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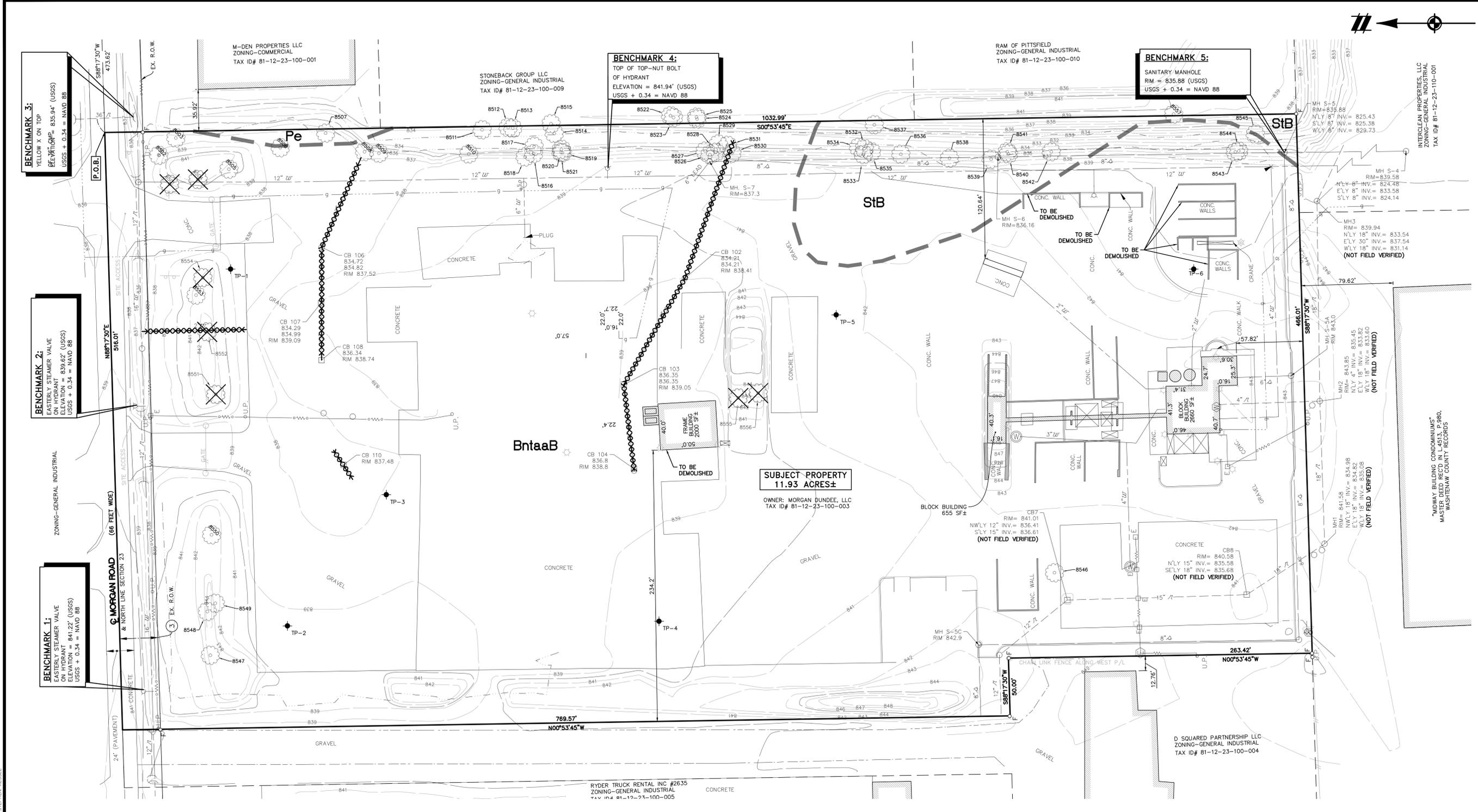


SECTION 05  
TOWN 3 SOUTH, RANGE 6 EAST  
PITTSFIELD TOWNSHIP  
WASHTENAW COUNTY, MICHIGAN

DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
EXISTING CONDITIONS & NATURAL FEATURES PLAN

CLIENT  
DATE  
SEPTEMBER 26, 2019

Table with columns for REVISIONS, SCALE (1" = 50 FEET), DR. CR, CH., JOB (18003508), SHEET NO. (02)



**BENCHMARK INFORMATION**

- BM #1: EASTERLY STEAMER VALVE ON HYDRANT... ELEVATION = 841.22' (USGS) USGS + 0.34 = NAVD 88
- BM #2: EASTERLY STEAMER VALVE ON HYDRANT... ELEVATION = 839.62' (USGS) USGS + 0.34 = NAVD 88
- BM #3: YELLOW X ON TOP OF 36" CMP... ELEVATION = 835.94' (USGS) USGS + 0.34 = NAVD 88
- BM #4: TOP OF TOP-NUT BOLT OF HYDRANT... ELEVATION = 841.94' (USGS) USGS + 0.34 = NAVD 88
- BM #5: SANITARY MANHOLE... RIM = 835.88 (USGS) USGS + 0.34 = NAVD 88

**SOIL LEGEND**

Table with columns: Map Unit Symbol, Map Unit Name, Hydrologic Soil Group. Includes BntaaB, Pe, StB.

**SOIL NOTES**

- 1. SOILS INFORMATION REFERENCED FROM USDA NRCS WEB SOILS SURVEY, ACCESSED 2019.

**DEMOLITION NOTES**

- 1. ALL ON-SITE WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT SPECIFICATIONS AND STANDARD DETAILS OF PITTSFIELD TOWNSHIP, UNLESS OTHERWISE SPECIFIED.
- 2. THE CONTRACTOR SHALL DEMOLISH OR RELOCATE ANY SITE FEATURES AS APPROPRIATE TO FACILITATE THE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS.
- 3. ALL DEMOLITION MATERIALS SHALL BE PROPERLY REMOVED FROM THE SITE AND DISPOSED OF IN A LEGALLY DESIGNATED DISPOSAL AREA.
- 4. THE CONTRACTOR SHALL OBTAIN THE NECESSARY PERMITS AND NOTIFY ALL AFFECTED UTILITY COMPANIES PRIOR TO THE DEMOLITION OF ANY EXISTING STRUCTURES. ALL EXISTING UTILITIES SHALL BE CAPPED OFF OR REMOVED SO AS NOT TO INTERFERE WITH THE CONSTRUCTION PROJECT. ALL DEBRIS SHALL BE HAULED AWAY FROM THE SITE AND DISPOSED OF AT AN APPROVED LOCATION.
- 5. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE. PRIOR TO THE START OF ANY DEMOLITION OR CONSTRUCTION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES AND FIELD LOCATE EXISTING UTILITIES.
- 6. ANY REMOVAL/ABANDONMENT OF EXISTING WELLS AND SEPTIC FIELDS, SHALL BE IN ACCORDANCE WITH WCEOHD STANDARDS.
- 7. ANY OVERHEAD LINES AFFECTED BY CONSTRUCTION SHALL BE RELOCATED UNDERGROUND.

**REFERENCE NOTES**

- 1. BEARINGS ARE BASED ON MICHIGAN STATE PLANE COORDINATES (NAD83), SOUTH ZONE, GROUND DISTANCES, INTERNATIONAL FEET. MEASURED BEARINGS AS SHOWN DIFFER FROM RECORD TITLE BEARINGS. VERTICAL DATUM IS BASED ON NAVD88.
- 2. THE SITE SHOWN HEREON IS LOCATED WITHIN ZONE X (AREAS DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN) ACCORDING TO MAP NUMBER 26161C0410E OF THE FLOOD INSURANCE RATE MAP, EFFECTIVE DATE APRIL 3, 2012.
- 3. WATER MAIN, STORM SEWER, AND SANITARY SEWER UTILITY STRUCTURES HAVE BEEN FIELD LOCATED WHERE VISIBLE. UTILITY AND AS-BUILT MAPS HAVE BEEN REQUESTED AND SOME MAPS HAVE BEEN RECEIVED AT DATE OF THIS SURVEY. FRANCHISE UTILITY MAPS HAVE BEEN REQUESTED FROM THE APPROPRIATE FRANCHISE COMPANY, BUT NOT ALL MAPS HAVE BEEN RECEIVED AT DATE OF SURVEY. FRANCHISE UTILITY STRUCTURES HAVE BEEN FIELD LOCATED WHERE VISIBLE.
- NOTE: THE SURVEYOR MAKES NO GUARANTEES THAT THE UNDERGROUND UTILITIES SHOWN COMPRISE ALL SUCH UTILITIES IN THE AREA, EITHER IN-SERVICE OR ABANDONED.
- NOTE TO THE CLIENT, INSURER, AND LENDER - WITH REGARD TO TABLE A, ITEM 11, SOURCE INFORMATION FROM PLANS AND MARKINGS WILL BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES PURSUANT TO SECTION 5.E.IV. TO DEVELOP A VIEW OF THE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY, AND RELIABLY DEPICTED. IN ADDITION, IN SOME JURISDICTIONS, 811 OR OTHER SIMILAR UTILITY LOCATE REQUESTS FROM SURVEYORS MAY BE IGNORED OR RESULT IN AN INCOMPLETE RESPONSE, IN WHICH CASE THE SURVEYOR SHALL NOTE ON THE PLAT OR MAP HOW THIS AFFECTED THE SURVEYOR'S ASSESSMENT OF THE LOCATION OF THE UTILITIES. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION AND/OR A PRIVATE UTILITY LOCATE REQUEST MAY BE NECESSARY.
- 4. THERE WAS NO EVIDENCE OF RECENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS OBSERVED IN THE PROCESS OF CONDUCTING THE FIELDWORK.

**LEGEND**

Legend table with symbols and descriptions for Boundary Line, Easement, Section Line, etc., and existing features like Hydrant, Valve, Sanitary Sewer, etc.

K:\18003508\DWG\PLAN SETS\SITE-PRELIMINARY\18003508P-02-EC.DWG, 9/26/2019, 11:35 AM, STEPHEN KESSEL

CAD FILE: 18003508P-02-EC.DWG



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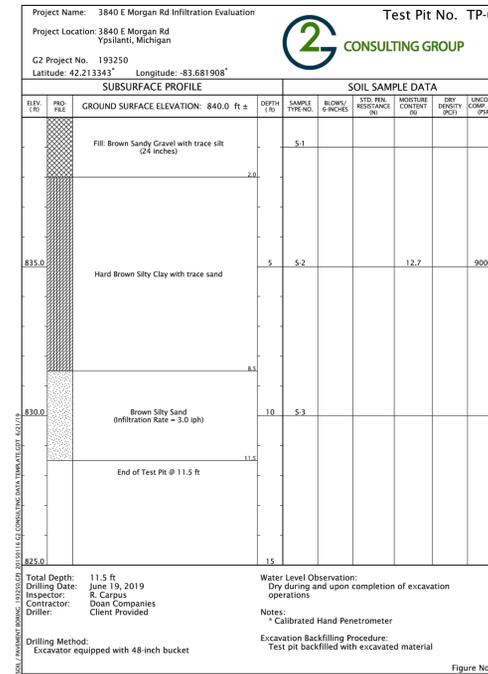
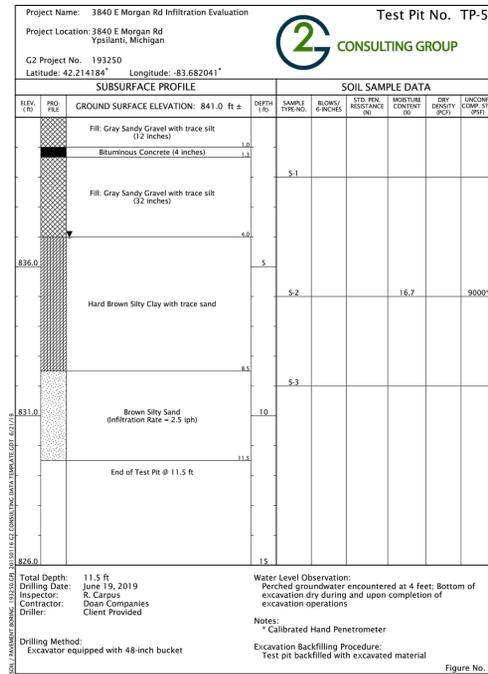
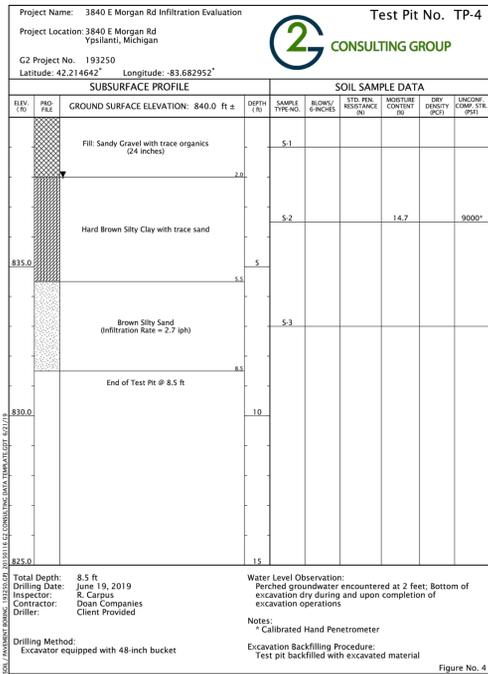
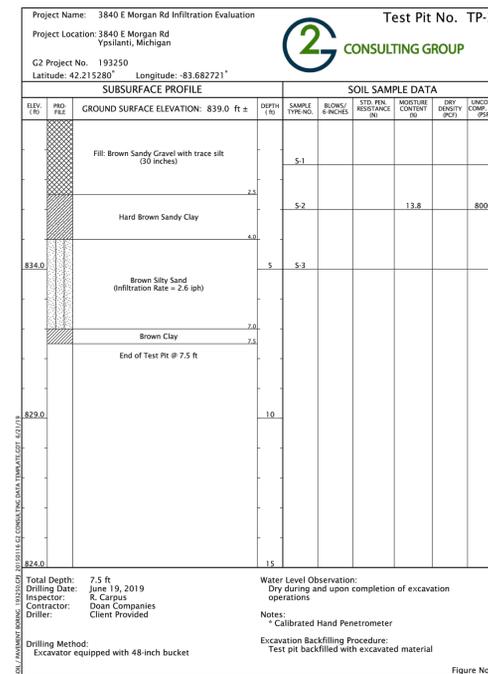
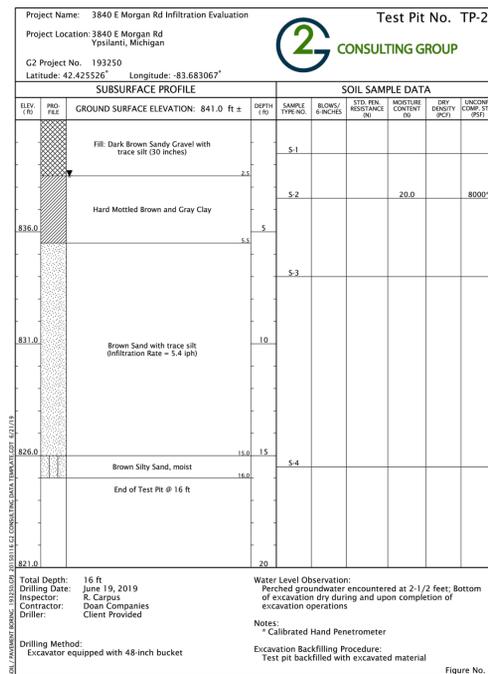
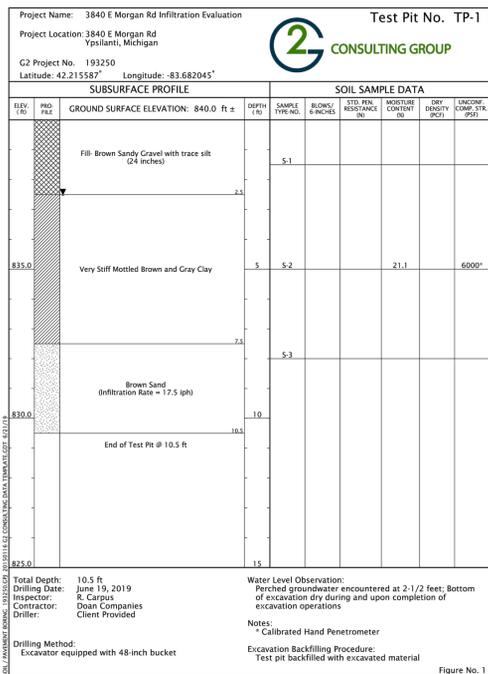
SECTION 05  
TOWN 3 SOUTH, RANGE 6 EAST  
PITTSFIELD TOWNSHIP  
WASHTENAW COUNTY, MICHIGAN

DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
SOIL BORINGS & TREE LIST

DATE  
SEPTEMBER 26, 2019

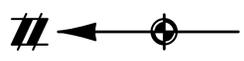
REVISIONS  
SCALE  
NO SCALE  
DR. CR CH. --  
P.M. TP  
JOB 18003508  
SHEET NO. 03

18003508 Morgan Road Tree Survey List										
Tree Tag #	Data Code	Scientific Name	Common Name	DBH (Inches)	Condition	Comments	Invasive Species	Landmark Tree (X)	To Be Removed (X)	
8501	ROPS	<i>Robinia pseudoacacia</i>	Black Locust	10	Good		(X)		(X)	
8502	ROPS	<i>Robinia pseudoacacia</i>	Black Locust	8.5	Good		(X)			
8503	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	9.5	Fair	Dead branches	(X)			
8504	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	9.5	Good					X
8505	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	13	Good					
8506	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10.5	Good	2 trunks 9.5	(X)			
8507	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10.5	Good	2 trunks 14	(X)			
8508	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	9	Good		(X)			
8509	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	9.5	Good		(X)			
8510	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	13.5	Good		(X)			
8511	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10	Good	2 trunks 8	(X)			
8512	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	12	Good	2 trunks 9.5	(X)			
8513	SANI	<i>Salix nigra</i>	Black Willow	7.5	Good		(X)			
8514	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	7.5	Good		(X)			
8515	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	8.5	Good		(X)			
8516	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	9	Good		(X)			
8517	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	12.5	Good	2 trunks 8.5	(X)			
8518	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	8	Good	3 trunks 7.5, 6.5	(X)			
8519	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	8.5	Good		(X)			
8520	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	6	Good		(X)			
8521	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10.5	Good		(X)			
8522	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	11	Good	2 trunks 6.5	(X)			
8523	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10	Fair	2 trunks 8	(X)			
8524	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	7	Good		(X)			
8525	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10	Good	4 trunks 10, 9, 9	(X)			
8526	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	9.5	Good		(X)			
8527	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	13.5	Good		(X)			
8528	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	17	Good		(X)			
8529	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	16	Good	2 trunks 10.5	(X)			
8530	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10.5	Good	2 trunks 10	(X)			
8531	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10.5	Good		(X)			
8532	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	12.5	Good	2 trunks 8	(X)			
8533	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	6.5	Good		(X)			
8534	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	16.5	Good		(X)			
8535	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10.5	Good	2 trunks 4	(X)			
8536	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	15	Good	2 trunks 12.5	(X)			
8537	MASP	<i>Malus sp.</i>	Apple Tree	8.5	Good					
8538	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	10	Fair		(X)			
8539	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	14	Good	4 trunks 13, 8.5, 12	(X)			
8540	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	12	Good		(X)			
8541	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	18	Good	2 trunks 6.5	(X)			
8542	ROPS	<i>Robinia pseudoacacia</i>	Black Locust	13	Good		(X)			
8543	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	12	Excellent	2 trunks 7.5	(X)			
8544	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	6.5	Good		(X)			
8545	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	23.5	Excellent		(X)			
8546	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	12	Excellent	2 trunks 9	(X)			
8547	PISY	<i>Pinus sylvestris</i>	Scotch Pine	12	Good					
8548	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	13.5	Good					
8549	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	8.5	Fair					
8550	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	12	Fair					
8551	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	11.5	Good					X
8552	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	13.5	Good					X
8553	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	12.5	Good					
8554	PIPU	<i>Pinus pumila</i>	Colorado Blue Spruce	14	Good					X
8555	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	11	Good	7 trunks 8.5, 8, 6.5, 9, 11, 10.5	(X)			X
8556	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	7	Good		(X)			X
8557	PODE	<i>Populus deltoides</i>	Eastern Cottonwood	57	Fair	Some trunks and branches previously removed	(X)			



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PITTSFIELD TOWNSHIP  
WASHTENAW COUNTY, MICHIGAN

CLIENT  
DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
LAYOUT PLAN

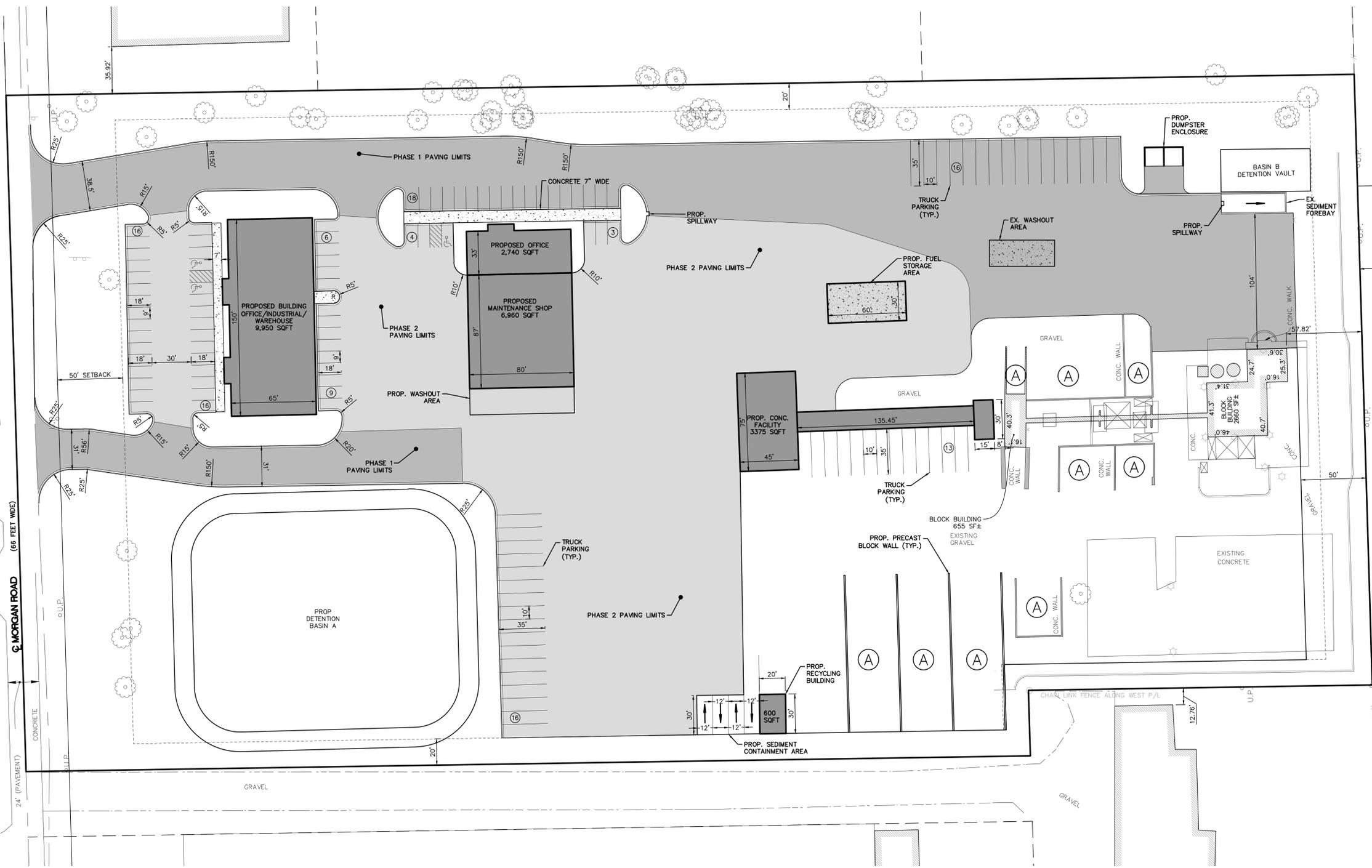
DATE  
SEPTEMBER 26, 2019

Table with 2 columns: REVISIONS, SCALE. The table is mostly empty with some faint lines.

SCALE 0 20 40  
1" = 40 FEET

DR. CR. CH. --  
JOB 18003508  
SHEET NO. 04

CAD FILE: 18003508PSP-04-LDWG



### PHASING NARRATIVE

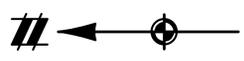
THE PROPOSED PROJECT GOAL IS TO RELOCATE THE EXISTING CONCRETE PRODUCING FACILITY FROM 3660 CARPENTER ROAD TO THE 3840 E. MORGAN ROAD SITE. IS ANTICIPATED THAT THE PROJECT WILL BE DONE IN PHASES, INCLUDING:

- STORM WATER AND PAVING IMPROVEMENTS.
  - NORTHWEST DETENTION AREA
  - PHASE 1 PAVING AND RELATED STORM WATER CONVEYANCE SYSTEM
  - RELATED LANDSCAPING
- PROPOSED CONCRETE FACILITY
  - SECOND CONCRETE PLANT ON SITE
  - RELATED FACILITY STAGING AND PARKING AREAS
  - NEW CONCRETE WASHOUT AREA
  - SOUTHEAST DETENTION AREA
  - RELATED LANDSCAPING
- MAINTENANCE SHOP BUILDING WITH ADJACENT PAVING AND LANDSCAPING
- OFFICE/INDUSTRIAL BUILDING WITH ADJACENT PAVING AND LANDSCAPING

### LEGEND

	BOUNDARY LINE		PROP. SETBACK
	EXIST. EASEMENT		PROP. BUILDING INTERIOR
	SECTION LINE		PROP. WALL
	BOUNDARY/PROPERTY LINE		PROP. PARKING STRIPE
	EXIST. SETBACK		PROP. BACK OF CURB
	EXIST. TREE LINE		PROP. ROAD CENTERLINE
	EXIST. CURB AND GUTTER		PROP. DETENTION
	EXIST. FENCE		PROP. CONCRETE WALK/SLAB
	EXIST. GRAVEL		PROP. PAVEMENT PHASE 1
	EXIST. BUILDING		PROP. PAVEMENT PHASE 2
	PROP. AGGREGATE STORAGE AREA		PROP. ADA PARKING SPACE

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DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
UTILITY PLAN

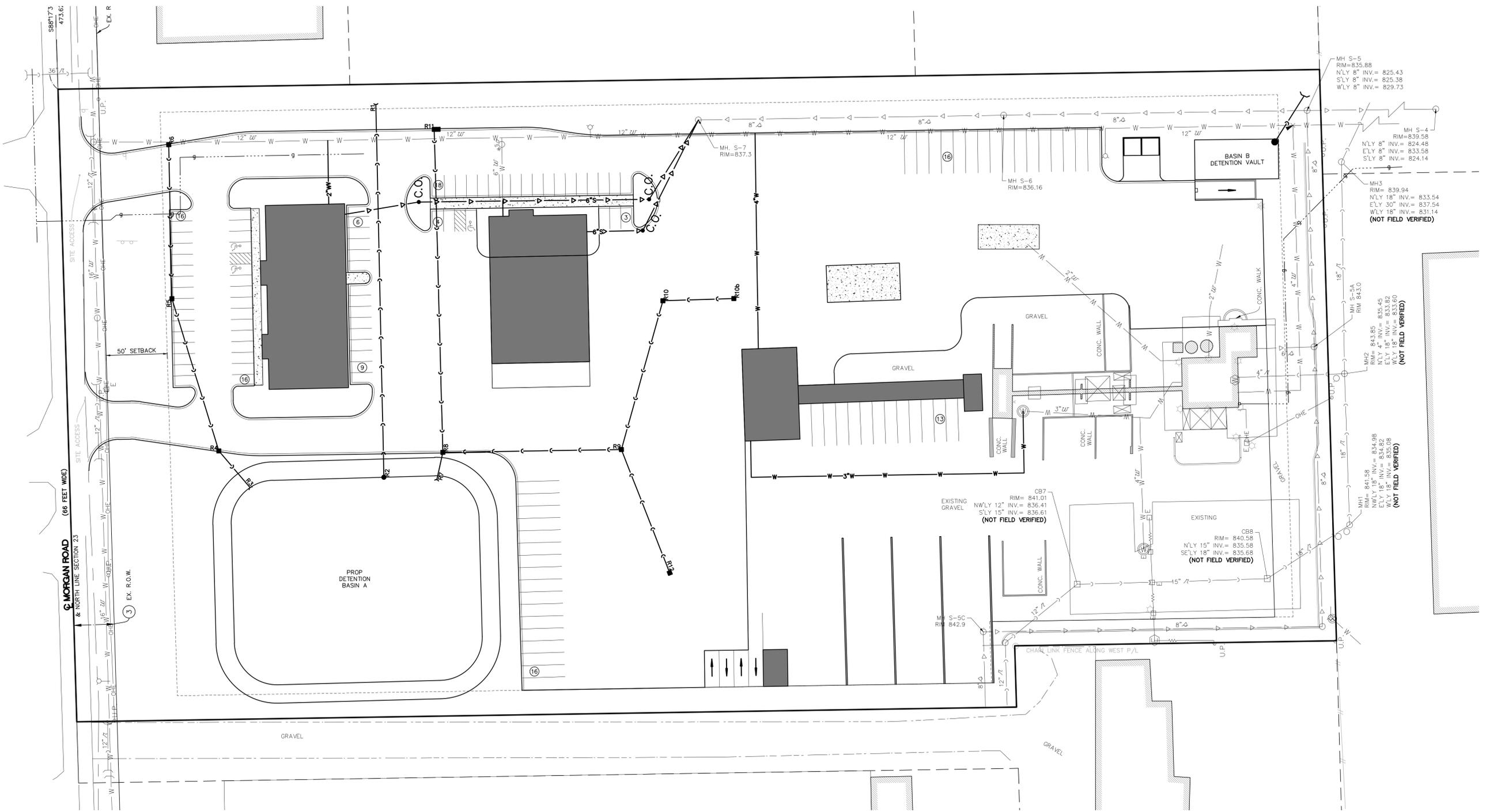
DATE  
SEPTEMBER 26, 2019

Table with 3 columns: DR., CR., CH. and 3 rows of empty cells for revision tracking.

REVISIONS  
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1" = 40 FEET

DR. CR. CH. --  
P.M. TP  
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SHEET NO. 05

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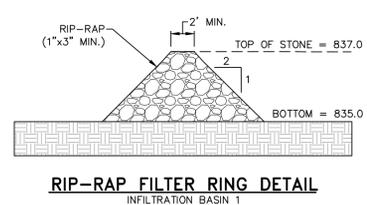
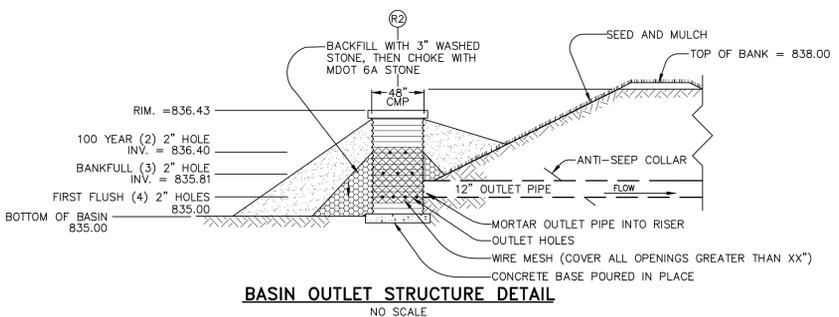
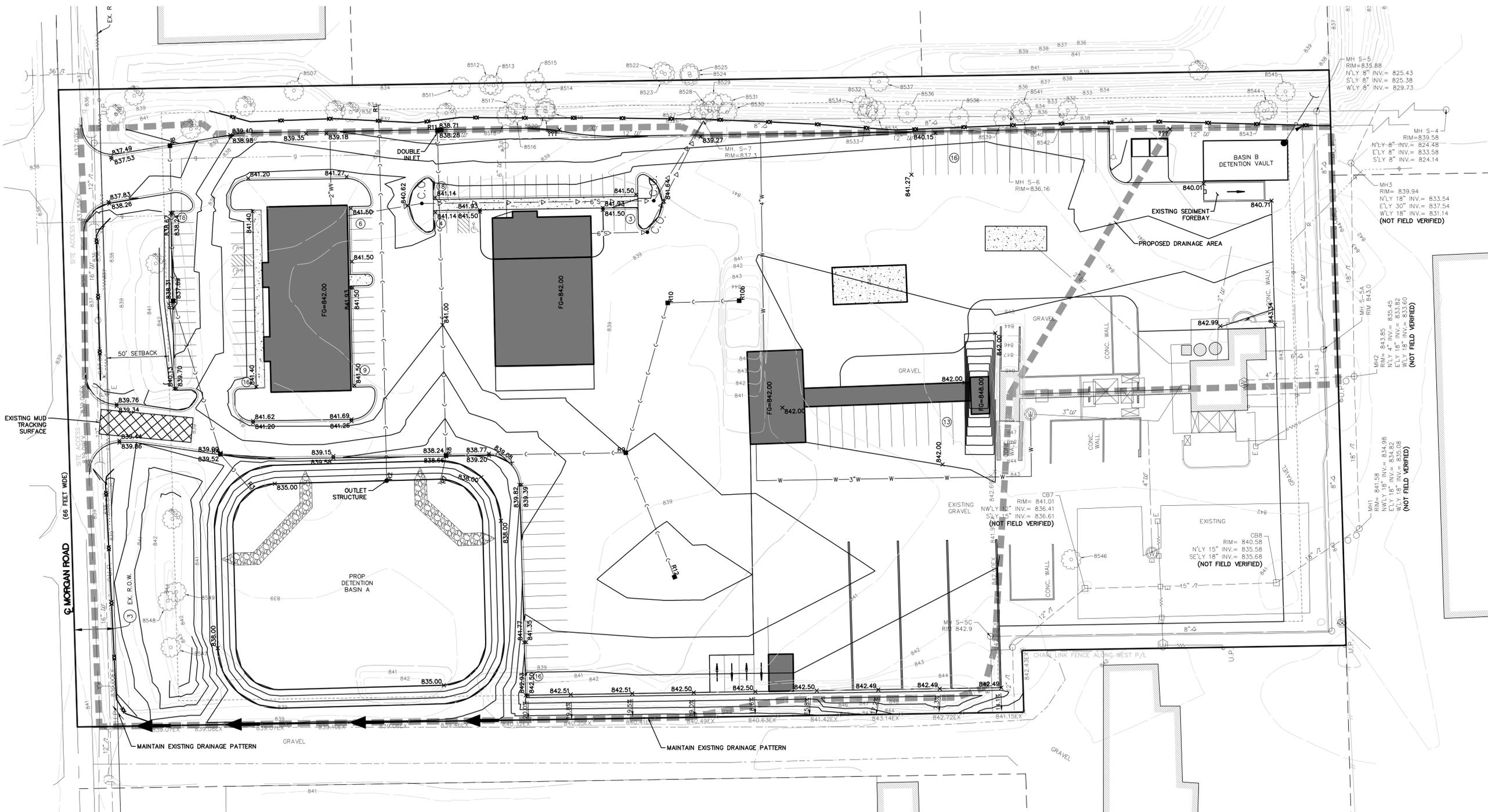
**SANITARY BASIS OF DESIGN:**

Table titled 'SANITARY SEWER BASIS OF DESIGN' showing calculations for population, average discharge rate, peak discharge rate, and capacity of 8-inch pipe.

**LEGEND**

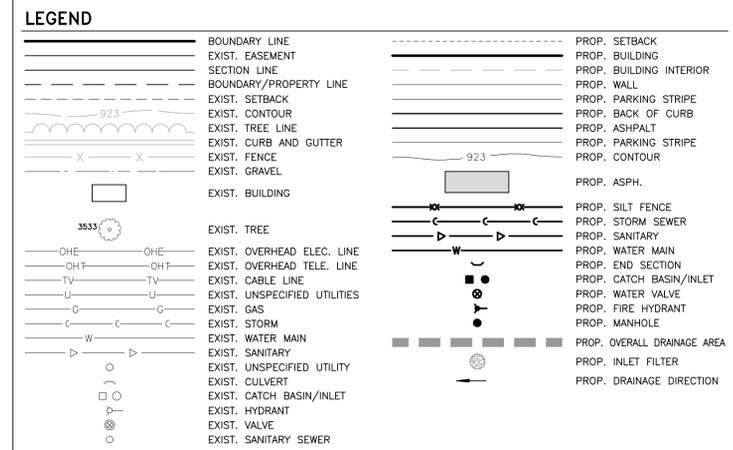
Legend table listing symbols for boundary lines, easements, setbacks, contours, trees, buildings, walls, parking, asphalt, detention basins, storm sewers, sanitary sewers, water mains, gas, catch basins, culverts, hydrants, valves, and wells.

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**GRADING/DRAINAGE/STORMWATER NOTES**

- PRELIMINARY GRADING CONCEPTS SHOWN. DETAILED GRADING OF THE SITE, INCLUDING THE PARKING AND SIDEWALK AREAS WILL BE PROVIDED DURING THE FINAL SITE PLAN.
- THE TOTAL REQUIRED DETENTION HAS BEEN DETERMINED IN ACCORDANCE WITH THE WASHTENAW COUNTY WATER RESOURCES COMMISSIONER RULES AND GUIDELINES, REVISED OCTOBER 2016.
- BASED ON THE SOIL INVESTIGATION PARTS OF THE SITE ARE SUITABLE FOR INFILTRATION. AN INFILTRATION BASIN WILL BE UTILIZED TO MEET THE REQUIRED INFILTRATION VOLUME.
- THE PROPOSED DETENTION BASINS SHALL OUTLET TO THE EXISTING DRAINAGE DITCH ALONG THE EASTERN SIDE OF THE SITE.
- ROOF DRAINAGE SHALL BE DIRECTED TO THE STORM SEWER WATER MANAGEMENT SYSTEM.
- BUILDINGS DO NOT CONTAIN BASEMENTS. NO BASEMENT SUMPS ARE REQUIRED.



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SECTION 05

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WASHTENAW COUNTY, MICHIGAN

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DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
GRADING PLAN

---

CLIENT

DATE  
SEPTEMBER 26, 2019

---

REVISIONS

SCALE 0 20 40  
1" = 40 FEET

DR. CR CH. --

JOB 18003508

SHEET NO. 06

CAD FILE: 18003508PSP-06-GDWG

**DRAINAGE NARRATIVE**

IN CONJUNCTION WITH THE DEVELOPMENT OF THE SITE, THE PROPOSED STORM WATER MANAGEMENT IMPROVEMENTS ARE TO COMPLY WITH THE CURRENT RULES AND REGULATIONS OF THE WASHTENAW COUNTY WATER RESOURCES COMMISSIONERS OFFICE (WCWRC). THIS INCLUDES REQUIRED TREATMENT AND ATTENUATION OF STORM WATER.

**INFILTRATION**  
A GEOTECHNICAL INFILTRATION EVALUATION HAS BEEN PREPARED FOR THE SITE BY G2 CONSULTING (DATED 6-24-19). BASED ON THIS EVALUATION THE SOILS ON THE SITE CAN SUPPORT INFILTRATION.

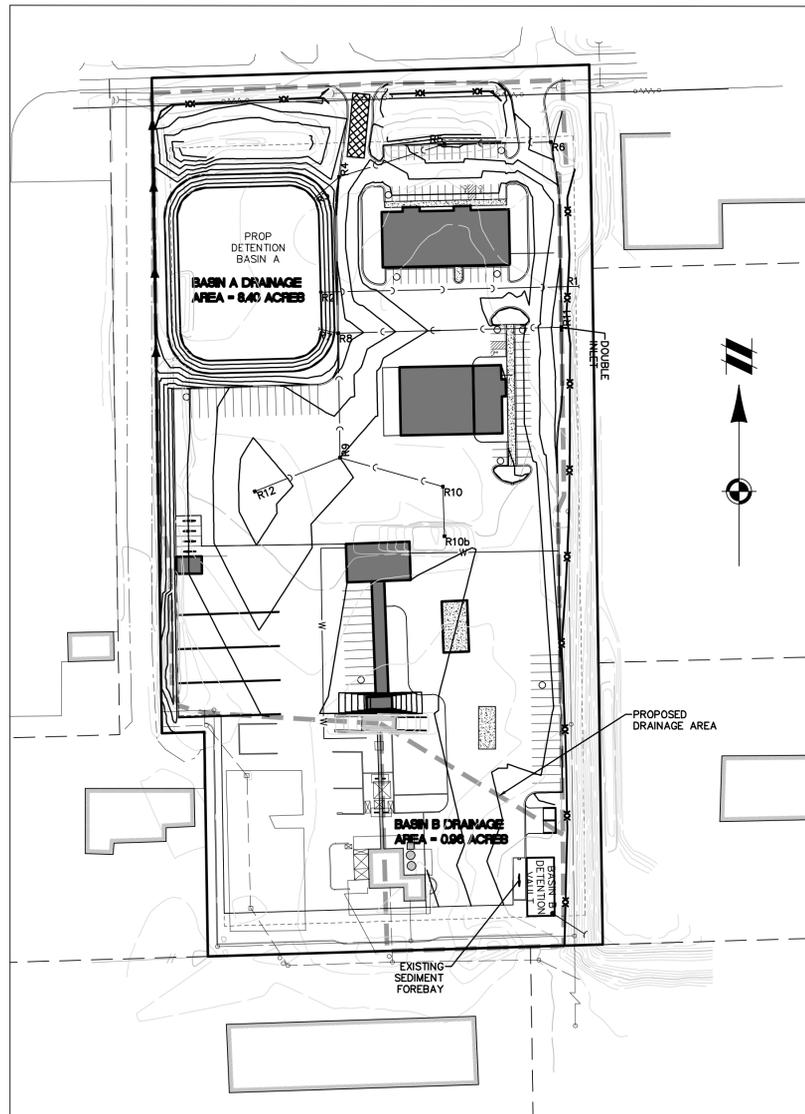
**CONVEYANCE AND DETENTION:**  
THE PROPOSED STORM WATER RUNOFF WILL BE COLLECTED AND CONVEYED VIA STORM SEWERS TO:  
 • PROPOSED DETENTION BASIN ON THE NORTHWESTERN OF THE PROJECT. THIS AREA WILL DRAIN VIA GRAVITY TO THE EXISTING DRAINAGE COURSE LOCATED ALONG THE EAST SIDE OF THE PARCEL.  
 • PROPOSED DETENTION BASIN VAULT LOCATED IN THE SOUTHEAST CORNER OF THE SITE. THIS AREA WILL DRAIN VIA GRAVITY TO THE EXISTING DRAINAGE COURSE LOCATED ALONG THE EAST SIDE OF THE PARCEL. THERE IS AN EXISTING SEDIMENT FOREBAY TO REMAIN THAT WILL DISCHARGE INTO THE NEW VAULT.  
 • THE SOUTHWEST CORNER OF THE SITE IS TO REMAIN UNDISTURBED AND INCLUDES AN EXISTING CONCRETE SLAB WITH TWO CATCH BASINS THAT CURRENTLY DRAIN OFFSITE INTO AN EXISTING DETENTION OFF SITE BASIN.

**OUTLET FLOW RESTRICTION OF THE PROPOSED DETENTION AREAS WILL BE REQUIRED VIA OUTLET CONTROL STRUCTURES. THIS WILL REGULATE THE RATE OF DISCHARGE AT OR BELOW THE ALLOWABLE RATES AS DEFINED BY THE RULES OF THE WCWRC.**

**PROPOSED STORM WATER OUTLET**  
THE PROPOSED STORM WATER OUTLET IS TO THE EXISTING DRAINAGE COURSE LOCATED ALONG THE EAST SIDE OF THE PARCEL. THIS DRAIN PROCEEDS SOUTH THEN EAST TO CARPENTER ROAD.

**THE PROPOSED STORM WATER OUTLET LOCATION IS UNDERSTOOD TO BE ADEQUATE FOR THE PROPOSED DISCHARGE FOR THE FOLLOWING REASONS:**

- THE PROJECT IS TO RE-DEVELOPMENT AN EXISTING IMPERVIOUS SITE.
- THE OUTLET LOCATION IS THE ONLY VIABLE AND REASONABLE OUTLET FOR THE SITE
- THE OUTLET APPEARS FUNCTIONAL AND THERE ARE NO KNOWN DOWSTREAM FLOODING ISSUES
- THE DISCHARGE RATE AND VOLUME TO THE ULTIMATE OUTLET WILL BE REDUCED IN PROPOSED CONDITIONS



**STORMWATER MANAGEMENT CALCULATIONS**

**BASIN A:**

<b>W1</b>	Determining Post-Development Cover Types, Areas, Curve Numbers and runoff coefficients	Total Contributing Drainage Area = 8.40 Acres Total Disturbed Area = 8.40 Acres
<b>Rational Method Variables</b>	Cover Type   Soil Type   Area (sf)   Area (ac)   Runoff Coef   (C)/Area	Pavement, rooftops   D   249,642   5.73   0.95   237,160 Water Surfaces (bankfull in basin)   D   60,000   1.38   1.00   60,000 Developed Open Space, Good Condition   D   56,262   1.29   0.50   28,131
<b>NIMCS Variables</b>	PerVIOUS Cover Type   Soil Type   Area (sf)   Area (ac)   Curve Number   (CN)/Area	Developed Open Space, Good Condition   D   56,262   1.29   80   4,500,960 0.00   0 0.00   0
<b>NIMCS Variables</b>	Impervious Cover Type   Soil Type   Area (sf)   Area (ac)   Curve Number   (CN)/Area	Pavement, rooftops   D   249,642   5.73   98   24,464,916 Water Surfaces (bankfull in ponds)   D   60,000   1.38   98   5,880,000 0.00   0
<b>W2</b>	First Flush Runoff Calculations (Vff)	A. Vff = (1 <sup>1/2</sup> ) (1/12) (49560 <sup>1/3</sup> ) (C) AC = 27,138 cf
<b>W3</b>	Predevelopment Bankfull Runoff Calculations (Vbf-pre)	A. 2 year/24 hour storm event P = 2.35 in B. Pervious Cover CN (meadow, Type D soils) CN = 78 C. S = (1000/CN) - 10 S = 2.82 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 0.69 in E. Pervious Cover Area Area = 365,904 sf F. V <sub>bf-pre</sub> = Q(1/12)Area V <sub>bf-pre</sub> = 21,112 cf
<b>W4</b>	Pervious Cover Post-development Bankfull Runoff Calculations (Vbf-per-post)	A. 2 year/24 hour storm event P = 2.35 in B. Pervious Cover CN CN = 80 C. S = (1000/CN) - 10 S = 2.50 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 0.79 in E. Pervious Cover Area Area = 56,262 sf F. V <sub>bf-per-post</sub> = Q(1/12)Area V <sub>bf-per-post</sub> = 3,689 cf
<b>W5</b>	Impervious Cover Post-development Bankfull Runoff Calculations (Vbf-imp-post)	A. 2 year/24 hour storm event P = 2.35 in B. Pervious Cover CN CN = 98 C. S = (1000/CN) - 10 S = 0.20 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 2.12 in E. Pervious Cover Area Area = 309,642 sf F. V <sub>bf-imp-post</sub> = Q(1/12)Area V <sub>bf-imp-post</sub> = 54,747 cf
<b>W6</b>	Pervious Cover Post-development 100-year Storm Runoff Calculations (V100-per-post)	A. 100 year storm event P = 5.11 in B. Pervious Cover CN CN = 80 C. S = (1000/CN) - 10 S = 2.50 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 2.99 in E. Pervious Cover Area Area = 56,262 sf F. V <sub>100-per-post</sub> = Q(1/12)Area V <sub>100-per-post</sub> = 14,014 cf
<b>W7</b>	Impervious Cover Post-development 100-year Storm Runoff Calculations (V100-imp-post)	A. 100 year storm event P = 5.11 in B. Pervious Cover CN CN = 98 C. S = (1000/CN) - 10 S = 0.20 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 4.87 in E. Pervious Cover Area Area = 309,642 sf F. V <sub>100-imp-post</sub> = Q(1/12)Area V <sub>100-imp-post</sub> = 125,740 cf
<b>W8</b>	Determine Time of Concentration (Tc-hrs)	User specified; assume 30 minutes Total Time of Concentration (hrs) = 0.50
<b>W9</b>	Runoff Summary & Onsite Infiltration Requirement	A. Runoff Summary from Previous Worksheets V <sub>bf-pre</sub> = 27,138 cf* V <sub>bf-per-post</sub> = 21,112 cf V <sub>bf-imp-post</sub> = 58,435 cf V <sub>100-per-post</sub> = 14,014 cf V <sub>100-imp-post</sub> = 125,740 cf Total BF Volume (V <sub>bf-pre</sub> ) = 58,435 cf Total 100-year Volume (V <sub>100</sub> ) = 139,755 cf B. Determine Onsite Infiltration Requirement V <sub>infil</sub> = 58,435 cf V <sub>infil</sub> = 21,112 cf Bankfull Volume Difference = 37,323 cf* Onsite Infiltration Requirement (V <sub>infil</sub> ) = 37,323 cf
<b>W10</b>	Detention / Retention Requirement	A. Q <sub>p</sub> = 238.6(T <sub>c</sub> ) <sup>0.82</sup> 421.23 cfs/ft-mi <sup>2</sup> B. Total Site Area 8.4 ac C. Q <sub>avg</sub> = Q <sub>100-per-post</sub> + Q <sub>100-imp-post</sub> 7.86 in D. Peak Flow (PF) = (Q <sub>p</sub> - Q <sub>avg</sub> ) / 60 43.466 cfs E. Delta = PF - 0.15A 42.206 cfs F. V <sub>det</sub> = (Delta/PP) x V <sub>100</sub> 135,703 cf
<b>W11</b>	Determine Applicable BMPs and Associated Volume Credits	Proposed BMP Area (ft <sup>2</sup> ) Storage Depth (ft) Storage Volume (ft <sup>3</sup> ) Ave. Design Infil. Rate Infil. During Storm (ft <sup>3</sup> ) Total Volume Reduction (ft <sup>3</sup> ) Infiltration Basin 31,850 1.0 31,850 4.0 63,700 95,550 Total Volume Reduction Credit by Proposed Structural BMPs (V <sub>infil</sub> ) = 95,550 cf
<b>W12</b>	Infiltration / Detention Summary	Proposed BMP Ave. Design Infil. Rate (ft/hr) Volume Rate (cf/hr) Estimated Drawdown Time (hrs) Infiltration Basin 0.333 10,617 3.00 Total Infiltration Required per WCWRC Rules: 37,323 cf Total Infiltration Provided: 95,550 cf Difference: 58,227 cf % Deficiency: 0.0% Pro-Rated 20% Detention Penalty: 20.0% Total Detention Required: 40,153 cf Total Detention Required w/ Pro-Rated Penalty: 48,184 cf Basin Stage-Storage Summary: Elev. Area Avg. Area Depth Volume 838.0 43,695 41,801 1.0 114,427 837.0 39,906 38,091 1.0 72,627 836.0 36,275 34,536 1.0 34,536 835.0 32,797 16,399 0.0 0 Total Detention Provided: 114,427 cf Vff Elev. = 835.79 Vbf Elev. = 836.63 V100 Elev. = 836.40 1.60 Freeboard

**BASIN B (VAULT):**

<b>W1</b>	Determining Post-Development Cover Types, Areas, Curve Numbers and runoff coefficients	Total Contributing Drainage Area = 0.96 Acres Total Disturbed Area = 0.96 Acres
<b>Rational Method Variables</b>	Cover Type   Soil Type   Area (sf)   Area (ac)   Runoff Coef   (C)/Area	Pavement, rooftops   D   17,117   0.39   0.95   16,261 Water Surfaces (bankfull in basin)   D   0   0.00   1.00   0 Developed Open Space, Good Condition   D   24,701   0.57   0.50   12,350
<b>NIMCS Variables</b>	PerVIOUS Cover Type   Soil Type   Area (sf)   Area (ac)   Curve Number   (CN)/Area	Developed Open Space, Good Condition   D   24,701   0.57   80   1,976,048 0.00   0 0.00   0
<b>NIMCS Variables</b>	Impervious Cover Type   Soil Type   Area (sf)   Area (ac)   Curve Number   (CN)/Area	Pavement, rooftops   D   17,117   0.39   98   1,677,466 Water Surfaces (bankfull in ponds)   D   0   0.00   98   0 0.00   0
<b>W2</b>	First Flush Runoff Calculations (Vff)	A. Vff = (1 <sup>1/2</sup> ) (1/12) (49560 <sup>1/3</sup> ) (C) AC = 2,370 cf
<b>W3</b>	Predevelopment Bankfull Runoff Calculations (Vbf-pre)	A. 2 year/24 hour storm event P = 2.35 in B. Pervious Cover CN (meadow, Type D soils) CN = 78 C. S = (1000/CN) - 10 S = 2.82 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 0.69 in E. Pervious Cover Area Area = 41,818 sf F. V <sub>bf-pre</sub> = Q(1/12)Area V <sub>bf-pre</sub> = 2,413 cf
<b>W4</b>	Pervious Cover Post-development Bankfull Runoff Calculations (Vbf-per-post)	A. 2 year/24 hour storm event P = 2.35 in B. Pervious Cover CN CN = 80 C. S = (1000/CN) - 10 S = 2.50 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 0.79 in E. Pervious Cover Area Area = 24,701 sf F. V <sub>bf-per-post</sub> = Q(1/12)Area V <sub>bf-per-post</sub> = 1,619 cf
<b>W5</b>	Impervious Cover Post-development Bankfull Runoff Calculations (Vbf-imp-post)	A. 2 year/24 hour storm event P = 2.35 in B. Pervious Cover CN CN = 98 C. S = (1000/CN) - 10 S = 0.20 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 2.12 in E. Pervious Cover Area Area = 17,117 sf F. V <sub>bf-imp-post</sub> = Q(1/12)Area V <sub>bf-imp-post</sub> = 3,026 cf
<b>W6</b>	Pervious Cover Post-development 100-year Storm Runoff Calculations (V100-per-post)	A. 100 year storm event P = 5.11 in B. Pervious Cover CN CN = 80 C. S = (1000/CN) - 10 S = 2.50 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 2.99 in E. Pervious Cover Area Area = 24,701 sf F. V <sub>100-per-post</sub> = Q(1/12)Area V <sub>100-per-post</sub> = 6,153 cf
<b>W7</b>	Impervious Cover Post-development 100-year Storm Runoff Calculations (V100-imp-post)	A. 100 year storm event P = 5.11 in B. Pervious Cover CN CN = 98 C. S = (1000/CN) - 10 S = 0.20 in D. Q = (P-0.25) <sup>2</sup> /(P+0.85) Q = 4.87 in E. Pervious Cover Area Area = 17,117 sf F. V <sub>100-imp-post</sub> = Q(1/12)Area V <sub>100-imp-post</sub> = 6,951 cf
<b>W8</b>	Determine Time of Concentration (Tc-hrs)	User specified; assume 30 minutes Total Time of Concentration (hrs) = 0.50
<b>W9</b>	Runoff Summary & Onsite Infiltration Requirement	A. Runoff Summary from Previous Worksheets V <sub>bf-pre</sub> = 2,370 cf* V <sub>bf-per-post</sub> = 2,413 cf V <sub>bf-imp-post</sub> = 3,026 cf V <sub>100-per-post</sub> = 6,153 cf V <sub>100-imp-post</sub> = 6,951 cf Total BF Volume (V <sub>bf-pre</sub> ) = 4,646 cf Total 100-year Volume (V <sub>100</sub> ) = 13,104 cf B. Determine Onsite Infiltration Requirement V <sub>infil</sub> = 4,646 cf V <sub>infil</sub> = 2,413 cf Bankfull Volume Difference = 2,233 cf* Onsite Infiltration Requirement (V <sub>infil</sub> ) = 2,370 cf
<b>W10</b>	Detention / Retention Requirement	A. Q <sub>p</sub> = 238.6(T <sub>c</sub> ) <sup>0.82</sup> 421.23 cfs/ft-mi <sup>2</sup> B. Total Site Area 0.96 ac C. Q <sub>avg</sub> = Q <sub>100-per-post</sub> + Q <sub>100-imp-post</sub> 7.86 in D. Peak Flow (PF) = (Q <sub>p</sub> - Q <sub>avg</sub> ) / 60 4.568 cfs E. Delta = PF - 0.15A 4.824 cfs F. V <sub>det</sub> = (Delta/PP) x V <sub>100</sub> 12,724 cf
<b>W12</b>	Infiltration / Detention Summary	Total Infiltration Required per WCWRC Rules: 2,370 cf Total Infiltration Provided: 0 cf Difference: (2,370) cf % Deficiency: 100.0% Pro-Rated 20% Detention Penalty: 0.0% * All Infiltration for the site is provided by the basin Total Detention Required: 12,724 cf Total Detention Required w/ Pro-Rated Penalty: 12,724 cf Basin Stage-Storage Summary: Elev. Area Avg. Area Depth Volume 840.0 2,200 2,200 1.0 15,400 839.0 2,200 2,200 1.0 13,200 838.0 2,200 2,200 1.0 11,000 837.0 2,200 2,200 1.0 8,800 836.0 2,200 2,200 1.0 6,600 835.0 2,200 2,200 1.0 4,400 834.0 2,200 2,200 1.0 2,200 833.0 2,200 2,200 1.0 0 Total Detention Provided: 15,400 cf Vff Elev. = 834.06 Vbf Elev. = 835.11 V100 Elev. = 838.78 1.22 Freeboard



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SECTION 05  
TOWN 3 SOUTH, RANGE 6 EAST  
PITTSFIELD TOWNSHIP  
WASHTENAW COUNTY, MICHIGAN

DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
STORMWATER CALCULATIONS

DATE  
SEPTEMBER 26, 2019

DR.	CR.	CH.	--
JOB	18003508	SHEET NO.	07

REVISIONS  
SCALE 0 50 100  
1" = 100 FEET



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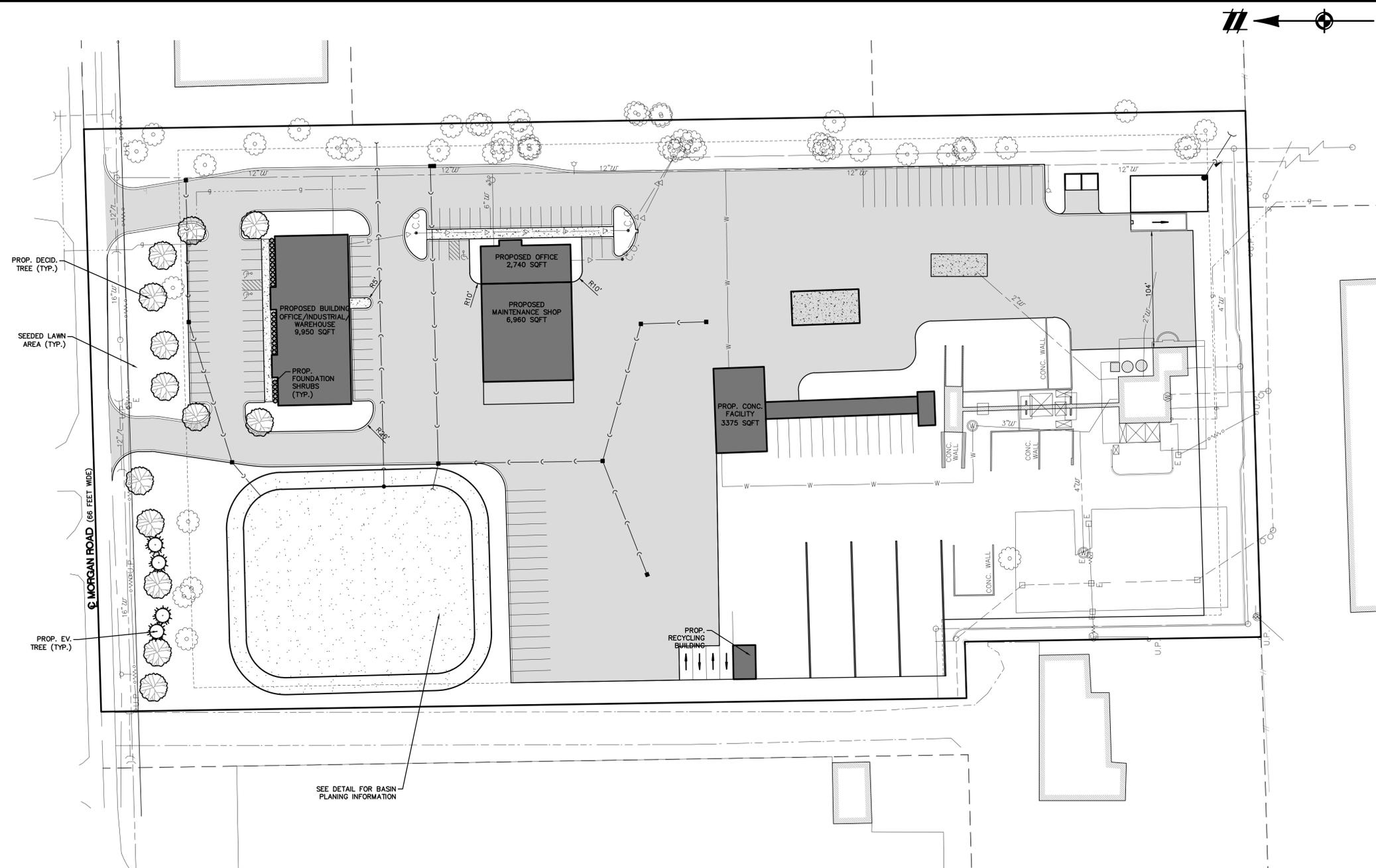
SECTION 05  
TOWN 3 SOUTH, RANGE 6 EAST  
PITTSFIELD TOWNSHIP  
WASHTENAW COUNTY, MICHIGAN

DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
CONCEPTUAL LANDSCAPE PLAN

DATE  
SEPTEMBER 26, 2019

REVISIONS  
SCALE 0 25 50  
1" = 50 FEET

DR. CR. CH. --  
P.M. TP  
JOB 18003508  
SHEET NO. 09



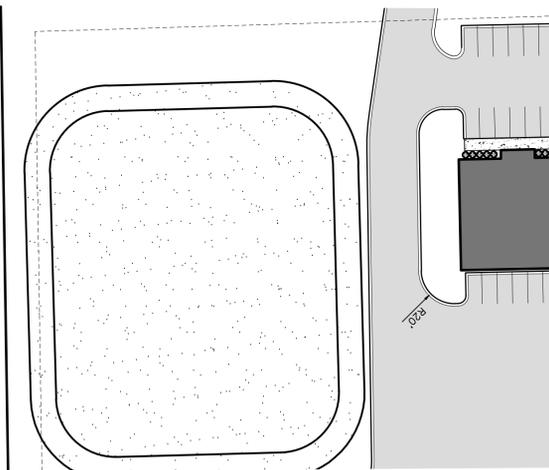
PROP. DECID. TREE (TYP.)

SEEDED LAWN AREA (TYP.)

PROP. EV. TREE (TYP.)

G. MORGAN ROAD (66 FEET WIDE)

SEE DETAIL FOR BASIN PLANNING INFORMATION



INfiltration BASIN PLANTING DETAIL  
SCALE: 1" = 50'

SEED MIXES

**SIDE SLOPE/DETENTION BASIN BOTTOM:**  
DETENTION BASIN MIX BY PRAIRIE NURSERY (OR APPROVED EQUAL)  
WILDFLOWERS: NODDING PINK ONION, RED MILKWEED, NEW ENGLAND ASTER, WHITE FALSE INDIGO, PALE INDIAN PLANTAIN, WILD SENNA, CANADA TICK TREFOL, JOE PYE WEED, BONESSET, DOCTOOTH DAISSY, OX EYE SUNFLOWER, WILD IRIS, BLUE FLAG IRIS, PRAIRIE BLAZINGSTAR, DENSE BLAZINGSTAR, GREAT BLUE LOBELIA, BERGAMOT, YELLOW CONEFLOWER, BLACK EYED SUSAN, SWEET BLACK EYED SUSAN, BROWN EYED SUSAN, ROSINWEED, CUPPLANT, PRAIRIE DOCK, OHIO GOLDENROD, STIFF GOLDENROD, TALL MEADOWRUJE, BLUE VERVAIN, IRONWEED, GOLDEN ALEXANDERS  
GRASSES: BIG BLUESTEM, BEBB'S SEDGE, BOTTLEBRUSH SEDG, PORCUPINE SEDGE, AWL FRUITED SEDGE, FOX SEDGE, CANADA WILD RYE, VIRGINIA WILD RYE, SWITCHGRASS, DARK GREEN BULRUSH, INDIANGRASS, PRAIRIE CORNGRAS, ANNUAL RYE  
PLANTING RATE PER ACRE: 10 LBS

LANDSCAPE REQUIREMENTS

**GREENBELT LANDSCAPE:**  
1 TREE SHALL BE PROVIDED FOR EACH 30 LF OF FRONTAGE MINUS ENTRANCE OPENINGS.  
REQUIRED: 516 LF - 60 = 456 LF / 30 = 15 TREES  
PROVIDED: 13 TREES + 2 EX. TREES ALONG EAST PROP. LINE = 15 TREES

**FRONT PARKING LOT LANDSCAPE:**  
1 TREE SHALL BE PROVIDED FOR EACH (8) EIGHT PARKING SPACES.  
REQUIRED: 31 SPACES / 8 = 4 TREES  
PROVIDED: 4 TREES

**FRONT PARKING LOT PERIMETER LANDSCAPE:**  
\*THIS PARKING LOT IS ADJACENT TO THE GREENBELT AND IS ALREADY PLANTED ACCORDINGLY SO, NO ADDITIONAL TREES ARE BEING PROVIDED.

LEGEND

[Symbol]	BOUNDARY LINE
[Symbol]	EXIST. EASEMENT
[Symbol]	SECTION LINE
[Symbol]	BOUNDARY/PROPERTY LINE
[Symbol]	EXIST. SETBACK
[Symbol]	EXIST. TREE LINE
[Symbol]	EXIST. CURB AND GUTTER
[Symbol]	EXIST. FENCE
[Symbol]	EXIST. GRAVEL
[Symbol]	EXIST. WETLAND
[Symbol]	EXIST. WETLAND BUFFER
[Symbol]	EXIST. GAS
[Symbol]	EXIST. STORM
[Symbol]	EXIST. WATER MAIN
[Symbol]	EXIST. SANITARY
[Symbol]	EXIST. UNSPECIFIED UTILITY
[Symbol]	EXIST. CULVERT
[Symbol]	EXIST. CATCH BASIN/INLET
[Symbol]	EXIST. HYDRANT
[Symbol]	EXIST. VALVE
[Symbol]	EXIST. SANITARY SEWER
[Symbol]	PROP. SETBACK
[Symbol]	PROP. BUILDING
[Symbol]	PROP. BUILDING INTERIOR
[Symbol]	PROP. WALL
[Symbol]	PROP. PARKING STRIPE
[Symbol]	PROP. BACK OF CURB
[Symbol]	PROP. ASPHALT
[Symbol]	PROP. SILT FENCE
[Symbol]	PROP. STORM SEWER
[Symbol]	PROP. SANITARY
[Symbol]	PROP. WATER MAIN
[Symbol]	PROP. END SECTION
[Symbol]	PROP. CATCH BASIN/INLET
[Symbol]	PROP. WATER VALVE
[Symbol]	PROP. FIRE HYDRANT
[Symbol]	PROP. MANHOLE



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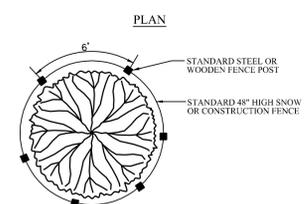
SECTION 05  
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CLIENT  
DOAN  
MORGAN ROAD  
PRELIMINARY SITE PLAN  
LANDSCAPE DETAILS

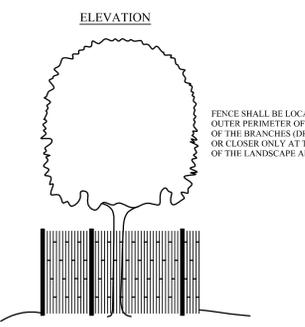
DATE  
SEPTEMBER 26, 2019

Table with 2 columns: REVISIONS, SCALE. Row 1: 0, AS NOTED.

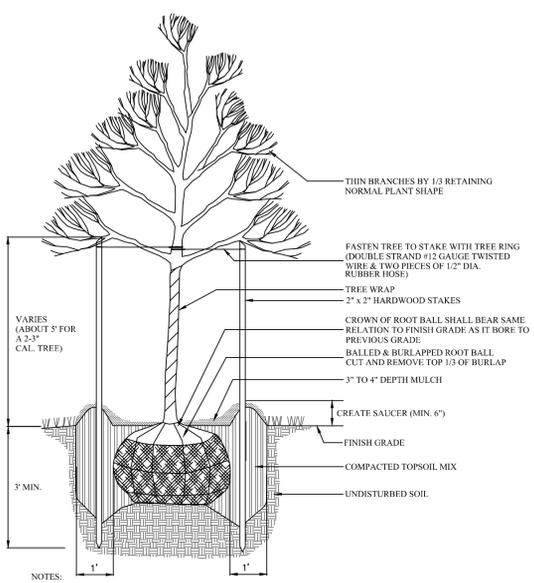
Table with 2 columns: DR, CR, CH. Row 1: P.M. TP, 18003508, 10.



- TREE PROTECTION NOTES: 1. ALL TREES TO BE REMOVED WILL BE IDENTIFIED BY RED FLAGGING. 2. TREE PROTECTION FENCING IS TO BE ERECTED PRIOR TO ANY EARTHWORK OR CONSTRUCTION AND IS TO REMAIN IN PLACE UNTIL CONSTRUCTION IS COMPLETE. 3. ALL DEBRIS, FILL, EQUIPMENT OR MATERIAL IS TO BE KEPT CLEAR OF AREA WITHIN PROTECTIVE FENCE. NO CLEANING OF EQUIPMENT OR MATERIAL OR STORAGE OR DISPOSAL OF ANY MATERIAL WITHIN THE DRIPLINE OF ANY TREES TO BE SAVED.

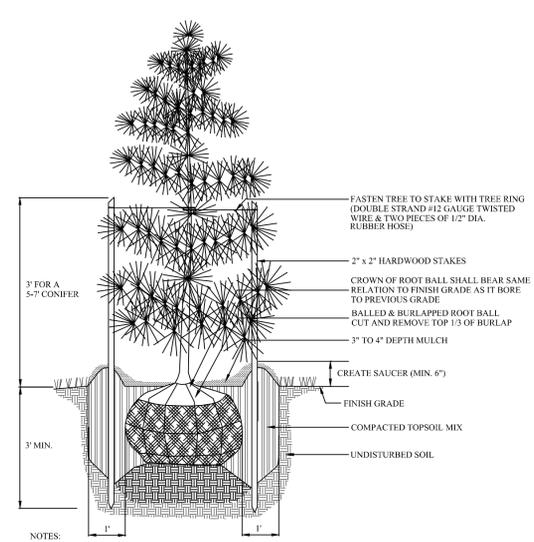


TREE PROTECTION FENCE DETAIL  
NO SCALE



- NOTES: 1. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING. 2. DO NOT DAMAGE MAIN ROOTS OR DESTROY ROOT BALL WHEN INSTALLING TREE STAKE. 3. REMOVE TREE RINGS, TREE WRAP AND STAKES TWO YEARS AFTER INSTALLATION. 4. WATER TREE THOROUGHLY SUBSEQUENT TO INSTALLATION.

DECIDUOUS TREE PLANTING DETAIL  
NO SCALE



- NOTES: 1. DO NOT ALLOW AIR POCKETS TO FORM WHEN BACKFILLING. 2. DO NOT DAMAGE MAIN ROOTS OR DESTROY ROOT BALL WHEN INSTALLING TREE STAKE. 3. REMOVE TREE RINGS AND STAKES TWO YEARS AFTER INSTALLATION. 4. WATER TREE THOROUGHLY SUBSEQUENT TO INSTALLATION.

CONIFEROUS TREE PLANTING DETAIL  
NO SCALE

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