST LINE OF SAID SECTION 22 AND THE CENTERLINE OF PLATT ROAD (VARIABLE WIDTH); THENCE N88°46'35"W 60.00 FEET FOR A PLACE OF BEGINNING; THENCE S01°01'55"W 660.06 FEET ALONG THE WEST RIGHT OF WAY LINE OF SAID PLATT ROAD; THENCE N88°50'13"W 606.64 FEET; THENCE N00°55'27"E 660.71 FEET (RECORDED AS 660.00 FEET); THENCE S88°46'35"E 607.89 FEET TO THE PLACE OF BEGINNING, BEING A PART OF THE SOUTHEAST 1/4 OF SAID SECTION 22, CONTAINING 9.206 ACRES OF LAND, MORE OR LESS, BEING SUBJECT TO EASEMENTS, CONDITIONS, RESTRICTIONS AND EXCEPTIONS OF RECORD, IF ANY.

PERMITS REQUIRED

WCRC ROAD & DRAINAGE
 WCRC FINAL SITE PLAN / DRAINAGE DISTRICT
 EGLE SANITARY SEWER
 EGLE WATERMAIN
 EGLE WETLAND/FLOODPLAIN
 NPDES CONSTRUCTION ACTIVITY PERMIT
 SESC PITTSFIELD TOWNSHIP
 CONDITIONAL LOMR



OVERALL SITE PLAN
NOT TO SCALE

SHEET LIST	
Sheet Number	Sheet Title
1	COVER SHEET
2	EXISTING CONDITIONS & DEMOLITION PLAN
3	EXISTING NATURAL FEATURES PLAN
4	TREE SURVEY AND REMOVAL
5	LAYOUT PLAN
6	GRADING PLAN
7	INTERSECTION PLAN
8	ENTRANCE & PLATT ROAD LAYOUT PLAN
9	ENTRANCE & PLATT ROAD GRADING PLAN
10	KOCH-WARNER DRAIN PLAN & PROFILE
11	UTILITY PLAN
12	DESIGN CALCULATIONS
13	STORM WATER MANAGEMENT PLAN
14	DRAINAGE AREA PLAN
15	DETENTION BASIN PLAN & PROFILE
16	DETENTION BASIN CALCULATIONS
17	FIRE PROTECTION PLAN
18	CONSTRUCTION DETAILS
19	PITTSFIELD TWP. STORM SEWER DETAILS & SPECIFICATIONS
20	PITTSFIELD TWP. WATER MAIN DETAILS
21	PITTSFIELD TWP. SANITARY SEWER DETAILS
22	PITTSFIELD TWP. EARTHWORK SPECIFICATIONS
23	PITTSFIELD TWP. SANITARY SEWER SPECIFICATIONS
24	PITTSFIELD TWP. WATER MAIN SPECIFICATIONS

L-1	LANDSCAPE PLAN
L-2	LANDSCAPE DETAILS

SITE NOTES

- TRASH REMOVAL WILL BE BY CURBSIDE PICK-UP.
- PROPOSED ROADS WILL BE PRIVATE.
- ROOF AND SUMP DRAINAGE MUST BE DIRECTLY DISCHARGED TO GRADE OR STORM SEWER MANHOLE IF POSSIBLE.
- OPEN SPACE AREAS WILL BE GENERAL COMMON ELEMENTS.
- THE PUBLIC ROAD IMPROVEMENTS SHOWN ON THESE PLANS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE 2012 MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.
- MAILBOXES WILL BE LOCATED AT EACH UNIT.



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 ANY PERSONS ENGAGED IN THE WORK, OR ANY NEARBY STRUCTURES, OR OF ANY OTHER PERSONS.

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SECTION 22
 TOWN 3 SOUTH, RANGE 6 EAST
 PITTSFIELD TOWNSHIP
 WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC
 MONARCH ESTATES
 PHASE I FINAL SITE PLAN
 COVER SHEET

DATE: NOVEMBER 22, 2019

2020-02-28 PER TWP
 2020-4-20 PER TWP/CLIENT

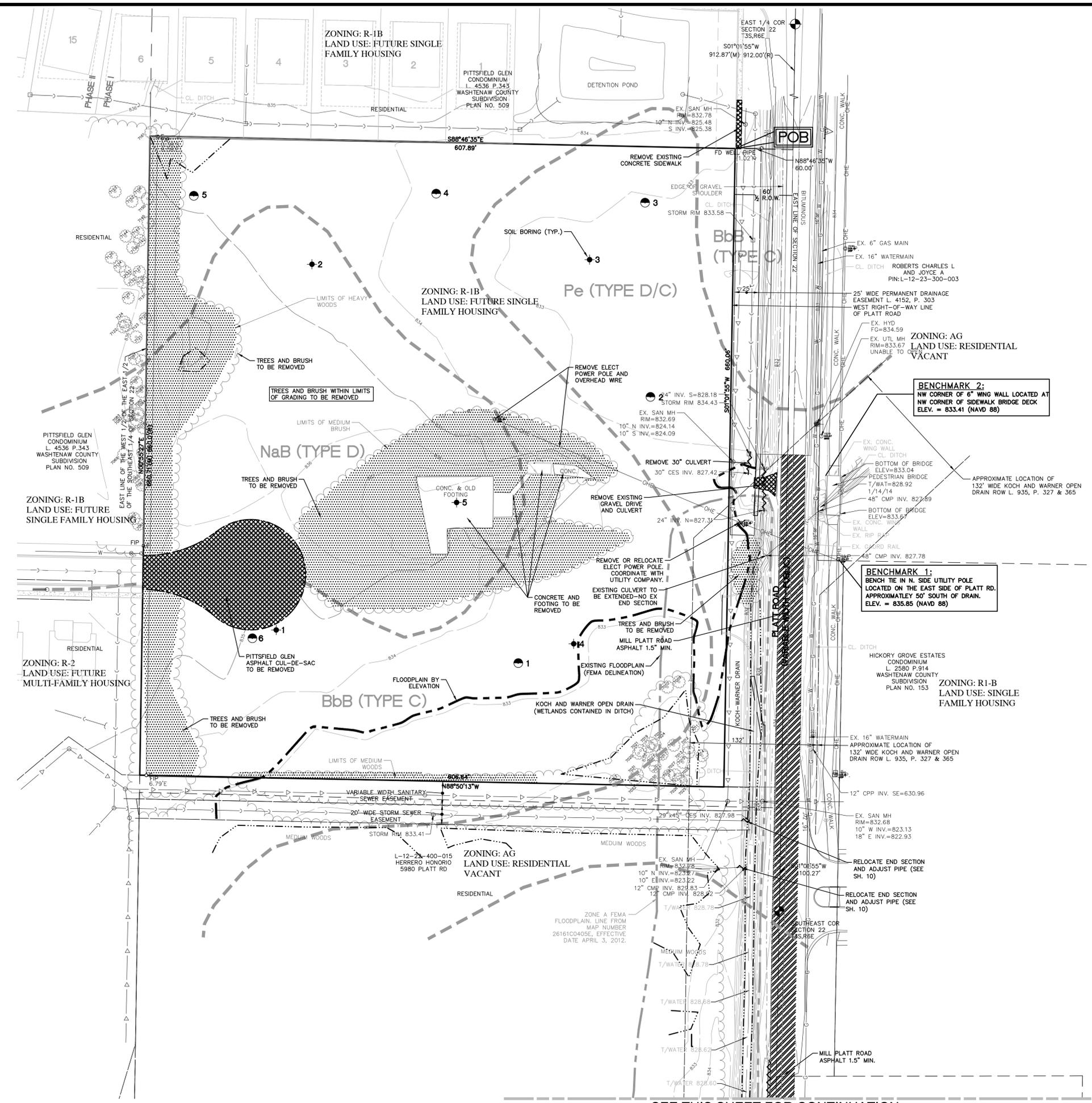
REVISIONS

NA NA NA
 N/A

DRAWN BY: KS
 CHECKED BY: JK
 P.M.: J. ACKERMAN
 JOB #: 12002004
 FILE CODE: -
 SHEET NO. 1

MONARCH ESTATES
 C.S.P.A.# 19-17

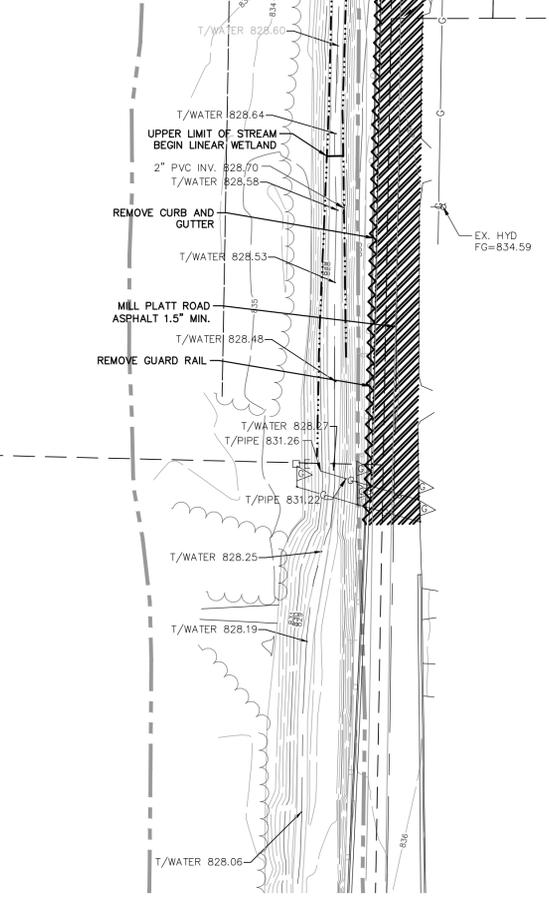
K:\12002004\DWG\PLAN SETS\SITE-FINAL\12002004SF-02-TP.DWG 4/20/2020 2:49 PM AMMAR KALASHO



LEGEND

	PROPERTY LINE
	EXISTING 1' CONTOUR
	EXISTING 5' CONTOUR
	EXISTING R.O.W. LINE
	CENTERLINE OF ROAD
	EASEMENT
	EXISTING FENCE
	EXISTING STORM SEWER
	EXISTING MANHOLE/CATCH BASIN/END SECTION
	EXISTING WATER MAIN
	EXISTING HYDRANT
	EXISTING GATE VALVE & WELL
	EXISTING SANITARY SEWER
	EXISTING SANITARY SEWER MANHOLE
	EXISTING TREE LINE
	BRUSH & TREE REMOVAL
	GRAVEL AND PAVEMENT REMOVAL
	ASPHALT PAVEMENT MILLING
	SOIL BORING (McDOWELL & ASSOCIATES 03-02-2012)
	SOIL BORING (McDOWELL & ASSOCIATES 09-20-2016)
	EXISTING SOIL TYPE BOUNDARY
	EXISTING FLOODPLAIN (BY ELEVATION)
	EXISTING FLOODPLAIN (FEMA DELINEATION)
	EXISTING WETLAND

SEE THIS SHEET FOR CONTINUATION



FLOODPLAIN

1. THE FLOODPLAIN SHOWN AND LABELED 'FEMA DELINEATION' IS PER FEMA FIRM PANEL 405 OF 585, MAP NUMBER 26161C0405E, EFFECTIVE APRIL 3, 2012.
2. FLOODPLAIN DELINEATION SHOWN AND LABELED 'BY ELEVATION' IS PER McDOWELL & ASSOCIATES REPORT AND ADDENDUM LETTER DATED NOVEMBER 5, 2019. THE 100-YEAR FLOODPLAIN ELEVATION RANGES FROM 833.01' TO 833.06'.

SOILS TABLE

SYMBOL	NAME	SLOPE	HYD. GROUP
BbB	BLOUNT LOAM	2%-6%	C
NaB	NAPPANEE SILTY CLAY LOAM	2%-6%	D
Pe	PEWAMO CLAY LOAM	<4%	D/C

GAS MAIN NOTE:

AN EXISTING GAS MAIN WAS ENCOUNTERED ALONG THE EAST SIDE OF PLATT ROAD DURING THE WATER MAIN TIE-IN FOR THE NEIGHBORING PITTSFIELD GLEN. THE APPLICANT SHALL VERIFY THE LOCATION OF THE GAS MAIN. THE GAS MAIN SHALL BE POTHOLED AT THE WATER MAIN TIE-IN LOCATION PRIOR TO CONSTRUCTION TO VERIFY THERE IS ADEQUATE SPACE FOR A GATE WELL.

SEE THIS SHEET FOR CONTINUATION



Know what's below.
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SECTION 22	TOWN 3 SOUTH, RANGE 6 EAST	PITTSFIELD TOWNSHIP	WASHTENAW COUNTY, MICHIGAN
SE MICHIGAN LAND HOLDINGS LLC	MONARCH ESTATES	PHASE I FINAL SITE PLAN	EXISTING CONDITIONS & DEMOLITION PLAN

DATE: NOVEMBER 22, 2019
 2020-02-28 PER TWP
 2020-4-20 PER TWP/CLIENT

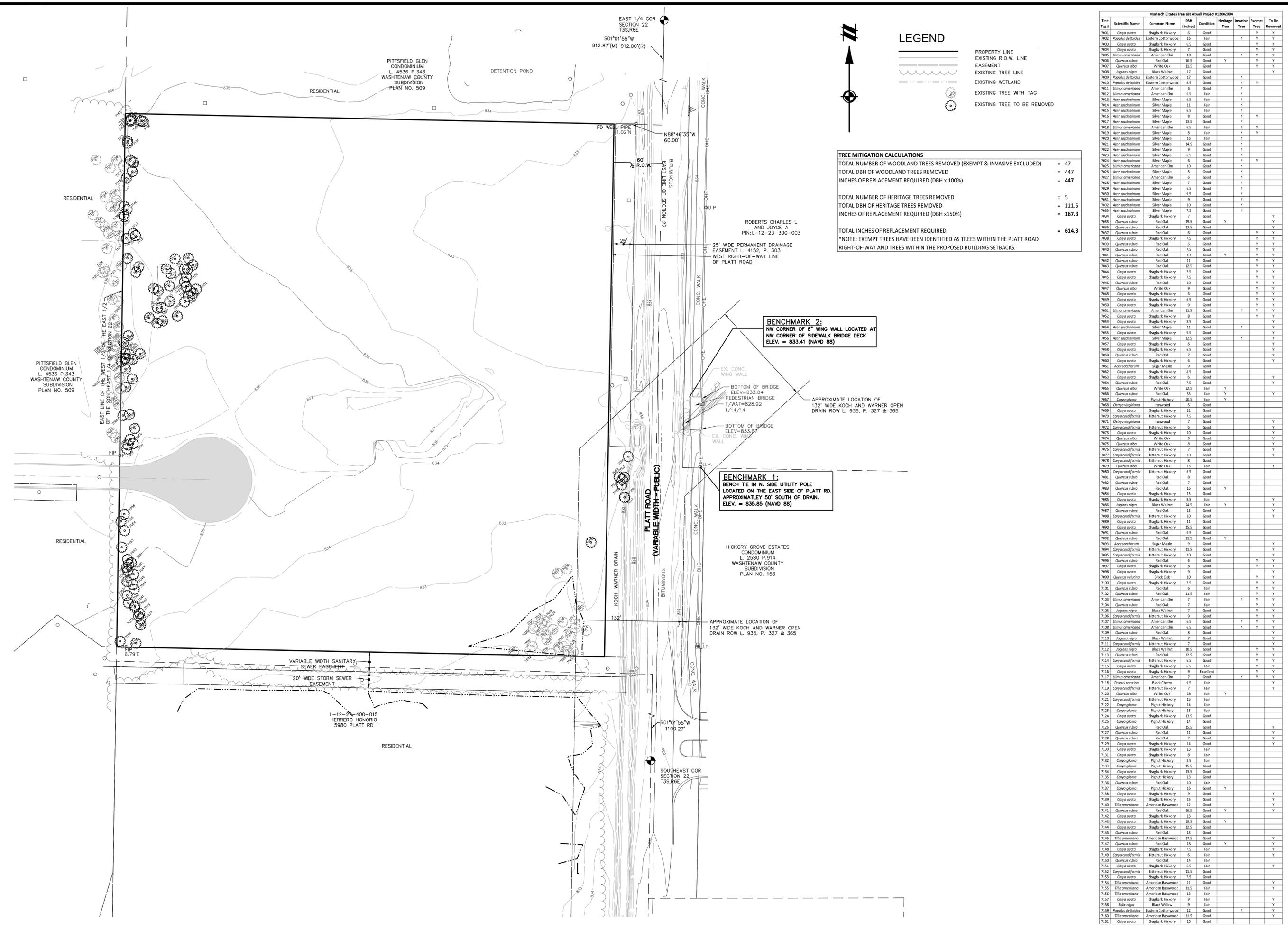
REVISIONS

SCALE: 1" = 50 FEET

DRAWN BY: KS
 CHECKED BY: JK
 P.M.: J. ACKERMAN
 JOB #: 12002004
 FILE CODE: -
 SHEET NO. **2**

CAD FILE: 12002004SF-02-TP.DWG

K:\12002004\DWG\PLAN SETS\SITE-FINAL\12002004SF-18-18-TREE.DWG 4/20/2020 2:50 PM ANMAR KALASHO



LEGEND

- PROPERTY LINE
- EXISTING R.O.W. LINE
- EASEMENT
- EXISTING TREE LINE
- EXISTING WETLAND
- EXISTING TREE WITH TAG
- EXISTING TREE TO BE REMOVED

TREE MITIGATION CALCULATIONS

TOTAL NUMBER OF WOODLAND TREES REMOVED (EXEMPT & INVASIVE EXCLUDED) = 47

TOTAL DBH OF WOODLAND TREES REMOVED = 447

INCHES OF REPLACEMENT REQUIRED (DBH x 100%) = 447

TOTAL NUMBER OF HERITAGE TREES REMOVED = 5

TOTAL DBH OF HERITAGE TREES REMOVED = 111.5

INCHES OF REPLACEMENT REQUIRED (DBH x 150%) = 167.3

TOTAL INCHES OF REPLACEMENT REQUIRED = 614.3

*NOTE: EXEMPT TREES HAVE BEEN IDENTIFIED AS TREES WITHIN THE PLATT ROAD RIGHT-OF-WAY AND TREES WITHIN THE PROPOSED BUILDING SETBACKS.

BENCHMARK 2:
NW CORNER OF 6" WING WALL LOCATED AT
NW CORNER OF SIDEWALK BRIDGE DECK
ELEV. = 833.41 (NAVD 88)

BENCHMARK 1:
BENCH TIE IN N. SIDE UTILITY POLE
LOCATED ON THE EAST SIDE OF PLATT RD.
APPROXIMATELY 50' SOUTH OF DRAIN.
ELEV. = 835.85 (NAVD 88)

Tree Tag #	Scientific Name	Common Name	DBH (inches)	Condition	Heritage Tree	Invasive	Exempt	To Be Removed
7001	Carya ovata	Shagbark Hickory	6	Good			Y	Y
7002	Populus deltoides	Eastern Cottonwood	16	Fair			Y	Y
7003	Carya ovata	Shagbark Hickory	6.5	Good			Y	Y
7004	Carya ovata	Shagbark Hickory	7	Good			Y	Y
7005	Ulmus americana	American Elm	10	Good			Y	Y
7006	Quercus rubra	Red Oak	8.5	Good	Y		Y	Y
7007	Quercus alba	White Oak	11.5	Good			Y	Y
7008	Juglans nigra	Black Walnut	17	Good			Y	Y
7009	Populus deltoides	Eastern Cottonwood	16	Good			Y	Y
7010	Populus deltoides	Eastern Cottonwood	6.5	Good			Y	Y
7011	Ulmus americana	American Elm	6	Good			Y	Y
7012	Ulmus americana	American Elm	6.5	Fair			Y	Y
7013	Acer saccharinum	Silver Maple	6.5	Fair			Y	Y
7014	Acer saccharinum	Silver Maple	11	Fair			Y	Y
7015	Acer saccharinum	Silver Maple	6.5	Fair			Y	Y
7016	Acer saccharinum	Silver Maple	8	Good			Y	Y
7017	Acer saccharinum	Silver Maple	13.5	Good			Y	Y
7018	Ulmus americana	American Elm	6.5	Fair			Y	Y
7019	Acer saccharinum	Silver Maple	8	Fair			Y	Y
7020	Acer saccharinum	Silver Maple	16	Fair			Y	Y
7021	Acer saccharinum	Silver Maple	14.5	Good			Y	Y
7022	Acer saccharinum	Silver Maple	9	Good			Y	Y
7023	Acer saccharinum	Silver Maple	6.5	Good			Y	Y
7024	Acer saccharinum	Silver Maple	6	Good			Y	Y
7025	Ulmus americana	American Elm	10	Good			Y	Y
7026	Acer saccharinum	Silver Maple	8	Good			Y	Y
7027	Ulmus americana	American Elm	6	Good			Y	Y
7028	Acer saccharinum	Silver Maple	7	Good			Y	Y
7029	Acer saccharinum	Silver Maple	6.5	Good			Y	Y
7030	Acer saccharinum	Silver Maple	9.5	Good			Y	Y
7031	Acer saccharinum	Silver Maple	9	Good			Y	Y
7032	Acer saccharinum	Silver Maple	10	Good			Y	Y
7033	Acer saccharinum	Silver Maple	7.5	Good			Y	Y
7034	Carya ovata	Shagbark Hickory	7	Good			Y	Y
7035	Quercus rubra	Red Oak	19.5	Good	Y		Y	Y
7036	Quercus rubra	Red Oak	12.5	Good			Y	Y
7037	Quercus rubra	Red Oak	6	Good			Y	Y
7038	Carya ovata	Shagbark Hickory	7.5	Good			Y	Y
7039	Quercus rubra	Red Oak	10	Good			Y	Y
7040	Quercus rubra	Red Oak	7.5	Good			Y	Y
7041	Quercus rubra	Red Oak	19	Good	Y		Y	Y
7042	Quercus rubra	Red Oak	11	Good			Y	Y
7043	Quercus rubra	Red Oak	12.5	Good			Y	Y
7044	Carya ovata	Shagbark Hickory	7.5	Good			Y	Y
7045	Carya ovata	Shagbark Hickory	7.5	Good			Y	Y
7046	Quercus rubra	Red Oak	10	Good			Y	Y
7047	Quercus alba	White Oak	9	Good			Y	Y
7048	Carya ovata	Shagbark Hickory	6	Good			Y	Y
7049	Carya ovata	Shagbark Hickory	6.5	Good			Y	Y
7050	Carya ovata	Shagbark Hickory	9	Good			Y	Y
7051	Ulmus americana	American Elm	11.5	Good			Y	Y
7052	Carya ovata	Shagbark Hickory	8	Good			Y	Y
7053	Carya ovata	Shagbark Hickory	8.5	Good			Y	Y
7054	Acer saccharinum	Silver Maple	11	Good			Y	Y
7055	Carya ovata	Shagbark Hickory	9.5	Good			Y	Y
7056	Acer saccharinum	Silver Maple	12.5	Good			Y	Y
7057	Carya ovata	Shagbark Hickory	6	Good			Y	Y
7058	Carya ovata	Shagbark Hickory	6.5	Good			Y	Y
7059	Quercus rubra	Red Oak	7	Good			Y	Y
7060	Carya ovata	Shagbark Hickory	6	Good			Y	Y
7061	Acer saccharinum	Sugar Maple	9	Good			Y	Y
7062	Carya ovata	Shagbark Hickory	8.5	Good			Y	Y
7063	Carya ovata	Shagbark Hickory	6	Good			Y	Y
7064	Quercus rubra	Red Oak	7.5	Good			Y	Y
7065	Quercus rubra	White Oak	22.5	Fair	Y		Y	Y
7066	Quercus rubra	Red Oak	13	Fair	Y		Y	Y
7067	Carya glabra	Pignut Hickory	20.5	Fair	Y		Y	Y
7068	Ostrya virginiana	Ironwood	6	Good			Y	Y
7069	Carya ovata	Shagbark Hickory	11	Good			Y	Y
7070	Carya cordiformis	Bitternut Hickory	7.5	Good			Y	Y
7071	Ostrya virginiana	Ironwood	7	Good			Y	Y
7072	Carya cordiformis	Bitternut Hickory	6	Good			Y	Y
7073	Carya ovata	Shagbark Hickory	10	Good			Y	Y
7074	Quercus alba	White Oak	9	Good			Y	Y
7075	Quercus alba	White Oak	8	Good			Y	Y
7076	Carya cordiformis	Bitternut Hickory	7	Good			Y	Y
7077	Carya cordiformis	Bitternut Hickory	10	Good			Y	Y
7078	Carya cordiformis	Bitternut Hickory	8	Good			Y	Y
7079	Quercus alba	White Oak	13	Fair			Y	Y
7080	Carya cordiformis	Bitternut Hickory	6.5	Good			Y	Y
7081	Quercus rubra	Red Oak	8	Good			Y	Y
7082	Quercus rubra	Red Oak	7	Good			Y	Y
7083	Quercus rubra	Red Oak	16	Good	Y		Y	Y
7084	Carya ovata	Shagbark Hickory	13	Good			Y	Y
7085	Carya ovata	Shagbark Hickory	9.5	Fair			Y	Y
7086	Juglans nigra	Black Walnut	24.5	Fair	Y		Y	Y
7087	Quercus rubra	Red Oak	13	Good			Y	Y
7088	Carya cordiformis	Bitternut Hickory	10	Good			Y	Y
7089	Carya ovata	Shagbark Hickory	11	Good			Y	Y
7090	Carya ovata	Shagbark Hickory	15.5	Good			Y	Y
7091	Quercus rubra	Red Oak	9.5	Good			Y	Y
7092	Quercus rubra	Red Oak	21.5	Good	Y		Y	Y
7093	Acer saccharinum	Sugar Maple	9	Good			Y	Y
7094	Carya cordiformis	Bitternut Hickory	11.5	Good			Y	Y
7095	Carya cordiformis	Bitternut Hickory	10	Good			Y	Y
7096	Quercus rubra	Red Oak	6	Good			Y	Y
7097	Carya ovata	Shagbark Hickory	8	Good			Y	Y
7098	Carya ovata	Shagbark Hickory	9	Good			Y	Y
7099	Quercus velutina	Black Oak	10	Good			Y	Y
7100	Carya ovata	Shagbark Hickory	7.5	Good			Y	Y
7101	Quercus rubra	Red Oak	6	Fair			Y	Y
7102	Quercus rubra	Red Oak	11.5	Fair			Y	Y
7103	Ulmus americana	American Elm	7	Fair			Y	Y
7104	Quercus rubra	Red Oak	7	Fair			Y	Y
7105	Juglans nigra	Black Walnut	7	Good			Y	Y
7106	Carya cordiformis	Bitternut Hickory	9	Good			Y	Y
7107	Ulmus americana	American Elm	6.5	Good			Y	Y
7108	Ulmus americana	American Elm	6.5	Good			Y	Y
7109	Quercus rubra	Red Oak	8	Good			Y	Y
7110	Juglans nigra	Black Walnut	7	Good			Y	Y
7111	Carya cordiformis	Bitternut Hickory	7	Good			Y	Y
7112	Juglans nigra	Black Walnut	10.5	Good			Y	Y
7113	Quercus rubra	Red Oak	12.5	Good			Y	Y
7114	Carya cordiformis	Bitternut Hickory	6.5	Good			Y	Y
7115	Carya ovata	Shagbark Hickory	9	Fair			Y	Y
7116	Carya ovata	Shagbark Hickory	9	Excellent			Y	Y
7117	Ulmus americana	American Elm	7	Good			Y	Y
7118	Prunus serotina	Black Cherry	9.5	Fair			Y	Y
7119	Carya cordiformis	Bitternut Hickory	7	Fair			Y	Y
7120	Quercus alba	White Oak	26	Fair	Y		Y	Y
7121	Carya cordiformis	Bitternut Hickory	15	Fair			Y	Y
7122	Carya glabra	Pignut Hickory	14	Fair			Y	Y
7123	Carya glabra	Pignut Hickory	13	Fair			Y	Y
7124	Carya ovata	Shagbark Hickory	13.5	Good			Y	Y
7125	Carya glabra	Pignut Hickory	14	Good			Y	Y
7126	Quercus rubra	Red Oak	15.5	Good			Y	Y
7127	Quercus rubra	Red Oak	11	Good			Y	Y
7128	Quercus rubra	Red Oak	7	Good			Y	Y
7129	Carya ovata	Shagbark Hickory	14	Good			Y	Y
7130	Carya ovata	Shagbark Hickory	13	Fair			Y	Y
7131	Carya ovata	Shagbark Hickory	8	Fair			Y	Y
7132	Carya glabra	Pignut Hickory	8.5	Fair			Y	Y
7133	Carya glabra	Pignut Hickory	15.5	Good			Y	Y
7134	Carya ovata	Shagbark Hickory	13.5	Good			Y	Y
7135	Carya glabra	Pignut Hickory	13	Good			Y	Y
7136	Quercus rubra	Red Oak	10	Fair			Y	Y
7137	Carya glabra	Pignut Hickory	16	Good			Y	Y
7138	Carya ovata	Shagbark Hickory	9	Good			Y	Y
7139	Carya ovata	Shagbark Hickory	15	Good			Y	Y
7140	Tilia americana	American Basswood	12	Good			Y	Y
7141	Quercus rubra	Red Oak	16.5	Good	Y		Y	Y
7142	Carya ovata	Shagbark Hickory	13	Good			Y	Y
7143	Carya ovata	Shagbark Hickory	18.5	Good	Y		Y	Y
7144	Carya ovata	Shagbark Hickory	12.5	Good			Y	Y
7145	Quercus rubra	Red Oak	13	Good			Y	Y
7146	Tilia americana	American Basswood	17.5	Good			Y	Y
7147	Quercus rubra	Red Oak	18	Good	Y		Y	Y
7148	Carya ovata	Shagbark Hickory	7.5	Fair			Y	Y
7149	Carya cordiformis	Bitternut Hickory	6	Fair			Y	Y
7150	Quercus rubra	Red Oak	14	Fair			Y	Y
7151	Carya ovata	Shagbark Hickory	6.5	Fair			Y	Y
7152	Carya cordiformis	Bitternut Hickory	11.5	Good			Y	Y
7153	Carya ovata	Shagbark Hickory	7.5	Good			Y	Y
7154	Tilia americana	American Basswood	11	Good			Y	Y
7155	Tilia americana	American Basswood	11.5	Fair			Y	Y
7156	Tilia americana	American Basswood	13	Fair			Y	Y
7157	Carya ovata	Shagbark Hickory	9	Fair			Y	Y
7158	Salix nigra	Black Willow	9	Fair			Y	Y
7159	Populus deltoides	Eastern Cottonwood	12	Good			Y	Y
7160	Tilia americana	American Basswood	11.5	Good			Y	Y
7161	Carya ovata	Shagbark Hickory	15	Good			Y	Y

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SECTION 22

TOWN 3 SOUTH, RANGE 6 EAST

PITTSFIELD TOWNSHIP

WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC

MONARCH ESTATES

PHASE I FINAL SITE PLAN

TREE SURVEY AND REMOVAL

DATE: NOVEMBER 22, 2019

2020-02-28 PER TWP

2020-4-20 PER TWP/CJENT

REVISIONS

0 25 50

SCALE: 1" = 50 FEET

DRAWN BY: KS

CHECKED BY: JK

P.M.: J. ACKERMAN

JOB #: 12002004

FILE CODE: -

SHEET NO. 4



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SECTION 22
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC
MONARCH ESTATES
PHASE I FINAL SITE PLAN
LAYOUT PLAN

DATE: NOVEMBER 22, 2019

2020-02-28 PER TWP
2020-4-20 PER TWP/CLIENT

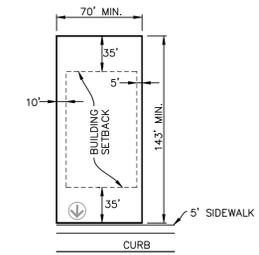
Table with 2 columns: REVISIONS, and a grid for recording changes.

SCALE: 1" = 50 FEET

DRAWN BY: KS
CHECKED BY: JK
P.M.: J. ACKERMAN
JOB #: 12002004
FILE CODE: -
SHEET NO. 5

LEGEND

- PROPERTY LINE
EXISTING ROW
EXISTING CURB AND GUTTER
PROPOSED CURB AND GUTTER
PROPOSED BUILDING SETBACK
PROPOSED DRIVEWAY
PROPOSED ASPHALT (ON-SITE)
PROPOSED ASPHALT (PLATT ROAD R.O.W.)
PROPOSED 1.5" MILL & OVERLAY
PROPOSED CONCRETE
PROPOSED GRAVEL
PROPOSED GRASS PAVERS
PROPOSED PHASE LINE



TYPICAL LOT DETAIL (NOT TO SCALE)

Parcel Table with columns: Parcel #, Area (S.F.), Acreage. Lists parcels 1-7.

Parcel Table with columns: Parcel #, Area (S.F.), Acreage. Lists parcels 8-14.

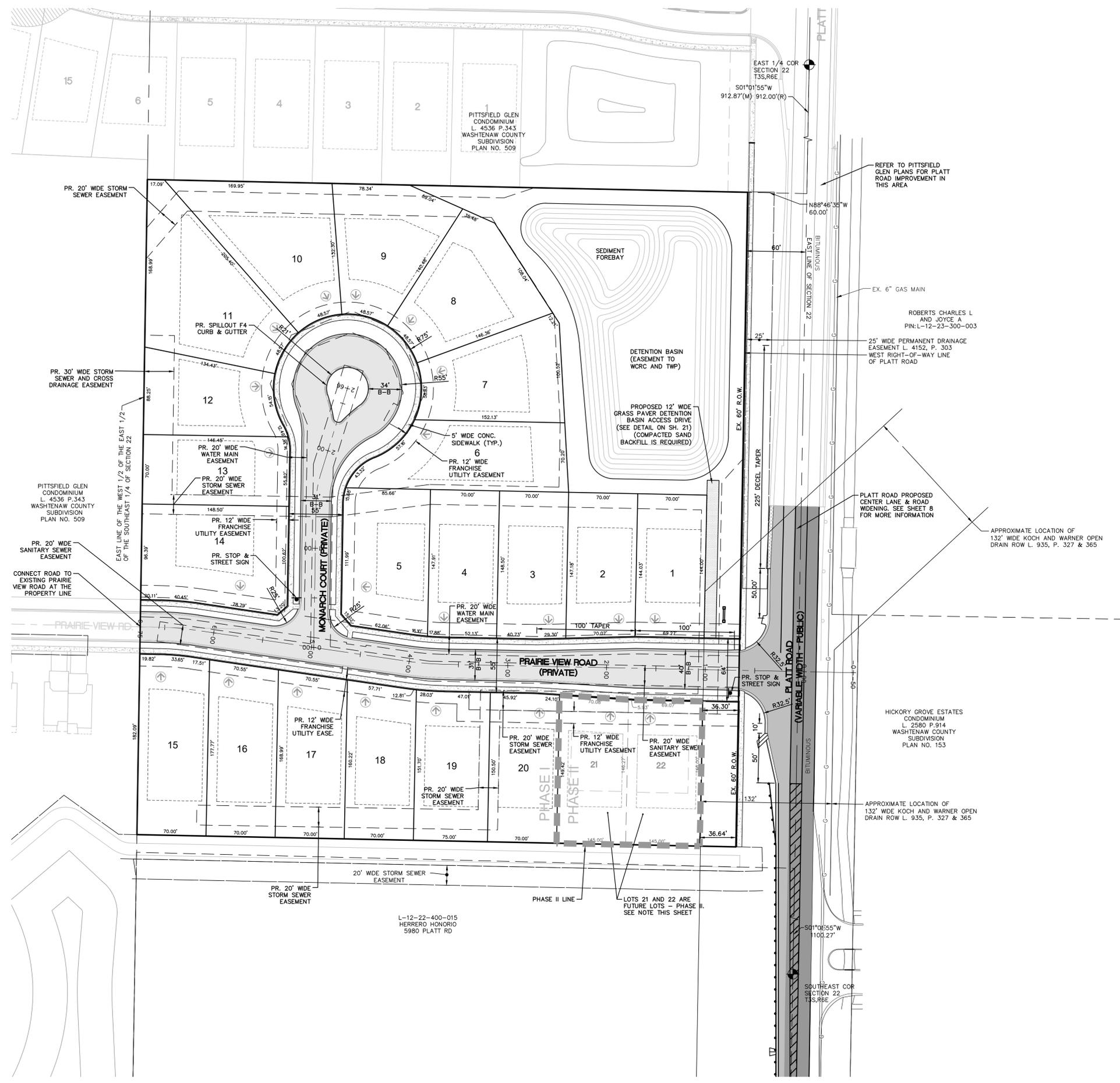
Parcel Table with columns: Parcel #, Area (S.F.), Acreage. Lists parcels 15-20.

- NOTES:
1. REFER TO SHEET 18 FOR TYPICAL ROAD CROSS SECTION AND OTHER SITE CONSTRUCTION DETAILS.
2. DIMENSIONS ARE SHOWN FROM BACK OF CURB.
3. REFER TO PITTSFIELD GLEN SET OF PLANS FOR PLATT ROAD IMPROVEMENT NORTH OF THE IMPROVEMENTS PROPOSED IN THIS SET OF PLANS.
4. FOR DETAILED PLATT ROAD IMPROVEMENTS DESIGN, REFER TO SHEET 7 & 8.

SITE DATA

Table comparing REQUIRED and PROPOSED site data for R-1B zoning, including site use, area, setbacks, and lot coverage.

FUTURE LOTS NOTE: LOTS 21 AND 22 ARE FUTURE LOTS. DETAILED DESIGN AND INFORMATION WILL BE PROVIDED AS A SEPARATE SUBMITTAL PACKAGE. THE CONSTRUCTION OF THESE FUTURE LOTS IS DEPENDANT UPON COMPLIANCE WITH THE WETLAND MITIGATION REQUIREMENTS.



K:\12002004\DWG\PLAN SETS\SITE-FINAL\12002004SF-04-LDWG 4/20/2020 2:51 PM AMMAR KALASHO



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SECTION 22
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC
MONARCH ESTATES
PHASE I FINAL SITE PLAN
GRADING PLAN

DATE: NOVEMBER 22, 2019

2020-02-28 PER TWP
2020-4-20 PER TWP/CLIENT

Table with 2 columns: REVISIONS, and empty rows for revision details.

SCALE: 1" = 50 FEET
DRAWN BY: KS
CHECKED BY: JK
P.M.: J. ACKERMAN
JOB #: 12002004
FILE CODE: -
SHEET NO. 6

LEGEND

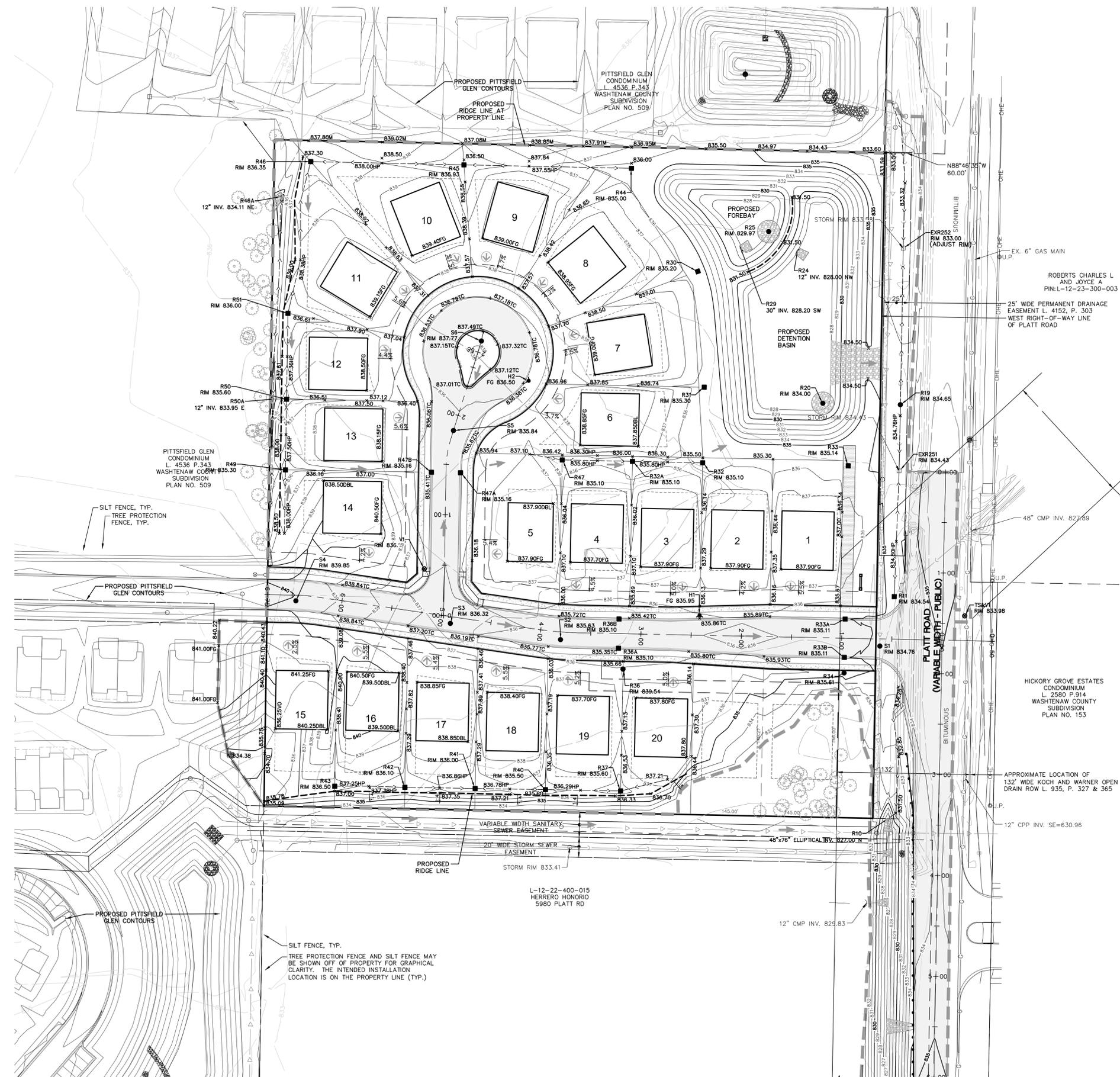
- 588 --- PROPOSED 1' CONTOUR
- 590 --- PROPOSED 5' CONTOUR
- 585 --- EXISTING 1' CONTOUR
- 590 --- EXISTING 5' CONTOUR
- --- PROPERTY LINE
- --- PROPOSED R.O.W. LINE
- --- RIDGE LINE
- --- EXISTING MANHOLE/CATCH BASIN/END SECTION
- --- PROPOSED MANHOLE/CATCH BASIN/END SECTION
- --- EXISTING HYDRANT
- --- PROPOSED HYDRANT
- --- EXISTING GATE VALVE & WELL
- --- PROPOSED GATE VALVE & WELL
- --- EXISTING SANITARY SEWER MANHOLE
- --- PROPOSED SANITARY SEWER MANHOLE
- --- EXISTING STORM SEWER
- --- PROPOSED STORM SEWER
- --- EXISTING WATER MAIN
- --- PROPOSED WATER MAIN
- --- EXISTING SANITARY SEWER
- --- PROPOSED SANITARY SEWER
- --- PROPOSED SPOT GRADE
- --- PROPOSED DRAINAGE ARROW
- --- PROPOSED DRIVEWAY
- --- PROPOSED OVERLAND OVERFLOW ROUTE
- --- PROPOSED ASPHALT
- --- PROPOSED CONCRETE

SPOT GRADE DESIGNATIONS
FG = FINISH GRADE/FLANGE
DRL = DROP BRICK LEDGE
VO = VELOWT
WO = WALKOUT
RM = RIM GRADE/FLOW LINE
HF = HIGH POINT
TC = TOP OF CURB
TW = TOP OF WALK
EM = EDGE OF METAL

GRADING NOTES

- ALL WALKWAYS MUST BE ADA COMPLIANT. THE SIDEWALK CROSS SLOPE SHALL BE 2% MAXIMUM.
- ALL SUMP PUMP DISCHARGE LINES SHALL BE 6" AND INCLUDE BACKFLOW PREVENTION.
- SOIL EROSION MEASURES WILL BE INSTALLED DEPENDENT UPON THE DEVELOPMENT SCHEDULE FOR THE BUILDER OF THE SITE. IF INTENDING TO MASS GRADE THE SITE ALL AT ONCE, THEN THE MEASURES FOR THE WHOLE SITE MUST BE INSTALLED. IF THE DISTURBANCE WILL BE IN PHASES, THEN THE NECESSARY MEASURES WILL BE INSTALLED ACCORDINGLY TO PROVIDE THE NECESSARY MEASURES OF PROTECTION.
- DETENTION BASINS TO BE SEEDED AND STABILIZED IMMEDIATELY UPON ACHIEVING FINAL GRADE, AND FOLLOW WASHTENAW COUNTY WATER RESOURCE COMMISSION (WCWRC) APPROVED SPECIFICATIONS.

Lot #	F.F. Elev.	B.F. Elev.
L01	839.94	831.09
L02	839.94	831.09
L03	839.94	831.09
L04	839.74	830.89
L05	839.94	831.09
L06	840.89	832.04
L07	841.04	832.19
L08	840.99	832.14
L09	841.04	832.19
L10	841.44	832.59
L11	841.19	832.34
L12	840.54	831.69
L13	840.19	831.34
L14	842.54	833.69
L15	843.29	833.44
L16	842.49	833.64
L17	840.89	832.04
L18	840.44	831.59
L19	839.74	830.89
L20	839.84	830.99



K:\12002004\DWG\PLAN SETS\SITE-FINAL\12002004SF-05-G.DWG 4/20/2020 2:52 PM AMAR KALASHO

CAD FILE: 12002004SF-05-G.DWG



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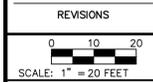
SECTION 22
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC
MONARCH ESTATES
PHASE I FINAL SITE PLAN
INTERSECTION PLAN

DATE: NOVEMBER 22, 2019

2020-02-28 PER TWP
2020-4-20 PER TWP/CLIENT

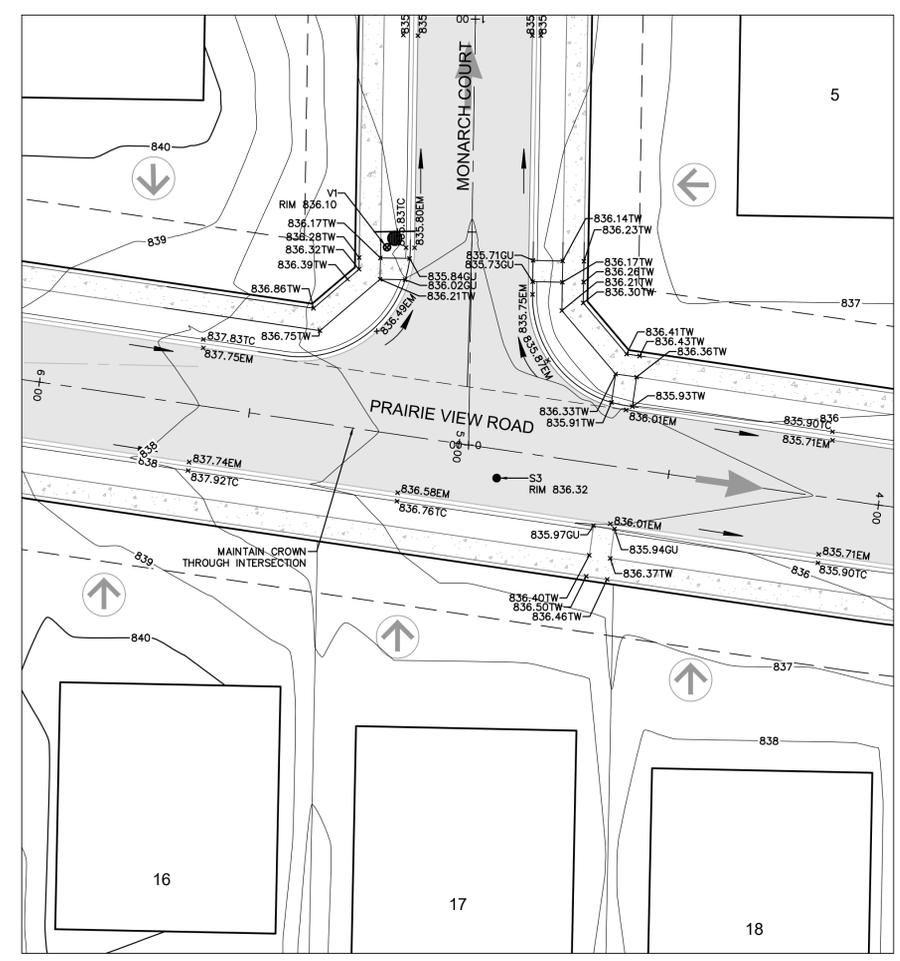
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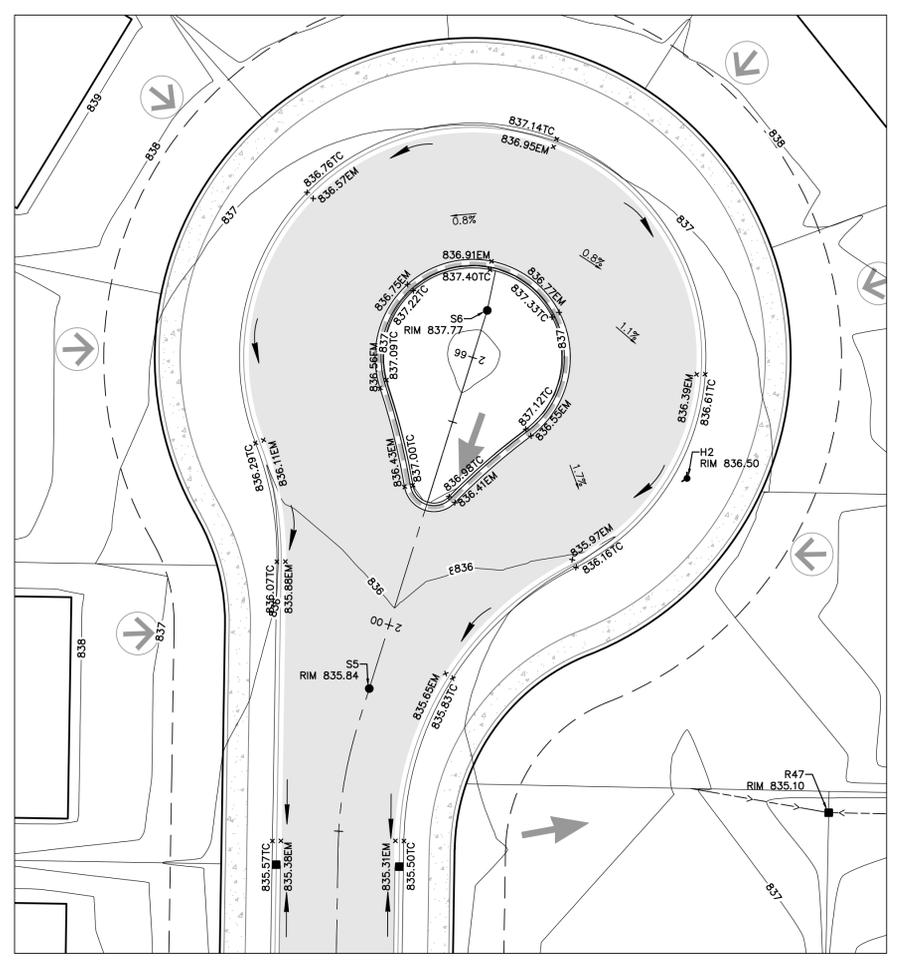
SCALE: 1" = 20 FEET
DRAWN BY: KS
CHECKED BY: JK
P.M.: J. ACKERMAN
JOB #: 12002004
FILE CODE: -
SHEET NO. 7

LEGEND

- PROPERTY LINE
- PROPOSED MANHOLE / CATCH BASIN / END SECTION
- PROPOSED STORM SEWER
- PROPOSED HYDRANT
- PROPOSED GATE VALVE & WELL
- PROPOSED WATER MAIN
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MAIN
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- PROPOSED R.O.W. LINE
- PROPOSED SPOT GRADE
- DRAINAGE ARROW



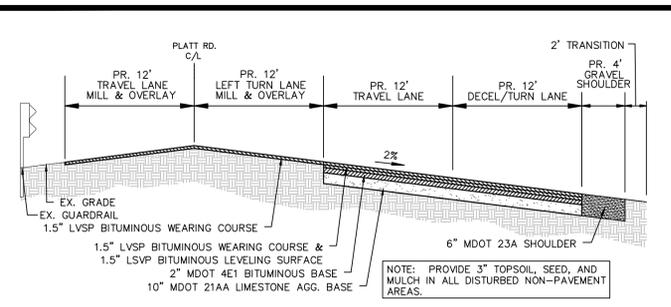
PRAIRIE VIEW ROAD & MONARCH COURT INTERSECTION
SCALE: 1"=20'



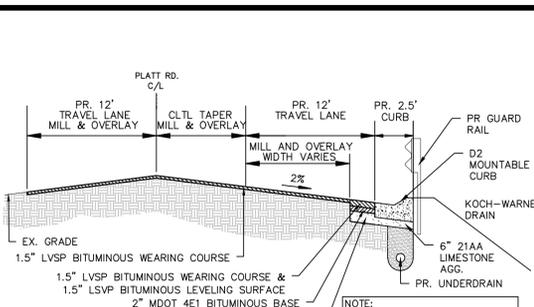
MONARCH COURT CUL-DE-SAC
SCALE: 1"=20'

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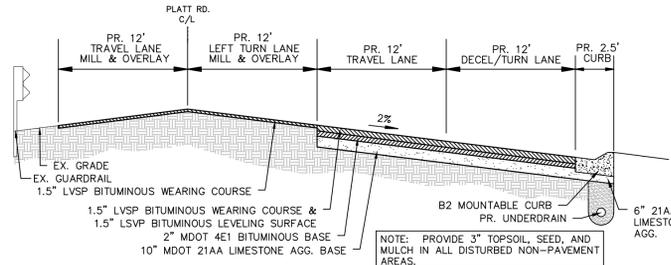
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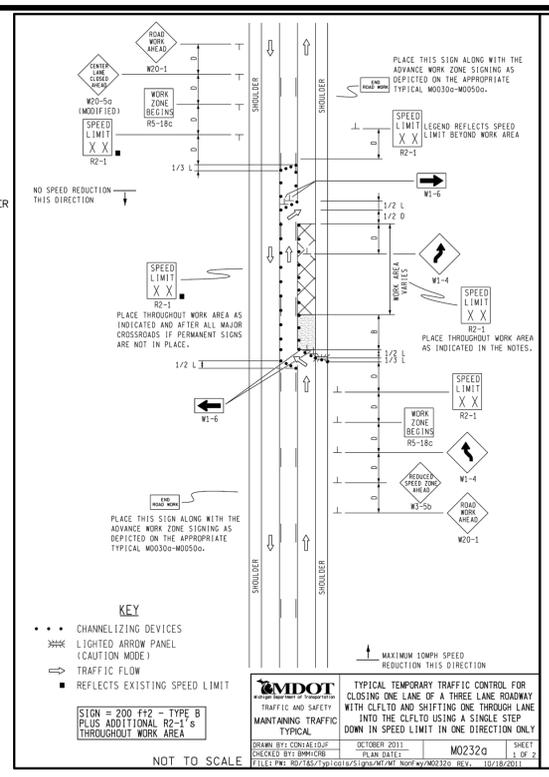
PLATT RD. CROSS SECTION A-A
(NOT TO SCALE)



PLATT RD. CROSS SECTION C-C
(NOT TO SCALE)



PLATT RD. CROSS SECTION B-B
(NOT TO SCALE)



NOT TO SCALE

NOTES

- IF: D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
1/2 L AND 1/3 L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE MDOT00 FOR "D," "L," AND "B" VALUES
- ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
- DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 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.
- THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREAS(S).
- FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.
- THE TYPE A WARNING FLASHER SHOWN ON THE WARNING SIGNS SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
- ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHY 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.
- WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
- ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.
- WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
- WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.
- ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

KEY

- CHANNELIZING DEVICES
- LIGHTED ARROW PANEL (CAUTION MODE)
- TRAFFIC FLOW
- REFLECTS EXISTING SPEED LIMIT

MDOT TYPICAL TEMPORARY TRAFFIC CONTROL FOR CLOSING ONE LANE OF A THREE LANE ROADWAY WITH CLEFT AND SHIFTING ONE THROUGH LANE INTO THE CLEFT USING A SINGLE STEP DOWN IN SPEED LIMIT IN ONE DIRECTION ONLY

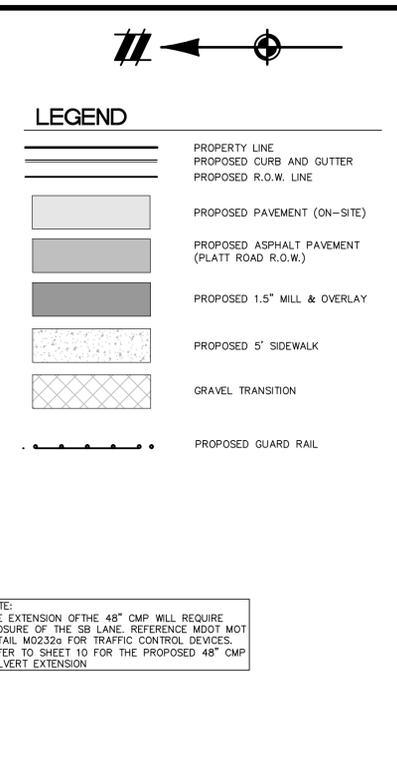
MDOT TYPICAL TEMPORARY TRAFFIC CONTROL FOR CLOSING ONE LANE OF A THREE LANE ROADWAY WITH CLEFT AND SHIFTING ONE THROUGH LANE INTO THE CLEFT USING A SINGLE STEP DOWN IN SPEED LIMIT IN ONE DIRECTION ONLY

KEY

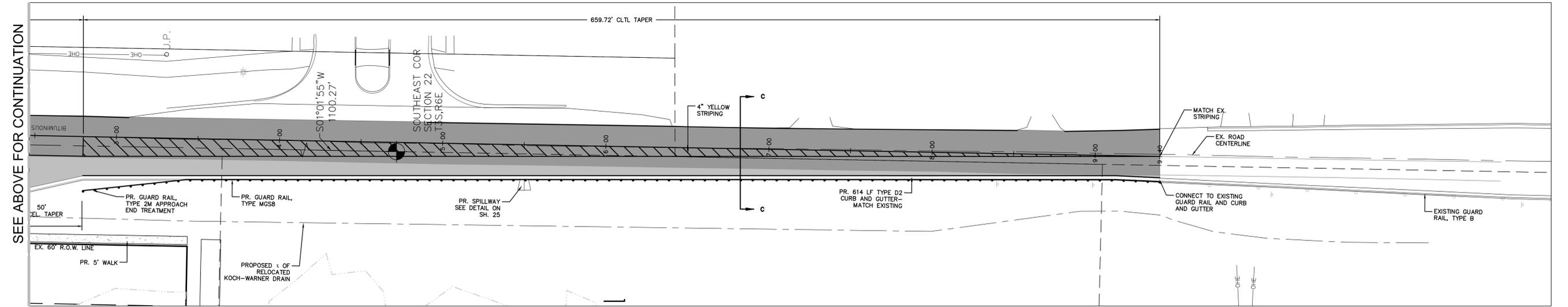
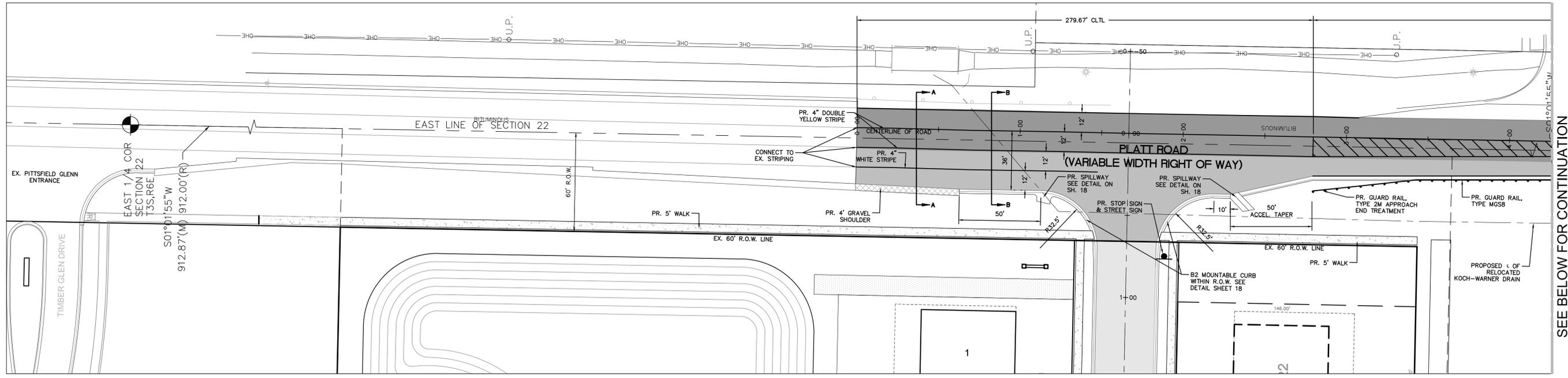
- DIAMOND WARNING - 48" x 48"
- W1-6 WARNING - 48" x 24"
- REGULATORY - 48" x 48"
- RS-18c REGULATORY - 48" x 48"

MDOT TYPICAL TEMPORARY TRAFFIC CONTROL FOR CLOSING ONE LANE OF A THREE LANE ROADWAY WITH CLEFT AND SHIFTING ONE THROUGH LANE INTO THE CLEFT USING A SINGLE STEP DOWN IN SPEED LIMIT IN ONE DIRECTION ONLY

NOT TO SCALE



NOTE:
THE EXTENSION OF THE 48" CMP WILL REQUIRE CLOSURE OF THE SB LANE. REFERENCE MDOT MOT DETAIL M0232a FOR TRAFFIC CONTROL DEVICES. REFER TO SHEET 10 FOR THE PROPOSED 48" CMP CULVERT EXTENSION



SEE ABOVE FOR CONTINUATION

SEE BELOW FOR CONTINUATION

811
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SECTION 22
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC
MONARCH ESTATES
PHASE I FINAL SITE PLAN
ENTRANCE & PLATT ROAD
LAYOUT PLAN

DATE: NOVEMBER 22, 2019
2020-02-28 PER TWP
2020-4-20 PER TWP/CLIENT

REVISIONS

SCALE: 1" = 30 FEET
DRAWN BY: KS
CHECKED BY: JK
P.M.: J. ACKERMAN
JOB #: 12002004
FILE CODE: -
SHEET NO. 8

CAD FILE: 12002004SF-07-ENT.DWG



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PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC
MONARCH ESTATES
PHASE I FINAL SITE PLAN
ENTRANCE & PLATT ROAD
GRADING PLAN

DATE: NOVEMBER 22, 2019

2020-02-28 PER TWP
2020-4-20 PER TWP/CJENT

Table with 2 columns: REVISIONS, and 10 rows for tracking changes.

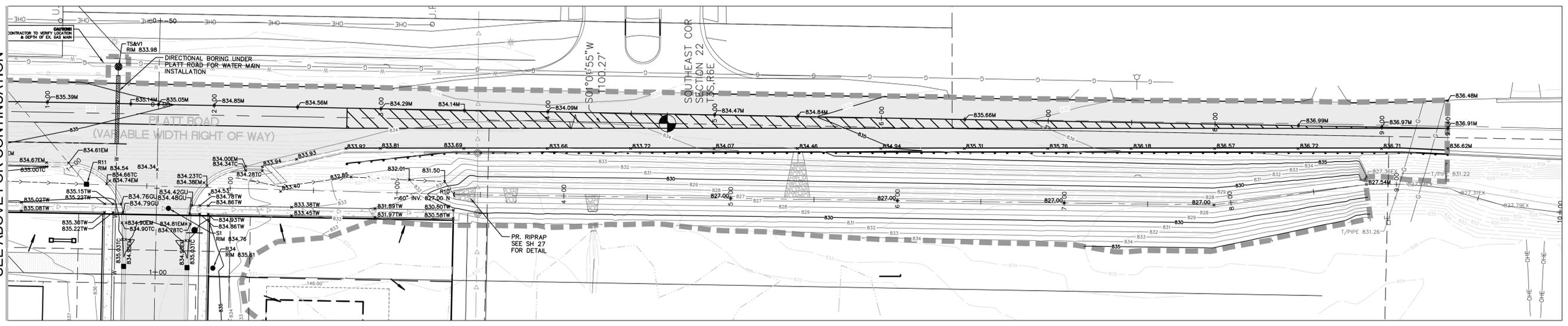
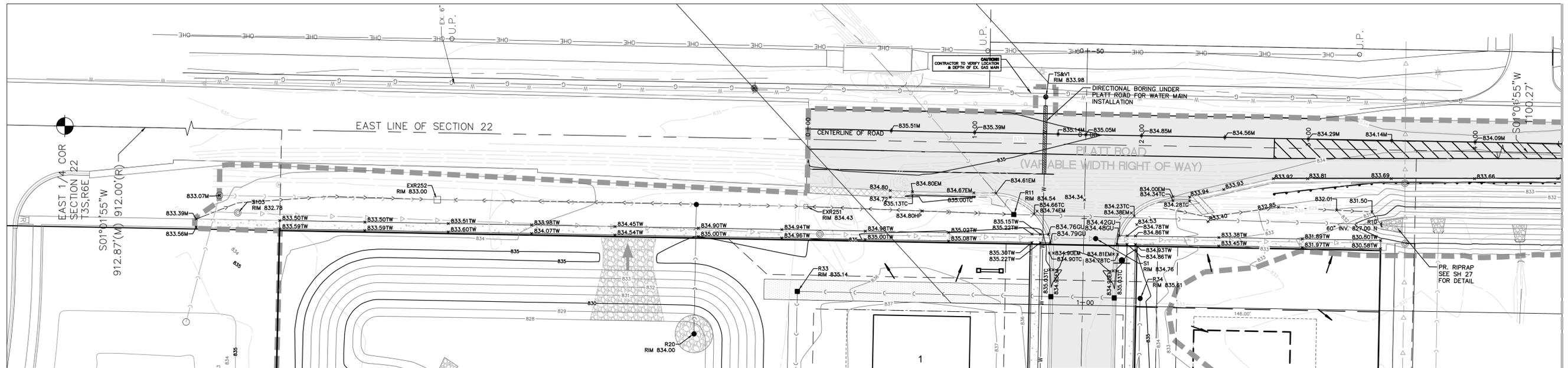
SCALE: 1" = 30 FEET
DRAWN BY: KS
CHECKED BY: JK
P.M.: J. ACKERMAN
JOB #: 12002004
FILE CODE: -
SHEET NO. 9

LEGEND

- 588 PROPOSED 1' CONTOUR
- 590 PROPOSED 5' CONTOUR
- 588 EXISTING 1' CONTOUR
- 590 EXISTING 5' CONTOUR
- PROPERTY LINE
- PROPOSED R.O.W. LINE
- RIDGE LINE
- EXISTING MANHOLE/CATCH BASIN/END SECTION
- PROPOSED MANHOLE/CATCH BASIN/END SECTION
- EXISTING HYDRANT
- PROPOSED HYDRANT
- EXISTING GATE VALVE & WELL
- PROPOSED GATE VALVE & WELL
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE
- PROPOSED SPOT GRADE
- PROPOSED DRAINAGE ARROW
- PROPOSED DRIVEWAY
- PROPOSED OVERLAND OVERFLOW ROUTE

SPOT GRADE DESIGNATIONS
 FG = FINISH GRADE/FLANGE
 DBL = DROP BRICK LEDGE
 VO = VEIWOUT
 WO = WALKOUT
 RIM = RIM GRADE/FLOW LINE
 HP = HIGH POINT
 TC = TOP OF CURB
 TW = TOP OF WALK
 EM = EDGE OF METAL

- NOTES:**
- REFER TO SHEET 25 FOR PLATT RD. CROSS SECTION & WCRC TYPICAL APPROACH ONTO EXISTING PAVED ROAD.
 - ALL SIDEWALK RAMPS MUST MEET ADA REQUIREMENTS. SEE DETAIL ON SHEET 25.
 - PAVEMENT STRIPING SHALL BE WATERBORNE PAINT.
 - REFER TO SHEET 12 & 22 FOR STORM SEWER PLAN AND PROFILES IN PLATT ROAD RIGHT OF WAY.
 - REFER TO SHEET 17 FOR SANITARY SEWER CONNECTION IN PLATT ROAD RIGHT OF WAY.
 - THE FRAME AND COVER OF STRUCTURE R11 WITHIN THE R.O.W. SHALL BE EJW 1040Z, TYPE N COVER.



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CAD FILE: 12002004SF-07-ENT.DWG



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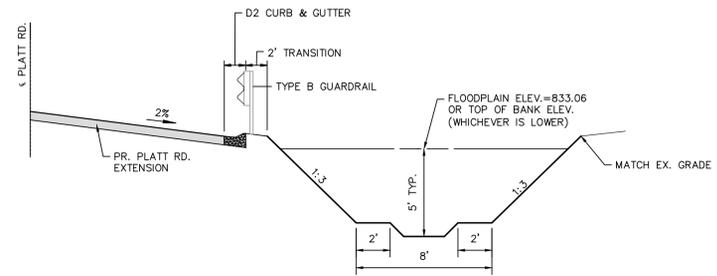
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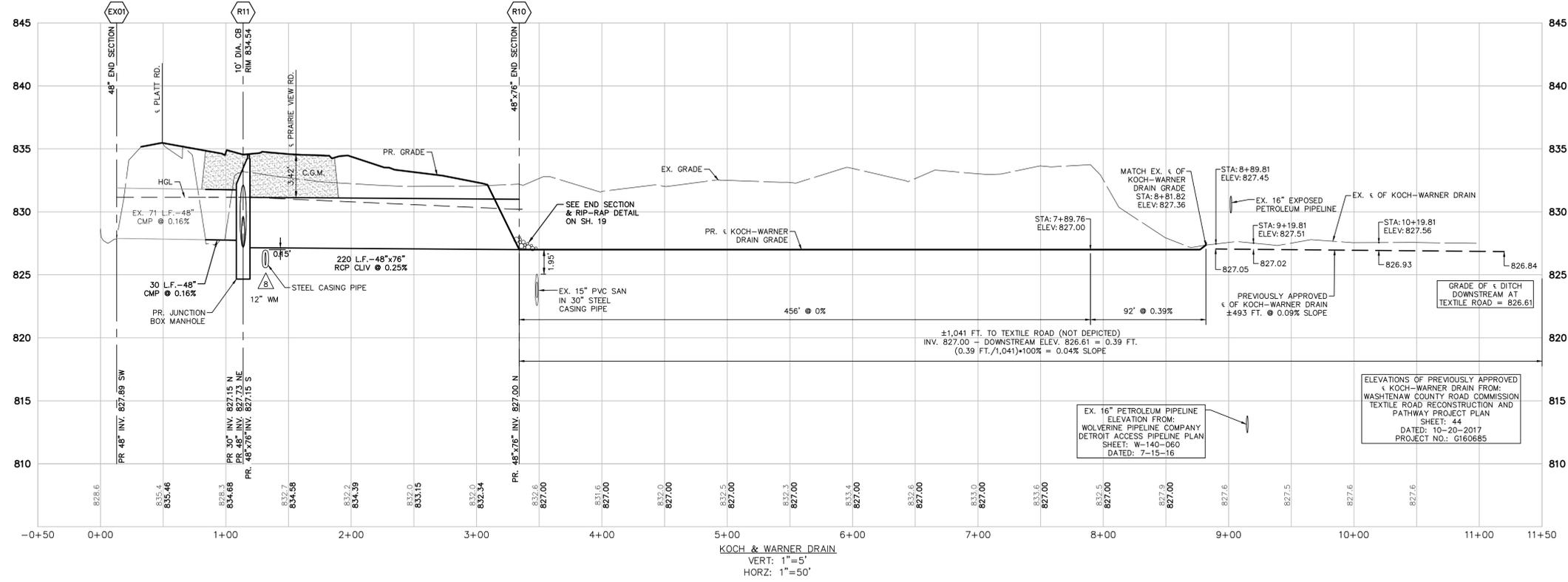
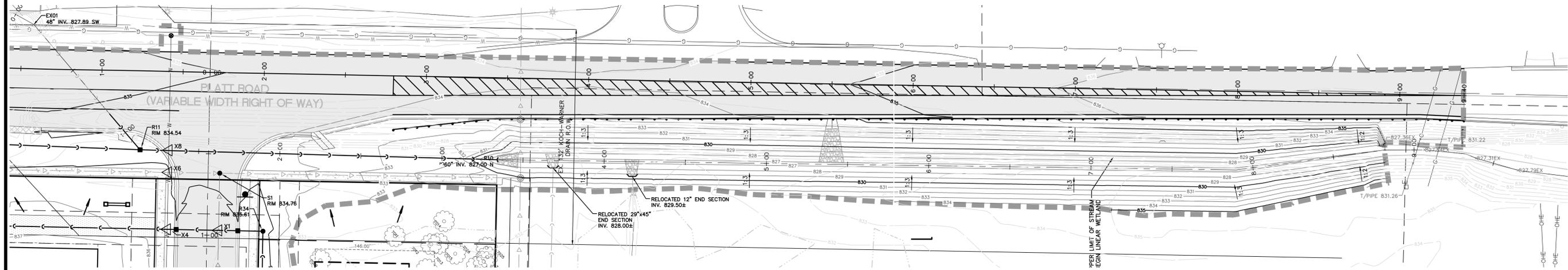
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LEGEND

- 588 PROPOSED 1' CONTOUR
- 590 PROPOSED 5' CONTOUR
- 588 EXISTING 1' CONTOUR
- 590 EXISTING 5' CONTOUR
- PROPERTY LINE
- PROPOSED R.O.W. LINE
- RIDGE LINE
- EXISTING MANHOLE/CATCH BASIN/END SECTION
- PROPOSED MANHOLE/CATCH BASIN/END SECTION
- EXISTING HYDRANT
- PROPOSED HYDRANT
- EXISTING GATE VALVE & WELL
- PROPOSED GATE VALVE & WELL
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE
- 945.07 PROPOSED SPOT GRADE
- PROPOSED DRAINAGE ARROW
- PROPOSED DRIVEWAY
- PROPOSED OVERLAND OVERFLOW ROUTE



PROPOSED KOCH-WARNER DRAIN CROSS-SECTION
SCALE: NO SCALE



KOCH & WARNER DRAIN
VERT: 1" = 5'
HORIZ: 1" = 50'

SECTION 22
TOWN 3 SOUTH, RANGE 6 EAST
PITTSFIELD TOWNSHIP
WASHTENAW COUNTY, MICHIGAN

SE MICHIGAN LAND HOLDINGS LLC
MONARCH ESTATES
PHASE 1 FINAL SITE PLAN
KOCH-WARNER DRAIN
PLAN & PROFILE

DATE: NOVEMBER 22, 2019
2020-02-28 PER TWP
2020-4-20 PER TWP/CLIENT

ELEVATIONS OF PREVIOUSLY APPROVED KOCH-WARNER DRAIN FROM: WASHTENAW COUNTY ROAD COMMISSION TEXTILE ROAD RECONSTRUCTION AND PATHWAY PROJECT PLAN SHEET: 44 DATED: 10-20-2017 PROJECT NO.: G160685

REVISIONS
SCALE: 1" = 30 FEET
DRAWN BY: KS
CHECKED BY: JK
P.M.: J. ACKERMAN
JOB #: 12002004
FILE CODE: -
SHEET NO. 10

K:\12002004\DWG\PLAN SETS\SITE-FINAL\12002004SF-08-DRAIN.DWG 4/20/2020 4:26 PM AMMAR KALASHO

CAD FILE: 12002004SF-08-DRAIN.DWG



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SE MICHIGAN LAND HOLDINGS LLC
MONARCH ESTATES
PHASE I FINAL SITE PLAN
UTILITY PLAN

DATE: NOVEMBER 22, 2019

2020-02-28 PER TWP
2020-4-20 PER TWP/CLIENT

Table with 2 columns: REVISIONS, and empty rows for revision details.

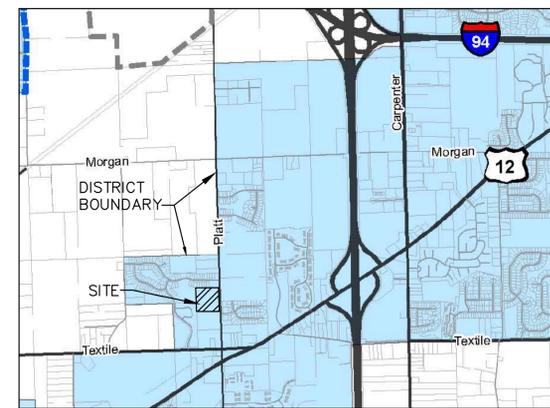
SCALE: 1" = 50 FEET

DRAWN BY: KS
CHECKED BY: JK
P.M.: J. ACKERMAN
JOB #: 12002004
FILE CODE: -
SHEET NO. 11

CAD FILE: 12002004SF-09-U.DWG

LEGEND

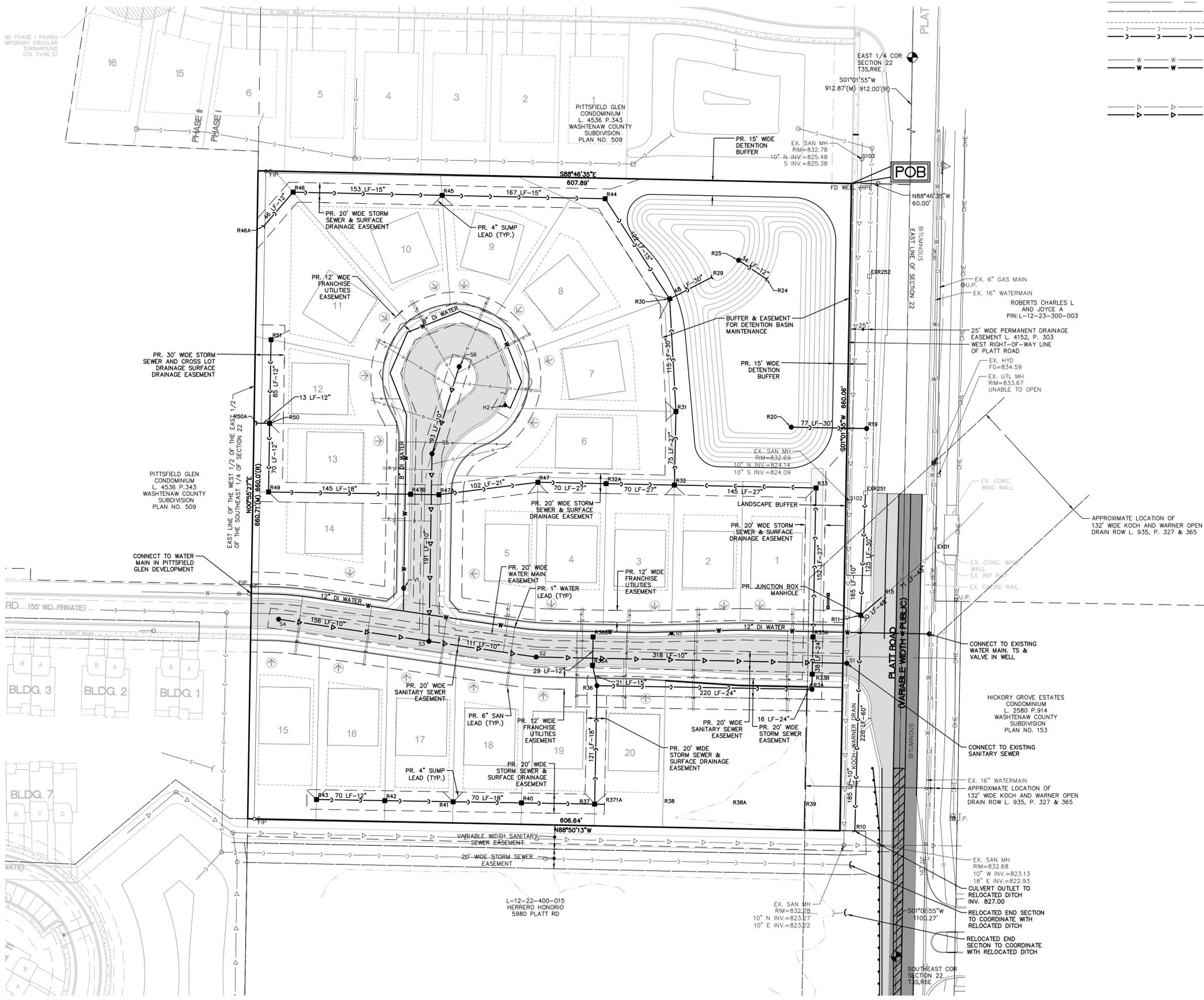
- PROPERTY LINE
- PROPOSED R.O.W. LINE
- PROPOSED CENTERLINE OF ROAD
- EASEMENT
- PROPOSED BUILDING SETBACK
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- EXISTING MANHOLE/CATCH BASIN/END SECTION
- PROPOSED MANHOLE/CATCH BASIN/END SECTION
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- EXISTING HYDRANT
- PROPOSED HYDRANT
- EXISTING GATE VALVE & WELL
- PROPOSED GATE VALVE & WELL
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- EXISTING SANITARY SEWER MANHOLE
- PROPOSED SANITARY SEWER MANHOLE



SANITARY SEWER DISTRICT MAP
NO SCALE

- NOTES:
- CURB STOPS SHALL BE INSTALLED AT THE R.O.W. LINE (A 1 FT BEHIND THE SIDEWALK). WHERE FRONT YARD STORM SEWER IS IN CONFLICT WITH THIS LOCATION, THE CURB STOP SHALL BE INSTALLED AT THE BACK EDGE OF THE STORM SEWER EASEMENT.
 - COMPACTION OF TRENCHES IS REQUIRED IN ROADWAY CORRIDOR (CLASS II GRANULAR BACKFILL AT 95% COMPACTION). ROADWAY CORRIDORS CONSTITUTE FRONT OF HOUSE TO FRONT OF HOUSE IN RESIDENTIAL DEVELOPMENTS OR WITHIN THE INFLUENCE OF PAVEMENT (INCLUDING WALKWAYS), WHEN NO STRUCTURES ARE PRESENT.

NOTE: THE STORM SEWER AND SURFACE DRAINAGE EASEMENT AND THE DETENTION BUFFER WILL BE GRANTED TO THE PITTSFIELD CHARTER TOWNSHIP AND WASHTENAW COUNTY WATER RESOURCES COMMISSION (WCWRC).



K:\12002004\DWG\PLAN SETS\SITE-FINAL\12002004SF-09-U.DWG 4/20/2020 3:53 PM AMMAR KALASHO

ON-SITE STORM SEWER CONVEYANCE SYSTEM DESIGN

Project: Monarch Estates Community: Washtenaw
 Date: April 20, 2020 County: Washtenaw
 Revision: 3

$I = \frac{B(T+D)^E}{C \cdot n}$ $B = 175.0$ $D = 25.0$ $E = 1$
 $C = \text{varies}$ $n = 0.013$
 $T = 20$ (min.)

FROM MH INPUT	TO MH	INCR. ACRES (A)	C	EQUIV. AREA 100% ACRES	TOTAL AREA 100% ACRES	T TIME (MIN.)	I (IN PER HOUR)	Q=CIA C.F.S. FLOW	CAPAC. OF SEWER (C.F.S.)	DIAM. OF PIPE (IN.)	LENGTH OF LINE (FT.)	SLOPE OF PIPE (%)	MIN HG BASED ON "Q" (%)	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
R43	R42	0.15	0.62	0.09	0.09	20.00	3.89	0.37	2.52	12	70	0.50	0.01	3.2	0.4	833.25	832.90	836.50	836.10	832.45	832.10
R42	R41	0.17	0.59	0.10	0.20	20.40	3.85	0.76	3.88	15	70	0.36	0.01	3.2	0.4	832.90	832.65	836.00	831.90	831.90	831.65
R41	R40	0.13	0.54	0.07	0.27	20.80	3.82	1.02	5.75	18	70	0.30	0.01	3.3	0.4	832.65	832.44	836.00	835.50	831.45	831.24
R40	R37	0.12	0.52	0.06	0.33	21.20	3.79	1.26	5.75	18	75	0.30	0.01	3.3	0.4	832.34	832.12	835.50	835.64	831.14	830.92
R37	R36	0.11	0.54	0.06	0.71	21.60	3.76	2.65	5.56	18	121	0.28	0.06	3.1	0.6	832.06	831.98	835.64	839.54	830.82	830.48
R36	R34	0.00	0.00	0.00	1.56	22.20	3.71	5.79	9.60	24	220	0.18	0.07	3.1	1.2	831.98	831.59	839.54	835.61	830.38	829.98
R34	R33B	0.00	0.00	0.00	1.56	23.40	3.62	5.79	9.60	24	16	0.19	0.07	3.1	0.1	831.49	831.45	835.61	835.11	829.88	829.85
R33B	R33A	0.40	0.51	0.20	1.77	23.50	3.61	6.37	9.60	24	38	0.18	0.08	3.1	0.2	831.35	831.29	835.11	835.11	829.75	829.69
R33A	R33	0.26	0.60	0.15	1.92	23.70	3.59	6.90	12.39	27	152	0.16	0.05	3.1	0.8	831.29	831.09	835.11	835.11	829.49	829.24
R33	R32	0.07	0.49	0.04	1.96	24.50	3.54	6.92	12.39	27	145	0.16	0.05	3.1	0.8	831.09	831.02	835.10	835.10	829.14	828.91
R32	R31	0.11	0.57	0.06	3.73	25.30	3.48	12.99	13.85	27	75	0.20	0.18	3.5	0.4	831.02	830.89	835.10	835.30	828.81	828.66
R31	R30	0.07	0.60	0.04	3.77	25.70	3.45	13.03	16.41	30	115	0.16	0.10	3.3	0.6	830.89	830.77	835.30	835.20	828.56	828.38
R30	R29	0.12	0.53	0.06	4.60	26.30	3.41	15.70	16.41	30	48	0.16	0.15	3.3	0.2	830.77	830.70	835.20	831.49	828.28	828.20
R36B	R36A	0.56	0.63	0.35	0.35	20.00	3.89	1.38	2.47	12	29	0.48	0.15	3.1	0.2	832.08	832.03	835.10	835.10	830.89	830.75
R36A	R36	0.77	0.65	0.50	0.86	20.20	3.87	3.31	3.77	15	21	0.34	0.26	3.1	0.1	832.03	831.98	835.10	835.54	830.55	830.48
R39	R38A	0.10	0.51	0.05	0.05	20.00	3.89	0.20	2.42	12	75	0.46	0.00	3.1	0.4	832.68	832.44	836.00	835.75	831.88	831.54
R38A	R38	0.14	0.56	0.08	0.13	20.40	3.85	0.50	3.77	15	70	0.34	0.01	3.1	0.4	832.44	832.30	835.75	835.60	831.44	831.20
R38	R371A	0.45	0.41	0.19	0.32	20.80	3.82	1.21	5.36	18	60	0.26	0.01	3.0	0.3	832.30	832.14	835.60	835.80	831.10	830.94
R371A	R37	0.00	0.00	0.00	0.32	21.10	3.60	1.21	5.36	18	10	0.26	0.01	3.0	0.1	832.14	832.12	835.60	835.64	830.94	830.92
R46A	R46	1.05	0.35	0.37	0.37	20.00	3.89	1.42	7.85	12	46	0.45	0.16	10.0	0.1	834.91	832.68	834.50	836.35	834.11	831.88
R46	R45	0.30	0.46	0.14	0.51	20.10	3.88	1.96	3.77	15	153	0.34	0.09	3.1	0.8	832.48	831.96	836.35	835.93	831.48	830.96
R45	R44	0.28	0.56	0.16	0.66	20.90	3.81	2.52	3.77	15	167	0.34	0.15	3.1	0.9	831.86	831.29	835.93	835.00	830.86	830.29
R44	R30	0.22	0.48	0.10	0.77	21.80	3.74	2.87	3.77	15	122	0.34	0.20	3.1	0.7	831.01	830.77	835.00	835.20	829.69	829.28
R51	R50	0.13	0.51	0.07	0.07	20.00	3.89	0.26	2.42	12	85	0.46	0.01	3.1	0.5	832.65	832.15	836.00	835.60	831.75	831.35
R50	R49	0.15	0.63	0.09	0.49	20.50	3.85	1.89	2.42	12	70	0.46	0.28	3.1	0.4	832.05	831.73	836.00	835.30	831.25	830.93
R49	R47B	0.22	0.58	0.13	0.62	20.90	3.81	2.37	5.56	18	145	0.28	0.05	3.1	0.8	831.73	831.73	835.30	835.16	830.53	830.12
R47B	R47A	0.75	0.64	0.48	1.10	21.70	3.75	4.12	7.43	21	29	0.22	0.07	3.1	0.2	831.42	831.36	835.16	835.16	830.02	829.96
R47A	R47	0.74	0.62	0.46	1.56	21.90	3.73	5.81	7.43	21	102	0.22	0.13	3.1	0.6	831.26	831.07	835.16	835.10	829.86	829.64
R47	R32A	0.14	0.35	0.05	1.61	22.50	3.68	5.92	12.39	27	70	0.16	0.04	3.1	0.4	831.07	831.05	835.10	835.10	829.24	829.12
R32A	R32	0.19	0.57	0.11	1.71	22.90	3.65	6.26	12.39	27	70	0.16	0.04	3.1	0.4	831.05	831.02	835.10	835.10	829.02	828.91
R50A	R50	0.95	0.35	0.33	0.33	20.00	3.89	1.29	7.89	12	13	4.90	0.13	10.05	0.0	834.75	834.10	834.50	835.60	833.95	833.30
R20	R19	0.00	0.00	0.00	8.40	20.00	3.89	15.70	17.40	30	77	0.18	0.15	3.5	0.4	833.46	833.34	834.00	833.36	827.87	827.73
EXR252	R19							44.00	20.51	30	155	0.25	1.15	4.18	0.6	835.13	833.34	833.58	833.36	828.02	827.63
R19	EXR251							44.00	20.51	30	66	0.25	1.15	4.2	0.3	833.34	832.59	833.36	834.43	827.63	827.47
EXR251	R11							44.00	20.51	30	125	0.25	1.15	4.2	0.5	832.59	831.15	834.43	834.54	827.47	827.15
R11	R10							67.00	69.90	60	220	0.07	0.07	3.5	1.0	831.15	830.20	834.54	833.00	827.15	827.00

PROPOSED 48x76" ELLIPTICAL PIPE (60" EQUIVALENT PIPE)

UPSTREAM FLOW SEE SH. 13 FOR TRIBUTARY AREA. SEE BELOW FOR CALCULATIONS

CROSSING TABLE

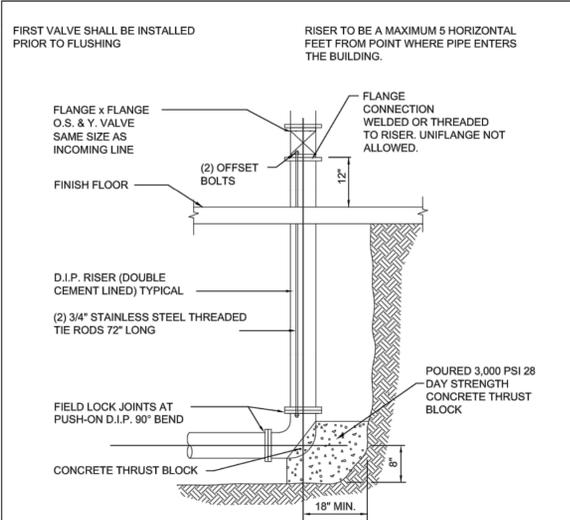
CROSSING	CROSSING PIPE 1	CROSSING PIPE 2	Clearance	NOTES
1	24" ST B/P= 829.48	10" SAN T/P= 824.80	4.68	
2	15" ST B/P= 830.34	10" SAN T/P= 825.48	4.86	
3	21" ST B/P= 829.75	10" SAN T/P= 825.63	4.11	
4	27" ST B/P= 829.21	8" WM T/P= 827.71	1.50	DIP WATER MAIN
5	18" ST B/P= 829.93	8" WM T/P= 826.43	1.50	DIP WATER MAIN
6	10" SAN T/P= 824.67	8" WM T/P= 826.89	4.22	
7	30" ST B/P= 827.18	10" SAN T/P= 825.27	1.91	
8	42X76" ST B/P= 826.64	8" WM T/P= 826.14	0.50	ENCASE PIPE-SEE PROFILE
9	10" SAN T/P= 826.26	8" WM T/P= 829.90	3.64	

STORM SEWER STRUCTURE TABLE

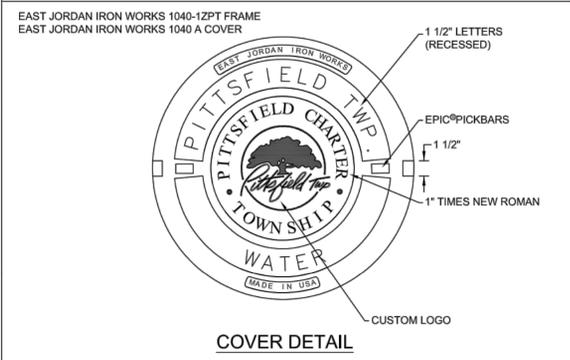
NUMBER	SIZE	DESC.	RIM ELEVATION	INVERT ELEVATION	NORTHING EASTING	CASTING TYPE	RIM TO SUMP DEPTH	SUMP
R11	10' DIA	CB	834.54	PR. 30" N 827.15 PR. 60" S 827.15 PR. 48" NE 827.73	N = 6157.500 E = 10367.196	EJ 1040Z WITH 1040 N 7"	9.4'	Y
R19	6' DIA	MH	834.18	PR. 30" S 827.63 PR. 30" W 827.73 PR. 30" N 827.63	N = 6347.776 E = 10363.157	EJ 1040Z WITH TYPE B COVER		N
R20	4' DIA	OCs	834.00	PR. 30" E 827.87	N = 6349.204 E = 10285.992	SEE DETAILS		Y
R24	1' DIA	ES	829.67	PR. 12" NW 828.00	N = 6500.368 E = 10260.525	SEE DETAILS		Y
R25	4' DIA	OCs	829.97	PR. 12" SE 828.15	N = 6519.429 E = 10232.016	SEE DETAILS		Y
R29	3' DIA	ES	831.49	PR. 30" SW 828.20	N = 6501.951 E = 10204.413	SEE DETAILS		Y
R30	5' DIA	CB	835.20	PR. 30" S 828.38 PR. 30" NE 828.28 PR. 15" NW 829.28	N = 6479.980 E = 10161.439	EJ 1040Z WITH 1040 N 7"	8.9'	Y
R31	4' DIA	CB	835.30	PR. 27" S 828.66 PR. 30" N 828.56	N = 6365.176 E = 10167.857	EJ 1040Z WITH 1040 N 7"	8.7'	Y
R32	5' DIA	CB	835.10	PR. 27" E 828.91 PR. 27" W 828.91 PR. 27" N 828.81	N = 6290.191 E = 10166.335	EJ 1040Z WITH 1040 N 7"	8.3'	Y
R32A	4' DIA	CB	835.10	PR. 27" W 829.12 PR. 27" E 829.02	N = 6291.612 E = 10096.349	EJ 1040Z WITH 1040 N 7"	8.1'	Y
R33	5' DIA	CB	835.10	PR. 27" S 829.24 PR. 27" W 829.14	N = 6287.248 E = 10311.305	EJ 1040Z WITH 1040 N 7"	8.0'	Y
R33A	4' DIA	CB	835.11	PR. 27" N 829.49 PR. 24" S 829.69	N = 6135.279 E = 10308.219	EJ 7045	7.6'	Y
R33B	4' DIA	CB	835.11	PR. 24" S 829.85 PR. 24" N 829.75	N = 6097.287 E = 10307.448	EJ 7045	7.4'	Y
R34	5' DIA	MH	835.61	PR. 24" W 829.98 PR. 24" N 829.88	N = 6081.790 E = 10307.133	EJ 1040Z WITH TYPE B COVER		N
R36	5' DIA	MH	839.54	PR. 18" S 830.48 PR. 15" N 830.48 PR. 24" E 830.38	N = 6085.670 E = 10086.915	EJ 1040Z WITH TYPE B COVER		N
R36A	4' DIA	CB	835.10	PR. 15" S 830.55 PR. 12" N 830.75	N = 6106.356 E = 10082.460	EJ 7045	6.5'	Y

STORM SEWER STRUCTURE TABLE

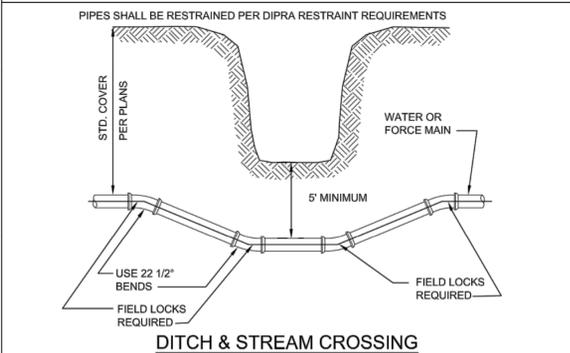
NUMBER	SIZE	DESC.	RIM ELEVATION	INVERT ELEVATION	NORTHING EASTING	CASTING TYPE	RIM TO SUMP DEPTH	SUMP
R36B	4' DIA	CB	835.10	PR. 12" S 830.69	N = 6135.350 E = 10083.049	EJ 7045	6.2'	Y
R37	4' DIA	CB	835.64	PR. 18" W 830.92 PR. 18" N 830.82 PR. 18" E 830.92	N = 5964.890 E = 10084.989	EJ 1040Z WITH 1040 N 7"	6.8'	Y
R40	4' DIA	CB	835.50	PR. 18" W 831.24 PR. 18" E 831.14	N = 5966.120 E = 10009.615	EJ 1040Z WITH 1040 N 7"	6.4'	Y
R41	4' DIA	CB	836.00	PR. 15" W 831.65 PR. 18" E 831.45	N = 5967.270 E = 9939.631	EJ 1040Z WITH 1040 N 7"	6.5'	Y
R42	4' DIA	CB	836.10	PR. 12" W 832.10 PR. 15" E 831.90	N = 5968.419 E = 9989.628	EJ 1040Z WITH 1040 N 7"	6.2'	Y
R43	4' DIA	CB	836.50	PR. 12" E 832.45	N = 5969.572 E = 9799.757	EJ 1040Z WITH 1040 N 7"	6.0'	Y
R44	4' DIA	CB	835.00	PR. 15" SE 829.69 PR. 15" W 830.29	N = 6582.156 E = 10095.321	EJ 1040Z WITH 1040 N 7"	7.3'	Y
R45	4' DIA	CB	835.93	PR. 15" W 830.96 PR. 15" E 830.86	N = 6585.585 E = 9928.442	EJ 1040Z WITH 1040 N 7"	7.1'	Y
R46	4' DIA	CB	836.35	PR. 12" SW 831.88 PR. 15" E 831.48	N =			



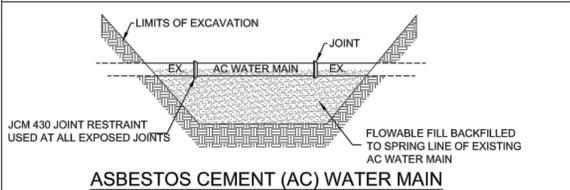
FIRE PROTECTION RISER DETAIL



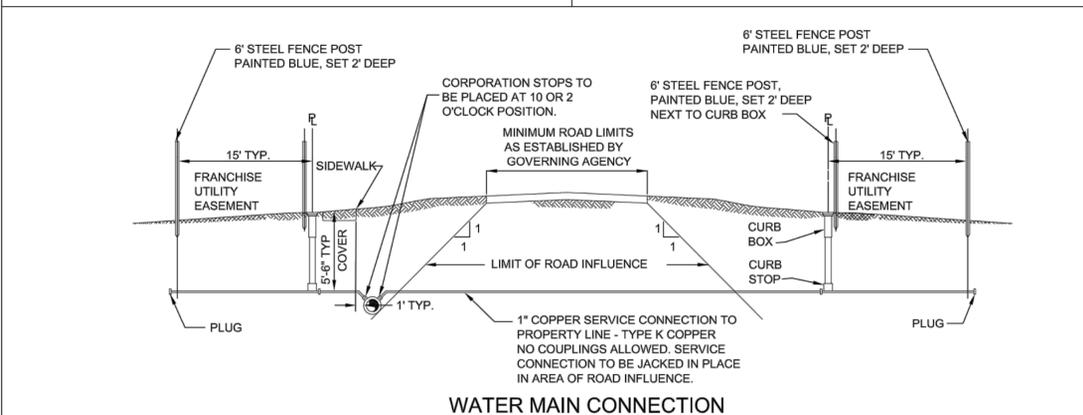
COVER DETAIL



DITCH & STREAM CROSSING



ASBESTOS CEMENT (AC) WATER MAIN



WATER MAIN CONNECTION

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

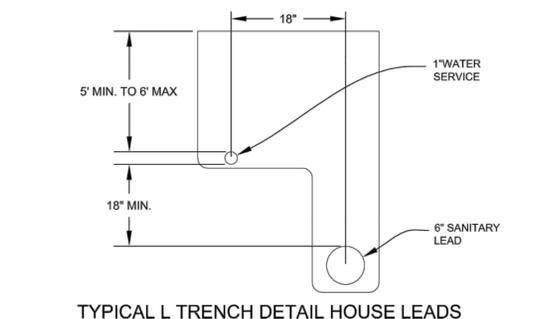
- NOTES:**
1. CONCRETE FOR ALL THRUST BLOCKS SHALL BE 3000 PSI, 28 DAY STRENGTH MIN.
 2. ALL THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH
 3. BOLTS, FITTINGS & JOINTS SHALL BE KEPT CLEAR OF CONCRETE
 4. A BEARING CAPACITY OF 2000# PER FOOT WAS USED IN DETERMINING THE MINIMUM "BEARING AREAS" 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

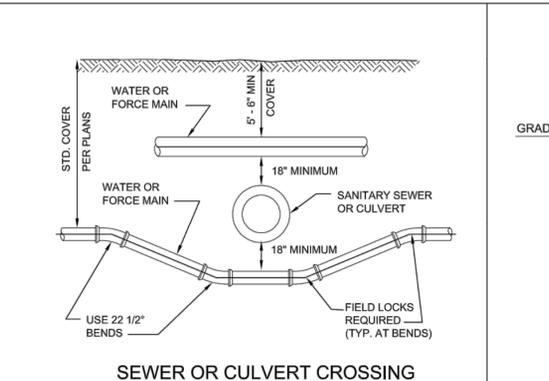
SOIL CHARACTERISTICS	FACTOR
(A) LOOSE COARSE OR MEDIUM SAND; COMPACT FINE SAND; COMPACT SAND-CLAY SOILS; STIFF CLAY	0.33
(B) FIRM FINE SAND; COMPACT INORGANIC SILT; FIRM SAND-CLAY SOILS; MEDIUM CLAY	0.50
(C) LOOSE FINE SAND; FIRM INORGANIC SILT	0.67
(D) LOOSE SAND-CLAY SOILS; LOOSE INORGANIC SILT SOFT 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

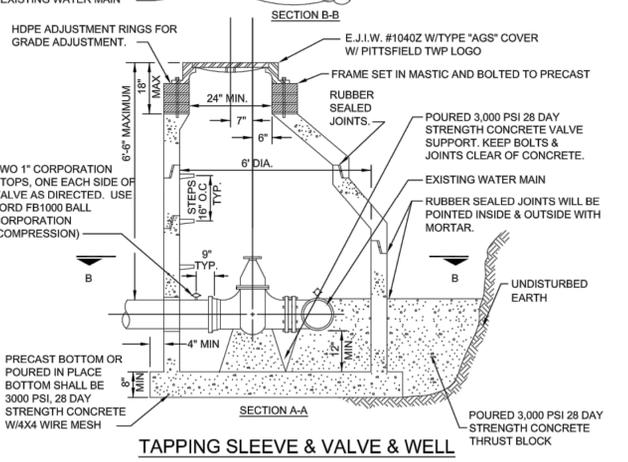


TYPICAL L TRENCH DETAIL HOUSE LEADS

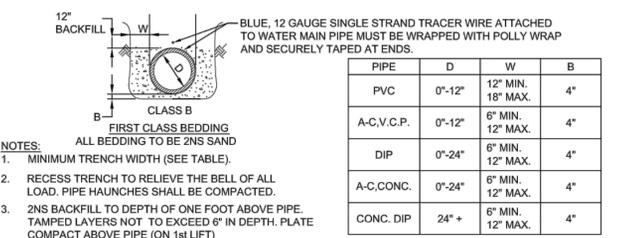


SEWER OR CULVERT CROSSING

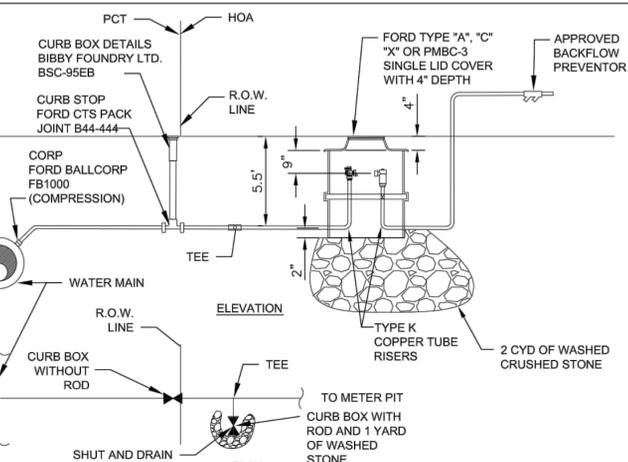
- PRE-CAST CONCRETE MANHOLE**
1. SECTIONS SHALL MEET ASTM C478.
 2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
 3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
 4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.



TAPPING SLEEVE & VALVE & WELL

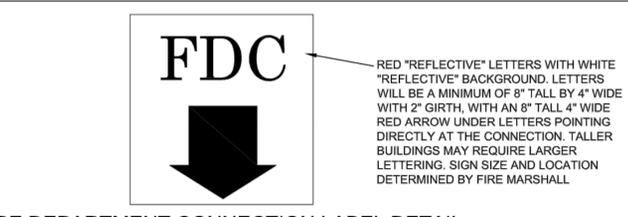


BEDDING



- 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.

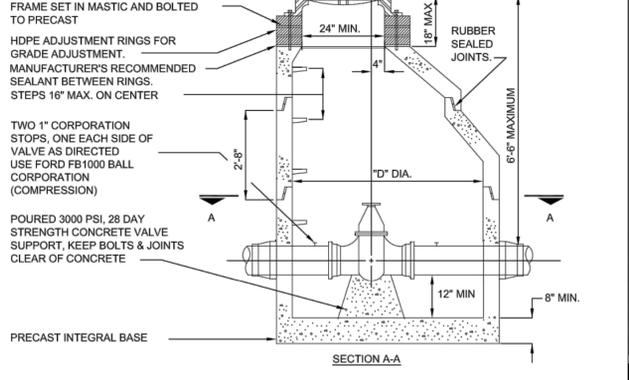
IRRIGATION METER PIT DETAIL



FIRE DEPARTMENT CONNECTION LABEL DETAIL

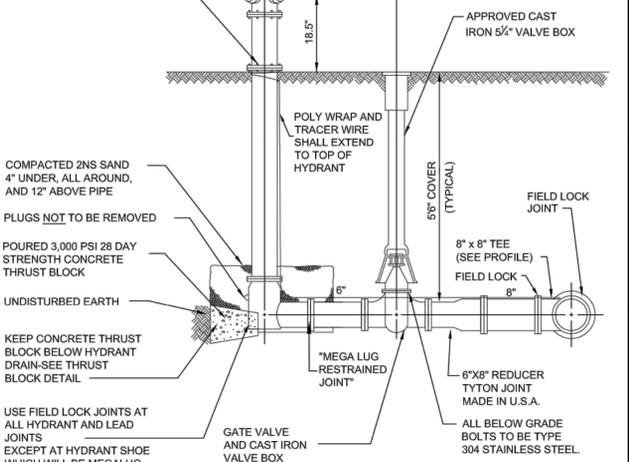
- PRE-CAST CONCRETE MANHOLE**
1. SECTIONS SHALL MEET ASTM C478.
 2. ALL JOINTS MADE WATERTIGHT WITH RUBBER GASKET JOINTS
 3. CONE TO BE OFFSET STEP ECCENTRIC TYPE
 4. ALL MANHOLE COMPONENT PARTS SHALL HAVE THE NAME OF THE MANUFACTURER STENCILED ON THE INSIDE. THE LETTERING SHALL BE A MINIMUM OF 4" HIGH.
 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 VALVE SIZE	"D"	TEE "D"
8"	5'-0"	6'-0"
12"	5'-0"	6'-0"
16"	6'-0"	6'-0"

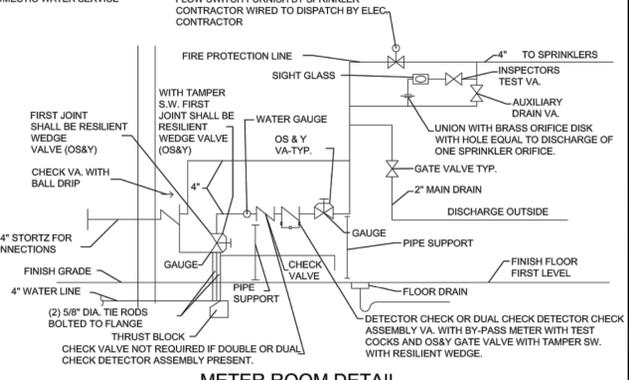


STANDARD GATE VALVE & WELL

- 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
- E.J.I.W. 5 BR-250 WITH 12" BARREL SECTION.
- SAFETY FLANGE (GRADE LINE) ± 3" ON HYDRANT AND VALVE BOX WILL BE SET AS SHOWN ON PLANS, AT ORIGINAL GROUND SURFACE OR AS DIRECTED BY RESIDENT ENGINEER. ALL EXTENSIONS SHALL BE BELOW SAFETY FLANGE.



STANDARD FIRE HYDRANT



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

REV	DATE	BY	APPD.	DESCRIPTION
14.01.24	MRH	DRW		UPDATES
11.09.13	BWA	DRW		FDC UPDATE
11.04.27	BWA	DRW		TWP REV
10.10.25	BWA	DRW		HYDRANT, MANHOLE UPDATE
10.01.20	TIN	DRW		UPDATES
YY.MM.DD	By	Appd.		Revision

Issued By Appd. YY.MM.DD

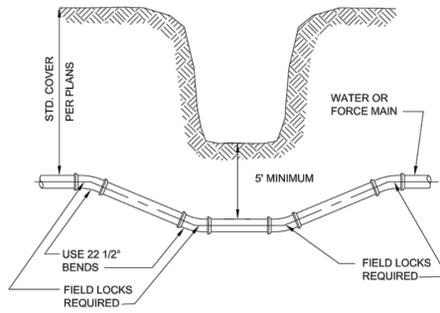
File Name: W-01 BWA DRW DRW 07.10.01

Permit-Seal Dwn. Chkd. Dsgn. YY.MM.DD

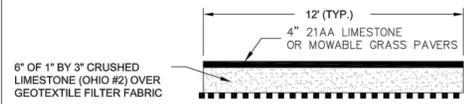
Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan
Title
WATER MAIN DETAILS

Project No. 2075001300 Scale NOT TO SCALE

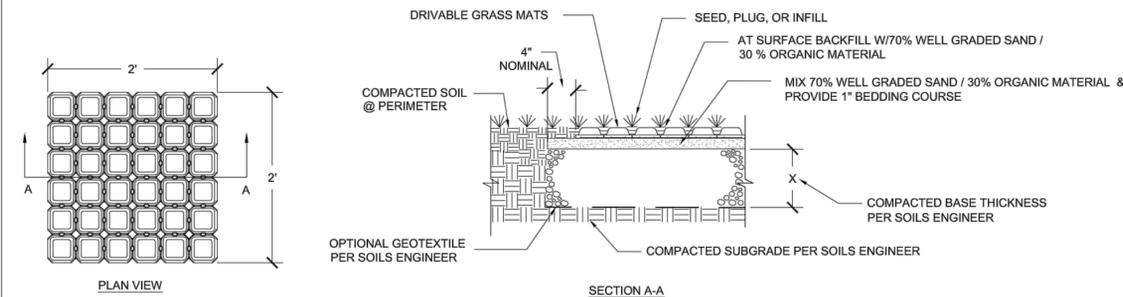


DITCH & STREAM CROSSING

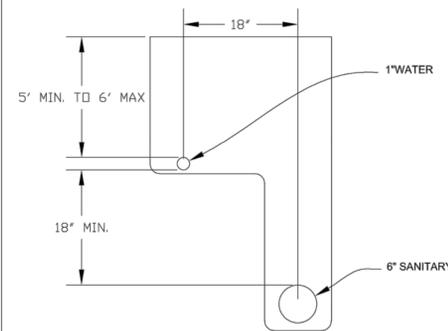


SANITARY SEWER ACCESS PATH

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

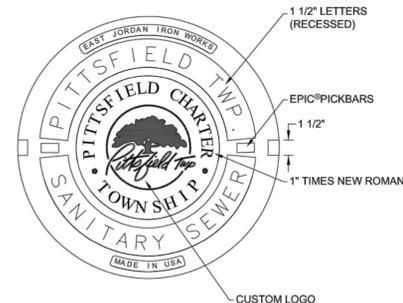


TYPICAL HEAVY TRAFFIC DRIVABLE GRASS DETAIL



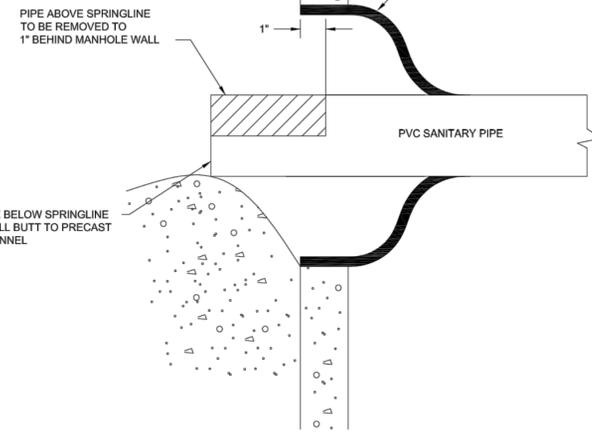
TYPICAL L TRENCH DETAIL
HOUSE LEADS

NOTE:
PER TOWNSHIP ENGINEER, COMPACTED SAND BACKFILL IS REQUIRED UNDER BASIN ACCESS ROAD.



COVER DETAIL

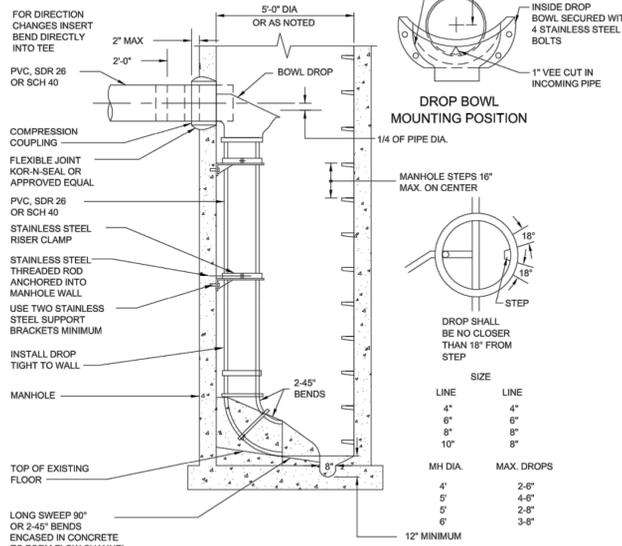
EAST JORDAN IRON WORKS 1040 Z BOLT DOWN FRAME
EAST JORDAN IRON WORKS 1040 AGS COVER



SANITARY PIPE PENETRATION

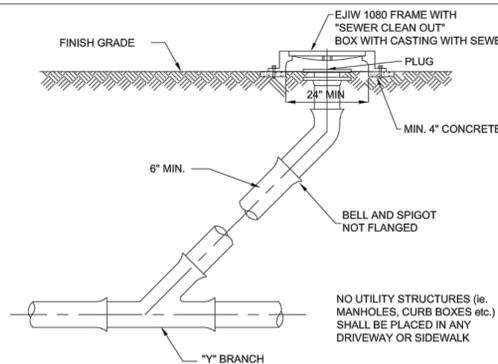
NOTES:

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 3/4" RAMSET/RED HEAD BOLTS HELD IN PLACE WITH 2 STAGE EPOXY PASTE.



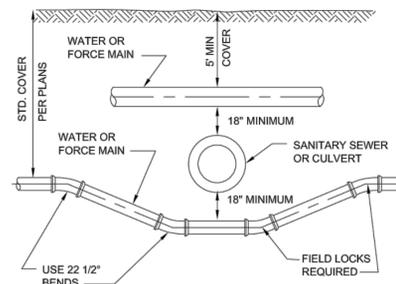
INTERIOR DROP
SANITARY MANHOLE

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



SANITARY SEWER CLEANOUT

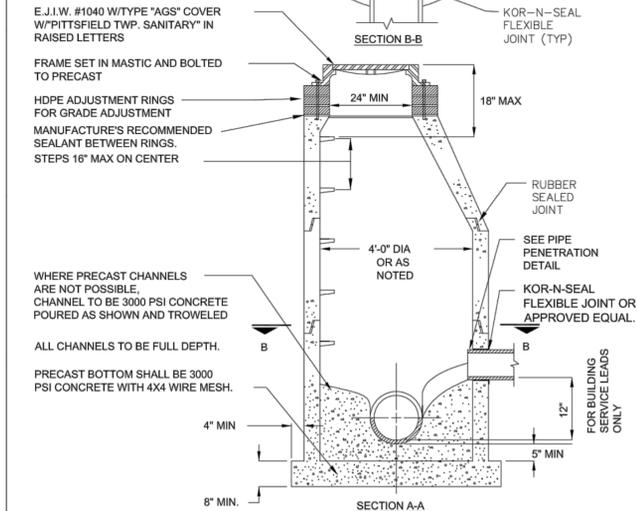
NO UTILITY STRUCTURES (ie. MANHOLES, CURB BOXES etc.) SHALL BE PLACED IN ANY DRIVEWAY OR SIDEWALK



SEWER OR CULVERT CROSSING

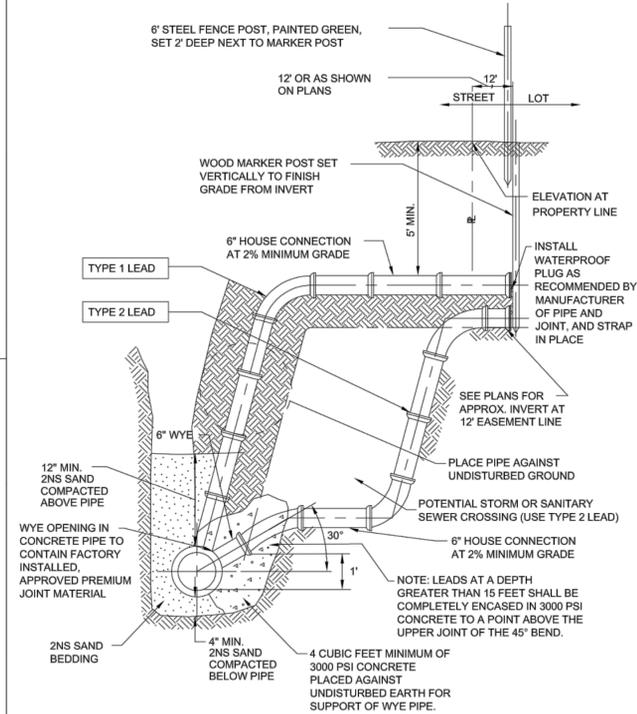
PRE-CAST CONCRETE MANHOLE

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.



SANITARY MANHOLE

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



SANITARY SEWER SERVICE
& RISER CONNECTION DETAIL



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

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

Issued By Appd. YY.MM.DD

File Name: SS-01 BWA DRW DRW 07.10.01
Den. 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

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:

Nominal Diameter (Inches)	Minimum Wall Thickness (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 to 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 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 or 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 pils 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.
 E. 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.
 F. 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. Waters and bracing shall be supplied and installed as required to complete the sheeting system. Waters and braces shall be of adequate strength for the load imposed. Splices in waters 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 liming 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 raking 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 tampers 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 begun, the base shall be made firm and cleared of topsoil, soil 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 uncompacted soil is encountered. The granular fill shall conform to the 2003 MDOT 8.02.08, 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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Revision	By	Appd.	YY.MM.DD
TWP REV	BWA	DRW	11.04.27
UPDATES	TTN	DRW	10.01.20

Issued	By	Appd.	YY.MM.DD

File Name: SE-02	TTN	DRW	DRW	07.10.01
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
EARTHWORK SPECIFICATIONS

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

- 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 and has been installed for not less than 30 days.
- 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.
- All sewer lines shall be televised while running enough water through the line to be visible at the next downstream manhole.
- All sewer lines shall be checked for alignment.
- All manholes shall be tested for leakage. All PVC lines shall be tested for deflection.
- 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.
- 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

- Section 33-95 (pg 30-6) 2004-Ten State Standards.
- 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.
- 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.
- 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.
- 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.
- The portion of line being tested shall be accepted if the portion under test meets the following conditions.
 - DI, and RCP Pipes
 - 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 3.0 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 (seconds)	Holding Time (seconds)	Minimum Holding Time
	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

- 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.
- 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

- 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.
- 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.
- 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

- All manholes shall be tested for leakage by using plugs on inlet-outletting sewers, and filling the manholes with water to the top of the manhole. 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

- 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

- 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.
- 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
- 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

- 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 through 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 Pro-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 of 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 1/4 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-8" 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.

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.
- 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.

3.05 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



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UPDATES	BWA	DRW	10.10.25	
UPDATES	TIN	DRW	10.01.20	
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Issued	By	Appd.	YY.MM.DD	
File Name: SS-02	BWA	DRW	DRW	07.10.01
Permit-Seal	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Client/Project
PITTSFIELD TOWNSHIP

Pittsfield Township, Michigan

Title
SANITARY SEWER SPECIFICATIONS

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 Pkg. 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-pkg, 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-Pkg
- 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 Pkg
- 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 feet 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.

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. Flugs, 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 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 8680 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 pipe extension shall reach within 0.5 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.

G. 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 C890. 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 P51-PF or P51-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 manufacture 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 Tru-bolt 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 4" mechanical joint inlet. Hydrants shall have two 2-1/2" (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 (HHS) adaptor. The HHS shall meet the requirements of AWWA C502 regarding material and pressure testing. Storz 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 adaptor 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 extension, 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 Siflos. 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 cleanliness 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 bell 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/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 undisturbed earth bedding.

H. Water mains shall be installed at least 10 feet horizontally from any existing or proposed gravity sanitary or storm sewer, septic tank, or subsol 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 plan 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. Whenever 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 valves, the CONTRACTOR shall furnish and install a 1-inch copper stop on the main as shown on the Standard Details.

C. All gate valves with operation 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 braced. 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



Carlisle | Wortman
ASSOCIATES, INC.

117 NORTH FIRST STREET SUITE 70 ANN ARBOR, MI 48104 734.662.2200 734.662.1935 FAX

Date: December 16, 2019
Revised: March 9, 2020
May 6, 2020

Final Site Plan Review For Pittsfield Township, Michigan

Applicant: SE Michigan Land Development LLC

Project Name: Monarch Estates

Plan Date: November 22, 2019

Revised Date: April 20, 2020

Location: West side of Platt Road, north of Textile Road

Zoning: R-1B Single Family Suburban Residential

Action Requested: Approval of Final Site Plan

PROJECT DESCRIPTION

The applicant is seeking final site plan approval of Phase 1 (20-units) of the 22-unit site condominium project on the east side of Platt Road. The project's first approval was obtained in 2013. The applicant then received two (2) extensions of approval totaling 18 months – 6-months in 2014 and 12-months in 2015. The applicant requested a third 12-month extension in May 2016 which was denied. The Preliminary Site plan was then approved for a third time on October 20, 2016 and again, most recently on October 3, 2019.

Current Use of Site:

The site is currently vacant.

NATURAL RESOURCES

The site has been actively used for agriculture. The applicant proposes to preserve select trees in the southeast corner and along the west property line. The removal of some additional trees may be required as part of the lot configuration and additional road connections.

The southern portion of the site is located within a FEMA designated Zone A (100-year) Flood Plain. The floodplain area encompasses (approximately) portions of Lots 18 through 22, as well as, the area of Whispering Springs Drive that connects with Platt Road. Lots 21 and 22 are not included in this phase of the development.

Lots 18 through 20 are subject to the standards outlined in Section 14.07 Flood Hazard Regulations in addition to all other applicable zoning provisions. The floodplain should be depicted on the site layout sheet demonstrating the location of the floodplain in relation to these lots should be provided.

Since the applicant has removed Lots 21 and 22 from this phase of the development, a wetland application is not required. The applicant will need to continue to discuss mitigation options with the Township for future phases (Lots 21 and 22). If the applicant does propose to construct the final two lots, wetland permit and mitigation will be considered at that time.

Items to be Addressed: *Demonstrate compliance with any floodplain regulation*

SUMMARY

In our preliminary site plan review, we noted the following items to be addressed during final site plan review:

1. Work with the applicant of the Pittsfield Glen site condominium to coordinate the inclusion of an interconnected road.

CWA COMMENT: *Information regarding the status of the road connection with the Pittsfield Glen development has not been provided. Sheet 6 demonstrates the connection of Prairie View Road to the west property line with the Pittsfield Glen development. Applicant shall provide township with cross-access easement.*

2. Compliance with Section 14.07 for development on Lots 18 through 22 within the floodplain.



CWA COMMENT: Information related to the location of floodplain on Lots 18 through 22 and compliance with Section 14.07 has not been provided. The location of the floodplain should be demonstrated on Sheet 5 in relation to the lot configuration.

3. Provide greenbelt plantings as required for final site plan review.

CWA COMMENT: A "landscape buffer" area is proposed along Platt Road. The greenbelt consists of 28 trees; 22 deciduous trees are required.

4. Work with Engineering to provide alternative material for drive to detention pond.

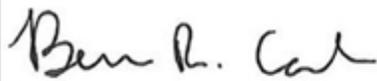
CWA COMMENTS: The driveway to the detention area has been modified to be constructed of a 12-foot wide grass pavers. We defer comment to the Township Engineer and Fire Marshal.

Items to be Addressed: 1) Demonstrate compliance with any floodplain regulation; and 2) Township Engineer and Fire Marshal review of grass paver drive to detention pond.

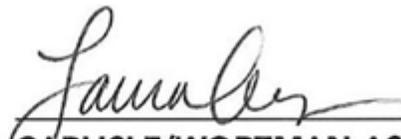
RECOMMENDATIONS

We recommend final site plan approval with the following conditions:

1. Demonstrate compliance with any floodplain regulation.
2. Township Engineer and Fire Marshal review of grass paver drive to detention pond.



CARLISLE/WORTMAN ASSOC., INC.
Benjamin R. Carlisle, AICP, LEED AP
Principal



CARLISLE/WORTMAN ASSOC., INC.
Laura K. Kreps, AICP
Senior Associate



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Craig Lyon
Director of Utilities &
Municipal Services
lyonc@pittsfield-mi.gov

Mandy Grewal, Supervisor

MEMORANDUM

TO: Ben Carlisle, AICP
Township Planning Consultant

FROM: Eric Humesky, P.E. *ESH*
Township Engineer

DATE: February 13, 2020

SUBJECT: Monarch Estates
C.S.P.A. # 19-17
Detailed Engineering Plan Review

We have reviewed the November 22, 2019, 33-sheet submittal of the above detailed engineering plan that was received by the Township on January 23, 2020 and comment as follows:

1. Sheet 2; Existing conditions & Demolition Plan
 - a. An existing gas main was encountered along the east side of Platt Road during the water main tie-in for the neighboring Pittsfield Glen. The Applicant shall verify the location of the gas main. If the gas main is present, it shall be potholed at the water main tie-in location prior to construction to verify there is adequate space for a gate well. A note shall be added to the plan accordingly.
2. Sheet 3; Existing Natural Features Plan
 - a. A tree survey shall be included.
 - b. A wetlands mitigation plan shall be provided.
3. Sheet 4; Soil Erosion & Sedimentation Control Plan
 - a. Erosion control blanket should be shown on or noted at all slopes steeper than 1:4.
 - b. The mud tracking mat should be shown across the entire site entrance. At a minimum it shall be 20 feet by 100 feet.

- c. The wording "... or if deemed necessary by the Township Engineer." shall be added to Stockpile Note 2.
 - d. A silt sack shall be proposed at EXR252.
 4. Sheet 6; Layout Plan
 - a. "Monarch Court (Private)" in the plan view shall be moved for readability.
 5. Sheet 7; Grading Plan
 - a. The top of curb elevations for the median in the cul-de-sac shall be noted.
 - b. The contours along the west property line do not match up with existing. Additionally, the proposed grading will potentially create a large area of ponding on the property to the west. This shall be addressed.
 - c. Side yards shall have a minimum 2% slope.
 - d. The proposed swale on the north property line has a slope of approximately 0.25%. A minimum slope of 2% should be proposed here.
 - e. The proposed grading connecting to the south property line will be poorly drained. Drainage here shall be improved.
 - f. Rip rap shall be proposed at the three end sections draining water into the re-graded Koch-Warner Drain.
 6. Sheet 8; Intersection Plan
 - a. The maximum sidewalk slope for ADA compliance is 2% on cross slope and 8.3% on downslopes. It is recommended that the sidewalk slopes are designed at approximately 1.5% and 7.5%, respectively, to allow for construction variations.
 7. Sheet 11; Koch-Warner Drain Plan & Profile
 - a. Rip rap shall be proposed at the three end sections draining water into the re-graded Koch-Warner Drain.
 8. Sheet 12; Floodplain Plan
 - a. Calculations shall be provided confirming the noted available flood plain storage in the proposed pond, ditch, and the elliptical pipe.
 9. Sheet 14; Road & Water Main Profiles

- a. The existing fire hydrant riser at Pittsfield Glen shall be shown in the profile view.
- b. The water main for hydrant 2 shall be raised after crossing 8 so that the hydrant riser has 5.5 feet depth of bury.
- c. Lead crossing shall be shown in the profile view. This shall be updated on all relevant profile sheets.
- d. Sanitary sewer and water leads shall be shown in the plan view. This shall be updated on all profile sheets.
- e. Compacted sand backfill shall be shown graphically in the profile view within the roadway corridor.
- f. In the Prairie View Road profile, vertical bends should be proposed in order to maintain 18 inches of vertical clearance at Crossings 9 and 11.
- g. Top of pipe elevations should be labeled every 50 feet and at all structures.
- h. The proposed grade shown on the profiles shall be the proposed grade above the water main.

10. Sheet 16; Storm Sewer Profiles

- a. The swale crest line type shall be added to the legend.
- b. The backfill under the basin access road shall be compacted sand and shown accordingly in the profile.
- c. Compacted sand backfill shall be placed in the roadway corridor between manholes R54 and R48 and shown accordingly in the profile.

11. Sheet 17; Design Calculations

- a. Manning's coefficient shall be noted in the on-site storm sewer conveyance system design.
- b. Per the Township Ordinance 36-72:
Whenever possible, the building sewer shall be brought to the building at an elevation below the basement floor. In all buildings in which any building drain is too low to permit gravity flow to the public sewer, sanitary sewage carried by such building drain shall be lifted by an approved means and discharged to the building sewer.

The Applicant shall adjust the sanitary sewer slope to the minimum allowable (0.28%) from manholes S1 to S3 and from manholes S3 to S6. With the revised slopes and pipe elevation, the Applicant shall confirm which units will require hung plumbing.

- c. A watermain structure schedule shall be provided and include:
 - i. Casting type
 - ii. Finished grade elevation/rim elevation
- d. The storm sewer structure table shall also include:
 - i. Casting type
 - ii. Depth
 - iii. Sump (Yes/No)
- e. The sanitary sewer structure table shall also include:
 - i. Casting type
 - ii. Depth

12. Sheet 20; Detention Basin Plan & Profile

- a. The Bottom of Basin/Storage elevation in the profile view shall be 828.00.
- b. The Bottom of Basin and the 100-Year elevations shall be corrected in the plan view.

13. Sheet 22; Fire Protection Plan

- a. The proper fire truck template, available for download on the Township website, shall be used.

14. Sheet 23; Landscape Plan

- a. Sanitary sewer and water leads shall be shown on this sheet.

15. All walkways must be ADA compliant.

16. The Washtenaw County Road Commission reviewed and did not approve the plan in correspondence dated August 26, 2019.

17. The Washtenaw Count Water Resources Commissioner reviewed and did not approve the plan in correspondence dated December 19, 2019.
18. The Michigan Department of Environment, Great Lakes, and Energy shall review and approve the floodplain impacts.
19. The proposed work within the floodplain will require a Conditional Letter of Map Revision prior to Engineering Plan Approval.
20. Prior to Final Site Plan approval, the Applicant shall execute a development agreement, in a form approved by the Township, specifying all the terms and understandings relative to the proposed development. A performance guarantee will be required as part of the development agreement in accordance with Section 3.09 of the Zoning Ordinance.
21. With each re-submittal, the preparer shall provide a written summary of revisions made to the plans.



Pittsfield Charter Township
Department of Utilities & Municipal Services

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Mandy Grewal, Supervisor

MEMORANDUM

TO: Pittsfield Township Planning Commissioners

FROM: Ben Carlisle, AICP
Laura Kreps, AICP

DATE: June 9, 2020

SUBJECT: Revised Open Space Preservation Development Option (OSPDO) Ordinance

The Planning Commission considered changes to the Open Space Preservation Development Option (OSPDO) at the June 4th meeting. During the meeting there was great discussion and questions. In this memo, I've tried to summarize the discussion and provide answers to the questions that were asked.

Summary of Discussion:

There appeared to be consensus from the Planning Commission on:

- Permitting OPSDO development in urban service areas.
- Permitting OPSDO development for multiple family residential.
- Allowing the Planning Commission to grant deviations from dimensional (setbacks, lot coverage, etc) requirements.
- Providing a 20% density bonus to encourage the use of the OPSDO, but such bonus shall be discretionary based on Planning Commission review.

Questions Raised During Discussion:

Listed below are questions raised during the Planning Commission discussion and our subsequent response:

1. Is this the appropriate tool to encourage/require the type of development the Township desires?

It is recognized that the use of OPSDO, is a useful tool for development in Pittsfield, as it promotes smart growth and preserves valuable natural resources, open space and

agricultural land. However, in the past ten (10) years, there has only been two (2) OSPDO developments in the Township. The purpose of the proposed amendment was to reduce unnecessary restrictions, such as locational restrictions, but also incentivize the development community to use this tool.

Other than the bonus density and flexibility for Planning Commission deviations, all the other amendments are offer the ability to use the OSPDO in locations that were not previously permitted such as on small lots, within the public utility portions of the township, and for multiple family developments.

Other development options, such as a PUD, should not be used when we have an appropriate tool such as the OSPDO in place. In other words, the use of a PUD is unnecessary for open space developments, when OSPDO is an appropriate tool already in place. Furthermore, development types that we encourage or wish to see more off should be made procedurally easier to achieve rather than more difficult. A PUD is a form of rezoning that has a much higher procedural bar.

2. Is a one-acre minimum to limited in lot area. Should it be increased?

The current ordinance requires a minimum of five (5) acres for an OSPDO. This large parcel acreage minimum is appropriate in the non-utility areas of the township, however if the township desires to see more OSPDO especially in the more urban areas, the five (5) acre minimum is a high bar. The purpose of this amendment is to reduce that regulatory hurdle.

However after further consideration, I feel that one (1) acre site is probably unrealistic to achieve a proper OSPDO development. As such, I recommend increasing the proposed minimum lot size from one (1) to three (3) acres. A three (3) acre is achievable both in the more agricultural and urban portions of the township.

3. Should the Planning Commission be allowed to vary height?

Height is often the most significant concern of property owners adjacent to newly proposed development. Issues such as a reduced setback, or lot coverage, can be addressed with an increase in screening or increased landscaping. Camouflaging or mitigating height is much more difficult. I will suggest the Planning Commission consider if they want the authority to allow for a height deviation.

4. Should the Planning Commission allow for a density bonus?

As I noted, the purpose of the ordinance amendments was to both reduce unnecessary regulatory requirements but also incentives the use of the tool. As currently written there is no direct incentive to use the OSPDO tool. The developer will have reduced infrastructure costs due to less roads and utility pipes, but in the end density and units it is often what

developers look for as incentives. If the township desires to see more OSPDO, an incentive may be best way to achieve this.

That being said, I have amended the draft to state that the up to a maximum 20% density bonus is purely discretionary based on the Planning Commission, and any density bonus shall be commensurate to the proposed benefit achieved by the development. I have put in language to note the discretionary nature of the bonus and the “types” of benefits considered including preservation of natural features, provision of recreation facilities, or preservation of agricultural land. I am open to suggestions from the Planning Commission of potential benefits that would qualify for increased density.

5. Why was 30% the minimum open space required to qualify for an OSPDO.

Currently there is no minimum percentage of open space that must be provided to qualify for an OSPDO. The only percentage distinction is that if you provide less than 50% open space you are reviewed as a conditional use. Part in parcel with the proposed regulatory flexibility and potential density bonus, I want to establish a minimum open space percentage to qualify for an OSPDO.

6. Does approving this ordinance lock future Township Boards or Planning Commissions?

Untimely the authority to amend the zoning ordinance lies with the Township Board. The Planning Commission is only a recommending body on this matter. Any decision by this Township Board, based upon a recommendation from this Planning Commission, would not bind a future Boards, as they may choose to amend the zoning ordinance in the same process that this Board and Planning Commission are following.

We look forward to discussing this item with the Planning Commission on June 18, 2020.

Sincerely,



CARLISLE/WORTMAN ASSOC., INC.

Benjamin R. Carlisle, AICP, LEED AP

Principal

ARTICLE 7.02

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SECTION 7.02 OPEN SPACE PRESERVATION DEVELOPMENT OPTION (OSPDO)

A. **Purpose.** This section is intended to carry out the provisions of Act 177, PA 2001, as amended (now MCL 125.286h) to include an open space preservation development option in the Pittsfield Township Zoning Ordinance. This Section proposes to accomplish this purpose by allowing the owner of certain parcels of land the option to develop that land in a manner that groups dwelling units on portions of the land that are most suitable for residential development while requiring the remaining portions of land most suitable for open space use to be perpetually preserved as undeveloped open space. The regulations in this Section are also intended to accomplish the following non-exclusive list of purposes.

1. Preserve natural drainage systems, open space, farmlands, rural character, woodlands and wetlands, natural topography, and environmentally sensitive areas.
2. Achieve a higher quality of residential development than could otherwise be achieved under conventional zoning.
3. Permit development that is consistent with the Township's adopted Master Plan and any other applicable adopted plans.
4. Preserve natural vegetation to the extent feasible.
5. Preserve open space.
6. Facilitate the construction and maintenance of streets, utilities, and public services in a more economical and efficient manner to ~~R~~reduce capital costs of development.
7. Limit soil erosion potential by reducing the amount of clearing and grading needed for development.
8. Encourage a less sprawling form of development, thus preserving open space as undeveloped land.
- ~~7.9.~~ Allow for design innovation to provide flexibility for land development where the normal development approach would otherwise be unnecessarily restrictive or contrary to other Township goals.

Commented [BC1]: Added a few additional purpose statement to clarify purpose of the ordinance

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B. **Review Authority.** The Pittsfield Township Planning Commission shall have authority to approve or deny applications for an OSPDO that is to be developed as a site condominium or a metes and bounds land division. The Township Board shall have authority to approve or deny an application for an OSPDO that is to be developed as a subdivision, after recommendation by the Planning Commission. The Township Board shall have final

authority to approve or reject the conservation easement and master deed or restrictive covenants for a development under this Section.

C. **Eligible Property.**

1. A parcel of land, which parcel shall be the parent lot for the purposes of this Section, is eligible for an OSPDO if all the following requirements are met.

- a. The parent lot is zoned AG, R-1A, ~~or R-1B, R-2, or R-3~~
- b. The parent lot has an area of at least ~~five-three (35)~~ acres of contiguous land, not divided by a road.
- c. The parent lot is under single ownership control such that a single person or entity has proprietary responsibility for completing and maintaining the development. An applicant applying for an OSPDO under this Section shall provide documentation of such ownership or control in the form of agreements, contracts, deeds, or other such evidence as is acceptable by the approving authority to assure that the applicant has sufficient ownership interest in the parcel to bind the land and assure that the development will be completed in its entirety as approved and that the land will continue to be in compliance and maintained in accordance with the final site plan, preliminary plat as finally approved, and the approved maintenance plan under this Section.

~~d. Neither the parent lot nor any individual parcel or condominium unit within a proposed OSPDO is dependent upon the extension of public water or sanitary sewer services.~~

2. A OSPDO development shall maintain a minimum of thirty percent (30%) of the gross area of the site as dedicated open space held in common ownership.

~~2.3.~~ Open space preservation developments achieving at least fifty percent (50%) dedicated open space and meeting the provisions of Section 7.02. ~~1-K~~ shall be treated as a permitted land use. Open space preservation developments with between thirty percent (30%) and less than fifty percent (50%) dedicated open space but otherwise meeting the provisions of Section 7.02. ~~1-K~~ shall be treated as a conditional land use.

D. **Permitted Uses.** The following uses are permitted within an OSPDO:

- 1. **AG District.** In an AG Zoning District, the land may be used for single family detached dwelling units and accessory buildings or structures on an approved lot or condominium unit. All other uses listed in Section 4.20 shall be permitted in the dedicated open space, except that intensive livestock or poultry raising operations, such as poultry houses, hog hotels, etc., shall not be permitted.

Commented [BC2]: Currently the ordinance doesn't permit cluster developments for multiple family (R-2, and R-3) districts. There may be opportunities to require/encourage cluster developments for multiple family developments

Commented [BC3]: Currently cluster developments are only permitted in the rural, non-utility portions of the township. By removing this requirement, clusters can be developed in all portions of the township.

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2. ~~R-1A, or R-1B, R-2, or R-3~~ District. All residential uses and types uses permitted in Section 4.20 in a R-1A, ~~or R-1B, R-2, and R-3~~ ~~Zoning~~ Districts, are permitted in an OSPDO under this Section.

Commented [BC4]: Added R-2 and R-3 districts

E. Density Regulations. The number of lots or site condominium units permitted on a parcel of land under an OSPDO shall be calculated as follows:

~~3.~~ For sites not served by public utilities, the number of units shall not exceed the area of the parent lot, in acres, multiplied by:

Commented [BC5]: Density shall be based upon sites with utilities and those without. The biggest restriction to lot size and density in the non-utility is the county requirement for ¼ or 1 acre for well and septic.

1.

a. Thirty-five one-hundredths (0.35) for land zoned AG.

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a.

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b. ~~Eighty one~~Eighty ~~one~~-hundredths (0.80) for land zoned AG that is designated for rural residential, low density use in the Township's adopted Comprehensive Plan.

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b.

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c. ~~Eighty one hundredths~~One (1.0)~~0.80~~ for land zoned R-1A ~~or R-1B~~.

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d. One point two-five (1.25) for land zoned R-1B.

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e. The minimum area of each lot or site condominium unit in an OSPDO shall not be less than the minimum area required by Washtenaw County for well and septic tank/drainfield permits

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~~4.2.~~ For lots served by public utilities, the number of dwelling units permitted shall not exceed the number of dwelling units customarily developable in the zoning district in which the proposed development is located, developed with a conventional layout and all applicable ordinances and laws observed. In order to calculate density with a conventional subdivision or site condominium layout, the applicant shall submit a concept site plan of the property with a conventional layout. The plan shall indicate the topography of the site at two (2) foot contour intervals and the limits of all floodplains, water bodies, wetlands, easements, and other areas which would be set aside and preserved due to impracticality, economic unfeasibility, contractual prohibition, or based upon applicable law or ordinance. In addition, the concept plan with the conventional layout shall include the general street pattern and lot configurations. In general, the plan shall be drawn with sufficient detail to permit the Planning Commission to determine the density that would be achieved by conventional development.

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Commented [BC6]: R-1A requires 1 acre per unit. Multiplying the total area by 0.8 is actually penalizing clusters by requiring a density that is only 4/5 of what the development could achieve by not doing a cluster.

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Commented [BC7]: Same comment as above. R-1B requires 10,000 sq/ft lots. Multiplying by 1.5 is more in line with R-1B requirements.

Again the overall density and minimum lot areas will be dictated by the county's minimum lot size.

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~~5.3.~~ Maximum lot coverage shall be twenty percent (20%). Maximum impervious surface coverage shall be twenty five percent (25%). Maximum floor area ratio shall be twenty percent (20%). The area of the parent lot shall be as defined in the definition of lot area in Article 2, herein. Fractions shall be rounded down to the nearest whole number.

Commented [BC8]: The intent of this section is to provide a "parallel" plan which sets the base density for the project

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4. To encourage the use of the OSPDO, if all standards set forth in Section 7.02.I are met, the underlying density established by 7.04.E.1 and 2 may be increased by up to twenty percent (20%) at the discretion of the Planning Commission. Density bonuses shall be based upon a demonstration by the applicant of one of the following:

a. Preservation of Significant Natural Features. Preservation of significant natural features contained on the site, as long as it is in the best interest of the Township to preserve the natural features that might be negatively impacted by conventional residential development. The determination of whether the site has significant natural features shall be made by the Planning Commission, after review of a Natural Features Analysis, prepared by the applicant, that inventories these features; or

b. Provision of Recreation Facilities. If the site lacks significant natural features, it can qualify with the provision of usable recreation facilities to which residents and non-residents of the development shall have reasonable access. Such recreation facilities include areas such as a neighborhood park, passive recreational facilities, soccer fields, ball fields, bike paths, or similar facilities that provide a feature of community-wide significance and enhance residential development; or

c. Preservation of Agricultural Land. Preservation of existing agricultural land. The determination of whether the site has significant agricultural features shall be made by the Planning Commission after review of a Site Plan, prepared by the applicant, which inventories these features.

E. ~~Minimum Lot Area.~~ The minimum area of each lot or site condominium unit in an OSPDO shall not be less than the minimum area required by Washtenaw County for well and septic tank/drainfield permits.

F. *Minimum Required Yards.*

G.1. Each lot or site condominium unit in an OSPDO shall provide the following minimum required yards. If property lines do not exist between houses, the setbacks shall be measured to an imaginary line of equal distance between the houses. A duplex shall be treated as a single-detached residence for the purpose of determining required setbacks.

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**Table 7.02.G-1
Open Space Required Yards**

gross area of the site as dedicated open space held in common ownership.

~~4.2.~~ Open space preservation developments achieving at least fifty percent (50%) dedicated open space and meeting the provisions of Section 7.02.I shall be treated as a permitted land use. Open space preservation developments with between thirty percent (30%) and less than fifty percent (50%) dedicated open space but otherwise meeting the provisions of Section 7.02.I. shall be treated as a conditional land use. At least fifty percent (50%) of the parent lot area shall be in dedicated open space, except where an applicant is seeking approval for an OSPDO as a conditional land use. The definition of lot area shall be as defined in Article 2 herein.

~~2.3.~~ The open space area within a proposed OSPDO shall be located so that it preserves significant natural resources and/or connects open spaces throughout the development and with adjacent open space.

~~3.4.~~ The open space shall be connected with existing or potential open space and/or adjacent public land where feasible.

~~4.5.~~ An accessory structure(s) for permitted uses may be erected in the open space in accordance with the approved site plan or plat.

~~5.6.~~ Except in a case where the applicant proposes agricultural use in the open space area that is independent from the proposed residential uses in the development, all owners of lots or site condominium units in an OSPDO shall be permitted access to the dedicated open space. Use of dedicated open space may be restricted to property owners in the development.

~~6.7.~~ The applicant shall submit an open space management plan for maintaining the dedicated open space with the application for the OSPDO.

~~7.8.~~ An owner's association shall be created for a development under this section which shall own and be responsible for maintaining the dedicated open space. Each property owner shall be a member of the association.

~~8.9.~~ Where a development under this Section is proposed in phases, the Township may require that all land to be dedicated as open space shall be included in the first phase of the development.

J. *Guarantee of Dedicated Open Space.*

1. The applicant for an OSPDO shall set aside the dedicated open space through an irrevocable conveyance that guarantees the dedicated open space will remain perpetually open and will be maintained in the manner approved by the Township Board. This conveyance shall be in the form of a permanent conservation easement.

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2. The purpose of the conservation easement shall be to ensure that dedicated open space will be:
 - a. Protected from all forms of development and limited to the uses and structures as approved;
 - b. Shown on an approved site plan or plat; and
 - c. Never changed to another use.
3. The conservation easement shall contain, at a minimum, the following provisions that:
 - a. Describe the permitted use(s) within the dedicated open space.
 - b. Prohibit the storing and/or dumping of refuse and any hazardous materials or refuse on the dedicated open space.
 - c. Prohibit any activity that might cause risk of soil erosion on the dedicated open space except for accepted agricultural practices.
 - d. Prohibit the use of motorized vehicles and or motorized watercraft on the dedicated open space.
 - e. Prohibit all cutting, filling, or removal of vegetation from wetland or wooded areas in dedicated open space, except for invasive species and as otherwise needed for acceptable resource management practices.
 - f. Prohibit the use of pesticides, herbicides, or fertilizers within or adjacent to wetlands in a dedicated open space.
 - g. Require that the owner's association maintain the dedicated open space in accordance with the approved management plan.
 - h. Provide for maintenance of the dedicated open space to be undertaken by the Township Board, and the costs thereof assessed against the person or entities responsible for maintaining the dedicated open space, if:
 - i. There is a failure to adequately maintain the open space in accordance with the approved maintenance plan; or
 - ii. The Township Board determines that the dedicated open space is a public nuisance.

- i. Require that the conservation easement runs with and is binding upon the land and shall be recorded with the deeds to all parcels created and proposed as part of a development under this Section.
 - j. Provide that, if the owners association, or any land trust or conservancy holding the conservation easement, ceases to exist, the easement shall revert to Pittsfield Township.
4. At the option of the applicant, the conservation easement may be dedicated to and held by the Township or a recognized land trust or conservancy approved by the Township Board. The easement shall be in a form acceptable to the Township and shall be duly recorded in the Washtenaw County Register of Deeds office. This provision does not prohibit a transfer of ownership or control, provided such transfer or control has prior approval of the Township Board and the property in the OSPDO continues in compliance with the Township's original approval.

K. **Review Procedures.** An application for an OSPDO shall be reviewed as follows:

1. **Subdivisions.** If an OSPDO is for a subdivision, review of the preliminary and final plats shall proceed as provided in the Pittsfield Township Subdivision Ordinance and the Township's adopted Land Development Standards.
2. **Site Condominiums.** If an OSPDO is for a site condominium, review shall proceed as provided in Section 7.01 and Article 9.0 of the Zoning Ordinance and the Township's adopted Land Development Standards.
- ~~3. **Metes and Bounds Divisions.** If an OSPDO is for land division by metes and bounds descriptions, the review shall proceed as provided for preliminary and final site plans in Article 9.0 of the Zoning Ordinance and the Township's adopted Engineering Standards.~~

L. **Review Standards.** A proposed OSPDO shall meet all the following standards for approval. The Planning Commission shall make the necessary findings for compliance with this Section upon its review of the final site plans for site condominiums and metes and bounds land divisions under this Section. It shall be the responsibility of the Township Board to make such findings for subdivisions developed under this Section after review and recommendation by the Planning Commission. All findings shall be in writing and shall be recorded in the minutes of the meeting at which the decision is made.

1. The proposed OSPDO must be consistent with the Township's adopted Master Plan and any other applicable adopted plan.
2. The proposed OSPDO must not adversely affect existing or future uses or the value of adjacent properties.

3. A site plan shall meet all requirements and standards for preliminary and final site plans as provided in Article 9.0 of the Zoning Ordinance and all requirements and standards of the Township's Land Development Standards. A subdivision plat shall meet all requirements and standards for preliminary and final plats in the Township's Subdivision Control Ordinance and the Township's Land Development Standards.
4. The proposed OSPDO must meet all requirements and standards in this Section and all other applicable provisions of the Zoning Ordinance.
5. The proposed OSPDO must comply with all applicable Federal, State, and local rules and regulations.

~~6~~.M. ***Design Standards.***

~~7~~.1. The OSPDO shall be designed to promote preservation of natural features. Lots or site condominium units, roads, storm water management facilities, and other improvements shall be designed and situated to minimize alteration of or intrusion into the natural environment.

~~8~~.2. Lots or site condominium units shall be located on soils that are most suitable for drainfields.

~~9~~.3. Dwelling units shall be located away from environmentally sensitive areas. They shall not be located in areas most suitable for open space. Dwelling units shall be located as far as possible from agricultural areas.

~~10~~.4. Placement of wells, septic tanks, and drainfields shall comply with all requirements of Washtenaw County.

~~11~~.5. Each lot or site condominium unit shall have access to and frontage on an approved street.

~~12~~.6. Pedestrian access shall be provided within a development between lots or site condominium units and non-agricultural open space, between open space areas, and to appropriate on and off-site uses.

~~13~~.7. The Planning Commission or Township Board, whichever applies, may require that structures of historic, cultural, or architectural significance on the site of an OSPDO be retained, if suitable for rehabilitation. Adaptive reuse for a permitted use may be permitted.

~~M~~.N. ***Conditions of Approval.*** The Planning Commission or Township Board, whichever applies, may impose reasonable conditions for approval of an OSPDO that will assure that the development and all elements of the proposed OSPDO will be consistent

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with the intent and purpose of requirements in this Section, the Zoning Ordinance, Subdivision Control Ordinance and the Township's Land Development Standards.

N.O. ***Recording of Action.***

1. Upon approval of a final site plan by the Planning Commission, or final approval of a preliminary plat by the Township Board, the applicant shall record an affidavit with the Washtenaw County Register of Deeds that contains the full legal description of the property in the OSPDO, specifies the date of Township approval, states the conditions the Planning Commission or Township Board imposed, and declares that all improvements will be carried out pursuant to the approved OSPDO plan or plat, unless an amendment is endorsed by the Planning Commission or Township Board, whichever applies. The deed restrictions and conservation easement shall be duly filed with the Washtenaw County Register of Deeds. The applicant shall promptly submit copies of the recorded documents to the Township Clerk.
2. Upon approval of a final site plan by the Planning Commission, or final approval of preliminary plat by the Township Board, the Township Zoning Administrator shall promptly record the approval of the OSPDO on the Township's official zoning map, which entry shall be signed by the Township Supervisor and attested to by the Township Clerk.

O.P. ***Time Limits.***

1. An approved OSPDO shall expire and be of no effect if construction does not commence within twelve (12) months after approval unless the Planning Commission or Township Board, whichever gave the approval, approves an extension. If the applicant does not comply with the conditions specified in the approval, the approving authority or Township Zoning Administrator shall issue a stop work order and no further work shall be done until such time as the conditions are met to the satisfaction of the approving authority.
2. Each phase of a development shall be commenced within twelve (12) months of the schedule set forth in the approval. If construction of any phase is not timely commenced as provided herein, the approval of the OSPDO shall become null and void and no further work may be conducted on the site until such time as adequate assurances to the satisfaction of the approving authority are made that the development will be completed as approved by a date certain as determined by the approving authority.
3. The applicant may apply in writing to the approving body for an extension of time in which to commence and/or complete construction. The application for extension must include an explanation of reasons justifying the requested extension. The body granting the original approval may grant a requested extension not exceeding twelve (12) months for good cause. Not more than one extension may be approved.

P.Q. *Continuing Compliance.*

1. An applicant who fails to comply with the approved final site plan or the preliminary plat as finally approved, whichever applies, shall be deemed in violation of the Zoning Ordinance, and subject to enforcement and penalties as provided in Section 3.07 of the Zoning Ordinance.
2. A development agreement and performance guarantee shall be required as a condition of final site plan and preliminary plat approval. The guarantee and agreement shall be in a form approved by the Township Board and shall ensure completion of a proposed OSPDO as approved.

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