PLANNING AND DEVELOPMENT SERVICES STAFF REPORT

For Planning Commission Meeting of July 16th, 2019

SUBJECT: Weber PUD Zoning, Supplemental Regulations & PUD Site Plan (2857 Packard Road)

File Nos. SP19-016, Z19-008

PROPOSED CITY PLANNING COMMISSION MOTION
The Ann Arbor City Planning Commission hereby recommends that the Mayor and City Council approve the Weber Rezoning Petition from R1E (Single-Family Residential) with conditions to PUD (Planned Unit Development) district and Supplemental Regulations.

PROPOSED CITY PLANNING COMMISSION MOTION
The Ann Arbor City Planning Commission hereby recommends that the Mayor and City Council approve the Weber PUD Site Plan and Development Agreement.

STAFF RECOMMENDATION:

Staff recommends that the **PUD zoning petition** be **approved** because it complies with the PUD standards of Chapter 55, Section 5.29.10. The following public benefits will be provided:

- Management of storm water from off-site neighbors
- Preservation of natural features with a maintenance plan
- A minimum of 54% of open space

With the improvements proposed, the project does not have a detrimental effect on public utilities or surrounding properties. The disturbance proposed is the minimum necessary to allow a reasonable use of this constrained site, and the benefit of this development to the community will be substantially greater than any negative impacts. This proposal is generally consistent with the Master Plan: Land Use Element and is compatible with the surrounding zoning designations and land uses.

Staff recommends that the **PUD site plan petition** be **approved** because it complies with all local, state and federal ordinances, standards and regulations; it will not cause a public or private nuisance; and it will not have a detrimental effect on public health, safety or welfare; the development would limit disturbance of natural features to the minimum necessary to allow a reasonable use of the land.

STAFF REPORT:

This petition was postponed at the June 18th, 2019 City Planning Commission Meeting to allow the petitioner to address and respond to issues raised by the Planning Commission.

Natural Features Maintenance Plan

A revised Natural Features Maintenance Plan has been reviewed and approved by the NAP (Natural Area Preservation) Coordinator and is attached on page 28 of the staff report.

The Maintenance Plan will fall on City staff to enforce and it is recommended this Plan be implemented for 5 years after construction is completed as most impacts to natural features occurs within this time frame.

Floor Area

Per the revised UDC (Unified Development Code), basements, whether finished or unfinished are counted as floor area and be counted toward the 2,000-square foot cap in the underlying R1E Zoning District.

To address this issue, the petitioner proposes allowing basements and not counting this as floor area in the PUD Supplemental Regulations and as shown on the site plan.

Energy Efficiency & Affordable Housing

Planning Commission inquired about energy efficiency approaches as part of the benefits to the PUD including construction to a higher energy efficiency standard (i.e. LEED, or Energy Star compliant); solar readiness through south facing roof planes; analysis of solar access to lots/buildings, or all electric-served homes with no natural gas reliance.

The petitioner declined to propose any energy efficiency criteria. The petitioner also does not propose any affordable housing or contribution as the site plan does not request an increase in density from the underlying R1E zoning.

Integration of Existing House

A formal inquiry has not been submitted to PAC (Park Advisory Commission) for moving the existing house to Cobblestone Farms. If an application were submitted, some of the issues to consider are the cost and logistics of moving the house, programming goals and historic district approval of the house.

Per the HDC Coordinator, it's unlikely the house could be moved into the Cobblestone Farm Historic District, which is its own parcel.

The petitioner responded the historic house is not in the purchase agreement on the property and therefore, the PUD/site plan will not include any integration of the historic house into the development plan.

Tree Preservation Counts

A miscount of the number of trees under the heading of Natural Features Impacts Denied Site Plan (2017) occurred and is updated in **bold** in the chart below. The revision changes the number of landmark trees removed in the Denied Site Plan from 43 to 44 trees and changes the number of preserved landmark trees from 5 to 6. The number of woodland trees remains the same at 37 trees.

NATURAL FEATURE	NATURAL FEATURES EXISTING CONDITIONS	NATURAL FEATURES IMPACTS PUD Site Plan (Current)	NATURAL FEATURES PRESERVED PUD Site Plan (Current)	NATURAL FEATURES IMPACTS DENIED Site Plan (2017)	NATURAL FEATURES PRESERVED DENIED Site Plan (2017)
Woodland (acres)	3.40 Acres				
Woodlands DISTURBED (acres)		3.40 Acres*		3.40 Acres*	
Woodlands PRESERVED (acres)			0 acres*		0 acres*
Woodland Trees (>6" DBH) DBH = Diameter at Breast Height (4.5' above ground)	208 trees** (2127" DBH)	146 Trees Removed (1459" DBH)	13 Trees Preserved w/ critical root zone impacts (137" DBH)	183 Trees Removed*** (1835" DBH)	13 Trees Preserved w/ critical root zone impacts (147" DBH)
			49 Trees Preserved w/ no impacts (531" DBH)		12 Trees Preserved w/ no impacts (121" DBH)
Landmark Trees	57 trees (1377" DBH)***	38 trees Removed (854" DBH)	5 trees Preserved w/ critical root zone impacts (157" DBH)	**44 trees Removed (1036" DBH)**	5 trees Preserved w/ critical root zone impacts (152" DBH)
			8 trees Preserved w/ no impacts (224" DBH)		2 trees Preserved w/ no impacts (39" DBH)

*The removal of trees for this development will reduce the basal area of the woodlands to less than 30 square feet per ½ acre and the areas will no longer meet the woodlands definition of Chapter 55.

**Does not include Landmark Trees that are also considered Woodland Trees—see Landmark Trees

***Includes Landmark Trees off-site that are within 50 feet of the property line/limits of disturbance.

SERVICE UNIT COMMENTS:

Planning – Staff recommends the PUD zoning be approved because the proposed use provides a reasonable approach to develop this site, which contains significant constraints due to natural features. The plan proposes to preserve 4.4 acres of open space and preserve a total of 42

additional landmark/woodland trees from the previously denied proposal. Mitigation trees totaling 577 inches are proposed to be planted around the perimeter of the site to provide screening from adjacent neighbors and along the public Right-of-Way between the road and detention pond. A total of 1,119 inches of mitigation trees is required and a contribution of $54,200 to the Street Tree Fund is proposed to make up this difference.

The proposed plan complies with PUD standards by providing public benefits in the form of a Maintenance Plan for the natural features and detaining off-site detention in the northeast detention pond, and a minimum requirement of open space.

The previous site plan proposed 51-single family detached units, while this site plan proposes the same number of units and preserving 42 additional trees totaling 558 inches of DBH. The Master Plan: Land Use Element identifies this site as Site 8 and states this 7.9-acre site is located on the north side of the Packard, east of Easy Street. Single-family detached residential use is recommended. This PUD zoning is largely consistent with the underlying R1E zoning density and surrounding zoning and land uses, however attached units would not be permitted.

The rezoning of this parcel from R1E to PUD zoning accomplishes many goals identified in the City's Master Plan and supporting documents. The existing land use recommendation designates the site for single-family residential use. While this proposal does not meet this single-family land use designation, the proposed townhouses provide a diverse housing type as recommended by the City's Master Plan. Compact or clustered development concentrates development away from sensitive natural features and helps preserve natural systems and utilizes infrastructure more efficiently. In this case, the attached units are preserving 42 additional trees.

Providing pedestrian, bicycle and transit connections and amenities encourages alternatives to vehicular access by increasing travel choices. Sidewalks have been provided on both sides of the streets in the development to encourage pedestrian access throughout the site and connect to public transit.

The proposed single-family and townhouse use generates a comparable traffic impact at a rate similar to the surrounding residential neighborhoods.

Prepared by Chris Cheng
Reviewed by Brett Lenart
7/11/19

Reference Documents: 6/18/19 Weber Staff Report
7/12/19 Site Plan & Maintenance Plan
2857 Packard Road Supplemental Regulations

PLANNING AND DEVELOPMENT SERVICES STAFF REPORT

For Planning Commission Meeting of June 18, 2019

SUBJECT: Weber PUD Zoning, Supplemental Regulations & PUD Site Plan (2857 Packard Road)

File Nos. SP19-016, Z19-008

PROPOSED CITY PLANNING COMMISSION MOTION
The Ann Arbor City Planning Commission hereby recommends that the Mayor and City Council approve the Weber Rezoning Petition from R1E (Single-Family Residential) with conditions to PUD (Planned Unit Development) district and Supplemental Regulations.

PROPOSED CITY PLANNING COMMISSION MOTION
The Ann Arbor City Planning Commission hereby recommends that the Mayor and City Council approve the Weber PUD Site Plan and Development Agreement conditioned upon submission of an ecological maintenance plan for the natural features be submitted and approved by the City.

STAFF RECOMMENDATION:

Staff recommends that the **PUD zoning petition** be **approved** because it complies with the PUD standards of Chapter 55, Section 5.29.10. The following public benefits will be provided:

- Management of storm water from off-site neighbors
- Preservation of natural features with a maintenance plan
- A minimum of 54% of open space

With the improvements proposed, the project does not have a detrimental effect on public utilities or surrounding properties. The disturbance proposed is the minimum necessary to allow a reasonable use of this constrained site, and the benefit of this development to the community will be substantially greater than any negative impacts. This proposal is generally consistent with the Master Plan: Land Use Element and is compatible with the surrounding zoning designations and land uses.

Staff recommends that the **PUD site plan petition** be **approved** because it complies with all local, state and federal ordinances, standards and regulations; it will not cause a public or private nuisance; and it will not have a detrimental effect on public health, safety or welfare; the development would limit disturbance of natural features to the minimum necessary to allow a reasonable use of the land.

LOCATION:

This site is located on the north side of Packard Road, east of Easy Street. This site is located in the South Area and located in the Malletts Creek Watershed.

SUMMARY:

This petition was originally heard as an Area Plan and Rezoning from R1C (Single-Family Residential Dwelling District) to R1E (Single-Family Residential Dwelling District) and approved by both City Planning Commission and City Council in September and November 2016.

In September of 2017, the site plan petition for construction of 51 single-family dwelling units was denied by City Planning Commission and later by City Council in November as this proposal did not limit the disturbance of natural features to the minimum necessary to allow a reasonable use of the land.

Since this denial, two citizen participation meetings for the 2857 Packard Planned Unit Development and site plan submittal were held at Tappan Middle School Media Center. The first meeting was held on March 21, 2019 and the second meeting was held April 11, 2019.

PROPOSED CHANGES:

The petitioner proposed changes from the original site plan submission to address natural features concerns. These issues and concerns include:

- Proposed townhouse residential units to cluster units
- A natural features maintenance plan

The following changes have been made to the PUD site plan.

Site Plan – The general layout from the previous site plan is the same with the number of units remaining at 51, a ring road accessing the units, and storm water detention basins located at the northeast and southwest areas of the site. The proposed units inside the ring road are no longer single-family detached units and instead are 26 two-story townhouse units in four buildings. This style of housing product requires rezoning from R1E, Single-Family Detached, to PUD, Planned Unit Development, to allow for townhouse units.

The revised townhouse layout preserves 37 more woodland trees (376 inches at DBH) and 5 additional landmark trees (182 inches at DBH) compared to the previously denied site plan. The Natural Features Chart below compares the previously denied site plan to the currently proposed PUD Site Plan.

A crushed limestone pathway has been added between the townhouse buildings connecting the east side of the site to the west side park.

NATURAL FEATURE	NATURAL FEATURES EXISTING CONDITIONS	NATURAL FEATURES IMPACTS PUD Site Plan (Current)	NATURAL FEATURES PRESERVED PUD Site Plan (Current)	NATURAL FEATURES IMPACTS DENIED Site Plan (2017)	NATURAL FEATURES PRESERVED DENIED Site Plan (2017)
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*The removal of trees for this development will reduce the basal area of the woodlands to less than 30 square feet per ½ acre and the areas will no longer meet the woodlands definition of Chapter 55.

**Does not include Landmark Trees that are also considered Woodland Trees—see Landmark Trees

***Includes Landmark Trees off-site that are within 50 feet of the property line/limits of disturbance.

Planned Unit Development – The PUD Supplemental regulations have been submitted and are attached.

SITE PLAN DATA ANALYSIS:

		PROPOSED	PERMITTED/REQUIRED	EXISTING	PERMITTED/REQUIRED
Zoning		PUD (Planned Unit Development)	PUD	R1E (Single-family Residential District)	R1E
Gross Lot Area		326,469 sq ft* (7.49 acres)	sq ft MIN/dwelling unit	326,469 sq ft* (7.49 acres)	4,000 sq ft MIN/dwelling unit
Lot Width		406 ft	34 ft	406 ft	34 ft
Setbacks	Front	20 ft	20 ft	125 ft	15 ft MIN
	Side	3 ft	3 ft	115 ft	3 ft
	Rear	20 ft	20 ft	620 ft	20 ft
Building Height		1-2 stories**	30 ft	30 ft	30 ft MAX
Parking - Automobiles		153 spaces	102 space/dwelling MIN***	2 spaces	1 space/dwelling MIN
Parking – Bicycles		1 Space/garage	None****	None	None

***** Net lot area is gross lot area minus Packard Road right-of-way.
****** A minimum of 5 homes are to be ranch style
*** Private street requires 1 space/unit plus 1 space/dwelling
**** Bicycle parking located in garages

SERVICE UNIT COMMENTS:

Planning – Staff recommends the PUD zoning be approved because the proposed use provides a reasonable approach to develop this site, which contains significant constraints due to natural features. The plan proposes to preserve 4.4 acres of open space and preserve a total of 42 additional landmark/woodland trees from the previously denied proposal. Mitigation trees totaling 577 inches are proposed to be planted around the perimeter of the site to provide screening from adjacent neighbors and along the public Right-of-Way between the road and detention pond. A total of 1,119 inches of mitigation trees is required and a contribution of $54,200 to the Street Tree Fund is proposed to make up this difference.

The proposed plan complies with PUD standards by providing public benefits in the form of a Maintenance Plan for the natural features and detaining off-site detention in the northeast detention pond, and a minimum requirement of open space.

The previous site plan proposed 51-single family detached units, while this site plan proposes the same number of units and preserving 42 additional trees totaling 558 inches of DBH. The

Master Plan: Land Use Element identifies this site as Site 8 and states this 7.9 acre site is located on the north side of the Packard, east of Easy Street. Single-family detached residential use is recommended. This PUD zoning is largely consistent with the underlying R1E zoning density and surrounding zoning and land uses, however attached units would not be permitted.

The rezoning of this parcel from R1E to PUD zoning accomplishes many goals identified in the City's Master Plan and supporting documents. The existing land use recommendation designates the site for single-family residential use. While this proposal does not meet this single-family land use designation, the proposed townhouses provide a diverse housing type as recommended by the City's Master Plan. Compact or clustered development concentrates development away from sensitive natural features and helps preserve natural systems and utilizes infrastructure more efficiently. In this case, the attached units are preserving 42 additional trees.

Providing pedestrian, bicycle and transit connections and amenities encourages alternatives to vehicular access by increasing travel choices. Sidewalks have been provided on both sides of the streets in the development to encourage pedestrian access throughout the site and connect to public transit.

The proposed single-family and townhouse use generates a comparable traffic impact at a rate similar to the surrounding residential neighborhoods.

Forestry - The PUD site plan proposes to have less impact on the site's natural features (i.e. landmark and woodland trees) than the 2017 site plan that was denied by City Council. High quality natural features proposed to be preserved on the PUD site plan, include trees in the bur oak stand on the western side of the property which contains the largest tree on the site, the 60" bur oak. Mid to low quality natural features proposed to be preserved include a black walnut stand in the center of the site and landmark and woodland trees along the perimeter. Based on the site's zoning (R1E), the density permitted under the zoning, the number and quality of natural features proposed to be preserved and the natural features mitigation provided, the City's reviewer has determined the PUD site plan meets city code natural features and landscaping requirements and standards for approval.

Parks - Proposed 51 dwelling units x .0125 acres (the amount desired to keep pace with existing parkland density) x $50,000/acre (the average cost for parkland/acre) = $31,875.

Storm Water – The WCWRC rules stipulate that detention must be provided for on-site runoff and any off-site runoff that is directed to the stormwater management system. If the off-site runoff can bypass the development to follow the natural flow paths, without greatly changing the existing flow patterns, the rules allow for that. With regard to the northeast basin under the current site layout, the off-site drainage could not bypass the system without changing the flowpath and/or concentrating the flow, so it was required to be included in the northeast basin. However, by having the runoff from the northern off-site areas be directed into the northeast basin, the amount of runoff that goes to the eastern adjoining properties will be greatly reduced from current conditions.

Prepared by Chris Cheng
Reviewed by Brett Lenart
6/15/19

Reference Documents:
March 21, 2019 & April 11, 2019 Neighborhood Meeting Minutes
September 19, 2017 Staff Report
PUD Zoning and Supplemental Regulations
PUD Site Plan & Maintenance Plan
Draft PUD Development Agreement
Zoning/Parcel Map
Aerial Map

c: Robert R. Weber (Owner)
Jim Haeussler, Peters Building Co. (Petitioner)
Tom Covert, Midwestern Consulting, LLC (Petitioner's Agent)
Systems Planning
Project No. SP19-016, Z19-008

2857 PACKARD ROAD

CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN
SECTION 3, T3S, R6E
PLANNED UNIT DEVELOPMENT - SITE PLAN

OWNER
ROBERT WEBER
13102 LYONS HWY.
SAND CREEK, MI

DEVELOPER/BUILDER
PETERS BUILDING COMPANY
172 S. INDUSTRIAL DRIVE
SALINE, MI. 48176
CONTACT: JIM HAEUSSLER
734-429-4200

SURVEYOR/ENGINEER/ LANDSCAPE ARCHITECT
MIDWESTERN CONSULTING, LLC
3815 PLAZA DR.
ANN ARBOR, MI 48108
CONTACT: TOM COVERT, RLA, AICP, LEED AP
TINA FIX, RLA, LEED AP
734-995-0200

ARCHITECT
J.B. MOORE AND ASSOCIATES
4844 JACKSON ROAD, SUITE 150
ANN ARBOR, MI 48103
CONTACT: BRAD MOORE
734-930-1500

SITE AREA CALCULATION

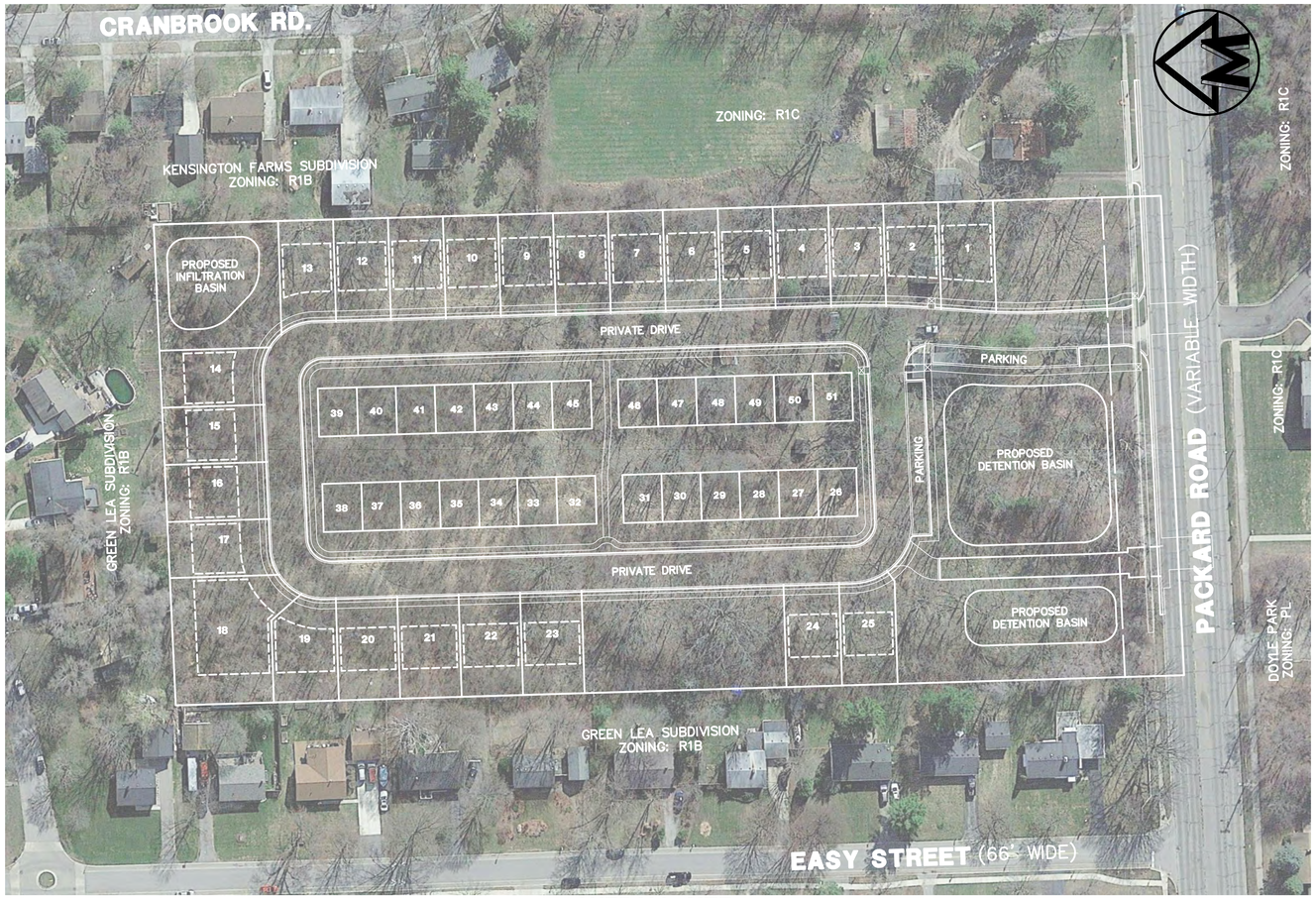
EXISTING SITE AREA (GROSS)	346,772 S.F./43560 = 7.96 AC.
EXISTING ROW	13,389 S.F./43560 = 0.31 AC.
EXISTING SITE AREA (NET)	333,383 S.F./43560 = 7.65 AC.
PROPOSED SITE AREA (GROSS)	346,772 S.F./43560 = 7.96 AC.
PROPOSED ROW	20,303 S.F./43560 = 0.47 AC.
PROPOSED SITE AREA (NET)	326,469 S.F./43560 = 7.49 AC.

DENSITY CALCULATION
TOTAL UNITS / SITE AREA = DWELLING UNITS PER ACRE
51 UNITS / 7.49 AC. = 7 DU/AC

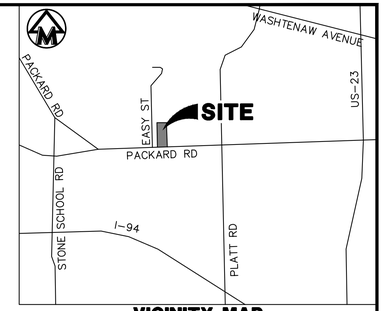
SITE DATA COMPARISON CHART

	PROPOSED	REQ./ALLOWED
SITE ZONING SITE USE	PUD PLANNED UNIT DEVELOPMENT	R1E SINGLE FAMILY DWELLING DISTRICT
SITE AREA (GROSS) SITE AREA (NET)	7.96 AC. 7.49 AC.	N/A N/A
LOT WIDTH	46.1 FT. MIN.	34 FT. MIN.
LOT AREA AVERAGE LOT AREA	4,000 S.F. MIN. 4,403 S.F.	4,000 S.F. MIN. N/A
LOT SETBACKS FRONT SIDE REAR	 20-25 FT 3 FT/6FT TOTAL 20 FT MIN.	 15 FT MIN. 3 FT/6 FT TOTAL 20 FT MIN.
NUMBER OF UNITS	51	79 MAX. (52 MAX. WITH CONDITIONAL REZONING)
SITE DENSITY	7.0 DU/AC	10 DU/AC. MAX.
HOME FLOOR AREA *BASEMENT NOT INCLUDED IN FLOOR AREA CALCULATIONS	2,000SF MAX.*	2,000SF MAX.
HOME HEIGHT	30 FT. MAX.	30 FT MAX.
OPEN SPACE	4.38 AC. (58%)	N/A
ON-STREET PARKING (PRIVATE STREETS ORD.)	51 SPACES	51 SPACES (1 PER UNIT)
RESIDENTIAL PARKING	102 SPACES (2-CAR GARAGE)	51 SPACES (1 PER SINGLE FAMILY DWELLING)

GENERAL NOTES
1. PER CHAPTER 49, SECTION 4:58 OF THE CITY CODE, "ALL SIDEWALKS ARE TO BE KEPT AND MAINTAINED IN GOOD REPAIR BY THE OWNER OF THE LAND ADJACENT TO AND ABUTTING THE SAME." PRIOR TO ISSUANCE OF THE FINAL CERTIFICATE OF OCCUPANCY FOR THIS SITE, ALL EXISTING SIDEWALKS MUST BE REPAIRED IN ACCORDANCE WITH CITY STANDARDS.
2. THE CONSTRUCTION COVERED BY THESE PLANS SHALL CONFORM TO THE CITY OF ANN ARBOR PUBLIC SERVICES DEPARTMENT STANDARD SPECIFICATIONS WHICH ARE INCLUDED BY REFERENCE.
3. THE OMISSION OF ANY STANDARD DETAILS DOES NOT RELIEVE THE CONTRACTORS OF THEIR OBLIGATION TO CONSTRUCT ITEMS IN COMPLETE ACCORDANCE WITH PUBLIC SERVICES DEPARTMENT STANDARDS AND SPECIFICATIONS.



OVERALL SITE
1" = 60'



VICINITY MAP
N.T.S.

SHEET INDEX

PROJECT SUMMARY
THE PROPOSED PLANNED UNIT DEVELOPMENT REZONING AND SITE PLAN CONSISTS OF 51 RESIDENTIAL HOMES (25 SINGLE FAMILY RESIDENTIAL LOTS AND 26 ATTACHED RESIDENTIAL UNITS IN 4 BUILDINGS) EACH HOME WITH TWO-CAR GARAGES. THE DEVELOPMENT INCLUDES APPROXIMATELY 1,628 LINEAR FEET OF PRIVATE ROADWAY AND 3,109 LINEAR FEET OF SIDEWALK AND A STORM WATER MANAGEMENT SYSTEM WITH INFILTRATION AND 100-YEAR DETENTION VOLUMES. THE DEVELOPMENT INCORPORATES PRESERVATION OF SOME NATURAL FEATURES ON THE SITE, INCLUDING WOODLAND AND LANDMARK TREES.

THE PROPOSED OVERALL SITE DENSITY IS 7.0 DWELLING UNITS PER ACRE WITH A MINIMUM LOT SIZE OF 4,000 SF. THE SITE IS CURRENTLY ZONED R1E SINGLE FAMILY RESIDENTIAL WITH CONDITIONS INCLUDING:
- A MAXIMUM OF 51 DWELLING UNITS WITH A MINIMUM OF 4 DISTINCT MODEL HOMES (TWO 2-STORY, ONE 1.5-STORY, ONE 1-STORY) AND THE SAME MODEL SHALL NOT BE BUILT NEXT TO EACH OTHER. DWELLING UNITS WILL HAVE VARYING EXTERIOR COLORS WITH NO TWO ADJACENT FACING THE STREET BEING THE SAME COLOR
- A MINIMUM OF FIVE 1-STORY RANCH STYLE HOUSES AROUND PERIMETER OF DEVELOPMENT.
- ATTACHED GARAGES SHALL NOT PROJECT FURTHER THAN 12 FEET OUT FROM THE FRONT OF EACH HOUSE OR 6 FEET FROM THE PORCH.
- A 15-FOOT WIDE LANDSCAPE BUFFER ALONG THE PERIMETER OF THE PROPERTY SHALL BE PROVIDED TO SCREEN DEVELOPMENT FROM ADJACENT RESIDENCES.

2857 PACKARD ROAD

JOB No. 16070

DATE: 4/25/19
SHEET 01 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
SITE PLAN/16070CV1

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19
PER CITY REVIEW	06/14/19
PER CITY REVIEW	06/26/19
PER CITY REVIEW	07/10/19
PER CITY REVIEW	07/12/19

01

MIDWESTERN CONSULTING
3815 Plaza Drive Ann Arbor, Michigan 48108
(734) 995-0200 • www.midwesternconsulting.com
Land Development • Land Survey • Institutional • Municipal
Wireless Communications • Transportation • Landfill Services

RELEASED FOR:	DATE

SCOTT G. FISHER
P.E. #58473

TYPICAL DETACHED AND ATTACHED HOUSING TYPOLOGY

PUD - DEVELOPMENT PROGRAM

THE PROPOSED DEVELOPMENT DOES NOT DEVIATE FROM THE AREA, HEIGHT, AND PLACEMENT REQUIREMENTS OR THE OFF-STREET PARKING OR LANDSCAPING REQUIREMENTS. THE PROPOSED DEVIATION IS FOR THE MULTI-FAMILY RESIDENTIAL LAND USE IN THE R1E ZONING DISTRICT FOR THE PROPOSED SIDE BY SIDE ATTACHED RESIDENTIAL UNITS.

DESCRIPTION OF OBJECTIVES, PURPOSES, AND BENEFICIAL EFFECT FOR THE CITY PROPOSED TO BE ACHIEVED BY THE PUD ZONING DISTRICT:

- DIVERSE HOUSING TYPOLOGY FOR ANN ARBOR HOUSING MARKET:
THE PROPOSED RESIDENTIAL LOT SIZE AND ATTACHED RESIDENTIAL UNITS PROVIDE A HOUSING TYPOLOGY THAT IS NOT CURRENTLY AVAILABLE IN THE COMMUNITY; A SMALLER SINGLE FAMILY RESIDENTIAL LOT AT A MARKET PRICE GEARED TOWARD HOUSEHOLDS WITH ONE FULL-TIME AND ONE PART TIME INCOME AND ATTACHED RESIDENTIAL UNITS WITHIN AN ESTABLISHED SINGLE FAMILY RESIDENTIAL COMMUNITY ALONG A MAJOR TRANSIT ROUTE/PEDESTRIAN CORRIDOR WITHIN THE CITY LIMITS.
- LIMITATION ON DENSITY:
THE PROPOSED DENSITY OF THE DEVELOPMENT LIMITS THE NUMBER OF RESIDENTIAL UNITS TO 51 DWELLING UNITS WITH 25 SINGLE FAMILY RESIDENTIAL LOTS AND 26 ATTACHED UNITS. THE PLACEMENT OF THE DETACHED SINGLE FAMILY RESIDENTIAL LOTS ALONG THE PERIMETER, AND THE INTENT TO MEET THE CONDITIONAL REZONING REQUIREMENT OF A MINIMUM NUMBER OF RANCH STYLE HOUSES ALONG THE PERIMETER, CREATES A DEVELOPMENT THAT IS COMPATIBLE WITH THE ADJACENT EXISTING RESIDENTIAL SUBDIVISIONS.
- MANAGEMENT OF STORMWATER FROM OFF-SITE NEIGHBORS:
THE PROPOSED REAR YARD DRAINAGE SYSTEM AND STORMWATER MANAGEMENT BASIN IN THE NORTHEAST CORNER OF THE SITE, ALLOW FOR STORMWATER CONVEYANCE AND INFILTRATION OF OFF-SITE DRAINAGE THAT HAS HISTORICALLY CAUSED FLOODING ISSUES AS IDENTIFIED BY THE PROJECT NEIGHBORS. IT IS ANTICIPATED THESE STORMWATER IMPROVEMENTS AND INFRASTRUCTURE WILL REDUCE OR ENTIRELY RESOLVE HISTORICAL NEIGHBOR CONCERNS OF PONDING IN THIS AREA. THE PROJECT IS ADDRESSING 2.3 ACRES OF OFF-SITE DRAINAGE THAT PASSES THROUGH THE SITE AND CREATES PONDING/FLOODING OF THE NEIGHBOR'S REAR YARDS. THE PROJECT AS DESIGNED WILL GATHER THIS WATER AND STORE IN AN INFILTRATION BASIN WHILE RELEASING ANY OVERFLOW WATER TO THE UNDERGROUND PIPE CONVEYANCE SYSTEM AWAY FROM THE AREA OF HISTORICAL FLOODING.
- NATURAL FEATURES PRESERVATION:
IN ORDER TO ACHIEVE ADDITIONAL PRESERVATION OF LANDMARK TREES AND WOODLANDS MORE CONSISTENT WITH THE ORIGINAL AREA PLAN APPROVED WITH THE REZONING, THE SINGLE FAMILY LOTS IN THE INTERIOR OF THE PRIVATE DRIVE LOOP WERE CHANGED TO ATTACHED RESIDENTIAL UNITS. THESE UNITS AS ATTACHED ARE OF THE SAME SIZE, DESIGN, AND CHARACTER AS PROPOSED IN THE PLAN WHERE THEY WERE DETACHED. AS A RESULT, THERE ARE TWO AREAS OF LANDMARK TREE/WOODLAND PRESERVATION ALONG THE WESTERN PROPERTY EDGE, WOODLAND PRESERVATION IN THE SOUTHEAST CORNER OF THE PROPERTY, AND WOODLAND PRESERVATION BETWEEN THE ATTACHED SINGLE FAMILY UNITS.
- NATURAL FEATURES MAINTENANCE PLAN:
THE PRESERVED WOODLAND AND LANDMARK TREES ON THE SITE ARE A VALUABLE RESOURCE TO THE DEVELOPMENT AND THE ANN ARBOR COMMUNITY. IN ORDER TO MAINTAIN THE HEALTH AND VIABILITY OF THESE TREES, A NATURAL FEATURES MAINTENANCE PLAN, INCLUDING INVASIVE SPECIES CONTROL, IS BEING PROPOSED AS PART OF THE DEVELOPMENT AND WOULD BE PERPETUATED AS PART OF THE MASTER DEED AND BYLAWS THROUGH THE HOMEOWNERS ASSOCIATION.
- IN-FILL DEVELOPMENT (NOT GREENFIELD DEVELOPMENT)
THIS PROJECT IS PROPOSED FOR DEVELOPMENT OF A PROPERTY THAT HAS ADJACENCY AND ACCESS TO:
  - -UTILITY INFRASTRUCTURE THAT DOES NOT REQUIRE IMPROVEMENTS TO ACCOMMODATE
  - -ALONG A COLLECTOR ROADWAY W/ PUBLIC TRANSIT STOPS
  - -SURROUNDED BY PARKS
  - -PROXIMITY TO EMPLOYERS
  - -PROXIMITY TO SCHOOLS AND EDUCATION
  - -PROXIMITY TO SERVICES

WHY BENEFICIAL EFFECT CANNOT BE ACHIEVED UNDER OTHER ZONING DESIGNATION:

THE INCLUSION OF ATTACHED MULTI-FAMILY UNITS ENABLES FURTHER PRESERVATION OF NATURAL FEATURES THAT CANNOT BE ACHIEVED WITH THE CONDITIONAL R1E ZONING CLASSIFICATION.

CONFORMITY TO THE ADOPTED MASTER PLAN AND POLICIES OF THE CITY OR DETAILED COMPELLING JUSTIFICATION FOR DEPARTURES FROM THE PLAN AND POLICIES.

THE SITE IS IDENTIFIED AS SITE 8 IN THE SOUTH AREA OF THE LAND USE ELEMENT MASTER PLAN AND SINGLE-FAMILY DETACHED RESIDENTIAL USE IS RECOMMENDED. THE PERIMETER OF THE SITE INCLUDES SINGLE FAMILY RESIDENTIAL LOTS AT COMPLEMENTARY DENSITY TO ADJACENT NEIGHBORHOODS WITH THE INTENT TO MAINTAIN REZONING CONDITIONS IDENTIFIED IN THE CONDITIONAL REZONING TO R1E INCLUDING A 15 FOOT WIDE BUFFER, TYPE AND NUMBER OF MODELS, AND RANCH HOUSES. THE INTERNAL BLOCK INCLUDES FOUR BUILDINGS WITH ATTACHED RESIDENTIAL UNITS THAT HAVE SIMILAR SIZE AS WOULD BE ANTICIPATED WITH THE SINGLE FAMILY HOMES AS APPROVED WITH THE AREA PLAN.
THE PROPOSED UNITS WITH THIS DEVELOPMENT WOULD SUPPORT THE WASHTENAW COUNTY OFFICE OF COMMUNITY AND ECONOMIC DEVELOPMENT'S REPORT, HOUSING AFFORDABILITY AND ECONOMIC EQUITY ANALYSIS, WASHTENAW COUNTY, MICHIGAN THAT IDENTIFIES A NEED TO:
  - -CONSIDER WAYS FOR ZONING TO ENCOURAGE SMALLER STARTER HOMES, FAMILY SIZED UNITS AND TO ADD SOME WORKFORCE OPTIONS TO EXISTING NEIGHBORHOODS.
  - -CONSIDER CHANGES TO ZONING AND/OR POLICY TO ENCOURAGE DEVELOPMENT OF MIXED-INCOME HOUSING IN TARGETED AREAS

ADDITIONALLY, THE CITY OF ANN ARBOR SUSTAINABILITY FRAMEWORK OUTLINES THREE PRIMARY ASPECTS OF SUSTAINABILITY: ENVIRONMENT, ECONOMY, AND EQUITY. THE PROPOSED DEVELOPMENT INCORPORATES DESIGN ELEMENTS FOR SEVERAL OF THE 16 SUSTAINABILITY GOALS INCLUDING:
  - -DIVERSE HOUSING – THE DEVELOPMENT IS INTENDED TO ADD DIVERSITY TO THE HOUSING TYPOLOGIES AVAILABLE WITHIN THE ANN ARBOR HOUSING MARKET.
  - -ACTIVE LIVING AND LEARNING – THE PROPOSED SITE LAYOUT INCLUDES SEVERAL AREAS OF NATURAL FEATURES PRESERVATION ON THE SITE AND A PEDESTRIAN SIDEWALK NETWORK THAT PROVIDES CONNECTIVITY TO PACKARD ROAD AND THROUGHOUT THE SITE, ALLOWING FOR PASSIVE RECREATION AND CONNECTIVITY TO OFF-SITE RECREATIONAL OPPORTUNITIES SUCH AS COBBLESTONE FARM AND BUHR PARK.
  - -ECONOMIC VITALITY – THE HOUSING TYPOLOGY HAS THE POTENTIAL TO ENABLE EXISTING EMPLOYEES WITHIN ANN ARBOR TO LIVE IN ANN ARBOR AND THE POTENTIAL TO ATTRACT A NEW SET OF TALENTED INDIVIDUALS THAT ARE SEEKING EMPLOYMENT IN THE ANN ARBOR AREA BUT ARE HAVING DIFFICULTY FINDING HOUSING THAT DOES NOT EXCEED THEIR BUDGET FOR HOUSING EXPENSES.
  - -TRANSPORTATION OPTIONS – THE DEVELOPMENT SITE IS LOCATED ALONG PACKARD ROAD, WHICH IS ALONG AN AATA TRANSIT ROUTE,
  - -CLEAN AIR AND WATER – STORMWATER RUNOFF TREATMENT INCLUDES INFILTRATION AND UNDERGROUND DETENTION THAT REDUCED IMPACTS TO NATURAL FEATURES ON THE SITE.
  - -HEALTHY ECOSYSTEMS – THE DEVELOPMENT INCLUDES PRESERVATION OF EXISTING WOODLANDS AND LANDMARK TREES ON THE SITE.

DEVELOPMENT PROGRAM

a. DESCRIPTION:
PROPOSED IMPROVEMENTS CONSIST OF 51 RESIDENTIAL UNITS INCLUDING 25 SINGLE FAMILY RESIDENTIAL LOTS AND 26 ATTACHED RESIDENTIAL UNITS FOR A DENSITY OF 7 DWELLING UNITS PER ACRE. THE RESIDENTIAL UNITS WILL HAVE SINGLE-FAMILY HOMES WITH 2 CAR GARAGES. THE APPLICANT CURRENTLY HAS PURCHASE AGREEMENT ON PROPERTY.

THE SITE IS ACCESSED BY ONE PRIMARY ENTRANCE ALIGNED WITH THE EXISTING DRIVEWAY ACROSS PACKARD ROAD. AN SECONDARY EMERGENCY ACCESS IS PROPOSED FROM PACKARD ROAD AS WELL. A 48-FOOT PRIVATE ROADWAY AND PEDESTRIAN EASEMENT INCLUDES 22 FOOT 2 WAY STREET WITH PARKING ON ONE SIDE. ADDITIONAL PARKING IS PROVIDED ADJACENT TO THE PROPOSED DETENTION BASIN ON THE SOUTH SIDE OF THE SITE. A FRANCHISE UTILITY EASEMENT RUNS PARALLEL TO THE PRIVATE STREET ON BOTH SIDES OF THE STREET.

b. PRELIMINARY PHASING PROPOSAL AND PROBABLE CONSTRUCTION COST:
SITE IMPROVEMENTS WILL BE CONSTRUCTED IN 1 PHASE AT AN APPROXIMATE COST OF $2.5 MILLION.

COMMUNITY ANALYSIS

a. IMPACT OF PROPOSED DEVELOPMENT ON AREA SCHOOLS:
THE DEVELOPMENT WILL LIKELY INCREASE THE NUMBER OF CHILDREN ATTENDING THE ANN ARBOR PUBLIC SCHOOLS BY A SMALL AMOUNT, HOWEVER THIS INCREASE WILL BE SPREAD OVER SEVERAL YEARS AND OVER ALL GRADES.

b. RELATIONSHIP OF INTENDED USE TO NEIGHBORING USES:
THE PROPOSED DEVELOPMENT IS IN CHARACTER WITH THE SINGLE-FAMILY RESIDENTIAL USES IMMEDIATELY TO THE EAST, WEST, AND NORTH OF THE SITE. THE ATTACHED UNITS WILL BE LOCATED IN THE CENTRAL PORTION OF THE SITE TO PROVIDE ADDITIONAL BUFFER FROM THE NEIGHBORING DETACHED SINGLE FAMILY RESIDENTIAL.

c. IMPACT OF ADJACENT USES ON THE PROPOSED DEVELOPMENT:
THE PROPOSED DEVELOPMENT WILL BE COMPLEMENTED BY THE SINGLE FAMILY RESIDENTIAL USES IMMEDIATELY ADJACENT TO THE SITE. THE MANY NEARBY PARKS AND MALLETTS CREEK BRANCH LIBRARY SERVE AS AMENITIES TO THE RESIDENTS OF THE DEVELOPMENT.

d. IMPACT OF PROPOSED DEVELOPMENT ON THE AIR/WATER QUALITY AND ON EXISTING NATURAL FEATURES OF THE SITE AND NEIGHBORING SITES:
A MINIMAL LOCAL IMPACT ON AIR QUALITY MAY ARISE FROM INCREASED TRAFFIC DUE TO THE ADDITIONAL RESIDENTS. HOWEVER, THIS MAY BE COUNTERBALANCED REGIONALLY DUE TO SHORTER COMMUTES, PUBLIC TRANSPORTATION USE, AND PEDESTRIAN TRAVEL OF RESIDENTS MOVING CLOSER TO WORK OPPORTUNITIES. WATER QUALITY AND FLOW RATES WILL BE TREATED AND CONTROLLED IN ACCORDANCE WITH THE 2016 WASHTENAW COUNTY WATER RESOURCES COMMISSIONER REQUIREMENTS: THE FIRST FLUSH (RUNOFF FROM 1" STORM) WILL BE TREATED FOR QUALITY, THE GREATER OF THE FIRST FLUSH OR THE INCREASE IN THE 2-YEAR 24-HOUR EVENT WILL BE INFILTRATED, AND THE FLOW RATE OF ALL STORMS UP TO THE 100-YEAR 24-HOUR STORM WILL BE RESTRICTED TO LESS THAN 0.15 CFS/ACRE.
NATURAL FEATURES ON-SITE INCLUDE EXISTING WOODLAND AND LANDMARK TREES. NATURAL FEATURES ARE INTEGRATED INTO A 15-FOOT LANDSCAPE BUFFER ALONG THE PERIMETER OF THE PROPERTY AND DESIGNATED OPEN SPACES. IMPACTED NATURAL FEATURES WILL BE MITIGATED AS REQUIRED BY THE CITY ORDINANCE.

e. IMPACT ON HISTORIC SITES OR STRUCTURES:
THERE ARE NO REGISTERED HISTORIC STRUCTURES ON SITE. THE HOUSE WAS BUILT IN 1840 AND HAS BEEN A RENTAL UNIT FOR THE LAST 30+ YEARS WITH MANY INTERIOR MODIFICATIONS.

SITE ANALYSIS

a. EXISTING LAND USE AND ACTIVITY ON THE SITE-THE SITE IS A SINGLE FAMILY RESIDENTIAL LOT CURRENTLY USED AS A RENTAL PROPERTY. SEE EXISTING CONDITIONS PLAN.
b. INVENTORY OF SITE CONDITIONS-SEE EXISTING CONDITIONS PLAN.
c. DESCRIPTION OF NATURAL FEATURES-SEE EXISTING CONDITIONS PLAN.
  i. NO KNOWN ENDANGERED SPECIES HABITAT ON THE SITE.
  ii. NO 100-YEAR FLOODPLAIN IDENTIFIED ON THE SITE.
  iii. LANDMARK TREES – SEE EXISTING CONDITIONS PLAN AND TREE LIST
  iv. STEEP SLOPES – NO STEEP SLOPES IDENTIFIED ON THE SITE.
  v. NO WATERCOURSES IDENTIFIED ON THE SITE.
  vi. NO WETLANDS IDENTIFIED ON THE SITE.
  vii. WOODLANDS – SEE EXISTING CONDITIONS PLAN AND TREE LIST.
d. LOCATION AND USE OF ALL EXISTING STRUCTURES ON THE SITE-SEE EXISTING CONDITIONS PLAN.
e. EXISTING AND PROPOSED VEHICULAR, PEDESTRIAN, AND BICYCLE WAYS AND ACCESS POINTS-SEE SITE LAYOUT PLAN
f. UTILITY AVAILABILITY AND PROPOSED CONNECTIONS WITH EXISTING PUBLIC RIGHTS-OF-WAY AND PUBLIC AND PRIVATE EASEMENTS – WATER SERVICE WILL LOOP TO PACKARD ROAD. SANITARY SERVICE WILL EXTEND FROM EAST ALONG PACKARD ROAD. THE STORMWATER MANAGEMENT SYSTEM WILL OUTLET TO THE STORM SYSTEM ON PACKARD ROAD. SEE EXISTING CONDITIONS PLAN AND SITE UTILITY PLAN.
g. EXISTING AND PROPOSED GENERAL DRAINAGE PATTERN – THE SITE GENERALLY SLOPES TOWARD PACKARD ROAD AND TO THE NORTHEAST OF THE PROPERTY. SEE EXISTING CONDITIONS PLAN FOR EXISTING TOPOGRAPHY AND SITE GRADING PLAN FOR PROPOSED CONDITIONS.
h. SUMMARY OVERLAY SHOWING HOW PROPOSED LAND USE RELATES TO EXISTING CONDITIONS – SEE ALTERNATIVE ANALYSIS PLAN

SCHEMATIC DESIGN

a. COMPARISON CHART – SEE SITE DATA ON COVER SHEET
b. EXISTING AND PROPOSED TOPOGRAPHY-SEE SITE GRADING PLAN
c. ORIENTATION AND LOCATION OF IMPROVEMENTS-SEE SITE LAYOUT PLAN
d. VERTICAL SECTION THROUGH THE SITE-SEE SITE CROSS-SECTIONS
e. PROPOSED CIRCULATION PATTERNS-SEE SITE LAYOUT PLAN
f. PROPOSED LOT LINES AND SETBACK LINES-SEE SITE LAYOUT PLAN
g. NATURAL FEATURE IMPACT AREAS – SEE SITE REMOVAL PLAN AND TREE LIST

TRAFFIC ANALYSIS

NUMBER OF PEAK HOUR TRIPS PER TRIP GENERATION MANUAL (10TH EDITION):

Vehicular Trip Generation per Trip Generation Manual (**10th Edition**)
For project with 25 single family detached and 26 single family attached lots

	ITE	Size	24-Hour	Morning Peak Hour			Afternoon Peak Hour		
Land Use	Code	(Units)	Volume	Enter	Exit	Total	Enter	Exit	Total
Single Family, Detached	210	25	290	6	17	23	17	10	27
Single Family, Attached	220	26	156	3	10	13	11	7	18
		51	446	9	27	36	28	17	45

TRAFFIC IMPACT STUDY SUBMITTED SEPARATELY.

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JIM HAEUSSLER
734-429-4200

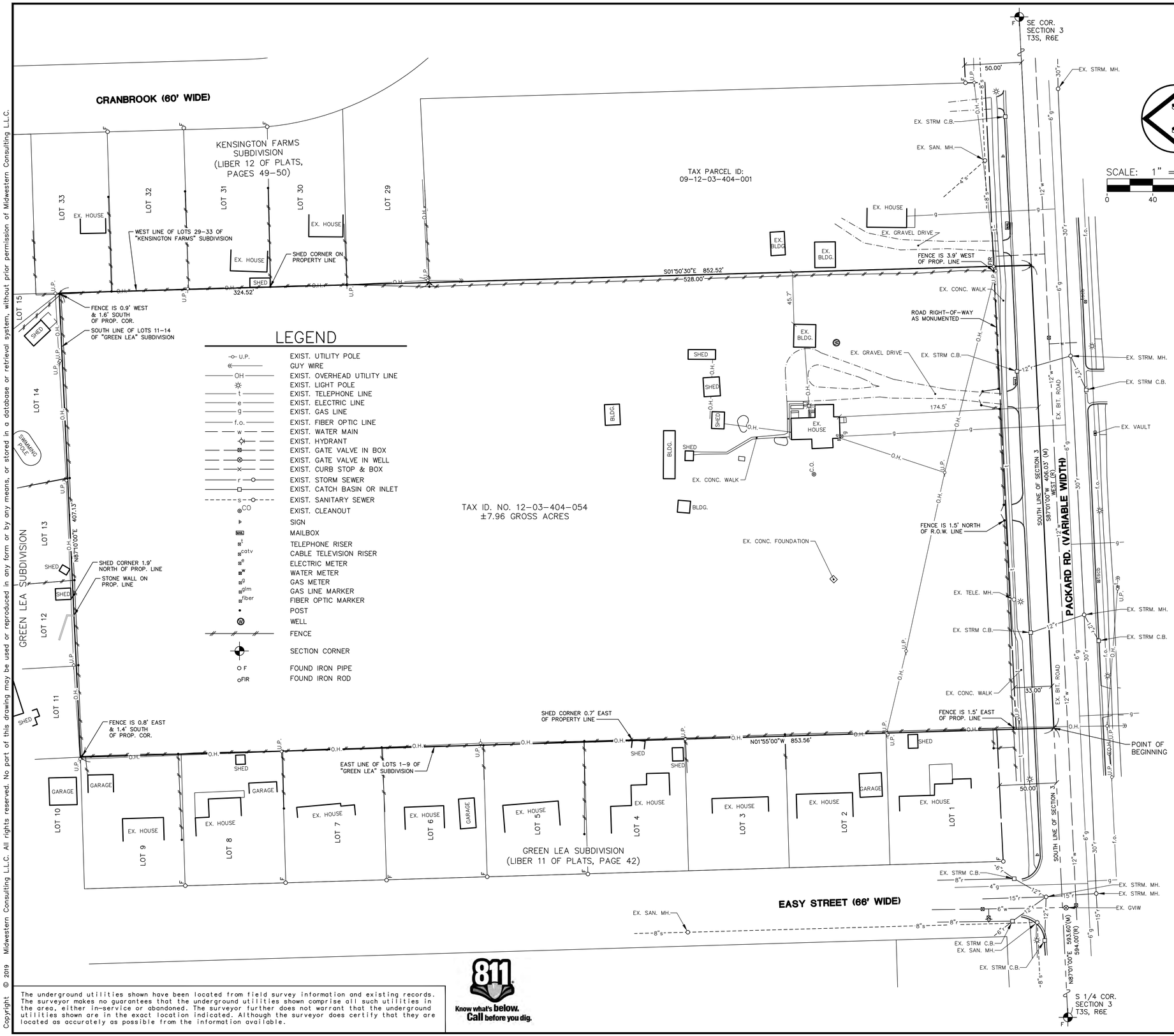
2857 PACKARD ROAD
PLANNED UNIT DEVELOPMENT
SITE PLAN NARRATIVES

02

DATE: 4/25/19
SHEET 02 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH:
SITE PLAN/16070CV1

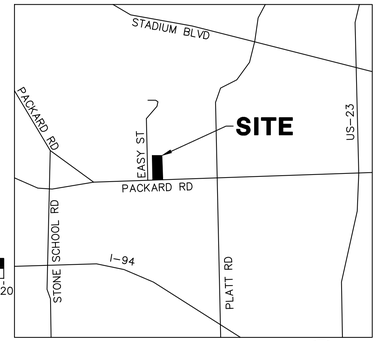
JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19



LEGEND

U.P.	EXIST. UTILITY POLE
	GUY WIRE
OH	EXIST. OVERHEAD UTILITY LINE
	EXIST. LIGHT POLE
t	EXIST. TELEPHONE LINE
e	EXIST. ELECTRIC LINE
g	EXIST. GAS LINE
f.o.	EXIST. FIBER OPTIC LINE
w	EXIST. WATER MAIN
	EXIST. HYDRANT
	EXIST. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
r	EXIST. STORM SEWER
	EXIST. CATCH BASIN OR INLET
s	EXIST. SANITARY SEWER
CO	EXIST. CLEANOUT
	SIGN
MAIL	MAILBOX
T	TELEPHONE RISER
CATV	CABLE TELEVISION RISER
E	ELECTRIC METER
W	WATER METER
G	GAS METER
GLM	GAS LINE MARKER
FIBER	FIBER OPTIC MARKER
	POST
W	WELL
	FENCE
	SECTION CORNER
O F	FOUND IRON PIPE
FIR	FOUND IRON ROD



VICINITY MAP
N.T.S.

LEGAL DESCRIPTION

(from Absolute Title Commitment, File No. 69755 Rev. 2, with effective date of March 29, 2016)

Commencing at the South 1/4 post of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence North 89°47'30" East, 594 feet in the South line of said Section for a Place of Beginning; thence North 00°51'30" East, 853.56 feet; thence North 89°56'30" East, 407.13 feet; thence South 00°56' West to the South line of the Section; thence West along said South Section line to Place of Beginning.

Being more particularly described as the following:

Commencing at the S 1/4 corner of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence N89°47'30"E 593.60 feet (recorded 594 feet) along the South line of said Section 3 to the Point of Beginning;
- thence N00°51'30"E 853.56 feet along the East line of Lots 1-9 of "Green Lea" Subdivision as recorded in Liber 11 of Plats, Page 42, Washtenaw County Records;
- thence N89°56'30"E 407.13 feet along the South line of Lots 11-14 of said "Green Lea" Subdivision;
- thence S00°56'00"W 324.52 feet along the West line of Lots 29-33 of "Kensington Farms" Subdivision, as recorded in Liber 12 of Plats, Pages 49 and 50, Washtenaw County Records;
- thence continuing S00°56'00"W 528.00 feet;
- thence S89°47'30"W 406.03 feet (recorded West) along said South line of Section 3 to the Point of Beginning. Being a part of the SE 1/4 of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, and containing 7.96 acres, more or less. Being subject to the rights of public over that portion as occupied by Packard Road. Being subject to any restrictions or easements, if any.

EXCEPTIONS

8. Rights of the public or any governmental unit in any part of subject property taken, deeded, or used for street, road, or highway purposes.

9. Resolution authorizing water improvement charges, as recorded in Liber 4646, Page 933, Washtenaw County Records. (Not Plotted)

NOTES

1. This survey was prepared using Absolute Title, Inc., File No. 69755 Rev.2 with an effective date of March 29, 2016.
2. Bearings based on Absolute Title, Inc., File No. 69755 Rev.2 with an effective date of March 29, 2016.
3. The legal description describes the same property as insured in the title commitment and any exceptions have been noted herein.
4. There is no observed evidence of this being used as a solid waste dump, sump or sanitary landfill.
5. There is no observed evidence indicating any cemeteries are located on the parcel herein described.
6. Site address: 2857 Packard Rd., Ann Arbor, Pittsfield Township, Michigan

SURVEYORS CERTIFICATE

To: Peters Building Company and Robert R. Weber.

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2016 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes none of the Items of Table A thereof. The fieldwork was completed on January 26, 2017.

MIDWESTERN CONSULTING, LLC

By: Mark Vander Veen
Mark Vander Veen, P.S. No. 56788

Date: March 29, 2017

STATE OF MICHIGAN
MARK VANDER VEEN
PROFESSIONAL SURVEYOR
NO. 56788
LICENSED PROFESSIONAL SURVEYOR

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

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

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
ALTA-NSPS LAND TITLE SURVEY

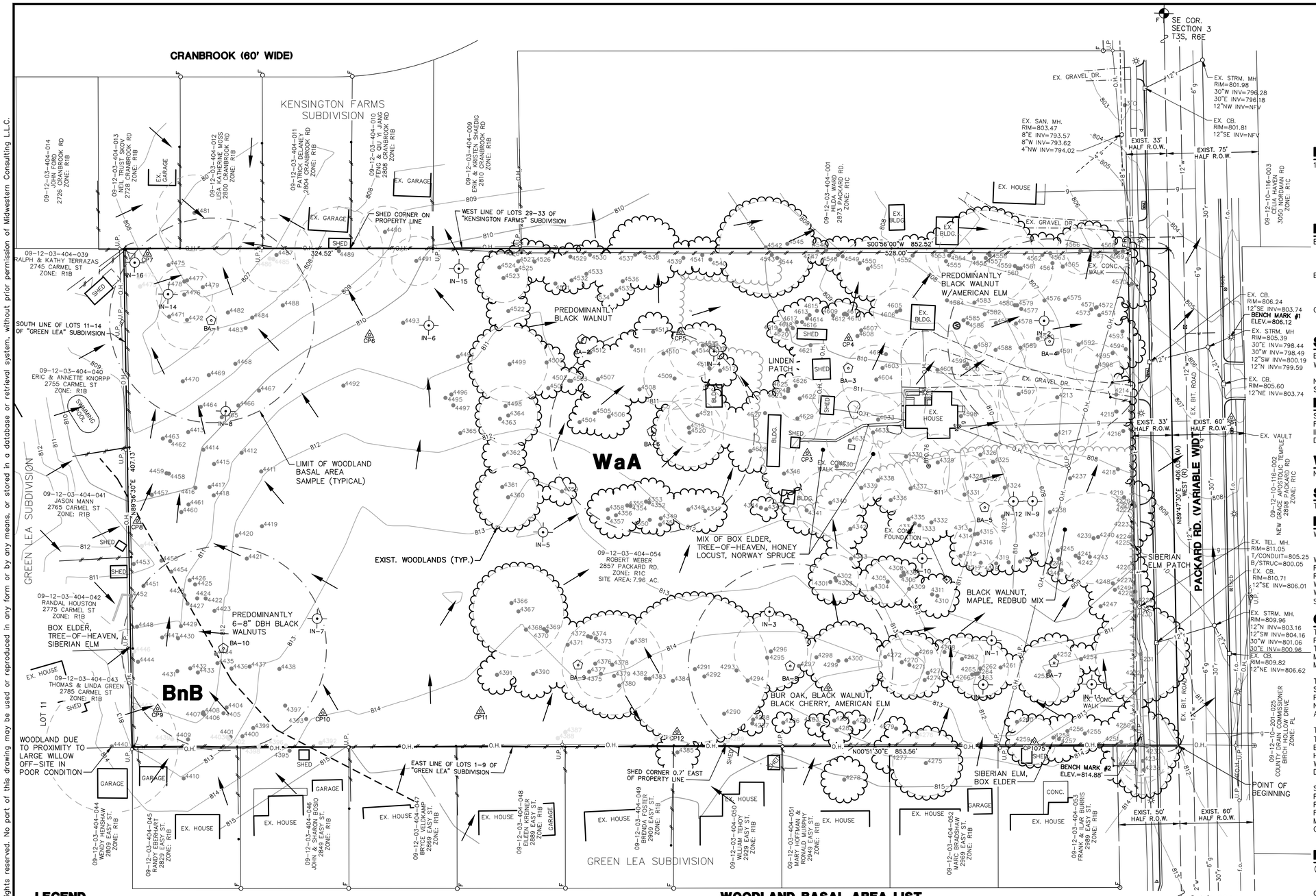
03

JOB No. 16070

REVISIONS:
PER CITY REVIEW

REV. DATE
05/31/19

DATE: 4/25/19
SHEET 03 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
SITE PLAN/16070_ALTA01.dwg



LEGEND

813	EXIST. CONTOUR	r	EXIST. STORM SEWER
×813.2	EXIST. SPOT ELEVATION		EXIST. CATCH BASIN OR INLET
U.P.	EXIST. UTILITY POLE	s	EXIST. SANITARY SEWER
	GUY WIRE		SIGN
OH	EXIST. OVERHEAD UTILITY LINE	MBX	MAILBOX
	EXIST. LIGHT POLE		TELEPHONE RISER
t	EXIST. TELEPHONE LINE		ELECTRIC METER
e	EXIST. ELECTRIC LINE	g	GAS METER
g	EXIST. GAS LINE	tscb	TRAFFIC SIGNAL CONTROL BOX
f.o.	EXIST. FIBER OPTIC LINE		POST
w	EXIST. WATER MAIN	W	WELL
	EXIST. HYDRANT		FENCE
	EXIST. GATE VALVE IN BOX		EXIST. SOILS TYPE LINE
	EXIST. GATE VALVE IN WELL		CONTROL PT.
	EXIST. CURB STOP & BOX		

	SINGLE TREE
	SINGLE TREE – IMPACTED BY DTE
	LANDMARK TREE – CRZ
	TREE OR BRUSH LIMIT
	SECTION CORNER
IN-1	TEST PIT LOCATION
F	FOUND IRON PIPE
F	FOUND MONUMENT
FIR	FOUND IRON ROD
	EXIST. REGULATED WOODLANDS
BA-1	WOODLAND BASAL AREA SAMPLE POINT
	EXIST. DRAINAGE ARROWS

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

WOODLAND BASAL AREA LIST

BA-1: SAMPLE BASAL AREA 1/2 ACRE PLOT; 19 TREES; BA=18.25SF; DOES NOT MEET WOODLAND CRITERIA

BA-2: 30 TREES; BA=30.91SF

BA-3: 33 TREES; BA=37.8SF

BA-4: SAMPLE BASAL AREA 1/2 ACRE PLOT; 44 TREES; BA=54.44SF

BA-5: 34 TREES; BA=35.37SF

BA-6: SAMPLE BASAL AREA 1/2 ACRE PLOT; 33 TREES; BA=34.53SF; FRAGMENTED WOODLAND

BA-7: 24 TREES; BA=31.18SF

BA-8: SAMPLE BASAL AREA 1/2 ACRE PLOT; 22 TREES; BA=39.54SF

BA-9: 21 TREES; BA=28.0SF

BA-10: SAMPLE BASAL AREA 1/2 ACRE PLOT; 33 TREES; BA=34.49SF; <0.5 ACRE IN SIZE

STATE OF MICHIGAN — MARK VANDER VEEN — PROFESSIONAL SURVEYOR NO. 56788 — LICENSED PROFESSIONAL SURVEYOR

Mark Vander Veen

MARK VANDER VEEN, PROFESSIONAL SURVEYOR #56788

SCALE: 1" = 40'

0 40 80 120

NOTE

1. THE BASE SURVEY WAS PREPARED BY MIDWESTERN CONSULTING IN APRIL 2016. ALL UNDERGROUND UTILITIES AND STRUCTURES HAVE BEEN SHOWN TO A REASONABLE DEGREE OF ACCURACY AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THEIR EXACT LOCATION AND TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.

BENCHMARKS

BM#1–NORTHEAST BOLT OF SILVER LAMP POST SOUTH SIDE OF PACKARD ROAD, SE OF EXISTING DRIVE ACCESS TO PROPERTY. ELEVATION = 806.12 (NAVD88 DATUM)

BM#2–SET SPIKE IN EAST FACE OF UTILITY POLE ON NORTH SIDE OF PACKARD ROAD, SOUTHWEST CORNER OF PROPERTY. ELEVATION = 814.88 (NAVD88 DATUM)

CITY OF ANN ARBOR BM #0016: +/–450' WEST OF PROPERTY, LOCATED IN BUHR PARK ON THE NORTH SIDE OF PACKARD ROAD. ELEVATION = 817.66 (NAVD88 DATUM)

SOILS DESCRIPTION

BnB – BOYER LOAMY SAND, 1–6% SLOPES (TYPE B SOILS)
WaA – WASEPI SANDY LOAM, 0–4% SLOPES (TYPE B SOILS)

NOTE: SEE INFILTRATION TESTING RESULTS ON SOIL BORING LOGS SHEET FOR MORE DETAILED INFORMATION.

FLOODPLAIN

SUBJECT PROPERTY IS NOT LOCATED WITHIN A 100–YEAR FLOODPLAIN, PER FLOOD INSURANCE RATE MAP NO. 26161C0402E, IN WASHTENAW COUNTY, STATE OF MICHIGAN, WITH AN EFFECTIVE DATE OF APRIL 3, 2012.

WETLANDS/WATER COURSES

NO WETLANDS IDENTIFIED ON THE SITE

STEEP SLOPES

THERE ARE NO STEEP SLOPES PRESENT ON THIS SITE.

NATURAL FEATURES SUMMARY

WASHTENAW COUNTY WATER RESOURCES COMMISSIONERS OFFICE

	MAPPED	TOTAL AREA	PROTECTED/ UNDISTURBED
WATER BODIES	NO	0 AC.	0 AC.
FLOODPLAINS	NO	0 AC.	0 AC.
RIPARIAN AREAS	NO	0 L.F.	0 L.F.
WETLANDS	NO	0 AC.	0 AC.
WOODLANDS	YES	3.40 AC.	±0.89 AC.
SLOPES (>33%)	NO	0 AC.	0 AC.

GENERAL DESC. OF NATURAL FEATURES

THE 8 ACRE SITE IS CURRENTLY UTILIZED AS A RESIDENTIAL RENTAL PROPERTY WITH A MAIN HOUSE AND SEVERAL FORMER FARM OUTHOUSES. THE PORTION OF THE SITE NEAR THE RESIDENCE IS WOODED WITH A MANICURED LAWN. THE REMAINDER OF THE SITE IS NATURALIZED WITH MOWED TRAILS MAINTAINED THROUGH PORTIONS OF THE SITE.

THE SOUTHERN PORTION OF THE SITE IS PRIMARILY WOODED WITH A SOMEWHAT LIMITED UNDERSTORY OF VEGETATION. THE NORTHERN PORTION OF THE SITE IS A FORMER FALLOW FIELD THAT HAS NATURALIZED WITH EARLY SUCCESSIONAL SHRUBS, INCLUDING BUCKTHORN AND TREE SAPLINGS INCLUDING WALNUT AND ELMS.

THE SITE HAS REGULATED NATURAL FEATURES INCLUDING LANDMARK TREES AND REGULATED WOODLANDS. TREES OVER 6" DBH IN SIZE HAVE BEEN IDENTIFIED AND MAPPED. A TREE LIST, INCLUDING LOCATION, HEALTH, AND LANDMARK STATUS IS PROVIDED. THE REGULATED WOODLAND BOUNDARY HAS BEEN DELINEATED PER THE WOODLAND DEFINITION IN THE CITY OF ANN ARBOR UNIFIED DEVELOPMENT CODE.

SEE NATURAL FEATURES OVERLAY PLAN FOR PROPOSED NATURAL FEATURES PROTECTION MEASURES. SEE LANDSCAPE PLAN FOR NATURAL FEATURES MITIGATION CALCULATIONS. SEE ALTERNATIVE ANALYSIS PLANS FOR NATURAL FEATURES ALTERNATIVE ANALYSIS. SEE NATURAL FEATURES MAINTENANCE PLAN FOR NATURAL FEATURES PROTECTION AND POST CONSTRUCTION MAINTENANCE.

LEGAL DESCRIPTION

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SALINE, MI 48176
JIM HAEUSSLER
734-429-4200

2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
EXISTING CONDITIONS AND NATURAL FEATURES PLAN

04

DATE: 4/25/19
SHEET 04 OF 27
CADD: CTS, TES
ENG: SGF
PM: MJC
TECH: WVV
SITE PLAN/16070EX1

JOB No. 16070

REVISIONS:
PER CITY REVIEW — REV. DATE 05/31/19

TREE LIST

TAG#	DBH	CUM. DBH	COMMON NAME	GENUS/SPECIES	STEMS	SCORE/ NOTES	LM	WOODLAND	INV	REMOVE	MITIGATE	OFF-SITE
4213	48"	48"	Northern Catalpa	Catalpa speciosa		21			X	X		
4214	14"	14"	Black Walnut	Juglans nigra				X		X	7	
4215	12"	12"	Black Walnut	Juglans nigra				X		X	6	
4216	6"	10"	White Mulberry	Morus alba	triple	40%			X	X		
4217	27"	27"	Tuliptree	Liriodendron tulipifera		18	X	X		X	13.5	
4218	12"	12"	Black Maple	Acer nigrum				X		X	6	
4219	13"	13"	Siberian Elm	Ulmus pumila					X	X		
4220	15"	15"	Siberian Elm	Ulmus pumila					X	X		
4221	11"	11"	Siberian Elm	Ulmus pumila					X	X		
4222	7"	7"	Siberian Elm	Ulmus pumila					X	X		
4223	14"	14"	Siberian Elm	Ulmus pumila					X	X		
4224	6"	6"	Siberian Elm	Ulmus pumila					X	X		
4225	6"	6"	Siberian Elm	Ulmus pumila					X	X		
4226	8"	8"	Siberian Elm	Ulmus pumila					X	X		
4227	10"	10"	Siberian Elm	Ulmus pumila					X	X		
4228	7"	7"	Siberian Elm	Ulmus pumila					X	X		
4229	12"	12"	Siberian Elm	Ulmus pumila					X	X		
4230	6"	6"	Siberian Elm	Ulmus pumila					X	X		
4231	37"	37"	Sugar Maple	Acer saccharum		15	X	X		X	0	
4232	6"	6"	Siberian Elm	Ulmus pumila					X	X		
4233	25"	25"	Bur Oak	Quercus macrocarpa		21	X	X				off-site
4234	18"	18"	Bur Oak	Quercus macrocarpa		21	X	X				off-site
4235	20"	20"	Bur Oak	Quercus macrocarpa		21	X	X				off-site
4236	13"	13"	Norway Spruce	Picea abies				X				off-site
4237	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4238	12"	12"	Silver Maple	Acer saccharinum				X		X	6	
4239	37"	37"	Cottonwood	Populus deltoides		21	X	X		X	18.5	
4240	14"	14"	Black Walnut	Juglans nigra				X		X	7	
4241	11"	11"	Black Cherry	Prunus serotina				X		X	5.5	
4242	7"	7"	Black Cherry	Prunus serotina				X		X	0	
4243	6"	6"	Black Maple	Acer nigrum				X		X	0	
4244	6"	6"	Black Cherry	Prunus serotina				X		X	0	
4245	10"	10"	Black Cherry	Prunus serotina				X		X	5	
4246	8"	8"	Redbud	Cercis canadensis		21	X	X		X	4	
4247	7"	7"	Red Cedar	Juniperus virginiana				X		X	0	
4248	7"	7"	Black Maple	Acer nigrum				X		X	0	
4249	6"	6"	Black Maple	Acer nigrum				X		X	0	
4250	17"	17"	Siberian Elm	Ulmus pumila					X			
4251	14"	14"	Honey Locust	Gleditsia triacanthos				X				
4252	16"	16"	Black Walnut	Juglans nigra				X		X	8	
4253	25"	25"	Black Walnut	Juglans nigra		21	X	X		X	12.5	
4254	10"	10"	Black Walnut	Juglans nigra				X		X	5	
4255	13"	13"	Siberian Elm	Ulmus pumila					X			
4256	11"	11"	Siberian Elm	Ulmus pumila					X			
4257	16"	23"	Siberian Elm	Ulmus pumila	twin				X			
4258	11"	11"	Siberian Elm	Ulmus pumila					X			
4259	19"	19"	Box Elder	Acer negundo		14	X	X				
4260	7"	7"	Black Cherry	Prunus serotina				X		X	0	
4261	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4262	23"	23"	Black Walnut	Juglans nigra		21	X	X		X	11.5	
4263	8"	8"	American Elm	Ulmus americana				X		X	4	
4264	13"	13"	American Elm	Ulmus americana				X		X	6.5	
4265	8"	8"	Silver Maple	Acer saccharinum				X		X	4	
4266	11"	11"	Black Walnut	Juglans nigra				X		X	5.5	
4267	18"	18"	Black Walnut	Juglans nigra		21	X	X		X	9	
4268	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4269	14"	14"	Black Walnut	Juglans nigra				X				
4270	19"	19"	Bur Oak	Quercus macrocarpa		17	X	X				
4271	25"	25"	Bur Oak	Quercus macrocarpa		18	X	X				
4272	7"	7"	Northern Hackberry	Celtis occidentalis				X		CRZ IMP	0	
4273	13"	13"	Black Walnut	Juglans nigra				X				
4274	11"	11"	Catalpa	Catalpa speciosa				X				
4275	27"	27"	White Pine	Pinus strubus		21	X	X				off-site
4276	7"	7"	Siberian Elm	Ulmus pumila		only trunk left			X	DTE Impact		
4277	13"	13"	Black Walnut	Juglans nigra				X				off-site
4278	16"	16"	White Pine	Pinus strubus				X				off-site
4279	7"	7"	Box Elder	Acer negundo		40%		X		X	0	
4280	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4281	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4282	10"	10"	Siberian Elm	Ulmus pumila					X	X		
4283	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4286	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4287	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4288	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4289	9"	9"	Black Walnut	Juglans nigra		only trunk left		X		DTE Impact		
4290	6"	6"	Black Walnut	Juglans nigra				X		CRZ IMP	0	
4291	60"	60"	Bur Oak	Quercus macrocarpa		21	X	X				
4292	10"	10"	Siberian Elm	Ulmus pumila					X			
4293	10"	10"	American Elm	Ulmus americana				X				
4294	6"	6"	Box Elder	Acer negundo				X				
4295	12"	12"	Bur Oak	Quercus macrocarpa				X		X	6	
4296	30"	30"	Bur Oak	Quercus macrocarpa		21	X	X		X	15	
4297	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4298	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4299	15"	15"	Bur Oak	Quercus macrocarpa		40%		X		X	0	
4300	29"	29"	Black Walnut	Juglans nigra		21	X	X		X	14.5	
4301	6"	6"	Linden	Tilia americana				X		X	0	
4302	19"	19"	Linden	Tilia americana		21	X	X		X	9.5	
4303	13"	13"	Linden	Tilia americana				X		X	6.5	
4304	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4305	18"	18"	Black Walnut	Juglans nigra		21	X	X		X	9	
4306	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4307	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4308	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4309	12"	12"	Black Walnut	Juglans nigra				X		X	6	
4310	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4311	12"	12"	Black Walnut	Juglans nigra				X		X	6	
4312	6"	6"	N. White-cedar	Thuja occidentalis				X		X	0	
4313	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4314	8"	8"	American Elm	Ulmus americana				X		X	4	
4315	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4316	19"	19"	Black Walnut	Juglans nigra		21	X	X		X	9.5	
4317	8"	8"	N. White-cedar	Thuja occidentalis		21	X	X		X	4	
4318	6"	6"	N. White-cedar	Thuja occidentalis				X		X	0	
4319	7"	7"	N. White-cedar	Thuja occidentalis				X		X	0	
4320	6"	6"	N. White-cedar	Thuja occidentalis				X		X	0	
4321	12"	12"	Black Maple	Acer nigrum				X		X	6	
4323	10"	10"	Red Cedar	Juniperus virginiana		15	X	X		X	0	
4324	7"	7"	Red Cedar	Juniperus virginiana		40%		X		X	0	
4325	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4326	17"	17"	Black Walnut	Juglans nigra				X		X	8.5	
4327	18"	18"	Black Walnut	Juglans nigra		21	X	X		X	9	
4328	19"	19"	Black Walnut	Juglans nigra		20	X	X		X	9.5	
4329	23"	23"	Black Walnut	Juglans nigra		21	X	X		X	11.5	
4330	11"	11"	Tree-of-heaven	Ailanthus altissima					X	X		
4331	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4332	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4333	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4334	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4335	14"	14"	Black Walnut	Juglans nigra				X		X	7	
4336	9"	9"	Red Cedar	Juniperus virginiana		15	X	X		X	0	
4337	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4338	14"	14"	Norway Spruce	Picea abies		DEAD		X		X	0	
4339	14"	14"	Norway Spruce	Picea abies				X		X	7	
4340	27"	27"	Black Walnut	Juglans nigra		21	X	X		X	13.5	
4341	17"	17"	Black Walnut	Juglans nigra				X		X	8.5	
4342	11"	11"	Black Walnut	Juglans nigra				X		X	5.5	
4343	6"	6"	Tree-of-heaven	Ailanthus altissima					X	X		
4344	6"	6"	Black Walnut	Juglans nigra				X				
4345	7"	7"	Black Walnut	Juglans nigra				X				
4346	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4347	15"	15"	Honey Locust	Gleditsia triacanthos				X		CRZ IMP	7.5	
4348	14"	14"	Honey Locust	Gleditsia triacanthos				X				
4349	7"	7"	American Elm	Ulmus americana				X		X	0	
4350	9"	9"	Honey Locust	Gleditsia triacanthos				X		X	4.5	
4351	6"	6"	Honey Locust	Gleditsia triacanthos				X		X	0	
4352	17"	17"	Black Walnut	Juglans nigra				X				
4353	11"	11"	Black Walnut	Juglans nigra				X				
4354	10"	10"	Honey Locust	Gleditsia triacanthos				X				
4355	14"	14"	Black Walnut	Juglans nigra				X				
4356	16"	16"	Black Walnut	Juglans nigra				X		X	8	
4357	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4358	14"	14"	Black Walnut	Juglans nigra				X				
4359	9"	9"	Honey Locust	Gleditsia triacanthos				X				
4360	25"	25"	Black Walnut	Juglans nigra		21	X					
4361	7"	7"	Black Walnut	Juglans nigra								
4362	15"	15"	Black Walnut	Juglans nigra						X		
4363	13"	13"	Black Walnut	Juglans nigra						X		
4364	24"	24"	Honey Locust	Gleditsia triacanthos		21	X	X		X	12	
4365	6"	6"	Black Walnut	Juglans nigra						X		
4366	7"	7"	Black Cherry	Prunus serotina				X		X	0	
4367	37"	37"	Bur Oak	Quercus macrocarpa		21	X	X		X	18.5	
4368	9"	9"	Black Cherry	Prunus serotina				X		X	4.5	
4369	7"	7"	Linden	Tilia americana				X		X	0	
4370	6"	6"	Linden	Tilia americana				X		X	0	
4371	6"	6"	American Elm	Ulmus americana				X		X	0	
4372	7"	7"	Linden	Tilia americana				X		X	0	
4373	8"	8"	Linden	Tilia americana				X		X	4	
4374	9"	9"	Linden	Tilia americana				X		X	4.5	
4375	20"	20"	Bur Oak	Quercus macrocarpa		21	X	X				
4376	15"	15"	Bur Oak	Quercus macrocarpa				X				
4377	11"	11"	Black Walnut	Juglans nigra				X				
4378	41"	41"	Bur Oak	Quercus macrocarpa		21	X	X		CRZ IMP	20.5	
4379	7"	7"	Black Cherry	Prunus serotina				X				
4380	7"	7"	Black Cherry	Prunus serotina				X				
4381	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4382	12"	12"	Bur Oak	Quercus macrocarpa				X				
4383	10"	10"	Black Walnut	Juglans nigra				X				
4384	6"	6"	Siberian Elm	Ulmus pumila					X			
4385	15"	15"	Honey Locust	Gleditsia triacanthos				X				off-site
4386	15"	15"	Norway Spruce	Picea abies		only trunk left,tree topped		X		DTE Impact		
4387	12"	12"	Northern Hackberry	Celtis occidentalis		minimal branches remain	X	X		DTE Impact		
4388	10"	14"	Black Walnut	Juglans nigra	twin	minimal branches remain	X	X		DTE Impact		
4390	17"	17"	Black Walnut	Juglans nigra				X		X	8.5	
4391	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4392	10"	10"	Black Walnut	Juglans nigra		minimal branches remain				DTE Impact		
4393	8"	8"	Black Walnut	Juglans nigra						X		
4395	7"	10"	Siberian Elm	Ulmus pumila	twin				X			off-site
4396	9"	9"	Black Walnut	Juglans nigra		minimal branches remain				DTE Impact		off-site
4397	11"	11"	Black Walnut	Juglans nigra						X		
4398	8"	8"	Black Walnut	Juglans nigra		only trunk left,tree topped		X		DTE Impact		
4399	7"	7"	Black Walnut	Juglans nigra						X		
4400	11"	11"	Black Walnut	Juglans nigra						X		
4401	8"	8"	Black Walnut	Juglans nigra						X		
4402	7"	7"	Box Elder	Acer negundo		only trunk left,tree topped				DTE Impact		
4403	13"	13"	Box Elder	Acer negundo		only trunk left,tree topped				DTE Impact		
4404	7"	7"	Black Walnut	Juglans nigra						X		
4405	6"	6"	Black Walnut	Juglans nigra						X		
4406	9"	9"	Black Walnut	Juglans nigra						X		
4407	13"	13"	Black Walnut	Juglans nigra						X		
4408	9"	9"	Black Walnut	Juglans nigra						X		
4409	10"	10"	Black Walnut	Juglans nigra								
4410	19"	19"	Norway Maple	Acer platanoides					X			
4411	7"	7"	Black Cherry	Prunus serotina						X		
4412	7"	7"	Black Cherry	Prunus serotina						X		
4413	6"	6"	Black Cherry	Prunus serotina						X		
4414	6"	6"	Black Cherry	Prunus serotina						X		
4415	6"	6"	Black Cherry	Prunus serotina						X		
4416	9"	9"	Black Walnut	Juglans nigra						X		
4417	7"	7"	Black Cherry	Prunus serotina						X		
4418	8"	8"	Black Walnut	Juglans nigra						X		
4419	8"	8"	Black Walnut	Juglans nigra						X		
4420	6"	6"	Black Walnut	Juglans nigra						X		
4421	6"	6"	Black Walnut	Juglans nigra						X		
4422	6"	6"	Black Walnut	Juglans nigra						X		
4423	7"	7"	Black Walnut	Juglans nigra						X		
4424	7"	7"	Black Walnut	Juglans nigra						X		
4425	6"	6"	Black Walnut	Juglans nigra						X		
4426	7"	7"	Black Walnut	Juglans nigra						X		
4427	8"	8"	Black Walnut	Juglans nigra						X		
4428	7"	7"	Black Walnut	Juglans nigra						X		
4429	8"	8"	Black Walnut	Juglans nigra						X		
4430	9"	9"	Black Walnut	Juglans nigra						X		
4431	7"	7"	Black Walnut	Juglans nigra						X		
4432	8"	8"	Black Walnut	Juglans nigra						X		
4433	7"	7"	Black Walnut	Juglans nigra						X		
4434	8"	8"	Black Walnut	Juglans nigra						X		
4435	6"	6"	Black Walnut	Juglans nigra						X		
4436	8"	8"	Black Walnut	Juglans nigra						X		
4437	7"	7"	Black Walnut	Juglans nigra						X		
4438	8"	8"	American Elm	Ulmus americana						X		
4439	8"	11"	Black Cherry	Prunus serotina	twin	only trunk left,tree topped				DTE Impact		
4440	54"	54"	Weeping Willow	Salix babyloncia		15	X					off-site
4443	12"	12"	Black Cherry	Prunus serotina		minimal branches remain				DTE Impact		
4444	12"	12"	Black Walnut	Juglans nigra								
4446	7"	10"	Siberian Elm	Ulmus pumila	twin	minimal branches remain			X	DTE Impact		
4447	9"	9"	Norway Maple	Acer platanoides					X	X		
4448	12"	12"	Box Elder	Acer negundo								
4451	7"	7"	Black Walnut	Juglans nigra						X		
4452	14"	14"	Tree-of-heaven	Ailanthus altissima					X			
4453	11"	16"	Siberian Elm	Ulmus pumila	twin				X			
4454	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4455	10"	10"	Black Walnut	Juglans nigra						X		
4456	9"	9"	Black Walnut	Juglans nigra		Trunk damaged				DTE Impact		
4457	10"	10"	Siberian Elm	Ulmus pumila					X	X		
4458	8"	8"	Black Cherry	Prunus serotina						X		
4459	6"	8"	Black Cherry	Prunus serotina	twin					X		
4460	8"	8"	Black Walnut	Juglans nigra						X		
4461	6"	6"	Black Walnut	Juglans nigra						X		
4462	8"	8"	Black Walnut	Juglans nigra						X		
4463	10"	10"	Siberian Elm	Ulmus pumila					X	X		
4464	8"	8"	Black Walnut	Juglans nigra						X		
4465	7"	7"	Black Cherry	Prunus serotina						X		
4466	6"	6"	Black Walnut	Juglans nigra						X		
4467	6"	6"	Black Walnut	Juglans nigra						X		
4468	8"	8"	Black Walnut	Juglans nigra						X		
4469	7"	7"	Black Walnut	Juglans nigra						X		
4470	8"	8"	Black Walnut	Juglans nigra						X		
4471	13"	13"	Black Walnut	Juglans nigra						X		
4472	24"	24"	Shagbark Hickory	Carya ovata		15	X			X	0	
4473	15"	15"	Box Elder	Acer negundo		minimal branches remain				DTE Impact		
4474	8"	8"	American Elm	Ulmus americana		minimal branches remain				DTE Impact		
4475	13"	13"	Black Walnut	Juglans nigra						X		
4476	23"	23"	Black Walnut	Juglans nigra		21	X			X	11.5	
4477	13"	13"	Black Walnut	Juglans nigra						X		
4478	7"	10"	Box Elder	Acer negundo	twin	40%				X		
4479	13"	13"	Black Walnut	Juglans nigra						X		
4481	31"	31"	Silver Maple	Acer saccharinum		20	X					off-site
4482	9"	9"	Black Walnut	Juglans nigra						X		
4483	7"	7"	Black Walnut	Juglans nigra						X		
4484	6"	6"	Black Walnut	Juglans nigra						X		
4485	10"	10"	Box Elder	Acer negundo		minimal branches remain				DTE Impact		
4486	11"	11"	Box Elder	Acer negundo		minimal branches remain				DTE Impact		
4487	30"	30"	Black Walnut	Juglans nigra		21	X			X	15	
4488	6"	6"	Black Walnut	Juglans nigra						X		
4489	36"	36"	Black Walnut	Juglans nigra		21	X					
4490	21"	21"	Black Walnut	Juglans nigra		20	X					off-site
4491	20"	20"	Black Walnut	Juglans nigra		21	X			CRZ IMP	10	
4492	7"	7"	Black Walnut	Juglans nigra						X		
4493	6"	6"	Black Walnut	Juglans nigra						X		
4494	6"	6"	Black Walnut	Juglans nigra						X		
4495	7"	7"	Black Walnut	Juglans nigra						X		
4496	6"	6"	Black Walnut	Juglans nigra						X		
4497	6"	6"	Black Walnut	Juglans nigra						X		
4498	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4499	31"	31"	Black Walnut	Juglans nigra		21	X	X		X	15.5	
4500	12"	12"	Black Walnut	Juglans nigra				X		X	6	
4501	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4502	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4503	8"	8"	American Elm	Ulmus americana				X		X	4	
4504	7"	7"	Black Walnut	Juglans nigra				X		X	0	
4505	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4506	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4507	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4508	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4509	25"	25"	Black Walnut	Juglans nigra		21	X	X		X	12.5	
4510	16"	16"	Black Walnut	Juglans nigra				X		X	8	
4511	10"	10"	Black Walnut	Juglans nigra				X		X	5	
4512	10"	10"	Black Cherry	Prunus serotina				X		X	5	
4513	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4514	20"	20"	Black Walnut	Juglans nigra		21	X	X		X	10	
4515	16"	16"	Black Walnut	Juglans nigra				X		X	8	
4516	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4517	11"	11"	Black Walnut	Juglans nigra				X		X	5.5	
4518	9"	9"	Linden	Tilia americana				X		X	4.5	
4519	20"	20"	Honey Locust	Gleditsia triacanthos		21	X	X		X	10	
4520	28"	28"	Honey Locust	Gleditsia triacanthos		21	X	X		X	14	
4521	24"	24"	Box Elder	Acer negundo		13	X	X		X	0	
4522	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4523	20"	20"	Black Cherry	Prunus serotina		13	X	X		X	0	
4524	10"	10"	Black Cherry	Prunus serotina						X		
4525	6"	6"	Northern Hackberry	Celtis occidentalis				X		X	0	
4526	14"	14"	Box Elder	Acer negundo				X		CRZ IMP	7	
4527	9"	9"	Box Elder	Acer negundo				X		CRZ IMP	4.5	
4528	7"	10"	American Elm	Ulmus americana	twin			X				
4529	8"	8"	American Elm	Ulmus americana				X		CRZ IMP	4	
4530	9"	9"	Black Walnut	Juglans nigra				X				
4531	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4532	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4533	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4534	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4535	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4536	10"	10"	Black Walnut	Juglans nigra				X		X	5	
4537	14"	14"	Black Cherry	Prunus serotina				X				
4538	27"	27"	White Mulberry	Morus alba					X			
4539	11"	11"	Black Walnut	Juglans nigra				X		CRZ IMP	5.5	
4540	11"	11"	Black Walnut	Juglans nigra				X		CRZ IMP	5.5	
4541	12"	12"	Honey Locust	Gleditsia triacanthos				X				
4542	38"	38"	Black Walnut	Juglans nigra		21	X	X		CRZ IMP	19	
4543	8"	8"	White Mulberry	Morus alba					X			
4544	13"	13"	Black Walnut	Juglans nigra				X		CRZ IMP	6.5	
4545	9"	13"	American Elm	Ulmus americana	twin			X				off-site
4546	7"	7"	American Elm	Ulmus americana				X				
4547	8"	8"	Black Walnut	Juglans nigra				X				
4548	12"	12"	American Elm	Ulmus americana				X				
4549	13"	13"	American Elm	Ulmus americana				X		CRZ IMP	6.5	
4550	6"	6"	American Elm	Ulmus americana				X		CRZ IMP	0	
4551	23"	23"	Black Walnut	Juglans nigra		21	X	X		X	11.5	
4552	14"	14"	Black Walnut	Juglans nigra				X		CRZ IMP	7	
4553	17"	17"	Black Walnut	Juglans nigra				X				
4554	19"	19"	Black Walnut	Juglans nigra		21	X	X		CRZ IMP	9.5	
4555	10"	10"	Black Walnut	Juglans nigra				X		CRZ IMP	5	
4556	8"	8"	Box Elder	Acer negundo		40%		X				
4557	39"	39"	Black Walnut	Juglans nigra		21	X	X		CRZ IMP	19.5	
4558	9"	9"	Black Cherry	Prunus serotina				X				
4559	14"	14"	Black Walnut	Juglans nigra				X				
4560	7"	7"	American Elm	Ulmus americana				X				
4561	26"	26"	Box Elder	Acer negundo		14	X	X				
4562	15"	15"	American Elm	Ulmus americana				X				
4563	11"	11"	Black Walnut	Juglans nigra				X				
4564	16"	16"	Black Walnut	Juglans nigra				X				
4565	9"	9"	Black Walnut	Juglans nigra				X				
4566	19"	19"	Black Walnut	Juglans nigra		21	X	X				
4567	20"	20"	Black Walnut	Juglans nigra		21	X	X				
4568	6"	6"	Black Walnut	Juglans nigra				X				
4569	9"	9"	Black Walnut	Juglans nigra				X				
4570	17"	17"	Siberian Elm	Ulmus pumila					X	X		
4571	10"	10"	Black Walnut	Juglans nigra				X				
4572	12"	12"	Black Walnut	Juglans nigra				X				
4573	11"	11"	Black Walnut	Juglans nigra				X				
4574	16"	16"	Black Walnut	Juglans nigra				X				
4575	13"	13"	Black Walnut	Juglans nigra				X				
4576	15"	15"	Black Walnut	Juglans nigra				X				
4577	9"	9"	Black Walnut	Juglans nigra				X				
4578	7"	7"	Black Walnut	Juglans nigra				X				
4579	8"	8"	Linden	Tilia americana				X				
4580	8"	8"	Linden	Tilia americana				X				
4581	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4582	12"	12"	American Elm	Ulmus americana				X		X	6	
4583	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4584	10"	10"	Black Walnut	Juglans nigra				X		X	5	
4585	6"	6"	Black Walnut	Juglans nigra				X		X	0	
4586	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4587	9"	9"	Red Cedar	Juniperus virginiana		14	X	X		X	0	
4588	25"	25"	Black Walnut	Juglans nigra		20	X	X		X	12.5	
4589	9"	9"	Black Walnut	Juglans nigra				X		X	4.5	
4590	8"	8"	Black Walnut	Juglans nigra				X		X	4	
4591	12"	12"	American Elm	Ulmus americana		40%		X		X	0	
4592	7"	7"	American Elm	Ulmus americana				X		X	0	
4593	9"	9"	Sugar Maple	Acer saccharum				X		X	4.5	
4594	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4595	14"	14"	Black Walnut	Juglans nigra				X		X	7	
4596	19"	19"	Norway Spruce	Picea abies		21	X	X		X	9.5	
4597	15"	15"	Hemlock	Tsuga canadensis		21	X	X		X	7.5	
4598	30"	30"	Norway Spruce	Picea abies		21	X	X		X	15	
4599	9"	9"	American Elm	Ulmus americana				X		X	4.5	
4600	10"	10"	American Elm	Ulmus americana				X		X	5	
4601	12"	12"	Black Walnut	Juglans nigra				X		X	6	
4602	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4603	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4604	28"	28"	Black Walnut	Juglans nigra		21	X	X		X	14	
4605	11"	11"	Black Walnut	Juglans nigra				X		X	5.5	
4606	19"	19"	Black Walnut	Juglans nigra		21	X	X		X	9.5	
4607	12"	12"	Black Walnut	Juglans nigra				X		X	6	
4608	14"	14"	Black Walnut	Juglans nigra				X		X	7	
4609	7"	7"	Linden	Tilia americana				X		X	0	
4610	6"	6"	Linden	Tilia americana				X		X	0	
4611	9"	9"	Linden	Tilia americana				X		X	4.5	
4612	10"	10"	Linden	Tilia americana				X		X	5	
4613	12"	12"	Linden	Tilia americana				X		X	6	
4614	8"	8"	Linden	Tilia americana				X		X	4	
4615	7"	7"	Linden	Tilia americana				X		X	0	
4616	14"	14"	Black Walnut	Juglans nigra				X		X	7	
4617	13"	13"	Black Walnut	Juglans nigra				X		X	6.5	
4618	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4619	8"	8"	Red Cedar	Juniperus virginiana		21	X	X		X	4	
4620	8"	8"	Red Cedar	Juniperus virginiana		21	X	X		X	4	
4621	15"	15"	Black Walnut	Juglans nigra				X		X	7.5	
4622	18"	18"	Black Walnut	Juglans nigra		21	X	X		X	9	
4623	8"	8"	Linden	Tilia americana				X		X	4	
4624	8"	8"	Linden	Tilia americana		40%		X		X	0	
4625	10"	10"	Linden	Tilia americana				X		X	5	
4626	8"	8"	Linden	Tilia americana				X		X	4	
4627	16"	16"	Black Walnut	Juglans nigra				X		X	8	
4628	15"	15"	Box Elder	Acer negundo		40%		X		X	0	
4629	11"	11"	Tree-of-heaven	Ailanthus altissima					X	X		
4630	36"	36"	Black Walnut	Juglans nigra		20	X	X		X	18	
4631	19"	19"	Norway Spruce	Picea abies		21	X	X		X	9.5	
4632	8"	8"	Tree-of-heaven	Ailanthus altissima					X	X		
4633	20"	20"	Black Walnut	Juglans nigra		21	X	X		X	10	

AARGS WORKSHEET

City of Ann Arbor Geodetic Reference System (AAGRS)
Coordinate Transformation Worksheet

This document is designed to provide the City of Ann Arbor a datum shift between a Project's local coordinate system and AAGRS coordinates (Michigan State Plane). This information will provide the data necessary to import project infrastructure items into the Ann Arbor Geographic Information System (GIS).

Project Name: PBC - Weber Property AA
Company Name: Midwestern Consulting
Contact: Mark Vander Veen
Date Submitted: 06-22-16
Contact No.: 734-995-0200

From what coordinate system was this project derived?
☒ AAGRS (MI State Plane) Geoid: 12A (Conus)
☐ Local coordinates (user defined)

If a **local** coordinate system was used, complete the *Project Reference Coordinates* section below.

Project Reference Coordinates

AAGRS coordinates used for projection of local coordinates into Michigan State Plane coordinates (International feet)

AAGRS No.	Easting (X)	Northing (Y)	Elevation (Z)	Description

Geoid:

Local coordinates

Point No.	Easting (X)	Northing (Y)	Elevation (Z)	Description

Local coordinates projected into AAGRS Michigan State Plane coordinates (International feet)

Point No.	Easting (X)	Northing (Y)	Elevation (Z)	Description

Scale Factor:

AREA BELOW IS FOR CITY OF ANN ARBOR USE ONLY

TRAKiT Planning No.: TRAKiT Civil Plan No.:

Checked by: Approved: ☐ Yes

Date: ☐ No

Comments:

Revised 7/17/2013 by JAD

M I D W E S T E R N
C O N S U L T I N G
3815 Plaza Drive Ann Arbor, Michigan 48108
(734) 995-0200 • www.midwesternconsulting.com
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SALINE, MI 48176
JIM HAEUSSLER
734-429-4200

2857 PACKARD ROAD
PLANNED UNIT DEVELOPMENT
TREE LIST

05

DATE: 4/25/19
SHEET 05 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
SITE PLAN/16070EX1

JOB No. **16070**

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19
PER CITY REVIEW	06/14/19

M:\Civil3d_Proj\16070\Site Plan\16070EX1.dwg, 6/26/2019 3:00 PM, Tyler E. Smith, MCLLC PDF.pc3

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-01

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (20 inches) — 1.7
- Brown Silty Sand with trace gravel — 2.8
- Brown and Gray Silty Clay with trace sand and gravel — 4.8
- Grayish Brown Sand with trace silt and gravel — 6.7
- Grayish Brown Silty Clay with trace sand and gravel — 6.9
- End of Test Pit @ 6.9 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					
BS-03					
BS-04					

Total Depth: 6.9 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 7 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 1

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-02

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (16 inches) — 1.3
- (Infiltration Rate = 3.45 iph) Brown Silty Sand with trace gravel — 3.8
- Gray Sand with trace silt and gravel — 5.6
- End of Test Pit @ 5.6 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					

Total Depth: 5.6 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 5-1/2 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 2

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-03

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (12 inches) — 1.0
- Brown Clayey Sand with trace gravel — 2.6
- (Infiltration Rate = 2.16 iph)
- Grayish Brown Silty Sand with trace gravel — 7.3
- End of Test Pit @ 7.3 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					

Total Depth: 7.3 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 7-1/5 feet during excavation operations; 5-1/2 feet upon completion

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 3

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-04

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (12 inches) — 1.0
- (Infiltration Rate = 0.77 iph)
- Brown Silty Sand with trace gravel — 4.4
- Gray Sand with trace silt and gravel — 6.5
- End of Test Pit @ 6.6 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					
BS-03					

Total Depth: 6.6 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 6-1/2 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 4

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-05

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (13-1/2 inches) — 1.1
- Brown Clayey Sand with trace gravel — 2.4
- (Infiltration Rate = 0.92 iph)
- Grayish Brown Sand with trace gravel and silt — 4.3
- Brownish Gray Sand with trace silt and gravel — 5.7
- End of Test Pit @ 5.7 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					
BS-03					

Total Depth: 5.7 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 5-2/3 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 5

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-06

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (14 inches) — 1.2
- Brown Silty Sand with trace gravel — 3.8
- (Infiltration Rate = 0.61 iph)
- Grayish Brown Sand with trace silt and gravel — 6.6
- End of Test Pit @ 6.6 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					

Total Depth: 6.6 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 6-1/2 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 6

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-07

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (16 inches) — 1.3
- Brown Clayey Sand with trace gravel — 2.1
- (Infiltration Rate = 3.82 iph)
- Grayish Brown Gravelly Sand with trace silt — 4.8
- End of Test Pit @ 4.8 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					

Total Depth: 4.8 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 5 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 7

Project Name: Proposed Development
Project Location: 2853 and 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 153100
Latitude: N/A Longitude: N/A

Test Pit No. IN-08

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: N/A

- Topsoil: Dark Brown Clayey Sand with trace gravel (12 inches) — 1.0
- Brown and Gray Silty Clay with trace sand and gravel — 3.0
- Brown Sand with trace silt and gravel — 4.1
- Gray Sand with trace silt and gravel — 5.0
- End of Test Pit @ 5 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
BS-01					
BS-02					
BS-03					

Total Depth: 5 ft
Drilling Date: June 22, 2015
Inspector: M. Dagher, E.I.T.
Contractor: MWB Contracting, Inc.
Driller: Ed

Water Level Observation: 5 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CAT Bucket Excavator

Figure No. 8

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.245203° Longitude: -83.707040°

Soil Boring No. IN-09

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 809.5 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (14 inches) — 1.2
- Brown Sand with little silt and trace gravel (Infiltration Rate = 0.8 iph) (Percent Passing No. 200 Sieve = 14.0%) — 4.5
- Very Stiff Brown Silty Clay with trace sand and gravel — 5.5
- Grayish Brown Silty Sand with trace gravel — 8.0
- End of Boring @ 8 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-01					
S-02		16.5			4500+
S-03					

Total Depth: 8 ft
Drilling Date: January 18, 2017
Inspector: J. Crow, E.I.T.
Contractor: DN Higgins, Inc.
Driller: M. Haeussler

Water Level Observation: 8 feet during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CASE Backhoe

Figure No. 1

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.245439° Longitude: -83.707216°

Soil Boring No. IN-10

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 811.5 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (16 inches) — 1.3
- Brown Clayey Sand with trace silt and gravel — 2.0
- Brown Sand with trace silt and gravel (Infiltration Rate = 5.3 iph) (Percent Passing No. 200 Sieve = 10.7%) — 7.0
- Very Stiff Brownish Gray Silty Clay with trace gravel, occasional sand seams — 7.5
- End of Boring @ 7.5 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-01					
S-02		18.9			4000+
S-03					

Total Depth: 7.5 ft
Drilling Date: January 18, 2017
Inspector: J. Crow, E.I.T.
Contractor: DN Higgins, Inc.
Driller: M. Haeussler

Water Level Observation: Groundwater seepage at 4-1/2 feet during excavtion operations; 7-1/2 feet upon completion

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CASE Backhoe

Figure No. 2

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.245058° Longitude: -83.707574°

Soil Boring No. IN-11

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 812.5 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (12 inches) — 1.0
- Brown Sand with little silt and trace gravel (Infiltration Rate = 0.4 iph) (Percent Passing No. 200 Sieve = 16.2%) — 5.0
- Very Stiff Brownish Gray Silty Clay with trace silt and gravel — 7.0
- Brown Sand with trace silt and gravel — 10.0
- End of Boring @ 10 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	BLOWS/ 6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
S-01					
S-02		14.2			7500+
S-03					

Total Depth: 10 ft
Drilling Date: January 18, 2017
Inspector: J. Crow, E.I.T.
Contractor: DN Higgins, Inc.
Driller: M. Haeussler

Water Level Observation: 10 feet during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Drilling Method: CASE Backhoe

Figure No. 3

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.24530° Longitude: -83.70705°

Soil Boring No. IN-12

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 810.0 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (16 inches) — 1.3
- Brown Sand with trace silt and gravel — 4.0
- Hard Brown Silty Clay with trace sand and gravel — 5.0
- Gray Sand with trace silt and gravel (Percent Passing No. 200 Sieve = 9.5%) (Infiltration Rate = 2.25 iph) — 8.0
- Gray Sand with little gravel and trace silt — 9.0
- End of Boring @ 9 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCONF. COMP. ST. (PSF)
S-01				
S-02		16.1		9000+
S-03				
S-04				

Total Depth: 9 ft
Excavation Date: June 19, 2017
Inspector: K. Kalman, E.I.T.
Contractor: DN Higgins, Inc.
Operator: B. Bivins

Excavation Equipment: CASE Backhoe

Water Level Observation: 9 feet during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Figure No. 1

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.24538° Longitude: -83.70759°

Soil Boring No. IN-13

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 812.0 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (18 inches) — 1.5
- Brown Sandy Clay with trace gravel — 3.0
- Very Stiff Brown and Gray Mottled Silty Clay with trace sand and gravel — 4.0
- Gray Silty Sand with trace gravel — 5.0
- Very Stiff Brown Silty Clay with trace sand and gravel — 5.5
- Gray Silty Sand with trace clay and gravel (Percent Passing No. 200 Sieve = 8.7%) (Infiltration Rate = 2.25 iph)
- Gray Sand with little gravel and trace silt — 8.5
- End of Boring @ 9 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCONF. COMP. ST. (PSF)
S-01				
S-02		17.7		4500+
S-03				
S-04		19.6		4000+
S-05				
S-06				

Total Depth: 9 ft
Excavation Date: June 19, 2017
Inspector: K. Kalman, E.I.T.
Contractor: DN Higgins, Inc.
Operator: B. Bivins

Excavation Equipment: CASE Backhoe

Water Level Observation: 9 feet during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Figure No. 2

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.24709° Longitude: -83.70648°

Soil Boring No. IN-14

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 808.0 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (14 inches) — 1.2
- Brown Clayey Sand with little silt and trace gravel (Percent Passing No. 200 Sieve = 39.2%) (Infiltration Rate = 3.00 iph) — 3.5
- Stiff Brown and Gray Mottled Silty Clay with trace sand and gravel — 4.5
- Gray Sand with little gravel and trace sand — 5.0
- End of Boring @ 5 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCONF. COMP. ST. (PSF)
S-01				
S-02				
S-03		28.7		2500+
S-04				

Total Depth: 5 ft
Excavation Date: June 19, 2017
Inspector: K. Kalman, E.I.T.
Contractor: DN Higgins, Inc.
Operator: B. Bivins

Excavation Equipment: CASE Backhoe

Water Level Observation: 5 feet during and upon completion of excavation operations

Notes:
* Calibrated Hand Penetrometer

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Figure No. 3

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.24653° Longitude: -83.70618°

Soil Boring No. IN-15

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 810.5 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (15 inches) — 1.3
- Brown and Gray Mottled Silty Clay with trace sand and gravel — 2.0
- Brown Sand with trace silt (Percent Passing No. 200 Sieve = 4.9%) (Infiltration Rate = 2.63 iph) — 4.0
- Brown Sand with trace silt and gravel — 5.0
- Gray Sand with little gravel and trace silt — 6.0
- End of Boring @ 6 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCONF. COMP. ST. (PSF)
S-01				
S-02				
S-03				
S-04				

Total Depth: 6 ft
Excavation Date: June 19, 2017
Inspector: K. Kalman, E.I.T.
Contractor: DN Higgins, Inc.
Operator: B. Bivins

Excavation Equipment: CASE Backhoe

Water Level Observation: 6 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Figure No. 4

Project Name: Weber Property
Project Location: 2857 Packard Road, City of Ann Arbor, Michigan
G2 Project No. 173001
Latitude: 42.24718° Longitude: -83.70639°

Soil Boring No. IN-16

SUBSURFACE PROFILE

GROUND SURFACE ELEVATION: 808.0 ft ±

- Topsoil: Dark Brown Clayey Sand with trace gravel (16 inches) — 1.3
- Brown Clayey Sand with trace gravel — 2.0
- Brown Sand with trace silt and gravel (Percent Passing No. 200 Sieve = 7.7%) (Infiltration Rate = 2.25 iph) — 4.0
- Gray Sand with little gravel and trace silt — 5.0
- End of Boring @ 5 ft

SOIL SAMPLE DATA

SAMPLE TYPE/NO.	DRY DENSITY (PCF)	MOISTURE CONTENT (%)	PERCENT COMPACTION	UNCONF. COMP. ST. (PSF)
S-01				
S-02				
S-03				

Total Depth: 5 ft
Excavation Date: June 19, 2017
Inspector: K. Kalman, E.I.T.
Contractor: DN Higgins, Inc.
Operator: B. Bivins

Excavation Equipment: CASE Backhoe

Water Level Observation: 5 feet during and upon completion of excavation operations

Excavation Backfilling Procedure: Excavation backfilled with excavated soil

Figure No. 5

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2857 PACKARD ROAD

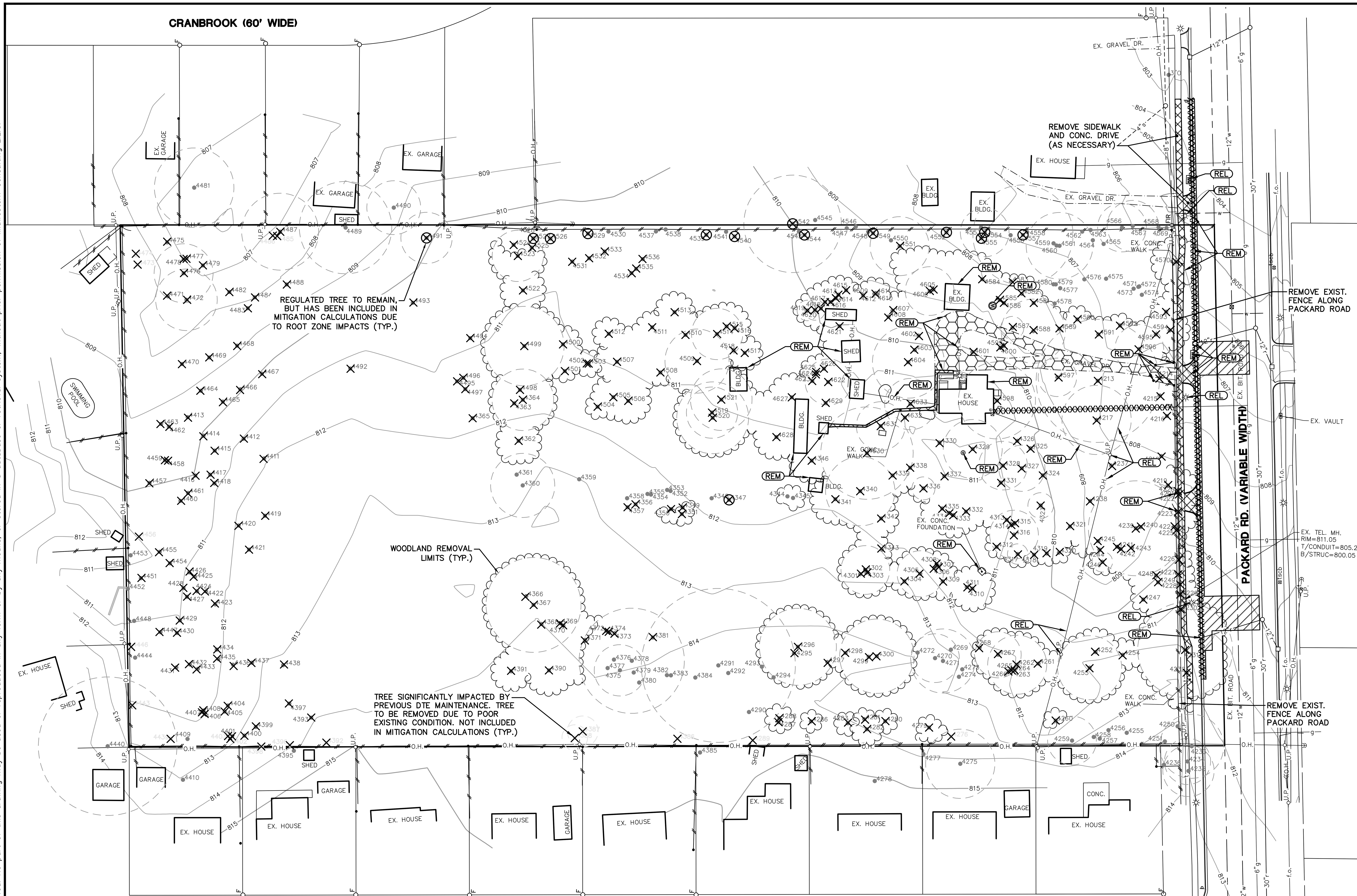
PLANNED UNIT DEVELOPMENT
SOIL PIT LOGS

06

JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19

DATE: 4/25/19
SHEET 06 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
SITE PLAN/16070EX1



SCALE: 1" = 40'

0 40 80 120

NOTES

1. THE BASE SURVEY WAS PREPARED BY MIDWESTERN CONSULTING IN APRIL 2016. ALL UNDERGROUND UTILITIES AND STRUCTURES HAVE BEEN SHOWN TO A REASONABLE DEGREE OF ACCURACY AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY THEIR EXACT LOCATION AND TO AVOID DAMAGE THERETO.
2. CONTRACTOR SHALL VERIFY LOCATION OF PROPOSED WORK AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.
3. THE EXISTING UTILITY SERVICE CONNECTIONS NEEDING TO BE REMOVED SHALL BE COORDINATED WITH THE CORRESPONDING UTILITY COMPANY PRIOR TO REMOVAL. ADDITIONALLY, THE EXISTING OVERHEAD LINES SHALL BE RELOCATED BY THE CORRESPONDING UTILITY COMPANY.
4. AN EXISTING WELL IS LOCATED ON THE SUBJECT PROPERTY. THE WELL SHALL BE ABANDONED IN ACCORDANCE WITH THE WELLHEAD PROTECTION PROGRAM. ABANDONMENT PROCEDURES SHALL INCLUDE: REMOVAL OF EXISTING WELL MECHANISMS (PUMPS, PIPES, ETC.), BACKFILLING OF THE WELL CASING WITH BENTONITE PELLETS, AND CAPPING THE WELL A MINIMUM OF 3 FEET BELOW FINISHED GRADE, AMONGST OTHER ITEMS IN THE PROGRAM.

NATURAL FEATURES IMPACT SUMMARY

A TOTAL OF 2.51 ACRES OF WOODLAND, 1,108" DBH OF WOODLAND TREES IN GOOD HEALTH AND 854" DBH OF LANDMARK TREES IN GOOD HEALTH ARE PROPOSED TO BE REMOVED. ADDITIONALLY, THE CRITICAL ROOT ZONE OF 14 REGULATED TREES IN GOOD HEALTH TO REMAIN (234" DBH) ARE ANTICIPATED TO BE IMPACTED AND HAVE BEEN INCLUDED IN THE MITIGATION CALCULATIONS. THROUGH A COMBINATION OF MITIGATION ON-SITE AND CONTRIBUTION TO THE CITY OF ANN ARBOR STREET TREE PROGRAM, A TOTAL OF 1,098" DBH OF MITIGATION WILL BE PROVIDED PER CITY OF ANN ARBOR STANDARDS. SEE THE NATURAL FEATURES ALTERNATIVE ANALYSIS AND SITE LANDSCAPE PLAN FOR ADDITIONAL INFORMATION.

Landmark Trees	Qty	DBH	
Existing:			
Landmark Trees existing on-site >16 health	51	1235"	
Landmark Trees existing on-site <16 health	9	178"	1413
Removals:			
Landmark Trees removals <16 health to be removed	7	133"	
Landmark Trees removals >16 health to be removed	38	854"	
Landmark Trees to remain with CRZ Impacts >16 health	5	157."	157
Landmark Tree mitigation required (50% DBH removed)		*505.5"*	

Woodland Trees	Qty	DBH	
Existing:			
Woodland Trees Existing 6 to 8" DBH	56	366"	366
Woodland Trees Existing >8" DBH and >40% health	146	1692"	1692
Woodland Trees Existing >8" DBH and <40% health	6	72"	72
Removals:			
Woodland Trees <8" - no mitigation required	44	287"	287
Woodland Tree removals <40% health - no mitigation required	5	64"	64
Woodland Trees to remain with CRZ Impacts <8" DBH - no mitigation required	3	19"	19
Woodland Trees to remain with CRZ Impacts >40% health	10	118."	118
Woodland Tree removals >8" with >40% health	97	1108"	1108
Woodland Tree mitigation required (50% DBH removed)		*613."*	
Total Mitigation Trees Required		***1119"***	

*Data does not include trees impacted by DTE tree trimming

LEGEND

- 813 — EXIST. CONTOUR
- ×813.2 — EXIST. SPOT ELEVATION
- U.P. — EXIST. UTILITY POLE
- GUY WIRE
- OH — EXIST. OVERHEAD UTILITY LINE
- EXIST. LIGHT POLE
- t — EXIST. TELEPHONE LINE
- e — EXIST. ELECTRIC LINE
- g — EXIST. GAS LINE
- f.o. — EXIST. FIBER OPTIC LINE
- w — EXIST. WATER MAIN
- EXIST. HYDRANT
- EXIST. GATE VALVE IN BOX
- EXIST. GATE VALVE IN WELL
- EXIST. CURB STOP & BOX
- r — EXIST. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- s — EXIST. SANITARY SEWER
- SIGN
- MAILBOX
- t — TELEPHONE RISER
- e — ELECTRIC METER
- g — GAS METER
- tscb — TRAFFIC SIGNAL CONTROL BOX
- POST
- WELL
- FENCE
- SINGLE TREE
- DTE IMPACTED TREE
- TREE OR BRUSH LIMIT
- SECTION CORNER
- FOUND IRON PIPE
- F — FOUND MONUMENT
- FIR — FOUND IRON ROD
- TREE TO BE REMOVED
- REGULATED TREE TO REMAIN BUT INCLUDED IN MITIGATION CALCULATIONS
- ASPHALT TO BE REMOVED
- CONCRETE TO BE REMOVED
- GRAVEL TO BE REMOVED
- CURB TO BE REMOVED
- PIPE TO BE REMOVED
- REM — ITEM TO BE REMOVED
- REL — ITEM TO BE RELOCATED
- WOODLAND TO BE REMOVED

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

M:\Civil3d_Proj\16070\Site Plan\16070RM1.dwg, 6/26/2019 3:00 PM, Tyler E. Smith, MCLLC PDF.pc3

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2857 PACKARD ROAD

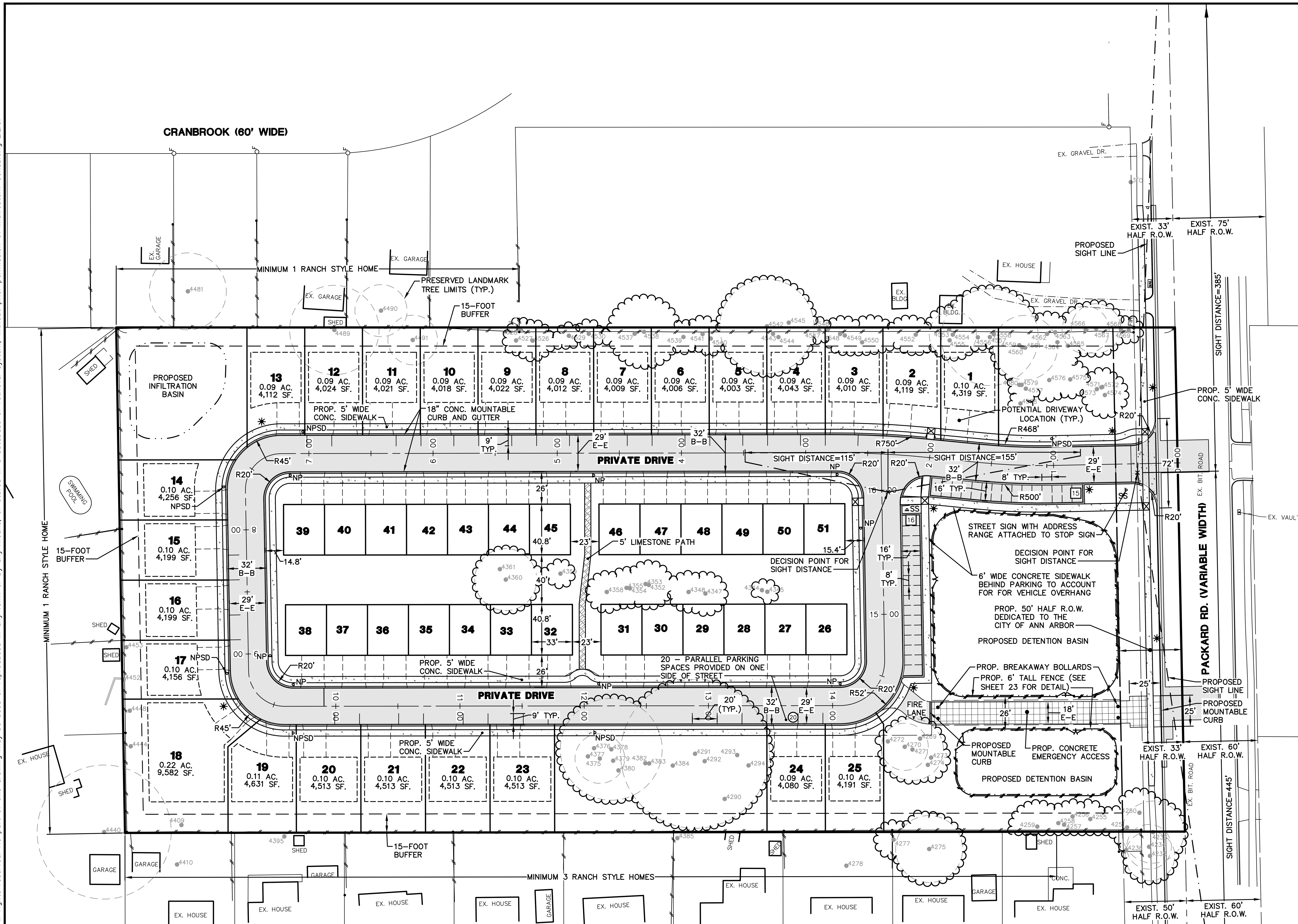
PLANNED UNIT DEVELOPMENT
SITE REMOVAL PLAN

07

DATE: 4/25/19	
SHEET 07 OF 27	
CADD: CTS	
ENG: SGF	
PM: TJC	
TECH: TES	
SITE PLAN/16070RM1	

JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19
PER CITY REVIEW	06/14/19



LOT AREA TABLE

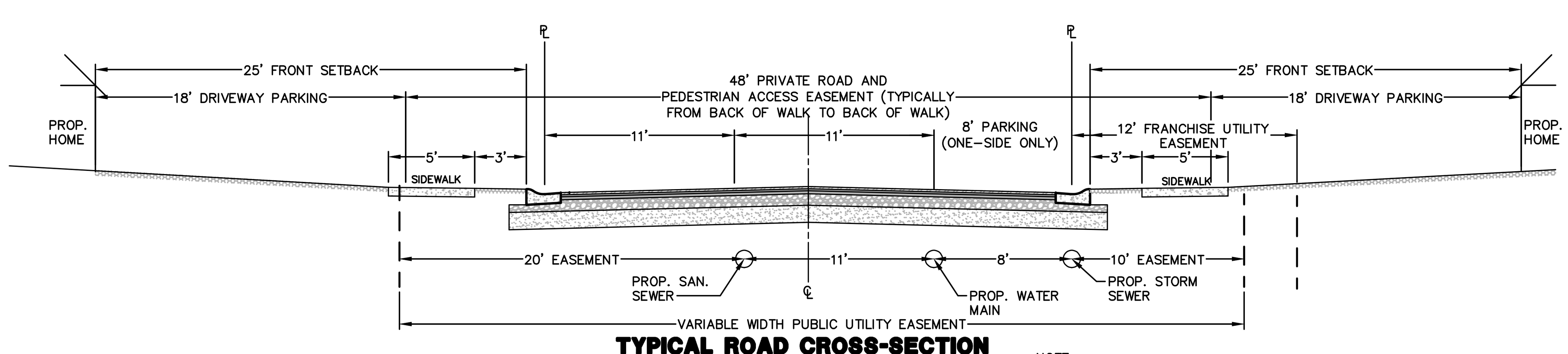
Number	Area (SF)	Area (AC)
1	4,319	0.10
2	4,119	0.09
3	4,010	0.09
4	4,043	0.09
5	4,003	0.09
6	4,006	0.09
7	4,009	0.09
8	4,012	0.09
9	4,022	0.09
10	4,018	0.09
11	4,021	0.09
12	4,024	0.09
13	4,112	0.09
14	4,256	0.10
15	4,199	0.10
16	4,199	0.10
17	4,156	0.10
18	9,582	0.22
19	4,631	0.11
20	4,513	0.10
21	4,513	0.10
22	4,513	0.10
23	4,513	0.10
24	4,080	0.09
25	4,191	0.10
Average	4,403	0.10

NOTES

1. PARKING WILL BE PERMITTED ONLY ON ONE SIDE OF ROADWAY.
2. ALL PEDESTRIAN SIDEWALKS WILL BE 5 FEET WIDE UNLESS OTHERWISE SPECIFIED.
3. CURB RADIUS DIMENSIONS ARE TO BACK OF CURB, UNLESS OTHERWISE NOTED. "E-E" DENOTES EDGE-TO-EDGE OF ASPHALT PAVEMENT (AKA EDGE-OF-METAL), AND "B-B" DENOTES BACK-TO-BACK OF CURB.
4. SITE LIGHTING WILL BE PROVIDED ON THE GARAGES OF EACH HOUSE.
5. THE PROPOSED 50 FEET OF HALF RIGHT-OF-WAY SHALL BE GRANTED TO THE CITY OF ANN ARBOR IN A MANNER TO BE DETERMINED BY THE CITY OF ANN ARBOR OFFICE ATTORNEY.

LEGEND

- PROP. ASPHALT PAVEMENT
- PROP. 4" CONCRETE SIDEWALK
- PROP. 6" CONCRETE PAVEMENT
- PROP. LIMESTONE PATH
- PROP. 6" CONCRETE PAVEMENT EMERGENCY ACCESS
- PRESERVED REGULATED WOODLANDS
- PRESERVED LANDMARK TREES
- EX. SIGN
- MR PROPOSED "MEDIAN RIGHT" SIGN (W6-1)
- NP PROPOSED "NO PARKING/FIRE LANE" SIGN
- NPSD PROPOSED "NO PARKING ON SERVICE DAYS" SIGN
- SS PROPOSED "STOP" SIGN (R1-1)
- PROPOSED LIGHT POLE
- NUMBER OF STANDARD PARKING SPACES IN ROW
- NUMBER OF SMALL CAR PARKING SPACES IN ROW



TYPICAL ROAD CROSS-SECTION
NOT TO SCALE
(SEE TYPICAL CROSS-SECTIONS ON DETAIL SHEET)

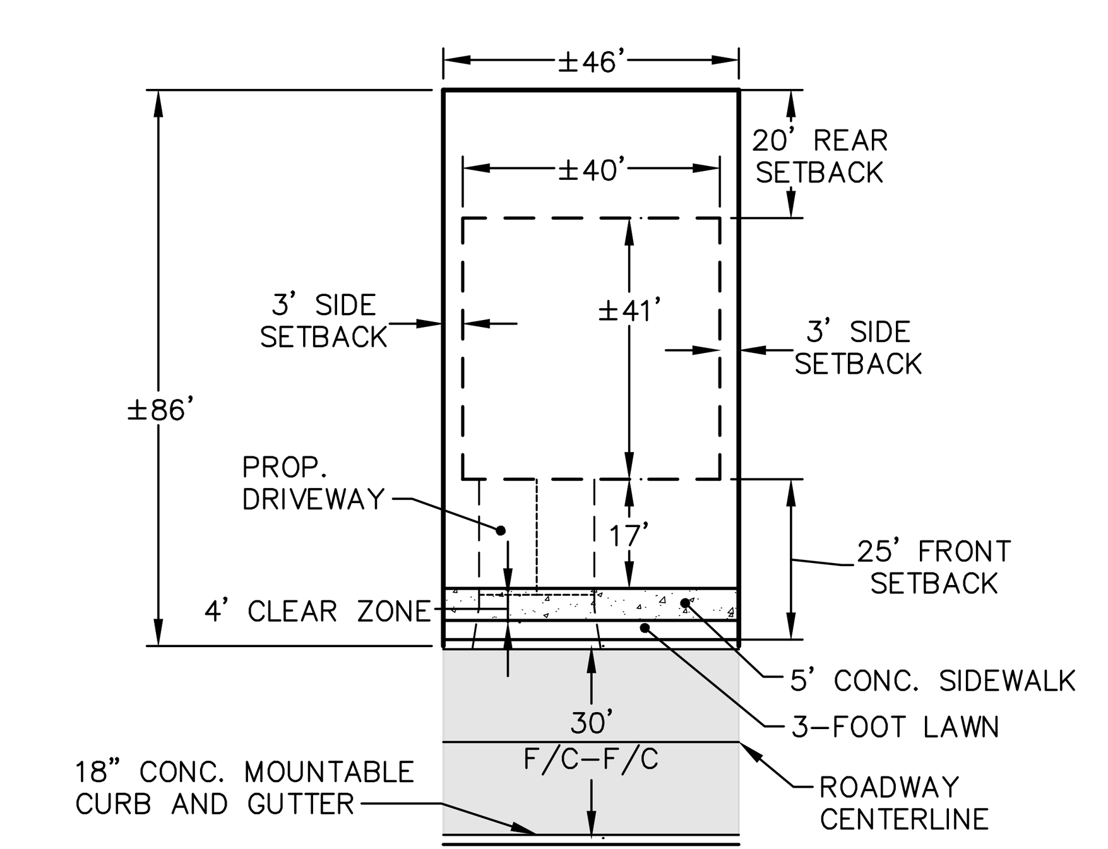
NOTE: TYPICAL ROAD CROSS-SECTION DOES NOT APPLY TO EASTERLY PRIVATE DRIVE

LEGAL DESCRIPTION

PROPOSED 50-FT WIDE ROAD RIGHT-OF-WAY DEDICATION

LEGAL DESCRIPTION OF A PARCEL OF LAND LOCATED
IN THE SE 1/4 OF SECTION 3, T3S, R6E, CITY OF ANN ARBOR,
WASHTENAW COUNTY, MICHIGAN

Commencing at the S 1/4 corner of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence N89°47'30"E 593.60 feet along the South line of said Section 3 to the Point of Beginning;
thence N00°51'30"E 55.01 feet;
thence N89°47'30"E 406.10 feet;
thence S00°56'00"W 55.01 feet;
thence S89°47'30"W 406.03 feet along said South line of Section 3 to the Point of Beginning.
Being a part of the SE 1/4 of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, and containing 0.51 acres, more or less. Being subject to any restrictions or easements of record, if any.



NOTE: DWELLING WILL NOT EXCEED 2,000 SF OF FLOOR AREA. BASEMENT IS NOT INCLUDED IN FLOOR AREA CALCULATION.

TYPICAL SINGLE FAMILY LOT DIMENSIONS
(4,000 SF MINIMUM, LOT DIMENSIONS VARY)

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2857 PACKARD ROAD

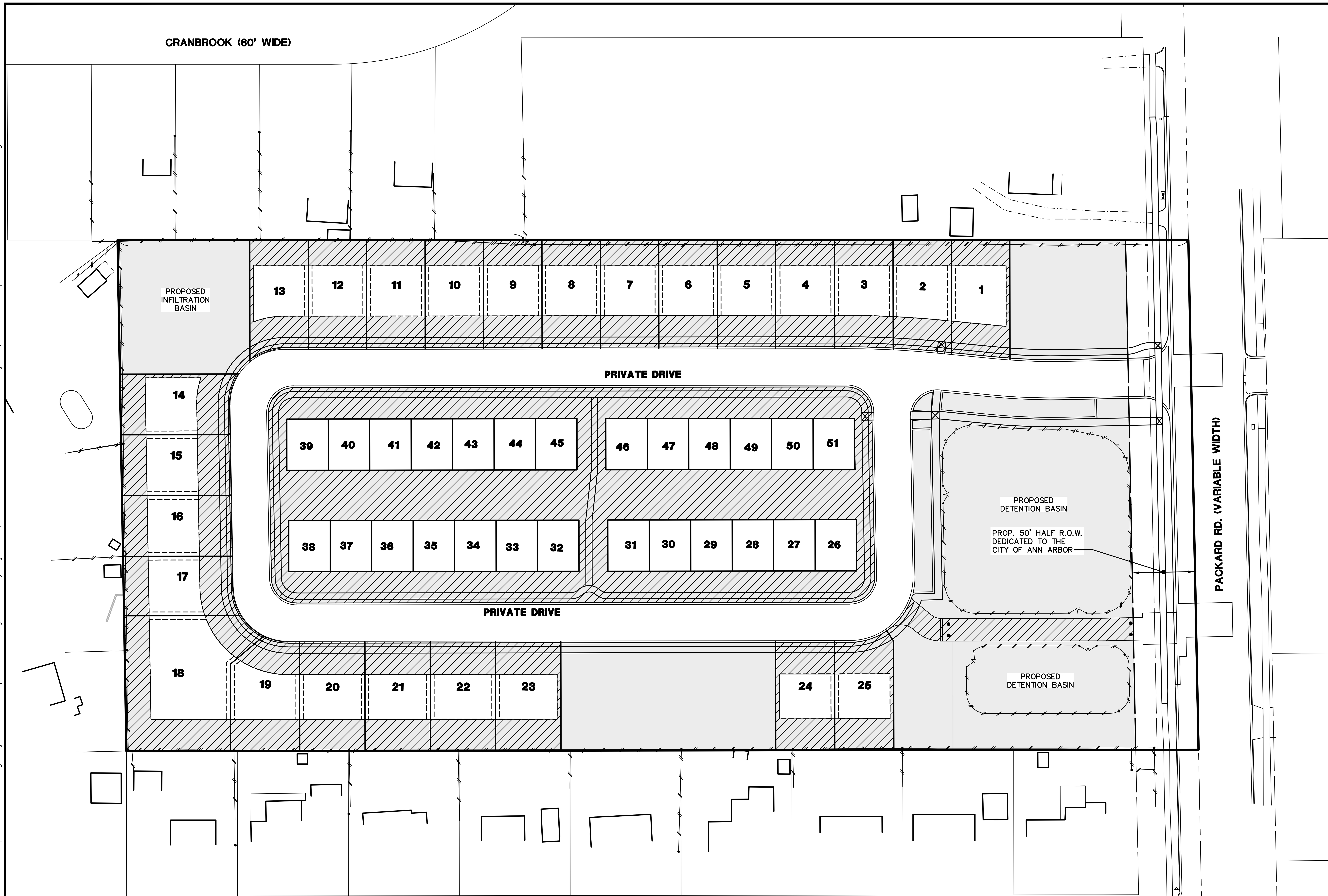
PLANNED UNIT DEVELOPMENT
SITE LAYOUT PLAN

08

DATE: 4/25/19
SHEET 08 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
SITE PLAN/16070SP1

JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19
PER CITY REVIEW	06/12/19
PER CITY REVIEW	06/14/19
PER CITY REVIEW	07/12/19



SCALE: 1" = 40'

0 40 80 120

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

LEGEND

TOTAL OPEN SPACE:	4.38 AC. 58% NET SITE AREA	
OPEN SPACE–ACTIVE:	2.50 AC. 33% NET SITE AREA	

TOTAL PEDESTRIAN OPPORTUNITIES:
SIDEWALK: 3,157 LF/0.60 MILES

NOTE: NO CITY REQUIREMENT FOR OPEN SPACE WITH SINGLE FAMILY DEVELOPMENT

PARKS CONTRIBUTION

PER CITY OF ANN ARBOR DEVELOPER CONTRIBUTIONS FOR PARK AND OPEN SPACE GUIDANCE, THE DEVELOPMENT WILL INCLUDE A CONTRIBUTION IN LIEU OF LAND TO THE CITY OF ANN ARBOR PARKS AND RECREATION AT A RATE OF 0.0125 ACRES PER RESIDENTIAL UNIT.

51 UNITS X 0.0125 ACRES = 0.6375 ACRES
0.6375 ACRES X $50,000/ACRE = $31,875.00

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2857 PACKARD ROAD

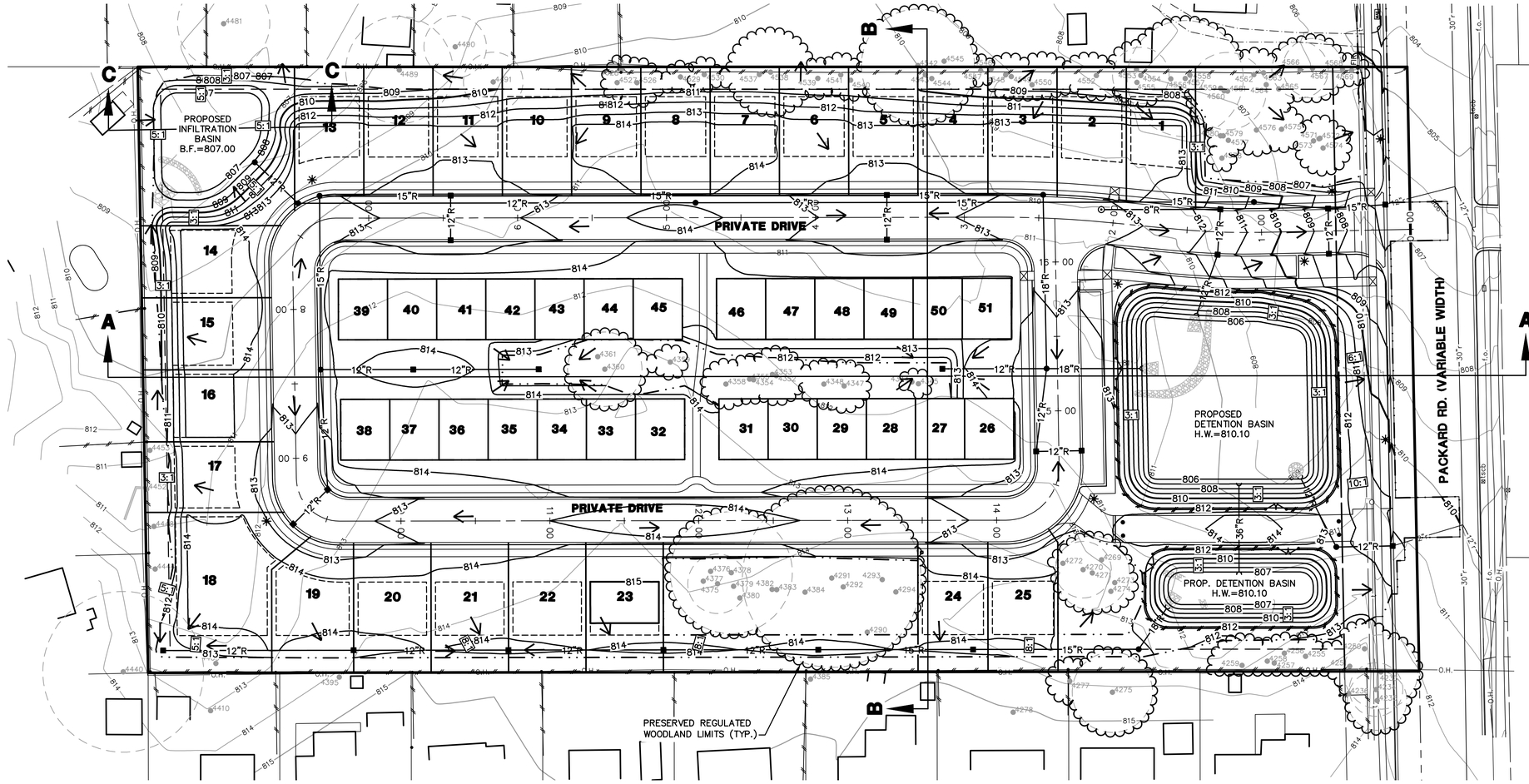
PLANNED UNIT DEVELOPMENT
OPEN SPACE PLAN

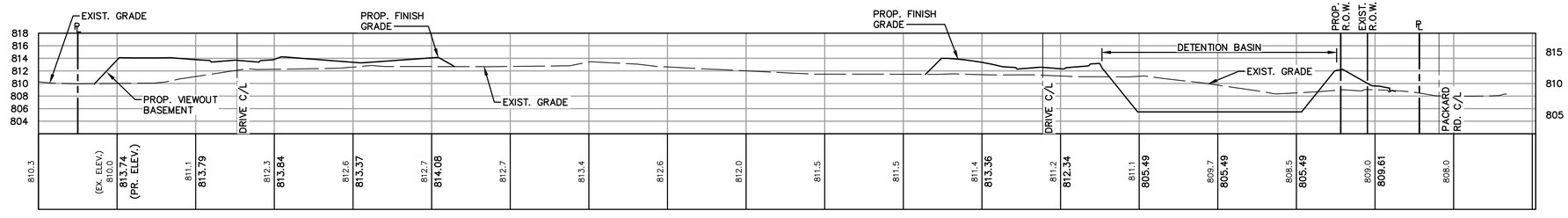
09

JOB No. 16070

REVISIONS:	REV. DATE
PER CITY COMMENTS	05/31/19
PER CITY COMMENTS	06/12/19

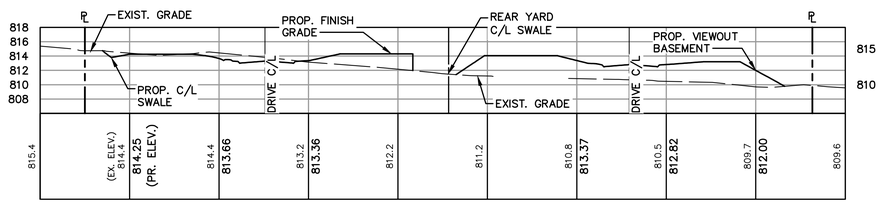
DATE: 4/25/19
SHEET 09 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
SITE PLAN/16070OS1





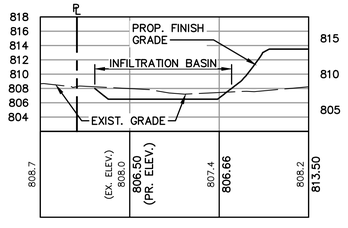
CROSS-SECTION A-A

SCALE: 1"=40' HORZ.
1"=20' VERT.



CROSS-SECTION B-B

SCALE: 1"=40' HORZ.
1"=20' VERT.



CROSS-SECTION C-C

SCALE: 1"=40' HORZ.
1"=20' VERT.

LEGEND

- EXIST. CONTOUR
- PROP. CONTOUR
- EXIST. SPOT ELEVATION
- PROP. SPOT ELEVATION
- EXIST. STORM SEWER
- PROP. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- PROP. CATCH BASIN OR INLET
- PROP. END SECTION
- PROPOSED DRAINAGE ARROWS
- LIMITS OF DISTURBANCE

CROSS-SECTION NOTES

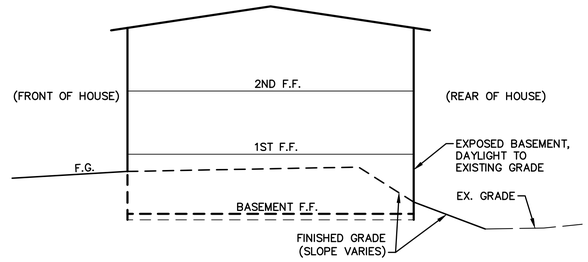
1. NO PART OF THE DETENTION BASIN OR FENCE SHALL BE LOCATED WITHIN THE PACKARD ROAD RIGHT-OF-WAY OR WITHIN THE PUBLIC EASEMENTS.

CROSS-SECTION NOTES

THE TERM "VIEWOUT BASEMENT" (SHOWN IN THE CROSS-SECTION VIEWS) ALSO KNOWN AS A "DAYLIGHT BASEMENT" DESCRIBES THE DESIGNED EXPOSURE OF THE BASEMENT OF THE REAR OF A HOUSE.

THE INTENDED PURPOSE IS TO ALLOW FOR MUCH LOWER ELEVATIONS AND SHALLOWER SLOPES IN THE REAR OF THE HOUSE COMPARED TO THE HIGHER ELEVATIONS IN THE FRONT OF THE HOUSE.

REFER TO THE SKETCH BELOW.



"VIEWOUT" SINGLE FAMILY BASEMENT SKETCH

NO SCALE

SCALE: 1" = 40'
0 40 80 120

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
GRADING PLAN AND CROSS-SECTIONS

10

JOB No. 16070

REVISIONS:
PER CITY REVIEW 08/14/19
PER CITY REVIEW

DATE: 4/25/19
SHEET 10 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
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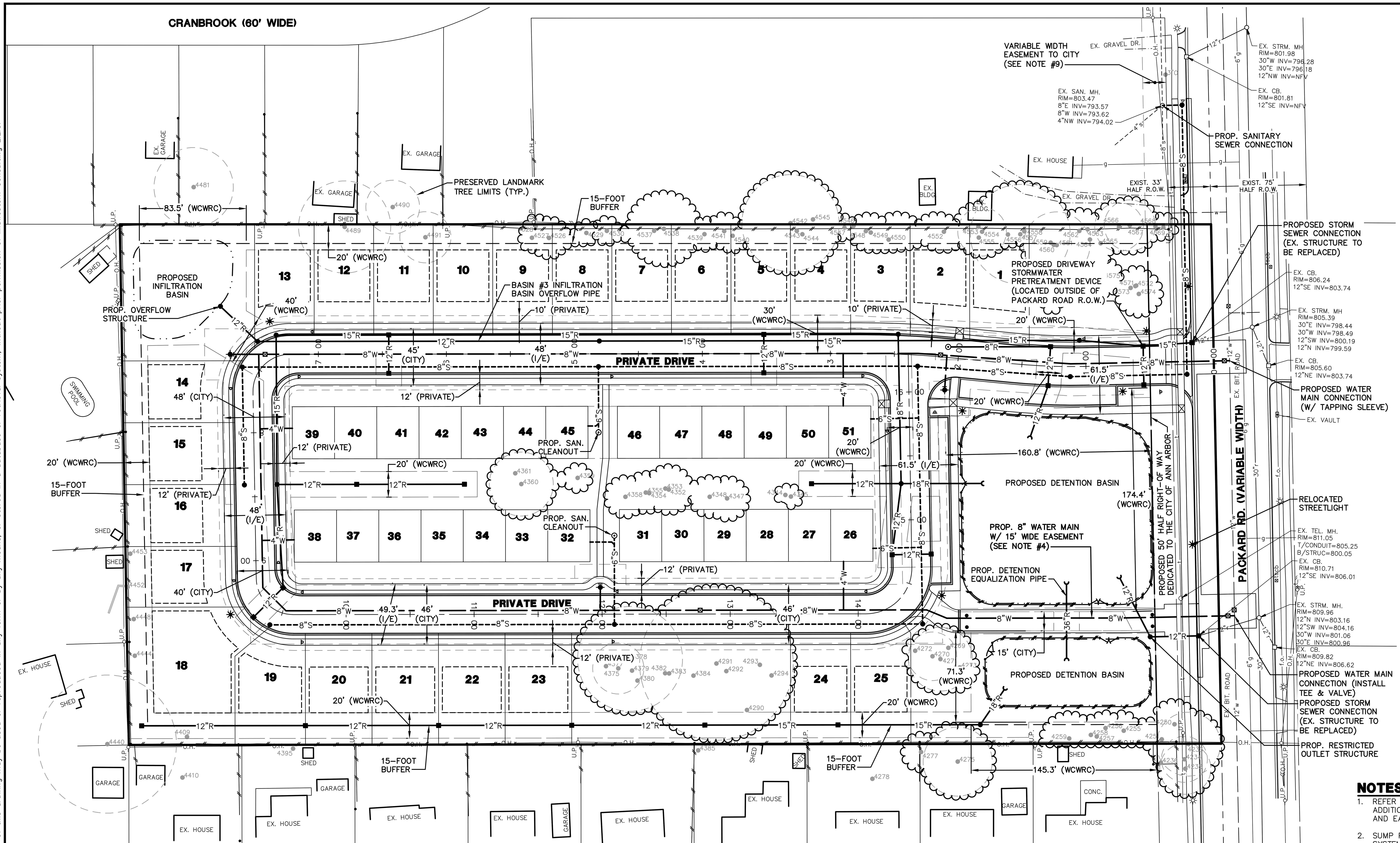


LEGEND

- EXIST. UTILITY POLE
- GUY WIRE
- EXIST. OVERHEAD UTILITY LINE
- EXIST. LIGHT POLE
- EXIST. TELEPHONE LINE
- EXIST. ELECTRIC LINE
- EXIST. GAS LINE
- EXIST. FIBER OPTIC LINE
- EXIST. WATER MAIN
- PROP. WATER MAIN
- EXIST. HYDRANT
- PROP. HYDRANT
- EXIST. GATE VALVE IN BOX
- EXIST. GATE VALVE IN WELL
- PROP. GATE VALVE IN WELL
- EXIST. CURB STOP & BOX
- EXIST. STORM SEWER
- PROP. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- PROP. CATCH BASIN OR INLET
- PROP. FRENCH DRAIN
- EXIST. SANITARY SEWER
- PROP. SANITARY SEWER
- PROP. SANITARY CLEANOUT
- SIGN
- MAILBOX
- TELEPHONE RISER
- ELECTRIC METER
- GAS METER
- TRAFFIC SIGNAL CONTROL BOX
- POST
- WELL
- FENCE
- SINGLE TREE
- TREE OR BRUSH LIMIT
- PRESERVED REGULATED WOODLANDS

SCALE: 1" = 40'

SANITARY SEWER BASIS OF DESIGN

	Quantity	Unit	Usage Rate	Unit	Proposed Flow	
Single Family Unit	1	EA	300	GPCPD	300	GPD
Total Units	25			Total=	7500	GPD
Daily Flow					7500	GPD
					0.012	CFS
Peaking Factor					4	
Average Peak Daily Flow					0.046	CFS

	Quantity	Unit	Usage Rate	Unit	Proposed Flow	
Attached (Townhouse Unit)	1	EA	300	GPCPD	300	GPD
Total Units	26			Total=	7800	GPD
Daily Flow					7800	GPD
					0.012	CFS
Peaking Factor					4	
Average Peak Daily Flow					0.048	CFS
Gross Average Peak Daily Flow					0.095	CFS
Capacity of 8 inch pipe at 0.50% slope					1.007	CFS

SANITARY SEWER MITIGATION CALCULATIONS

Based on flow data in the City's "Table A" of the Sewage Flow Offset Mitigation Program
Used to determine sewer pipe sizing and number of footing drain disconnects (FDD) required.

Sewer Design Flow - Single Family Units:

Design Flow Rate per Unit (from Table A)	300	GPD/Unit
Peaking Factor	4	
Number of Units	25	Units
Eq: (Flow Rate per House X Peaking Factor X # Units) =	30,000	GPD
Eq: (Sewer Design Flow / 24 hr / 60 min) =	20.8	GPM
System Recovery Factor for Mitigation	1.1	

Mitigation Design Flow - Single Family Units:

Eq: (Sewer Design Flow X System Recovery Factor) =	33,000	GPD
Eq: (Mitigation Design Flow / 24 hr / 60 min) =	22.9	GPM

Sewer Design Flow - Attached (Townhouse) Units:

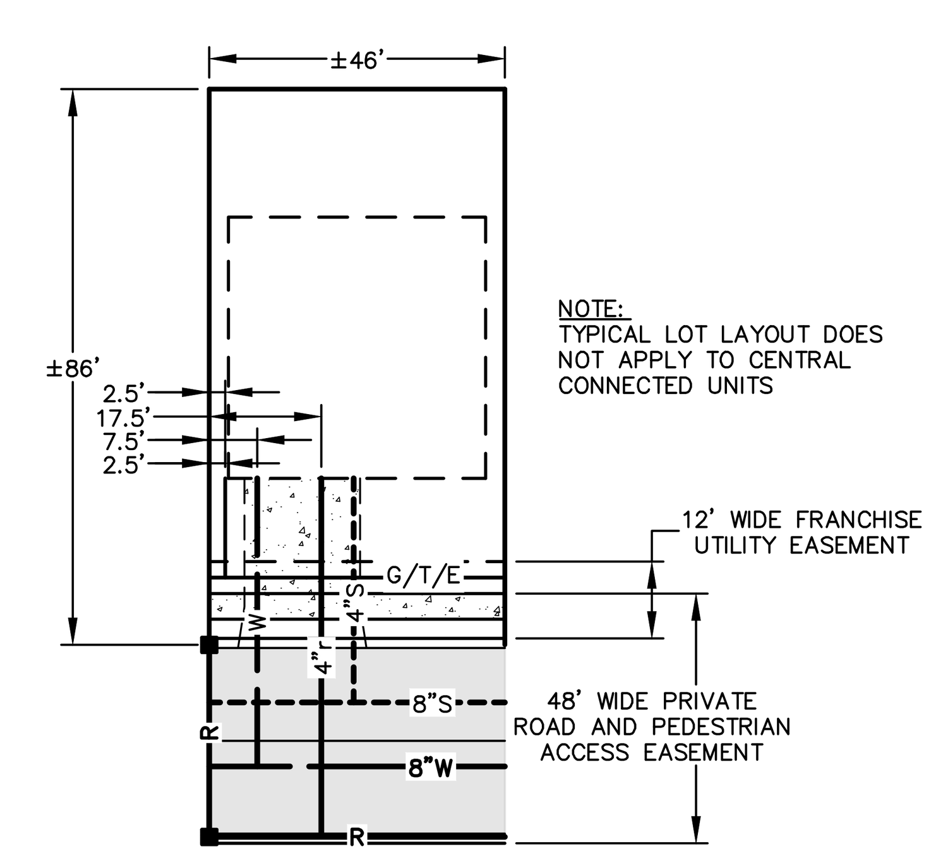
Design Flow Rate per Unit (from Table A)	300	GPD/Unit
Peaking Factor	4	
Number of Units	26	Units
Eq: (Flow Rate per House X Peaking Factor X # Units) =	31,200	GPD
Eq: (Sewer Design Flow / 24 hr / 60 min) =	21.7	GPM
System Recovery Factor for Mitigation	1.1	

Mitigation Design Flow - Attached (Townhouse) Units:

Eq: (Sewer Design Flow X System Recovery Factor) =	34,320	GPD
Eq: (Mitigation Design Flow / 24 hr / 60 min) =	23.8	GPM

Gross Mitigation Design Flow (To be mitigated): 46.8 GPM

Note: Pending field verification, there is no existing flow to the public sanitary sewer system from the subject property. Mitigation will be required for a flow of 55 gallons per minute, or equivalent alternate mitigation to equate to the additional peak



TYPICAL LOT UTILITY LEADS

NOTES

1. REFER TO TYPICAL ROAD SECTION AND EASEMENT PLAN SHEET FOR ADDITIONAL INFORMATION REGARDING PROPOSED UTILITY LOCATIONS AND EASEMENT WIDTHS.
2. SUMP PUMPS WILL BE CONNECTED DIRECTLY TO THE STORM SEWER SYSTEM, CROSSING THE STREET IF NECESSARY, VIA ENCLOSED PIPE. LEADS WILL BE SHOWN IN DETAILED ENGINEERING PLANS.
3. EXISTING SANITARY SEWER LEADS AT THE TERMINAL MANHOLE (MANHOLE LOCATED EAST OF SUBJECT PROPERTY) SHALL BE FIELD VERIFIED, AND TERMINATED AT THE MANHOLE, IF ABANDONED.
4. WATER MAIN LOCATED WITHIN 15' WIDE PUBLIC UTILITY EASEMENT SHALL MEET PIPE MATERIAL AND CASING SPECIAL PROVISIONS PER APPROVAL BY THE PUBLIC SERVICES DIRECTOR. SPECIAL PROVISIONS TO BE DETERMINED DURING DETAILED ENGINEERING PLAN PHASE.
5. EACH ATTACHED RESIDENTIAL GROUPING WILL HAVE A SINGLE SANITARY AND WATER LEAD, LOCATIONS TO BE DETERMINED DURING DETAILED ENGINEERING PLAN PHASE.
6. NO FIREWALLS ARE PROPOSED. NO FIRE SUPPRESSION PROPOSED IN BUILDINGS.
7. ALL DIMENSIONS ARE PROPOSED EASEMENT WIDTHS, INCLUDING EASEMENT OWNERSHIP IN PARENTHESIS. SEE SHEET 12 FOR ADDITIONAL EASEMENT INFORMATION.
8. NO BOOSTER PUMPS ARE PROPOSED FOR BUILDING WATER SERVICE LEADS.
9. AN EASEMENT SHALL BE ESTABLISHED AND CONVEYED TO THE CITY OF ANN ARBOR FOR THE EXISTING OFF-SITE 8" SANITARY SEWER THAT FRONTS PARCEL 2873 PACKARD ROAD. THE EASEMENT SHALL BE CONVEYED TO THE CITY PRIOR TO THE ISSUANCE OF ANY PERMITS FOR THIS PROJECT.
10. THE FINAL LOCATION AND ALIGNMENT OF THE PROPOSED SANITARY SEWER LOCATED NEAR PACKARD ROAD WILL BE DETERMINED DURING THE DETAILED ENGINEERING PLAN PHASE.

The underground utilities shown have been located from field survey information and existing records. The surveyor makes no guarantees that the underground utilities shown comprise all such utilities in the area, either in-service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated. Although the surveyor does certify that they are located as accurately as possible from the information available.

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
SITE UTILITY PLAN

11

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19
PER CITY REVIEW	06/14/19
PER CITY REVIEW	06/26/19

DATE: 4/25/19
SHEET 11 OF 27
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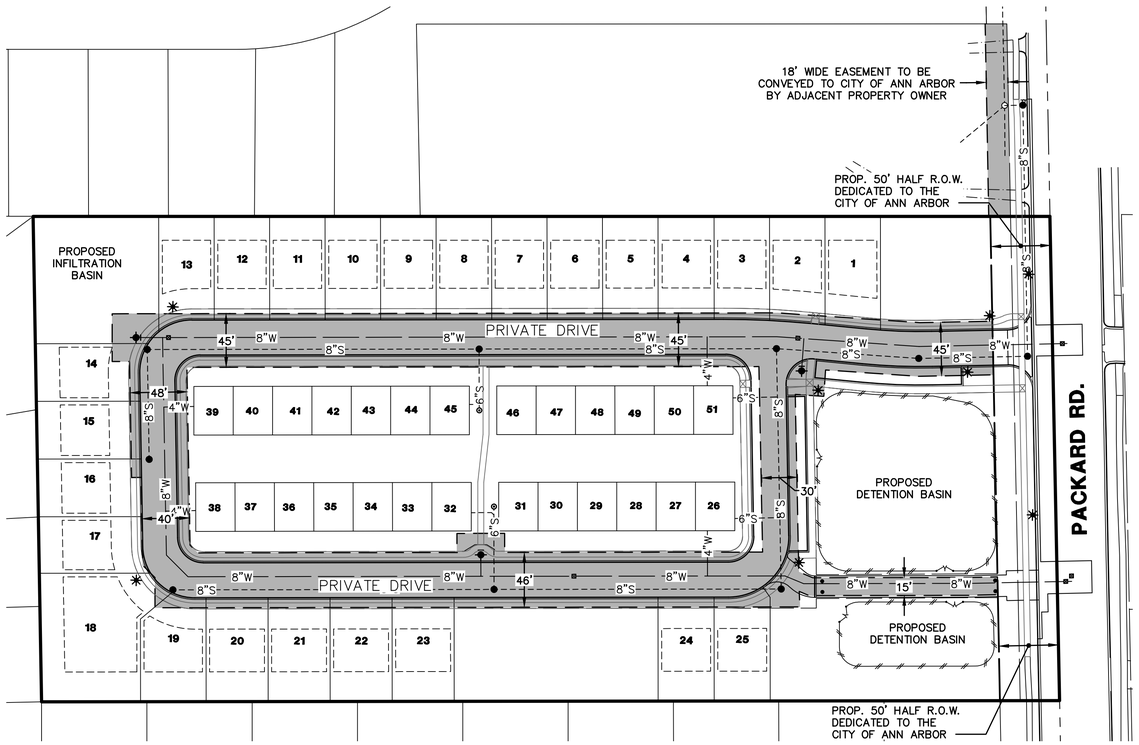
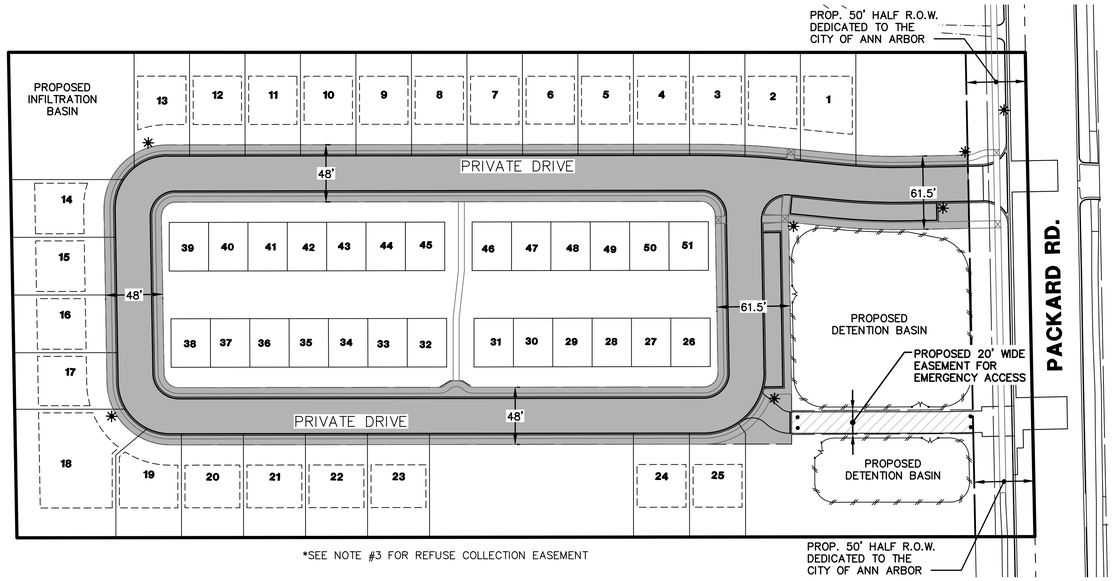
JOB No. 16070

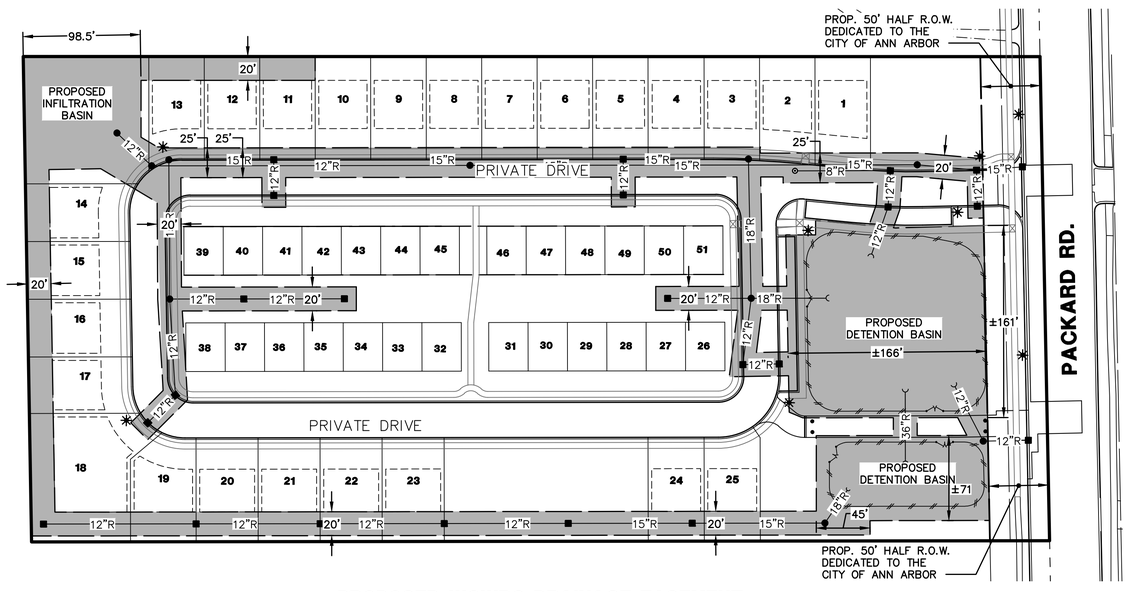


PROPOSED CITY OF ANN ARBOR PUBLIC UTILITY EASEMENT

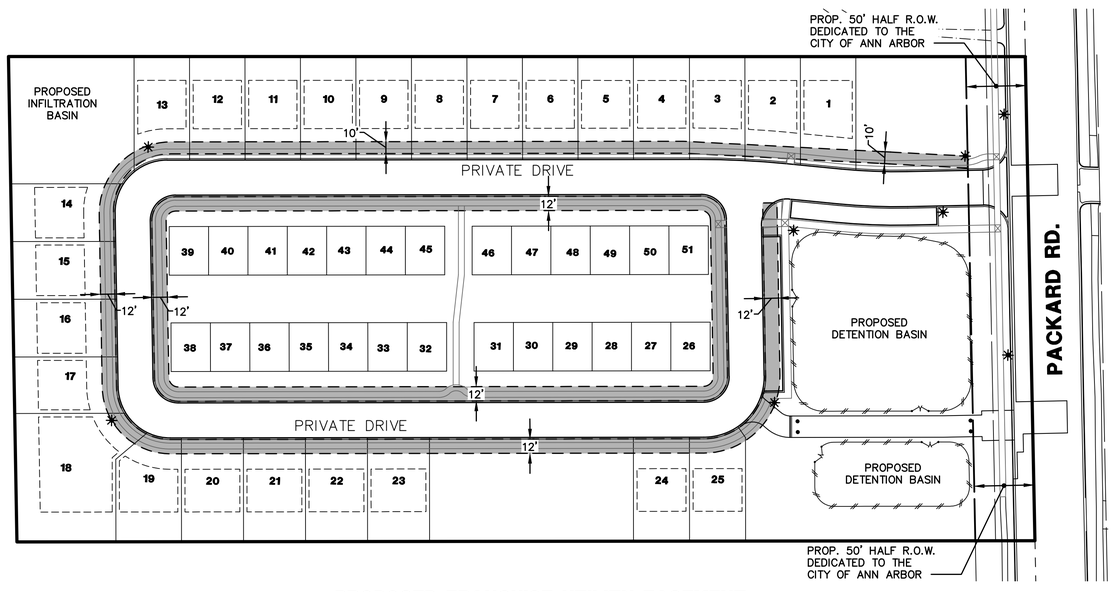


*SEE NOTE #3 FOR REFUSE COLLECTION EASEMENT

PROPOSED PRIVATE ROAD & PEDESTRIAN ACCESS EASEMENT



PROPOSED WCWRC DRAINAGE EASEMENT



PROPOSED FRANCHISE UTILITY EASEMENT

SCALE: 1" = 60'

0 60 120 180

Know what's below. Call before you dig.

NOTES

1. THE PROPOSED DRAINAGE EASEMENTS ARE PRIVATE AND DEDICATED IN FAVOR OF THE WASHTENAW COUNTY WATER RESOURCES COMMISSIONER AND THE CONDOMINIUM ASSOCIATION.
2. NO PART OF THE PROPOSED DETENTION BASIN OR FENCING SHALL BE LOCATED WITHIN A PUBLIC UTILITY EASEMENT.
3. A DUPLICATE EASEMENT OF THE "PROPOSED PRIVATE ROAD & PEDESTRIAN ACCESS EASEMENT" SHALL BE GRANTED TO THE CITY OF ANN ARBOR SPECIFICALLY FOR THE PURPOSES OF REFUSE COLLECTION.

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
EASEMENT PLAN

12

DATE: 4/25/19
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TECH: TES
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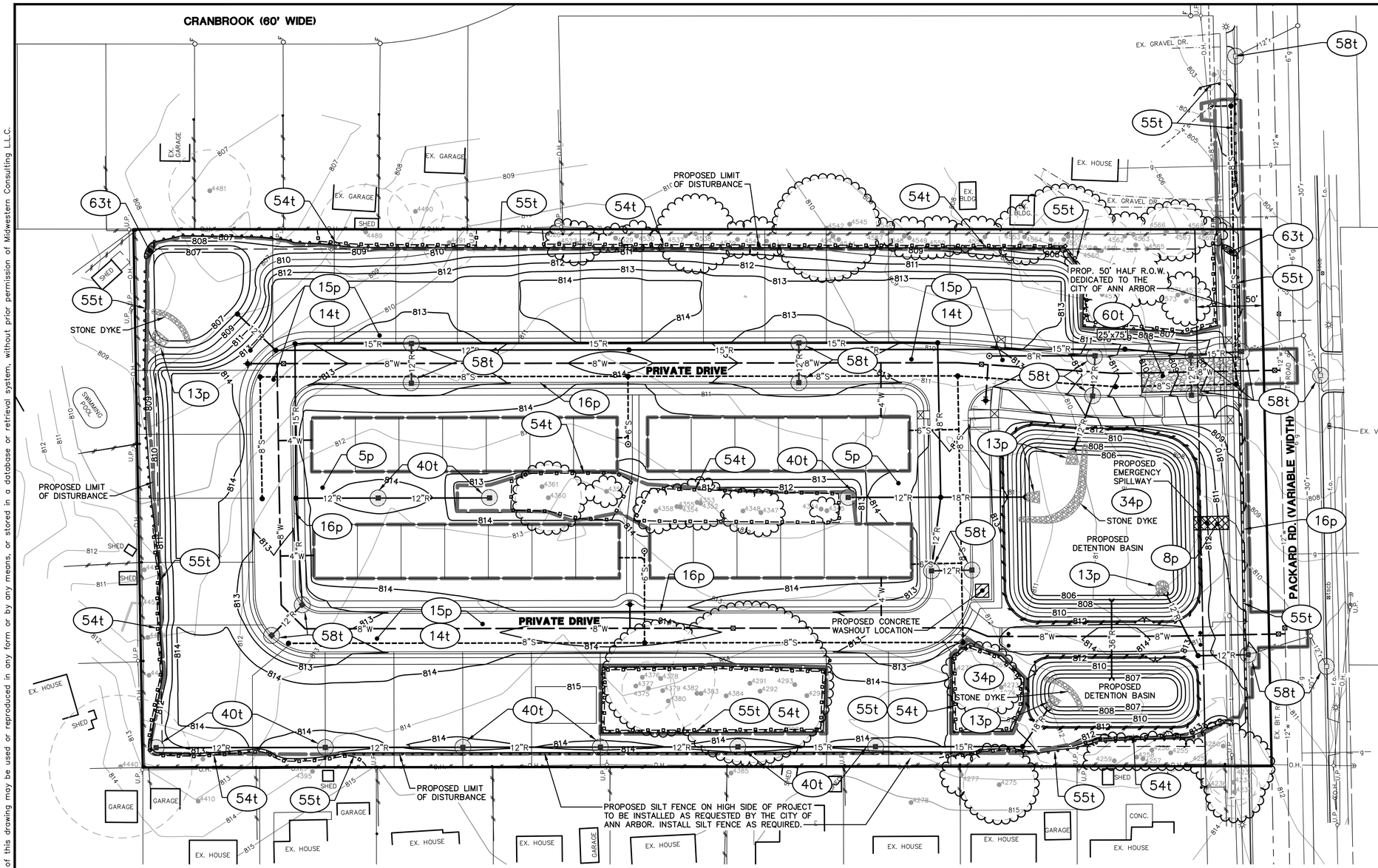
JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/14/19
PER CITY REVIEW	06/26/19
PER CITY REVIEW	



SCALE: 1" = 40'

0 40 80 120

Know what's below. Call before you dig.

LEGEND

- EXIST. CONTOUR
- PROP. CONTOUR
- PROP. WATER MAIN
- PROP. HYDRANT
- PROP. GATE VALVE IN WELL
- PROP. STORM SEWER
- PROP. CATCH BASIN OR INLET
- PROP. SANITARY SEWER
- LIMITS OF DISTURBANCE
- SILT FENCE
- TREE PROTECTION FENCE

SESC NOTES

1. THE CONTRACTOR SHALL IMPLEMENT AND MAINTAIN THE SOIL EROSION CONTROL MEASURES AS SHOWN ON THE SESC PLANS AT ALL TIMES DURING CONSTRUCTION ON THIS PROJECT. FOLLOWING CONSTRUCTION, IT WILL BE THE RESPONSIBILITY OF THE CONDOMINIUM ASSOCIATION TO PERFORM THE MAINTENANCE. ANY MODIFICATIONS OR ADDITIONS TO THE SOIL EROSION CONTROL MEASURES DUE TO CONSTRUCTION OR CHANGED CONDITIONS, SHALL BE COMPLIED WITH AS REQUIRED OR DIRECTED BY THE OWNER, PROJECT ENGINEER, OR WASHTENAW COUNTY.
2. DAILY INSPECTIONS SHALL BE MADE BY THE CONTRACTOR. PERIODIC INSPECTIONS MAY BE MADE BY THE OWNER/PROJECT ENGINEER/CITY TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENTATION CONTROL MEASURES. ANY NECESSARY CORRECTIONS SHALL BE MADE WITHOUT DELAY BY THE ONSITE RESPONSIBLE INDIVIDUAL.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL TEMPORARY SOIL EROSION CONTROL MEASURES AND REMOVAL OF SOME UPON AUTHORIZED COMPLETION OF PROJECT. COMPLETION OF PROJECT WILL NOT BE AUTHORIZED UNTIL ALL SITE WORK, HOME BUILDING, ROAD WORK, AND UTILITY CONSTRUCTION IS COMPLETE AND ALL SOILS ARE STABILIZED.
4. ALL SILT FENCE SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. IF AT ANY TIME THE DEPTH OF SILT AND SEDIMENT COMES TO WITHIN 12" OF THE TOP OF ANY SILT FENCE, ALL SILT AND SEDIMENT SHALL BE REMOVED TO ORIGINAL GRADE.
5. ALL TEMPORARY GRAVEL FILTERS SHOULD BE ADJUSTED AS TO LOCATION PER ACTUAL FIELD CONDITIONS. THE REMOVAL OF TRAPPED SEDIMENT AND THE CLEAN OUT OR REPLACEMENT OF CLOGGED STONE MAY BE NECESSARY AFTER EACH STORM EVENT DURING THE PROJECT.
6. ONLY UPON STABILIZATION OF ALL DISTURBED AREAS MAY THE SILT FENCE, AND TEMPORARY GRAVEL FILTERS BE REMOVED. ALSO, ALL STORM SEWERS MUST BE CLEANED OF ALL SEDIMENT.
7. INTERNAL AND EXTERNAL STREETS WILL BE CLEANED OF ANY TRACKED MUD IMMEDIATELY FOLLOWING EACH MUD-TRACKING OCCURRENCE.
8. SEE SITE DETAILS SHEET FOR ALL SESC DETAILS, CONSTRUCTION NOTES AND MAINTENANCE NOTES.
9. ESTIMATED COST OF STABILIZATION IF CONSTRUCTION OPERATIONS CEASED = $40,000
10. LIMIT OF DISTURBANCE = 258,000 SF (5.92 ACRES)
11. ONLY USE HAND TOOLS FOR EARTHWORK WITHIN LIMITS OF TREE PROTECTION FENCE.
12. END SECTIONS SHALL BE BURIED IN 1.5 CYD OF MDOT 6A WASHED STONE.
13. ANY DIRT OR DEBRIS TRACKED ONTO INTERNAL OR EXTERNAL ROADS WILL BE IMMEDIATELY CLEANED UP FOLLOWING ANY MUD-TRACKING EVENT AND ON A DAILY BASIS AT A MINIMUM.
14. USE ONLY HAND TOOLS FOR GRADING WITHIN TREE PROTECTION FENCE LIMITS.
15. STONE DYKE SHALL CONSIST OF 6" TO 8" NATURAL STONE RIP RAP PLACED TO SPECIFIED DEPTH PER PLAN.
16. PER CHAPTER 55, SECTION 5.22.3.D, DETENTION FACILITIES MUST BE INSTALLED PRIOR TO THE ISSUANCE OF BUILDING PERMITS.
17. PER THE REQUIREMENTS OF THE NPDES PERMIT, INSPECTIONS MUST BE PERFORMED BY A CERTIFIED MDEQ STORM WATER OPERATOR AT LEAST ONCE A WEEK AND IMMEDIATELY FOLLOWING EACH PRECIPITATION EVENT. THE WRITTEN REPORTS MUST BE MAINTAINED ONSITE.
18. PER CHAPTER 55, SECTION 5.22.4.J, PERMANENT SOIL EROSION CONTROLS ARE REQUIRED TO BE INSTALLED WITHIN FIVE (5) DAYS AFTER FINAL GRADING OR FINAL EARTH CHANGE.
19. ESTIMATED EARTHWORK:
    CUT: 35,820 CYD
    FILL: 27,790 CYD

CONSTRUCTION SEQUENCE

CONSTRUCTION SEQUENCE	OPERATION TIME SCHEDULE – BEGINNING AUGUST 2019
	AUG. | SEP. | OCT. | NOV. | DEC. | JAN. | FEB. | MARCH | APRIL
INSTALL AND MAINTAIN SOIL EROSION CONTROL MEASURES AS REQUIRED	
SITE REMOVALS	
TRAFFIC CONTROL PACKARD ROAD	
R.O.W. REMOVALS	
R.O.W. UTILITIES	
R.O.W. PAVING	
STRIP AND STOCKPILE TOPSOIL	
DETENTION BASIN CONSTRUCTION	
MASS GRADING AND INSTALL PUBLIC UTILITIES	
CONSTRUCT/PAVE PRIVATE DRIVE	
CONSTRUCT FOUNDATIONS FOR HOMES (AS PURCHASED)	
INSTALL FRANCHISE UTILITIES	
CONSTRUCT SIDEWALK	
CONSTRUCT ACCESS DRIVES AND FINAL PAVE MAIN ROAD	
PLACE LANDSCAPING, TOPSOIL AND LAWNS	
FINAL CLEAN-UP & REMOVAL OF SOIL EROSION CONTROLS	

SOIL EROSION CONTROL MEASURES

t = temporary p = permanent

5	SEEDING	16	CURB & GUTTER	54	CONSTRUCTION FENCE OR SNOW FENCE
8	SODDING	34	SEDIMENT BASIN	55	GEOTEXTILE SILT FENCE
13	RIPRAP, RUBBLE, GABIONS	40	INLET SEDIMENT TRAP	58	CURB INLET FILTER
14	AGGREGATE COVER	49	CHECK DAMS	60	MUD TRACKING MAT
15	PAVING	51	RETAINING WALL	63	SILT FENCE WITH STONE FILTER

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
SOIL EROSION & SEDIMENTATION CONTROL PLAN

13

JOB No. 16070

DATE: 4/25/19
SHEET 13 OF 27
CADD: CTS
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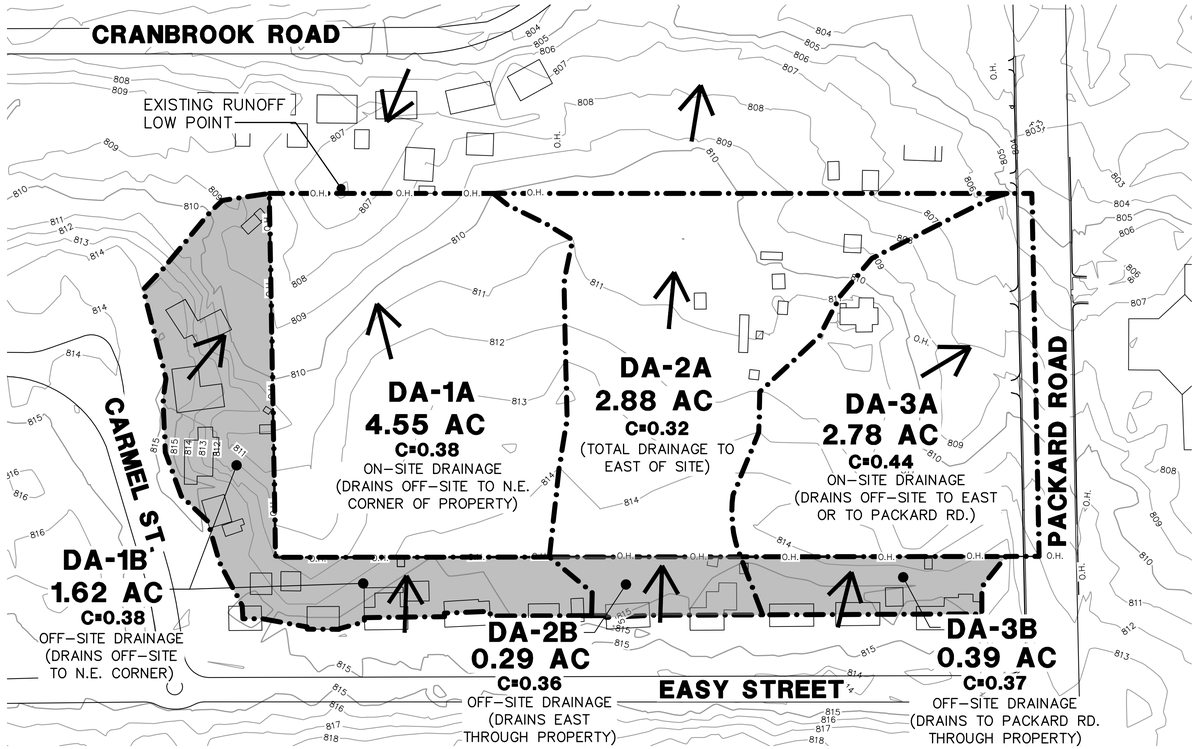
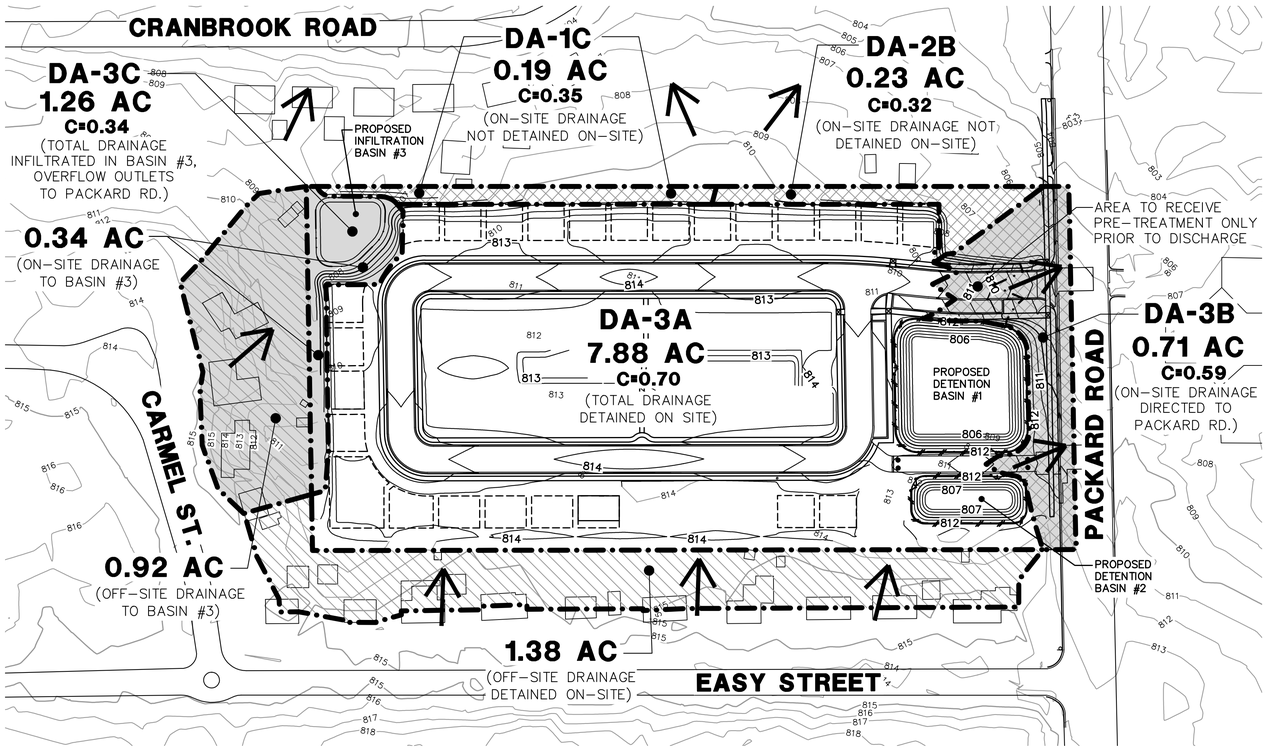


EXISTING SITE DRAINAGE



PROPOSED SITE DRAINAGE

SCALE: 1" = 80'

0 80 160 240

Know what's below. Call before you dig.

LEGEND

- DRAINAGE AREA BOUNDARY
- 7.25 AC — DRAINAGE AREA IN ACRES
- C=0.40 — DRAINAGE AREA RUNOFF COEFFICIENT
- OFFSITE DRAINAGE TO BE DETAINED
- ONSITE DRAINAGE NOT TO BE DETAINED
- DRAINAGE ARROW

DRAINAGE COMPARISON

Equations:

100 Year Peak Discharge Rate=$Q_{100}=C_{avg} \times i_{100} \times$ Area [ft^3/s]

First Flush Volume =$V_{ff}=C_{avg} \times$ Area x 1" [ft^3]

100 Year Peak Volume=$V_{100}= C_{avg} \times$ Area x 5.11" [ft^3]

Assumptions:

Required 100 Year Storage Volume (per WCWRC) = $V_{100(req)}$= 97,162 cf

Required Infiltration Volume (per WCWRC) = $V_{inf(req)}$= 33,655 cf

Existing Conditions							
Drainage Area #	Area (sf)	Area (acre)	C_{avg}	Q_{100} (cfs)	V_{ff} (cf)	V_{100} (cf)	See Note #
DA-1A (On-Site NE)	198,404	4.55	0.38	**11.899**	**6,283**	**32,105**	
DA-1B (Off-Site NE)	70,590	1.62	0.38	**4.234**	**2,235**	**11,423**	
DA-2A (On-Site East)	125,502	2.88	0.32	**6.338**	**3,347**	**17,102**	
DA-2B (Off-site East)	12,649	0.29	0.36	**0.719**	**379**	**1,939**	
DA-3A (On-Site South)	121,285	2.78	0.44	**8.423**	**4,447**	**22,725**	
DA-3B (Off-Site South)	17,085	0.39	0.37	**0.998**	**527**	**2,692**	

Proposed Conditions							
Drainage Area #	Area (sf)	Area (acre)	C_{avg}	Q_{100} (cfs)	V_{ff} (cf)	V_{100} (cf)	See Note #
DA-1C (NE) Total	8,077	0.19	0.35	0.446	236	1,204	
DA-2B (East) Total	10,134	0.23	0.32	**0.512**	**270**	**1,381**	
DA-3A (Packard Rd)	343,301	7.88	0.70	1.182	0	63,507	**1, 2, 3**
DA-3B (Packard Rd)	30,818	0.71	0.59	2.870	1,515	7,743	
DA-3C (Packard Rd)	54,765	1.26	0.34	2.965	0	8,637	
DA-3 Total	374,119	8.59	-	**7.017**	**1,515**	**61,121**	

Note 1:
For DA-3A, the entire first flush volume (V_{ff}) is designed to be infiltrated into the soil horizon in the central detention basin, therefore no volume is discharged to Packard Road.
Note 2:
For DA-3A, Q_{100} = 0.15 (cfs/acre) X Area (acres) ... [Maximum Post-development Discharge Rate per WCWRC]
Note 3:
For DA-3A, $V_{100} = V_{100(req)} - V_{inf(req)}$ = 97,162-33,655=63,507 cf

		Existing	Proposed	Difference	% Difference	Inc/Dec	See Note #
DA-1	Q_{100} (cfs)	11.899	0.446	11.453	-96%	Decrease	
	V_{ff} (cf)	6,283	236	6,047	-96%	Decrease	
	V_{100} (cf)	32,105	1,204	30,901	-96%	Decrease	

Summary:
There is a significant reducation in drainage to the northeast corner the site, which has been historically reported to flood some adjacent properties in this area. All flows to this corner should be reduced by the redirection and management of existing flows to the proposed detention basin.

DA-2	Q_{100} (cfs)	6.338	0.512	5.827	-92%	Decrease	
	V_{ff} (cf)	3,347	270	3,076	-92%	Decrease	
	V_{100} (cf)	17,102	1,381	15,721	-92%	Decrease	

Summary:
There is a significant reduction in drainage east across the site, which is managed by the detention basins instead of flowing to the adjacent property to the east like it has historically done.

DA-3	Q_{100} (cfs)	8.423	7.017	1.405	-17%	Decrease	
	V_{ff} (cf)	4,447	1,515	2,932	-66%	Decrease	
	V_{100} (cf)	22,725	61,121	-38,396	169%	Increase	**1**

Note 1:
The stormwater systems applied to the site and surrounding area will descrease the first flush volume directed to Packard Road by 66%. Although more stormwater volume will contribute to Packard Road (shown by the V_{100} increase) the existing flooding to the surrounding parcels will be significantly alleviated. The stormwater will be detained within basins over time and therefore will result in a combined peak flow rate reduction to Packard Road by 17%, which will not overload the existing stormwater system.

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
DRAINAGE COMPARISON PLAN

14

JOB No. 16070

REVISIONS:	REV. DATE:
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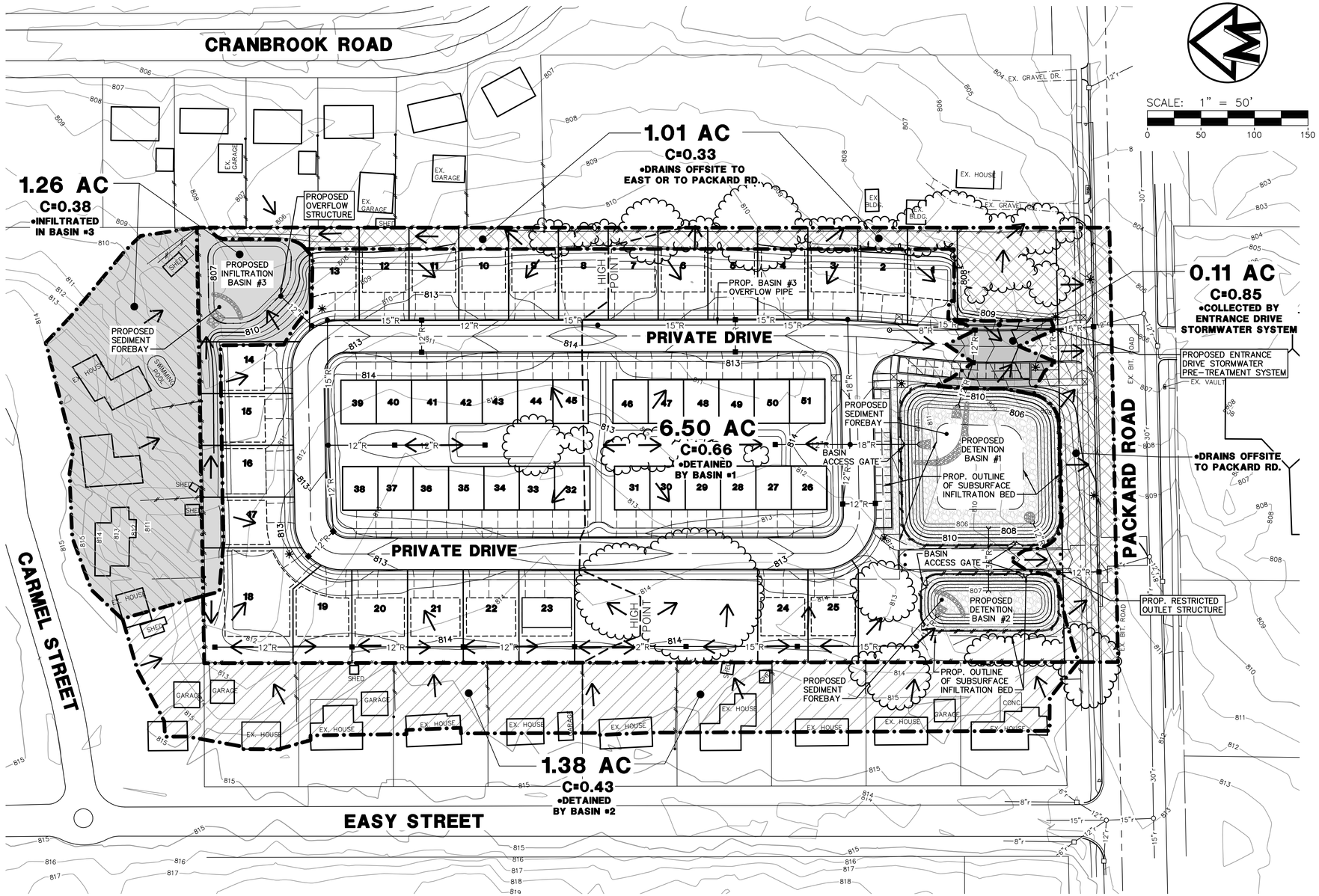


LEGEND

- EXIST. CONTOUR (838)
- EXIST. SPOT ELEVATION (×836.2)
- EXIST. STORM SEWER
- EXIST. CATCH BASIN OR INLET
- EXIST. BEEHIVE INLET
- END SECTION
- HEAD WALL
- CULVERT
- SINGLE TREE
- TREE OR BRUSH LIMIT
- DRAINAGE AREA BOUNDARY
- 7.25 AC — DRAINAGE AREA IN ACRES
- C=0.40 — DRAINAGE AREA RUNOFF COEFFICIENT
- PROPOSED DRAINAGE ARROW
- OFFSITE DRAINAGE TO BE DETAINED
- ONSITE DRAINAGE NOT TO BE DETAINED
- DRAINAGE AREA TO HYDRODYNAMIC SEPARATOR
- SUBSURFACE INFILTRATION (GRAVEL BED)

STORMWATER DRAINAGE NARRATIVE

The proposed site is located along Packard Road between Easy Street and Chesterfield Drive. The site is located in the Southeast 1/4 of Section 3 of Pittsfield Township and is bounded by residential neighborhoods to the north, east and west, and by Packard Road to the south.

Summary:
The proposed drainage area is designed to redirect and manage a large majority of the existing drainage patterns to improve runoff conditions to the surrounding parcels. Existing drainage patterns result in recurring flooding events in the northeast corner of the site. A total of 6.41 acres drain toward the northeast corner from the west of the site, while 3.17 acres drain directly across the site to the adjacent property to the east. Lastly, 3.17 acres drain directly to Packard Road. The proposed stormwater management systems will improve the flooding conditions in the northeast corner of the site by redirecting all subject property drainage, and nearly all of the off-site drainage passing through the site, away from this corner, and toward the detention/infiltration systems on the subject property. The management systems outlet to Packard Road at controlled rates during typical stormwater events.

Detention Basins #1 and #2:
The proposed detention system will be designed to meet the current Washtenaw County Water Resources Commission requirements, dated October 17, 2016. The detention system will meet infiltration volume requirements and the remaining stormwater will be a controlled release of 0.15 cfs/acre to Packard Road. Detention volume will be provided by the use of the detention basins located on the south side and at the southwest corner of the site. The basins are vertically offset so the first flush and bankfull events are infiltrated in Basin #1 alone. In storm events more severe than bankfull, stormwater will travel to Basin #2 for storage and infiltration via the equalization pipe. See the "Detention Basin Profile Sketch" located on the "Stormwater Calculations – Basins #1 & #2" sheet for a visual depiction of how the infiltration and storage process will occur. Subsurface infiltration beds will be utilized (located at the extents of the detention basins) to meet infiltration area requirements. Runoff along the west extents of the site and the middle lots will be directed to catch basins which are directed to Basin #1.

There will be small portions of the site that will not be detained on the site. Said areas are along the east extents of the site where the elevations are too low relative to the detention basin to be collected and along the southern portion of the detention basin. These isolated areas will follow the existing drainage patterns and will not adversely impact the adjacent parcels or Packard Road as the volumes and flow rates for these direct-release areas will be decreasing, and the total flow rates to Packard Road will be decreasing.

Infiltration Basin #3:
An infiltration basin is proposed in the northeast corner of the site, which is designed to overflow to Packard Road separately from Basins #1 and 2. This basin is designed to infiltrate the first flush and bankfull storms entirely for stormwater collected from the north extents of the property and off-site drainage from the north that heads east historically to the low point. In the event of a 100 year storm, the infiltration basin will overflow south to the pre-treatment system and outlet to Packard Road. The existing storm sewer system in Packard Road will not be overburdened because there is a calculated net 17% reduction in the 100 year storm flow rate compared to existing.

Pre-treatment:
A small portion of the entrance drive to the site will drain offsite since it cannot be collected by the detention system, including a small portion of the emergency access path. For the main driveway entrance, intermediate catch basins will be located such that a portion of the flow directed toward Packard Road will be collected by a pre-treatment system. The system will be designed to collect and pre-treat runoff via a hydrodynamic separator so stormwater can be discharged to the existing storm sewer system. Historically, a large area of the site drained directly towards Packard Road, which will be mitigated with the aforementioned management systems. The peak flow rate to Packard Road will decrease 66% and the 100 year runoff volume will decrease by 17%. The existing low point in the northeast corner of the site will also see a 96% decrease in total first flush and 100 year storm volumes, therefore a significant improvement. Also worth note, the adjacent property to the east will see a 92% decrease in first flush and 100 year volumes.

With the methods proposed for stormwater management on this site, there will be no negative downstream impacts as a result of this development and will improve overall existing drainage conditions.

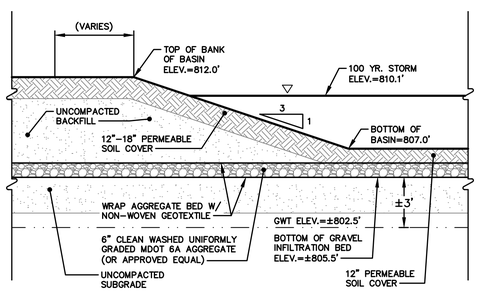
Outlet Certification:
Based upon the data and criteria outlined above, I hereby certify that the existing storm sewer is the only reasonably achievable stormwater outlet for the proposed stormwater management system. The existing storm sewer has sufficient capacity to serve as an adequate outlet for the proposed system, without detriment to or diminution of the drainage serve that the existing outlet presently provides.

Signed: _____

Scott G. Fisher, P.E. #58473

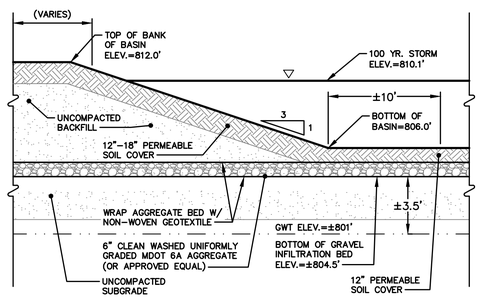
NOTE:

ROOF DRAINAGE LINES AND SUMP DISCHARGES WILL BE CONNECTED DIRECTLY TO STORM SEWER SYSTEM ALONG FRONTAGE OR REAR OF PROPERTIES VIA ENCLOSED PIPE.



SUBSURFACE INFILTRATION BED SECTION

(PROPOSED DETENTION BASIN #2)
NOT TO SCALE



SUBSURFACE INFILTRATION BED SECTION

(PROPOSED DETENTION BASIN #1)
NOT TO SCALE

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PLANNED UNIT DEVELOPMENT
STORMWATER MANAGEMENT PLAN

15

JOB No. 16070
DATE: 4/25/19
SHEET 15 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
16070DA2.dwg

REVISIONS:
PER CITY REVIEW — REV. DATE 06/14/19

STORMWATER CALCULATIONS - BASINS #1 AND #2 COMBINED

Both Basin #1 and Basin #2

W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Total Site Area (Property Limits)	**7.96 ac**
Total Site Area (Main Detention Basin Zone, includes runoff from off-site)	**7.88 ac**
Total Site Area Excluding "Self-Crediting" BMPs* (Main Basin Zone)	**7.88 ac**

Rational Method Variables (for first flush)

0.25 for pervious surfaces, Soil Type B
0.50 for pervious surfaces, Soil Type D
0.95 for house roofs, driveways, and roadways
1.00 for water surfaces (2-year pond elevation)

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) (Area)
House Roofs	B	94,685	2.17	0.95	2.06
Driveways	B	19,151	0.44	0.95	0.42
Roadways	B	67,849	1.56	0.95	1.48
Landscaping	B	147,485	3.39	0.25	0.85
Water Surface	B	14,132	0.32	1.00	0.32
Total		343,301	7.88	0.65	5.13

Total - Sum(C)(Area) 5.13 ac
Area Total 7.88 ac
Weighted C - (Sum(C)(Area))/(Area Total) 0.65

Pervious

NRCS Variables

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Landscaping	B	147,485	3.39	61	2.07
Total		147,485	3.39	61	2.07

Total - Sum(C)(Area) 2.07 ac
Area Total 3.39 ac
Weighted C - (Sum(C)(Area))/(Area Total) 61.0

Impervious

NRCS Variables (for bankfull and 100-year calculations)

98 for House Roofs
98 for water surfaces (2-year pond elevation)

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
House Roofs	B	94,685	2.17	98	2.13
Driveways	B	19,151	0.44	98	0.43
Roadways	B	67,849	1.56	98	1.53
Water Surface	B	14,132	0.32	98	0.32
Total		195,817	4.50	98	4.41

Total - Sum(C)(Area) 4.41 ac
Area Total 4.50 ac
Weighted C - (Sum(C)(Area))/(Area Total) 98.0

W2 - First Flush Runoff Calculations (Vff)

A. Vff = 1" x 1'/12" x 43560 sft/ac x A x C 18,634 cft
0.43 ac-ft

W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre)

A.	2 year / 24 hour storm event: P=	2.35 in
B.	Pre-Development CN (Good Cover Woods, Type B Soils)	58
C.	S = (1000 / CN) - 10	7.241 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	0.100 in
E.	Total Site Area excluding "Self-Crediting" BMPs	343,301 sft
F.	Vbf-pre = Q x (1/12) x Area	2,857 cft
		0.07 ac-ft

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

A.	2 year / 24 hour storm event: P=	2.35 in
B.	Pervious Cover CN From Worksheet 1	61
C.	S = (1000 / CN) - 10	6.393 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	0.154 in
E.	Pervious Cover Area from Worksheet 1	147,485 sft
F.	Vbf-per-post = Q x (1/12) x Area	1,890 cft
		0.04 ac-ft

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

A.	2 year / 24 hour storm event: P=	2.35 in
B.	Impervious Cover CN From Worksheet 1	98
C.	S = (1000 / CN) - 10	0.204 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	2.122 in
E.	Impervious Cover Area from Worksheet 1	195,817 sft
F.	Vbf-imp-post = Q x (1/12) x Area	34,622 cft
		0.79 ac-ft

W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post)

A.	100 year / 24 hour storm event: P=	5.11 in
B.	Pervious Cover CN From Worksheet 1	61
C.	S = (1000 / CN) - 10	6.393 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	1.436 in
E.	Pervious Cover Area from Worksheet 1	147,485 sft
F.	V100-per-post = Q x (1/12) x Area	17,644 cft
		0.41 ac-ft

W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post)

A.	2 year / 24 hour storm event: P=	5.11 in
B.	Impervious Cover CN From Worksheet 1	98
C.	S = (1000 / CN) - 10	0.204 in
D.	Q = [(P-0.2S)^2] / [P+0.8S]	4.873 in
E.	Impervious Cover Area from Worksheet 1	195,817 sft
F.	Vbf-imp-post = Q x (1/12) x Area	79,518 cft
		1.83 ac-ft

W8 - Time of Concentration (Tc-hrs)

A. Assume 15-minute minimum time of concentration 0.25 hr

W9 - Runoff Summary & On-Site Infiltration Requirement

A. Summary from Previous Worksheets

First Flush Volume (Vff)	**18,634**	**cft**
Pre-Development Bankfull Runoff Volume (Vbf-pre)	**2,857**	**cft**
Pervious Cover Post-Development Bankfull Volume (Vbf-per-post)	*1,890*	*cft*
Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post)	*34,622*	*cft*
Total BF Volume (Vbf-post)	**36,511**	**cft**
Pervious Cover Post-Development 100-Year Volume (V100-per-post)	*17,644*	*cft*
Impervious Cover Post-Development 100-Year Volume (V100-imp-post)	*79,518*	*cft*
Total 100-Year Volume (V100)	**97,162**	**cft**

B. Determine Onsite Infiltration Requirement
Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume

Total Post-Development Bankfull Volume (Vbf-post)	36,511	cft
Pre-Development Bankfull Runoff Volume (Vbf-pre)	2,857	cft
Bankfull Volume Difference	**33,655**	**cft**
Compare to First Flush Volume (Vff)	18,634	cft
Greater of Bankfull Volume or First Flush Volume	**33,655**	**cft**
To be Infiltrated		

W10 - Detention/Retention Requirement

Detention

A.	Qp = 238.6 Tc^-0.82	743.63 cfs/(in x sq. mi)
B.	Total Site Area excluding "Self-Crediting" BMPs	7.88 ac
C.	Q100 = Q100-per + Q100-imp (from W6 and W7, respectively)	6.309 in
D.	Peak Flow (PF) = Qp x Q100 x Area / 640	57.77 cfs
E.	Delta = PF - 0.15 x Area (ac)	56.59 cfs
	[0.15 x Area (ac)]	*1.18 cfs*
F.	Vdet = Delta / PF x V100	95,174 cft
	Required Detention not including infiltration credit or penalty.	

Minimum Forebay Volume (5% of V100)	4,858	cft
Forebay Provided	5,065	cft

W11 - Determine Applicable BMPs and Associated Volume Credits

Five total test pits with infiltration tests were performed in the location of the detention basin: Originally, three test pits were performed, two of which yielded <0.4 in/hour infiltration rates, while the other had a rate of 5.3 in/hr. At a later date, additional test pits were performed, with both pits yielding 2.25 in/hr infiltration rates. Therefore 2.25 in/hour was determined as the design infiltration rate.

	Area (sft)		Storage Volume (cft)		Design Infilt.	Infilt. Volume in	Max. Allowable	Total Volume
Proposed BMP	Infiltration Area	Gravel Bed	Surface	Soil**	Rate (in/hr)	6-hr storm (cft)	48-hr drawdown (cft)	Reduction (cft)
Detention Basin w/ Gravel Infiltration Bed	27,271	29,052	29,696	4,357.80	2.25	30,680	245,439	34,053

***Note:** For simplification of calculations, the central detention basin was soley considered for the infiltration of the entire first flush and bank*
***Soil Storage Volume = Area of Gravel Infiltration Bed x 6" x 30% (for voids) =** 29,052 x 0.5' x 0.3 4,358 cft

Max. Allowable 48-hour drawdown must be greater than storage volume used for infiltration credit reduction.

Total Infiltration Area (Both basins)	35,266	sft
Total Detention Area(Offsite and Onsite)	343,301	sft
Total Area Loading Ratio**	**9.7 :1**	(10:1 maximum)
Impervious Area Loading Ratio	**7.2 :1**	(8:1 maximum)

***Loading Ratio includes off-site and on-site drainage*

Total Volume Reduction Credit by Proposed Structural BMPs (cft)	34,053
Runoff Volume Infiltration Requirement (Vinf) from Worksheet 9 (cft)	33,655
Runoff Volume Credit (cft)	399

W12 - Natural Features Inventory

Existing Natural Resources	Mapped	Total Area (ac)	Protected Area (ac)
Water Bodies	Yes	0.00	0.00
Floodplains	Yes	0.00	0.00
Riparian Areas	Yes	0.00	0.00
Wetlands	Yes	0.00	0.00
Woodlands	Yes	3.40	0.89
Slopes (>33%)	Yes	0.00	0.00
Total Existing		**3.40**	**0.89**

W13 - Site Summary of Infiltration & Detention

A. Stormwater Management Summary

Minimum Onsite Infiltration Requirement (Vinf)	33,655	cft
Designed/Provided Infiltration Volume	34,053	cft
% Minimum Required Infiltration Provided	101%	
Total Calculated Detention Volume, Vdet	95,174	cft
Net Required Detention Volume (Vdet - Designed/Provided Infiltration Volume)	61,121	cft

B. Detention Volume Increase for sites where the required infiltration volume cannot be achieved.

% Required Infiltration NOT Provided (100% - % Minimum Required Infiltration Provided)	0.0%	
Net % Penalty (20% x % Required Infiltration NOT Provided)	0.0%	
Total Required Detention Volume, including p [(100% + Net % Penalty) x Net Required Detention Volume)]	**61,121**	**cft**

W14 - Storage-Elevation Data

Basins #1&2 Storage Information (Includes forebay areas)

Elevation (ft)	Height (ft)	Basin #1 Area (sft)	Basin #2 Area (sft)	Basin #1 Volume (cft)	Basin #2 Volume (cft)	Basin #1 Cum. Volume (cft)	Basin #1 + Basin #2 Cum. Volume (cft)	Basin #1 + Basin #2 *Cum. Det'n Volume (cft)
806.0	0.0	11,940	0	0	0	0	0	0
807.0	1.0	13,243	2,119	12,586	706	12,586	13,292	0
808.0	**1.0**	**14,604**	**2,871**	**13,918**	**2,486**	**26,504**	**29,696**	0
809.0	1.0	16,020	3,672	15,307	3,263	41,810	48,266	18,570
810.0	1.0	17,494	4,530	16,752	4,093	58,562	69,111	39,415
811.0	**1.0**	**19,024**	**5,443**	**18,254**	**4,980**	**76,816**	**92,344**	**62,648**
812.0	1.0	20,610	6,414	19,812	5,922	96,627	118,077	88,382

1-foot Freeboard & Overflow Structure
Top of Basin

Basins #1&2 Subtotal	**92,344**	**62,648**
Gravel Bed Subtotal	**4,358**	
Pipe Subtotal	**502**	**502**
Total Storage	**97,203**	**63,150**

Equalization Pipe (1 Pipe)
Storage volume per 36" pipe (Cft) 3.14*(36/12/2)*(36/12/2)*71x (1) 36" DIA Pipe = 501.6 cft storage

Infiltration (Only for Central Basin)

Min. Infiltration Vol. (Required)	**33,655**
Cumulative Storage Volume Below BF Elev	**26,504**

Summary: Basin #1 is able to detain and infiltrate the required infiltration volume by itself

Forebay Storage Information (Forebays for inlet pipes, Forebay #1)

Elevation (ft)	Height (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)
805.5	-	1,498	-	-
806.0	0.5	1,628	781	781
807.0	1.0	1,899	1,762	2,543
808.0	1.0	2,186	2,041	4,584
809.0	1.0			
		Forebay #1 Subtotal		4,584

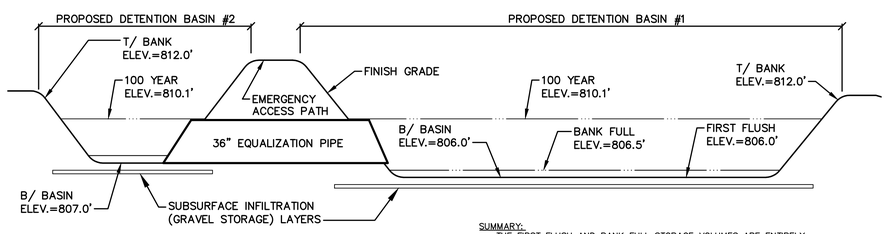
Forebay Storage Information (Forebay #2)

Elevation (ft)	Height (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)
	-	-	-	-
807.0	-	277	139	139
808.0	1.0	409	343	482
		Forebay #2 Subtotal		482

Forebay Storage Total	**5,065**	cft
Required Forebay Storage Volume (5% Total Det. Vol. Required)	4,759	cft

Total Storage Volumes (Subtracting out 6-hour infiltration volumes)

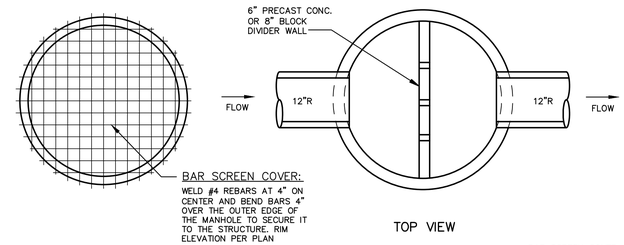
1" Event	-	cft
2-year Event	5,831	cft
100-year Event	66,482	cft



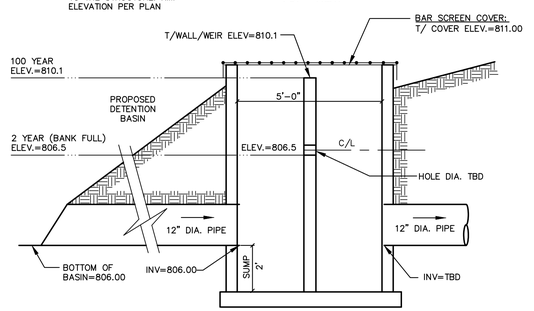
DETENTION BASIN PROFILE SKETCH

NOT TO SCALE

SUMMARY:
- THE FIRST FLUSH AND BANK FULL STORAGE VOLUMES ARE ENTIRELY INFILTRATED IN DETENTION BASIN #1 SINCE DETENTION BASINS ARE VERTICALLY OFFSET.
- INFILTRATION WILL OCCUR IN DETENTION BASIN #2 ONLY AFTER STORMWATER REACHES AN ELEVATION GREATER THAN THE BANKFULL ELEVATION IN BASIN #1 AND WILL TRAVEL TO BASIN #2 VIA AN EQUALIZATION PIPE.



TOP VIEW



PLAN VIEW

OUTLET CONTROL STRUCTURE MANHOLE DETAIL FOR DETENTION BASIN

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STORMWATER CALCULATIONS - BASINS 1 & 2

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STORMWATER CALCULATIONS - BASIN #3

Infiltration Basin

W1 - Determining Post-Development Cover Types, Areas, Curve Numbers, and Runoff Coefficients

Total Site Area (Infiltration Basin Zone, includes runoff from off-site) **1.26 ac**
Total Site Area Excluding "Self-Crediting" BMPs* (Main Basin Zone) **1.26 ac**

Rational Method Variables (for first flush)

0.25 for pervious surfaces, Soil Type B
0.50 for pervious surfaces, Soil Type D
0.95 for house roofs, driveways, and roadways
1.00 for water surfaces (2-year pond elevation)

Cover Type	Soil Type	Area (sft)	Area (ac)	Runoff Coeff. (C)	(C) (Area)
House Roofs	B	6,781	0.16	0.95	0.15
Driveways	B	500	0.01	0.95	0.01
Roadways	B	0	0.00	0.95	-
Landscaping	B	47,484	1.09	0.25	0.27
Water Surface	B	0	0.00	1.00	-
Total		54,765	1.26	0.34	0.43

Total - Sum(C)(Area) 0.43 ac
Area Total 1.26 ac
Weighted C - (Sum(C)(Area))/(Area Total) 0.34

Pervious

NRCS Variables

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
Landscaping	B	47,484	1.09	61	0.66
Total		47,484	1.09	61	0.66

Total - Sum(C)(Area) 0.66 ac
Area Total 1.09 ac
Weighted C - (Sum(C)(Area))/(Area Total) 61.0

Impervious

NRCS Variables (for bankfull and 100-year calculations)

98 for House Roofs
98 for Driveways and Roadways
98 for water surfaces (2-year pond elevation)

Cover Type	Soil Type	Area (sft)	Area (ac)	Curve Number	(CN) (Area)
House Roofs	B	6,781	0.16	98	0.15
Driveways	B	500	0.01	98	0.01
Roadways	B	0	0.00	98	0.00
Water Surface	B	0	0.00	98	0.00
Total		7,281	0.17	98	0.16

Total - Sum(C)(Area) 0.16 ac
Area Total 0.17 ac
Weighted C - (Sum(C)(Area))/(Area Total) 98.0

W2 - First Flush Runoff Calculations (Vff)

A. Vff = 1" x 1'/12" x 43560 sft/ac x A x C 1,566 cft
0.04 ac-ft

W3 - Pre-Development Bankfull Runoff Calculations (Vbf-pre)

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pre-Development CN 58
(Good Cover Woods, Type B Soils)
C. S = (1000 / CN) - 10 7.241 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.100 in
E. Total Site Area excluding "Self-Crediting" BMPs 54,765 sft
F. Vbf-pre = Q x (1/12) x Area 456 cft
0.01 ac-ft

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

A. 2 year / 24 hour storm event: P= 2.35 in
B. Pervious Cover CN From Worksheet 1 61
C. S = (1000 / CN) - 10 6.393 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 0.154 in
E. Pervious Cover Area from Worksheet 1 47,484 sft
F. Vbf-per-post = Q x (1/12) x Area 608 cft
0.01 ac-ft

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

A. 2 year / 24 hour storm event: P= 2.35 in
B. Impervious Cover CN From Worksheet 1 98
C. S = (1000 / CN) - 10 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 2.122 in
E. Impervious Cover Area from Worksheet 1 7,281 sft
F. Vbf-imp-post = Q x (1/12) x Area 1,287 cft
0.03 ac-ft

W6 - Pervious Cover Post-Development 100-Year Runoff Calculations (V100-per-post)

A. 100 year / 24 hour storm event: P= 5.11 in
B. Pervious Cover CN From Worksheet 1 61
C. S = (1000 / CN) - 10 6.393 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 1.436 in
E. Pervious Cover Area from Worksheet 1 47,484 sft
F. V100-per-post = Q x (1/12) x Area 5,681 cft
0.13 ac-ft

W7 - Impervious Cover Post-Development 100-Year Runoff Calculations (V100-imp-post)

A. 2 year / 24 hour storm event: P= 5.11 in
B. Impervious Cover CN From Worksheet 1 98
C. S = (1000 / CN) - 10 0.204 in
D. Q = [(P-0.2S)^2] / [P+0.8S] 4.873 in
E. Impervious Cover Area from Worksheet 1 7,281 sft
F. Vbf-imp-post = Q x (1/12) x Area 2,957 cft
0.07 ac-ft

W8 - Time of Concentration (Tc-hrs)

A. Assume 15-minute minimum time of concentration 0.25 hr

W9 - Runoff Summary & On-Site Infiltration Requirement

A. Summary from Previous Worksheets
First Flush Volume (Vff) **1,566 cft**

Pre-Development Bankfull Runoff Volume (Vbf-pre) **456 cft**
Pervious Cover Post-Development Bankfull Volume (Vbf-per-post) *608 cft*
Impervious Cover Post-Development Bankfull Volume (Vbf-imp-post) *1,287 cft*
Total BF Volume (Vbf-post) **1,896 cft**

Pervious Cover Post-Development 100-Year Volume (V100-per-post) *5,681 cft*
Impervious Cover Post-Development 100-Year Volume (V100-imp-post) *2,957 cft*
Total 100-Year Volume (V100)** **8,637 cft**
(Not required to be detained for this infiltration basin per WCWRC email dated June 28, 2017)

B. Determine Onsite Infiltration Requirement
Subtract the Pre-Development Bankfull from the Post-Development Bankfull Volume
Total Post-Development Bankfull Volume (Vbf-post) 1,896 cft
Pre-Development Bankfull Runoff Volume (Vbf-pre) 456 cft
Bankfull Volume Difference **1,440 cft**

Compare to First Flush Volume (Vff) 1,566 cft

Greater of Bankfull Volume or First Flush Volume **1,566 cft**
To be Infiltrated

W10 - Detention/Retention Requirement

Detention
A. Qp = 238.6 Tc^-0.82 743.63 cfs/(in x sq. mi)
B. Total Site Area excluding "Self-Crediting" BMPs 1.26 ac
C. Q100 = Q100-per + Q100-imp 6.309 in
(from W6 and W7, respectively)
D. Peak Flow (PF) = Qp x Q100 x Area / 640 9.22 cfs
E. Delta = PF - 0.15 x Area (ac) 9.03 cfs
[0.15 x Area (ac)] *0.19 cfs*
F. Vdet** = Delta / PF x V100 **8,461** cft
Required Detention not including infiltration credit or penalty.
(Not required to be detained for this infiltration basin per WCWRC email dated June 28, 2017)

Minimum Forebay Volume (5% of V100) 432 cft
Forebay Provided 121 cft

W11 - Determine Applicable BMPs and Associated Volume Credits
Two test pits with infiltration tests were performed in the location of the detention basin: 2 had 2.5 in/hour infiltration
Therefore the design infiltration value is 2.5 in/hour

	Area (sft) Infiltration Area	Volume (cft) Surface Storage	Design Infilt. Rate (in/hr)	Infilt. Volume in 6-hr storm (cft)**	Max. Allowable 48-hr drawdown (cft)	Total Volume Reduction (cft)
Proposed Basin	3,838	1,776	2.50	**4,798**	38,380	1,776

Max. Allowable 48-hour drawdown must be greater than storage volume used for infiltration credit reduction.

Total Storage Volumes (Subtracting out 6-hour infiltration volumes)
1" Event - cft
2-year Event - cft
100-year Event-**N/A** N/A cft
Entire 2-Year Storm Volume to be Infiltrated in 6 hrs

Total Infiltration Area 3,838 sft
Total Detention Area 0 sft

Total Area Loading Ratio** **N/A**
Impervious Area Loading Ratio **N/A**

Total Volume Reduction Credit by Proposed Structural BMPs (cft) 1,776
Runoff Volume Infiltration Requirement (Vinf) from Worksheet 9 (cft) 1,566
Runoff Volume Credit (cft) 211

W12 - Natural Features Inventory **N/A**

W13 - Site Summary of Infiltration & Detention

A. Stormwater Management Summary

Minimum Onsite Infiltration Requirement (Vinf)	**1,566**	cft
Designed/Provided Infiltration Volume	1,776	cft
% Minimum Required Infiltration Provided	113%	%
Total Calculated Detention Volume, Vdet	8,461	cft
Net Required Detention Volume (Vdet - Designed/Provided Infiltration Volume)	6,684	cft

B. Detention Volume Increase for sites where the required infiltration volume cannot be achieved.

% Required Infiltration NOT Provided (100% - % Minimum Required Infiltration Provided)	0.0%	
Net % Penalty (20% x % Required Infiltration NOT Provided)	0.0%	
Total Required Detention Volume, including penalty [(100% + Net % Penalty) x Net Required Detention Volume)]	**6,684**	**cft**

Storage-Elevation Data

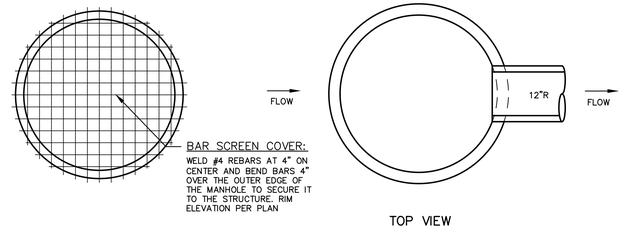
Basin Storage Information (Includes forebay areas)

Elevation (ft)	Height (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)	Cum. Det'n Volume (cft)
			-	-	-
		-	-	-	-
B/ Basin (GWT Elev = ±803') 806.5	0.0	3,275	-	-	-
Lowest Outlet Orifice (BF Elev) 807.0	0.5	3,838	1,776	1,776	-
1-foot Freeboard & Overflow Structure (T/ Basin) **808.0**	1.0	5,080	-		-
		Total Storage		**1,776**	-

Forebay Storage Information
(Forebays for inlet pipes, Forebay #1)

Elevation (ft)	Height (ft)	Area (sft)	Volume (cft)	Cum. Volume (cft)
806.5	-	200	-	-
807.0	0.5	285	121	121
		Forebay Storage Total		**121** cft
Required Forebay Storage Volume (5% Total Infil. Vol. Required)				95 cft

Storage Elevations *(adjust formulas to proper rows on basin elevations)*
Elevation for 1" event **806.95** Elevation
Elevation for 2-year event **807.03** Elevation
Elevation for 100-year event - **N/A** **808.79** Elevation



OVERFLOW STRUCTURE MANHOLE DETAIL FOR INFILTRATION BASIN
NOT TO SCALE

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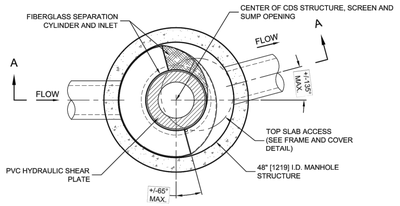
2857 PACKARD ROAD
PLANNED UNIT DEVELOPMENT
STORMWATER CALCULATIONS - BASIN 3

17

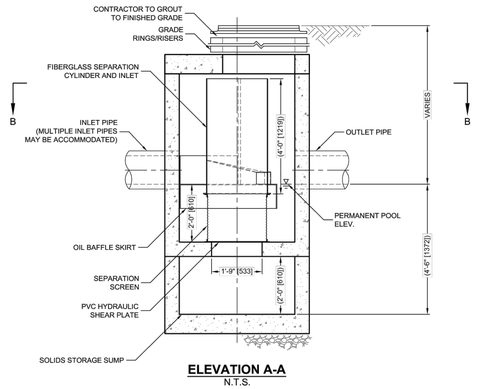
JOB No. **16070**
REVISIONS:
PER CITY REVIEW | REV. DATE 06/14/19
DATE: 4/25/19
SHEET 17 OF 27
CADD: CTS
ENG: SGF
PM: MC
TECH: TES
16070042.dwg

NOTE

1. CONTRACTOR MAY USE CDS2015-4-C PRETREATMENT DEVICE OR APPROVED EQUAL.



PLAN VIEW B-B
N.T.S.



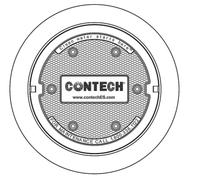
ELEVATION A-A
N.T.S.

C:\USERS\SCHLACHTER\HDESKTOP\CDS DETAILS 180 MICRON SIZING\DACAD\CDS2015-4-C-STL.DWG 5/19/2014 5:18 PM

CDS2015-4-C DESIGN NOTES

THE STANDARD CDS2015-4-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

CONFIGURATION DESCRIPTION
GRATED INLET ONLY (NO INLET PIPE)
GRATED INLET WITH INLET PIPE OR PIPES
CURB INLET ONLY (NO INLET PIPE)
CURB INLET WITH INLET PIPE OR PIPES
SEPARATE OIL BAFFLE (SINGLE INLET PIPE REQUIRED FOR THIS CONFIGURATION)
SEDIMENT WEIR FOR NJDEP / NJCAT CONFORMING UNITS



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

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	
WATER QUALITY FLOW RATE (CFS OR L/s)	*
PEAK FLOW RATE (CFS OR L/s)	*
RETURN PERIOD OF PEAK FLOW (YRS)	*
SCREEN APERTURE (2400 OR 4700)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR FABRICATION DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.contechES.com
4. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 AND CASTINGS SHALL MEET HS20 (AASHTO M 306) LOAD RATING, ASSUMING GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION.
6. PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.

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

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800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C
INLINE CDS
STANDARD DETAIL

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION
BASED ON THE RATIONAL RAINFALL METHOD
BASED ON AN AVERAGE PARTICLE SIZE OF 110 MICRONS
PEA Project
ANN ARBOR, MI
for SYSTEM:

Area	0.216	acres	CDS Model	2015-4	
Weighted C	0.85		Particle size	110	microns
Tc	10	minutes	1" First Flush	0.26	cfs

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Removal Efficiency (%)	Incremental Removal (%)
0.02	12.53%	12.53%	0.00	100.00	12.53
0.04	11.32%	23.85%	0.01	100.00	11.32
0.06	10.08%	33.93%	0.01	100.00	10.08
0.08	7.49%	41.42%	0.01	100.00	7.49
0.10	7.44%	48.86%	0.02	100.00	7.44
0.12	5.31%	54.17%	0.02	100.00	5.31
0.14	4.18%	58.35%	0.03	100.00	4.18
0.16	4.82%	63.17%	0.03	100.00	4.82
0.18	3.40%	66.57%	0.03	100.00	3.40
0.20	2.89%	69.46%	0.04	100.00	2.89
0.25	6.22%	75.68%	0.05	99.82	6.21
0.30	4.12%	79.80%	0.06	99.51	4.10
0.35	3.37%	83.17%	0.06	99.20	3.34
0.40	2.90%	86.07%	0.07	98.9	2.9
0.45	2.65%	88.72%	0.08	98.6	2.6
0.50	1.68%	90.40%	0.09	98.3	1.7
0.75	5.11%	95.51%	0.14	96.7	4.9
1.00	2.18%	97.69%	0.18	95.1	2.1
1.42	0.00%	97.69%	0.26	92.6	0.0
1.50	1.50%	99.19%	0.28	92.0	1.4
2.00	0.50%	99.69%	0.37	88.9	0.4
2.10	0.31%	100.00%	0.39	88.3	0.3
					99.36
				Removal Efficiency Adjustment[2] =	6.5%
				Predicted % Annual Rainfall Treated =	93.5%
				Predicted Net Annual Load Removal Efficiency =	**92.9%**

1 - Based on 26 Years of Rainfall Data from NCDC Station Ann Arbor University of Michigan
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

Project: Weber Property
Location: *Ann Arbor, MI*
Prepared For: Midwestern Consulting

Purpose: To calculate the first flush runoff flow rate (WQF) over a given site area. In this situation the WQV to be analyzed is the runoff produced by the first 1" of rainfall.

Reference: United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Given:

Structure Name	A (acres)	A (miles^2)	Runoff Coefficient	Percent Imp. (%)*	t_c (min)	t_c (hr)
CDS	0.22	0.00034	0.85	91.67	10.0	0.167
		0.00000		-50.00		0.000
		0.00000		-50.00		0.000

* Assumes runoff coefficient of 0.3 for pervious areas and 0.9 for impervious areas.

Procedure:

The Water Quality Flow (WQF) is calculated using the Water Quality Volume (WQV). This WQV, converted to watershed inches, is substituted for the runoff depth (Q) in the Natural Resources Conservation Service (formerly Soil Conservation Service), TR-55 Gr

1. Compute WQV in watershed inches using the following equation:

$$WQV = P * R$$

where: WQV = water quality volume (watershed inches)
P = design precipitation (inches)
R = volumetric runoff coefficient = 0.05 + 0.009(I)
I = percent impervious cover

Structure Name	Percent Imp. (%)	R	P (in)	WQV (in)	WQV (CF)
CDS	91.67	0.875	1	0.875	698.78
0	-50.00	-0.400		0.000	-
0	-50.00	-0.400		0.000	-

2. Compute the NRCS Runoff Curve Number (CN) using the following equation, or graphically using Figure 2-1 from TR-55 (USDA, 1986):

$$CN = 1000 / [10+5P+10Q-10(Q^2+1.25QP)^{1/2}]$$

where: CN = Runoff Curve Number
P = design precipitation (inches)
Q = runoff depth (watershed inches)

Structure Name	Q (in)	CN
CDS	0.875	98.87
0	0.000	100.00
0	0.000	100.00

3. Using computed CN, read initial abstraction (I_a) from Table 4-1 in Chapter 4 of TR-55; compute I_a/P, interpolating when appropriate.

Structure Name	I_a (in)	I_a/P
CDS	0.041	0.041
0		#DIV/0!
0		#DIV/0!

4. Compute the time of concentration (t_c) in hours and the drainage area in square miles. A minimum t_c of 0.167 hours (10 minutes) should be used.

Structure Name	t_c (hr)	A (miles^2)
CDS	0.167	0.00034
0	0.167	0.00000
0	0.167	0.00000

5. Read the unit peak discharge (q_u) from Exhibit 4-II in Chapter 4 of TR-55 for appropriate t_c for type II rainfall distribution.

Structure Name	t_c (hr)	I_a/P	q_u (csm/in)
CDS	0.167	0.041	856
0	0.167	#DIV/0!	
0	0.167	#DIV/0!	

6. Substituting WQV (watershed inches) for runoff depth (Q), compute the water quality flow (WQF) from the following equation:

$$WQF = (q_u)*(A)*(Q)$$

where: WQF = water quality flow (cfs)
q_u = unit peak discharge (cfs/mi^2/inch)
A = drainage area (mi^2)
Q = runoff depth (watershed inches)

Structure Name	q_u (csm/in)	A (miles^2)	Q (in)	WQF (cfs)
CDS	856	0.00034	0.875	0.26
0	0	0.00000	0.000	0.00
0	0	0.00000	0.000	0.00

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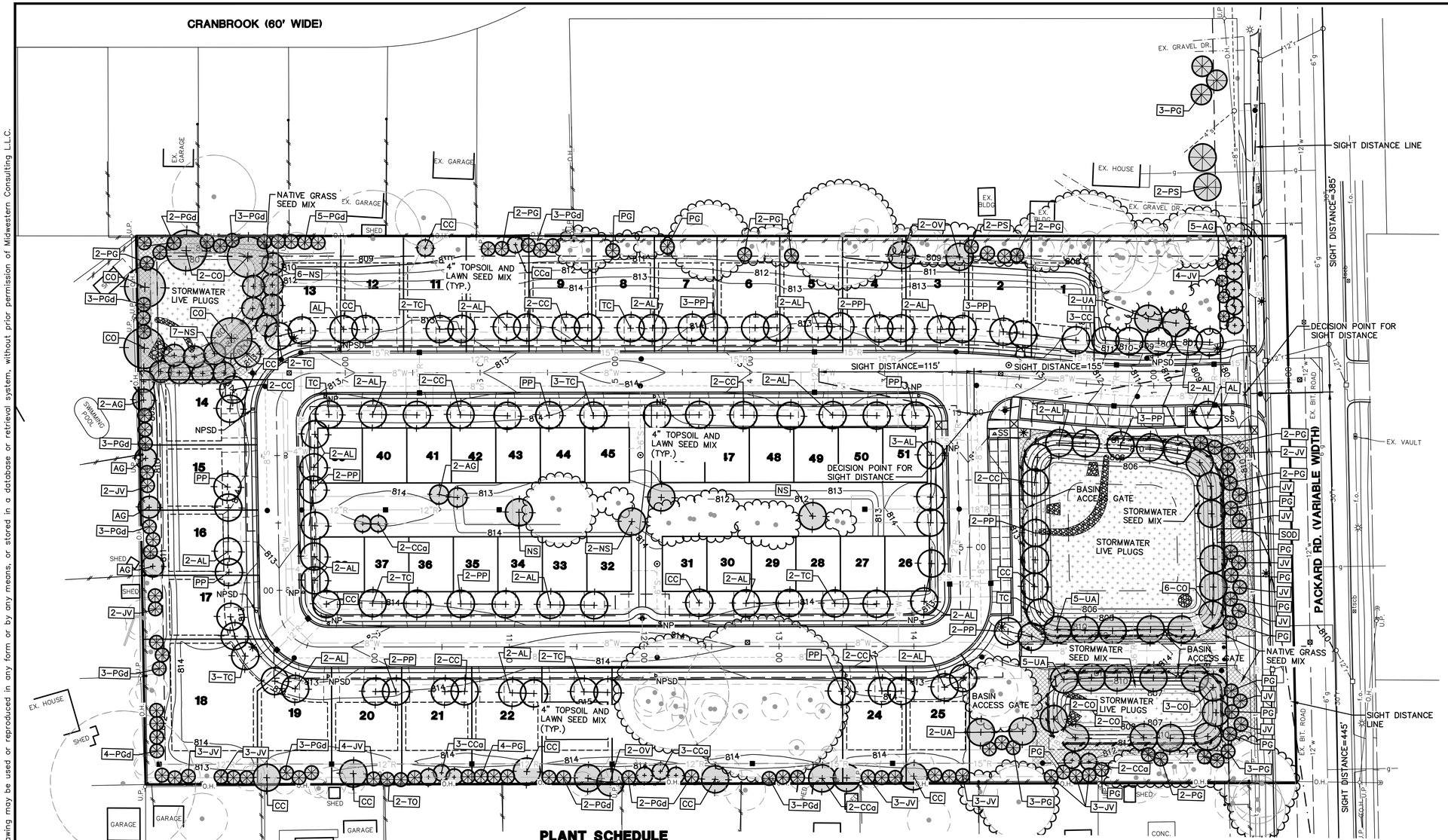
2857 PACKARD ROAD
PLANNED UNIT DEVELOPMENT
STORMWATER PRETREATMENT DETAIL AND NOTES

18

JOB No. 16070
REVISIONS:

REV.	DATE

DATE: 4/25/19
SHEET 18 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
16070DT1.dwg



SCALE: 1" = 40'

0 40 80 120

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

LEGEND

- PROPOSED DECIDUOUS STREET TREE
- PROPOSED MITIGATION DECIDUOUS TREE
- PROPOSED MITIGATION EVERGREEN TREE
- PROPOSED NATIVE GRASS SEED MIX
- PROPOSED STORMWATER SEED MIX
- PROPOSED STORMWATER PLUGS
- PROPOSED SOD
- CRITICAL ROOT ZONE OF LANDMARK TREES TO REMAIN
- PRESERVED REGULATED WOODLANDS

PLANT SCHEDULE

Total	Street Tree	Screening/ Mitigation	Code	Scientific Name	Common Name	Root	Size	Spacing	Notes
Deciduous Trees									
12		12	AG	Amelanchier grandiflora 'brilliantisima'	Autumn Brilliance Serviceberry	B&B	8' ht	15' o.c.	Tree form (assume 2.5" cal. Eq.)
39	39		AL	Amelanchier laevis 'JFS Arb'	Spring Flurry Serviceberry	B&B	2" cal.	15' o.c.	Tree form
28	22	6	CC	Carpinus caroliniana	American Hornbeam	B&B	2.5" cal.	15' o.c.	
18		18	CO	Celtis occidentalis	Northern Hackberry	B&B	3"	As shown	
13		13	Cca	Cercis canadensis 'Ace of Hearts'	Ace of Hearts Eastern Redbud	B&B	8' ht	12' o.c.	Tree form (assume 2.5" cal. Eq.)
17		17	NS	Nyssa sylvatica 'Wildfire'	Wildfire Tupelo	B&B	2.5" cal.	20' o.c.	Single Stem
4		4	OV	Ostrya virginiana	Hop Hornbeam	B&B	2.5" cal.	20' o.c.	Single Stem
14		14	UA	Ulmus americana 'Frontier'	Frontier Elm	B&B	3" cal.	20' o.c.	
26	26		PP	Parrotia persica	Persian Parrotia	B&B	2.5" cal.	15' o.c.	
19	19		TC	Tilia cordata 'Chancole'	Chancellor Linden	B&B	2" cal.	15' o.c.	
190	106	84	Total						
Evergreen Trees									
35		35	JV	Juniperus virginiana	Eastern Red Cedar	B&B	8' ht	10' o.c.	Full
39		39	PG	Picea glauca	White Spruce	B&B	8' ht	10' o.c.	Full
39		39	PGd	Picea glauca 'densata'	Black Hills Spruce	B&B	8' ht	10' o.c.	Full
4		4	PS	Pinus strobus	Eastern White Pine	B&B	8' ht	10' o.c.	Full
117	0	117	Total						

Stormwater Live Plantings - Species to be planted as a mixed composition at bottom of basin to first flush elevation									
Qty	SE Basin (11,080 sf)	SW Basin (2,090 sf)	Infiltration Basin (5,075 sf)						
760	462	87	211	Aster novae-angliae	New England Aster	Plug	24" o.c.	Quantity per flat varies by supplier	
1351	820	155	376	Carex hystericina	Porcupine Sedge	Plug	18" o.c.	Quantity per flat varies by supplier	
1351	820	155	376	Carex vulpinoidea	Fox Sedge	Plug	18" o.c.	Quantity per flat varies by supplier	
211	0	0	211	Eupatorium maculatum	Joe pye weed	Plug	24" o.c.	Quantity per flat varies by supplier	
549	462	87	0	Glyceria striata	Fowl Manna Grass	Plug	24" o.c.	Quantity per flat varies by supplier	
760	462	87	211	Helenium autumanle	Sneezeweed	Plug	24" o.c.	Quantity per flat varies by supplier	
1351	820	155	376	Juncus effusus	Soft Rush	Plug	18" o.c.	Quantity per flat varies by supplier	
6331	Total								

NATURAL FEATURES MITIGATION SUMMARY

MITIGATION FOR TREE AND WOODLAND REMOVALS ARE PROPOSED WITHIN THE 15 FOOT LANDSCAPE BUFFER ALONG THE PERIMETER OF THE SITE TO PROVIDE ADDITIONAL SCREENING BETWEEN THE DEVELOPMENT AND ADJACENT RESIDENTS, IN THE REAR YARD OF THE HOMES IN THE CENTRAL PORTION OF THE SITE TO PROVIDE SCREENING, AND WITHIN OPEN SPACES ON THE SITE. APPROXIMATELY 51.6% OF THE REQUIRED MITIGATION IS PROPOSED ON-SITE WITH THE REMAINDER OF THE MITIGATION TO BE PROVIDED THROUGH CONTRIBUTION TO THE CITY OF ANN ARBOR STREET TREE PLANTING FUND.

NATURAL FEATURES MITIGATION TIMING SCHEDULE

MITIGATION PLANTINGS WILL BE INSTALLED UPON COMPLETION OF CONSTRUCTION OF THE DEVELOPMENT AND PRIOR TO CONSTRUCTION OF INDIVIDUAL HOMES. STORMWATER MANAGEMENT BASINS SHALL BE CONSTRUCTED PRIOR TO INSTALLATION OF THE MITIGATION PLANTINGS.

LANDSCAPE CALCULATIONS

	Required	Proposed	
Mitigation Trees	1119''	3" cal. Deciduous = 32 trees	96''
		2.5" cal. Deciduous = 52 trees	130.''
		8' ht Evergreen (3" eq) = 117 trees	351.''
		Total	577.''
		Proposed mitigation through contribution to City Street Tree Planting Fund	
		Required Mitigation (1119'' - 577'')	541.5
		2" caliper trees	271
		271 trees x $200 per tree	$54,200
Stree Trees	1 per 30 lf (3,158lf)		
	Total 106 trees	106 trees	
Conflicting Land Use Buffer	Not Applicable		
Vehicle Use Area	Not Applicable		
Refuse/Recycling Screening	Not Applicable - individual containers - assume stored in garages		

STREET TREE ESCROW CALCULATIONS

Street Tree Escrow	Packard Road - 604 linear feet x $1.30 per linear foot = $785.20

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
LANDSCAPE PLAN

19

DATE: 4/25/19
SHEET 19 OF 27
CADD: CTS.TES
ENG: SGF
PM: TJC
TECH: TRF
16070LP1.dwg

JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/14/19
PER CITY REVIEW	06/14/19
PER CITY REVIEW	07/10/19

LANDSCAPE NOTES

1. Plant materials shall be selected and installed in accordance with standards established by the Ann Arbor City Parks and Recreation Department.
2. All diseased, damaged or dead material shown on the site plan as proposed plantings shall be replaced by the end of the following growing season.
3. Restore disturbed areas with a minimum of four (4) inches of topsoil and then seed/ fertilize/mulch.
4. All disturbed areas not to be seeded with native seed mix shall be lawn areas. Fertilizer for the initial installation of lawns shall provide not less than one (1) pound of actual nitrogen per 1,000 sq ft of lawn area and shall contain not less than two percent (2%) potassium and four percent (4%) phosphoric acid.
5. Lawn (turfgrass) seed mix shall consist of:
   a. 15% Rugby Kentucky Bluegrass
   b. 10% Park Kentucky Bluegrass
   c. 40% Ruby Creeping Red Fescue
   d. 15% Pennifine Perennial Ryegrass
   e. 20% Scaldis Hard Fescue
6. Seed shall be applied at a rate of five pounds (5 lbs) per 1000 sq ft. Mulch within 24 hours with two (2) tons of straw per acre, or 71 bales of excelsior mulch per acre. Anchor straw mulch with spray coating of adhesive material applied at the rate of 150 gals. / acre.
7. After the first growing season, only fertilizers that contain NO phosphorus shall be used on the site.
8. Detention basin side slopes shall be seeded with Wet-Mesic Prairie Mix from Native Connections, or equivalent as approved by landscape architect, as noted on Landscape Plan. Seeding rates and installation techniques shall be confirmed with supplier. Seed shall be installed per manufacturer's specification via hand broadcast
9. Bottom of detention basin shall have live plantings (plugs) installed as specified on the Grading Plans. Native plugs shall be planted between March 1 and June 1 or mid-September through Mid-October. If planted outside specified time period, irrigation is required for plant establishment. Contractor shall contact nursery early in construction process to allow necessary time for nursery to grow/stock appropriate quantities of plants. (Preferred nursery – Wildtype design native plants and seeds, Ltd., Mason, MI – 517-244-1140).
10. Upon installation of native plugs, vegetative establishment must be documented and approved as per the soil erosion and sedimentation control permit.
11. Areas identified as Native Grass Seed Mix on the Landscape Plan shall be seeded with native grass seed mix below. Mulch within 24 hours with two (2) tons of straw per acre, or 71 bales of excelsior mulch per acre. Anchor straw mulch with spray coating of adhesive material applied at the rate of 150 gals. / acre.

Native Grass Seed Mix		
Botanical Name	***Common Name***	***Application***
Andropogon gerardii	Big Blue -Stem	8 oz/acre
Carex vulpinoidea	Fox Sedge	4 oz/acre
Elymus canadensis	Canada Wild Rice	8 oz/acre
Koeleria cristata	Prairie June Grass	1 lbs/acre
Panicum virgatum	Switch Grass	2 lbs/acre
Schizachyrium scoparium	Little Blue Stem	1.5 lbs/acre
Lolium multiflorum	Annual Rye	200 lbs/acre

A bi-annual, mowable, semi-natural, cool-season seed mix suited for basin bottom and side slopes.

12. All seeded areas with slopes less than 1:3 (one vertical foot for every 3 horizontal feet) shall be mulched with straw mulch at the rate of two (2) bales per 1,000 square feet. All seeded areas with slopes greater than 1:3 shall be seeded and biodegradable erosion control blanket North American Green SC150, or equivalent, shall be applied with biodegradable stakes.
13. Deciduous plants shall be planted between March 1 and May 15 and from October 1 until the prepared soil becomes frozen. Evergreen plants shall be planted between March 1 and June 1 and from August 15 to September 15.
14. Native seeding areas shall be seeded after May 1, (when soil is free of frost and in workable condition), but before June 15 or after October 1, but before November 30 (or prior to ground freezing) or as approved by Landscape Architect. Annual cover crop shall be seeded until appropriate permanent seeding time.
15. All planting beds are to receive four (4) inches of shredded bark mulch.
16. All trees to be located a minimum of 10 feet from public utilities.
17. All single trunk, deciduous trees shall have a straight and a symmetrical crown with a central leader. One sided trees or those with thin or open crowns shall not be accepted.
18. All evergreen trees shall be branched fully to the ground, symmetrical in shape and have not been sheared in the last three (3) growing seasons.
19. All compacted subgrade soils in proposed landscape areas shall be tilled to a minimum 12-inch depth prior to placement of topsoil, geotextile fabric, or other planting media as specified.
20. Proposed deciduous trees will be planted a minimum of 15 feet apart. Proposed evergreen trees will be planted a minimum of 8 feet apart. All tree plantings shall be located a minimum of 5 feet from all utilities.
21. Planting Soil: Existing, in-place or stockpiled topsoil. Supplement with imported topsoil as needed. Verify suitability of existing surface soil to produce viable planting soil. Remove stones, roots, plants, sod, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth. Mix surface soil with the following soil amendments to produce planting soil:
   a. Ratio of Loose Compost to Topsoil by Volume: 1:4.
   b. Weight of Lime per 1000 Sq. Ft.: Amend with lime only on recommendation of soil test to adjust soil pH.
   c. Weight of Sulfur or Aluminum Sulfate per 1,000 Sq. Ft.: Amend with sulfur or aluminum sulfate only on recommendation of soil test to adjust soil pH.
   d. Volume of Sand: Amend with sand only on recommendation of Landscape Architect to adjust soil texture.
   e. Weight of Slow-Release Fertilizer per 1,000 Sq. Ft.: Amend with fertilizer only on recommendation of soil test to adjust soil fertility.
22. At the time of plant and seed delivery for the detention basins, including native seed and live plantings, a Washtenaw County Water Resource Commissioner landscape reviewer must be present. Contact Catie Wytychak at wytychakc@ewashtenaw.org or 734-222-6813 to coordinate.
23. During the establishment period for the installed deciduous mitigation trees (1-2 years as to be determined by certified arborist):
   a. The trunk of young trees shall be wrapped in late autumn and wrap shall be removed in early spring
   b. Burlap screening or wrapping shall be installed on the southwest and windward sides from late autumn to early spring.
   c. Trees shall be watered in spring and autumn and during dry conditions at a frequency determined by certified arborist.
   d. Mulching around trees shall be maintained at a depth of 2 to 3 inches

Native Connections
17080 Hoshel Rd, Three Rivers, MI 49093
(P) 269.580.4765 • (F) 269.273.1367
info@nativeconnections.net
www.nativeconnections.net

Stormwater Mix

An economical mix designed to tolerate the low water quality and highly variable condtions often associated with stormwater features. Most species will tolerate mesic to wet hydrology with others filling in the wettest and driest ends of the spectrum. Approximately half of the species are salt tolerant. The high seed count and heavy cover crop in this mix ensures full and aggressive establishment in a wide range of soils.

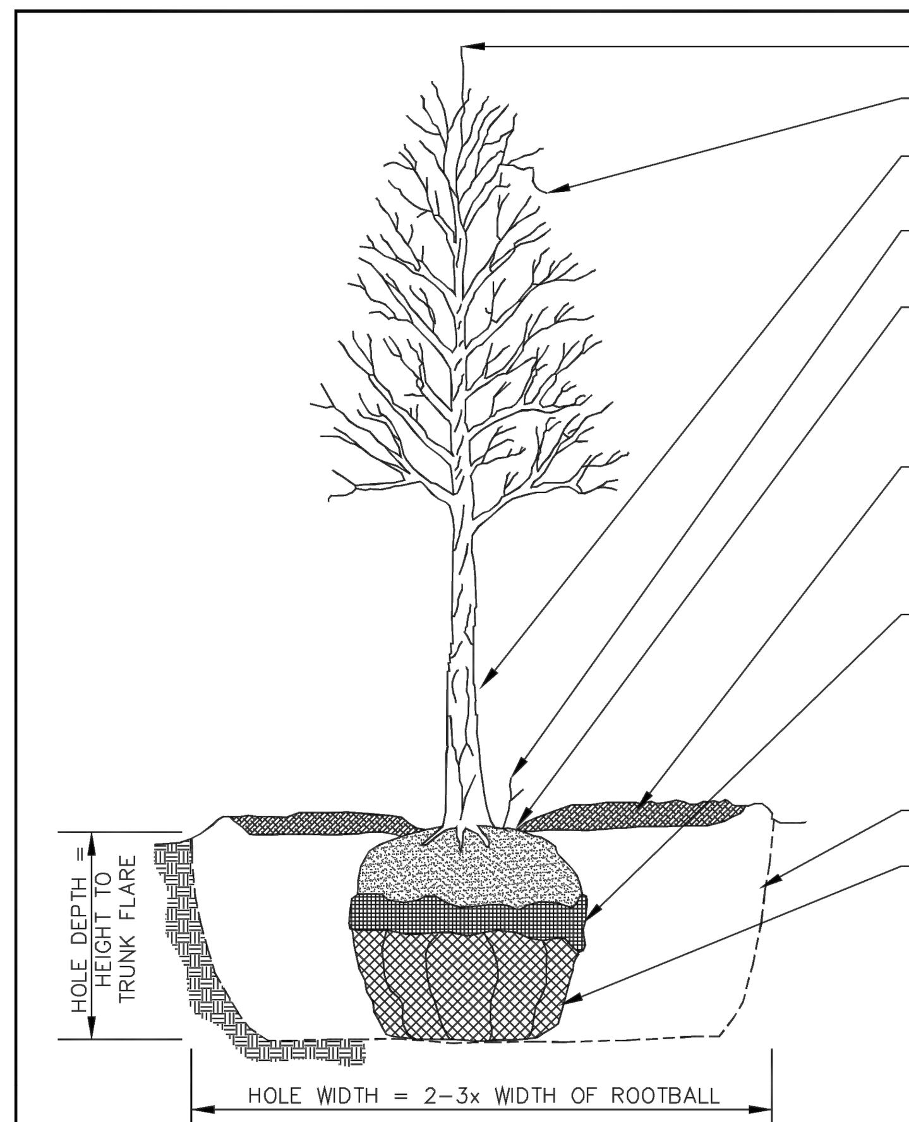
Total Seeding Rate: 40 lbs per acre
2.5 lbs grasses • 1.5 lbs forbs
101 seeds per sq ft
30 lbs seed oats • 6 lbs annual ryegrass

1/4 acre $400
1/2 acre $505
1 acre $796

Grasses, Sedges & Rushes		**PLS Ounce/Acre**
Carex bebbii	Bebb's oval sedge	1.75
Carex vulpinoidea	Fox Sedge	2.00
Eleocharis palustris	Great Spike Rush	1.00
Elymus virginicus	Virginia Wild Rye	16.00
Juncus effusus	Soft Rush	0.50
Juncus tenuis	Path Rush	0.50
Juncus torreyi	Torrey's Rush	0.25
Panicum virgatum	Switchgrass	8.00
Scirpus pungens	Three square Rush	1.00
Scirpus validus	Soft-stem Bulrush	1.00
Sorghastrum nutans	Indian Grass	8.00
	Total PLS Oz per Acre	**40.00**

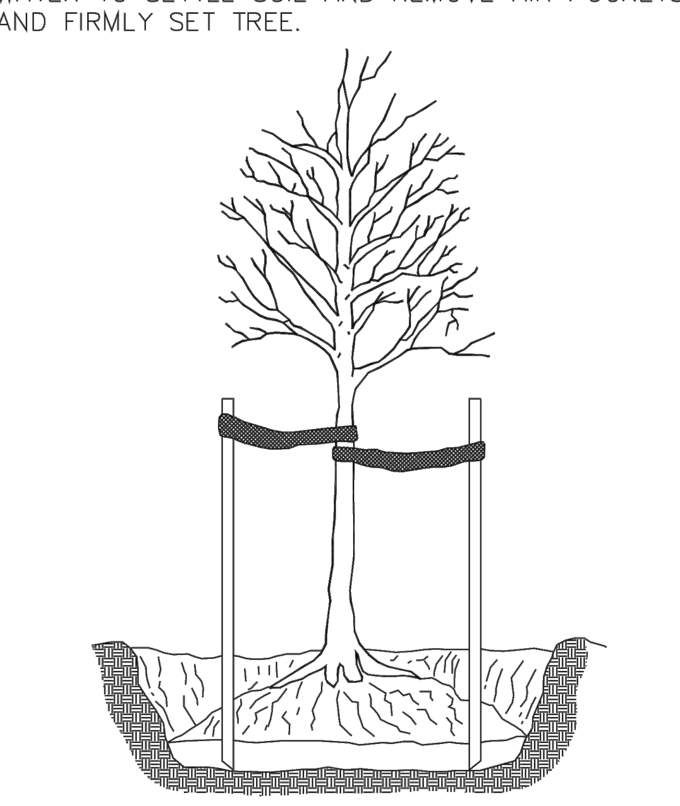
Forbs		**PLS Ounce/Acre**
Alisma subcordatum	Common Water Plantain	1.00
Asclepias incarnata	Swamp Milkweed	1.50
Aster novae-angliae	New England Aster	0.50
Aster umbellatus	Flat-topped Aster	0.50
Bidens cernua	Nodding Bur Marigold	1.00
~~*Echinacea purpurea*~~	~~Purple Coneflower~~	~~2.50~~
Helenium autumnale	Sneezeweed	1.00
Liatris spicata	Marsh Blazingstar	1.00
Lycopus americanus	Water Horehound	0.50
Mimulus ringens	Monkey Flower	0.25
Monarda fistulosa	Wild Bergamot	0.60
Oenothera biennis	Common Evening Primrose	2.20
Penthorum sedoides	Ditch Stonecrop	0.40
Physostegia virginiana	Obedient Plant	0.50
Polygonum pennsylvanicum	Pennsylvania Smartweed	1.25
Rudbeckia hirta	Black-eyed Susan	2.50
Verbena hastata	Blue Vervain	2.80
Zizia aurea	Golden Alexander	4.00
	Total PLS Oz per Acre	**24.00**

NOTE: ECHINACEA PURPUREA SHALL BE REMOVED FROM THE SEED MIX.



DO NOT STAKE UNLESS IN HEAVY CLAY SOIL, WINDY CONDITIONS, 3" OR GREATER DIAMETER TREE TRUNK OR LARGE CROWN. IF STAKING IS NEEDED DUE TO THESE CONDITIONS:

- STAKE WITH 2 x 2 HARDWOOD STAKES, OR APPROVED EQUAL, DRIVEN 6"–8" OUTSIDE OF ROOTBALL.
- LOOSELY STAKE TREE TRUNK TO ALLOW FOR TRUNK FLEXING.
- STAKE TREES JUST BELOW FIRST BRANCH WITH 2"–3" WIDE BELT–LIKE, NYLON OR PLASTIC STRAPS (2 PER TREE ON OPPOSITE SIDES OF TREE, CONNECT FROM TREE TO STAKE HORIZONTALLY. DO NOT USE ROPE OR WIRE THROUGH A HOSE.)
- REMOVE ALL STAKING MATERIALS AFTER 1 YEAR.

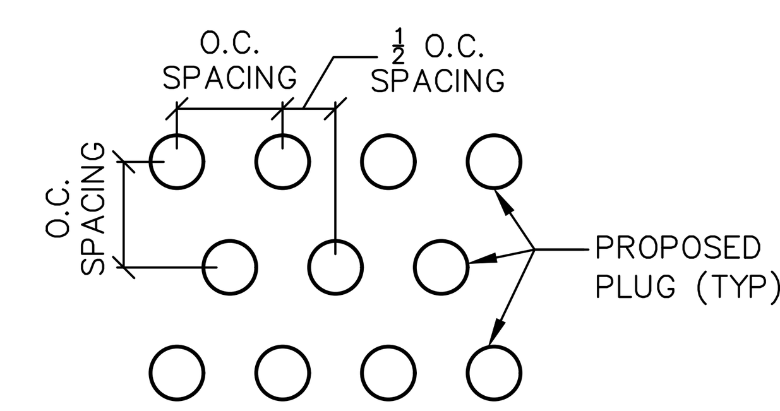


REVISIONS	**REV. NO.**	**DR.BY**	**CH. BY**	**DATE**

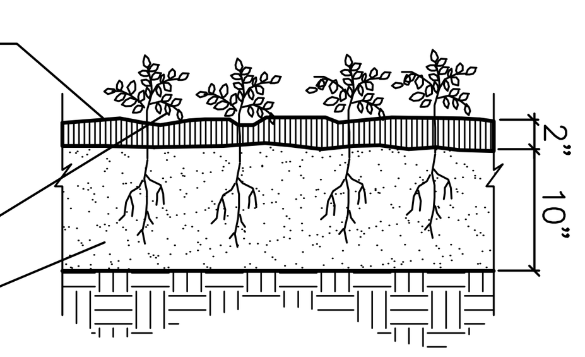
PUBLIC SERVICES DEPARTMENT
CITY OF ANN ARBOR

TREE PLANTING DETAIL

DR. BY	ARG	**CH. BY**	CSS	**DRAWING NO.** SD–L–3
SCALE	NONE	**DATE**	7–23–10	
INCH				**SHEET NO.** ______ **OF** ______



PLANT PLUG SPACING DETAIL

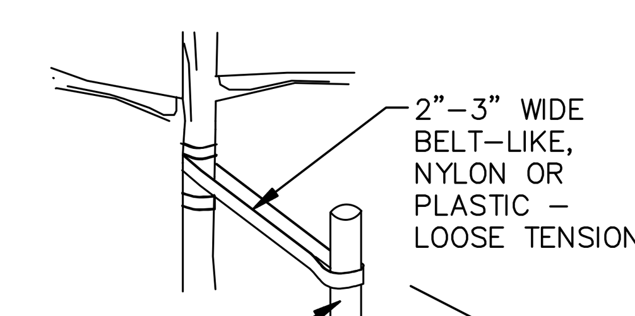


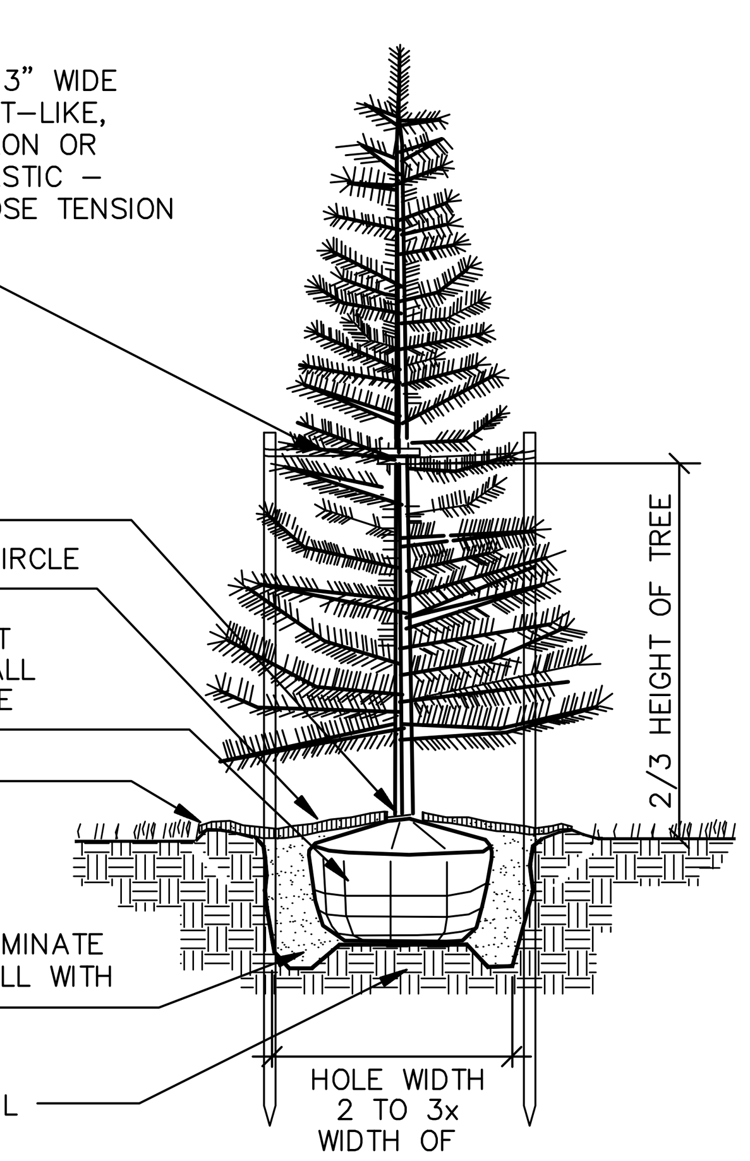
1. 1. HERBACEOUS PLANTS SHOULD BE PEAT POT GROWN. PLANT PLUG WITH PEAT POT INTACT.
2. HERBICIDES SHALL NOT BE USED WITHIN THE BIO–RETENTION AREA TO REMOVE EXISTING WEED GROWTH.
3. FERTILIZERS SHALL NOT BE USED WITHIN THE BIO–RETENTION AREA.
4. PLANTING SHALL TAKE PLACE IMMEDIATELY AFTER PREPARATION.
5. LAYOUT OF SPECIES SHALL BE A MIXED COMPOSITION THROUGHOUT THE SPECIFIED PLANTING AREA. SEE PLANT SCHEDULE FOR SPACING FOR EACH SPECIES.
6. PLANTING MIXTURE SHALL CONSIST OF 30% COMPOST MIXED WITH EXISTING, IN–PLACE OR STOCKPILED TOPSOIL. COMPOST SHALL BE PURCHASED FROM WECARE ORGANICS OR EQUIVALENT. PERMEABLE SOIL SHALL MEET INFILTRATION REQUIREMENTS SET FORTH BY WASHTENAW COUNTY WATER RESOURCES COMMISSIONER OFFICE.

PLUG PLANTING DETAIL

NOT TO SCALE

NOTE: REMOVE STAKING/GUYING MATERIAL AFTER ONE YEAR.





EVERGREEN TREE PLANTING DETAIL

NOT TO SCALE

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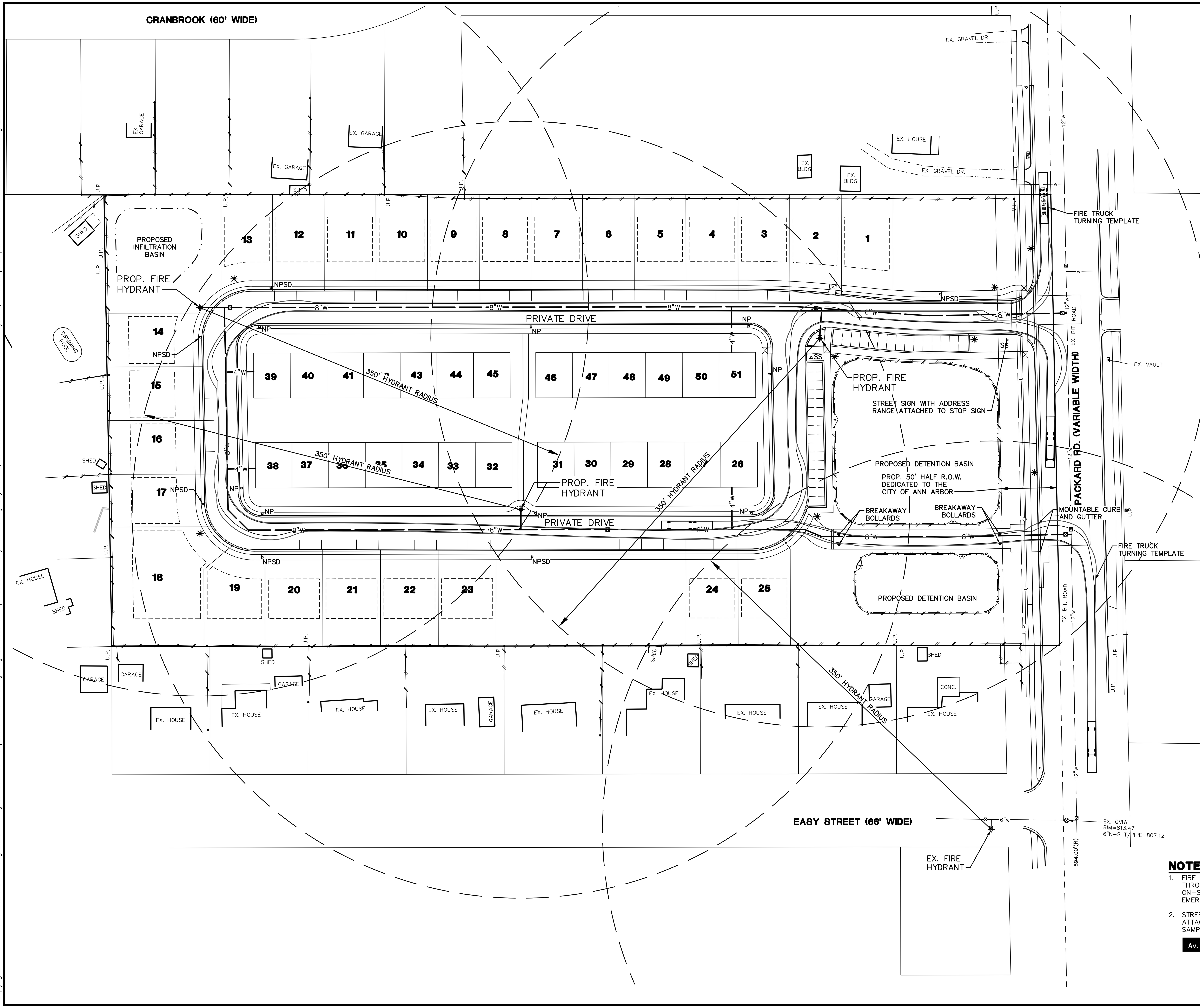
2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
LANDSCAPE DETAILS

20

JOB No. 16070

REVISIONS:	REV. DATE	
PER CITY REVIEW	05/31/19	DATE: 4/25/19
		SHEET 20 OF 27
		CADD: CTS,TES
		ENG: SGF
		PM: TJC
		TECH: TRF
		16070LP1.dwg



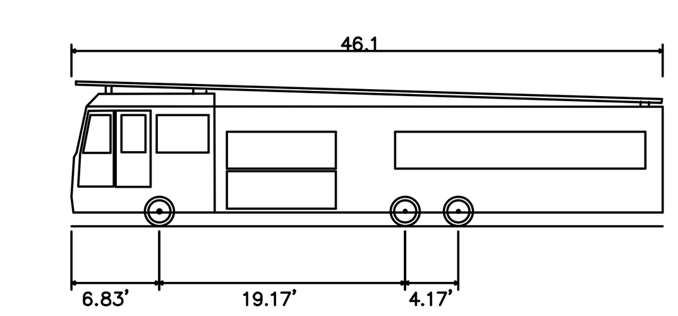
SCALE: 1" = 40'

0 40 80 120

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

LEGEND

—w—	EXIST. WATER MAIN
—W—	PROP. WATER MAIN
	EXIST. HYDRANT
	PROP. HYDRANT
	EXIST. GATE VALVE IN BOX
	EXIST. GATE VALVE IN WELL
	PROP. GATE VALVE IN WELL
	EXIST. CURB STOP & BOX
	SIGN
	FENCE
	SINGLE TREE
	TREE OR BRUSH LIMIT
	PRESERVED REGULATED WOODLANDS
NP	PROPOSED "NO PARKING/FIRE LANE" SIGN
SS	PROPOSED "STOP" SIGN (R1-1)
NPSD	PROPOSED "NO PARKING ON SERVICE DAYS" SIGN



SPH-100 Aerial Fire Truck 46.1'

Overall Length	46.100ft
Overall Width	7.800ft
Overall Body Height	11.299ft
Min Body Ground Clearance	1.080ft
Max Track Width	6.543ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	36.30°

NOTE

1. FIRE TRUCK AND EMERGENCY ACCESS WILL BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT. THE STORAGE OF ANY ON-SITE MATERIALS WILL BE LOCATED AS NOT TO INTERFERE WITH EMERGENCY ACCESS.
2. STREET SIGN AT ENTRANCE SHALL INCLUDE ADDRESSES FOR ATTACHED HOMES. SAMPLE STREET SIGNS:

Av. Flanagan Ave. 126 → 184   Prom. Meadowlands Dr. 534 → 369

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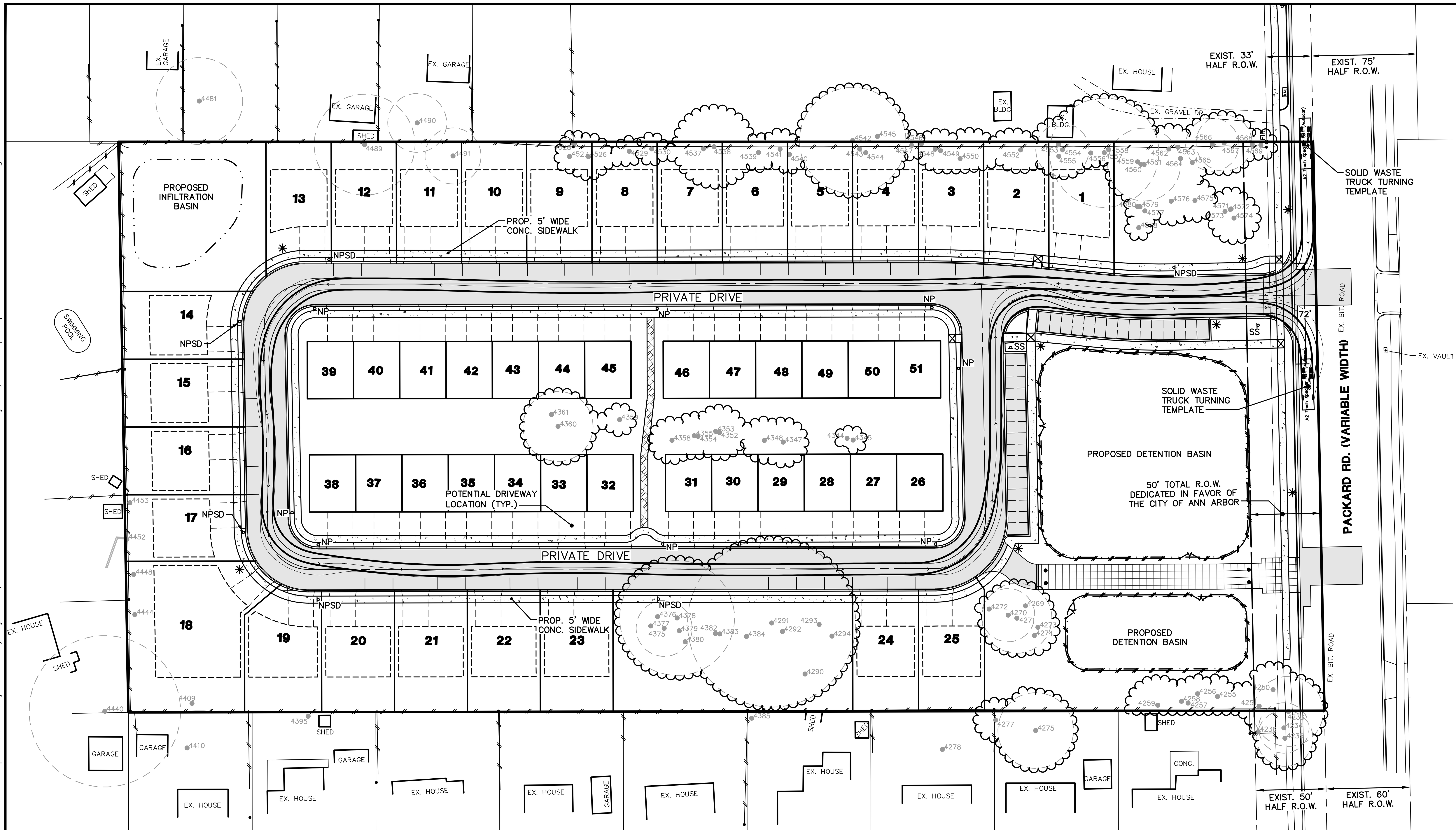
PLANNED UNIT DEVELOPMENT
FIRE PROTECTION PLAN

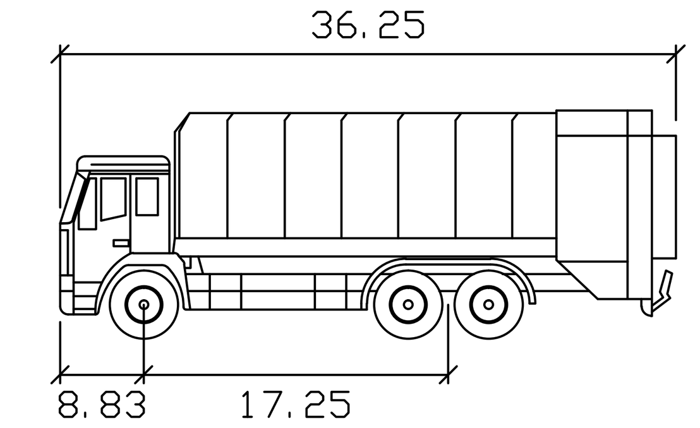
21

DATE: 4/25/19
SHEET 21 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
16070FP1.dwg

JOB No. **16070**

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19
PER CITY REVIEW	06/12/19
PER CITY REVIEW	06/14/19





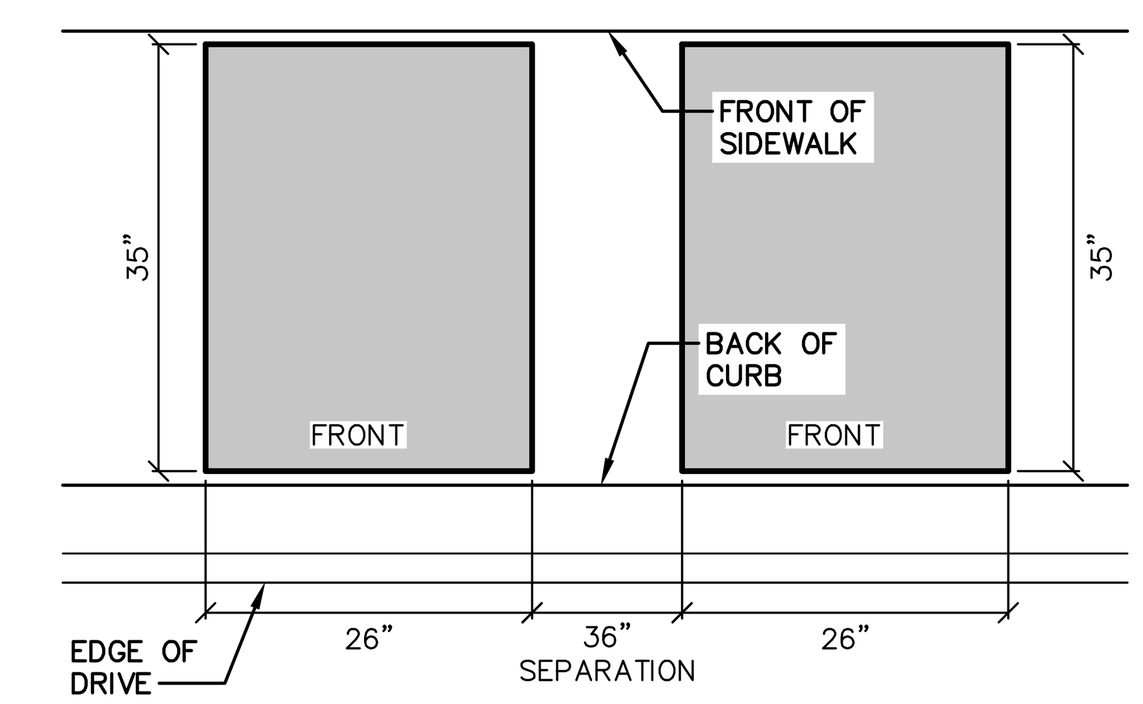
Refuse Vehicle

feet

Width	: 8.42
Track	: 8.00
Lock to Lock Time	: 6.0
Steering Angle	: 31.8

SOLID WASTE TRUCK DETAIL

(NOT TO SCALE)



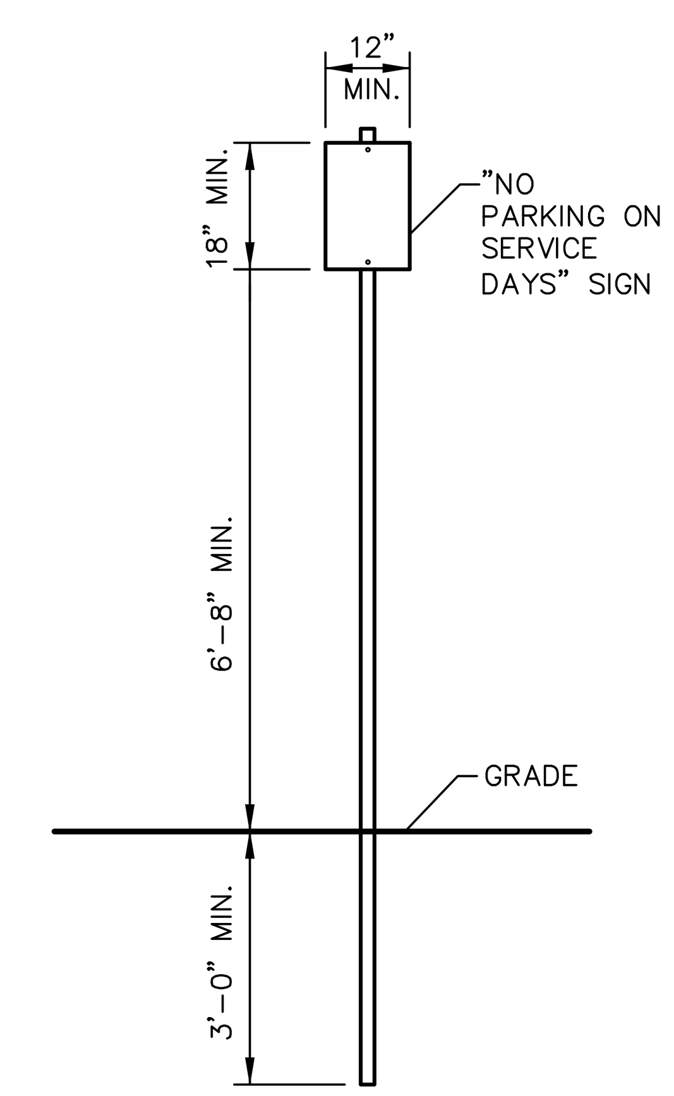
TYPICAL REFUSE CONTAINERS POSITIONED ALONG CURB FOR PICKUP

(NOT TO SCALE)

SCALE: 1" = 40'

0 40 80 120

Know what's below. Call before you dig.



NO PARKING ON SERVICE DAYS SIGN DETAIL

NOT TO SCALE

NOTES

1. TRASH AND RECYCLING WILL BE PICKED UP PER INDIVIDUAL HOME BY WASTE AND RECYCLING SERVICES.
2. "NO PARKING ON SERVICE DAYS" SIGN SHALL BE INSTALLED ON PARALLEL SIDE OF STREET.

LEGEND

- PROP. ASPHALT PAVEMENT
- PROP. 4" CONCRETE SIDEWALK
- PROP. 6" CONCRETE PAVEMENT
- PROP. 6" CONCRETE PAVEMENT FOR EMERGENCY ACCESS
- PRESERVED REGULATED WOODLANDS
- PRESERVED LANDMARK TREES
- NP — PROPOSED "NO PARKING/FIRE LANE" SIGN
- SS — PROPOSED "STOP" SIGN (R1-1)
- NPSD — PROPOSED "NO PARKING ON SERVICE DAYS" SIGN
- ✳ — PROPOSED LIGHT POLE
- NUMBER OF STANDARD PARKING SPACES IN ROW
- NUMBER OF SMALL CAR PARKING SPACES IN ROW

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
SOLID WASTE PLAN

22

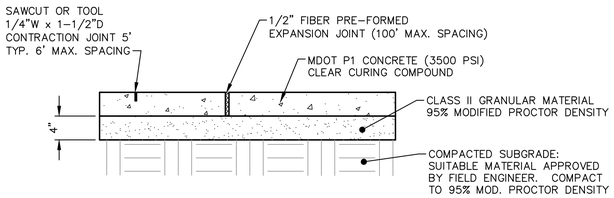
DATE: 4/25/19
SHEET 22 OF 27
CADD: CTS
ENG: SGF
PM: SGF
TECH: TES
16070SW1.dwg

REVISIONS:	REV. DATE
PER CITY REVIEW	05/31/19

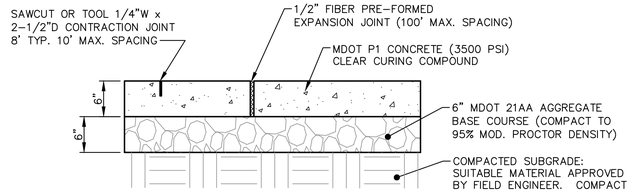
JOB No. 16070

M:\Civil3d_Proj\16070\Site Plan\16070SW1.dwg, 6/26/2019 3:04 PM, Tyler E. Smith, MCLLC PDF.pc3

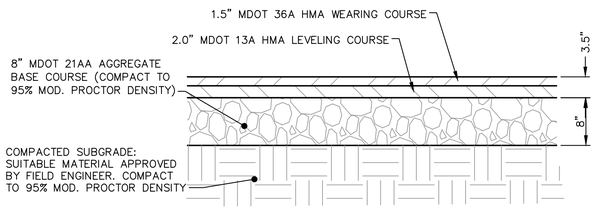
LIMESTONE PATH
NOT TO SCALE



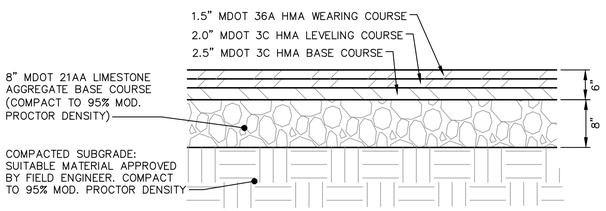
4" CONCRETE SIDEWALK DETAIL
NOT TO SCALE



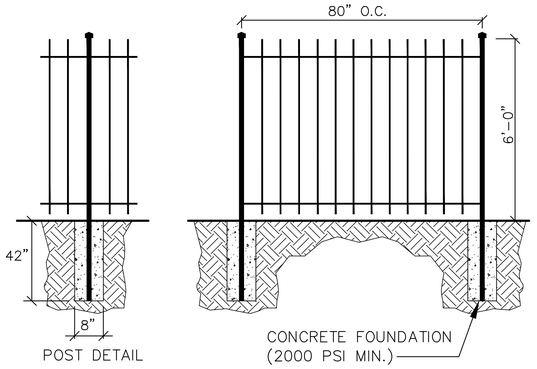
6" CONCRETE PAVEMENT DETAIL
NOT TO SCALE



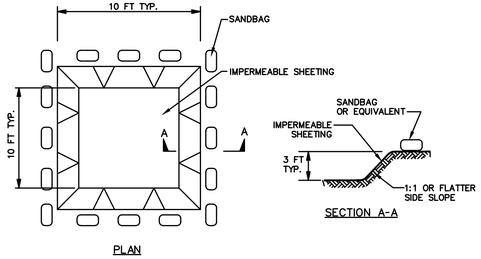
PRIVATE ROAD PAVEMENT SECTION
NOT TO SCALE



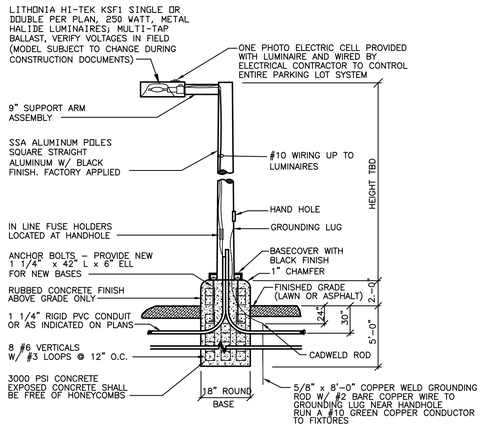
PACKARD ROAD PAVEMENT SECTION
NOT TO SCALE



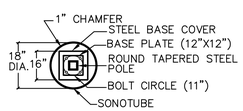
DETENTION BASIN FENCE DETAIL
NOT TO SCALE



EXCAVATED CONCRETE WASHOUT STRUCTURE
NO SCALE



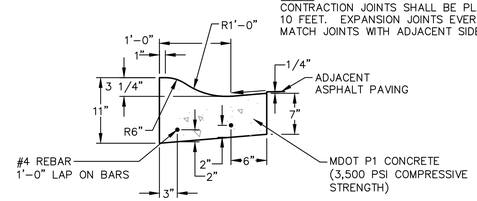
TYPICAL LIGHT POLE DETAIL
NOT TO SCALE



NOTE:
ALL LOCATIONS AND DIMENSIONS FOR ANCHOR BOLTS ETC. SHALL BE VERIFIED IN FIELD BY ELECTRICAL CONTRACTOR WITH BOLTS AS FURNISHED BY POLE MANUFACTURER. PROVIDE NEW ANCHOR BOLTS AS REQUIRED FOR BASES.

LIGHT POLE ATTACHMENT DETAIL
NOT TO SCALE

NOTE:
CONTRACTION JOINTS SHALL BE PLACED EVERY 10 FEET. EXPANSION JOINTS EVERY 100 FEET. MATCH JOINTS WITH ADJACENT SIDEWALK JOINTS



18" WIDE MOUNTABLE CURB & GUTTER
NOT TO SCALE

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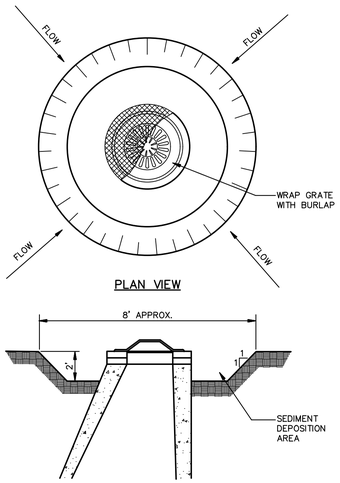
2857 PACKARD ROAD
PLANNED UNIT DEVELOPMENT
MISCELLANEOUS DETAILS AND NOTES

23

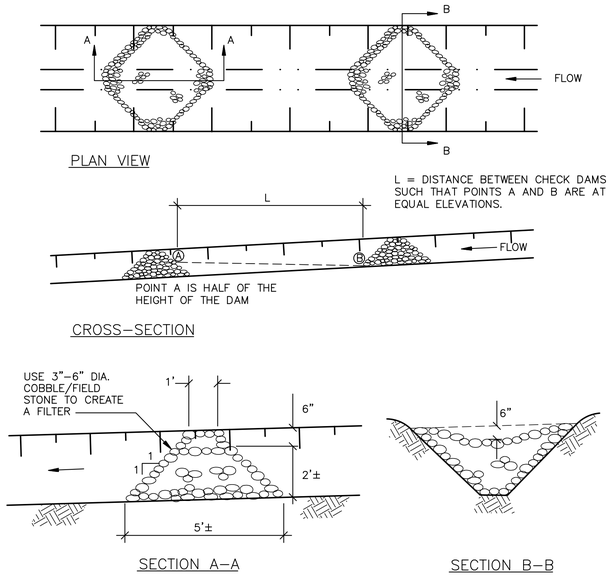
JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/14/19
PER CITY REVIEW	06/14/19

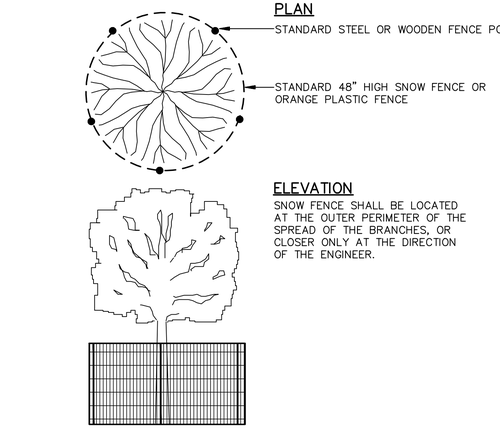
DATE: 4/25/19
SHEET 23 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TES
16070DT1.dwg



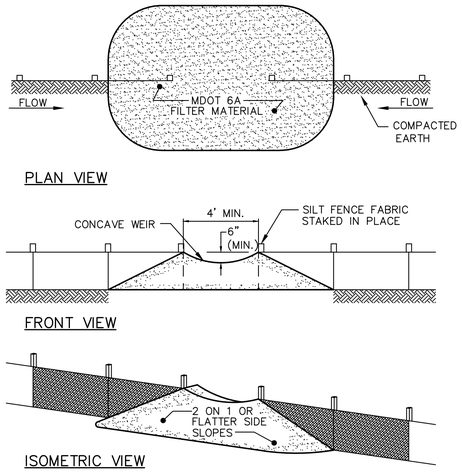
INLET SEDIMENT TRAP 40t
NO SCALE



STONE CHECK DAM DETAIL 49t
NO SCALE



TREE PROTECTION DETAIL 54t
NOT TO SCALE



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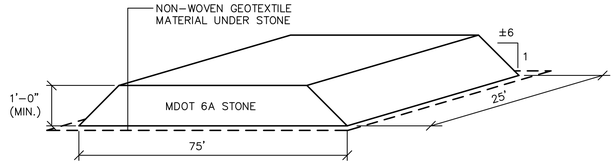


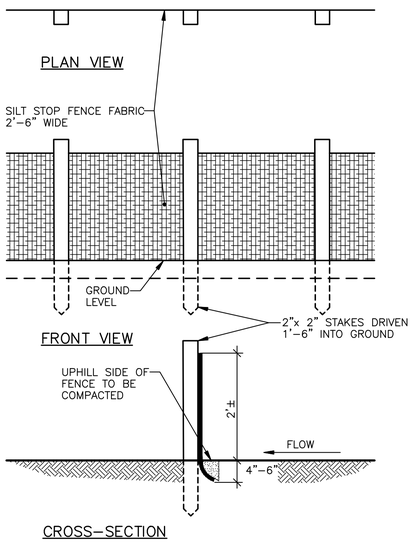
GRAVEL MUD TRACKING MAT 60t
NOT TO SCALE

PERMANENT MAINTENANCE TASKS, SCHEDULE AND BUDGET

TASKS	Storm Sewer System	Catch Basin Sumps	Catch Basin Castings	Ditches & Swales	Detention Basin	Emergency Overflow	Schedule	Project Cost
Inspect for sediment accumulation	X	X		X	X		annually	$100
Removal of sediment accumulation	X	X		X	X		every 2 yrs as needed	$600
Inspect for floatables and debris			X	X	X		annually	$50
Cleaning of floatables and debris			X	X	X		as needed	$100
Inspect for erosion				X	X	X	as needed	$100
Reestablish permanent vegetation on eroded slopes				X	X	X	as needed	$100
Inspect structural elements during wet weather and compare to as-built plans (by a professional engineer reporting to the owner)					X	X	annually	$100
Inspect stormwater system components during wet weather and compare to as-built plans (by professional engineer reporting to Washtenaw County.)	X	X	X	X	X	X	annually	$100
Make adjustment or replacements as determined by annual wet weather inspection	X	X	X	X	X	X	as needed	$250
Keep records of all inspections and maintenance activities and report to Washtenaw County.							annually	$50

STORMWATER MANAGEMENT SYSTEM MAINTENANCE NOTES:

1. The Contractor shall implement and maintain the soil erosion control measures as shown on the SESC Plans at all times during construction on this project. Following construction, it will be the responsibility of the Condominium Association to perform the maintenance. Any modifications or additions to the soil erosion control measures due to construction or changed conditions, shall be complied with as required or directed by the owner, project engineer, or Washtenaw County.
2. Daily inspections shall be made by the Contractor. Periodic inspections may be made by the Owner/Project Engineer/County to determine the effectiveness of erosion and sedimentation control measures. Any necessary corrections shall be made without delay by the onsite responsible individual.
3. The Contractor shall be responsible for maintaining all temporary soil erosion control measures and removal of some upon authorized completion of project. Completion of project will not be authorized until all site work, home building, road work, and utility construction is complete and all soils are stabilized.
4. No chemicals are allowed in storm water features or buffer zones with the following exception: invasive species may be treated with chemicals by a certified applicator. In addition, mowing of storm water features is only allowed twice per year.



SILT FENCE DETAIL 55t
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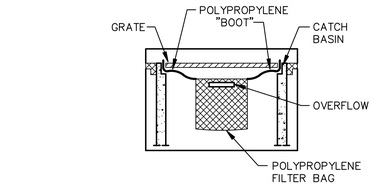
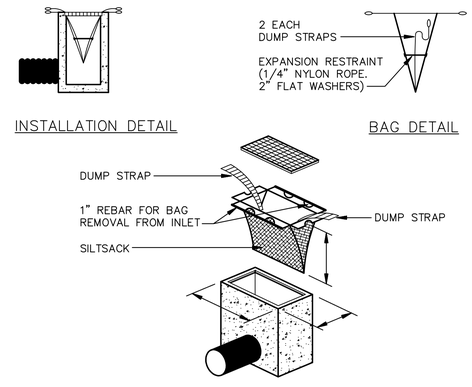


NOTE:
TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVED CATCH BASINS OR STORM INLETS. INLET FILTER TO BE SIMILAR TO "STREAMGUARD" AS MANUFACTURED BY STORMWATER SERVICES CORPORATION (206-767-0441) OR "SILTSACK" AS MANUFACTURED BY ATLANTIC CONSTRUCTION FABRICS, INC.; (800-448-3636). CLEAN FILTER AS NEEDED.



SILT SACK DETAIL 58t
NO SCALE

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2857 PACKARD ROAD
PLANNED UNIT DEVELOPMENT
MISCELLANEOUS DETAILS AND NOTES

24

JOB No. 16070
REVISIONS:
PER CITY REVIEW

REV.	DATE
	05/31/19

DATE: 4/25/19
SHEET 24 OF 27
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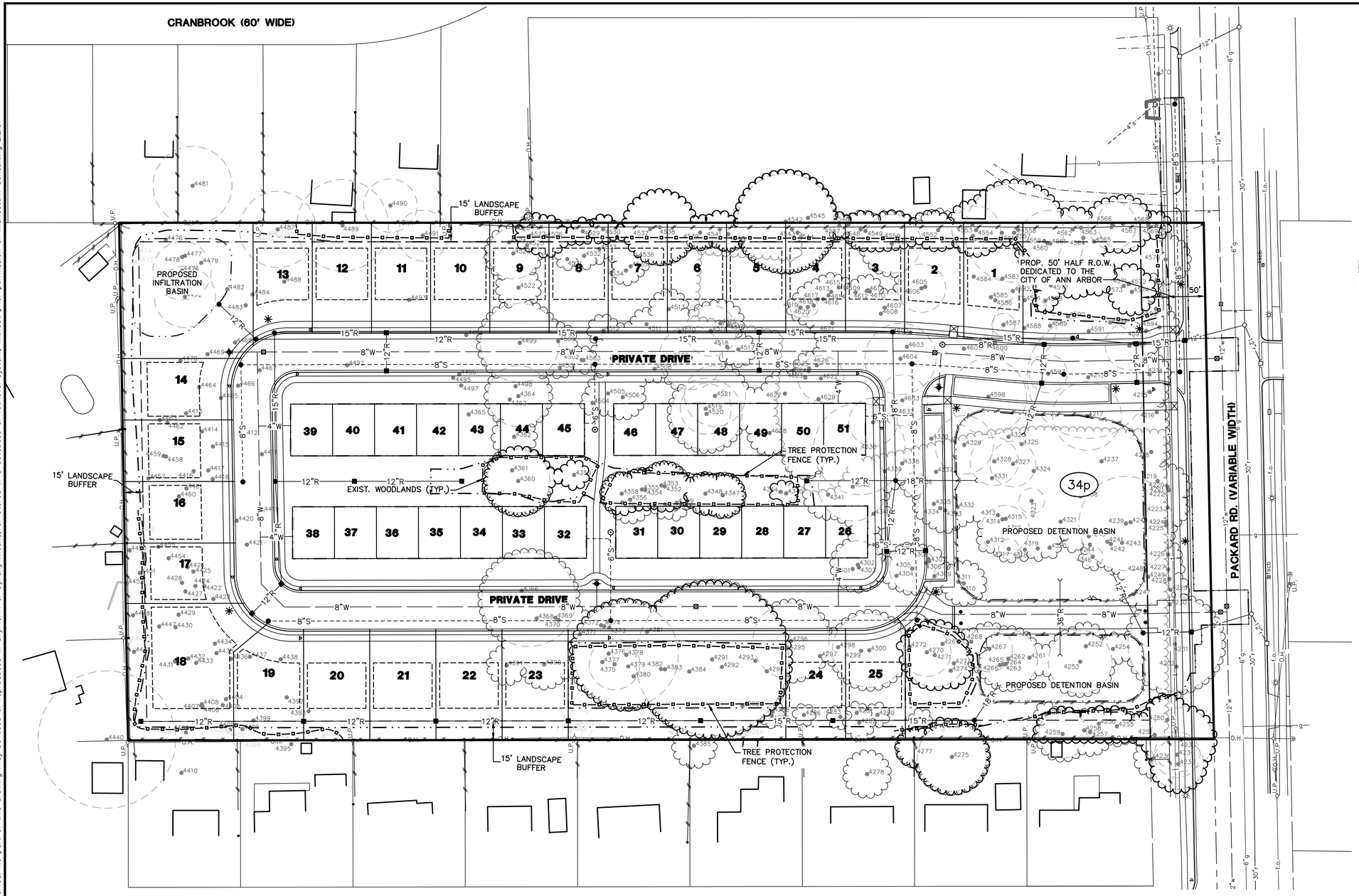
ENG: SGF
PM: TJC
TECH: TES
16070D01.dwg



SCALE: 1" = 40'

0 40 80 120

Know what's below. Call before you dig.

NOTES:

1. REFER TO EXISTING CONDITIONS AND NATURAL FEATURES PLAN AND TREE LIST FOR ADDITIONAL INFORMATION ON EXISTING ON-SITE NATURAL FEATURES.
2. REFER TO GRADING PLAN AND CROSS-SECTION SHEET FOR CROSS-SECTION OF PROPOSED DEVELOPMENT.
3. REFER TO ALTERNATIVE ANALYSIS SHEETS FOR NATURAL FEATURES ALTERNATIVE ANALYSIS.
4. REFER TO LANDSCAPE PLAN FOR PROPOSED NATURAL FEATURES MITIGATION PLANTINGS AND MITIGATION CALCULATIONS.
5. REFER TO NATURAL FEATURES MAINTENANCE PLAN FOR TREE PROTECTION DURING CONSTRUCTION AND POST-CONSTRUCTION TREE MAINTENANCE.

LEGEND

813	EXIST. CONTOUR	s	EXIST. SANITARY SEWER
×813.2	EXIST. SPOT ELEVATION		SIGN
U.P.	EXIST. UTILITY POLE	MAIL	MAILBOX
	GUY WIRE	t	TELEPHONE RISER
OH	EXIST. OVERHEAD UTILITY LINE	e	ELECTRIC METER
	EXIST. LIGHT POLE	g	GAS METER
t	EXIST. TELEPHONE LINE	tscb	TRAFFIC SIGNAL CONTROL BOX
e	EXIST. ELECTRIC LINE		POST
g	EXIST. GAS LINE	W	WELL
f.o.	EXIST. FIBER OPTIC LINE		FENCE
w	EXIST. WATER MAIN		SINGLE TREE
	EXIST. HYDRANT		TREE OR BRUSH LIMIT
	EXIST. GATE VALVE IN BOX		EXIST. REGULATED WOODLANDS
	EXIST. GATE VALVE IN WELL		REGULATED WOODLANDS TO REMAIN
	EXIST. CURB STOP & BOX		LIMITS OF DISTURBANCE
r	EXIST. STORM SEWER		TREE PROTECTION FENCE
	EXIST. CATCH BASIN OR INLET		

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2857 PACKARD ROAD

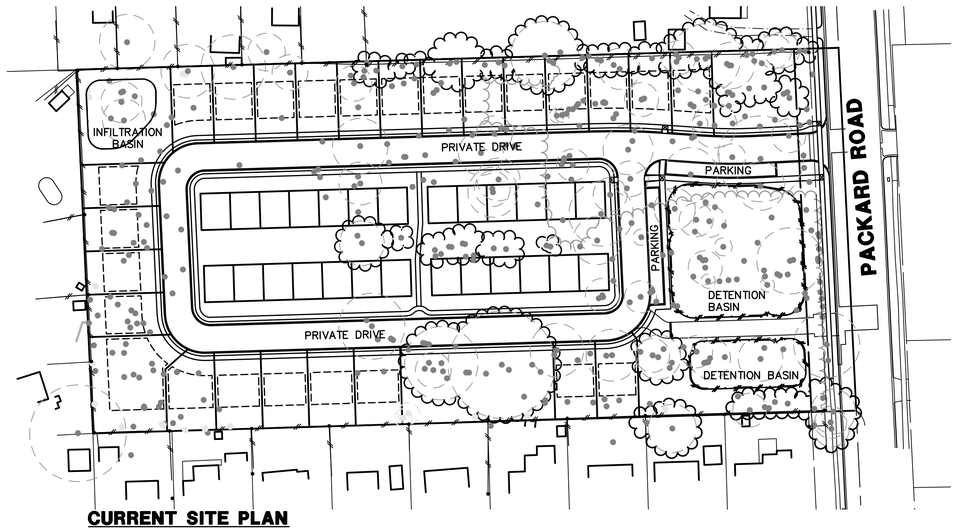
PLANNED UNIT DEVELOPMENT
NATURAL FEATURES OVERLAY PLAN

25

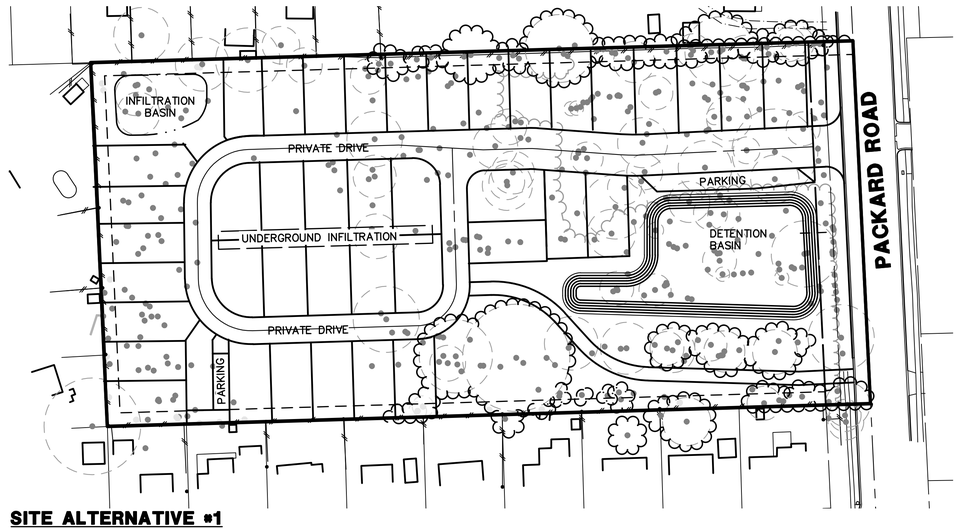
JOB No. 16070

DATE: 4/25/19
SHEET 25 OF 27
CADD: CTS,TES
ENG: SGF
PM: TJC
TECH: TRF
16070NF1.dwg

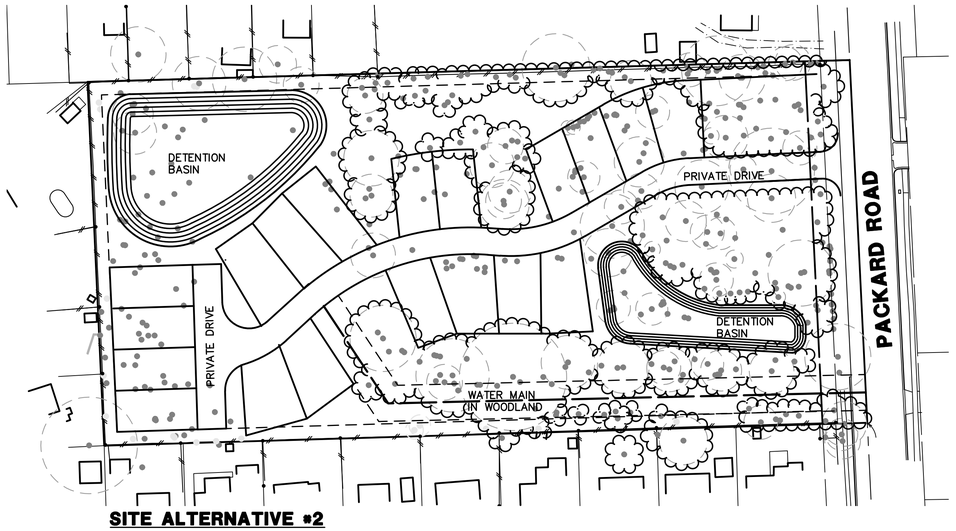
REVISIONS:	REV. DATE
PER CITY REVIEW	05/17/19
PER CITY REVIEW	06/14/19



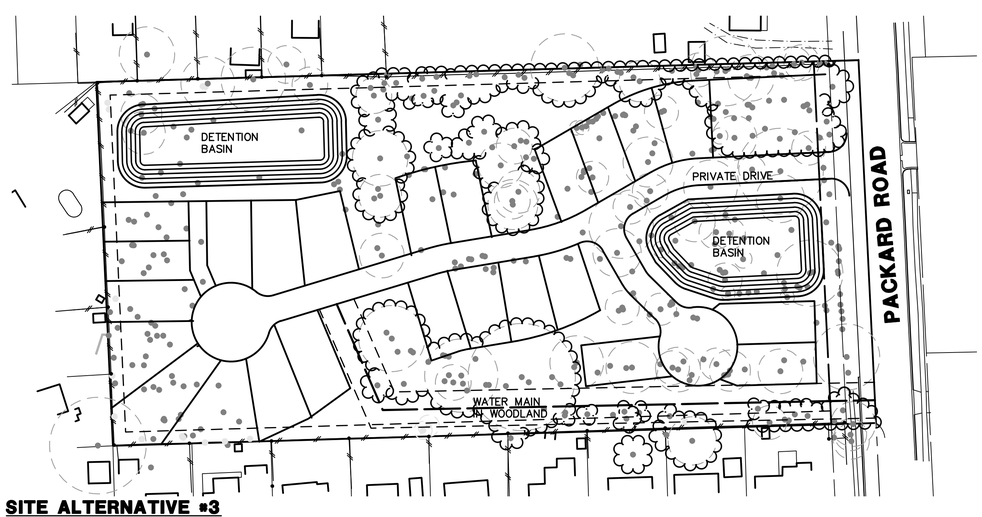
CURRENT SITE PLAN



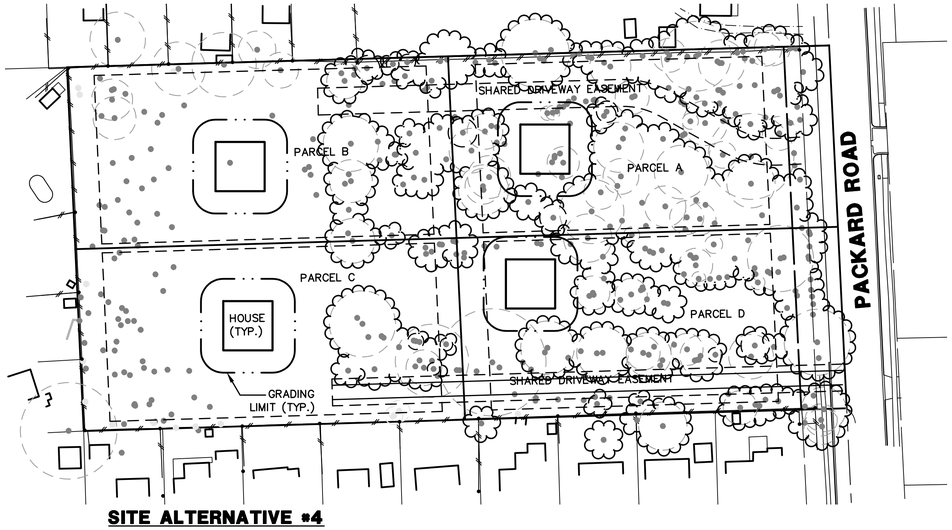
SITE ALTERNATIVE #1



SITE ALTERNATIVE #2



SITE ALTERNATIVE #3



SITE ALTERNATIVE #4

SITE ALTERNATIVE COMPARISON CHART

With our alternatives analysis we explored a number of variations of the project and summarize them as follows:

	Existing		Current PUD Site Plan		Area Plan		Denied Site Plan		Revised Site Plan #1 with Blvd		Site Alternative 1		Site Alternative 2		Site Alternative 3		Site Alternative 4	
LM Trees >16 health to be preserved*	51	> 16 health	13	trees	14	trees	7	trees	11	trees	14	trees	32	trees	17	trees	41	trees
LM Trees > 16 health dbh to be preserved*	1235''	dbh	381''	dbh	405''	dbh	191''	dbh	348''	dbh	393''	dbh	835''	dbh	507''	dbh	997''	dbh
Woodland Area to be preserved	3.4	acres	0.89	acres	0.79	acres	0.3	acres	0.65	acres	0.8	acres	2.25	acres	1.46	acres	2.6	acres
Woodland dbh >8" DBH >40% health to be preserved*	1692''	dbh	584''	dbh	376''	dbh	266''	dbh	317''	dbh	357''	dbh	982''	dbh	665''	dbh	1303''	dbh
Wetlands / Water Courses	None		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts	
Floodplains	None		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts	
Steep Slopes	None		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts	
Private Roadway	None		1578	lf	1,672	lf	1578	lf	1578	lf	1309	lf	923	lf	883	lf	None	
Dead Ends			No		No		No		No		No		Yes		Yes		NA	
Dual Access per fire access			Yes	2	Yes	2	Yes	2	No	1	Yes	2	No	1	No	1	NA	
Single Access per City traffic			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Shared Drives	None		No		Yes		No		Yes	2	Yes	2	No		Yes	1	Yes	2
Water Main Loop Max. Distance	None		Yes	emerg. access	Yes		Yes	emerg. access	No		Yes	emerg. access	Yes	Bore in woodland	Yes	Bore in woodland	None (leads)	
Stormwater - County Compliant	None		Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
At Grade			Yes		Yes		Yes		Yes		Yes		Yes		Yes		NA	
Underground			No		No		No		No		Yes		Yes		Yes		NA	
Slope			1	3	1	3	1	3	1	5	1	3	1	5	1	5	NA	
			1	5			1	5					1	3			NA	
Infiltration			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Loading Ratio per County			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
At grade			Yes		Yes		Yes		Yes		Yes		Yes		Yes		NA	
Below grade			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Bioswale			No		Yes		No		No		No		No		No		NA	
Meeting groundwater seperation			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Perimeter Landscape Buffers - 15 ft. min	None		Yes		Yes		Yes		Yes		Yes		Yes		Yes		NA	
Homes / Lots	1		51		52		51		52		40		19		24		4	
Financially Feasibility (Land cost; Infrastructure costs; Lot yield)	No		Yes		Yes		Yes		Yes		No		No		No		No	

*Note: Critical Root Zone impacts to trees to remain are not included in the calculations and removals of existing trees between 6"DBH and 8" DBH within woodland are not included in these calculations.

**Previous submittal preservation numbers updated to reflect DTE impacts to woodland and landmark trees

SCALE: 1" = 80'

0 80 160 240

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
ALTERNATIVE ANALYSIS PLAN

26

JOB No. 16070

DATE: 4/25/19
SHEET 26 OF 27
CADD: CTS.TES
ENG: SGF
PM: TJC
TECH: TRF
16070SA1.dwg

REVISIONS:	REV. DATE
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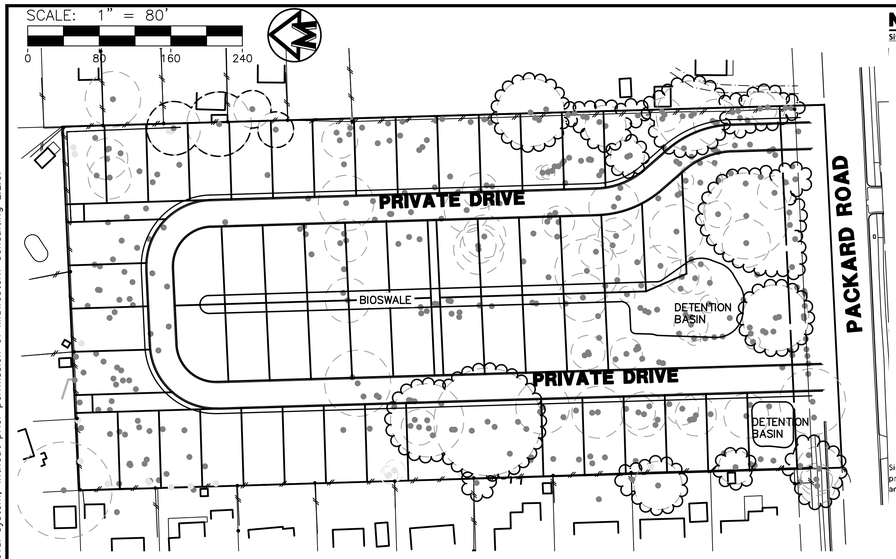
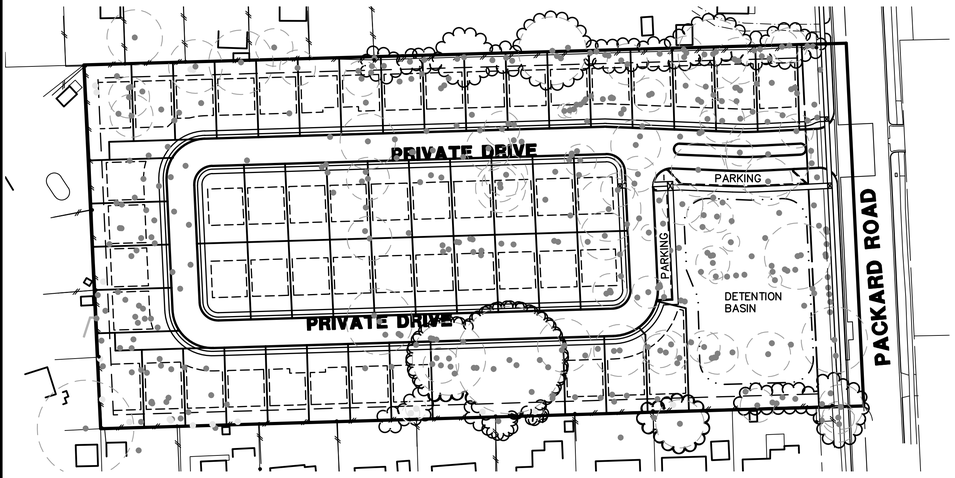
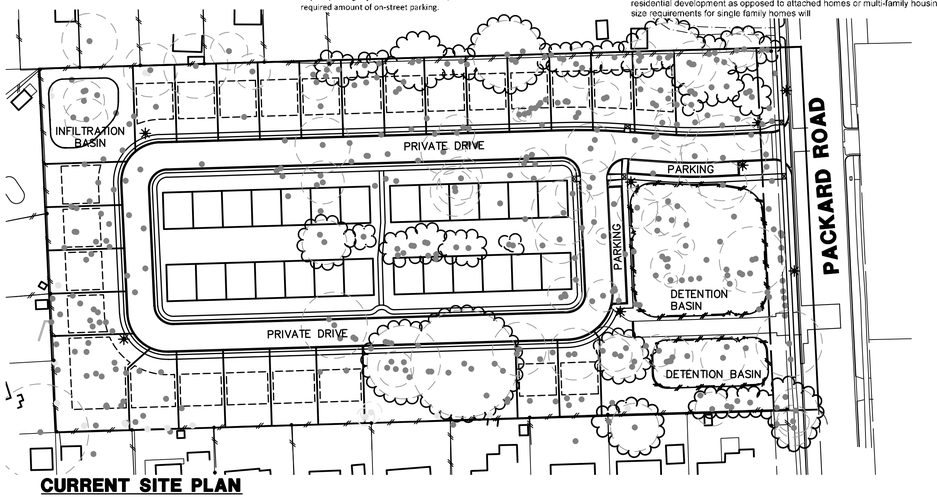


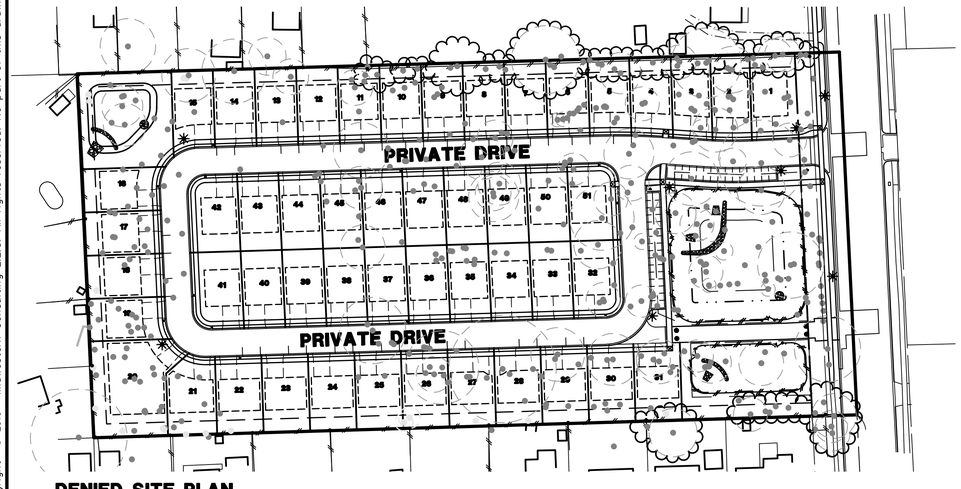
AREA PLAN LAYOUT



REVISED SITE PLAN #1 SUBMITTAL WITH BOULEVARD



CURRENT SITE PLAN



DENIED SITE PLAN

NATURAL FEATURES ALTERNATIVE ANALYSIS

Site Design Goals / Elements

- 52 Single Family Homes and Lots minimum of 4,000 sf. w/ width of 46 feet
- Where possible minimize impacts to Trees and Woodlands
- Provide pedestrian access through the site
- Meet the conditions of the conditional rezoning (site specific goals)
  - Provide a 15 foot wide landscape buffer of limited/minimal grading and impacts along the north, east and west property lines.
  - Provide for no more than 52 new homes / lots
  - Provide no less than five ranch style homes along the perimeter of the site where adjacent to existing single family homes
- Vehicular Circulation utilizing double loaded private roadway to efficiently utilize impervious surfaces
  - Minimize impervious surfaces where possible
    - Minimize the length of single loaded roadways
- Vehicular Circulation that is accessible by fire apparatus as well as solid waste vehicles. Requiring no dead end streets, and two access points.
- Provide Stormwater management that meets Washtenaw County Water Resources Commissioner's recently updated requirements
  - Recent updates for infiltration require
    - Infiltration loading of 1:10
      - For our site this means 0.75 acres / 32,700 sf.
    - Infiltration 3 feet above existing water table
- Provide a stormwater management system that meets Washtenaw County Water Resources Commissioner's Drainage District Requirements
  - Collection / accounting for all stormwater that lands on site
  - Collection / accounting for all stormwater that comes onto site from adjacent neighboring properties
    - For our site this means accounting for an additional 1.38 acres / 60,113 sf that is off-site and upgrade within the current neighborhood that is not accounted for or controlled.
    - This requires an additional volume of 11,500 cft. to be accounted for with our stormwater system
- Provide a source for water through a water main loop from the existing system in Packard Road
- Provide a sanitary connection opportunity through an efficient layout and connection to sanitary system in Packard Road
- Minimize grading and earthwork to be most efficient with construction and limit impacts and earthwork

Since our Area Plan and Rezoning there were a number of things that result in the current proposal with respect to minimizing the impacts to natural features at the site (landmark tree, and woodlands).

- Further evaluation of the trees including health condition has been completed and it is concluded that the area identified in the Area Plan at the northwest corner is not a woodland as defined by ordinance (less than ½ acre in size)
- With the Area Plan we had conceptually designed a system that would load and infiltrate the stormwater based upon the capacity of the soil. With the recently updated County rules we are only able to account for loading of 1:10 as opposed to the calculated capacity of the soil based upon the testing.
- We have also completed additional infiltration tests at the site to evaluate soils conditions. During this testing it has been determined that the groundwater is a bit higher than indicated in the previous testing. This could be a seasonal condition, however we will need to account for this elevation and propose our infiltration 3 feet above the groundwater.
- Further evaluation and topographical survey indicated that there is approximately 1.38 acres / 60,113 sf of offsite area in the adjacent subdivision that contributes run-off through our site. This is significantly more than conceptually accounted for with the Area Plan. Since the existing neighborhood was developed at a time that there were no or minimal stormwater design guidelines much of this area drains to a low spot shared on our site and the adjacent homes along our eastern property line. We had heard about this concern during the Citizen Participation Meeting. Our goal with this, and as you will see with the proposed plan, is to make this situation better than existing by accounting for much of this stormwater runoff with our system. We are reducing the contributing area of stormwater runoff to this area by 75%. This requires our system to provide about 11,500 cft of additional stormwater treatment.

There are opportunities to lessen these factors and preserve additional trees and woodlands. Those factors are:

- Allow for the stormwater system to be designed outside of the Washtenaw County Water Resources Requirements, and requirements for a County Drainage District.
  - This would allow for slopes at the detention basin to be steeper than 1:5 (w/o a fence)
  - This would allow for the soils capacity to dictate the loading rate for the infiltration. This would allow for a reduction in the size of the detention basin of about 25% or 6,000sf.
- Reduce the number of homes / parcels
  - Which does not make the project financially feasible
  - In doing so we potentially decrease the efficiency of the access roadway, the main impervious surface.

Based on initial review comments from the City of Ann Arbor planning staff, the submitted site layout was revised to address the following comments/concerns (additional comments/concerns not identified here but also addressed) which has a direct impact on the ability to preserve regulated natural features:

- Vehicular Circulation that is accessible by fire apparatus as well as solid waste vehicles while minimizing traffic conflicts. Requiring no dead end streets, and two access points. Per City traffic comments, one boulevard entrance that aligns with the church driveway on the opposite side of Packard Road is identified as preferred method for vehicular access to the site. Further this single access point needs to be designed as a boulevard entry in order to function as two points of access. This style and point of access requires an additional east-west road surface. In incorporating the project goals with this new road surface including the single boulevard entry requires impact to regulated natural features in the southeast corner of the site.
- Provide 1 parking space per dwelling unit in the private street easement. We have modified the plan to include a combination of parallel and ninety degree parking along the proposed private roadway. We are proposing limiting parking to one side of the street as well as limiting parking in the roadway direction transitions to ensure adequate accessibility by fire apparatus and solid waste vehicles. This design requires additional bays of parking adjacent to the entrance/detention basin in order to achieve the required amount of on-street parking.
- Provide sidewalk on both sides of the private street. The inclusion of sidewalk on both sides of the private street promotes pedestrian accessibility but also decreases the buildable footprint of the lots.

Based on additional comments from the City of Ann Arbor staff, the submitted site layout was revised a second time to address the following comments/concerns (additional comments/concerns not identified here but also addressed) which has a direct impact on the ability to preserve regulated natural features:

- Vehicular Circulation that is accessible by fire apparatus as well as solid waste vehicles while minimizing traffic conflicts. Requiring no dead end streets, and two access points. Per City traffic comments, one entrance that aligns with the church driveway on the opposite side of Packard Road is identified as preferred method for vehicular access to the site. Per City Fire access comments, the single boulevard access point is not acceptable as two access points. Therefore, at a minimum, an additional emergency access point is required. The alignment with the church maintains the natural features impacts from the first revised submittal and the second emergency access point limits site availability for stormwater management and requires impact to regulated natural features in the southwest corner of the site.
- Per City engineering comments, the two connection points for the water main loop needs to be as far apart as possible on the site. This requires the use of the emergency access point to also serve as the second connection of the water main to Packard Road. This limits the potential for this area to be utilized for stormwater management, both for detention and infiltration.
- Per WCWRC comments and discussion with the Mallets Creek Advisory Committee, the WCWRC will require dedicated easements to the WCWRC and the extent of woody vegetation needs to be limited to the greatest extent practicable. This limits the availability of space in the rear yards of lots to preserve existing trees and to plant mitigation trees. Lot configuration was shifted to accommodate these easements to the greatest extent possible.

Based on additional comments from the City of Ann Arbor staff, the submitted site layout was revised a third time to address the following comments/concerns (additional comments/concerns not identified hear but also addressed) which has a direct impact on the ability to preserve regulated natural features:

- Stormwater management in the northeast corner of the site to direct and outlet off-site drainage and rear yard of lots in the vicinity. This resulted in the loss of a lot and reconfiguration of remaining lots and impact to natural features.
- Solid waste service requires direct driveway access to private road. This resulted in the reconfiguration of lots and impact to natural features.

Based on comments from the City of Ann Arbor Planning Commission and City Council for the denied site plan, the layout has been revised in the PUD site plan submittal to preserve additional natural features on the site. This has been achieved by attaching the units in the central portion of the site in order to preserve two areas of woodland/landmark trees on the western side of the site, one area of woodland near the entrance to the side, and one area of woodland trees between the attached units.

Alternative Analysis

Natural features on the site include City regulated woodland predominantly on the southern Portion of the site, and landmark trees within the woodland and scattered throughout the site. The zoning and master plan for the site, as well as expressed preference by neighboring residents is for the site to be developed as single family residential development as opposed to attached homes or multi-family housing. Lot size requirements for single family homes will have slightly more impact to natural features than clustered multi-family housing. The intent for this development is to provide a typology of single family residential housing on a smaller lot at a market price geared toward households with one full-time and one part time income, adding diversity to the housing stock within the City of Ann Arbor. The location of the site along Packard Road, which provides access to public transportation and proximity to City schools, City parks, and the Malletts Creek Branch Library makes the site an ideal location for efficient single family housing in Ann Arbor. However, the cost of the land, infrastructure cost and requirements, including stormwater management practices for developing this site are not significantly reduced by the type of single family housing that is proposed for the project. Therefore, there is a certain number of lots that will need to be realized in order for the project to be financially feasible.

Meeting the project goals and incorporating one vehicular access point that is aligned with the adjacent driveway on Packard Road and providing an additional emergency access point results in impacts to the regulated woodland and landmark trees in the southern half of the site. The width of the access points is required per the Zoning Ordinance. This requirement makes the Area Plan layout, the initial site plan layout, and the 1st revised site plan layout unfeasible. Additional alternatives that align with the adjacent driveway were evaluated – see alternatives 1, 2, and 3. A 15-foot landscape buffer along the perimeter of the property to the east, west, and north has been proposed on each of the alternative layouts. This landscape buffer includes minimal grading to preserve the existing trees and provides screening for the adjacent residents. Additionally, areas of the landscape buffer that do not have existing trees will be planted with mitigation trees to provide additional screening.

Alternatives 2 and 3 illustrate reduced impact to regulated natural features by including stormwater management in the northeast corner of the site and preserving trees and woodland in the central portion of the site; however, a maximum of 24 or 19 lots are achieved with these layouts. Additionally, the looped water main would require directional bore of water main within the woodland along the west property line to maintain maximum separation of the water main connections on Packard Road. With the limited number of lots, these alternatives are not financially feasible. A more in depth analysis of the proposed layout and Alternative 1, with a total of 40 lots, is provided below.

The location of the entrance and the existing topography of the site would require that stormwater management elements be provided in the southern portion of the site within the regulated woodlands in order to capture and treat as much of the runoff from the site as possible. The elevation of the southeast corner of the site and the elevation of groundwater limit the depth of the detention basin in order to accommodate an infiltration area to the loading requirements. The required volume of stormwater runoff that must be captured dictates the elevation for the top of storage in the basin and, therefore, the elevation of the development on the site. This leads to filling on the site. Incorporation of houses with view-out basements expands to this raising of the site and reduces the amount of impact within the 15-foot landscape buffer along the perimeter of the site and the natural features located in these areas. Providing stormwater detention and infiltration in the northeast corner of the site makes it difficult to achieve a looped road network, resulting in far fewer lots as illustrated in Alternatives 2 and 3. Efforts to preserve natural features in the southern portion of the site in Alternative 1 requires detention basin slopes of 3:1 and use of underground infiltration in the rear yards of 10 of the lots. Both the current site layout and Alternative 1 propose aggregate below the side slopes of the detention basin to meet the required infiltration area per the WCWRC rules. This limits the impact to natural features that would be necessary to achieve this infiltration at surface grades.

The most efficient and economical way to use impervious road surfaces for the project is to have lots on both sides of the street (double load the street frontage). This splits the amount of impervious surfaces and burden of infrastructure costs per linear foot of road onto more lots and reduces the impact to the project economics. The width of the existing parcel dictates the maximum depth of the lots in a double loaded layout and the required 4,000 square foot lots restricts the use of narrower lots to avoid impacts to natural features. Additionally, the design of houses with 2-car garages and the rezoning condition of a minimum number of ranch houses, dictates a minimum lot width that results in a feasible building envelope for the development. Therefore, a site layout with consistent lot dimensions (i.e. the current site layout; with the exception of the northern corners) requires the design of less architectural footprints than a site layout with a variety of lot dimensions, i.e. site alternative 1 and is preferred.

Additional site considerations for the current site plan and Alternative 1 are outlined below. Refer to the comparison chart on each page of the alternative analysis for additional information on natural features preservation for each alternative and design considerations.

Current PUD Site Plan

- Preserves 30% of the landmark trees by dbh, preserves 26% of the woodland area, and preserves 34% of the woodland trees by dbh
- 2 to 3 standard lot dimensions (width and depth) to provide economy in building footprints
- Requires approximately 194 linear feet of emergency access drive
- 3:1 and 4:1 slopes for the detention basin – requires perimeter fence
- Requires underground aggregate under slopes of detention basin for infiltration area
- Road to Lot ratio: 30.9 linear feet of road per lot and 3.8 linear feet of emergency access drive per lot

Alternative 1

- Preserves 31% of the landmark trees by dbh, preserves 23% of the woodland area, and preserves 21% of the woodland trees by dbh
- Requires variable lot dimensions (width and depth) to achieve 4000 square foot lots as required per ordinance. This requires additional architectural footprints
- Requires approximately 480 linear feet of emergency access drive
- Requires 3:1 slopes for the detention basin and fence
- Requires underground infiltration in the rear yards of 10 lots, which reduces the area of placement of mitigation trees and adds cost for stormwater management
- Requires underground aggregate under slopes of detention basin for infiltration area
- Road to Lot ratio: 32.7 linear feet of road per lot and 12 linear feet of emergency access drive per lot

City staff has requested additional alternatives that preserve the natural features on the site. Given the location of the natural features in relation to Packard Road and the required site entrance aligned with the driveway on the opposite side of Packard Road, it is not possible to completely eliminate impacts to the natural features on the site. In an effort to illustrate that any development of the site will require natural features impacts, Alternative 4 has been added to the alternative analysis. This alternative illustrates that a land division to allow for four residential lots on the site will require two shared driveways to the site and impacts to the natural features on the site. While there would be less natural features impacts on the site, given the cost of the land, this is not a financially feasible alternative from a developer perspective.

SITE ALTERNATIVE COMPARISON CHART

With our alternatives analysis we explored a number of variations of the project and summarize them as follows:

	Existing		Current PUD Site Plan		Area Plan		Denied Site Plan		Revised Site Plan #1 with Blvd		Site Alternative 1		Site Alternative 2		Site Alternative 3		Site Alternative 4	
LM Trees >16 health to be preserved*	51	> 16 health	13	trees	14	trees	7	trees	11	trees	14	trees	32	trees	17	trees	41	trees
LM Trees > 16 health dbh to be preserved*	1235"	dbh	381"	dbh	405"	dbh	191"	dbh	348"	dbh	393"	dbh	835"	dbh	507"	dbh	997"	dbh
Woodland Area to be preserved	3.4	acres	0.89	acres	0.79	acres	0.3	acres	0.65	acres	0.8	acres	2.25	acres	1.46	acres	2.6	acres
Woodland dbh >8" DBH >40% health to be preserved*	1692"	dbh	584"	dbh	376"	dbh	266"	dbh	317"	dbh	357"	dbh	982"	dbh	665"	dbh	1303"	dbh
Wetlands / Water Courses	None		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts	
Floodplains	None		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts	
Steep Slopes	None		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts		No Impacts	
Private Roadway	None		1578	lf	1,672	lf	1578	lf	1578	lf	1309	lf	923	lf	883	lf	None	
Dead Ends			No		No		No		No		No		Yes		Yes		NA	
Dual Access per fire access			Yes	2	Yes	2	Yes	2	No	1	Yes	2	No	1	No	1	NA	
Single Access per City traffic			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Shared Drives	None		No		Yes		No		Yes	2	Yes	2	No		Yes	1	Yes	2
Water Main Loop Max. Distance	None		Yes	emerg. access	Yes		Yes	emerg. access	No		Yes	emerg. access	Yes	Bore in woodland	Yes	Bore in woodland	None (leads)	
Stormwater - County Compliant	None		Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
At Grade			Yes		Yes		Yes		Yes		Yes		Yes		Yes		NA	
Undergound			No		No		No		No		Yes		Yes		Yes		NA	
Slope			1	3	1	3	1	3	1	5	1	3	1	5	1	5	NA	
			1	5			1	5					1	3			NA	
Infiltration			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Loading Ratio per County			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
At grade			Yes		Yes		Yes		Yes		Yes		Yes		Yes		NA	
Below grade			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Bioswale			No		Yes		No		No		No		No		No		NA	
Meeting groundwater seperation			Yes		No		Yes		Yes		Yes		Yes		Yes		NA	
Perimeter Landscape Buffers - 15 ft. min	None		Yes		Yes		Yes		Yes		Yes		Yes		Yes		NA	
Homes / Lots	1		51		52		51		52		40		19		24		4	
Financially Feasibility (Land cost; Infrastructure costs; Lot yield)	No		Yes		Yes		Yes		Yes		No		No		No		No	

*Note: Critical Root Zone impacts to trees to remain are not included in the calculations and removals of existing trees between 6"DBH and 8" DBH within woodland are not included in these calculations.

**Previous submittal preservation numbers updated to reflect DTE impacts to woodland and landmark trees

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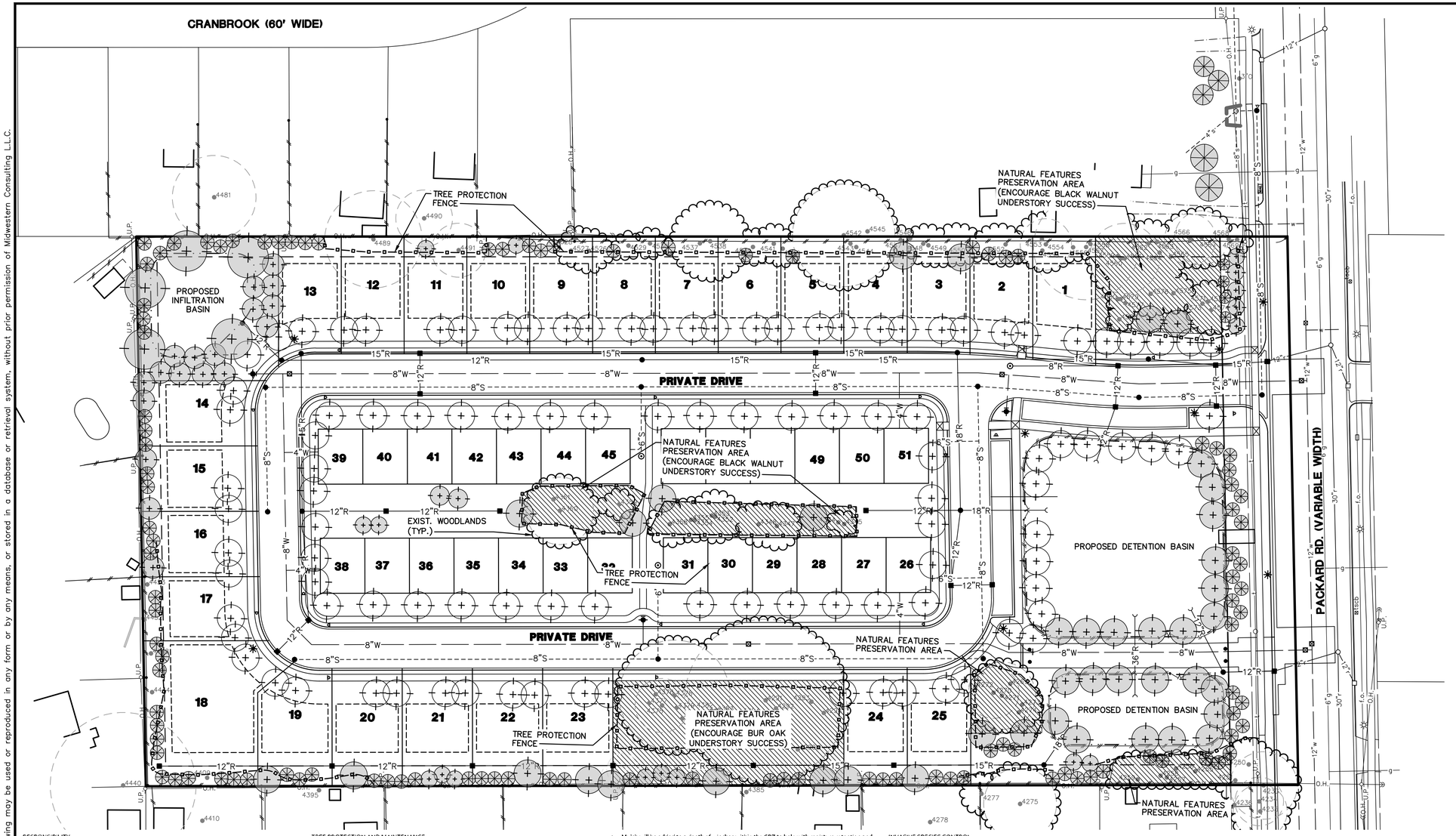
2857 PACKARD ROAD
PLANNED UNIT DEVELOPMENT
ALTERNATIVE ANALYSIS PLAN

27

DATE: 4/26/19
SHEET 27 OF 27
CADD: CTS
ENG: SGF
PM: TJC
TECH: TRF
16070SA1.dwg

JOB No. 16070

REVISIONS:	REV. DATE
PER CITY REVIEW	05/14/19
PER CITY REVIEW	



SCALE: 1" = 40'

0 40 80 120

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

LEGEND

- TREE OR BRUSH LIMIT
- REGULATED WOODLANDS TO REMAIN
- SINGLE TREE
- LANDMARK TREE CRITICAL ROOT ZONE
- PROPOSED DECIDUOUS STREET TREE
- PROPOSED MITIGATION DECIDUOUS TREE
- PROPOSED MITIGATION EVERGREEN TREE
- NATURAL FEATURES PRESERVATION AREAS

RESPONSIBILITY

1. The maintenance of City regulated natural features and the areas identified as Natural Features Preservation Areas on the Natural Features Maintenance Plan will be the responsibility of the developer/owner and/or successor.
2. Pre-construction/construction related items within the fifteen (15) foot conflicting land use buffer will be the responsibility of the developer/owner. Post-construction, each lot owner shall be responsible for maintaining the existing trees in the fifteen (15) foot wide landscape buffer and trees identified as "Landmark Trees", "Woodland Trees" or "Mitigation Trees". Owners are prohibited from removing a Landmark, Woodland, or Mitigation tree without approval from the City of Ann Arbor. If trees are removed without City approval/permission, mitigation shall be provided by the Owner/Homeowners Association at the direction of the City.
3. The invasive species control within the identified Natural Features Preservation Areas will be the responsibility of the developer/owner and/or in perpetuity with the approved site plan. It will be an iterative process in which management techniques will be modified each year based on the observed site conditions.

PRE-CONSTRUCTION

1. Prior to beginning construction on the site, a certified arborist shall perform a site visit to assess the current condition of the regulated natural features as identified on the approved site plans on file with the City of Ann Arbor. Tree Health/Condition Forms shall be prepared for regulated landmark and woodland trees to remain in order to document the health of the trees prior to construction activities on the site. A list of trees that are in poor health (<16 points on the assessment form) shall be prepared to avoid potential responsibility for future replacement of trees in poor health after construction. The list and tree health/condition forms shall be submitted to the City of Ann Arbor Planning Department for their records.
2. The Master Deed and By Laws established for the Homeowners Association shall include the following:
   a. All mitigation trees and landscaping on the approved site plan that die will be required to be replaced by the next growing season in perpetuity, as a continuing obligation of the site plan.
   b. Cutting and/or removal of a regulated tree as defined on the approved site plan is subject to an evaluation of health and shall have a health condition of less than 16 per the City of Ann Arbor Tree Health/Condition Factors form.
   c. Owners are prohibited from removing a Landmark, Woodland, or Mitigation tree without approval from the City of Ann Arbor. If trees are removed without City approval/permission, mitigation shall be provided by the Owner/Homeowners Association at the direction of the City.
   d. Each owner shall be responsible for maintaining the existing trees in the fifteen (15) foot wide landscape buffer and trees identified as "Landmark Trees", "Woodland Trees" or "Mitigation Trees". If any of the trees identified as "Landmark Trees" or "Woodland Trees" are in poor health, or are a risk to public health, safety, and/or welfare, the property owner/Homeowner's Association must receive permission from the City of Ann Arbor to remove the tree. The tree must be evaluated by a certified arborist using the City of Ann Arbor Landmark Tree Health and Condition form and include photographs of the tree to document its condition for City of Ann Arbor staff to review. Mitigation, if required, shall be provided by the Owner/Homeowner's Association at the direction of the City.

TREE PROTECTION AND MAINTENANCE

Goal: To reduce the impact of construction on and to promote the post-construction health of preserved regulated trees on the site.

SITE CLEARING:

1. Site contractor to meet with Midwestern Consulting certified arborist on site to review procedures, access/haul road and tree protection measures. It is recommended that site clearing be completed by an arborist/tree company familiar with the process and procedures of tree preservation or under direct supervision of same.
2. Prior to any site clearing or construction activities beginning, install fence and signage around the CRZ (critical root zone) of existing trees to remain.
3. Small trees within in CRZ of regulated natural features to be removed by hand.
4. Proper care is to be taken while clearing the site. Do not felled trees into any protected trees. Any limbs that conflict with the crown of trees to remain should be hand pruned prior to felling.
5. CRZ is off limits to parking, storage of fuel cans, fueling of equipment or any activity not directly involved with caring for the trees health.
6. Determine if pre-construction injections are required at this time and schedule with Arborist.

PRUNING:

1. Preserved trees should be pruned to clear crown of diseased, weak crossing or dead wood.
2. Avoid pruning cuts on limbs larger than 4" diameter, except dead wood.
3. Never remove more than 20% of the live foliage.
4. Oak trees pruned between March 15th and November 15th will require the application of wound paint to the pruning cut to prevent oak wilt.

CONSTRUCTION:

1. Prior to any site clearing or construction activities beginning, tree protection fence shall be installed around all existing trees to remain at the limits of the CRZ or as depicted on the soil erosion control plan and natural features maintenance plan.
2. Grading, roads, walkways, underground utility lines, irrigation lines, and all other aspects of soil disturbance shall be minimized to the fullest extent that sound design and public safety will allow.
3. Excavated spoils from basements and other needed grading should not be spread on the site in the areas of natural features preservation. Very careful handling of trees near the building envelope should be undertaken to the fullest extent possible.
4. No materials, equipment, spoils or wash water (especially concrete trucks or tools) may be dumped, parked or stored within the CRZ fencing.
5. If additional pruning is required during construction this must be completed by an Arborist and not construction personnel.
6. Any herbicides or pesticides placed near the trees to be preserved will need to be approved by the Arborist prior to application.
7. If construction is required within the CRZ, roots need to be properly pruned by the Arborist prior to equipment damaging the root system. Roots can be cut by manually digging a trench and cutting exposed roots with a saw, vibrating knife or other approved root-pruning tools.
8. A watering program needs to be implemented for the preserved trees. Typically one inch of water per week. A tensiometer may be needed within the CRZ to monitor moisture during the construction process.
9. Mulch will be added to a depth of 4 inches within the CRZ to help with moisture retention and soil compaction after mowing and treatment of invasive species per the invasive species control plan below. Mulch should not touch or be piled on trunk.

POST-CONSTRUCTION:

1. During the establishment period for the installed deciduous mitigation trees (3 years or longer as to be determined by certified arborist):
   a. Burlap screening or wrapping shall be installed on the southwest and windward sides from late autumn to early spring.
   b. Trees shall be watered in spring and autumn and during dry conditions at a frequency determined by certified arborist.
   c. Mulching around trees shall be maintained at a depth of 2 to 3 inches
   d. Mulch should not touch or be piled on trunk.
2. The Homeowners Association shall work with landscape contractor/certified arborist to locate healthy, vigorously growing Oak and Black Walnut understory trees. Selective thinning of other understory trees shall be proposed as necessary to nurture these trees to become future canopy. Encouraging success of these trees offer the following benefits:
   a. These are established trees on site that do not have to be transplanted, increasing likelihood of success of the trees.
   b. These are truly native genotype as distinct from what planted trees would be, and would include Quercus macrocarpa (Burr Oak) and Juglans nigra (Black Walnut).
   c. By focusing on existing desired understory trees, we encourage faster growth rates, since these trees are established and have extensive root systems
3. The Homeowners Association shall work with a restoration contractor with approval from certified arborist to establish a tree maintenance program for the regulated natural features and proposed mitigation trees on the development site beyond the 3 year establishment period. The program shall at a minimum include:
   a. A water program for the establishment of newly planted mitigation trees for a minimum of two growing seasons.
   b. A fertilization program for the proposed mitigation trees.
   c. Any mitigation trees and landscaping on the approved site plan that dies shall be replaced by the next growing season in perpetuity, as a continuing obligation of the site plan.
4. The developer/owner shall provide the City with a written report by December 31st of each year detailing the progress made in the maintenance plan during construction and first growing season. The Homeowners Association shall provide the City with an annual written report by December 31st of each year detailing the progress made in the natural features maintenance plan that year for the remainder of the three year establishment period. A copy of the long term maintenance program shall be provided to the City. Documentation of the natural features maintenance activities during construction and post-construction growing seasons, if applicable, shall be provided to the City before the first Final Certificate of Occupancy is released.

INVASIVE SPECIES CONTROL:

Goal: To reduce instances of invasive species (woody and herbaceous) currently on site and limit the spread of new seed to create room for desirable native species.

1. Natural features maintenance/restoration contractor, with a certified herbicide applicator on staff, shall work with arborist and landscape architect to prepare an invasive species control schedule to be approved by certified arborist. A copy of the invasive species control plan shall be submitted to the City.
2. Control of woody invasive plants (including but not limited to: honeysuckle, buckthorn, and privet) and aggressive non-invasive species (including but not limited to: boxelder.) within the natural features preservation areas and undisturbed portions of the fifteen (15) foot conflicting land use buffer such that these woody species do not make up more than 20% of the total coverage of the natural preservation areas.
   a. Plants will be cut and treated through the application of a solution containing 22-28% active ingredient (glyphosate,) which is to be painted onto the cut surface. Refuse is to be removed and legally disposed of off-site.
   b. Following initial site clearing, further cutting and treatment of invasive species shall be performed as needed. Annual application of solution containing 22-28% active ingredient (glyphosate) shall be painted onto cut surface of individual plants as needed. This process can be performed during dormant winter months.
3. Control of herbaceous invasive species within the natural features preservation areas, including but not limited to: Dame's rocket, Garlic mustard, Narrowleaf bittercress, Tawny daylily, Bedstraw, Ground ivy, Oriental bittersweet, Greater celandine, Orchard grass, Bindweed, Queen Anne's Lace, Chinese yam, Motherwort, Common velvet grass, Canada thistle, Herb bennet, Yellow toadflax, Lady's thumb, Jetbead, Burdock, and Myrtle to reduce coverage of invasive species, reduce establishment of invasive species seed, and encourage establishment of native herbaceous groundcover over a minimum of 75% of the natural features preservation areas.
   a. Herbaceous invasive species will be controlled through a combination of techniques as identified by restoration contractor on an annual basis. Techniques may include mowing, herbicide application, hand pulling, and/or prescribed burn.
      i. During the first management season, vegetation shall be mowed to a maximum height of 3" following the initial removal of woody species from the site.
      ii. Following the initial mow, a mowing schedule shall be implemented on a regular basis to limit re-growth and prevent seed set.
      iii. Herbaceous invasive species with persistent underground root systems (including but not limited to: Myrtle, Canada thistle, Yellow toadflax) shall be treated with foliar herbicide spraying a solution containing triclopyr, or other restoration contractor recommended herbicide.
      iv. The effectiveness of this method shall be periodically monitored and the treatment schedule shall be modified as appropriate to achieve desired results during the first two years of management.
      v. During the third year of management, or as determined by restoration contractor based upon status of invasive species control success, using local genotypes, native herbaceous species seed shall be sowed into the natural features preservation areas. Species list is provided on the Natural Features Maintenance Plan.
4. The developer/owner shall provide the City with an annual written report by December 31st of each year detailing the progress made in the invasive species control plan that year and recommended treatment techniques and schedule for the following year.
5. The Homeowners Association shall work with a certified arborist and restoration contractor to develop a long-term invasive species control program for the natural features preservation areas on the site. The program shall at a minimum include:
   a. Site assessment every year to identify invasive species becoming established on the site.
   b. Development of invasive species control methods and timelines specific to each type of invasive species to be controlled.
   c. Identification of protection measures necessary to minimize impact of invasive species control on regulated natural features within the natural features preservation areas.

RESTORATION HERBACEOUS SEED MIX

Scientific Name	Common Name
Allium cernuum	Nodding Wild Onion
Andropogon scoparius	Little Bluestem Grass
Anmenone virginiana	Thimbleweed
Aquilegia canadensis	Wild Columbine
Aster cordifolius	Heart Leaved Aster
Aster laevis	Smooth Aster
Aster oolentangiensisi	Prairie Heart Leaved Aster
Aster sagittifolius	Arrow Leaved Aster
Desmodium canadense	Showy Tick Trefoil
Eupatorium rugosum	White Snakeroot
Monarda fistulosa	Wild Bergamot
Panicum virgatum	Switch Grass
Penstemon digitatlis	Foxglove Beard Tongue
Ratibida pinnata	Yellow Coneflower
Rudbeckia hirta	Black Eyed Susan
Scrophularia marilandica	Late Figwort
Senecio obovatus	Round Leaved Ragwort
Silphium terebinthinaceium	Prairie Dock
Solidago caesia	Blue Stemmed Goldenrod
Solidago juncea	Early Goldenrod
Solidago rigida	Stiff Goldenrod
Thalictrum dioicum	Early Meadow Rue
Tradescantia ohiensis	Common Spiderwort
Veronicastrum virginicum	Culver's Root
Zizia aurea	Golden Alexanders

Seed should be sowed at 3 ounce per 1,000 square feet of bare area in natural features preservation areas or as directed by seed supplier and approved by City of Ann Arbor Natural Areas Preservation staff

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2857 PACKARD ROAD

PLANNED UNIT DEVELOPMENT
NATURAL FEATURES MAINTENANCE PLAN

28

JOB No. 16070

DATE: 4/25/19
SHEET OF 27
CADD: CTS
ENG.: SGF
PM: JAC
TECH: TES
16070NF2.dwg

REVISIONS:	REV. DATE
PER CITY REVIEW	06/14/19
PER CITY REVIEW	06/28/19
PER CITY REVIEW	07/10/19

2857 Packard Road Supplemental Regulations:
(DRAFT dated July 12, 2019)

Section 1: Purpose
It is the purpose of the City Council in adopting these regulations to provide for the coordinated and unified development of this parcel of land in harmonious integration with the surrounding neighborhood and preservation of natural features on the parcel. These regulations seek to promote development of a mix of single family residential units and attached multi-family buildings with side by side single family residential units will provide diverse housing within the established neighborhood and be compatible with surrounding residential uses.

Section 2: Applicability
The provisions of these regulations shall apply to the property described as follows ("Property" or "Project"):

> Commencing at the South 1/4 post of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence North 89°47'30" East, 594 feet in the South line of said Section for a Place of Beginning; thence North 00°51'30" East, 853.56 feet; thence North 89°56'30" East, 407.13 feet; thence South 00°56' West to the South line of the Section; thence West along said South Section line to Place of Beginning.
>
> Being more particularly described as the following:
> Commencing at the S 1/4 corner of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan; thence N89°47'30"E 593.60 feet (recorded 594 feet) along the South line of said Section 3 to the Point of Beginning; thence N00°51'30"E 853.56 feet along the East line of Lots 1-9 of "Green Lea" Subdivision as recorded in Liber 11 of Plats, Page 42, Washtenaw County Records; thence N89°56'30"E 407.13 feet along the South line of Lots 11-14 of said "Green Lea" Subdivision; thence S00°56'00"W 324.52 feet along the West line of Lots 29-33 of "Kensington Farms" Subdivision, as recorded in Liber 12 of Plats, Pages 49 and 50, Washtenaw County Records; thence continuing S00°56'00"W 528.00 feet; thence S89°47'30"W 406.03 feet (recorded West) along said South line of Section 3 to the Point of Beginning. Being a part of the SE 1/4 of Section 3, T3S, R6E, Pittsfield Township, Washtenaw County, Michigan, and containing 7.96 acres, more or less. Being subject to the rights of public over that portion as occupied by Packard Road. Being subject to any restrictions or easements, if any.
>
> Exceptions
> Rights of the public or any governmental unit in any part of subject property taken, deeded, or used for street, road, or highway purposes.
> Resolution authorizing water improvement charges, as recorded in Liber 4646, Page 933, Washtenaw County Records.

Further, the provisions of these regulations shall be adopted and incorporated into the 2857 Packard Road Planned Unit Development Zoning District. These regulations, however, are intended to supplement only those provisions in the City Codes that may be modified as a part of a PUD and shall not be construed to replace or modify other provisions or regulations in City Codes.

Section 3: Findings
During the public hearings on this Planned Unit Development Amendment, the Planning Commission and City Council determined that:

Section 4: PUD Regulations:

A. Permitted Principal Uses of the development as depicted on the attached Site Plan shall be:

1. Single family residential units
2. Multiple-family residential building with single family dwelling units. Side by side attached units with no firewalls
3. Additional uses as identified in the R1E zoning district.

B. Permitted Accessory Uses shall be:
    1. Uses as identified in the R1E zoning district.

C. Setbacks: Minimum setbacks are:
    1. Single family residential lots:
        i. Front: 20 foot minimum
            1. Front lot line located at face of curb on private street
        ii. Side: 3ft per side minimum, 6 ft total minimum
        iii. Rear: 20 foot minimum
    2. Attached multiple family units:
        i. Front: 26 foot minimum from face of curb
        ii. Side: 14ft minimum from face of curb
        iii. Building separation:
            1. 23 foot minimum side to side
            2. 40 foot minimum rear to rear – decks/patios permitted within 40 foot setback

D. Density:
    1. 7 dwelling units per acre
    2. Maximum of 51 dwelling units

E. Lot Size:
    1. Minimum lot size of 4,000sf
    2. Minimum lot width: 34 ft

F. Landscaping, Screening, and Buffers:
    1. Site perimeter - 15' landscape buffer along the East, North, and South property lines
    2. Natural Features maintenance and invasive species control: A maintenance and invasive species control plan shall be incorporated into the development and perpetuated as part of the master deed and bylaws through the homeowners association.

G. Architectural Design:
    1. Building Height: 30 foot, 2 story maximum
    2. Floor area: Maximum of 2,000sf floor area. Basement square footage not included in floor area calculations.
    3. Home type: Four distinct model homes (two 2-story, one 1.5-story, and one 1-story) and the same model shall not be built next to each other. A minimum of five 1-story ranch style houses shall be around the perimeter of the development.
    4. Finishing: Dwelling units will have varying exterior colors with no two adjacent facing the street being the same color.
    5. Garages: Attached garages shall not project further than 12 feet out from the front of each house or 6 feet from the porch.