

**SUPERIOR CHARTER TOWNSHIP PLANNING COMMISSION
SUPERIOR TOWNSHIP HALL
3040 N. PROSPECT, SUPERIOR TOWNSHIP, MI 48198
AGENDA
NOVEMBER 16, 2022
7:00 p.m.**

1. CALL TO ORDER
2. ROLL CALL
3. DETERMINATION OF QUORUM
4. ADOPTION OF AGENDA
5. APPROVAL OF MINUTES
 - A. Approval of the July 27, 2022 Regular Meeting Minutes
6. CITIZEN PARTICIPATION
7. CORRESPONDENCE
8. PUBLIC HEARINGS, DELIBERATIONS AND ACTIONS
9. REPORTS
 - A. Ordinance Officer Report
 - B. Building Department Report
 - C. Zoning Administrator Report
10. OLD BUSINESS
11. NEW BUSINESS
 - A. STPC 22-04 Kinsley Development Preliminary Site Plan
12. POLICY DISCUSSION
13. ADJOURNMENT

Thomas Brennan III, Commission Secretary
3040 N. Prospect, Ypsilanti, MI 48198

Laura Bennett, Planning & Zoning Administrator
734-482-6099

**SUPERIOR CHARTER TOWNSHIP
PLANNING COMMISSION
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DRAFT MINUTES
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1. CALL TO ORDER

Chairman Gardner called the regular meeting to order at 7:00 p.m.

2. ROLL CALL

The following members were present: Brennan, Findley, Gardner, McGill, Sani-Yahyai, Steele. Dabish-Yahkind was absent. Also present was Ben Carlisle, Carlisle Wortman; and George Tsakoff, OHM.

3. DETERMINATION OF QUORUM

A quorum was present.

4. ADOPTION OF AGENDA

A motion was made by Commissioner Findley and supported by Commissioner Sani-Yahyai to adopt the agenda as presented. The motion carried.

5. APPROVAL OF MINUTES

A. Minutes of the April 27, 2022 Meeting

A motion was made by Commissioner Findley and supported by Commissioner Sani-Yahyai to approve the minutes as presented. The motion carried.

6. CITIZEN PARTICIPATION

None.

7. CORRESPONDENCE

None.

8. PUBLIC HEARINGS, DELIBERATIONS AND ACTIONS

None.

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9. REPORTS

A. Ordinance Officer Report

A motion was made by Commissioner Brennan and supported by Commissioner Findley to receive the report. The motion carried.

B. Building Department Report

A motion was made by Commissioner Brennan and supported by Commissioner Findley to receive the report. The motion carried.

10. OLD BUSINESS

None.

11. NEW BUSINESS

A. Pre-Application Conference: Brookwood Development

Luke Bonner, CEO of the Bonner Advisory Group and real estate developer, explained the vision for the site on Leforge Road, north of Clark Road. Housing at the site would include active senior, townhouses, and stacked apartments.

Mr. Bonner showed a proposed layout of the site, showing how each area of the development was separated by the existing natural features and landscaping of the site. He noted that he has reached out to neighboring property owners about the potential development.

Commissioner Brennan asked if the housing would be for purchase or rentals.

Mr. Bonner replied that the active senior housing would be for purchase with the rest being rental.

Commissioner Sanii-Yahyai asked if a traffic study had been completed. It was determined that one has not been completed yet.

Ben Carlisle reviewed the Planner's Report dated July 19, 2022.

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Grading at the site was discussed. The applicant noted heavy sloping toward the middle of the site but explained that the site is designed around moving as little dirt as possible.

Commissioner Gardner inquired about amenities at the proposed site.

Mr. Bonner replied that the senior living area will have a clubhouse that hosts programming and activities. There will be walking paths throughout and have pickleball courts. Pricing will be reflective of market rate.

Commissioner Findley shared her thoughts on market rate pricing. She feels that the applicant cuts out a large portion of the population by pricing the homes based on the market rate.

Commissioner McGill inquired about the exterior façade.

Mr. Bonner replied that the Zoning Ordinance guidelines will be followed, but there will be a mixture of Hardy Board and brick on the exteriors.

Tyler Worman, 6900 Hickory Run, asked if there was any leeway with the location of the exit/entrance.

George Tsakoff replied that the Washtenaw County Road Commission would need to review entrance/exit placement. He noted a potential issue with southbound traffic turning into the site.

Commissioner Gardner inquired about neighbor input.

Mr. Bonner replied that the neighbors were generally accepting of a proposed project at the site.

Mr. Worman inquired about lighting at the site.

Commissioner Gardner stated that it will be reviewed at the Final Site Plan stage.

12. POLICY DISCUSSION

None.

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13. ADJOURNMENT

Motion by Commissioner Brennan, supported by Commissioner Findley to adjourn.

Motion Carried.

The meeting was adjourned at 7:35 pm.

Respectfully submitted,
Thomas Brennan III, Planning Commission Secretary

Laura Bennett, Recording Secretary
Superior Charter Township
3040 N. Prospect Rd.
Ypsilanti, MI 48198 (734) 482-6099

Superior Township Monthly Report

September/October 2022

Resident Complaints/ Debris:

- 8746 Barrington- Toilet on Extension- **(Tagged)**
- 10223 Avondale- Mattress & Carpet on Extension- **(Tagged)**
- 9779 Ravenshire- 2 Piece Luggage on Extension- **(Tagged)**
- 1788 Sheffield- Cabinet on Extension- **(Tagged)**
- 1645 Cardiff- Daybed on Extension- **(Tagged)**
- 9678 Wexford- Chair on Extension- **(Tagged)**
- 8956 Nottingham- Mattress & B/spring on Extension- **(Tagged)**

Grass Complaints:

- 8507 Barrington- Brush on Extension- **(Tagged)**
- 4961 Old Oak- Grass Needs Cutting- **(Tagged)**
- 8781 Nottingham- Grass Needs Cutting- **(Tagged)**
- 8537 Liverpool- Grass Needs Cutting- **(Spoke with Owner)**
- 8954 Bristol Ct.- Grass Needs Cutting- **(Tagged)**

Vehicle Complaints:

- 8925 Bristol Ct.- Wrecked Vehicle on Driveway- **(Spoke with Owner)**
- 8884 Nottingham- 2 Vehicles on Property Wrecked- **(Tagged)**
- 1666 Wiard Blvd.- Vehicle W/ No Tag on Driveway- **(Tagged)**

Animal Complaint:

- 1783 Sheffield- Dog Poop in Front of House- **(Tagged)**

Illegal Dumpings:

- Vreeland Near Harris Rd.- Pile of Wood Dumped
- Harris Rd. & Geddes- Gallon Jugs of Oil By Tree Dumped

SUPERIOR TOWNSHIP BUILDING DEPARTMENT
MONTH-END REPORT
October 2022

Category	Estimated Cost	Permit Fee	Number of Permits
Com/Multi-Family New Building	<i>\$18,820,556.00</i>	<i>\$122,333.00</i>	<i>1</i>
Com-Other Non-Building	<i>\$2,600.00</i>	<i>\$100.00</i>	<i>1</i>
Electrical	<i>\$0.00</i>	<i>\$3,043.00</i>	<i>23</i>
Mechanical	<i>\$0.00</i>	<i>\$5,051.00</i>	<i>39</i>
Plumbing	<i>\$0.00</i>	<i>\$2,330.00</i>	<i>16</i>
Res-Additions (Inc. Garages)	<i>\$100,340.00</i>	<i>\$652.00</i>	<i>2</i>
Res-Manufactured/Modular	<i>\$30,000.00</i>	<i>\$450.00</i>	<i>3</i>
Res-New Building	<i>\$283,043.00</i>	<i>\$1,839.00</i>	<i>1</i>
Res-Other Building	<i>\$112,851.00</i>	<i>\$779.00</i>	<i>5</i>
Res-Renovations	<i>\$150,077.00</i>	<i>\$1,035.00</i>	<i>3</i>
Totals	<i>\$19,499,467.00</i>	<i>\$137,612.00</i>	<i>94</i>

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Zoning Report

11/10/2022

Laura Bennett, Planning & Zoning Administrator

Garrett's Space

In August, the Township met with Garrett's Space, a non-profit that offers supportive care options for young adults ages 18-28 facing mental health challenges. Garrett's Space is considering the existing home at 3900 Dixboro Road, and surrounding six parcels, as the home for their campus. Outpatient and short-term stays are planned, and many on-site improvements are proposed. The applicant is now working through the best way to bring the project forward through the Planning Commission process with the Planning Consultants.

Superior Storage

In October, Ben Carlisle and I met with Ryan Joss from Joss Construction, and Evan Priest from MLP Associates. Mr. Joss is interested in the property at 10190 Plymouth-Ann Arbor Road, formerly used by Lucas Landscaping, for a mini storage/RV storage facility. The property is currently zoned A-1 and does not support the usage of a storage facility. A rezoning would be required to allow for this.

Dixboro Dental Office

An area dentist is interested in purchasing the property at 5387 Plymouth-Ann Arbor Road. This property is located directly west of the approved Arbor Hills Animal Clinic. The dental office has been working with the Washtenaw County Road Commission regarding their driveway for several months. We anticipate that the dental office will reach a shared access agreement to utilize a driveway with the Arbor Hills Animal Clinic. As part of the special district requirements in the Dixboro area, the dental office will be meeting with the Dixboro Design Review Board on 11/17 before they come before the Planning Commission.

SITE PLAN REVIEW APPLICATION

(This application must be typewritten or printed. All questions must be answered.)

APPLICANT NAME Diverse Real Estate LLC (c/o Joe Klee)

**NAME OF PROPOSED
DEVELOPMENT** Kinsley

APPLYING FOR

- PRELIMINARY SITE PLAN
- FINAL SITE PLAN
- COMBINED PRELIMINARY AND FINAL SITE PLAN
(Combination is at discretion of Planning Commission)
- MINOR SITE PLAN
- MAJOR/MINOR CHANGE DETERMINATION
- ADMINISTRATIVE REVIEW

WILL PROJECT BE PHASED? YES NO

IF PROJECT IS PHASED COMPLETE THE FOLLOWING:

- Total number of phases 1
- Phase number of current application 1
- Name and date of preliminary site plan approval

9/28/2022

- Date of Previous Phase Approvals:

Phase #	_____	Date	_____
Phase #	_____	Date	_____
Phase #	_____	Date	_____
Phase #	_____	Date	_____

SEEKING ADDITIONAL APPROVAL FOR A CONDITIONAL USE YES NO

Signature of the Clerk or Designee

Date of Receipt of Application

Amount of Fee

GENERAL INFORMATION

- Name of Proposed Development Kinsley
- Address of Property 6595 Plymouth Road
- Current Zoning District Classification of Property R2 (approved 6/21/22)

Is the zoning classification a Special District as defined by Article 7? YES NO

- Has this property been the subject of a rezoning request, Zoning Board of Appeals petition or other Township action with the past five (5) years? YES NO

Please explain Subject parcel was just rezoned earlier this year from R1 to R2
Board of Trustees approval received 6/21/22

- Tax ID Number(s) of property 10-08-400-003 & 004
- Site Location - Property is located on (circle one) (N)S E W side of Plymouth Road between Ford Road and Birch Run Drive Roads.
- Legal Description of Property (please attach a separate sheet)
Where a metes and bounds description is used, lot line angles or bearings shall be indicated on the plan. Lot line dimensions and angles or bearings shall be based upon a boundary survey prepared by a registered surveyor and shall correlate with the legal description.

Site Area (Acreage) and Dimensions

- Are there any existing structures on the property? YES NO

Please explain: There is an existing house and remnants of old foundations on site

PROPOSED LAND USE

- Residential Office Commercial Other

If other, please specify _____

- Number of units 21 units with land division for 4 parcels
- Total floor area of each unit N/A
- Give a complete description of the proposed development.
Site will be composed of 21 condominium units and 4 lot split parcels

ESTIMATED COSTS

- Buildings and other structures _____
- Site improvements To Provided With FSP Submittal Package
- Landscaping To Provided With FSP Submittal Package
- Total _____

ESTIMATED DATES OF CONSTRUCTION

- Initial construction 2023
- Project completion 2023
- Initial construction of phases (IF APPLICABLE) _____

- Completion of subsequent phases. (IF APPLICABLE) _____

- Estimated date of first occupancy 2024

IDENTIFY EACH DRAWING SUBMITTED BY NAME OF PLAN OR DRAWING, DATE AND DRAWING NUMBER (ATTACH ADDITIONAL SHEET IF NECESSARY)

Preliminary Site Plan Set Kinsley _____

Prepared by Atwell, Job #21002863 _____

Dated September 28, 2022 _____

APPLICANT INFORMATION

- APPLICANTS NAME Joe Klee
Company Diverse Real Estate, LLC
Address 13001 23 Mile Road, Suite 200, Shelby Twp, MI 48315
Telephone Number 586-232-9141 Email jkle@lombardcompanies.com

- PROPERTY OWNER'S NAME Kathleen Davids
Company N/A
Address 6249 Deering Street
Telephone Number _____ Email _____

- DEVELOPER'S NAME Joe Klee
Company Diverse Real Estate, LLC
Address 13001 23 Mile Road, Suite 200, Shelby Twp, MI 48315
Telephone Number 586-232-9141 Email jkle@lombardcompanies.com

- ENGINEER'S NAME Mark Crider
Company Atwell, LLC
Address 311 N Main St, Ann Arbor, MI 48104
Telephone Number 734-308-6910 Email mcrider@atwell-group.com

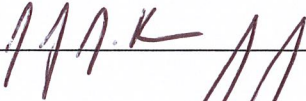
- ARCHITECT/PLANNER'S NAME John Ackerman
Company Atwell, LLC
Address 2 Towne Square, Suite 700, Southfield, MI 48076
Telephone Number 248-447-2000 Email jackerman@atwell-group.com


The applicant indicated on page 4 must sign this application. All correspondence regarding the application and plan will be directed to the applicant. If the applicant is not the property owner, the owner's signed consent must also be provided with this application.

APPLICANT'S DEPOSITION

I hereby depose and certify that all information contained in this application, all accompanying plans and all attachments are complete and accurate to the best of my knowledge.

APPLICANT'S PRINTED NAME: Joe Klee

APPLICANT'S SIGNATURE  DATE 9-22-2022

PROPERTY OWNER'S PRINTED NAME 

PROPERTY OWNER'S SIGNATURE _____ DATE 9-22-2022

Parcel ID:

J-10-08-400-003

Description:

*OLD SID J-10-008-044-00 SU 8-9D-1 COM AT SE COR OF SEC, TH W 1000 FT IN S LINE OF SEC, TH N 5 DEG 56' EAST 1835.64 FT, TH S 16 DEG 30' E 50 FT, TH S 73 DEG 30' W 259.66 FT IN CENT OF ROAD FOR PL OF BEG, TH N 29 DEG EAST 71.35 FT IN CENT OF CREEK, TH N 37 DEG 50' EAST 379.31 FT IN CENT OF CREEK, TH 38 DEG 41'30" E 296.77 FT IN CENT OF CREEK, TH N 24 DEG 32' W TO A POINT IN E & W 1/4 LINE 724.89 FT W OF E 1/4 COR, TH W TO NW COR OF E 1/2 OF SE 1/4, TH S IN W LINE OF E 1/2 OF SE 1/4 TO CENT OF HWY, TH NELY ALONG HWY TO PL OF BEG, BEING PART OF NE 1/4 OF SE 1/4, EXC THAT PART LYING N OF A LINE 103 FT S OF, MEASURED AT RIGHT ANGLES AND PARALLEL WITH THE REFERENCE LINE OF EAST BOUND ROADWAY OF LIMITED ACCESS HWY. M-14 SEC 8 T2S-R7E 7.05 AC.

Parcel ID:

J-10-08-400-004

Description:

*OLD SID - J 10-008-030-00 SU 8-7-A COM AT SE COR OF W 1/2 OF SE 1/4, TH N 1505.70 FT IN E LINE OF W 1/2 OF SE 1/4 TO CENT OF FLEMING CREEK FOR A PL OF BEG, TH N TO THE NE COR OF W 1/2 OF SE 1/4, TH W IN THE E&W 1/4 LINE TO THE CENT OF SEC, TH S IN THE N&S 1/4 LINE TO A POINT WHICH IS 921.60 FT N OF S 1/4 POST OF SEC, SAID POINT BEING ON THE CENT OF FLEMING CREEK, TH ELY AND NLY ALG FLEMING CREEK TO PL OF BEG, EXC COM AT S 1/4 POST OF SEC, TH N 1311 FT IN N & S 1/4 LINE, TH N 72 DEG 29'30" E 332.78 FT IN CENTER OF PLYMOUTH ROAD FOR PL OF BEG, TH CONT N 72 DEG 29'30" E 240 FT IN CENT OF ROAD, TH S 1 DEG 33' 40" W 455.80 FT TH S 76 DEG 17' 20" W 222.76 FT, TH N 0 DEG 0' 30" W 436.23 FT TO POB, ALSO EXC THAT PART OF W 1/2 OF SE 1/4 LYING N OF A LINE 103 FT S OF & PARALLEL TO REF LINE OF E-BOUND ROADWAY OF HWY M-14 SEC 8 T2S R7E. 39.87 AC.

Approved, SCAD

JIS CODE: QSR

STATE OF MICHIGAN
PROBATE COURT
COUNTY OF WAYNE

ORDER REGARDING
SALE OF REAL ESTATE
(DECEDENT ESTATE)

FILE NO.
2009-747305-DA
Judge David A. Perkins

Estate of Kathleen J. Davids, Deceased

- 1. Date of hearing: December 1, 2021 Judge: David A. Perkins P38750
Bar no.
- 2. Linda E. Walker, as personal representative of the estate, petitioned for court approval of sale of real estate.
Name

THE COURT FINDS:

- 3. Notice of the hearing was given to or waived by all interested persons.
- 4. It is in the estate's best interest to sell or otherwise dispose of the real estate.
- 5. Bond was filed and approved by the court.
- 6. The legal description of the real estate is:
See attached legal descriptions

IT IS ORDERED:

- 7. The sale of the property described above, to CP Land Holding LLC, a Michigan limited liability company for the sum of \$ 700,000.00 and payable on the terms and conditions set forth in the petition, is approved.
Name of buyer
- 8. A written appraisal of the real estate must be provided to the court within _____ days.
- 9. The sale is denied.
- 10. GAL/Attorney Fees: Estate to pay.

DEC 01 2021
Date

Lawrence J. Paulucci
for Judge David A. Perkins

Michael Muma P29808
Attorney name (type or print) Bar no.
134 N. Main St.
Address
Plymouth, MI 48170 (734) 453-1976
City, state, zip Telephone no.



Do not write below this line - For court use only

Section 10.07 Required Site Plan Information.

The following minimum information shall be included with each application for approval of a minor site plan, preliminary site plan, final site plan, or Special District Area Plan per Article 7.0 (Special District Regulations). An item of required information not applicable to the project or site may be omitted from a site plan, subject to acceptance by the Planning Commission:

Minimum Site Plan Information	Minor Site Plan	Special District Area Plan	Preliminary Site Plan	Final Site Plan	
SITE PLAN DESCRIPTIVE INFORMATION					
Applicant and developer’s name(s), address(es), telephone and facsimile numbers, and interest in the property; and property owner's name, address, telephone number, and signed consent if applicant is not the owner.	●	●	●	●	01
The name, address, telephone, and facsimile numbers of the firm or individual preparing the site plan. Site plans prepared by an architect, engineer, landscape architect or land surveyor registered or licensed in the State of Michigan shall bear the individual’s professional seal.	●	●	●	●	01
Location, address(es), and tax identification number(s) of subject parcel(s).	●	●	●	●	02
Dimensions of the site, and the gross and net land area.	●	●	●	●	01-02
Legal description(s) of the subject parcel(s).		●	●	●	01
Legal description of the proposed development site and any non-contiguous open space area(s), if different from the subject parcel(s), with lot line angles or bearings indicated on the plan. Dimensions, angles, and bearings shall be based upon a boundary survey prepared by a registered surveyor.			●	●	01
Details of existing and proposed covenants or other restrictions imposed upon land or buildings, including bylaws, deed restrictions, and articles of incorporation for a cooperative, condominium, or homeowners' association.				●	
Description of applicant's intentions regarding selling or leasing of all or portions of land and dwelling units or other structures.		●	●	●	01
Gross and net dwelling unit density for residential projects.		●	●	●	01
General description of the number, size ranges, and types of proposed dwelling units; and proposed facade materials.		●			
A schedule of the number, sizes (bedrooms, floor areas), and types of dwelling units, and lot area per dwelling unit.			●	●	28-29
Average initial sales price ranges for dwelling units to be offered for sale, and average initial rents of rental dwelling units.		●		●	
A detailed use statement describing proposed use(s); including land or building areas for each use, number of units, number of anticipated employees, or other applicable information to verify Ordinance compliance.	●	●	●	●	01

Minimum Site Plan Information	Minor Site Plan	Special District Area Plan	Preliminary Site Plan	Final Site Plan	
SITE PLAN DATA AND NOTES					
Vicinity map showing the general location of the site.		●	●	●	01
Scale, north arrow, initial plan date, and any revision date(s).	●	●	●	●	all sheets
Preliminary and final site plans shall be drawn to an engineer’s scale not greater than 1:100 and appropriate for the required sheet size of 24 inches by 36 inches. For a large development shown in sections on multiple sheets, one overall composite sheet shall be provided for clarity.		●	●	●	all sheets
Existing zoning classification(s) for the subject parcel(s) and surrounding parcels (including across road rights-of-way).		●	●	●	02-06
Minor site plans shall be drawn to a scale appropriate for a sheet size between 8.5 inches by 14 inches (minimum) and 24 inches by 36 inches (maximum); and of such accuracy that the Planning Commission can readily interpret the plan.	●				
Owners’ names, existing uses, and location of structures, drives, and improvements on surrounding parcels (including across rights-of-way).			●	●	02-06
Identification of all adjacent property in which the applicant(s), developer(s), or owner(s) have an ownership interest.		●	●	●	N/A
Dimensions of all property boundaries and interior lot lines.	●	●	●	●	02-06
Percentage of lot coverage, total ground floor area, and floor area ratio.			●	●	01
Calculations for parking and other applicable Ordinance requirements.	●		●	●	01
EXISTING CONDITIONS					
Location of existing structures, fences, and driveways on the subject property, with notes regarding their preservation or alteration.	●	●	●	●	02-06
Location of existing walls, signs, utility poles and towers, pipelines, excavations, bridges, culverts, and other site features on the subject property, with notes regarding their preservation or alteration.			●	●	02-06
SITE PLAN DETAILS					
Delineation of required yards, setback areas, and transition strips.	●		●	●	08
Identification of general location(s) and area(s) of each development phase.			●	●	08
Planned construction program and schedule for each development phase.			●	●	25
Location, width, purpose, and description of all existing and proposed easements and rights-of-way on or adjacent to the site.	●		●	●	08
Location, type, area, height, and lighting specifications of proposed signs.	●			●	
An exterior lighting plan with all existing and proposed lighting locations, heights from grade, specifications, lamps types, and methods of shielding.				●	

Minimum Site Plan Information	Minor Site Plan	Special District Area Plan	Preliminary Site Plan	Final Site Plan	
Location, area, and dimensions of any outdoor sales, display or storage areas.	●		●	●	N/A
Location of proposed outdoor waste receptacle enclosures; with size, elevation, and vertical cross section showing materials and dimensions.			●	●	N/A
BUILDING DESIGN AND ORIENTATION					
Location, outline, ground floor area, and height of proposed structures; and of existing structures to remain on-site.	●	●	●	●	28-29
Dimensions, number of floors, and gross and net floor area of proposed principal buildings; and of existing principal buildings to remain on-site.			●	●	28-29
Separation distances between adjacent buildings, and between buildings and adjacent lot boundaries.			●	●	08-12
Conceptual drawings of exterior building façades for principal buildings and building additions, drawn to an appropriate scale.		●			
Detailed exterior building façade elevation drawings for all proposed dwellings, principal buildings, and additions, drawn to an appropriate scale and indicating types, colors, and dimensions of finished wall materials.	●		●	●	28-29
Finished floor elevations and contact grade elevations for proposed principal buildings and existing principal buildings to remain on-site, referenced to a common datum acceptable to the Township Engineer.				●	
ACCESS AND CIRCULATION					
Locations, layout, surface type, centerlines, road pavement and right-of-way widths, and indication of public or private road status for all existing and proposed roads and access drives serving the site.		●	●	●	08-12
Conceptual locations, layout, and surface type for all parking lots, sidewalks, and pedestrian pathways within and accessing the site.	●	●	●	●	08-12
Locations and dimensions of vehicle access points, and distances between adjacent or opposing driveways and road intersections.	●		●	●	
Details of locations, widths, and paving of proposed sidewalks and pedestrian ways, including alignments, typical cross sections, connections to existing or planned off-site facilities, and easement or right-of-way dedications.				●	
Parking space dimensions, pavement markings, and traffic control signage.	●		●	●	N/A
Parking space angles; maneuvering aisle, island, and median dimensions; surface type; fire lanes; drainage patterns; location of loading areas; and typical cross-section showing surface, base, and sub-base materials.			●	●	N/A
Identification of the proposed name(s) for new public or private road(s) serving the site.			●	●	08-12

Minimum Site Plan Information	Minor Site Plan	Special District Area Plan	Preliminary Site Plan	Final Site Plan	
Spot elevations of the road surface for existing roads on and adjacent to the subject parcel(s), including surface elevations at intersections with the internal roads and drives serving the proposed development; curve-radii and road grades; location and details of curbs, and turning lanes; and typical road cross sections showing surface, base, and sub-base materials and dimensions.				●	
NATURAL FEATURES AND OPEN SPACE AREAS					
General description and delineation of existing natural features on and abutting the site; such as trees, shrubs, wooded areas, general topography and soil information, areas of steep slopes, bodies of water, watercourses, drainageways, and wetlands; with clear indication of all features to be preserved, removed, or altered.		●	●	●	02-07
Details of all existing natural features on the site as required by Section 14.05 (Natural Features Protection) or the Township Wetlands Ordinance; including type, location, size, and species; slopes from 12% to 25% and steep slopes 25% and above; clear indication of all features to be preserved, removed, or altered; and proposed mitigation measures.				●	
Delineation of the 100-year floodplain on and abutting the site [see Section 14.05D (Floodplains)].		●	●	●	07
Description of groundwater recharge areas located on the subject parcel(s), and a rough delineation of their borders [see Section 14.05E (Groundwater Recharge Areas)].			●	●	07
Delineation of all vegetation within required open space setback from watercourses and wetlands per Section 14.05B (Watercourses and Wetlands).				●	
Outdoor open space and recreation areas; location, area, and dimensions.		●	●	●	26
Description of the organization that will own and maintain open space and recreation areas, and a long-term maintenance plan for such areas.				●	
SCREENING AND LANDSCAPING					
Location and size of required landscape strips, if applicable.		●	●	●	L1-L3
General layout of proposed landscaping and screening improvements; including plantings, topographic changes, and similar features.	●		●	●	L1-L3
A detailed landscape plan, including location, size, quantity and type of proposed plant materials and any existing plant materials to be preserved.				●	
Planting list for proposed landscape materials, with the method of installation, botanical and common name, quantity, size, and height at planting.				●	
Landscape maintenance plan, including notes regarding replacement of dead or diseased plant materials.				●	

Minimum Site Plan Information	Minor Site Plan	Special District Area Plan	Preliminary Site Plan	Final Site Plan	
Proposed fences, walls, and other screening devices, including typical cross section, materials, and height above grade.	●		●	●	L1-L3
Screening methods for any waste receptacle areas, ground-mounted generators, transformers, mechanical (HVAC) units, and similar devices.	●		●	●	N/A
Proposed screening of rear dwelling elevations facing towards and visible from abutting primary roads, where proposed as an alternative to the rear façade material standards of Section 14.09B (Residential Building Exteriors).				●	
UTILITIES, STORMWATER MANAGEMENT, AND GRADING					
General layout of existing and proposed water supply systems, sanitary sewerage or septic systems, and stormwater management facilities.		●	●	●	13-17
Location and size or capacity of the existing and proposed potable water supply and sewage treatment and disposal facilities serving the site.			●	●	N/A
Location, size, and slope of proposed detention or retention ponds; and location and size of underground tanks and drain lines where applicable.			●	●	18-19
Layout, line sizes, inverts, hydrants, flow patterns, and location of manholes and catch basins for proposed sanitary sewer and water supply systems.				●	
Calculations for capacity of stormwater management and drainage facilities.				●	
Location and size of existing and proposed telephone, gas, electric, and similar utility lines and surface-mounted equipment.				●	
General areas of intended filling or cutting.		●	●	●	26
A detailed grading plan, with details of proposed filling or cutting, existing and proposed topography at a minimum of two (2) foot contour levels, stormwater runoff drainage patterns, and a general description of grades within 100 feet of the site. All finished contour lines are to be connected to existing contour lines within the site or at the parcel boundaries.				●	
Locations, dimensions, and materials of proposed retaining walls, with fill materials and typical vertical sections.			●	●	N/A
Description of measures to control soil erosion and sedimentation during construction operations, and until permanent groundcover is established.				●	
ADDITIONAL REQUIRED INFORMATION					
Other information as requested by the Township Planner or Planning Commission to verify that the site and use are in accordance with the intent, purposes, and requirements of this Ordinance and the policies of the Township's Growth Management Plan.	●	●	●	●	

SOILS INVESTIGATION
PROPOSED RESIDENTIAL DEVELOPMENT
6595 PLYMOUTH ROAD
SUPERIOR TOWNSHIP, MICHIGAN

LOMBARDO HOMES OF SE MICHIGAN, LLC
13001 23 MILE ROAD
SUITE 200
SHELBY TOWNSHIP, MICHIGAN

MAY 11, 2022
BY
McDOWELL & ASSOCIATES

McDowell & Associates

Geotechnical, Environmental & Hydrogeological Services • Materials Testing & Inspection

21355 Hatcher Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157
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May 11, 2022

Lombardo Homes of SE Michigan, LLC
13001 23 Mile Road
Suite 200
Shelby Township, Michigan 48315

Job No. 22-113

Attention: Mr. Cosimo Lombardo

Subject: Soils Investigation
Proposed Residential Development
6595 Plymouth Road
Superior Township, Michigan

Dear Mr. Lombardo:

In accordance with your request, we have made a Soils Investigation at the subject project. A test pit exploration previously performed in November 2021 is not discussed in this report.

Field Work and Laboratory Testing

Six Soil Test Borings, designated as 1 through 6, were performed at the subject property at the approximate locations shown on the Soil Boring Location Plan which accompanies this report. The boring locations were staked by others prior to drilling. The borings were advanced to depths ranging from about fifteen feet (15') to twenty five feet (25') below the existing ground surface at the boring locations. Piezometers were installed in Borings 1 and 6 in order to obtain delayed water level measurements. Piezometer installation details are shown on the individual boring logs.

Soil descriptions, groundwater observations and the results of field and laboratory tests are to be found on the accompanying Logs of Soil Test Borings and summary sheet of Sieve Analysis results.

The borings encountered about one foot (1') to four feet (4') of surficial topsoil/fill, underlain by slightly compact to extremely compact brown silty sand and gravel with occasional cobbles to about twenty feet (20') below the existing ground surface. As an exception, gray clayey fine sand was found in Boring 1 between depths of twenty three feet six inches (23'6") and twenty five feet (25'), and sandy clay with pebbles was found in Boring 6 between depths of eighteen feet six inches (18'6") and twenty feet six inches (20'6").

We made a site visit on May 10, 2022 to take measurements from the installed piezometers. The results are presented in the table below. If additional readings are required, it is anticipated that you will let us know.

<u>Boring</u>	<u>Provided Ground Surface Elevation (feet)</u>	<u>Measured Piezometer Stickup (feet)</u>	<u>Groundwater Elevation (feet)</u>	<u>Depth to Groundwater (feet)</u>
1	824.0	2.95	816.3	7.7
6	816.2	3.15	814.2	2.0

Soil descriptions and depths shown on the boring logs are approximate indications of change from one soil type to another and are not intended to represent an area of exact geologic change or stratification.

Groundwater was encountered in all borings except Boring 5 at initial depths ranging from three feet two inches (3'2") to fourteen feet (14') below the existing ground surface. The groundwater levels were measured upon completion of drilling at depths ranging from two feet two inches (2'2") to fourteen feet (14') below the existing ground surface. It should be noted that short-term groundwater observations may not provide a reliable indication of the depth of the water table. Water levels in granular soils fluctuate with seasonal and climatic changes as well as the amount of rainfall in the area immediately prior to the measurements. It should be expected that groundwater fluctuations could occur on a seasonal basis and that seams of water-bearing sands or silts could be found within the various clay strata at the site.

Standard Penetration Tests (SPTs) made during the sampling operation indicate that the shallow site soils up to six feet (6') generally have poor to fair strengths and densities while the deeper site soils have good to very good strengths and densities. The tests of the top layer resulted in penetration indices ranging from 2 to 12 blows per foot. At six feet (6') and below, penetration indices ranged from 11 blows per foot to 61 blows for six inches (6"). All SPTs were performed with a rope and cathead safety hammer.

Project Description

It is understood that the project will consist of constructing new one to two-story residential houses with basements and attached garages along with a detention pond at the subject property. It is anticipated that the structures will transmit relatively light loads to the supporting soils and desired basements will extend about seven feet (7') below the existing ground surface at the boring locations.

Foundation Recommendations

Based on the project information provided and the results of field and laboratory tests, the indications are that the structures could be supported by conventional to deeper than normal spread or strip footings. All exterior footings should be constructed at, or below, a minimum frost penetration depth of three feet six inches (3'6") below finished grade. All interior and exterior load-bearing footings should extend through non-engineered fill soils if any, soils containing significant amounts of organic substances, or excessively weak soils. All strip footings should be continuously reinforced in order to minimize any noticeable effects of differential settlement.

Footings constructed at the following boring locations could be proportioned for the design soil pressures shown below, provided this results in the footings bearing on native, non-organic soils:

<u>Boring</u>	<u>Depth</u>	<u>Soil Pressure (psf)</u>
1	3'0" to 7'6"	2,500
	7'6" to 8'0"	4,500
2	6'6" to 8'0"	3,500
3	2'6" to 6'0"	2,500
	6'0" to 8'0"	4,500
4	4'0" to 8'0"	4,500
5	6'0" to 8'0"	3,500
6	2'0" to 4'6"	1,500
	4'6" to 8'0"	3,000

Based on the above chart, it appears that lower strength soils may be encountered at relatively shallow depths which may necessitate slightly deeper or larger than normal footing sizes. Higher design soil pressures are available at various depths in the borings and could be detailed, if desired.

Engineered Fill

Fill soils or poor strength apparent native soils were encountered in Borings 1, 2, 4 and 5 to depths ranging from about three feet (3') to six feet six inches (6'6"). As an alternative to relatively deep footings, the building spread or strip footings could be supported on engineered fill. All existing non-engineered fill, organic soils, soft soils and loose granular soils should be excavated and removed from the proposed foundation area. The excavations should extend beyond the edge of the structure's footings one foot (1') for every foot below the footing. Groundwater flow into the excavation will require special dewatering techniques in order to facilitate the excavation of the unsuitable soils. Extreme caution should be practiced during the dewatering operation if the nearby building, utilities or other structures are sensitive to settlement. The removal of the unsuitable soils should be done in the presence of a qualified soils engineer or technician to limit the potential for uncontrolled fill or highly organic soils being left behind before the placement of engineered fill. After the unsuitable soils have been removed, the excavation should preferably be filled with compacted bank run sand similar to MDOT Type I or II granular soils. If clay material is utilized, it should be placed within 3% of its optimum moisture content. If the bottom of the excavation is not sufficiently stable to install the fill material, then a layer of coarse stone fill such as MDOT 6AA crushed stone could be installed. Geotextile fabric should be placed between the coarse stone engineered fill material and lower native granular soils to minimize the amount of fines infiltrating into the aggregate material. If granular material is to be placed above the stone, a six-inch (6") layer of MDOT 21AA or an additional layer of filter fabric should be placed above the stone, overlapping the underlying fabric to further minimize the amount of material infiltrating into the aggregate

material. The fill soils should be deposited in horizontal lifts not to exceed nine inches (9") in thickness with each lift being compacted uniformly to a minimum density of 95% of its maximum value as determined by the Modified Proctor Test (ASTM D-1557).

One inch by three-inch (1" x 3") size crushed stone or crushed concrete could be used in lieu of the MDOT Type 6AA aggregate and bank run sand that we recommended above. The crushed material would need to be placed and compacted in lifts not exceeding nine inches (9") up to about one foot (1') below the planned footings and/or floor slabs. About a one-foot (1') thick layer of MDOT 21AA dense aggregate could then be placed above the crushed material in an effort to choke off the stone. The crushed stone or crushed concrete material should not contain significant amounts of brick and should be relatively clean of lime or cement dust which could potentially foul up or clog the drain tiles. We suggest that the brick content should be less than 5% and cement/lime dust should be less than 3%. The large crushed material will need to be separated from the existing site granular soils by a geotextile fabric. We suggest that a geotextile filter fabric be placed along the bottom and sides of the engineered fill excavation in an effort to minimize fines from migrating into the voids within the crushed material. It should be noted that the use of crushed concrete could cause problems for basement drains and sump pumps. When water percolates through crushed concrete, the pH of the water can increase and minerals can precipitate out of the solution (mostly calcium salts and, in some cases, calcium hydroxide). Mineral deposits precipitating from the solution can shorten the life of sump pumps and plug drain tiles. High pH water can also corrode metal pipes. See AASHTO M 319-02 for discussion of these problems.

Foundations placed on the engineered fill could be proportioned for a design soil pressure of 3,000 psf provided the strength is not limited by the presence of weaker underlying materials. Engineered fill should be placed and compacted up to footing and floor invert elevations.

Ground Improvement

Low strength apparent native granular soils were encountered in Borings 2 and 5 to depths of about six feet (6') or six feet six inches (6'6"). You may wish to consider attempting to improve the existing granular soil in the planned house and pavement areas by heavily proof-compacting with a 20-ton or larger vibratory roller before construction. All topsoil and other surficial materials should be removed, exposing the underlying granular soils prior to compaction. Where topsoil or organic soils extend near or below the water table, the organic soils should be removed and relatively clean sand (Class II or cleaner) should be placed to about two feet (2') above the water table. We suggest at least 20 passes in alternating directions in the vicinity of the proposed buildings and at least 15 passes in alternating directions in pavement areas. Extreme care must be taken if existing structures or utilities are located within about fifty feet (50') from the proof compaction area. Vibrations from this operation could damage these structures if they are located close by.

Once the granular soils have been compacted as discussed above, it is anticipated that a minimum design soil pressure of 2,000 psf could be considered for foundations bearing on native, non-organic soils placed within a few feet of the lowest elevation where vibratory compaction was performed. If basement footings will be six feet (6') or seven feet (7') below the lowest elevation where vibratory compaction was performed, the improvement is expected to decrease (design soil pressures may be on the order of 1,000 – 1,500 psf). However, this is not known for certain. Where design soil

pressures in the provided table are less than 2,000 psf, or where they were not provided, additional testing should be performed to confirm the applicable design soil pressure. Additional testing should either consist of Housel Penetration Tests or preferably Soil Test Borings.

Groundwater Considerations

Basement footing excavations are expected to be above groundwater elevations indicated from Borings 2 through 5. Water seepage from potential perched water in the vicinity of these borings is not expected to be a major issue, but if significant should be manageable with construction pumping and sumps. However, this is not known for certain. If large volumes of water or saturated granular soils are encountered, special dewatering techniques may be required. Extreme care must be exercised during any dewatering operation if nearby buildings or utilities are sensitive to settlement. Care must be taken to minimize the removal of soil fines during any pumping operations.

It should be noted that groundwater was found near or above the anticipated basement footing depth in Borings 1 and 6. Depending upon the depth of the footings relative to the existing ground surface and the actual conditions at the time of construction, it may be necessary to depress the water table in these locations to allow for footings to be constructed. It is sometimes possible to construct strip footings a foot or so below the water table in coarse granular soils using a rapid sequence of excavation and placement of concrete. If this is not possible, it may be necessary to use special dewatering techniques to depress the water table in the vicinity of these borings.

It is our recommendation that basement floors be maintained at least one foot (1') and preferably two feet (2') above the seasonal high water table where granular soils are present. To do this at the boring locations listed above may require raising basement floors and lowering the brick ledges and/or raising the site grade in the vicinity of the specific lots. Prior to raising any site grades, we suggest all topsoil, fill, and other obviously objectionable materials be stripped.

The basements should be provided with an adequate drainage system to protect the floor and walls from the possible effects of hydrostatic pressure. The drainage system should be designed and installed to minimize the potential for soil fines to erode into the underdrainage system. For any basement constructed in close proximity to the water table in granular soils we suggest a drainage system including interior and exterior drains with the following specifications:

1. In order to lessen the possibility of soil fines affecting the perimeter drain system, it is recommended that exterior footing drains be at least four-inch (4") diameter slotted or perforated pipe with maximum 1/16" slot openings; larger openings would require a filter sock. We also suggest surrounding the drain tiles with at least four inches (4") of MDOT Specification 2NS sand. The 2NS sand would preferably be extended vertically over the drain to within about one foot (1') to two feet (2') of the final grade. The 2NS sand against the basement wall should be maintained at a width of at least twelve inches (12") measured perpendicular to the walls and footings.
2. Interior underfloor drains should be provided and should be nominally four-inch (4") diameter slotted or perforated pipe. These should be placed at ten-

foot (10') to twenty-foot (20') centers and along the inside of the footings. A geotextile filter fabric should completely cover the basement subgrade and extend several inches up the sides of the footing. A minimum of eight inches (8") of coarse material such as pea stone or MDOT 6A stone should be placed over the fabric. Cleanouts should be provided for all of the drains. A good moisture barrier should be placed between the floor slab and the stone.

3. Note that crushed concrete materials are not desirable since they occasionally clog/plug drain tiles and ruin sump pumps.
4. The interior and exterior drain tiles should be independently connected to the sump so that if one fails the other can continue to operate.
5. A backup power supply should be provided in case of power outages.

Floor Slabs

Concrete floors or floor-supporting backfill could be placed at, or near, the present grade at Borings 3 and 6. Any existing topsoil or other obviously objectionable materials should be removed and the subgrade should then be thoroughly proof-compacted. If, during the proof-compaction operation, areas are found where the soils yield excessively, the yielding materials should be scarified, dried, and recompact or removed and replaced with engineered fill meeting the specifications outlined above.

Fill soils or apparent native granular soils with very poor strength were encountered in Borings 1, 2, 4 and 5 to depths ranging from three feet (3') to six feet six inches (6'6"). In Borings 1 and 4, the fill soil was described by the drillers as being primarily topsoil. Consequently, at Borings 1 and 4 it is suggested that the fill soils be completely removed and replaced with engineered fill for slab support. If you wish to further evaluate the potential to place slabs on the fill at Borings 1 and 4, additional test pits and Loss on Ignition tests are suggested. At Borings 2 and 5 any topsoil or other obviously objectionable material should be removed, and it is suggested that the subgrade be thoroughly compacted as discussed above in the ground improvement section of this report. If, after compaction operation, areas are found where the soils yield excessively, the yielding materials should be scarified, dried, and recompact or removed and replaced with engineered fill as outlined above.

If any existing structures are found, they should be entirely removed from the proposed building area. Buried utilities should be removed or grouted in place. Resulting excavations should be backfilled with engineered fill meeting the requirements outlined above.

To minimize capillary action under floor slabs, we suggest placing at least four inches (4") of clean material on the subgrade followed by a suitable plastic vapor barrier between the clean material and the concrete slab. The clean material could consist of pea stone, MDOT Class I sand, 2NS sand or 6AA crushed stone.

Closing

Experience indicates that actual subsurface conditions at the site could vary from those found at the six test borings made at specific locations. It is, therefore, essential that McDowell & Associates be notified of any variation of soil conditions to determine their effects on the recommendations presented in this report. The evaluations and recommendations presented in this report have been formulated on the basis of reported or assumed data relating to the proposed project. Any significant change in the final design plans should be brought to our attention for review and evaluation with respect to the prevailing subsoil conditions.

It is recommended that the services of McDowell & Associates be engaged to observe the soils in the footing excavations prior to concreting in order to test the soils for the required bearing capacities. Testing should also be performed to check that suitable materials are being used for controlled fills and that they are properly placed and compacted.

If we can be of any further service, please feel free to call.

Very truly yours,

McDOWELL & ASSOCIATES



Tony (Antoine) Merheb, M.S., P.E.
Senior Geotechnical Engineer



David Quintal, M.S., P.E.
Geotechnical Engineer

TM/DQ/



McDOWELL & ASSOCIATES
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LOG OF SOIL

BORING NO. 1
PROJECT Soils Investigation – Proposed Residential Subdivision
LOCATION 6595 Plymouth Road
Superior Township, Michigan

JOB NO. 22-113
SURFACE ELEV. 824.0 **DATE** 5-5-22

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1								
A	2		Soft moist dark brown clayey sandy TOPSOIL with pebbles	1					
SS	3			1	15.6	---			
	4		3'0" Medium compact moist brown gravelly SAND	2					
B	5			3					
SS	6		3'6" Compact moist brown silty SAND	4	17.3	---			
	7			4					
C	8			6					
SS	9		7'5" Very compact wet brown SAND & GRAVEL with occasional cobbles and trace of silt	10	9.6	---			
	10			12					
D	11			6					
SS	12			10	10.5	---			
	13		12'6" Compact wet gray gravelly SAND with occasional cobbles	14					
E	14			5					
SS	15			6					
	16			6					
	17								
	18								
F	19			7					
SS	20		19'6" Extremely compact wet gray fine SAND	13					
	21			18					
	22		Extremely compact wet gray clayey fine SAND with occasional cobbles						
	23								
	24		23'6" Notes:						
G	25		1) Used track rig.	30					
SS			2) Installed 1 1/2" diameter PVC piezometer in boring with screen bottom at 10' and 3' stick up.	61					
			25'0"	---					

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

REMARKS:

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

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT 7 FT. 5 INS.
 G.W. ENCOUNTERED AT FT. INS.
 G.W. AFTER COMPLETION 5 FT. 2 INS.
 G.W. AFTER HRS. FT. INS.
 G.W. VOLUMES Heavy



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LOG OF SOIL

BORING NO. 2
PROJECT Soils Investigation – Proposed Residential Subdivision

JOB NO. 22-113

LOCATION 6595 Plymouth Road

SURFACE ELEV. 827.3 **DATE** 5-5-22

Superior Township, Michigan

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1		Moist dark brown clayey TOPSOIL						
	1'0"								
A	2		Slightly compact moist brown fine SAND with trace of gravel and occasional moist sandy clay seams	1					
SS	3			2	13.5	---			
	4				2				
	4'6"								
B	5		Slightly compact moist brown fine SAND	1					
SS	6			1	12.9	---			
	6'6"				1				
	6'6"								
C	7		Compact moist brown fine SAND	3					
SS	8			6	12.7	---			
	9				7				
	9'6"								
D	10		Extremely compact moist brown SAND & GRAVEL with trace of silt	8					
SS	11			14	4.3	---			
	12'0"				15				
	12'0"								
	12'0"								
	13								
	14		Very compact wet brown gravelly SAND						
E	15			8					
SS	15'6"			8					
				9					
	16								
	17								
	18								
	19								
	20								
	21								
	22								
	23								
	24								
	25								

Note: Used track rig.

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

REMARKS:

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

GROUND WATER OBSERVATIONS

 G.W. ENCOUNTERED AT 12 FT. 0 INS.
 G.W. ENCOUNTERED AT FT. INS.
 G.W. AFTER COMPLETION 12 FT. 0 INS.
 G.W. AFTER HRS. FT. INS.
 G.W. VOLUMES Heavy



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LOG OF SOIL

BORING NO. 3
PROJECT Soils Investigation – Proposed Residential Subdivision

JOB NO. 22-113

LOCATION 6595 Plymouth Road

SURFACE ELEV. 829.8 **DATE** 5-5-22

Superior Township, Michigan

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1		0'10" Moist dark brown clayey TOPSOIL with pebbles						
A	2		2'6" Medium compact moist brown fine SAND with occasional moist gravelly sand seams	2	7.9	---			
SS	3								
	6								
B	4		Compact moist brown fine SAND with traces of silt and gravel	4	8.2	---			
SS	5								
	5								
C	7		Very compact moist brown fine SAND with occasional moist brown silt lenses	4	6.5	---			
SS	8								
	9								
D	9		12'9" Extremely compact wet brown gravelly SAND with moist brown sandy clay seams	6	9.5	---			
SS	10								
	13								
E	14		15'6" Note: Used track rig.	9					
SS	15								
	15								
	16								
	17								
	18								
	19								
	20								
	21								
	22								
	23								
	24								
	25								

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

REMARKS:

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

GROUND WATER OBSERVATIONS

 G.W. ENCOUNTERED AT 12 FT. 9 INS.
 G.W. ENCOUNTERED AT FT. INS.
 G.W. AFTER COMPLETION 13 FT. 2 INS.
 G.W. AFTER HRS. FT. INS.
 G.W. VOLUMES Heavy



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LOG OF SOIL

BORING NO. 4
PROJECT Soils Investigation – Proposed Residential Subdivision

JOB NO. 22-113

LOCATION 6595 Plymouth Road

SURFACE ELEV. 833.4 **DATE** 5-5-22

Superior Township, Michigan

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1	[Brown Soil Legend]	Soft moist dark brown sandy clayey TOPSOIL with pebbles and layers of moist brown sand and moist silty clay, fill						
A	2			1					
SS	3			2	15.9	---	*	(4000)	
	4	[Dotted Soil Legend]	4'0" Compact moist brown fine SAND with trace of silt and gravel						
B	5			3					
SS	6			5	6.3	---			
	7	[Dotted Soil Legend]	7'0" Compact moist brown fine SAND with trace of silt						
C	8			4					
SS	9			6	8.7	---			
	10	[Dotted Soil Legend]	Compact moist brown fine SAND with trace of silt						
D	11			4					
SS	12			7	10.9	---			
	13	[Dotted Soil Legend]	14'0" Very compact wet brown fine SAND with occasional wet brown silt lenses						
E	14			6					
SS	15			9					
	16	[Dotted Soil Legend]	19'0" Very compact wet brown fine SAND with occasional wet gravelly sand seams						
	17			6					
	18			9					
	19	[Dotted Soil Legend]	20'6" Note: Used track rig.						
F	20			6					
SS	21			9					
	22								
	23								
	24								
	25								

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

REMARKS: *Calibrated penetrometer

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

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT 14 FT. 0 INS.
 G.W. ENCOUNTERED AT FT. INS.
 G.W. AFTER COMPLETION 14 FT. 0 INS.
 G.W. AFTER HRS. FT. INS.
 G.W. VOLUMES Heavy



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

LOG OF SOIL

BORING NO. 5
PROJECT Soils Investigation – Proposed Residential Subdivision

JOB NO. 22-113

LOCATION 6595 Plymouth Road

SURFACE ELEV. 831.6 **DATE** 5-5-22

Superior Township, Michigan

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1		0'9" Soft moist dark brown sandy clayey TOPSOIL with pebbles						
A	2		Slightly compact moist brown fine SAND with trace of silt	1	8.2	---			
SS	3			2					
	4								
B	5		6'0" Slightly compact moist brown fine SAND with trace of silt	1	9.3	---			
SS	6			2					
	7								
C	8		6'0" Slightly compact moist brown fine SAND with trace of silt	4	10.1	---			
SS	9			7					
	10			8					
D	11		Compact moist brown silty fine SAND	5	13.5	---			
SS	12			6					
	13			7					
E	14		14'5" Extremely compact moist brown gravelly SAND	7					
SS	15			12					
	16			16					
	17								
	18								
	19								
	20		Note: Used track rig.						
	21								
	22								
	23								
	24								
	25								

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

REMARKS:

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

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT FT. INS.
 G.W. ENCOUNTERED AT FT. INS.
 G.W. AFTER COMPLETION FT. INS.
 G.W. AFTER HRS. FT. INS.
 G.W. VOLUMES None



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

LOG OF SOIL

BORING NO. 6
PROJECT Soils Investigation – Proposed Residential Subdivision
LOCATION 6595 Plymouth Road
Superior Township, Michigan

JOB NO. 22-113
SURFACE ELEV. 816.2 **DATE** 5-5-22

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows for 6"	Moisture %	Natural Wt. P.C.F.	Dry Den Wt. P.C.F.	Unc. Comp. Strength PSF.	Str. %
	1		0'9" Moist black sandy clayey TOPSOIL						
A SS	2		3'3" Medium compact moist brown clayey fine to medium SAND with trace of gravel and seams of sandy clay	2	12.8	---	*	(1500)	
	3								
	4								
B SS	5		3'3" Medium compact moist brown clayey fine to medium SAND with trace of gravel and seams of sandy clay	3	14.9	---			
	4								
	5								
	6		3'3" Medium compact moist brown clayey fine to medium SAND with trace of gravel and seams of sandy clay						
	7								
	8								
C SS	7		Compact wet brown gravelly SAND with little silt	4	9.5	---			
	8								
	9								
D SS	10		Compact wet brown gravelly SAND with little silt	3	13.0	---			
	11								
	12								
	13		12'6" Extremely compact wet brown gravelly SAND with occasional cobbles						
	14								
	15								
E SS	15		14'0" Extremely compact wet gray fine SAND	16					
	16								
	17								
	18		17'0" Extremely compact wet gray fine SAND with occasional fractured limestone rock pieces						
	19								
	20								
G SS	20		18'6" Extremely stiff moist blue sandy CLAY with pebbles	21	---				
	21								
	22								
	23		20'6" Extremely stiff moist blue sandy CLAY with pebbles						
	24								
	25								

Notes:

- Used track rig.
- Installed 1 1/2" diameter PVC piezometer in boring with screen bottom at 10' and 3' stick up.

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

REMARKS: *Calibrated penetrometer

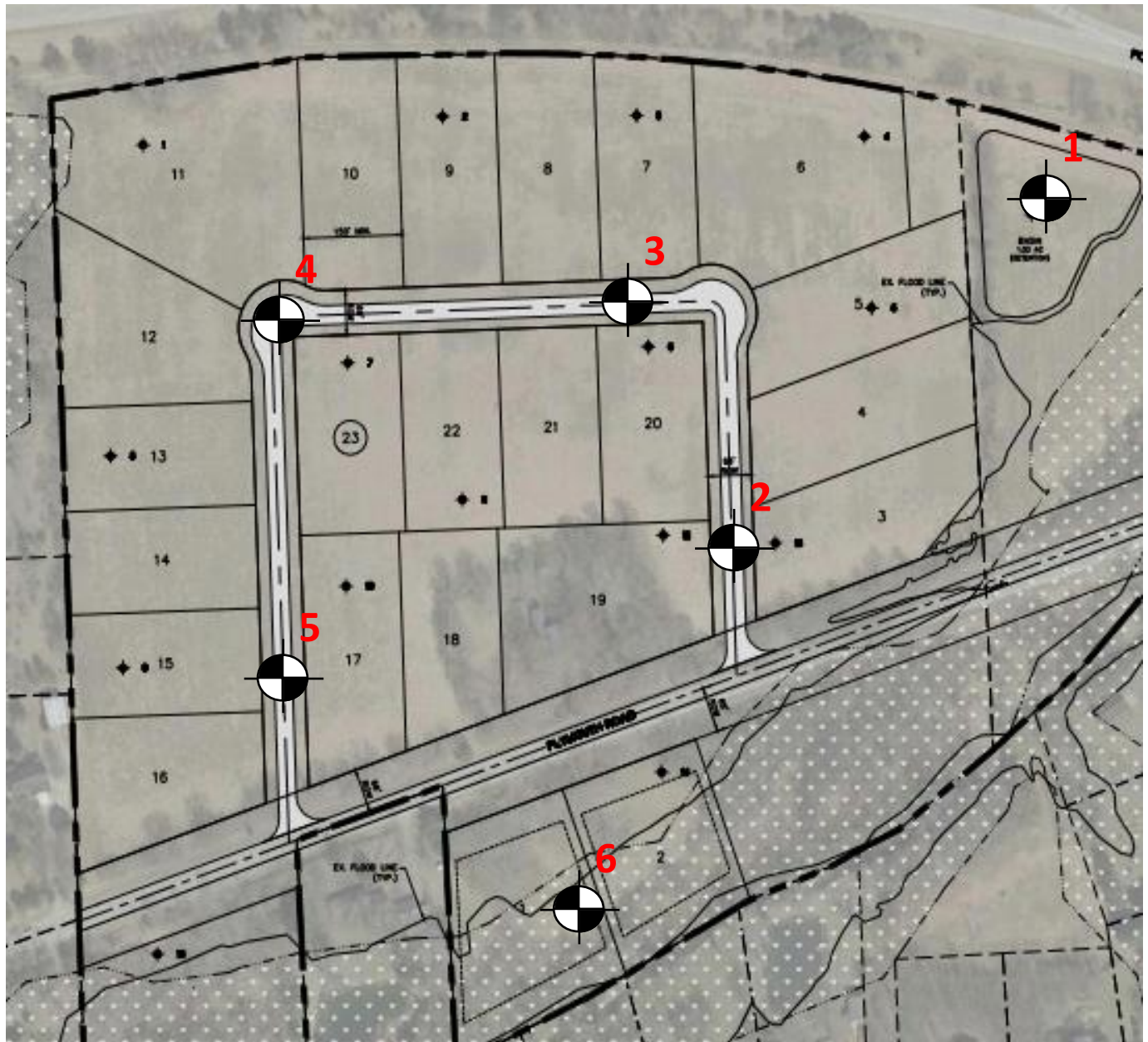
Standard Penetration Test - Driving 2" OD Sampler 1' With
 140# Hammer Falling 30"; Count Made at 6" Intervals

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT 3 FT. 3 INS.
 G.W. ENCOUNTERED AT FT. INS.
 G.W. AFTER COMPLETION 2 FT. 2 INS.
 G.W. AFTER HRS. FT. INS.
 G.W. VOLUMES Heavy

SIEVE ANALYSIS

Boring	Sample	% Passing #4 Sieve	% Passing #10 Sieve	% Passing #40 Sieve	% Passing #100 Sieve	% Passing #200 Sieve
1	C	69.6	49.8	16.9	12.0	9.7
2	D	35.8	28.4	11.3	7.9	6.6
3	C	97.4	93.5	79.0	21.5	6.5
4	C	98.3	95.6	87.0	26.2	6.5
5	D	99.2	98.9	96.3	60.4	24.3
6	B	72.4	51.8	29.3	24.2	21.1



LEGEND



Soil Boring Locations, 1 through 6:
Drilled by McDowell & Associates



McDowell & Associates
21355 Hatcher Avenue
Ferndale, Michigan 48220
Phone: (248) 399-2066
Fax: (248) 399-2157

Soil Boring Location Plan

Job No. 22-113

INFILTRATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
6595 PLYMOUTH ROAD
SUPERIOR TOWNSHIP, MICHIGAN

LOMBARDO HOMES OF SE MICHIGAN, LLC
13001 23 MILE ROAD
SUITE 200
SHELBY TOWNSHIP, MICHIGAN 48315

SEPTEMBER 12, 2022
BY
McDOWELL & ASSOCIATES

McDowell & Associates

Geotechnical, Environmental & Hydrogeological Services • Materials Testing & Inspection

21355 Hatcher Avenue • Ferndale, MI 48220
Phone: (248) 399-2066 • Fax: (248) 399-2157
www.mcdowasc.com

September 12, 2022

Lombardo Homes of SE Michigan, LLC
13001 23 Mile Road
Suite 200
Shelby Township, Michigan 48315

Job No. 22-349

Attention: Mr. Cosimo Lombardo

Subject: Infiltration Study
Proposed Residential Development
6595 Plymouth Road
Superior Township, Michigan

Dear Mr. Lombardo:

As requested, we have performed a stormwater infiltration study for the subject project. Our findings and recommendations are presented below.

It has been proposed to incorporate an “infiltration to the ground” component to the stormwater management system for the development. Therefore, test pit excavations were performed in accordance with the “Washtenaw County Water Resources Commissioner Rules and Guidelines, Procedures & Design Criteria for Stormwater Management Systems,” (WCWRC Rules) issued August 2014, revised October 2016. The excavations were made by Pamar Enterprises and the infiltration tests were conducted by McDowell & Associates’ personnel: Edward Quintal and Ihsan Aljawaheri, P.E.

Field Work

Twelve Test Pits, designated TP-1 through TP-12, were excavated to depths ranging from about seven feet (7’) to twenty feet (20’) below the existing ground surface. The test pits were excavated at the locations selected and staked by others (with elevations provided) at the approximate locations shown on the accompanying Test Pit Location Plan. Descriptions of the soil and groundwater conditions encountered at each test pit location may be found on the Test Pit Log sheets which accompany this report.

It should be noted that the test pits were backfilled with uncompacted material. If future structures are to be constructed so that floor slabs or footings are to be supported by the uncompacted fill from the test pits, the test pit location should be re-excavated and filled with compacted material. Therefore, you may wish to have the test pit locations placed on any development plans.

Following completion of the test pit excavations, each test pit was prepared for infiltration testing in accordance with “Section V: Design Requirements for Stormwater Management Systems, Part D – Design Requirements – Infiltration BMPs, Item 3 – Soil Infiltration Testing Methodologies, Double-Ring Infiltrometer” of the WCWRC Rules. Infiltration test preparation consisted of excavating a soil

bench adjacent to each primary test pit excavation. On the benched soil, two double ring infiltrometers with open bottoms were installed at a depth of about two inches (2") into the soil bench. Extra care was exercised to maintain a good seal between the steel tubing and in-situ soils to prevent loss of test water. Following installation of the two infiltrometers, a thin needle-punch geotextile filter was placed above the soil in the inner ring of each infiltrometer, and the pipes were filled with about five inches (5") of potable water to initiate the "soak period". Representative soil samples were obtained at each test location. Additional information pertaining to infiltration test depths, infiltrometer configurations and soak period durations may be found on the accompanying Test Pit Log sheets.

Once the appropriate soak period duration was maintained in each infiltrometer, the casings were refilled with potable water and the infiltration test was initiated. Throughout the course of testing, water level readings within the inner ring of the infiltrometers were obtained and recorded at specific time intervals. It should be noted that water level readings were taken to the nearest sixteenth of an inch (1/16"). Water level readings from each infiltration test may be found on the Test Pit Log sheets.

Laboratory tests for moisture content and grain-size distribution were performed on the grab samples obtained from the infiltration test locations. Test results are provided on the accompanying Gradation Curve sheets.

Soil descriptions and depths shown on the test pit logs are approximate indications of change from one soil type to another and are not intended to represent an area of exact geologic change or stratification. Due to their manner(s) of deposition, the transition from one soil type to the next may be gradual rather than abrupt. Also, subsurface conditions may vary from those found by the test pits at locations between or beyond the actual test pit locations.

Groundwater Conditions

Groundwater levels were recorded in the test pits after a period ranging from about 30 minutes to two hours after excavation. Groundwater depths ranged from six feet one inch (6'1") to nineteen feet three inches (19'3") below the existing ground surface.

It should be noted that short-term groundwater observations may not provide a reliable indication of the depth of the water table. In soils with significant fines content (clay and/or silt), this is due to the slow rate of infiltration of water into the test pit as well as the potential for water to become trapped in overlying layers of granular soils during periods of heavy rainfall. Water levels in granular soils fluctuate with seasonal and climatic changes as well as the amount of rainfall in the area immediately prior to the measurements. It should be expected that groundwater fluctuations could occur on a seasonal basis and that seams of water-bearing sands or silts could be found within the various clay strata at the site.

Site Geology

The USDA "Soil Survey of Washtenaw County, Michigan" (issued 1977; reprinted August 1985; amended January 1996) indicates the site is in an area of the Boyer-Fox-Sebewa association, which is described as "nearly level to steep, well drained and very poorly drained soils that have a moderately coarse textured to moderately fine textured subsoil and coarse textured underlying material; on outwash plains, valley trains, terraces and lake moraines". Map Sheet 20 shows the soil series of Boyer loamy sand (symbol BnB) covering most of the site.

Infiltration Study Results

Average percolation rates varied from 0.00 in./hr. to 127.7 in./hr. based on the Infiltration Rate Computations sheet that accompanies this report. It is recommended that the combined average infiltration rate at the test pits be used for design of infiltration components of the proposed stormwater management system. Considering a factor of safety of two, design infiltration rates varied from 0.00 in./hr. to 58.82 in./hr. as shown on the Infiltration Rate Computations sheet.

It is understood that a stormwater basin with a desired infiltration to the ground component has been proposed in the northeast corner of the site (TP-5, TP-6 and TP-7). Test Pit TP-7 appeared to be favorable for infiltration; however, TP-5 and TP-6 appeared to be unfavorable for infiltration. A layer of silty sandy clay was encountered from roughly two feet (2') to within three feet (3') of the indicated water table at these locations. If additional infiltration is desired at TP-5 and TP-6, you may wish to consider removing the silty sandy clay and exposing the underlying sand and gravel. Free draining granular backfill could then be utilized to raise the grade to achieve the required clearance above the seasonal high water table.

Conclusions

An infiltration study was done at the site via test pit excavation. Experience indicates that the actual subsoil conditions at the site could vary from those generalized on the basis of the test pits made at specific locations. McDowell & Associates should be notified if any soil variations from those described in this report are encountered to determine their effects on the recommendations presented herein. The evaluations and recommendations presented in this letter have been formulated on the basis of reported or assumed data relating to the proposed project. Any significant change in this data in the final design plans should be brought to our attention for review and evaluation with respect to the prevailing subsoil conditions.

If you have any questions or need additional information, please do not hesitate to call.

Very truly yours,

McDOWELL & ASSOCIATES



David Quintal, M.S., P.E.
Geotechnical Engineer

DQ/

Attachments: Infiltration Rate Computations (1 p)
 Test Pit Log sheets (12 pp)
 Gradation Curve sheets (3 pp)
 Test Pit Location Plan (1 p)



Job No. 22-349
 Infiltration Study - Proposed Residential Development
 6595 Plymouth Road- Superior TWSP, Michigan

Infiltration Rate Computations									
Test Pit No.	Infiltrometer #1			Infiltrometer #2			Combined Average Rate per Test Pit (in/hr)	Safety Factor	Design Infiltration Rate per Test Pit (in/hr)
	Average Percolation (inches)	Percolation Time (Minutes)	Average Percolation Rate (inches/hour)	Average Percolation (inches)	Percolation Time (Minutes)	Average Percolation Rate (inches/hour)			
1	4.00	5.36	44.78	4.00	5.57	43.09	43.93	2	21.97
2	1.14	10.00	6.84	2.09	10.00	12.54	9.69	2	4.85
3	4.00	8.95	26.82	2.72	10.00	16.32	21.57	2	10.78
4	4.00	2.03	118.23	4.00	2.38	100.84	109.53	2	54.77
5	0.00	30.00	0.00	0.00	30.00	0.00	0.00	2	0.00
6	0.00	30.00	0.00	0.00	30.00	0.00	0.00	2	0.00
7	2.75	10.00	16.50	2.96	10.00	17.76	17.13	2	8.57
8	2.13	10.00	12.78	1.40	10.00	8.40	10.59	2	5.30
9	0.00	30.00	0.00	0.00	30.00	0.00	0.00	2	0.00
10	4.00	3.23	74.30	4.00	3.93	61.07	67.69	2	33.84
11	4.00	7.50	32.00	4.00	8.16	29.41	30.71	2	15.35
12	3.55	10.00	21.30	2.86	10.00	17.16	19.23	2	9.62



Test Pit Log

Test Pit #: 1

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 833.8

Soil Stratigraphy:	Pipe Installation #1
0"-8" Moist dark brown sandy Topsoil 8"-2'7" Moist brown clayey fine Sand with trace of gravel 2'7"-18'2" Moist brown fine to medium Sand with traces of gravel, silt and moist brown clayey sand streaks 18'2"-19'10" Wet brown silty fine Sand with occasional trace of gravel	Soil Depth: <u>5'6"</u> Inner Pipe Dia.: <u>6"</u> Outer Pipe Dia. <u>10"</u> Embedment: <u>2"</u> Stick-up: <u>5"</u>
	Pipe Installation #2
	Soil Depth: <u>5'6"</u> Inner Pipe Dia.: <u>6"</u> Outer Pipe Dia. <u>10"</u> Embedment: <u>2"</u> Stick-up: <u>5"</u>
encountered at 18'2" Groundwater Depth: <u>19'3" after 2 hours</u>	Pipe Distance: <u>4'</u>

Soak Period (Pipe #1)	Soak Period (Pipe #2)
Start Date: <u>9/1/2022</u> Notes: _____ Time: <u>4min 11sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>4 min 34sec</u> Water Drop: <u>4.00</u> inches Notes: _____	Start Date: <u>9/1/2022</u> Notes: _____ Time: <u>4 min 21sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>4 min 40sec</u> Water Drop: <u>4.00</u> inches Notes: _____

Test Period (Pipe #1)	Test Period (Pipe #2)
Time: <u>4 min 52sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 4sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 16sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 28sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 38sec</u> Water Drop: <u>4.00</u> inches Notes: <u>Average of last 4 readings: 4" in 5.36 min</u> _____	Time: <u>5 min 14sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 19sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 29sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 40sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>5 min 49sec</u> Water Drop: <u>4.00</u> inches Notes: <u>Average of last 4 readings: 4" in 5.57 min</u> _____



Test Pit Log

Test Pit #: 2

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 829.5

Soil Stratigraphy:	Pipe Installation #1
0"-6" Moist dark brown clayey Topsoil, fill 6"-1'1" Moist brown clayey fine Sand with trace of topsoil, fill 1'1"-12'8" Moist brown silty fine Sand with occasional trace of gravel and moist brown sandy clay lenses 12'8"-17' 2" Moist brown Sand and Gravel with trace of silt 17'2"-17' 8" Wet brown Sand and Gravel with trace of silt	Soil Depth: <u>6'6"</u> Inner Pipe Dia.: <u>6"</u> Outer Pipe Dia. <u>10"</u> Embedment: <u>2"</u> Stick-up: <u>5"</u>
	Pipe Installation #2
	Soil Depth: <u>6'6"</u> Inner Pipe Dia.: <u>6"</u> Outer Pipe Dia. <u>10"</u> Embedment: <u>2"</u> Stick-up: <u>5"</u>
Groundwater Depth: <u>17'2" after 1 hour</u>	Pipe Distance: <u>4'</u>

Soak Period (Pipe #1)	Soak Period (Pipe #2)
Start Date: <u>9/1/2022</u> Notes: _____ Time: <u>19 min 34sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>28 min 57sec</u> Water Drop: <u>4.00</u> inches Notes: _____	Start Date: <u>9/1/2022</u> Notes: _____ Time: <u>14 min 13sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>24 min 6sec</u> Water Drop: <u>4.00</u> inches Notes: _____

Test Period (Pipe #1)	Test Period (Pipe #2)
Time: <u>10 min</u> Water Drop: <u>1.38</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.31</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.19</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.06</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.00</u> inches Notes: <u>Average of last 4 readings: 1.14" in 10 min</u> _____	Time: <u>10 min</u> Water Drop: <u>2.31</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.19</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.13</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.06</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.00</u> inches Notes: <u>Average of last 4 readings: 2.09" in 10 min</u> _____



Test Pit Log

Test Pit #: 3

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 824.1

Soil Stratigraphy:	Pipe Installation #1
0"-6" Moist dark brown sandy Topsoil	Soil Depth: <u>3'</u>
6"-6'8" Moist brown silty fine Sand with moist brown silty clay lenses	Inner Pipe Dia.: <u>6"</u>
6'8"-10'7" Moist brown Sand and Gravel with trace of silt and moist brown sandy clay lenses	Outer Pipe Dia. <u>10"</u>
10'7"-11' 3" Wet brown Sand and Gravel with traces of silt and clay	Embedment: <u>2"</u>
	Stick-up: <u>5"</u>
	Pipe Installation #2
	Soil Depth: <u>3'</u>
	Inner Pipe Dia.: <u>6"</u>
	Outer Pipe Dia. <u>10"</u>
	Embedment: <u>2"</u>
	Stick-up: <u>5"</u>
Groundwater Depth: <u>10'7" after 1 hour</u>	Pipe Distance: <u>3'6"</u>

Soak Period (Pipe #1)	Soak Period (Pipe #2)
Start Date: <u>9/1/2022</u>	Start Date: <u>9/1/2022</u>
Notes: _____	Notes: _____
Time: <u>5 min 58sec</u> Water Drop: <u>4.00</u> inches	Time: <u>8 min 34sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>7 min 44sec</u> Water Drop: <u>4.00</u> inches	Time: <u>11 min 11sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____

Test Period (Pipe #1)	Test Period (Pipe #2)
Time: <u>8 min 20sec</u> Water Drop: <u>4.00</u> inches	Time: <u>10 min</u> Water Drop: <u>2.94</u> inches
Notes: _____	Notes: _____
Time: <u>8 min 38sec</u> Water Drop: <u>4.00</u> inches	Time: <u>10 min</u> Water Drop: <u>2.81</u> inches
Notes: _____	Notes: _____
Time: <u>8 min 50sec</u> Water Drop: <u>4.00</u> inches	Time: <u>10 min</u> Water Drop: <u>2.75</u> inches
Notes: _____	Notes: _____
Time: <u>9 min 6 sec</u> Water Drop: <u>4.00</u> inches	Time: <u>10 min</u> Water Drop: <u>2.69</u> inches
Notes: _____	Notes: _____
Time: <u>9 min 14sec</u> Water Drop: <u>4.00</u> inches	Time: <u>10 min</u> Water Drop: <u>2.63</u> inches
Notes: _____	Notes: _____
Notes: <u>Average of last 4 readings: 4" in 8.95 min</u>	Notes: <u>Average of last 4 readings: 2.72" in 10 min</u>
_____	_____



Test Pit Log

Test Pit #: 4

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 820.0

Soil Stratigraphy:

0"-10" Moist dark brown sandy Topsoil
 10"-3'6" Moist brown sandy Clay with trace of gravel
 3'6"-6'1" Moist brown Sand and Gravel with trace of silt and moist brown sandy clay lenses
 6'1"-10' Wet brown Sand and Gravel with traces of clay

Pipe Installation #1

Soil Depth: 3'6"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Pipe Installation #2

Soil Depth: 3'6"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Groundwater Depth: 6'1" after 2 hours

Pipe Distance: 4'

Soak Period (Pipe #1)

Start Date: 9/1/2022
 Notes: _____
 Time: 59 sec Water Drop: 4.00 inches
 Notes: _____
 Time: 1 min 21sec Water Drop: 4.00 inches
 Notes: _____

Soak Period (Pipe #2)

Start Date: 9/1/2022
 Notes: _____
 Time: 1 min 4sec Water Drop: 4.00 inches
 Notes: _____
 Time: 1 min 29sec Water Drop: 4.00 inches
 Notes: _____

Test Period (Pipe #1)

Time: 1 min 39sec Water Drop: 4.00 inches
 Notes: _____
 Time: 1 min 54sec Water Drop: 4.00 inches
 Notes: _____
 Time: 1 min 58sec Water Drop: 4.00 inches
 Notes: _____
 Time: 2 min 05sec Water Drop: 4.00 inches
 Notes: _____
 Time: 2 min 11sec Water Drop: 4.00 inches
 Notes: _____
 Notes: Average of last 4 readings: 4" in 2.03 min

Test Period (Pipe #2)

Time: 1 min 45sec Water Drop: 4.00 inches
 Notes: _____
 Time: 2 min 12sec Water Drop: 4.00 inches
 Notes: _____
 Time: 2 min 21sec Water Drop: 4.00 inches
 Notes: _____
 Time: 2 min 28sec Water Drop: 4.00 inches
 Notes: _____
 Time: 2 min 30sec Water Drop: 4.00 inches
 Notes: _____
 Notes: Average of last 4 readings: 4" in 2.38 min



Test Pit Log

Test Pit #: 5

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 821.7

Soil Stratigraphy:

0"-6" Moist brown sandy Topsoil
 6"-2'2" Moist brown silty Sand with occasional moist brown silty clay lenses
 2'2"-5'4" Moist brown sandy silty Clay with occasional trace of gravel
 5'4"-6'10" Moist brown Sand and Gravel with trace of silt
 6'10"-7'6" Wet brown Sand and Gravel with trace of silt

Pipe Installation #1

Soil Depth: 2'6"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Pipe Installation #2

Soil Depth: 2'6"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Groundwater Depth: 6'10" after 2 hours

Pipe Distance: 4'

Soak Period (Pipe #1)

Start Date: 9/1/2022
 Notes: _____
 Time: 30 min Water Drop: 0.25 inches
 Notes: _____
 Time: 30 min Water Drop: 0.19 inches
 Notes: _____

Soak Period (Pipe #2)

Start Date: 9/1/2022
 Notes: _____
 Time: 30 min Water Drop: 0.19 inches
 Notes: _____
 Time: 30 min Water Drop: 0.13 inches
 Notes: _____

Test Period (Pipe #1)

Time: 30 min Water Drop: 0.06 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: _____ Water Drop: _____ inches
 Notes: Average of last 3 readings: 0" in 30 min

Test Period (Pipe #2)

Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: _____ Water Drop: _____ inches
 Notes: Average of last 3 readings: 0" in 30 min



Test Pit Log

Test Pit #: 6

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 820.9

Soil Stratigraphy:

0"-6" Moist brown sandy Topsoil
 6"-1'6" Moist brown silty fine Sand with trace of gravel
 1'6"-5'4" Moist brown silty sandy Clay with occasional trace of gravel
 5'4"-6'5" Moist brown Sand and Gravel with trace of silt
 6'5"-7'2" Wet brown Sand and Gravel with trace of silt

Pipe Installation #1

Soil Depth: 2'
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Pipe Installation #2

Soil Depth: 2'
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Groundwater Depth: 6'5" after 2 hours

Pipe Distance: 4'

Soak Period (Pipe #1)

Start Date: 9/1/2022
 Notes: _____
 Time: 30 min Water Drop: 0.06 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____

Soak Period (Pipe #2)

Start Date: 9/1/2022
 Notes: _____
 Time: 30 min Water Drop: 0.13 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____

Test Period (Pipe #1)

Time: 30 min Water Drop: 0.06 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: _____ Water Drop: _____ inches
 Notes: _____
 Time: _____ Water Drop: _____ inches
 Notes: _____
 Notes: Average of last 3 readings: 0" in 30 min

Test Period (Pipe #2)

Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: 30 min Water Drop: 0.00 inches
 Notes: _____
 Time: _____ Water Drop: _____ inches
 Notes: _____
 Time: _____ Water Drop: _____ inches
 Notes: _____
 Notes: Average of last 3 readings: 0" in 30 min



Test Pit Log

Test Pit #: 7

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: _____

Soil Stratigraphy:

0"-8" Moist dark brown sandy Topsoil
 8"-1'4" Moist brown silty fine Sand
 1'4"-3'1" Moist brown clayey fine Sand with moist brown silty clay lenses
 3'1"- 7' Moist brown silty fine to medium Sand with trace of gravel
 7'- 9'4" Moist brown Sand and Gravel with trace of silt
 9'4" - 9'10" Wet brown Sand and Gravel with trace of silt

Groundwater Depth: 9'4" after 1 hour

Pipe Installation #1

Soil Depth: 3'3"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Pipe Installation #2

Soil Depth: 3'3"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Pipe Distance: 2'6"

Soak Period (Pipe #1)

Start Date: 9/1/2022
 Notes: _____
 Time: 9 min 28sec Water Drop: 4.00 inches
 Notes: _____
 Time: 11 min 44sec Water Drop: 4.00 inches
 Notes: _____

Soak Period (Pipe #2)

Start Date: 9/1/2022
 Notes: _____
 Time: 9 min 53sec Water Drop: 4.00 inches
 Notes: _____
 Time: 12 min 1sec Water Drop: 4.00 inches
 Notes: _____

Test Period (Pipe #1)

Time: 10 min Water Drop: 2.88 inches
 Notes: _____
 Time: 10 min Water Drop: 2.81 inches
 Notes: _____
 Time: 10 min Water Drop: 2.75 inches
 Notes: _____
 Time: 10 min Water Drop: 2.75 inches
 Notes: _____
 Time: 10 min Water Drop: 2.69 inches
 Notes: Average of last 4 readings: 2.75" in 10 min

Test Period (Pipe #2)

Time: 10 min Water Drop: 3.06 inches
 Notes: _____
 Time: 10 min Water Drop: 3.00 inches
 Notes: _____
 Time: 10 min Water Drop: 3.00 inches
 Notes: _____
 Time: 10 min Water Drop: 2.94 inches
 Notes: _____
 Time: 10 min Water Drop: 2.88 inches
 Notes: Average of last 4 readings: 2.96" in 10 min



Test Pit Log

Test Pit #: 8

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: _____

Soil Stratigraphy:	Pipe Installation #1
0"-8" Moist dark brown sandy Topsoil 8"-2'1" Moist brown silty fine Sand 2'1"-3'7" Moist brown clayey fine Sand with moist brown silty clay lenses 3'7"- 8'3" Moist brown silty fine Sand with layers of sand and silt 8'3"- 10'5" Moist brown Sand and Gravel with trace of silt 10'5" - 11'2" Wet brown Sand and Gravel with trace of silt	Soil Depth: <u>4'6"</u> Inner Pipe Dia.: <u>6"</u> Outer Pipe Dia. <u>10"</u> Embedment: <u>2"</u> Stick-up: <u>5"</u>
	Pipe Installation #2
	Soil Depth: <u>4'6"</u> Inner Pipe Dia.: <u>6"</u> Outer Pipe Dia. <u>10"</u> Embedment: <u>2"</u> Stick-up: <u>5"</u>
Groundwater Depth: <u>10'5" after 1 hour</u>	Pipe Distance: <u>4'</u>

Soak Period (Pipe #1)	Soak Period (Pipe #2)
Start Date: <u>9/1/2022</u> Notes: _____ Time: <u>13min 36sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>15 min 9sec</u> Water Drop: <u>4.00</u> inches Notes: _____	Start Date: <u>9/1/2022</u> Notes: _____ Time: <u>19 min 3sec</u> Water Drop: <u>4.00</u> inches Notes: _____ Time: <u>24 min 21sec</u> Water Drop: <u>4.00</u> inches Notes: _____

Test Period (Pipe #1)	Test Period (Pipe #2)
Time: <u>10 min</u> Water Drop: <u>2.19</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.19</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.13</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.13</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>2.06</u> inches Notes: <u>Average of last 4 readings: 2.13" in 10 min</u> _____	Time: <u>10 min</u> Water Drop: <u>1.63</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.50</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.44</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.38</u> inches Notes: _____ Time: <u>10 min</u> Water Drop: <u>1.31</u> inches Notes: <u>Average of last 4 readings: 1.40" in 10 min</u> _____



Test Pit Log

Test Pit #: 9

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 823.2

Soil Stratigraphy:	Pipe Installation #1
0"-8" Moist dark brown sandy Topsoil	Soil Depth: <u>4'</u>
8"-2' Moist brown silty fine Sand	Inner Pipe Dia.: <u>6"</u>
2'- 6'8" Moist brown silty fine Sand with moist brown silty clay seams	Outer Pipe Dia. <u>10"</u>
6'8" - 9'5" Moist brown Sand and Gravel with trace of silt	Embedment: <u>2"</u>
9'5" - 10' Wet brown Sand and Gravel with trace of silt	Stick-up: <u>5"</u>
	Pipe Installation #2
	Soil Depth: <u>4'</u>
	Inner Pipe Dia.: <u>6"</u>
	Outer Pipe Dia. <u>10"</u>
	Embedment: <u>2"</u>
	Stick-up: <u>5"</u>
Groundwater Depth: <u>9'5" after 2 hours</u>	Pipe Distance: <u>4'</u>

Soak Period (Pipe #1)	Soak Period (Pipe #2)
Start Date: <u>9/1/2022</u>	Start Date: <u>9/1/2022</u>
Notes: _____	Notes: _____
Time: <u>30 min</u> Water Drop: <u>0.38</u> inches	Time: <u>30 min</u> Water Drop: <u>0.25</u> inches
Notes: _____	Notes: _____
Time: <u>30 min</u> Water Drop: <u>0.13</u> inches	Time: <u>30 min</u> Water Drop: <u>0.06</u> inches
Notes: _____	Notes: _____

Test Period (Pipe #1)	Test Period (Pipe #2)
Time: <u>30 min</u> Water Drop: <u>0.06</u> inches	Time: <u>30 min</u> Water Drop: <u>0.00</u> inches
Notes: _____	Notes: _____
Time: <u>30 min</u> Water Drop: <u>0.00</u> inches	Time: <u>30 min</u> Water Drop: <u>0.00</u> inches
Notes: _____	Notes: _____
Time: <u>30 min</u> Water Drop: <u>0.00</u> inches	Time: <u>30 min</u> Water Drop: <u>0.00</u> inches
Notes: _____	Notes: _____
Time: <u>30 min</u> Water Drop: <u>0.00</u> inches	Time: <u>30 min</u> Water Drop: <u>0.00</u> inches
Notes: _____	Notes: _____
Time: _____ Water Drop: _____ inches	Time: _____ Water Drop: _____ inches
Notes: <u>Average of last 3 readings: 0" in 30 min</u>	Notes: <u>Average of last 3 readings: 0" in 30 min</u>
_____	_____



Test Pit Log

Test Pit #: 10

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 833.4

Soil Stratigraphy:	Pipe Installation #1
0"-8" Moist dark brown sandy Topsoil	Soil Depth: <u>4'6"</u>
8"-3'9" Moist brown clayey fine Sand with trace of gravel	Inner Pipe Dia.: <u>6"</u>
3'9"-17'6" Moist brown gravelly fine to coarse Sand with trace of silt and occasional clay lenses	Outer Pipe Dia. <u>10"</u>
17'6"-18' 6" Wet brown silty fine Sand with occasional trace of gravel and clay	Embedment: <u>2"</u>
	Stick-up: <u>5"</u>
	Pipe Installation #2
	Soil Depth: <u>4'6"</u>
	Inner Pipe Dia.: <u>6"</u>
	Outer Pipe Dia. <u>10"</u>
	Embedment: <u>2"</u>
	Stick-up: <u>5"</u>
Groundwater Depth: <u>17'6" after 30 min</u>	Pipe Distance: <u>4'</u>

Soak Period (Pipe #1)	Soak Period (Pipe #2)
Start Date: <u>9/1/2022</u>	Start Date: <u>9/1/2022</u>
Notes: _____	Notes: _____
Time: <u>2 min 56sec</u> Water Drop: <u>4.00</u> inches	Time: <u>3 min 11sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>2 min 59sec</u> Water Drop: <u>4.00</u> inches	Time: <u>3 min 21sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____

Test Period (Pipe #1)	Test Period (Pipe #2)
Time: <u>3 min 4sec</u> Water Drop: <u>4.00</u> inches	Time: <u>3 min 29sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>3 min 9sec</u> Water Drop: <u>4.00</u> inches	Time: <u>3 min 40sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>3 min 12sec</u> Water Drop: <u>4.00</u> inches	Time: <u>3 min 50sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>3 min 16sec</u> Water Drop: <u>4.00</u> inches	Time: <u>4 min 4sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>3 min 19 sec</u> Water Drop: <u>4.00</u> inches	Time: <u>4 min 9sec</u> Water Drop: <u>4.00</u> inches
Notes: <u>Average of last 4 readings: 4" in 3.23 min</u>	Notes: <u>Average of last 4 readings: 4" in 3.93 min</u>
_____	_____



Test Pit Log

Test Pit #: 11

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP, Michigan

Ground Elv.: 829.7

Soil Stratigraphy:	Pipe Installation #1
0"-1'4" Moist dark brown sandy Topsoil	Soil Depth: <u>4'</u>
1'4"-3'7" Moist brown silty fine Sand with roots	Inner Pipe Dia.: <u>6"</u>
3'7"-8' Moist brown fine Sand with traces of silt and gravel	Outer Pipe Dia. <u>10"</u>
8'-19' Wet brown fine Sand with trace of silt and occasional trace of gravel	Embedment: <u>2"</u>
	Stick-up: <u>5"</u>
	Pipe Installation #2
	Soil Depth: <u>4'</u>
	Inner Pipe Dia.: <u>6"</u>
	Outer Pipe Dia. <u>10"</u>
	Embedment: <u>2"</u>
	Stick-up: <u>5"</u>
Groundwater Depth: <u>8' after 30 min</u>	Pipe Distance: <u>3'</u>

Soak Period (Pipe #1)	Soak Period (Pipe #2)
Start Date: <u>9/1/2022</u>	Start Date: <u>9/1/2022</u>
Notes: _____	Notes: _____
Time: <u>5 min 42sec</u> Water Drop: <u>4.00</u> inches	Time: <u>6 min 27sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>6 min 29sec</u> Water Drop: <u>4.00</u> inches	Time: <u>7 min 1sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____

Test Period (Pipe #1)	Test Period (Pipe #2)
Time: <u>6 min 50sec</u> Water Drop: <u>4.00</u> inches	Time: <u>7 min 32sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>7 min 9sec</u> Water Drop: <u>4.00</u> inches	Time: <u>7 min 51sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>7 min 27sec</u> Water Drop: <u>4.00</u> inches	Time: <u>8 min 1sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>7 min 38sec</u> Water Drop: <u>4.00</u> inches	Time: <u>8 min 20sec</u> Water Drop: <u>4.00</u> inches
Notes: _____	Notes: _____
Time: <u>7 min 46 sec</u> Water Drop: <u>4.00</u> inches	Time: <u>8 min 26sec</u> Water Drop: <u>4.00</u> inches
Notes: <u>Average of last 4 readings: 4" in 7.50 min</u>	Notes: <u>Average of last 4 readings: 4" in 8.16 min</u>
_____	_____



Test Pit Log

Test Pit #: 12

Job Number: 22-349

Date: 9/1/2022

Project: Infiltration Study - Proposed Residential sub.

Weather: sunny

Location: 6595 Plymouth Rd.-Superior TWSP,Michigan

Ground Elv.: 829.7

Soil Stratigraphy:

0"-6" Moist dark brown sandy Topsoil
 6"-2'2" Moist brown clayey Sand with trace of gravel
 2'2"-8'5" Moist brown silty fine Sand with moist brown silty clay lenses
 8'5" - 16' Wet brown silty fine Sand with moist brown silty clay lenses

Pipe Installation #1

Soil Depth: 4'6"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Pipe Installation #2

Soil Depth: 4'6"
 Inner Pipe Dia.: 6"
 Outer Pipe Dia. 10"
 Embedment: 2"
 Stick-up: 5"

Groundwater Depth: 15'6" after 30 min

Pipe Distance: 4'

Soak Period (Pipe #1)

Start Date: 9/1/2022
 Notes: _____
 Time: 7 min 4sec Water Drop: 4.00 inches
 Notes: _____
 Time: 10 min 1sec Water Drop: 4.00 inches
 Notes: _____

Soak Period (Pipe #2)

Start Date: 9/1/2022
 Notes: _____
 Time: 8 min 49sec Water Drop: 4.00 inches
 Notes: _____
 Time: 11 min 23sec Water Drop: 4.00 inches
 Notes: _____

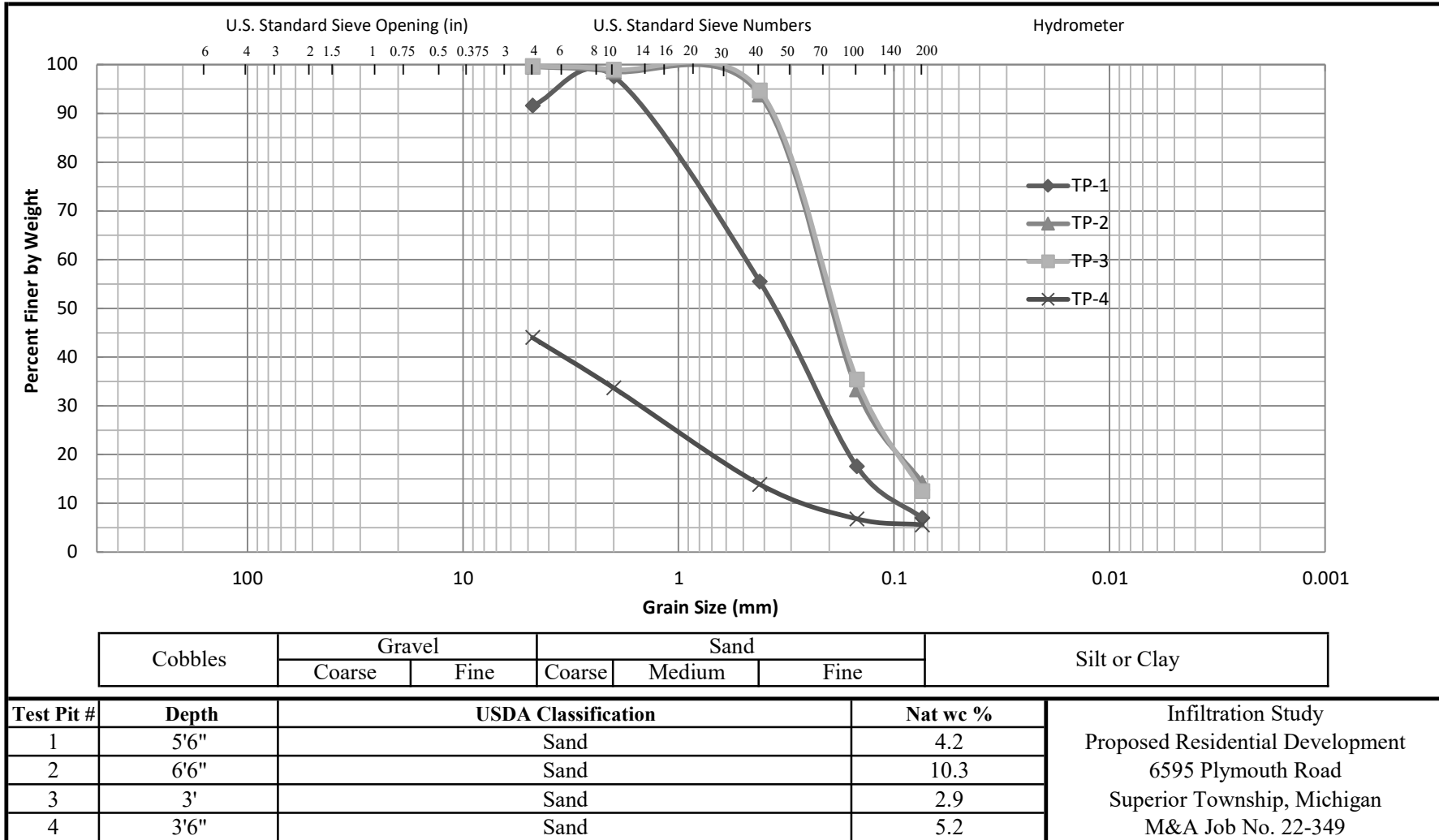
Test Period (Pipe #1)

Time: 10 min Water Drop: 3.81 inches
 Notes: _____
 Time: 10 min Water Drop: 3.69 inches
 Notes: _____
 Time: 10 min Water Drop: 3.56 inches
 Notes: _____
 Time: 10 min Water Drop: 3.50 inches
 Notes: _____
 Time: 10 min Water Drop: 3.44 inches
 Notes: Average of last 4 readings: 3.55" in 10 min

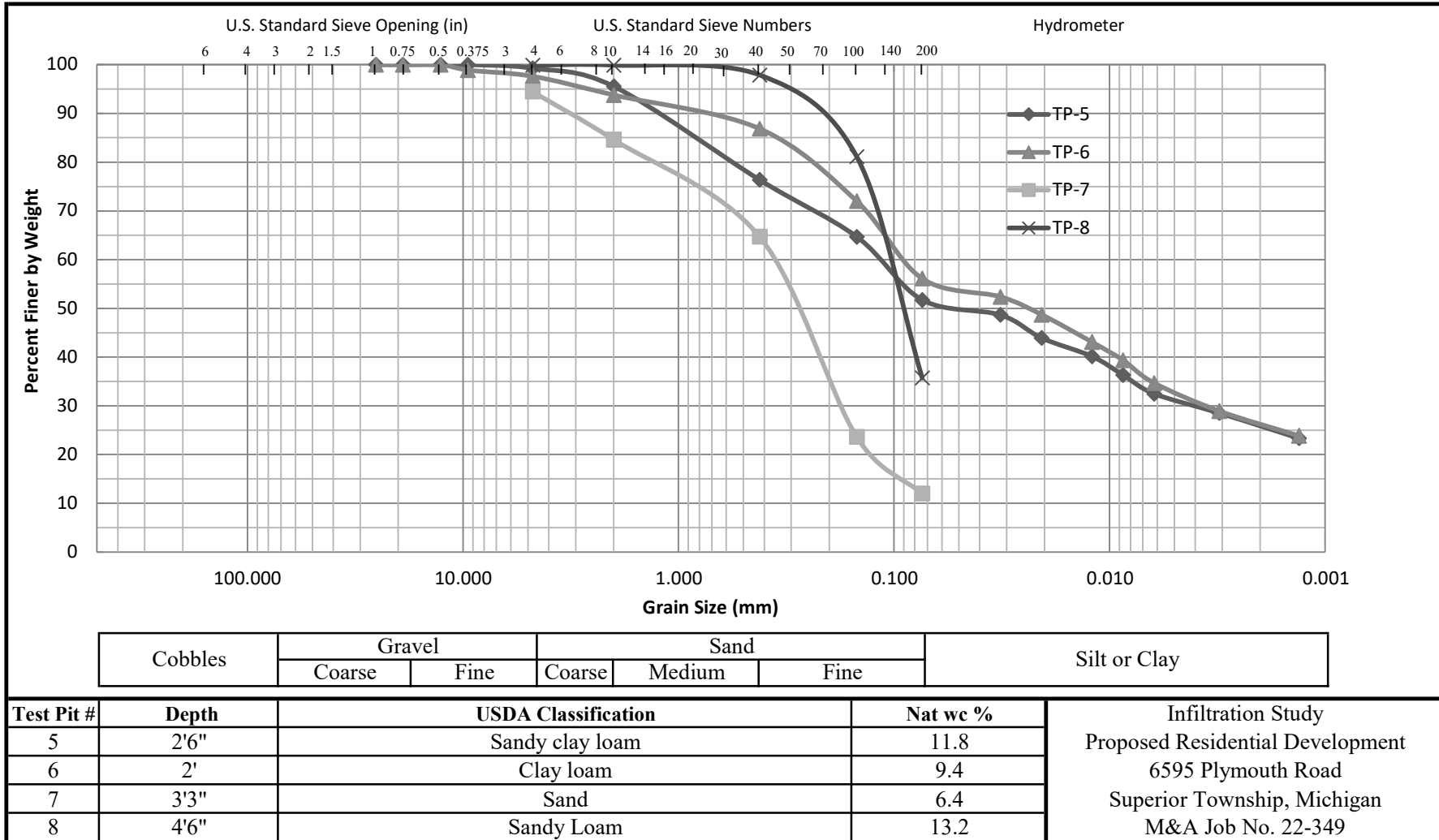
Test Period (Pipe #2)

Time: 10 min Water Drop: 3.13 inches
 Notes: _____
 Time: 10 min Water Drop: 3.00 inches
 Notes: _____
 Time: 10 min Water Drop: 2.88 inches
 Notes: _____
 Time: 10 min Water Drop: 2.81 inches
 Notes: _____
 Time: 10 min Water Drop: 2.75 inches
 Notes: Average of last 4 readings: 2.86" in 10 min

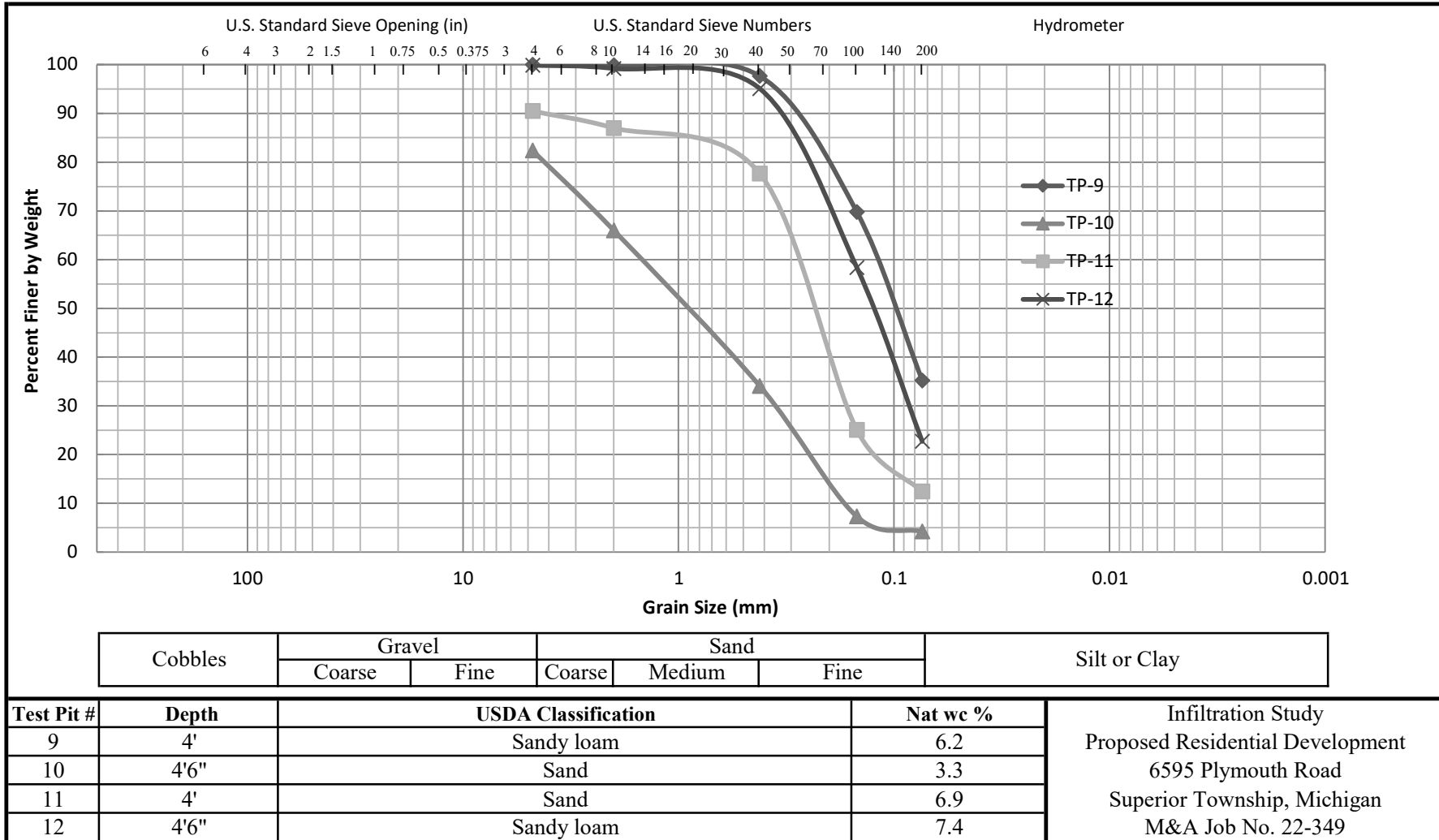
Gradation Curves

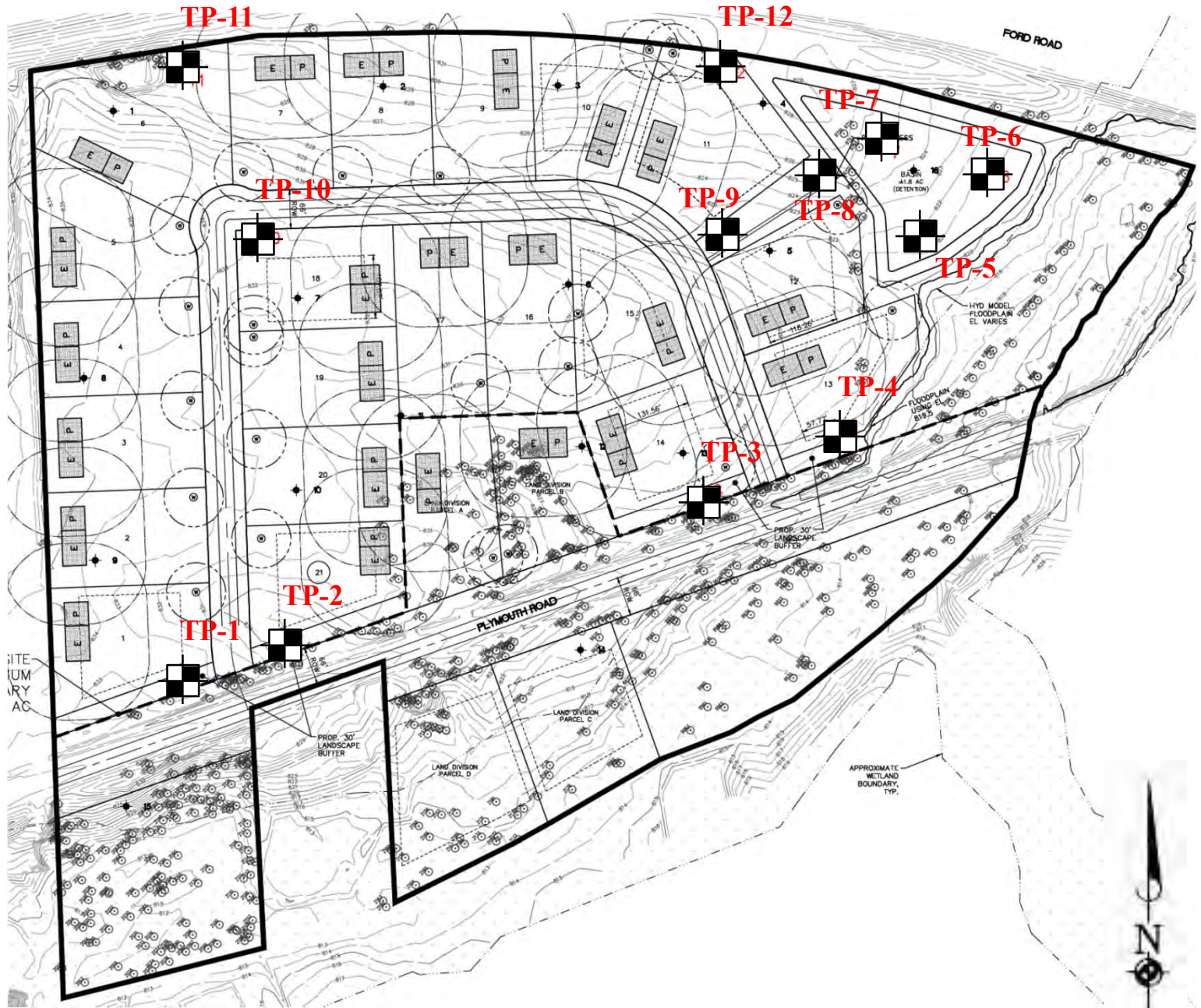


Gradation Curves



Gradation Curves





Note: Base drawing prepared by others.

LEGEND



Test Pit Locations, TP-1 through TP-12
Witnessed by McDowell & Associates



McDowell & Associates
21355 Hatcher Avenue
Ferndale, Michigan 48220
Phone: (248) 399-2066
Fax: (248) 399-2157

Test Pit Location Plan

Job No. 22-349

November 1, 2022



Fleming Creek Advisory Council

RE: Review of site plans submitted for Kinsley proposal

Thank you for providing your review and feedback for the above referenced project. We have revised the plans in accordance with your review letter dated October 6, 2022. For your use, below are our responses on how we have addressed or plan to address each of the comments in your letter.

1. FCAC understands that the proposal will be reviewed under the Washtenaw County Water Resources Commission Rules, which should ensure stormwater BMPs to mitigate the impact of the impervious surfaces. We hope WCWRC pays specific attention to the following
 - a. The need for a stormwater narrative in the plan. Without it, it is difficult to determine where runoff is intended to go; rain garden vs. infiltration trench vs. stormwater pond.
Response: *A stormwater narrative has been added, see sheet 29.*
 - b. It will be important to ensure that septic fields and tanks be set back from the infiltration basin according to county rules
Response: *The septic fields and tanks are designed according to Oakland County standards and we are coordinating directly with both the Water Resource Office and Health Department for review and approval.*
 - c. We are concerned that the rain garden plants will find it difficult to survive at the current planned elevation of the rain garden and will be “swamped out” by larger storms. We recommend runoff calculations for all three stormwater features to ensure proper treatment:
 - i. Rain garden
 - ii. Stormwater pond
 - iii. Infiltration trench
Response: *All stormwater detention and conveyance calculations are provided on Sheets 29 and 30 of the Preliminary Site Plans.*
 - d. The plant list for the rain garden was unclear to us; however, we do support the live plantings of the emergent wetland plants (e.g. smartweed) as well as the wet meadow plants (e.g. boneset); the presence of both of these kinds of plants (wetter and drier) will help the rain garden survive drought periods as well as heavy storms.
Response: *The plant list and legend have been updated to note “Rain Garden” instead of “Wet Meadow”. Plants will be randomly planted to help mimic a natural environment.*
2. FCAC is concerned about the need to continually monitor and maintain the stormwater treatment elements of the site. We hope the township will have a rigorous inspection and maintenance schedule in place to, among other things, protect the rain garden and stormwater pond from phragmites and cattail invasion.
Response: *Agreed.*

3. FCAC applauds the use of native Michigan plants in the landscape and stormwater plans. We would recommend a higher diversity of plantings, however, which will make the rain garden and stormwater pond more resilient to changes in weather conditions. Trees would be beneficial to add to the rain garden, as their root structure will improve the long-term viability of the rain garden. More native landscape, with its deeper roots and resiliency to climate changes, will result in a more attractive and cooler site that will do more to absorb the stormwater runoff created by impervious surfaces created by the development.

- a. Here are some planting suggestions: bur and swamp white oaks, bitter nut and shagbark hickories, native maples. Shrubs such as spicebush, ninebark, sandbar willow and elderberry closer to the creek.

Response: *Canopy trees are shown around the pond perimeters. Species include Red Maple, Tulip Tree, Bur Oak and Redmond Linden. Four additional rain garden plantings as well as perimeter shrubs have been added to the plans.*

4. In regard to the stormwater pond, FCAC would encourage the creation of a naturalized wetland there, which would make it an attractive amenity to the site, provide pollinator habitat, be more resilient to future increasing floods due to climate change, and better mimic the ecological services that are being removed in order to build the development.

Response: *Native plantings will be utilized within the detention basin to ensure ecological conformity with surrounding native plant species. As the basin is currently proposed, there are minimal impacts to existing ecological services and additional native plantings will further offset this impact. The basin is designed with capacity to detain and release a 100-yr flood event over a 48+ hour period.*

5. Fleming Creek is a designated county drain on the south side of Plymouth Road, so a permit would be needed for any modification to the drain (a sump line tap-in, a culvert, etc). The only thing that may not need a permit would be grading in the easement, since it does not appear that WCWRC has an easement over that stretch of drain.

Response: *Understood.*

6. Superior Township is in the county soil erosion program jurisdiction. The petitioners will need permits for the whole development and for each lot.

Response: *Understood.*

7. FCAC is concerned about the future of the area south of Plymouth Road. It appears that there will be two lots that will remain as land division parcels. If these are eventually developed (as, presumable, single family homes), they will encroach upon Fleming Creek and its floodplain. FCAC recommends a deed restriction be placed on any parcels that are within the floodplain of Fleming Creek. It is our understanding that other developments in the Township have such deed restrictions along the creek (e.g. Tanglewood, Mathaei Farms, etc.)

Response: *Understood.*

Should you have any remaining questions or need anything else from us to help facilitate your review and approvals, please do not hesitate to contact me direct at (734) 308-6910.

Sincerely,

ATWELL, LLC

A handwritten signature in blue ink, appearing to read 'M. Crider', is positioned below the company name.

Mark Crider, P.E.

November 1, 2022



Benjamin Carlisle, AICP, LEED AP
Principle
117 North First Street
Ann Arbor, MI 48104

RE: *Kinsley Development*
Preliminary Site Plan - Review No. 1

Thank you for providing your review and feedback for the above referenced project. We have revised the plans in accordance with your review letter dated October 18, 2022. For your use, below are our responses on how we have addressed or plan to address each of the comments in your letter.

1. Clarify purpose and intent of including portions of the site south of Plymouth and including both site condominium lots and land division lots on the plan set. Please explain as part of the Condominium Act how you are able to have land divisions included in a site condominium?
Response: *The proposed site condominium is shown within the bold black dashed line on the preliminary site plans. The indicated land divisions fall outside of this boundary. We have updated the plans to exclude the land divisions from this site plan and provided a supplemental exhibit that provides additional information for the proposed land divisions.*
2. Move the rain garden out of lot 6 or reconfigure the site plan to put lot 6 into a common area.
Response: *Lot 6 and the rain garden have been revised to move the rain garden into common area.*
3. Confirm if the common area south of Plymouth Road is part of the site's common area and will be maintained by Homeowners Association?
Response: *The west most common area along the south side of Plymouth Road (Parcel 1, Tract A, see sheet 02 of the preliminary site plans) has been updated to be a part of the proposed land divisions. The remaining area to the east of the proposed land divisions in Parcel 1, Tract C is to remain as a common element to the community and remain untouched in effort to preserve the existing natural features. Both areas are very low lying and within the floodplain, so development is not viable. Please refer to the included supplemental exhibit named "Excluded area Intended Use Plan" for more information.*
4. Confirm with the Road Commission what and if any ROW acquisition or dedication will be required?
Response: *The preliminary site plan has been submitted to the Road Commission and we will coordinate with them if any right-of-way acquisition or dedication is required.*
5. What are applicants plan for the future use or preservation of the onsite historic structures.
Response: *The applicant is prepared to help support the Township with relocating the onsite historic structures. Funds normally dedicated for removal and/or demolition can be donated to go towards relocation.*

6. Provide 50-foot wide landscape strip along Plymouth Road.

Response: *A 50-foot wide landscape strip has been added along Plymouth Road as requested.*

Should you have any remaining questions or need anything else from us to help facilitate your review and approvals, please do not hesitate to contact me direct at (734) 308-6910.

Sincerely,

ATWELL, LLC



Mark Crider, P.E.

November 1, 2022



Cresson Sloten, P.E.
Senior Project Manger
34000 Plymouth Road
Livonia, MI 48150

*RE: Kinsley Development
Preliminary Site Plan - Review No. 1
OHM Job No. 0140-22-1030*

Thank you for providing your review and feedback for the above referenced project. We have revised the plans in accordance with your review letter dated October 25, 2022. For your use, below are our responses on how we have addressed or plan to address each of the comments in your letter.

1. There appears to be inconsistencies between the legal descriptions on the Cover Sheet, the parcel boundaries shown on the plans, and the parcel boundaries shown in both the County and Township GIS data. The parcel boundaries in County and Township GIS show "Parcel 2" as extending south of the Plymouth Road centerline (see screenshot below), whereas the plans are showing "Parcel 1 Tract C" occupying the entire portion of the site south of Plymouth Road and east of 6530 Plymouth Road (Parcel J-10-08-400-005). Also, the Cover Sheet refers to Parcel 2 as "Tract A" and "Tract B" while the plans show "Parcel 2" as one single entity. The legal descriptions and existing parcel boundaries should be reviewed and revised as needed.

Response: *The legal descriptions as provided on the cover sheet correspond to the title commitment received. It appears that the Washtenaw County GIS visually does not accurately reflect the tax parcel description as well as the boundaries that were depicted in the title work.*

We have updated the Parcel 2 label to indicate that it is inclusive of both "Tract A" and "Tract B," so it corresponds to the cover.

2. On Sheet 2, the boundary lines and descriptions are missing along the southern border of the site, from the southwest corner of "Parcel 1 Tract C" to the Point of Beginning of "Parcel 1 Tract A." These boundaries and their descriptions should be shown on the plan sheet. Also, a "possible gap in boundary" is noted between the recorded and measured property along a portion of the southerly boundary of the site adjacent to the north line of the Arbor Hills II Condominium which should be resolved before submittal of the Final Site Plan.

Response: *The missing calls along the southern border of Parcel 1, Tract A and Tract C have been added.*

3. On Sheet 13, there is a callout note for "PROP SEPTIC CLEAR DISTANCE" for which the leader line is not pointing to any lines. The leader line should be updated here.

Response: *This callout has been revised as requested on sheet 13.*

4. On Sheet 18, the legend identifies two types of contour lines both as "EXIST. CONTOUR." The legend labels should be updated to correctly reflect existing versus proposed contour lines.

Response: The legend on sheet 27, previously sheet 18, has been updated to show contour lines corresponding with the plan view.

5. The stormwater management design on the site plan should be consistent with Washtenaw County Water Resources Commissioner (WCWRC) Standards. Review and approval from WCWRC will be required at the Final Site Plan stage of the project.

Response: *We are actively coordinating with the Washtenaw County Water Resource office. The pre-application meeting and infiltration test pits have been completed. The preliminary site plan has been submitted to their office for review and comment. We will continue to coordinate with the WCWRC for approval.*

6. The soil erosion and sedimentation control (SESC) measures on the site plan should meet the requirements of the WCWRC Standards and will be required to be shown on the future final site plan.

Response: *Understood. As stated above, we will continue to work with the WCWRC for SESC approval and permitting.*

7. The private road connections to Plymouth Road should meet the requirements of the Washtenaw County Road Commission (WCRC). Review and approval from WCRC will be required at the Final Site Plan stage of the project.

Response: *Agreed. The preliminary site plan has been submitted to the Road Commission and we will continue to coordinate with their office through the preliminary and final plan approval process.*

8. The individual well and septic systems for each proposed site condominium unit are to meet all requirements of the Washtenaw County Health Department's Environmental Health Division.

Response: *Understood. We are actively coordinating with Jenni Conn at the WCHD. Initial septic field test pits have been completed and test wells are on-going.*

Should you have any remaining questions or need anything else from us to help facilitate your review and approvals, please do not hesitate to contact me direct at (734) 308-6910.

Sincerely,
ATWELL, LLC



Mark Crider, P.E.



EVAN N. PRATT, P.E.

Water Resources Commissioner

705 N Zeeb Road
Ann Arbor, MI 48103
734-222-6860

Drains@washtenaw.org

October 14, 2022

Harry Sheehan
Chief Deputy Water Resources Commissioner

Scott Miller, P.E.
Deputy Water Resources Commissioner

Theo Eggermont
Public Works Director

Joe Wywrot
PEA Group
7927 Nemco Way, Suite 115
Brighton, MI 48116

RE: Kinsley Development
6595 Plymouth Road
Superior Township, MI
WCWRC WO 8754

Dear Mr. Wywrot:

This office has reviewed the construction plans for the above referenced project in the Township of Superior. These plans have a job number of 21002863, are dated September 28, 2022, and were received by this office on September 28, 2022. As a result of our review, we would like to offer the following comments:

1. It appears that groundwater elevations in the vicinity of the detention basin range from ~814.5 - 818.9, while the basin bottom is set at 810.0. County standards require a 3-foot vertical separation between seasonal high groundwater and the bottom of the basin. Any storage below 818.9 will not be counted towards the detention volume.
2. The plans shall be stamped and sealed by a professional engineer licensed in the state of Michigan.
3. A certificate of outlet signed and sealed by a licensed engineer shall be provided within the next submittal. The certificate should include all pertinent calculations to verify that the receiving waterbody has adequate capacity.
4. A storm water management narrative shall be included in the next submittal.
5. Storm sewer profiles shall be provided to verify conveyance calculations.
6. Easements for enclosed storm sewer shall be a minimum of 20 feet wide and a minimum of 30 feet wide for open channel systems. Deep sewers will warrant wider easements.
7. Verify the calculations for Worksheet W10 in the Preliminary Detention Calculations shown on Sheet 18.
8. Orifice calculations for the proposed detention basin shall be provided.

9. Identify the proposed emergency overflow for the proposed detention basin.
10. Rain garden maintenance is required twice per year (spring and fall). The schedule on Sheet 25 shall be updated to reflect the requirement.
11. An overflow outlet for the proposed rain garden shall be provided or called out. The overflow outlet shall be directed as to not cause damage to the site.
12. The site does not have any proposed buildings as the parcels will be sold for future development. A note shall be added to the plans that the proposed infiltration trench shall not be located within 15 feet of a building foundation.
13. The plans state that the detention basin will outlet to the adjacent wetland (Fleming Creek). Provide documentation of EGLE's approval for the use of this wetland.
14. Test pit locations and the associated ground water elevations shall be identified on the plans.
15. The rain gardens must provide 2-feet of vertical separation between the seasonal high groundwater and the bottom of the basin. Infiltration trenches must provide 3-feet of clearance.
16. The rain garden planting mix shall be 20-30% organic compost and 70-80% topsoil.
17. Infiltration trenches are typically linear features, sized for the 2-year design storm, and have a flat underdrain pipe to uniformly distribute flow. The 15- to 20-foot width is atypical for this application. Consider the use of other green infrastructure features.
18. There is significant elevation change around the rain garden. The amount of water directed to the rain garden shall be verified. Additionally, the plant selection for the rain garden shall be included with a note that states "Maximum 10% clay" in the planting soil notes.
19. Add a note to the planting plan sheets: "At the time of plant and seed delivery, a WCWRC landscape reviewer must be present. The quantity and species delivered will be reviewed on site. Contact Catie Wytychak at wytychakc@ewashtenaw.org or (734) 222-6813 to coordinate."
20. Drain use permit(s) will be required for all outlets (taps) into the Fleming Creek drain. These permits will be issued after construction plan review and approval.

21. Each end section (tap) that outlets to the County drain should be identified with a unique name and with the following note:

"WCWRC Drain Use Permit required– Tap-in to [Open Drain or Enclosed Drain Pipe]. Coordinate with WCWRC to schedule inspection 4-5 days in advance of construction."

22. Please see the attached invoice for the current fees and remit these fees upon receipt.

At your convenience, please send us a complete set of revised plans and the additional information requested above so that we may continue our review. If you have any questions, please do not hesitate to contact me via email at byrnem@washtenaw.org.

Sincerely,



Matt Byrne, P.E.
Stormwater Engineer

(drain district \ Kinsley Development_rev1

Cc: Joe Klee, Lombardo Homes
Lynette Findley, Superior Township Clerk
Laura Bennett, Superior Township Planning Department
George Tsakoff, PE, Superior Township Engineer (OHM)

CHARTER TOWNSHIP OF SUPERIOR FIRE DEPARTMENT

BUREAU OF FIRE PREVENTION

7999 Ford Rd, Ypsilanti, MI 48198

November 4, 2022

Laura Bennett
Charter Township of Superior
3040 N. Prospect Rd.
Superior Charter Twp, MI 48198

RE: Preliminary (non-residential) Site Plan Review #2
Project Name: Kinsley Development
Project Location: 6595 Plymouth Road
Plan Date: 9/28/2021
Project Job Number: 21002863
Applicable Codes: IFC 2015
Engineer: Atwell
Engineer Address: 311 N. Main St. Ann Arbor, MI 48104

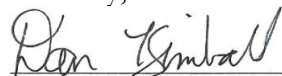
Status of Review

Status of review: Approved Conditionally (see comments)

Site Coverage - Access

Comments: Meets IFC 2015, Add a dry hydrant at the road that fronts the pond/rain basin for fire department use. Dry hydrant specifications can be obtained from the Superior Township Fire Department.

Sincerely,



Dan Kimball, Fire Marshal
Charter Township of Superior Fire Department
CFPS, CFI II, CFPE



November 8, 2022

CHARTER TOWNSHIP OF SUPERIOR

3040 N. Prospect Road
Ypsilanti, MI 48198

Attention: **Lynette Findley, Township Clerk**

Regarding: **Kinsley Development
Preliminary Site Plan - Review No. 2
OHM Job No. 0140-22-1030**

Dear Ms. Findley,

On behalf of the Township, we have reviewed the Preliminary Site Plan submittal for the above referenced project, as submitted to the Township on November 1, 2022. In our opinion, this plan is ready for consideration by the Planning Commission at their November meeting regarding Preliminary Site Plan approval. We do offer the following comments that will need to be addressed by the Applicant at the Final Site Plan review stage.

1. Our Survey Group has reviewed the legal descriptions of the existing parcels provided on the cover sheet and Overall Existing Conditions plan (sheet 2), and their review shows the measured (M) distance of the northerly boundary of Parcel 1, Tract C along the centerline of Plymouth Road (bearing N70°30'49"E) being 1163.35' rather than 1164.01' as noted on sheet 2. This measured distance should be verified by the Applicant's Engineer.
2. The Soil Erosion and Sedimentation Control plan (sheet 32) states that the condominium association will be first in line for maintaining all storm sewers and detention basins, and that a drainage district will be established for the development giving the WCWRC statutory responsibility for ultimate maintenance responsibility of the stormwater management systems if the condo association does not provide adequate maintenance. Ultimately WCWRC will determine the jurisdiction of the stormwater management system between WCWRC and the future HOA for the subdivision. It's our understanding from WCWRC that an easement for maintenance access should be provided from the private road to Rain Garden #1 north of Parcel #6 meeting WCWRC requirements, and that a 20' width is preferred for the easement.
3. On Sheets 2 through 6, there is a legend item for "Test Pit Location (September 2022)" that does not include a legend symbol. The symbol should be included in the legend if it is present in plan view.
4. On Sheets 18 through 21, the legend identifies two types of contour lines both as "EXIST. CONTOUR." The legend labels should be updated to correctly reflect which are "existing" versus "proposed" contour lines.
5. On Sheets 13 and 16, the proposed storm sewer easement should be centered on the proposed storm sewer alignment between structures #R30 and #R31.



Outside Agency Permits and Approvals

6. The stormwater management design on the site plan should be consistent with Washtenaw County Water Resources Commissioner (WCWRC) Standards. Review and approval from WCWRC will be required at the Final Site Plan stage of the project.
7. The soil erosion and sedimentation control (SESC) measures on the site plan should meet the requirements of the WCWRC Standards and will be required to be shown on the future final site plan.
8. The Washtenaw County Road Commission (WCRC) needs to confirm what (if any) right-of-way acquisition or dedication is required for Plymouth Road from these properties. Also, the private road connections to Plymouth Road should meet the requirements of the WCRC. Review and approval from WCRC will be required at the Final Site Plan stage of the project.
9. The individual well and septic systems for each proposed site condominium unit are to meet all requirements of the Washtenaw County Health Department's Environmental Health Division.

If you have any questions regarding our review, please do not hesitate to contact me at (734) 466-4585, or George Tsakoff at (734) 466-4439.

Sincerely,
OHM Advisors

Cresson Sloten, PE
Senior Project Manager

cc: Ken Schwartz, Township Supervisor (via e-mail)
Bill Balmes, Building Department (via e-mail)
Laura Bennett, Planning Coordinator (via e-mail)
Ben Carlisle, CWA, Twp Planner (via email)
Paul Montagno, CWA (via email)
George Tsakoff, OHM
file



Carlisle | Wortman
ASSOCIATES, INC.

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

Date: October 18, 2022
November 8, 2022

**Site Plan Review
For
Superior Township, Michigan**

Applicant: Lombardo
Project Name: Kinsley Development
Location: 6595 Plymouth Road
Plan Date: November 1, 2022
Zoning: R2 Single Family Residential
Action Requested: Preliminary Site Plan Approval

PROJECT DESCRIPTION

The site, totaling 48.49 acres in size, was rezoned from R-1 Single-Family Residential to R-2, Single-Family Residential. The site is located on the north side of Plymouth Road just south of the M-14 and M-53 interchange. The north side of the site is bound by the off ramp from east-bound M-14. The existing site is made up of two parcels which each have a portion on the north and south side of Plymouth Road.

The applicant is submitting a 21-unit single-family site condominium plan. Please note that the plan shows 25 total lots; however four (4) of those lots directly front on Plymouth, are proposed to be split via land divisions, and are not being reviewed as part of this site plan review.

Aerial Photograph



The Zoning and existing land uses for the subject site and surrounding parcels are identified in the following table:

Direction	Zoning	Existing Use
North	MDOT Right-of-Way	M-14 Corridor
South	R-2 and PC	Single Family Residential
East	R-2 and PC	Single Family Residential
West	R-1 and PC	Single Family Residential

NATURAL RESOURCES

Topography: The site is generally flat with lower slopes south of Plymouth Road towards Fleming Creek.

Woodlands: The site includes woodlands along the periphery of the site. The applicant did not submit a detailed tree inventory; however the natural features notes that “trees on the site although in good condition, are not necessarily high quality with respect to species.”

A full tree inventory and mitigation plan for protected trees will be required for the final site plan set.

Wetlands: There are two wetlands delineated on the site plan. The regulatory status is not provided for either wetland. However, the applicant has indicated that as part of the final site plan the size, delineation and regulatory status of the wetlands will be verified by the Michigan Department of the Environment Great Lakes and Energy (EGLE) have been provided.

Items to be Addressed: 1) A detailed grading plan is required for the final site plan. 2) A detailed tree inventory and mitigation plan must be provided with the final site plan. 3) Provide the regulatory status of each wetland along with verification of the size and delineation from the EGLE for the final site plan.

SITE LAYOUT, ACCESS, AND CIRCULATION

The applicant is proposing 21 lots as part of the site condominium. All lots are north of Plymouth Road. The 21 lots will be served with a new private road, with two access points off Plymouth Road. We note that the applicant has provided a rain garden behind lot 6. The rain garden has no access. The applicant should work with the Township Engineer to determine what type of access is required. Due to the rain garden, and potential need for access, the applicant shall confirm that lot 6 and 7 is buildable.

The existing parcel bisects Plymouth Road. The applicant should confirm with the Road Commission what and if any ROW acquisition or dedication will be required.

In addition, the plan notes that the historic structures on the property will be removed or relocated. The future use or preservation of this structure is also something that would be considered as part of a site plan review.

Items to be Addressed: 1). Work with Township Engineer to determine type of access needed to the rain garden; 2). Confirm that lot 6 is buildable; 3) Confirm with the Road Commission what and if any ROW acquisition or dedication will be required; and 4). What are applicants plan for the future use or preservation of the onsite historic structures.

AREA, WIDTH, HEIGHT, SETBACKS

The following table summarizes the Density, Placement, and Height Regulations for the site plan associated with this use. The table will use the typical or smallest dimensions provided for any lot.

Density, Placement, and Height Regulations

	Required	Provided
Lot Area	1 acre (43,560 s.f)	43,724 Square Feet
Lot Width	150 Feet	150 Feet
Front Setback	50 Feet	50 Feet
Side Setback	15 Feet	15 feet
Rear Setback	50 Feet	50 Feet
Ground Floor Coverage	15% Max	Confirmed through building permit review
Landscape Strip Along Plymouth	50 feet	50 feet
Floor area Ratio	15% Max	Confirmed through building permit review
Building Height	35 Feet/2.5 Stories	Confirmed through building permit review

Plymouth Road was identified as a “Special Landscape Corridor” in the Master Plan.

Items to be Addressed: None

PARKING

Two spaces are required for each dwelling unit. Parking for each unit will be accommodated in driveways and garages for each dwelling.

Items to be Addressed: None.

LANDSCAPING

Landscaping Requirements

Frontage	Required	Provided	Compliance
Greenbelt	One (1) tree and three (3) shrub for every 15 lineal feet. $1,177 / 15 = 79$ trees and 236 shrubs	110 trees and 348 shrubs	Complies

New private Street	One (1) large evergreen tree per fifty (60) lineal feet. 4,152 lf./60 lf = 70 evergreen trees	70 proposed	Complies
Tree Mitigation	118	113	Does not comply

The landscape plan will be reviewed in greater detail as part of the final site plan review.

Items to be Addressed: *Provide required tree mitigation.*

LIGHTING

No lighting plan has been provided. The applicant should confirm if they propose street lighting.

Items to be Addressed: *Confirm if the applicant is proposing street lighting for final site plan.*

FLOOR PLANS AND ELEVATIONS

The applicant has provided conceptual renderings. The applicant will provide floor plans and elevations with the final site plan.

Items to be Addressed: *Submit building floor plans and elevations with the final site plan to confirm compliance with Section 14.09.B. of the Zoning Ordinance.*

RECOMONDATION

We recommend that the planning commission discuss the following items with the applicant:

1. *Confirm from Township Engineer what type of access needed to the rain garden;*
2. *Based on needed access to rain garden, confirm that lot 6 and 7 is buildable;*
3. *Confirm with the Road Commission what and if any ROW acquisition or dedication will be required; and*
4. *Clarify plans for the future use or preservation of the onsite historic structures.*

Based on that discussion, if the Planning Commission approves the preliminary site plan we recommend the following conditions for final site plan submittal:

1. *Show rain garden access*
2. *Provide required tree mitigation*
3. *Road Commission approval of access and ROW*
4. *Water Resources Commission approval*

Kinsley Development
November 8, 2022

5. *Detailed grading plans*
6. *The regulatory status of each wetland along with verification of the size and delineation from the EGLE*
7. *Confirm if the applicant is proposing street lighting for final site plan*
8. *Building floor plans and elevations*
9. *Any other conditions based on Planning Commission discussion*



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

cc: Ken Schwartz, Township Supervisor
Lynette Findley, Township Clerk
Laura Bennett, Planning & Zoning Administrator
George Tsakof, Township engineer

TO: Superior Township Planning Commission
FROM: Fleming Creek Advisory Council
SUBJ: Review of site plans submitted for Kinsley proposal
DATE: October 6, 2022

The FCAC met on October 6th to discuss the site plans and has the following comments and suggestions:

1. FCAC understands that the proposal will be reviewed under the Washtenaw County Water Resources Commission Rules, which should ensure stormwater BMPs to mitigate the impact of the impervious surfaces. We hope WCWRC pays specific attention to the following
 - a. The need for a stormwater narrative in the plan. Without it, it is difficult to determine where runoff is intended to go; rain garden vs. infiltration trench vs. stormwater pond.
 - b. It will be important to ensure that septic fields and tanks be set back from the infiltration basin according to county rules
 - c. We are concerned that the rain garden plants will find it difficult to survive at the current planned elevation of the rain garden and will be “swamped out” by larger storms. We recommend runoff calculations for all three stormwater features to ensure proper treatment:
 - i. Rain garden
 - ii. Stormwater pond
 - iii. Infiltration trench
 - d. The plant list for the rain garden was unclear to us; however, we do support the live plantings of the emergent wetland plants (e.g. smartweed) as well as the wet meadow plants (e.g. boneset); the presence of both of these kinds of plants (wetter and drier) will help the rain garden survive drought periods as well as heavy storms.
2. FCAC is concerned about the need to continually monitor and maintain the stormwater treatment elements of the site. We hope the township will have a rigorous inspection and maintenance schedule in place to, among other things, protect the rain garden and stormwater pond from phragmites and cattail invasion.
3. FCAC applauds the use of native Michigan plants in the landscape and stormwater plans. We would recommend a higher diversity of plantings, however, which will make the rain garden and stormwater pond more resilient to changes in weather conditions. Trees would be beneficial to add to the rain garden, as their root structure will improve the long-term viability of the rain garden. More native landscape, with its deeper roots and resiliency to climate changes, will result in a more attractive and cooler site that will do more to absorb the stormwater runoff created by impervious surfaces created by the development.
 - a. Here are some planting suggestions: bur and swamp white oaks, bitter nut and shagbark hickories, native maples. Shrubs such as spicebush, ninebark, sandbar willow and elderberry closer to the creek.
4. In regard to the stormwater pond, FCAC would encourage the creation of a naturalized wetland there, which would make it an attractive amenity to the site, provide pollinator habitat, be more resilient to future increasing floods due to climate change, and better mimic the ecological services that are being removed in order to build the development.
5. Fleming Creek is a designated county drain on the south side of Plymouth Road, so a permit would be needed for any modification to the drain (a sump line tap-in, a culvert, etc). The only thing that may not need a permit would be grading in the easement, since it does not appear that WCWRC has an easement over that stretch of drain.

6. Superior Township is in the county soil erosion program jurisdiction. The petitioners will need permits for the whole development and for each lot.
7. FCAC is concerned about the future of the area south of Plymouth Road. It appears that there will be two lots that will remain as land division parcels. If these are eventually developed (as, presumable, single family homes), they will encroach upon Fleming Creek and its floodplain. FCAC recommends a deed restriction be placed on any parcels that are within the floodplain of Fleming Creek. It is our understanding that other developments in the Township have such deed restrictions along the creek (e.g. Tanglewood, Mathaei Farms, etc.)

Thank you for the opportunity to provide comment on these site plans.

*FCAC is a group of local landowners and agency representatives (including county, city, townships, the University of Michigan, and Huron River Watershed Council) formed by those with an interest in maintaining and improving the quality and health of Fleming Creek. Ann Arbor Township requires FCAC review of development proposals within the Fleming Creekshed.