

GENERAL PAVING NOTES

PAVEMENT SHALL BE OF THE TYPE, THICKNESS AND CROSS SECTION AS INDICATED ON THE PLANS AND AS FOLLOWS:

CONCRETE: PORTLAND CEMENT TYPE IA (AIR-ENTRAINED) WITH A MINIMUM CEMENT CONTENT OF SIX SACKS PER CUBIC YARD, MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,500 PSI AND A SLUMP OF 1 1/2 TO 3 INCHES.

ASPHALT: BASE COURSE - MDOT BITUMINOUS MIXTURE HMA 4E1, 20A; SURFACE COURSE - MDOT BITUMINOUS MIXTURE HMA 5E1, 20A; ASPHALT CEMENT PENETRATION GRADE 85-100, BOND COAT - MDOT SS-1H EMULSION AT 0.10 GALLON PER SQUARE YARD, MAXIMUM 2 INCH LIFT.

PAVEMENT BASE SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT. EXISTING SUB-BASE SHALL BE PROOF-ROLLED IN THE PRESENCE OF THE ENGINEER TO DETERMINE STABILITY.

ALL CONCRETE PAVEMENT, DRIVEWAYS, CURB & GUTTER, ETC., SHALL BE SPRAY CURED WITH WHITE MEMBRANE CURING COMPOUND IMMEDIATELY FOLLOWING FINISHING OPERATION.

ALL CONCRETE PAVEMENT JOINTS SHALL BE FILLED WITH HOT POURED RUBBERIZED ASPHALT JOINT SEALING COMPOUND IMMEDIATELY AFTER SAWCUT OPERATION. FEDERAL SPECIFICATION SS-S164.

ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY AND THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, CURRENT EDITION.

ALL TOP OF CURB ELEVATIONS, AS SHOWN ON THE PLANS, ARE CALCULATED FOR A 6" CONCRETE CURB UNLESS OTHERWISE NOTED.

ALL SIDEWALK RAMPS, CONFORMING TO PUBLIC ACT NO. 8, 1993, SHALL BE INSTALLED AS INDICATED ON THE PLANS.

CONSTRUCTION OF A NEW OR RECONSTRUCTED DRIVE APPROACH CONNECTING TO AN EXISTING STATE OR COUNTY ROADWAY SHALL BE ALLOWED ONLY AFTER AN APPROVED PERMIT HAS BEEN SECURED FROM THE AGENCY HAVING JURISDICTION OVER SAID ROADWAY.

FOR ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL PAY FOR AND SECURE ALL NECESSARY PERMITS AND LIKewise ARRANGE FOR ALL INSPECTION.

EXISTING TOPSOIL, VEGETATION AND ORGANIC MATERIALS SHALL BE STRIPPED AND REMOVED FROM PROPOSED PAVEMENT AREA PRIOR TO PLACEMENT OF BASE MATERIALS.

EXPANSION JOINTS SHALL BE INSTALLED AT THE END OF ALL INTERSECTION RADI.

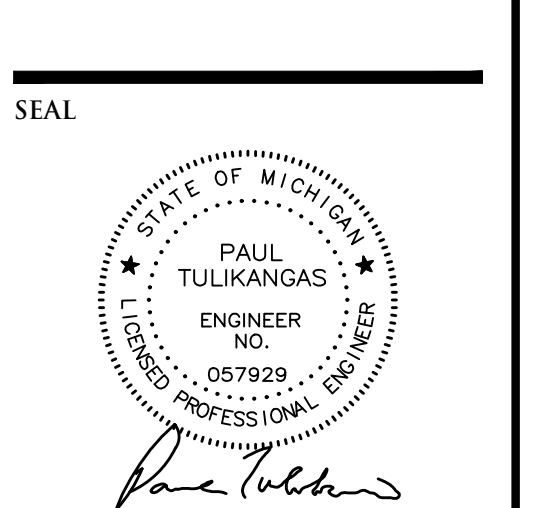
SIDEWALK RAMPS CONFORMING TO PUBLIC ACT NO. 8, 1973, SHALL BE INSTALLED AS SHOWN AT ALL STREET INTERSECTIONS AND AT ALL BARRIER FREE PARKING AREAS AS INDICATED ON THE PLANS.

ALL PAVEMENT AREAS SHALL BE PROOF-ROLLED UNDER THE SUPERVISION OF A GEOTECHNICAL ENGINEER PRIOR TO THE PLACEMENT OF BASE MATERIALS AND PAVING MATERIALS.

FILL AREAS SHALL BE MACHINE COMPACTED IN UNIFORM LIFTS NOT EXCEEDING 9 INCHES THICK TO 98% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT.

NF ENGINEERS
 CIVIL ENGINEERS
 LAND SURVEYORS
 LAND PLANNERS

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 PONTIAC, MI 48342-5032
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PROJECT
 Serra Ford Rochester Hills

CLIENT
 Serra Ford Rochester Hills
 2890 S. Rochester Road
 Rochester Hills, MI
 Contact: Joseph O. Serra
 Ph-248-852-0400

PROJECT LOCATION
 Part of the SE 1/4
 of Section 27
 T.3N, R.11E
 City of Rochester Hills,
 Oakland County, Michigan

SHEET
 Paving & Grading Plan -
 South

811
 Know what's below
 Call before you dig.

DATE	ISSUED/REVISED
02-23-22	CONCEPT DETENTION
03-18-22	ISSUED FOR SITE PLAN REVIEW
05-06-22	REVISED FOR SITE PLAN REVIEW
06-13-22	REVISED PER CITY REVIEW

DRAWN BY:
 J. Lawrey

DESIGNED BY:
 P. Tulikang

APPROVED BY:
 B. Buchholz

DATE:
 11-24-2021

SCALE: 1" = 30'

NFE JOB NO. M623 **SHEET NO.** C09

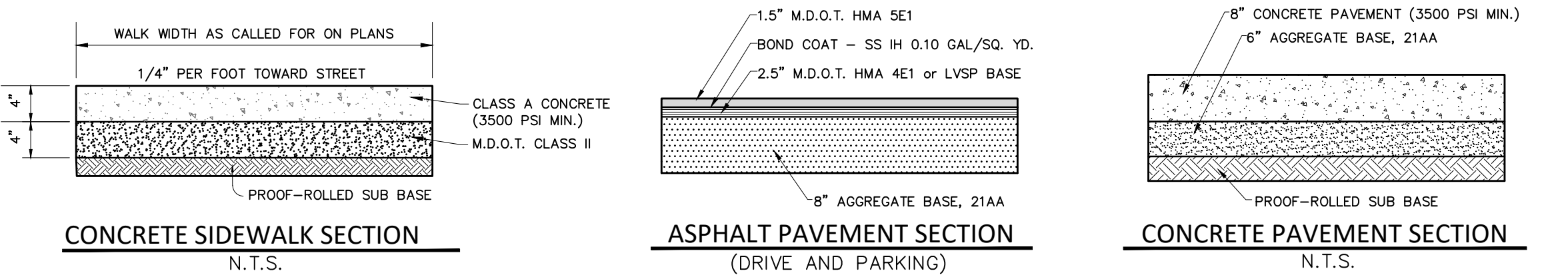
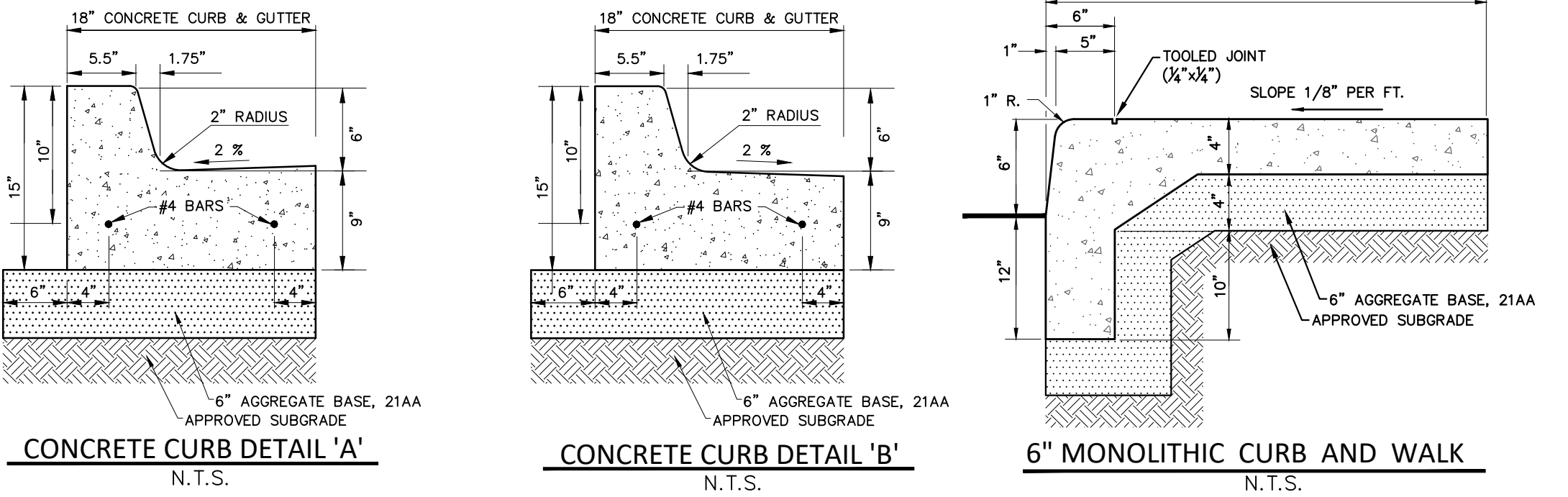
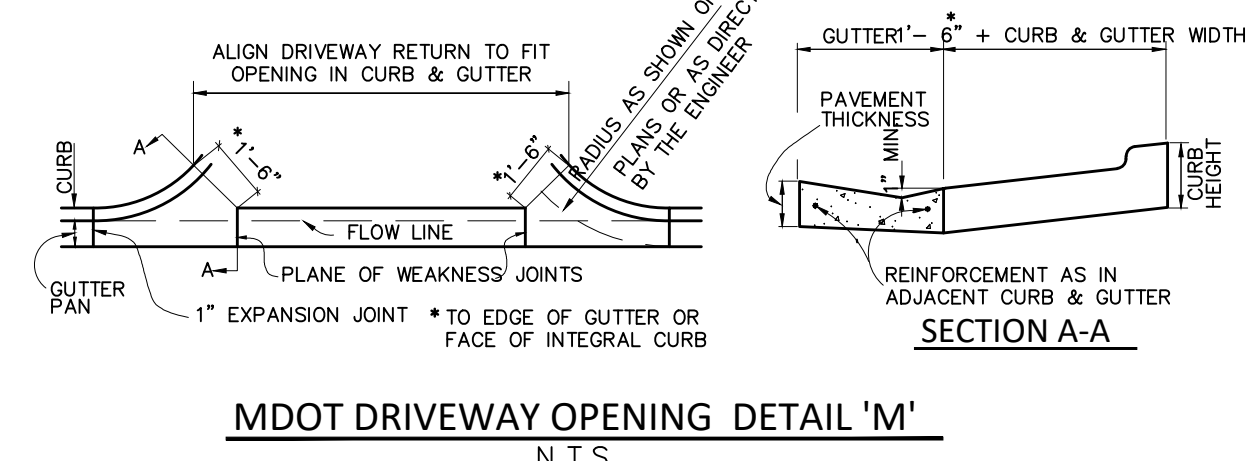
PAVING LEGEND

	PROPOSED CONCRETE PAVEMENT
	PROPOSED ASPHALT PAVEMENT

LEGEND

	EXISTING SANITARY SEWER
	SAN. CLEAN OUT
	EXISTING WATERMAIN
	EXISTING STORM SEWER
	EX. R. Y. CATCH BASIN
	EXISTING BURIED CABLES
	OVERHEAD LINES
	EXISTING GAS MAIN
	PR. SANITARY SEWER
	PR. WATER MAIN
	PR. STORM SEWER
	PR. R. Y. CATCH BASIN
	PROPOSED LIGHT POLE
	PR. TOP OF CURB ELEVATION
	PR. GUTTER ELEVATION
	PR. TOP OF WALK ELEVATION
	PR. TOP OF PWMT. ELEVATION
	FINISH GRADE ELEVATION

N89°48'15"W 661.52' (M) TO S.E. CORNER OF EYSTER'S AVON GARDENS PLAT
 N89°48'15"W 361.00' (M)



CITY OF ROCHESTER HILLS
 PSP #2022-004, SEC. 27

LEGEND	
	EXISTING SANITARY SEWER
	SAN. CLEAN OUT
	EXISTING WATER MAIN
	EXISTING STORM SEWER
	EX. R. Y. CATCH BASIN
	EXISTING BURIED CABLES
	OVERHEAD LINES
	LIGHT POLE
	EXISTING GAS MAIN
	PR. SANITARY SEWER
	PR. WATER MAIN
	PR. STORM SEWER
	PR. R. Y. CATCH BASIN
	SAND BACKFILL (95% DENSITY)
	PROPOSED LIGHT POLE

DETENTION CALCULATIONS - ROCHESTER HILLS (25) YEAR STORM EVENT - SERRA FORD (Roch. Rd. Drainage District #1)	
TOTAL SITE ACREAGE:	6.645 ACRES
CONTRIBUTING ACREAGE:	6.645 ACRES
ALLOWABLE OUTFLOW:	1.329 CFS @ 2' (CFS/ACRE)
RUNOFF COEFFICIENT:	0.819 IMPERVIOUSNESS
MAXIMUM ALLOWABLE OUTFLOW:	0.244 CFS/ACRE/INCH
STORAGE TIME (100 YEAR):	150.70 MINUTES
STORAGE VOLUME:	9,594.45 CFS/ACRE/INCH
TOTAL VOLUME:	52,215.44 CUBIC FEET

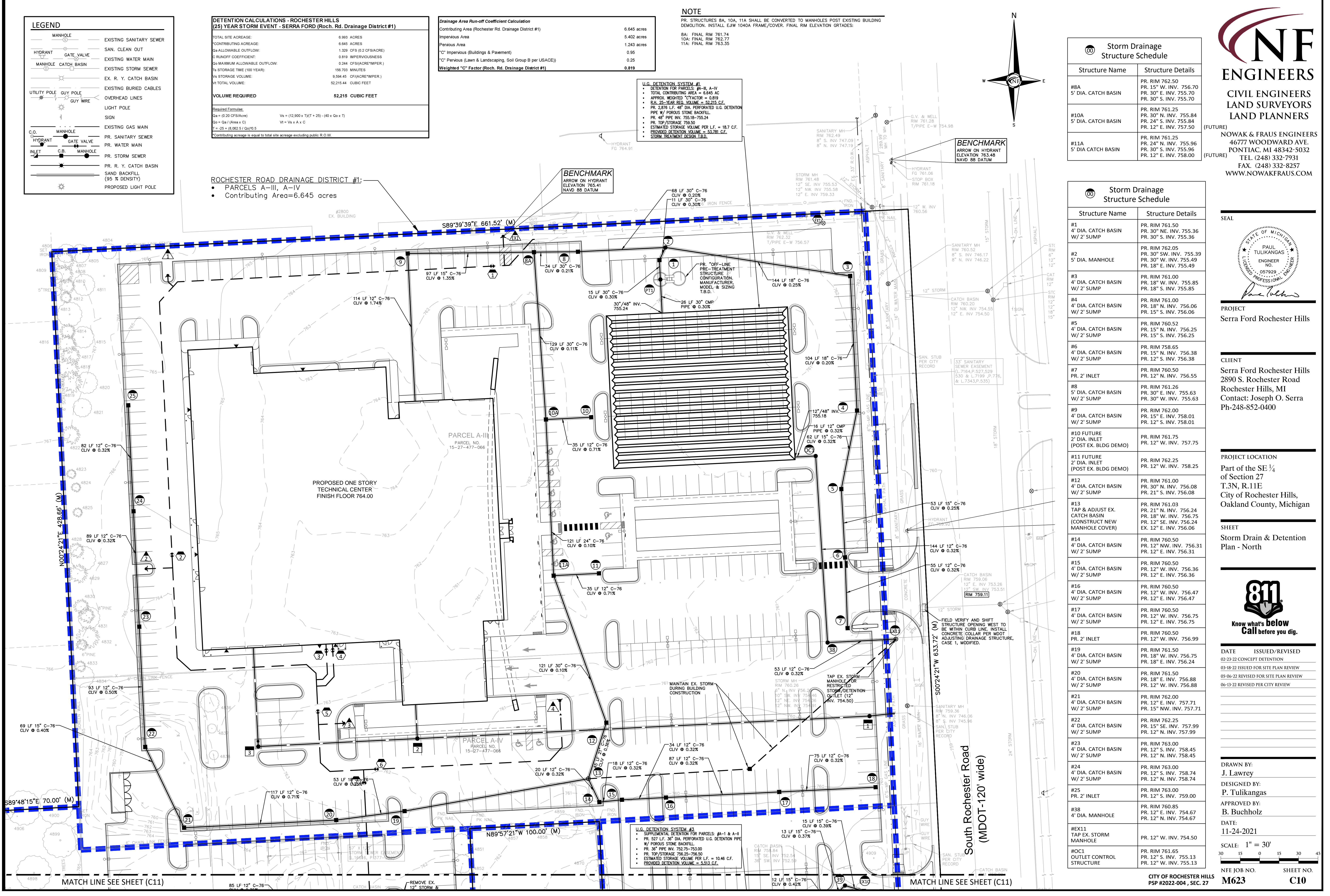
Required Formulas:
 $Q_p = 0.20 \times (C \times A)$
 $Q_p = Q_a / (Area \times C)$
 $T = 25 + (0.0025 / Q_p)^{0.5}$
 *Contributing acreage is equal to total site acreage excluding public R.O.W.

Drainage Area Run-off Coefficient Calculation	
Contributing Area (Rochester Rd. Drainage District #1)	6.645 acres
Impervious Area	5.402 acres
Pervious Area	1.243 acres
"C" Impervious (Buildings & Pavement)	0.95
"C" Pervious (Lawn & Landscaping, Soil Group B per USACE)	0.25
Weighted "C" Factor (Roch. Rd. Drainage District #1)	0.819

NOTE
 PR. STRUCTURES BA, 10A, 11A SHALL BE CONVERTED TO MANHOLES POST EXISTING BUILDING DEMOLITION. INSTALL E&W 1040A FRAME/COVER. FINAL RIM ELEVATION GRATES:
 BA: FINAL RIM 761.74
 10A: FINAL RIM 762.77
 11A: FINAL RIM 763.55

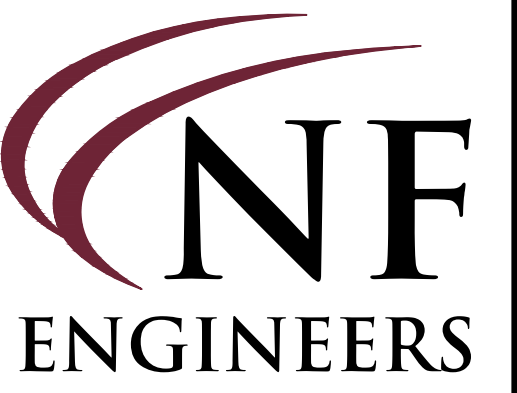
U.G. DETENTION SYSTEM #1
 • DETENTION FOR PARCELS: #A-III, A-IV
 • TOTAL CONTRIBUTING AREA = 6.645 AC
 • APPROX. WEIGHTED "C" FACTOR = 0.819
 • R.H. 25-YEAR RFD VOLUME = 52,215 C.F.
 • PR. 24" LF. 48" DIA. PERFORATED U.G. DETENTION PIPE W/ POROUS STONE BACKFILL
 • PR. 48" PIPE INV. 755.18-755.24
 • PR. TOP STORAGE 756.50
 • ESTIMATED STORAGE VOLUME PER LF. = 18.7 C.F.
 • PROVIDED DETENTION VOLUME = 53,781 C.F.
 • STORM TREATMENT DESIGN T.E.D.

ROCHESTER ROAD DRAINAGE DISTRICT #1:
 • PARCELS A-III, A-IV
 • Contributing Area=6.645 acres



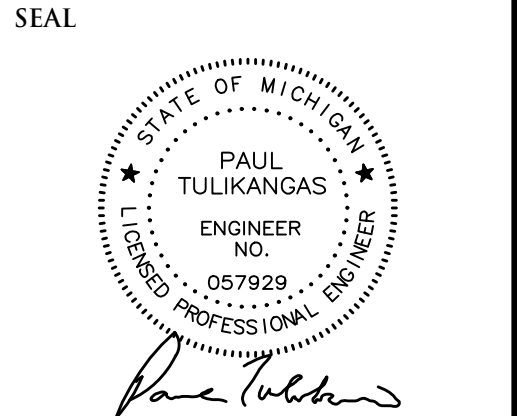
Storm Drainage Structure Schedule	
Structure Name	Structure Details
#8A 5' DIA. CATCH BASIN	PR. RIM 762.50 PR. 15" W. INV. 756.70 PR. 30" E. INV. 755.70 PR. 30" S. INV. 755.70
#10A 5' DIA. CATCH BASIN	PR. RIM 761.25 PR. 24" N. INV. 755.84 PR. 24" S. INV. 755.84 PR. 12" E. INV. 757.50
#11A 5' DIA. CATCH BASIN	PR. RIM 761.25 PR. 24" N. INV. 755.96 PR. 30" S. INV. 755.96 PR. 12" E. INV. 758.00

Storm Drainage Structure Schedule	
Structure Name	Structure Details
#1 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.50 PR. 30" N. INV. 755.36 PR. 30" S. INV. 755.36
#2 5' DIA. MANHOLE	PR. RIM 762.05 PR. 30" SW. INV. 755.39 PR. 30" E. INV. 755.49 PR. 18" E. INV. 755.49
#3 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.00 PR. 18" N. INV. 755.85 PR. 18" S. INV. 755.85
#4 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.00 PR. 18" N. INV. 756.06 PR. 15" S. INV. 756.06
#5 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.52 PR. 15" N. INV. 756.25 PR. 15" S. INV. 756.25
#6 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 758.65 PR. 15" N. INV. 756.38 PR. 12" S. INV. 756.38
#7 PR. 2' INLET	PR. RIM 760.50 PR. 12" N. INV. 756.55
#8 5' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.26 PR. 30" E. INV. 755.63 PR. 30" W. INV. 755.63
#9 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 762.00 PR. 15" E. INV. 758.01 PR. 12" S. INV. 758.01
#10 FUTURE 2' DIA. INLET (POST EX. BLDG DEMO)	PR. RIM 761.75 PR. 12" W. INV. 757.75
#11 FUTURE 2' DIA. INLET (POST EX. BLDG DEMO)	PR. RIM 762.25 PR. 12" W. INV. 758.25
#12 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.00 PR. 30" N. INV. 756.08 PR. 21" S. INV. 756.08
#13 TAP & ADJUST. CATCH BASIN (CONSTRUCT NEW MANHOLE COVER)	PR. RIM 761.03 PR. 21" N. INV. 756.24 PR. 18" W. INV. 756.75 PR. 12" SE. INV. 756.24 EX. 12" E. INV. 756.06
#14 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 12" N. INV. 756.31 PR. 12" E. INV. 756.31
#15 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 12" W. INV. 756.36 PR. 12" E. INV. 756.36
#16 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 12" W. INV. 756.47 PR. 12" E. INV. 756.47
#17 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 12" W. INV. 756.75 PR. 12" E. INV. 756.75
#18 PR. 2' INLET	PR. RIM 760.50 PR. 12" W. INV. 756.99
#19 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.50 PR. 18" W. INV. 756.75 PR. 18" E. INV. 756.24
#20 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.50 PR. 18" E. INV. 756.88 PR. 12" W. INV. 756.88
#21 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 762.00 PR. 12" E. INV. 757.71 PR. 15" NW. INV. 757.71
#22 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 762.25 PR. 15" SE. INV. 757.99 PR. 12" N. INV. 757.99
#23 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 763.00 PR. 12" S. INV. 758.45 PR. 12" N. INV. 758.45
#24 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 763.00 PR. 12" S. INV. 758.74 PR. 12" N. INV. 758.74
#25 PR. 2' INLET	PR. RIM 763.00 PR. 12" S. INV. 759.00
#38 4' DIA. MANHOLE	PR. RIM 760.85 PR. 12" E. INV. 754.67 PR. 12" N. INV. 754.67
HEX11 TAP EX. STORM MANHOLE	PR. 12" W. INV. 754.50
HOC11 OUTLET CONTROL STRUCTURE	PR. RIM 761.65 PR. 12" S. INV. 755.13 PR. 12" W. INV. 755.13



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PROJECT
 Serra Ford Rochester Hills

CLIENT
 Serra Ford Rochester Hills
 2890 S. Rochester Road
 Rochester Hills, MI
 Contact: Joseph O. Serra
 Ph-248-852-0400

PROJECT LOCATION
 Part of the SE 1/4
 of Section 27
 T.3N, R.11E
 City of Rochester Hills,
 Oakland County, Michigan

SHEET
 Storm Drain & Detention
 Plan - North

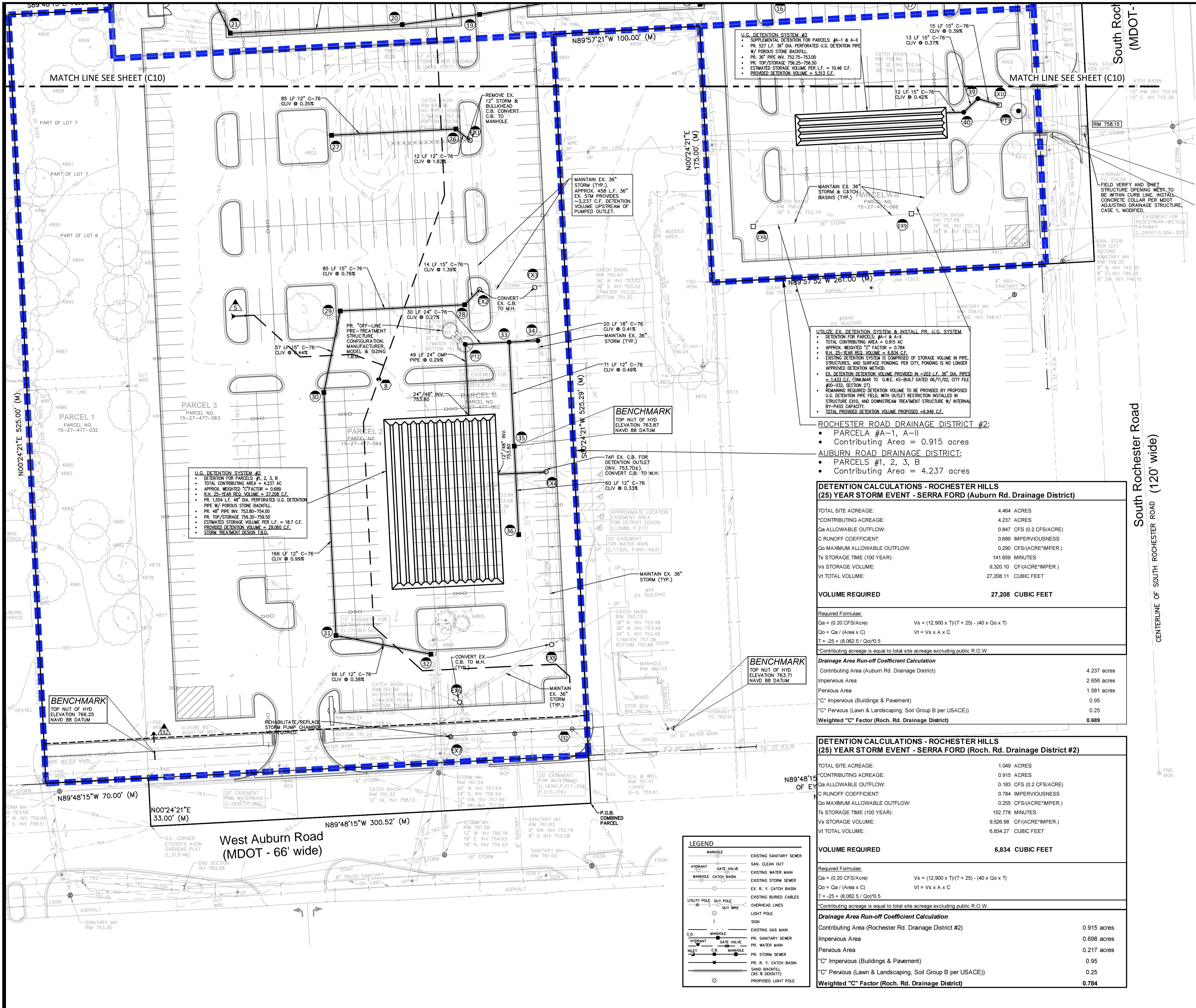


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DRAWN BY:
 J. Lawrey
DESIGNED BY:
 P. Tulikangas
APPROVED BY:
 B. Buchholz
DATE:
 11-24-2021

SCALE: 1" = 30'
 30 15 0 15 30 45
NEE JOB NO. M623 **SHEET NO.** C10

CITY OF ROCHESTER HILLS
 PSP #2022-004, SEC. 27



Storm Drainage Structure Schedule

Structure Name	Structure Details
#26 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 12" SE. INV. 756.20 PR. 12" W. INV. 756.20
#27 PR. 2' INLET	PR. RIM 760.50 PR. 12" E. INV. 756.50
#28 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 15" SE. INV. 754.50 PR. 15" S. INV. 754.70
#29 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 15" E. INV. 755.35 PR. 15" S. INV. 755.35
#30 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 759.87 PR. 15" N. INV. 755.60 PR. 12" S. INV. 755.60
#31 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 761.25 PR. 12" E. INV. 757.25
#32 PR. 2' INLET	PR. RIM 761.50 PR. 12" W. INV. 757.50
#33 PR. 5' DIA. STORM MANHOLE	PR. RIM 760.85 PR. 24" W. INV. 754.12 PR. 12" S. INV. 755.95 PR. 18" E. INV. 754.22
#34 PR. 6' DIA. STORM MANHOLE CONSTRUCT ONLINE W/ FLOW-DIVERSION WEIR.	PR. RIM 761.15 PR. 18" W. INV. 754.30
#35 4' DIA. CATCH BASIN W/ 2' SUMP	PR. RIM 760.50 PR. 12" N. INV. 756.30 PR. 12" S. INV. 756.30
#36 PR. 2' INLET	PR. RIM 760.50 PR. 12" N. INV. 756.50
#EX1 TAP & CONVERT EX. CATCH BASIN TO STORM MANHOLE	PR. RIM 761.25 PR. 12" NW. INV. 756.00
#EX2 TAP & CONVERT EX. CATCH BASIN TO STORM MANHOLE	PR. 15" SW. INV. 754.70
#EX3 CONVERT EX. CATCH BASIN TO STORM MANHOLE	
#EX4 CONVERT EX. CATCH BASIN TO STORM MANHOLE	PR. 12" W. INV. 753.70
#EX5 CONVERT EX. CATCH BASIN TO STORM MANHOLE	
#EX6 CONVERT EX. CATCH BASIN TO STORM MANHOLE	
#EX7 REHABILITATE OR REPLACE EX. STORM PUMP CHAMBER	
#PT2 PR. OFF-LINE FLOW DIVERSION MANHOLE & PRE-TREATMENT STRUCTURE	PR. 24" S. INV. 753.80 PR. 24" E. INV. 754.04

**DETENTION CALCULATIONS - ROCHESTER HILLS
(25) YEAR STORM EVENT - SERRA FORD (Auburn Rd. Drainage District)**

TOTAL SITE ACREAGE:	4.484 ACRES
*CONTRIBUTING ACREAGE:	4.237 ACRES
Qa ALLOWABLE OUTFLOW:	0.847 CFS (0.2 CFS/ACRE)
C RUNOFF COEFFICIENT:	0.089 IMPERVIOUSNESS
Qo MAXIMUM ALLOWABLE OUTFLOW:	0.290 CFS/(ACRE*IMPER.)
Ts STORAGE TIME (100 YEAR):	141.859 MINUTES
Vs STORAGE VOLUME:	9,320.10 CF/(ACRE*IMPER.)
Vt TOTAL VOLUME:	27,208.11 CUBIC FEET

VOLUME REQUIRED 27,208 CUBIC FEET

Required Formulae:
 $Qa = (0.20 \text{ CFS/Acre})$
 $Qo = Qa / (\text{Area} \times C)$
 $T = -25 + (8.062 \times 5 / Qo)^{0.5}$
 $Vs = (12,900 \times T) / (T + 25) - (40 \times Qo \times T)$
 $Vt = Vs \times A \times C$

*Contributing acreage is equal to total site acreage excluding public R.O.W.

**DETENTION CALCULATIONS - ROCHESTER HILLS
(25) YEAR STORM EVENT - SERRA FORD (Roch. Rd. Drainage District #2)**

TOTAL SITE ACREAGE:	1.049 ACRES
*CONTRIBUTING ACREAGE:	0.915 ACRES
Qa ALLOWABLE OUTFLOW:	0.183 CFS (0.2 CFS/ACRE)
C RUNOFF COEFFICIENT:	0.784 IMPERVIOUSNESS
Qo MAXIMUM ALLOWABLE OUTFLOW:	0.255 CFS/(ACRE*IMPER.)
Ts STORAGE TIME (100 YEAR):	152.778 MINUTES
Vs STORAGE VOLUME:	9,526.98 CF/(ACRE*IMPER.)
Vt TOTAL VOLUME:	6,834.27 CUBIC FEET

VOLUME REQUIRED 6,834 CUBIC FEET

Required Formulae:
 $Qa = (0.20 \text{ CFS/Acre})$
 $Qo = Qa / (\text{Area} \times C)$
 $T = -25 + (8.062 \times 5 / Qo)^{0.5}$
 $Vs = (12,900 \times T) / (T + 25) - (40 \times Qo \times T)$
 $Vt = Vs \times A \times C$

*Contributing acreage is equal to total site acreage excluding public R.O.W.

Drainage Area Run-off Coefficient Calculation

Contributing Area (Rochester Rd. Drainage District #2)	0.915 acres
Impervious Area	0.698 acres
Pervious Area	0.217 acres
*"C" Impervious (Buildings & Pavement)	0.95
*"C" Pervious (Lawn & Landscaping, Soil Group B per USACE)	0.25
Weighted "C" Factor (Roch. Rd. Drainage District)	0.784

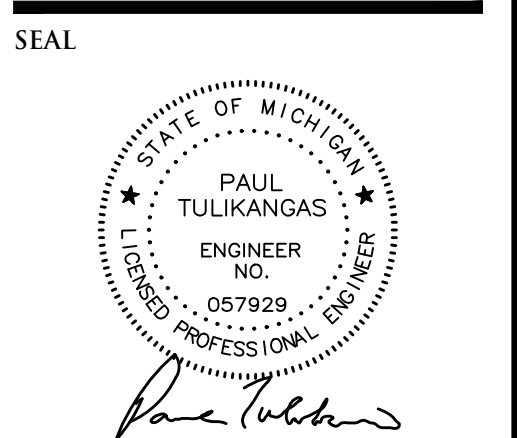
Storm Drainage Structure Schedule

Structure Name	Structure Details
#39 PR. 4' DIA. STORM MH	PR. RIM 756.92 PR. 15" E. INV. 752.65 PR. 15" SW. INV. 752.65
#40 PR. 4' DIA. STORM MH	PR. RIM 756.97 PR. 15" NE. INV. 752.70 PR. 15" W. INV. 752.75
#EX10 15" TAP EX. STORM MANHOLE (MAINTAIN EX. 15" S.E. AND 36" S.W.) INSTALL PVC OUTLET RESTRICTION TEE AT EX. 15" S.E. OUTLET PIPE.	PR. RIM 758.84 PR. 15" W. INV. 752.59
#PT3 PR. IN-LINE POST-TREATMENT STRUCTURE W/ INTERNAL BY-PASS FOR 10-YR. STORM (RE-CONNECT EX. 15" NW/SE INV. 752.53)	PR. RIM 759.00



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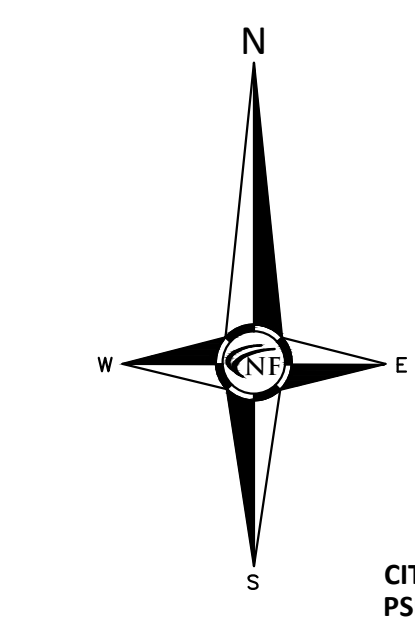
SHEET
Storm Drain & Detention
Plan - South



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06-13-22 REVISED PER CITY REVIEW

DRAWN BY:
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DESIGNED BY:
P. Tulikangas
APPROVED BY:
B. Buchholz
DATE:
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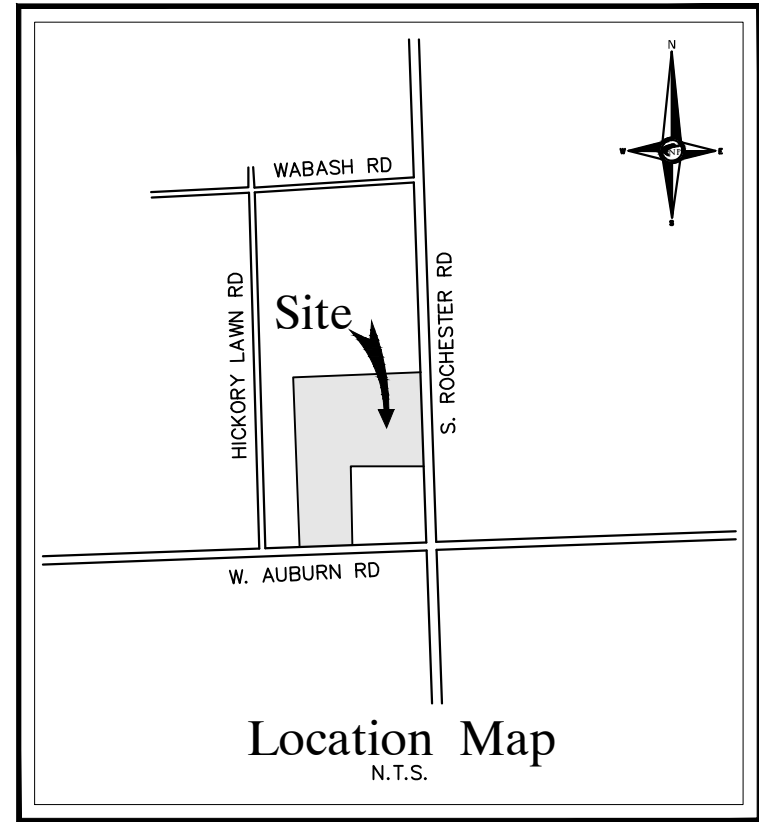
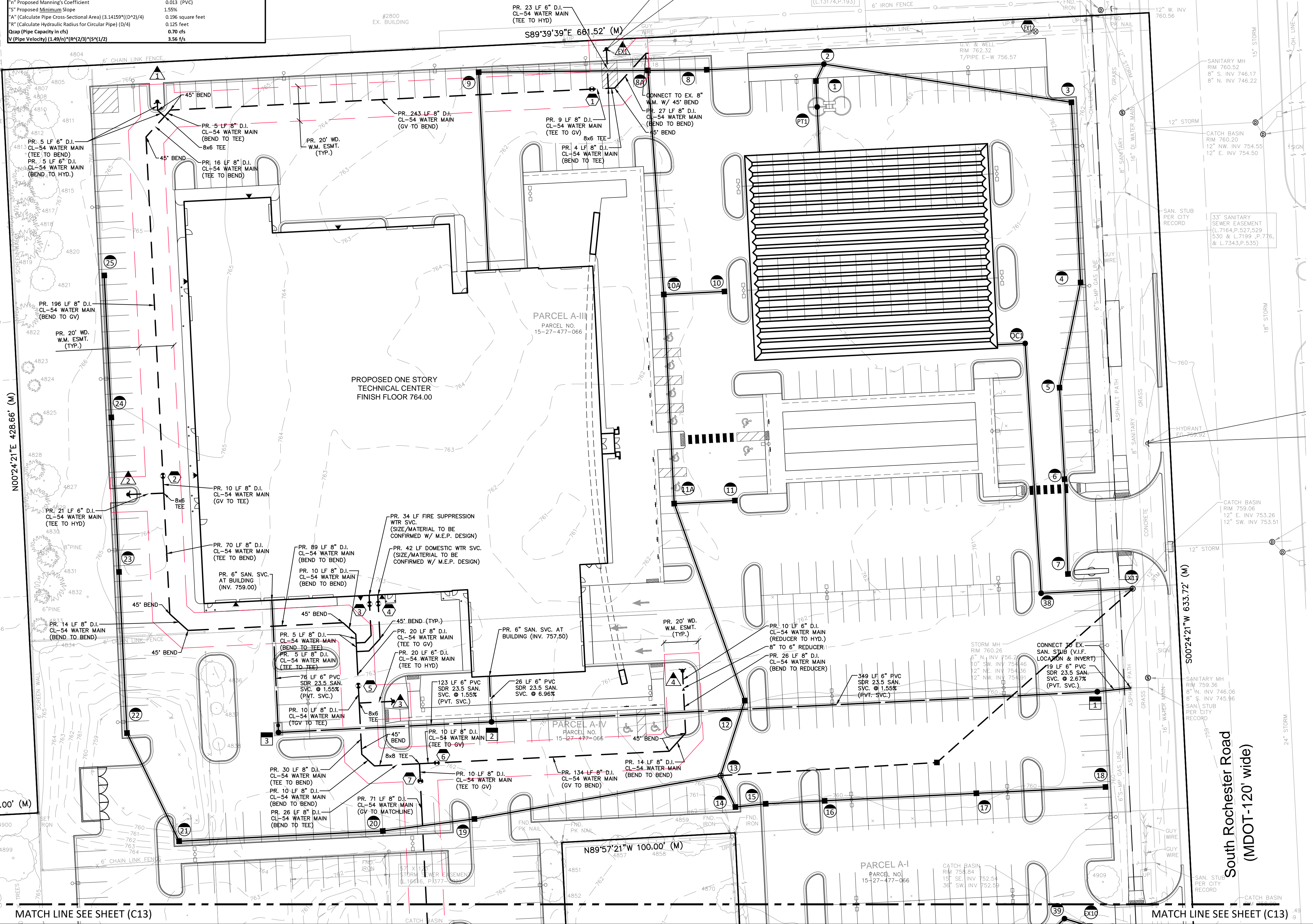
SCALE: 1" = 30'
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NFE JOB NO. SHEET NO.
M623 C11



CITY OF ROCHESTER HILLS
PSP #2022-004, SEC. 27

SANITARY SEWER BASIS OF DESIGN	
Based on Ten States Standards Equation for Peak Flow	
Name of Project:	Serra Ford Rochester Hills
Location of Project:	Rochester Hills, MI
NFE Project No.:	M623
Calculate Project Residential Equivalency Units (REU)	
Type of Project Use	Auto Showroom/Dealership
OCWRC Unit Assignment Factor per 2018 REU Study	0.37 REU Per 1,000 S.F.
Floor Area of Auto Showroom/Dealership	18,822 S.F.
Equivalent Single-Family REU	7.0 REU
Calculate Project Residential Equivalency Units (REU)	
Type of Project Use	Auto Service/Repair
OCWRC Unit Assignment Factor per 2018 REU Study	0.29 REU Per employee
Number of Employees (Approximate)	60 employees
Equivalent Single-Family REU	17.4 REU
Calculate Project Residential Equivalency Units (REU)	
Type of Project Use	Fully & Semi-Automatic Car Washes
OCWRC Unit Assignment Factor per 2018 REU Study	6.95 REU Per 1,000 S.F.
Floor Area of Car Washes	993 S.F.
Equivalent Single-Family REU	6.9 REU
Total REU (From Above)	31.3 REU
Calculate Peak Flow	
Based on OCWRC 2018 REU Study for Clinton-Oakland service area	
Population Density per Unit	2.44 People per REU
Design Ultimate Population To Be Served	76 People
Design Daily Flowrate per Capita	100 gallons/person/day
Average Flow	7,600 gallons/day
Average Flow (convert to gpm)	5,298 gallons/minute
Average Flow (convert to cfs)	0.022 cfs
Peaking Factor (per Ten States Equation)	4.27
Peak Flow	32,604 gallons/day
Peak Flow (convert to gpm)	22.64 gallons/minute
Peak Flow (convert to cfs)	0.05 cfs
Calculate Design Pipe Capacity (per Manning's Equation) [Qcap = (1.49/n) * (3.14159 * (D^2) / 4) * (R^2/3) * (S^1/2)]	
D Proposed Pipe Diameter	6 inches
n Proposed Manning's Coefficient	0.013 (PVC)
S Proposed Minimum Slope	1.55%
A (Calculate Pipe Cross-Sectional Area) (3.14159 * (D^2) / 4)	0.196 square feet
R (Calculate Hydraulic Radius for Circular Pipe) (D/4)	0.125 feet
Qcap (Pipe Capacity in cfs)	0.70 cfs
V (Pipe Velocity) (1.49/n) * (R^2/3) * (S^1/2)	3.56 f/s

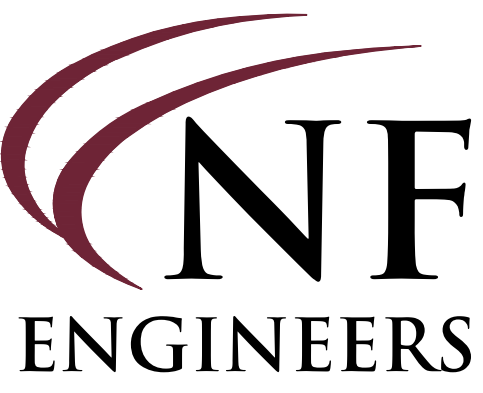
WATER MAIN BASIS OF DESIGN	
Based on Ten States Standards Equation for Peak Flow	
Name of Project:	Serra Ford Rochester Hills
Location of Project:	Rochester Hills, MI
NFE Project No.:	M623
Calculate Project Residential Equivalency Units (REU)	
Type of Project Use	Auto Showroom/Dealership
OCWRC Unit Assignment Factor per 2018 REU Study	0.37 REU Per 1,000 S.F.
Floor Area of Auto Showroom/Dealership	18,822 S.F.
Equivalent Single-Family REU	7.0 REU
Calculate Project Residential Equivalency Units (REU)	
Type of Project Use	Auto Service/Repair
OCWRC Unit Assignment Factor per 2018 REU Study	0.29 REU Per employee
Number of Employees (Approximate)	60 employees
Equivalent Single-Family REU	17.4 REU
Calculate Project Residential Equivalency Units (REU)	
Type of Project Use	Fully & Semi-Automatic Car Washes
OCWRC Unit Assignment Factor per 2018 REU Study	6.95 REU Per 1,000 S.F.
Floor Area of Car Washes	993 S.F.
Equivalent Single-Family REU	6.9 REU
Total REU (From Above)	31.3 REU
Calculate Water Use Requirements	
Based on OCWRC 2018 REU Study for Clinton-Oakland service area	
Population Density per Unit	2.44 people/unit
Design Ultimate Population To Be Served	76 people
Assumed Water Use Rate per Capita	150 gallons/person/day
Average Usage (GPD)	11,443 gallons/day (GPD)
Average Usage (convert to MGD)	0.0134 Million gallons/day (MGD)
Average Usage (convert to gpm)	7.947 gallons/minute (GPM)
Average Usage (convert to cfs)	0.0272 cfs
Maximum Usage Factor	2.00
Maximum Usage (GPD)	22,886.34 gallons/day (GPD)
Maximum Usage (convert to MGD)	0.0229 Million gallons/day (MGD)
Maximum Usage (convert to gpm)	15.89 gallons/minute (GPM)
Maximum Usage (convert to cfs)	0.0554 cfs



- | HYDRANT SCHEDULE | |
|--|--|
| 1. FIRE HYDRANT & ASSEMBLY (PER CITY REQ.) | 3. FIRE HYDRANT & ASSEMBLY (PER CITY REQ.) |
| 2. FIRE HYDRANT & ASSEMBLY (PER CITY REQ.) | 4. FIRE HYDRANT & ASSEMBLY (PER CITY REQ.) |
| 3. MAINTAIN EX. HYDRANT | |
-
- | GATE VALVE SCHEDULE | |
|---|--|
| 1. 8" GATE VALVE IN WELL (PER CITY REQ.) | 5. 8" GATE VALVE IN WELL (PER CITY REQ.) |
| 2. 8" GATE VALVE IN WELL (PER CITY REQ.) | 6. 8" GATE VALVE IN WELL (PER CITY REQ.) |
| 3. FIRE SUPPRESSION SHUT-OFF VALVE IN BOX (SIZE T.B.D.) | 7. 8" GATE VALVE IN WELL (PER CITY REQ.) |
| 4. DOMESTIC SHUT-OFF VALVE IN BOX (SIZE T.B.D.) | |

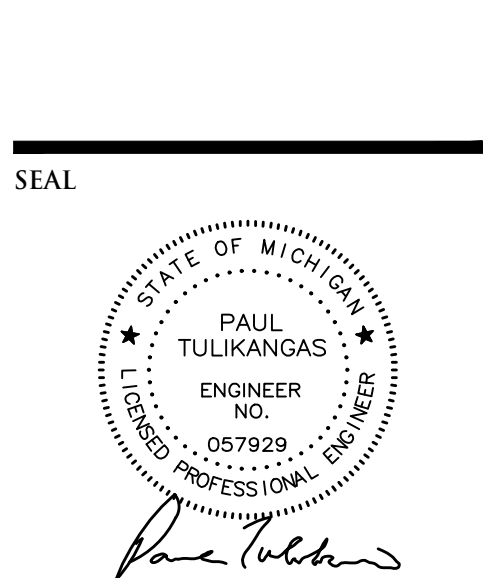
Sanitary Structure Schedule	
Structure Name	Structure Details
#1 PR. 4" DIA. SAN. M.H. (PVT. SVC.)	PR. RIM 761.15 PR. 6" W. INV. 749.02 PR. 6" E. INV. 748.02
#2 PR. 4" DIA. SAN. M.H. (PVT. SVC.)	PR. RIM 762.85 PR. 6" W. INV. 755.67 PR. 6" E. INV. 754.42 PR. 6" N. INV. 755.67
#3 PR. SAN. OIL/GREASE INTERCEPTOR	PR. RIM 762.75 PR. 6" N. INV. 757.82 PR. 6" E. INV. 757.57

LEGEND			
	MANHOLE		EXISTING SANITARY SEWER
	HYDRANT		SAN. CLEAN OUT
	MANHOLE		EXISTING WATER MAIN
	CATCH BASIN		EXISTING STORM SEWER
	UTILITY POLE		EX. R. Y. CATCH BASIN
	GUY WIRE		EXISTING BURIED CABLES
	OVERHEAD LINES		LIGHT POLE
	SIGN		EXISTING GAS MAIN
	PR. SANITARY SEWER		PR. WATER MAIN
	PR. STORM SEWER		PR. R. Y. CATCH BASIN
	SAND BACKFILL (95% DENSITY)		PROPOSED LIGHT POLE



CIVIL ENGINEERS
LAND SURVEYORS
LAND PLANNERS

NOWAK & FRAUS ENGINEERS
46777 WOODWARD AVE.
PONTIAC, MI 48342-5032
TEL (248) 332-7931
FAX (248) 332-8257
WWW.NOWAKFRAUS.COM



PROJECT
Serra Ford Rochester Hills

CLIENT
Serra Ford Rochester Hills
2890 S. Rochester Road
Rochester Hills, MI
Contact: Joseph O. Serra
Ph-248-852-0400

PROJECT LOCATION
Part of the SE 1/4
of Section 27
T.3N, R.11E
City of Rochester Hills,
Oakland County, Michigan

SHEET
Sanitary Sewer & Water
Main Plan - North



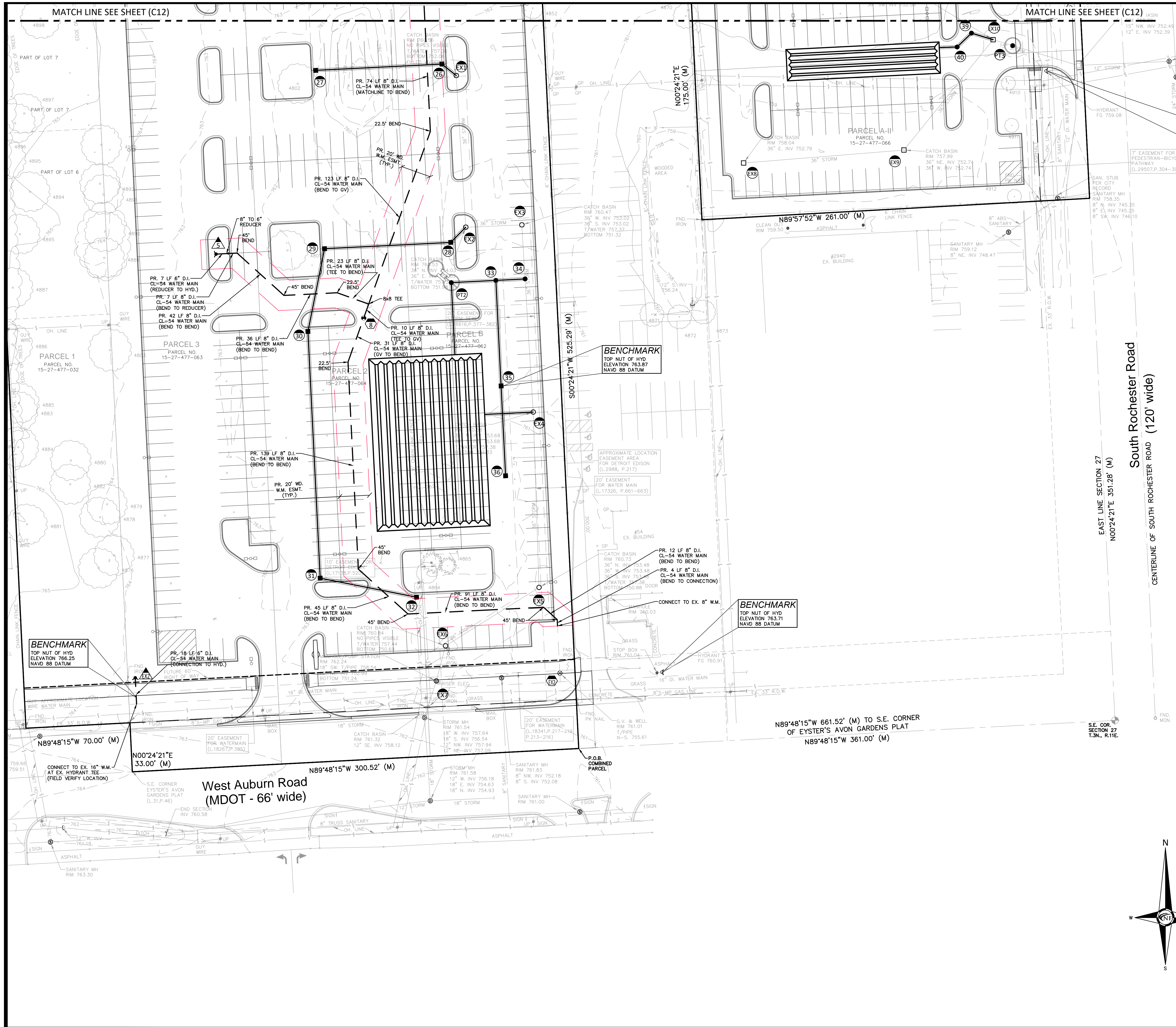
DATE	ISSUED/REVISED
02-23-22	CONCEPT DETENTION
03-18-22	ISSUED FOR SITE PLAN REVIEW
05-06-22	ISSUED FOR SITE PLAN REVIEW
06-13-22	REVISED PER CITY REVIEW

DRAWN BY:
J. Lawrey
DESIGNED BY:
P. Tulikangas
APPROVED BY:
B. Buchholz
DATE:
11-24-2021

SCALE: 1" = 30'
NFE JOB NO. M623 SHEET NO. C12

MATCH LINE SEE SHEET (C13)

MATCH LINE SEE SHEET (C13)



HYDRANT SCHEDULE

- 5 FIRE HYDRANT & ASSEMBLY (PER CITY REQ.)
- EXA RELOCATE EX. HYDRANT

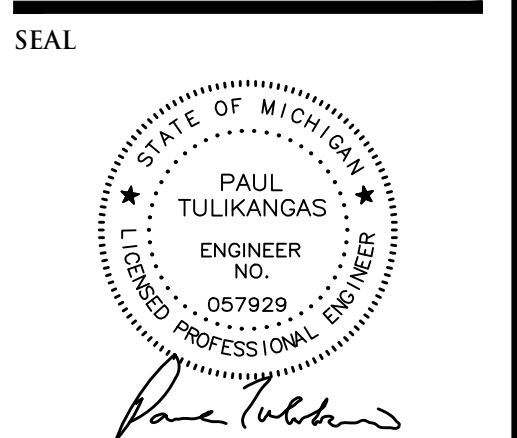
GATE VALVE SCHEDULE

- 8 8" GATE VALVE IN WELL (PER CITY REQ.)



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T.3N, R.11E
City of Rochester Hills,
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SHEET
Sanitary Sewer & Water
Main Plan - South



Know what's below
Call before you dig.

DATE	ISSUED/REVISION
02-23-22	CONCEPT DETENTION
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LEGEND

	MANHOLE	EXISTING SANITARY SEWER
	HYDRANT	SAN. CLEAN OUT
	MANHOLE	EXISTING WATER MAIN
	MANHOLE	EXISTING STORM SEWER
	MANHOLE	EX. R. Y. CATCH BASIN
	UTILITY POLE	EXISTING BURIED CABLES
	GUY WIRE	OVERHEAD LINES
	LIGHT POLE	SIGN
	MANHOLE	EXISTING GAS MAIN
	MANHOLE	PR. SANITARY SEWER
	MANHOLE	PR. WATER MAIN
	MANHOLE	PR. STORM SEWER
	MANHOLE	PR. R. Y. CATCH BASIN
	SAND BACKFILL	(95% DENSITY)
	PROPOSED LIGHT POLE	

DRAWN BY:
J. Lawrey

DESIGNED BY:
P. Tulikangas

APPROVED BY:
B. Buchholz

DATE:
11-24-2021

SCALE: 1" = 30'

30 15 0 15 30 45

SOIL EROSION CONTROL - SEQUENCE OF OPERATION (NEW CONSTRUCTION)

INSTALL CRUSHED CONCRETE ACCESS DRIVE AND TEMPORARY CULVERTS AT THE SITE ENTRANCE AS INDICATED ON THE PLANS.

INSTALL SILT FENCE OR SIMILAR APPROVED SILT BARRIER ALONG PROPERTY LINES AND AROUND SENSITIVE NATURAL FEATURES AS INDICATED ON THE PLANS.

EXCAVATE A SHALLOW SWALE/NOTCH AROUND PERIMETER OF SITE. GRADE THE TEMPORARY SWALE TO AN EXISTING DRAINAGE FACILITY. PLACE OUTLET FILTER IN EXISTING UPSTREAM STORM SEWER FACILITIES.

IF INDICATED ON CONSTRUCTION PLANS, SEDIMENTATION BASINS, DETENTION POND, ETC., SHALL BE CONSTRUCTED PRIOR TO THE INSTALLATION OF ANY OTHER WORK.

STRIP EXISTING TOPSOIL, VEGETATION AND ORGANIC MATTER FROM BUILDING PAD AND PARKING AREAS. COMMENCE LAND BALANCE AND MASS GRADING OPERATIONS. MAINTAIN A MINIMUM BUFFER OF 15' OF EXISTING VEGETATION WHEREVER POSSIBLE AROUND SITE PERIMETER. STOCK PILES SHOULD BE LOCATED AWAY FROM EXISTING DRAINAGE FACILITIES.

EXCAVATE AND INSTALL UNDERGROUND UTILITIES. INSTALL PEASTONE INLET FILTERS AROUND ALL NEW STORM SEWER FACILITIES AS INDICATED ON THE PLANS. EXISTING AND PROPOSED STORM SEWER FACILITIES SHALL BE PROTECTED FROM EROSION AND SEDIMENT INFILTRATION AT ALL TIMES.

COMMENCE FINAL GRADING AND TRIMMING OPERATIONS. PREPARE SUBGRADE FOR INSTALLATION OF PROPOSED PAVEMENT.

SEED AND MULCH ALL DISTURBED SITE AREAS AND INSTALLED SITE LANDSCAPING.

REMOVE CONSTRUCTION DEBRIS AND JET VAC NEWLY INSTALLED STORM SEWER SYSTEM AS REQUIRED BY THE MUNICIPALITY.

REMOVE ALL REMAINING TEMPORARY SOIL EROSION AND SEDIMENTATION CONTROL MEASURES ONCE PERMANENT MEASURES ARE ESTABLISHED.

WHENEVER POSSIBLE, THE SITE SHALL BE GRADED TO WITHIN SIX INCHES (6") OF THE PROPOSED FINISH GRADE PRIOR TO INSTALLATION OF UNDERGROUND FACILITIES.

STAGING OF PROPOSED WORK SHALL BE COMPLETED BY THE CONTRACTOR AS REQUIRED TO ENSURE PROGRESSIVE STABILIZATION OF DISTURBED AREAS.

SOIL EROSION CONTROL

CUTTING, FILLING AND GRADING SHALL BE MINIMIZED AND THE NATURAL TOPOGRAPHY OF THE SITE SHALL BE PRESERVED TO THE MAXIMUM POSSIBLE EXTENT, EXCEPT WHERE SPECIFIC FINDINGS DEMONSTRATE THAT MAJOR ALTERATIONS WILL STILL MEET THE PURPOSES AND REQUIREMENTS OF THIS ORDINANCE.

DEVELOPMENT SHALL BE STAGED TO KEEP THE EXPOSED AREAS OF SOIL AS SMALL AS PRACTICABLE.

SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED BETWEEN THE DISTURBED AREA AND ANY WATERCOURSES, INCLUDING RIVERS, STREAMS, CREEKS, LAKES, PONDS AND OTHER WATERCOURSES; WETLANDS; OR ROADWAYS ON OR NEAR THE SITE.

SEDIMENT RESULTING FROM ACCELERATED SOIL EROSION SHALL BE REMOVED FROM RUNOFF WATER BEFORE THAT WATER LEAVES THE SITE.

TEMPORARY AND PERMANENT SOIL EROSION CONTROL MEASURES DESIGNED AND CONSTRUCTED FOR THE CONVEYANCE OF WATER AROUND, THROUGH, OR AWAY FROM THE SITE SHALL BE DESIGNED TO LIMIT THE WATER FLOW TO A NON-EROSIVE VELOCITY.

TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE REMOVED AFTER PERMANENT SOIL EROSION CONTROL MEASURES HAVE BEEN IMPLEMENTED. ALL SITES SHALL BE STABILIZED WITH PERMANENT SOIL EROSION CONTROL MEASURES.

IF LAKES, PONDS, CREEKS, STREAMS, OR WETLANDS ARE LOCATED ON OR NEAR THE SITE, EROSION CONTROL MEASURES WHICH DIVERT RUNOFF AND TRAP SEDIMENT MUST BE PROVIDED AT STRATEGIC LOCATIONS. STRAW BALE BERMS MAY BE USED AS TEMPORARY STORMWATER DIVERSION STRUCTURES, BUT WILL NOT BE CONSIDERED SUFFICIENT FOR TRAPPING SEDIMENT. THE USE OF SEDIMENT BASINS, FILTER FABRIC, VEGETATED BUFFER STRIPS, AND ROCK FILTERS IN LIEU OF STRAW BALE BERMS SHALL BE STRONGLY ENCOURAGED. OTHER MEASURES MAY BE REQUIRED IF REASONABLY DETERMINED TO BE NECESSARY TO PROTECT A WATERCOURSE OR WETLAND.

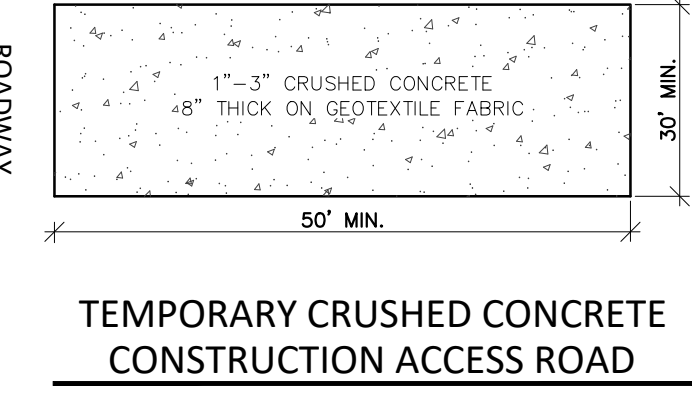
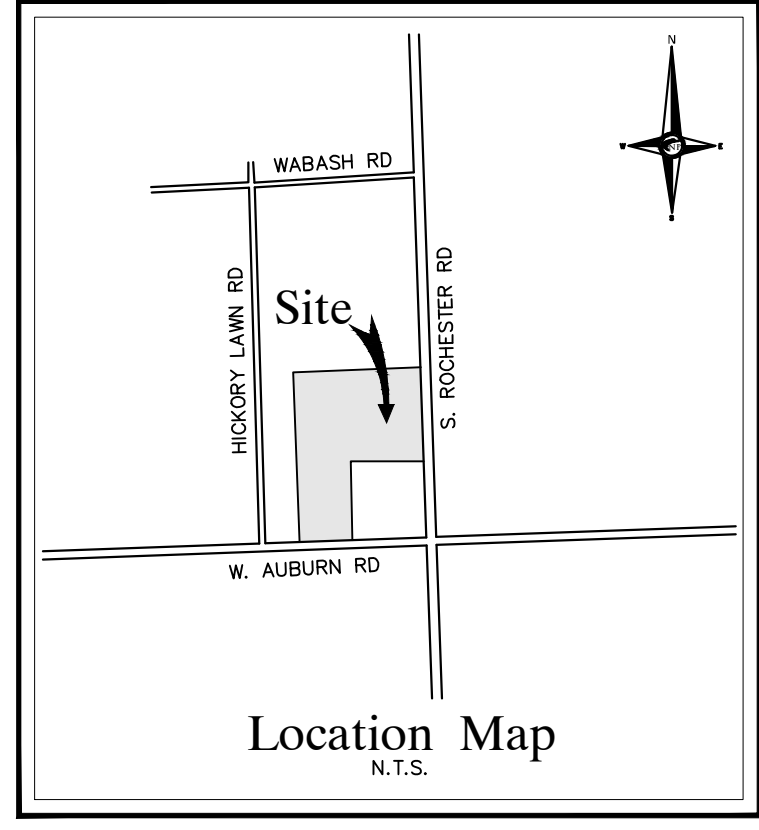
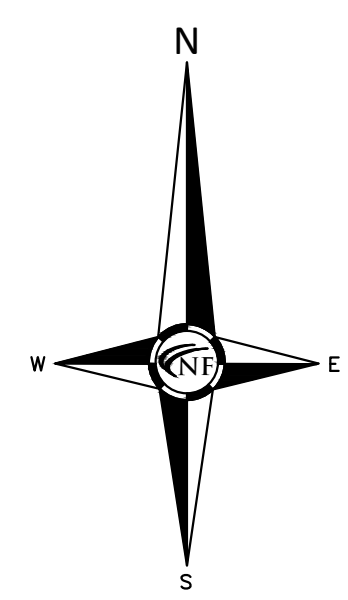
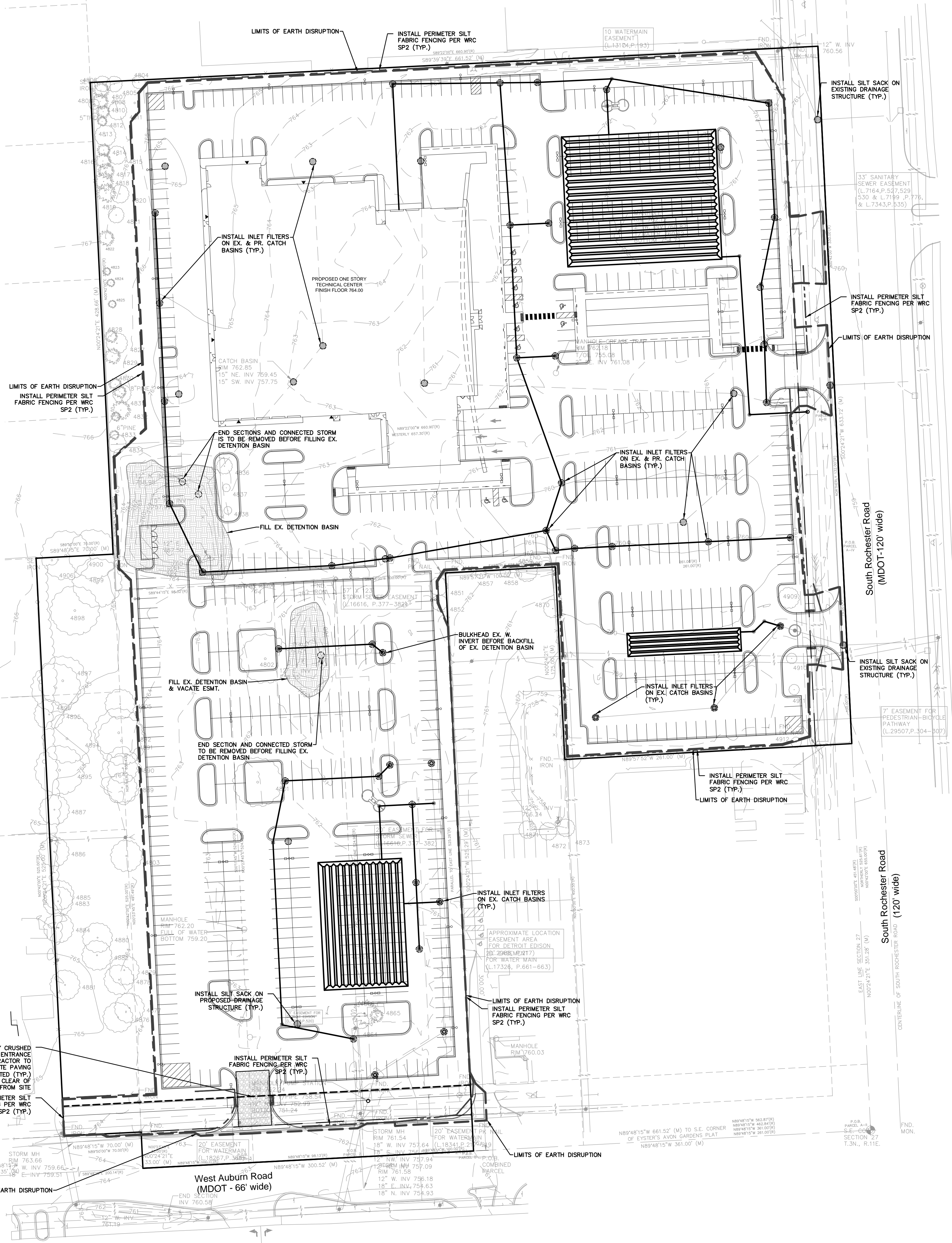
WHEN IT IS NOT POSSIBLE TO PERMANENTLY STABILIZE A DISTURBED AREA AFTER AN EARTH CHANGE HAS BEEN COMPLETED OR WHEN SIGNIFICANT EARTH CHANGE ACTIVITY CEASES, TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE INSTALLED.

PERMANENT EROSION CONTROL MEASURES FOR ALL SLOPES, CHANNELS, DITCHES, OR ANY DISTURBED LAND AREA SHALL BE COMPLETED WITHIN 15 (FIFTEEN) CALENDAR DAYS AFTER FINAL GRADING OR THE FINAL EARTH CHANGE HAS BEEN COMPLETED. ALL TEMPORARY SOIL EROSION CONTROL MEASURES SHALL BE MAINTAINED UNTIL PERMANENT SOIL EROSION CONTROL MEASURES ARE IMPLEMENTED.

VEGETATED BUFFER STRIPS SHALL BE CREATED OR RETAINED ALONG THE EDGES OF ALL LAKES, PONDS, CREEKS, STREAMS, OTHER WATERCOURSES, OR WETLANDS.

EROSION AND SEDIMENTATION CONTROL MEASURES SHALL RECEIVE REGULAR MAINTENANCE TO ASSURE PROPER FUNCTIONING.

ALL GRADING PLANS AND SPECIFICATIONS, INCLUDING EXTENSIONS OF PREVIOUSLY APPROVED PLANS, SHALL INCLUDE PROVISIONS FOR EROSION AND SEDIMENT CONTROL IN ACCORDANCE WITH, BUT NOT LIMITED TO, THE STANDARDS CONTAINED IN THE "STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL", PUBLISHED BY THE OAKLAND SOIL CONSERVATION DISTRICT.

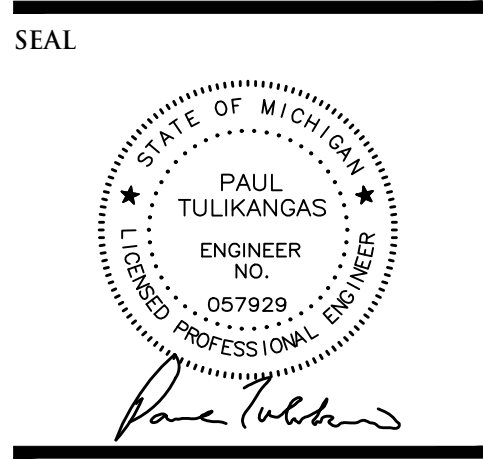


CONSTRUCTION SEQUENCE / TIMING SCHEDULE

1. INSTALL PERIMETER FILTER FABRIC FENCING AND STONE FILTER WHERE REQUIRED.	JUNE 2022
2. MASS GRADE SITE.	JUNE 2022
3. COMMENCE UNDERGROUND UTILITY WORK.	JULY 2022
4. INSTALL INLET FILTERS ON PROPOSED DRAINAGE STRUCTURES.	AUGUST 2022
5. FILL IN SEDIMENTATION TRAPS AND PAVE SITE.	MAY 2023
6. COMPLETE ALL BUILDINGS AND LANDSCAPE ACTIVITY.	JULY 2023
7. JET VAC NEW STORM SEWER SYSTEM AS REQUIRED.	AUGUST 2023
8. REMOVE ALL TEMPORARY SOIL EROSION MEASURES.	OCTOBER 2023

NF ENGINEERS
 CIVIL ENGINEERS
 LAND SURVEYORS
 LAND PLANNERS

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 46777 WOODWARD AVE.
 PONTIAC, MI 48342-5032
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PROJECT
 Serra Ford Rochester Hills

CLIENT
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 2890 S. Rochester Road
 Rochester Hills, MI
 Contact: Joseph O. Serra
 Ph-248-852-0400

PROJECT LOCATION
 Part of the SE 1/4
 of Section 27
 T.3N, R.11E
 City of Rochester Hills,
 Oakland County, Michigan

SHEET
 Soil Erosion Control &
 Drainage Area Plan



DATE ISSUED/REVISED

02-23-22	CONCEPT DETENTION
03-18-22	ISSUED FOR SITE PLAN REVIEW
05-06-22	REVISED FOR SITE PLAN REVIEW
06-13-22	REVISED PER CITY REVIEW

NOTES

REFER TO THE WRC SOIL EROSION AND SEDIMENTATION CONTROL DETAIL SHEET FOR ALL ADDITIONAL NOTES & DETAILS (TYP.)

A DISTANCE OF ±900' TO THE NEAREST BODY OF WATER (GIBSON DRAIN).

THE TOTAL AREA OF EARTH DISRUPTION IS ±10.62 ACRES.

THE SOIL EROSION CONTROLS WILL BE MAINTAINED WEEKLY AND AFTER EVERY STORM EVENT BY THE CONTRACTOR

A SOIL EROSION PERMIT IS REQUIRED FROM THE OAKLAND COUNTY WATER RESOURCES COMMISSIONER.

SOIL DATA

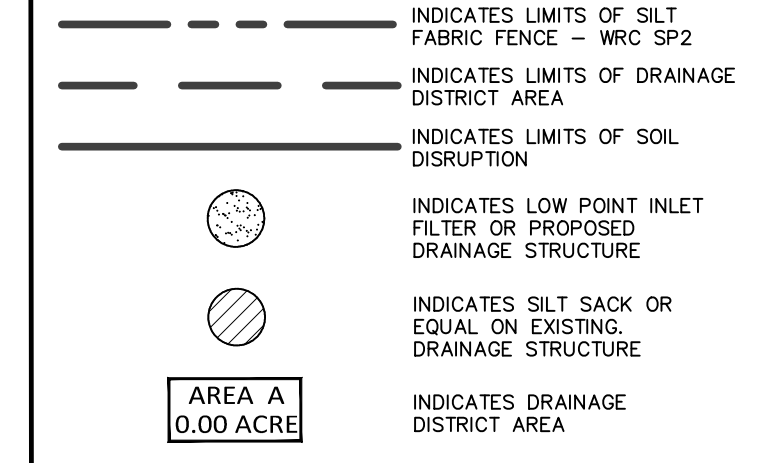
THIS SITE CONSISTS OF SHEBEON-URBAN LAND COMPLEX, 0 TO 4 PERCENT SLOPES, BASED ON DATA PROVIDED BY THE UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE.

ESTIMATED QUANTITIES

SOIL EROSION

DESCRIPTION	QUANTITY	UNITS
SILT FABRIC FENCING	3,800	L.F.
SILT SACK OR EQUAL	63	EA.

LEGEND



DRAWN BY:
 J. Lawrey

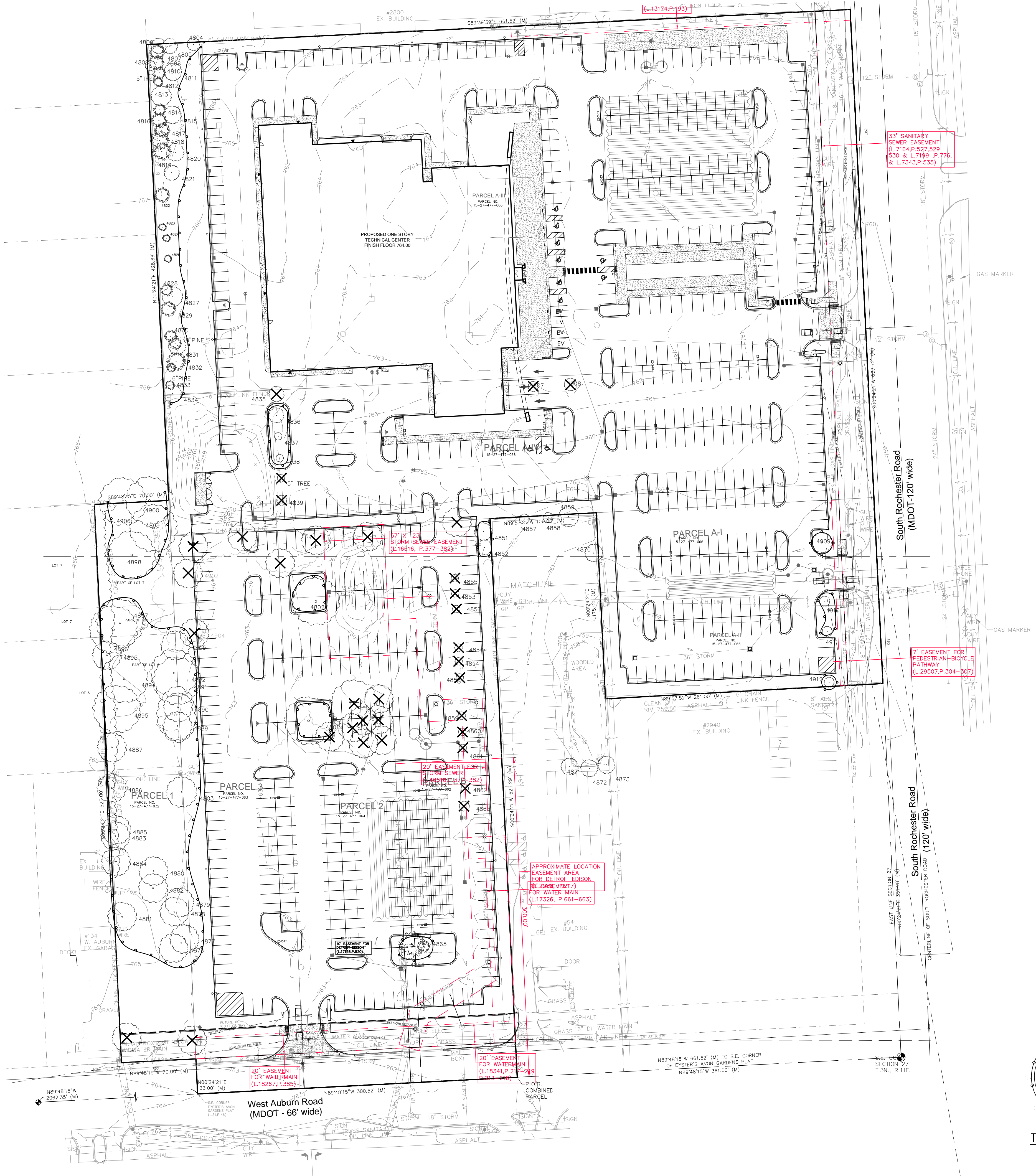
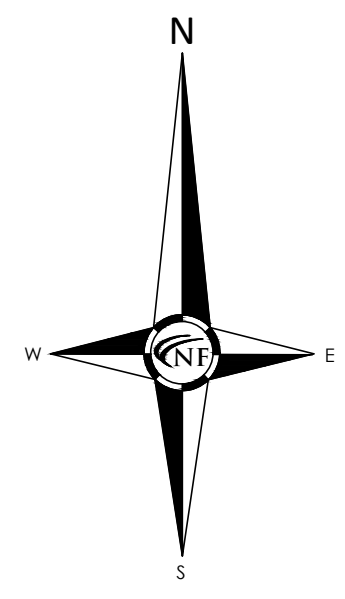
DESIGNED BY:
 P. Tulikangas

APPROVED BY:
 B. Buchholz

DATE:
 11-24-2021

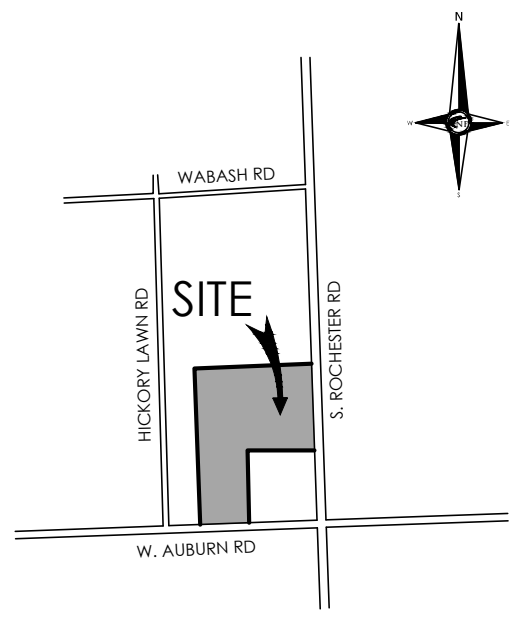
SCALE: 1" = 50'

NFE JOB NO. **M623** SHEET NO. **C14**



GENERAL TREE PROTECTION NOTES

- APPROVED TREE PROTECTION SHALL BE ERECTED PRIOR TO THE START OF CONSTRUCTION ACTIVITIES, AND SHALL REMAIN IN PLACE UNTIL THE IN PLACE UNTIL CONSTRUCTION IS COMPLETE.
- ALL UNDERSTORY VEGETATION WITHIN THE LIMITS OF PROTECTIVE FENCING SHALL BE PRESERVED.
- NO PERSON MAY CONDUCT ANY ACTIVITY WITHIN THE DRIP LINE OF ANY TREE DESIGNATED TO REMAIN, INCLUDING BUT NOT LIMITED TO: PLACING SOLVENTS, BUILDING MATERIALS, CONSTRUCTION EQUIPMENT, OR SOIL DEPOSITS WITHIN THE DRIP LINE.
- WHERE GROUPINGS OF TREES ARE TO REMAIN, TREE FENCING SHALL BE PLACED AT THE LIMITS OF GRADING LINE.
- DURING CONSTRUCTION, NO PERSON SHALL ATTACH ANY DEVICE OR WIRE TO ANY TREE, SCHEDULED TO REMAIN.
- ALL UTILITY SERVICE REQUESTS MUST INCLUDE NOTIFICATION TO THE INSTALLER THAT PROTECTED TREES MUST BE AVOIDED. ALL TRENCHING SHALL OCCUR OUTSIDE OF THE PROTECTIVE FENCING.
- SWALES SHALL BE ROUTED TO AVOID THE AREA WITHIN THE DRIP LINES OF PROTECTED TREES.
- TREES LOCATED ON ADJACENT PROPERTIES THAT MAY BE AFFECTED BY CONSTRUCTION ACTIVITIES MUST BE PROTECTED.
- ROOT ZONES OF PROTECTED TREES SHOULD BE SURROUNDED WITH RIGIDLY STAKED FENCING.
- THE PARKING OF IDLE AND RUNNING EQUIPMENT SHALL BE PROHIBITED UNDER THE DRIP LINE OF PROTECTED TREES.
- THE STRIPPING OF TOPSOIL FROM AROUND PROTECTED TREES SHALL BE PROHIBITED.
- ALL TREES TO BE REMOVED SHALL BE CUT AWAY FROM TREES TO REMAIN.
- THE GRUBBING OF UNDERSTORY VEGETATION WITHIN CONSTRUCTION AREAS SHOULD BE CLEARED BY CUTTING VEGETATION AT THE GROUND WITH A CHAIN SAW OR MINIMALLY WITH A HYDRO-AXE.
- THE CONTRACTOR IS RESPONSIBLE FOR THE REPLACEMENT PER ORDINANCE GUIDELINES, FOR THE DAMAGE OR REMOVAL OF ANY TREE DESIGNATED TO REMAIN.
- TREES TO BE REMOVED SHALL BE FIELD VERIFIED, EVALUATED AND FLAGGED FOR REMOVAL BY THE LANDSCAPE ARCHITECT OR FORESTER, ONLY AS DIRECTED BY THE OWNER OR OWNERS REPRESENTATIVE.



LOCATION MAP

TREE PRESERVATION SUMMARY:

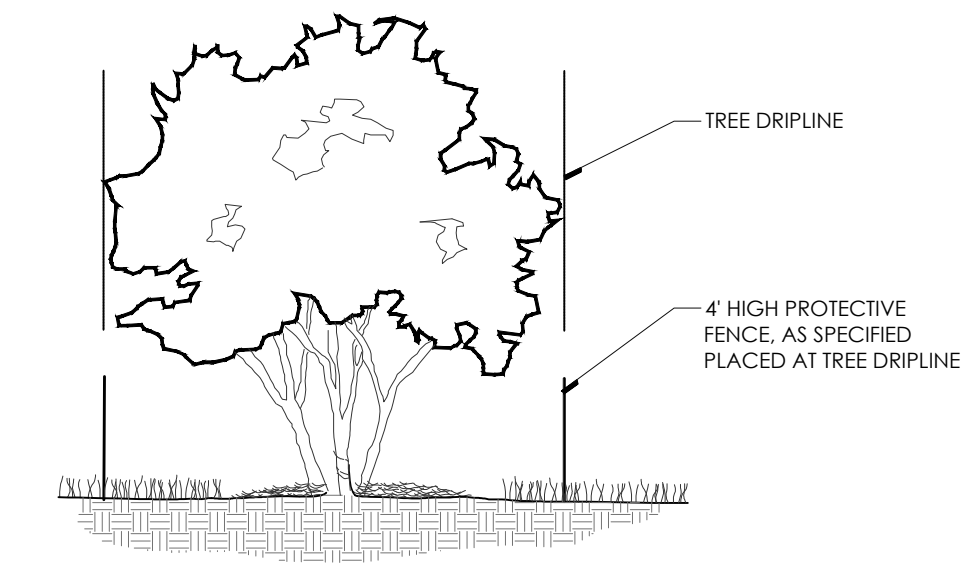
TOTAL NUMBER OF TREES SURVEYED:	111
LESS NUMBER OF DEAD TREES:	0
LESS NUMBER OF R.O.W. TREES:	0
LESS OFF-SITE TREES:	4
NET TREES ON-SITE:	105
TOTAL TREES TO BE REMOVED:	30
TOTAL TREES TO REMAIN:	75
MINIMUM PRESERVATION REQUIREMENT	
105 TREES - 0 TREES IN BUILDING ENVELOPE = 105 X 40% =	42 TREES NEED TO BE PRESERVED
	75 TREES PROPOSED TO BE SAVED
TREE REPLACEMENT	
TOTAL REPLACEMENTS:	30 TREES
TOTAL SPECIMEN TREE REMOVALS:	-1 TREE
TOTAL REPLACEMENT TREES REQUIRED:	29 TREES
TOTAL SPECIMEN REPLACEMENT TREES REQUIRED (12.1" x 50% = 6/2)":	3 TREES
LESS SPECIMEN CREDITS:	-4 TREES
TOTAL REPLACEMENT TREES REQUIRED:	27 TREES
TOTAL REPLACEMENT TREES PROVIDED:	27 TREES

PROTECTIVE FENCING NOTE:

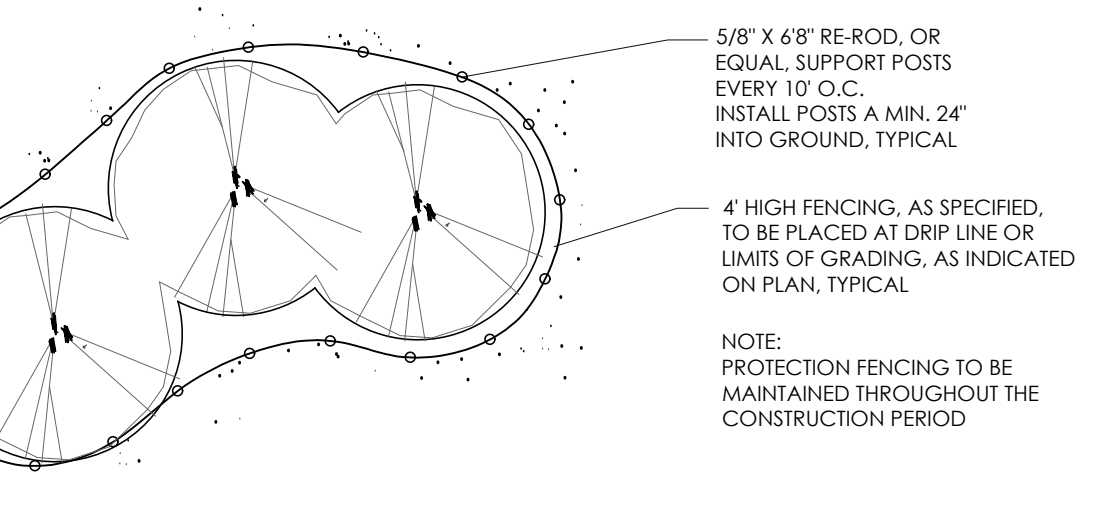
TREE PROTECTION AND SILT FENCING, AS REVIEWED AND APPROVED BY CITY STAFF, SHALL BE INSTALLED PRIOR TO THE ISSUANCE OF THE LAND IMPROVEMENT PERMIT.

LEGEND:

- TREES TO BE REMOVED
- TREES TO REMAIN
- TREE PROTECTION FENCING



TREE PROTECTION DETAIL-SECTION

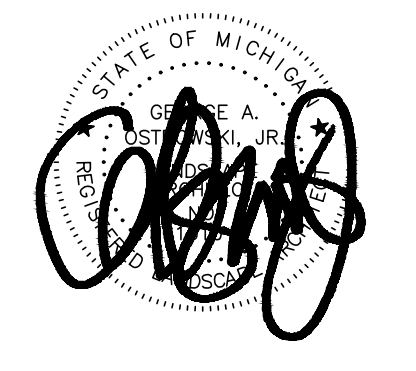


TREE PROTECTION DETAIL-PLAN



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SEAL



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City of Rochester Hills,
Oakland County, Michigan

SHEET
Tree Preservation Plan



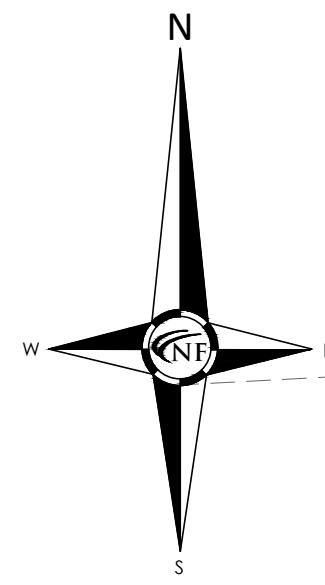
REVISIONS
03/18/2022 ISSUED FOR SITE PLAN REVIEW
05/06/2022 REVISED PER CITY REVIEW
06/13/2022 REVISED PER CITY REVIEW

DRAWN BY:
G. Ostrowski
DESIGNED BY:
G. Ostrowski
APPROVED BY:
G. Ostrowski
DATE:
01-13-2022

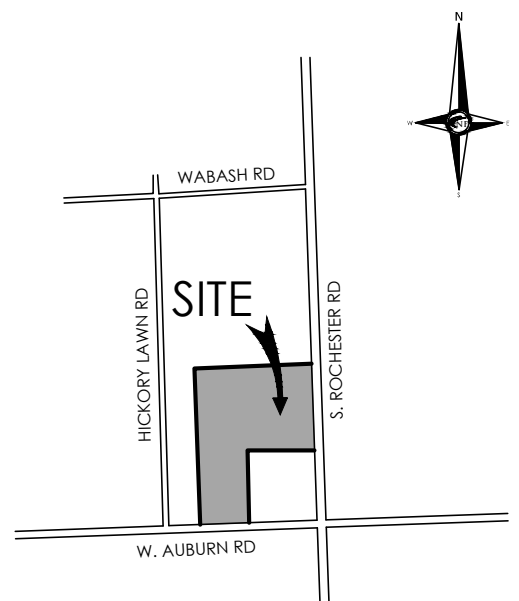
SCALE: 1" = 50'
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CITY OF ROCHESTER HILLS
PSP#2022-004, SECTION 27

NFE JOB NO. SHEET NO.
M623 L1



- GROUND COVER KEY**
- 1 TYPICAL SOD LAWN AREAS, SOWN ON 3" TOPSOIL
 - 2 TYPICAL HYDRO-SEED AND MULCH LAWN AREAS
 - 3 4" DIA SPADE CUT EDGE W/ 3" SHREDDED BARK MULCH
 - 4 3" DEPTH DOUBLE SHREDDED HARDWOOD BARK MULCH
 - 5 3/4" - 1 1/2" STONE MULCH, 3-4" DEPTH ON WEED BARRIER



LOCATION MAP



NOWAK & FRAUS ENGINEERS
 46777 WOODWARD AVE.
 PONTIAC, MI 48342-5032
 TEL. (248) 332-7931
 FAX. (248) 332-8257



PROJECT
 Serra Ford Rochester Hills

CLIENT
 Serra Ford Rochester Hills
 2890 S. Rochester Road
 Rochester Hills, MI
 Contact: Joseph O. Serra
 Ph-248-852-0400

PROJECT LOCATION
 Part of the SE 1/4
 of Section 27
 T.3N, R.11E
 City of Rochester Hills,
 Oakland County, Michigan

SHEET
 Enlarged Landscape Plan

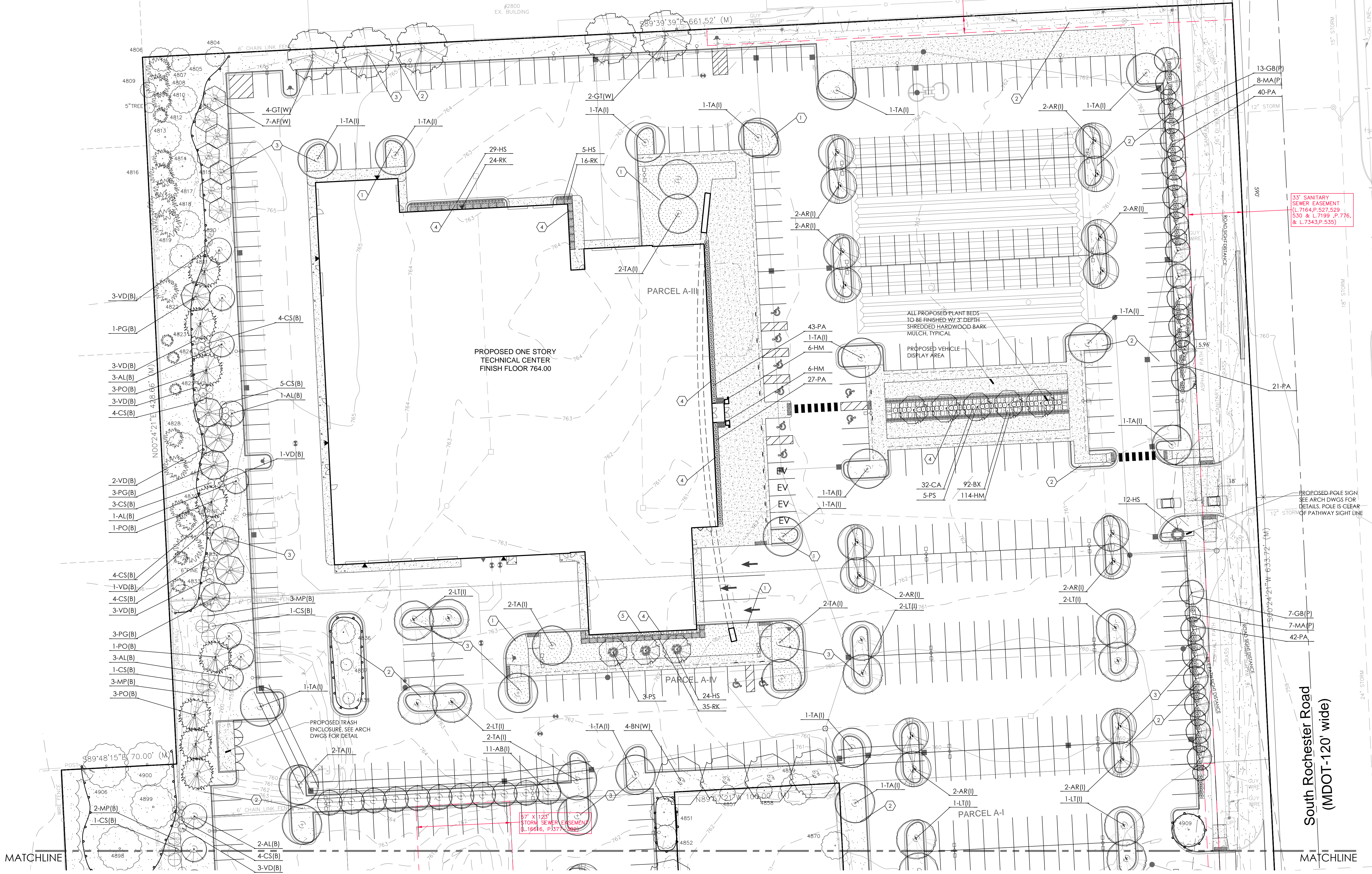


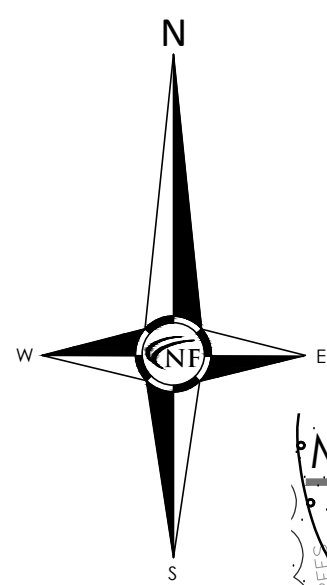
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 01-13-2022

SCALE: 1" = 30'
 30 15 0 15 30 45
 NFE JOB NO. SHEET NO.
M632 L3

CITY OF ROCHESTER HILLS
 PSP#2022-004, SECTION 27





NOWAK & FRAUS ENGINEERS
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 TEL. (248) 332-7931
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SEAL



PROJECT
Serra Ford Rochester Hills

CLIENT
Serra Ford Rochester Hills
 2890 S. Rochester Road
 Rochester Hills, MI
 Contact: Joseph O. Serra
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PROJECT LOCATION
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 City of Rochester Hills,
 Oakland County, Michigan

SHEET
Enlarged Landscape Plan



Know what's below
 Call before you dig.

REVISIONS
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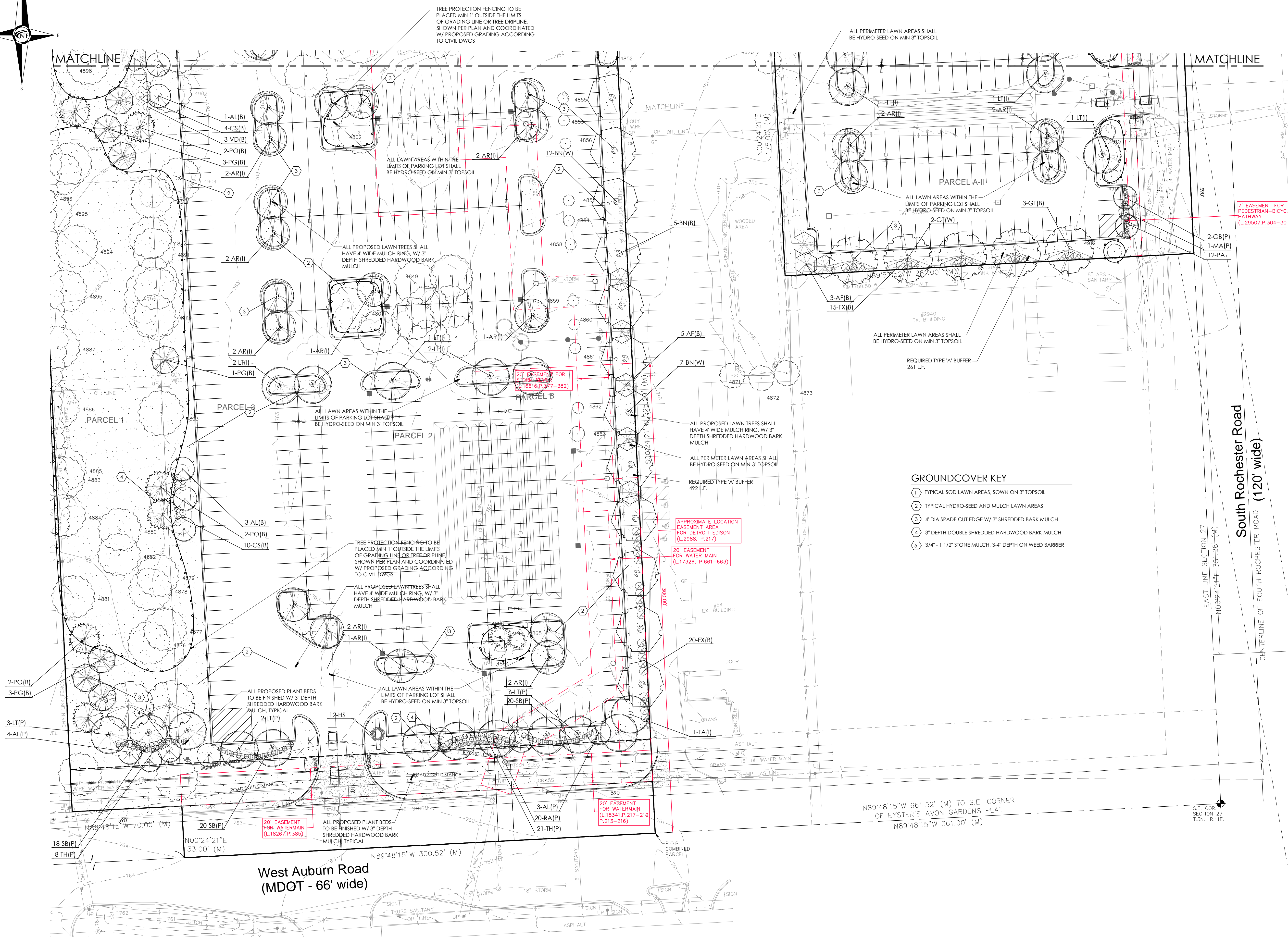
DRAWN BY:
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 DATE:
01-13-2022

SCALE: 1" = 30'



NFE JOB NO. SHEET NO.
M632 L4

CITY OF ROCHESTER HILLS
 PSP#2022-004, SECTION 27





Statistics	Symbol	Avg	Max	Min	Max/Min	Avg/Min	Avg/Max
INVENTORY - SOUTH ROCHESTER ROAD	X	4.4 fc	9.4 fc	0.7 fc	13.4:1	6.3:1	0.5:1
INVENTORY - WEST AUBURN ROAD	X	3.4 fc	7.5 fc	1.3 fc	5.8:1	2.6:1	0.5:1
OVERALL	+	2.1 fc	9.4 fc	0.0 fc	N/A	N/A	0.2:1
PROPERTY LINE	+	0.1 fc	0.4 fc	0.0 fc	N/A	N/A	0.3:1
PROPERTY LINE	+	0.2 fc	0.7 fc	0.0 fc	N/A	N/A	0.3:1
SERVICE STORAGE	X	3.2 fc	7.2 fc	0.7 fc	10.3:1	4.6:1	0.4:1
SOUTH ROCHESTER ROAD PROPERTY LINE	+	0.5 fc	1.0 fc	0.1 fc	10.0:1	5.0:1	0.5:1
WEST AUBURN ROAD PROPERTY LINE	+	0.1 fc	0.2 fc	0.0 fc	N/A	N/A	0.5:1
CUSTOMER PARKING	X	2.3 fc	4.4 fc	0.7 fc	6.3:1	3.3:1	0.5:1

Symbol	Label	Quantity	Manufacturer	Description	Lamp	Mounting Height
	A	20	Lithonia Lighting	DSXO LED AREA LIGHT, 4000K	LED	20'-0"
	A2	27	Lithonia Lighting	TWIN DSXO LED AREA LIGHT, 4000K	LED	20'-0"
	B	6	Lithonia Lighting	DSXW2 LED WALL MOUNTED LIGHT, 4000K	LED	17'-0"

D-Series Size 0 LED Area Luminaire

Specifications

- EPA: 0.95 ft (d)
- Length: 26" (686mm)
- Width: 13" (330mm)
- Height: 3" (76mm)
- Height: 7" (178mm)
- Weight: 16 lbs (7.3kg)

Introduction

The modern styling of the D-Series is striking yet unobtrusive - making a bold, progressive statement even as it blends seamlessly with its environment. The D-Series distills the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire. The outstanding photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. It is ideal for replacing up to 400W metal halide with typical energy savings of 70% and expected service life of over 100,000 hours.

Series	LED	Color temperature	Distribution	Mounting	Shipped included	
DSXO LED	P1	30K	TS5	TS5	TS5	TS5
	P2	40K	TS5	TS5	TS5	TS5
	P3	50K	TS5	TS5	TS5	TS5
DSXW2 LED	P1	30K	TS5	TS5	TS5	TS5
	P2	40K	TS5	TS5	TS5	TS5
	P3	50K	TS5	TS5	TS5	TS5

Control options	Shipped installed	Other options	Finish
INM2: 24V AC, 60 Hz, 100W	FR: High flow, multi-lumen, 8' x 17' mounting height, ambient sensor enabled at 30'	DDKO: Dark bronze	DDKO: Dark bronze
INM3: 24V AC, 60 Hz, 100W	FR: High flow, multi-lumen, 8' x 17' mounting height, ambient sensor enabled at 30'	DDKO: Dark bronze	DDKO: Dark bronze
INM4: 24V AC, 60 Hz, 100W	FR: High flow, multi-lumen, 8' x 17' mounting height, ambient sensor enabled at 30'	DDKO: Dark bronze	DDKO: Dark bronze

General Note

- SEE SCHEDULE FOR LUMINAIRE MOUNTING HEIGHT.
- CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 0' - 0"
- PROPERTY LINE CALCULATIONS ARE SHOWN IN FOOTCANDLES AT: 5' - 0"

THE ENGINEER AND/OR ARCHITECT MUST DETERMINE APPLICABILITY OF THE LAYOUT TO EXISTING / FUTURE FIELD CONDITIONS. THIS LIGHTING LAYOUT REPRESENTS ILLUMINATION LEVELS CALCULATED FROM LABORATORY DATA TAKEN UNDER CONTROLLED CONDITIONS IN ACCORDANCE WITH ILLUMINATING ENGINEERING SOCIETY APPROVED METHODS. ACTUAL PERFORMANCE OF ANY MANUFACTURER'S LUMINAIRE MAY VARY DUE TO VARIATION IN ELECTRICAL VOLTAGE, TOLERANCE IN LAMPS, AND OTHER VARIABLE FIELD CONDITIONS. MOUNTING HEIGHTS INDICATED ARE FROM GRADE AND/OR FLOOR UP.

THESE LIGHTING CALCULATIONS ARE NOT A SUBSTITUTE FOR INDEPENDENT ENGINEERING ANALYSIS OF LIGHTING SYSTEM SUITABILITY AND SAFETY. THE ENGINEER AND/OR ARCHITECT IS RESPONSIBLE TO REVIEW FOR MICHIGAN ENERGY CODE AND LIGHTING QUALITY COMPLIANCE.

UNLESS EXEMPT, PROJECT MUST COMPLY WITH LIGHTING CONTROLS REQUIREMENTS DEFINED IN ASHRAE 90.1 2013. FOR SPECIFIC INFORMATION CONTACT GBA CONTROLS GROUP AT ASG@GASSERBUSH.COM OR 734-266-6705.

Drawing Note

THIS DRAWING WAS GENERATED FROM AN ELECTRONIC IMAGE FOR ESTIMATION PURPOSE ONLY. LAYOUT TO BE VERIFIED IN FIELD BY OTHERS.

Mounting Height Note

MOUNTING HEIGHT IS MEASURED FROM GRADE TO FACE OF FIXTURE. POLE HEIGHT SHOULD BE CALCULATED AS THE MOUNTING HEIGHT LESS BASE HEIGHT.

Alternates Note

THE USE OF FIXTURE ALTERNATES MUST BE RESUBMITTED TO THE CITY FOR APPROVAL.

Ordering Note

FOR INQUIRIES CONTACT GASSER BUSH AT QUOTES@GASSERBUSH.COM OR 734-266-6705.

Plan View
Scale - 1" = 40ft



SEAL



PROJECT
Serra Ford Rochester Hills

CLIENT
Serra Ford Rochester Hills
2890 S. Rochester Road
Rochester Hills, MI
Contact: Joseph O. Serra
Ph-248-852-0400

PROJECT LOCATION
Part of the SE 1/4
of Section 27
T.3N, R.11E
City of Rochester Hills,
Oakland County, Michigan

SHEET
Landscape Notes
and Details



REVISIONS

03/18/2022	ISSUED FOR SITE PLAN REVIEW
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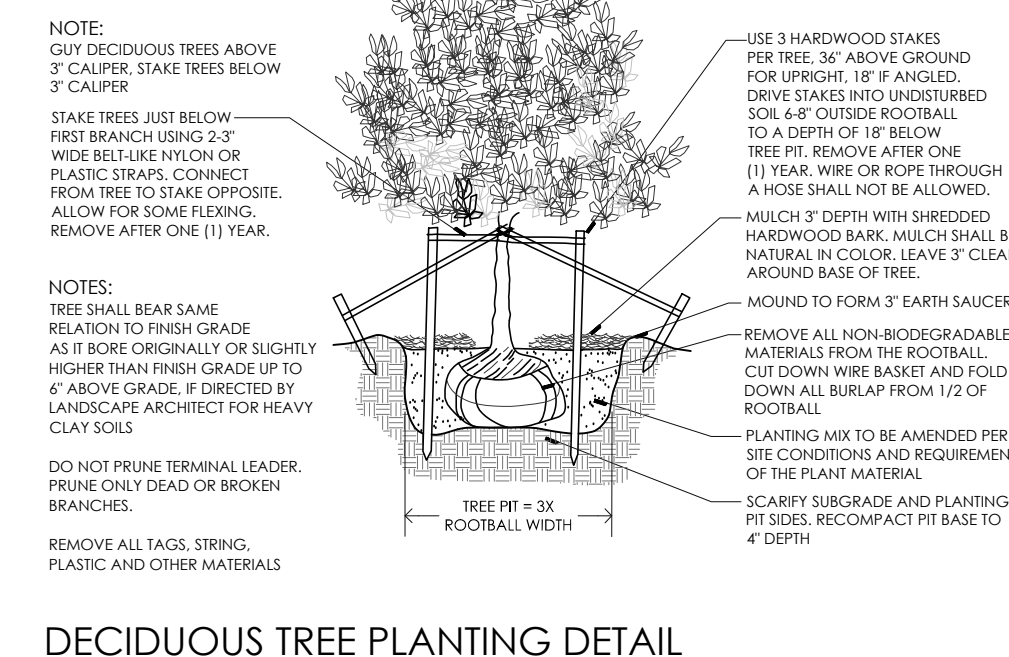
DRAWN BY:
G. Ostrowski
DESIGNED BY:
G. Ostrowski
APPROVED BY:
G. Ostrowski

DATE:
03-11-2021

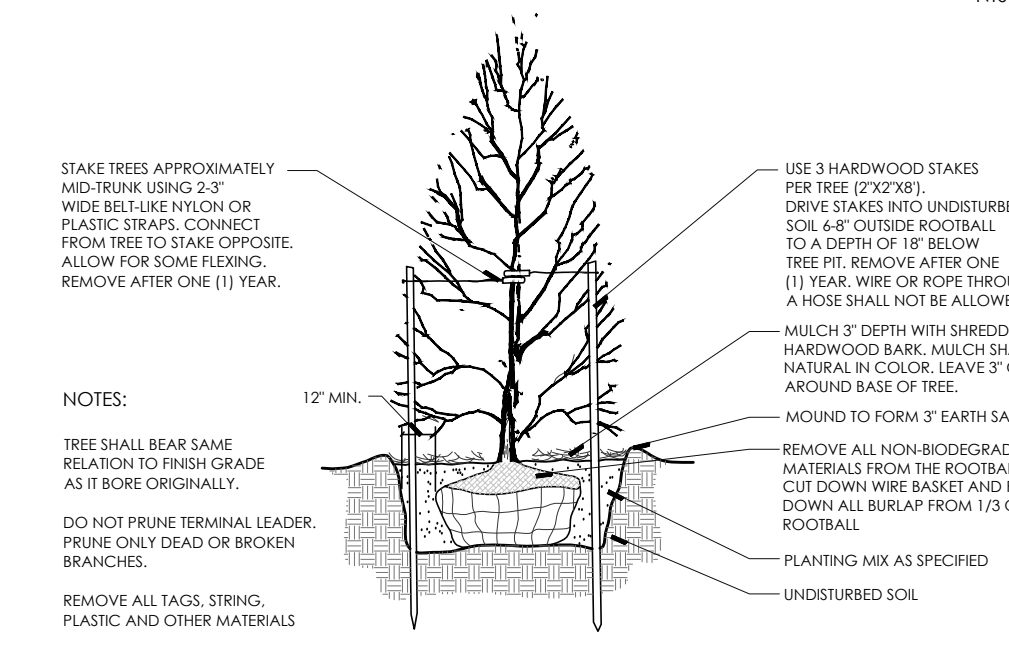
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NFE JOB NO. SHEET NO.
M623 L5

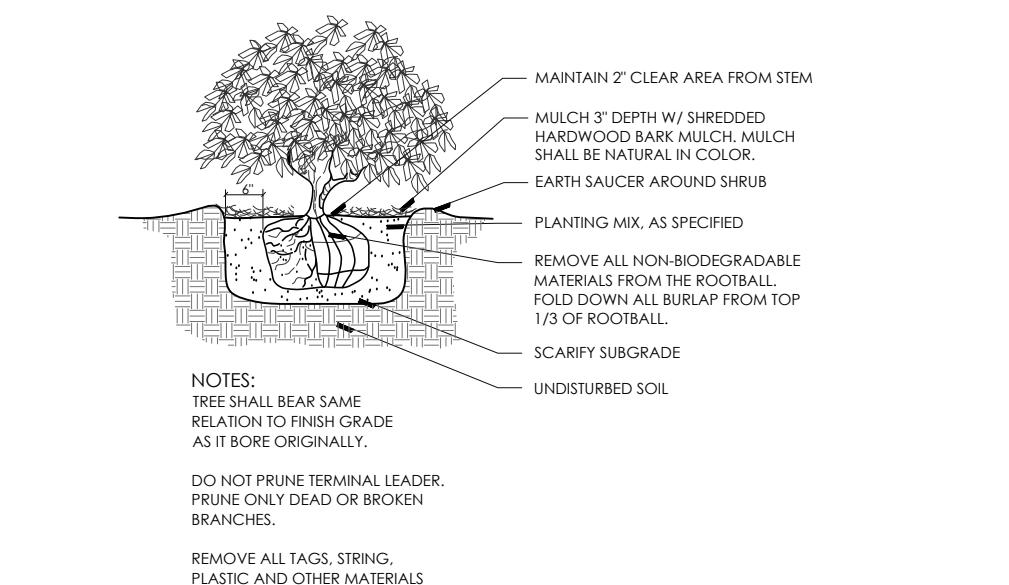
CITY OF ROCHESTER HILLS
PSP#2022-004, SECTION 27



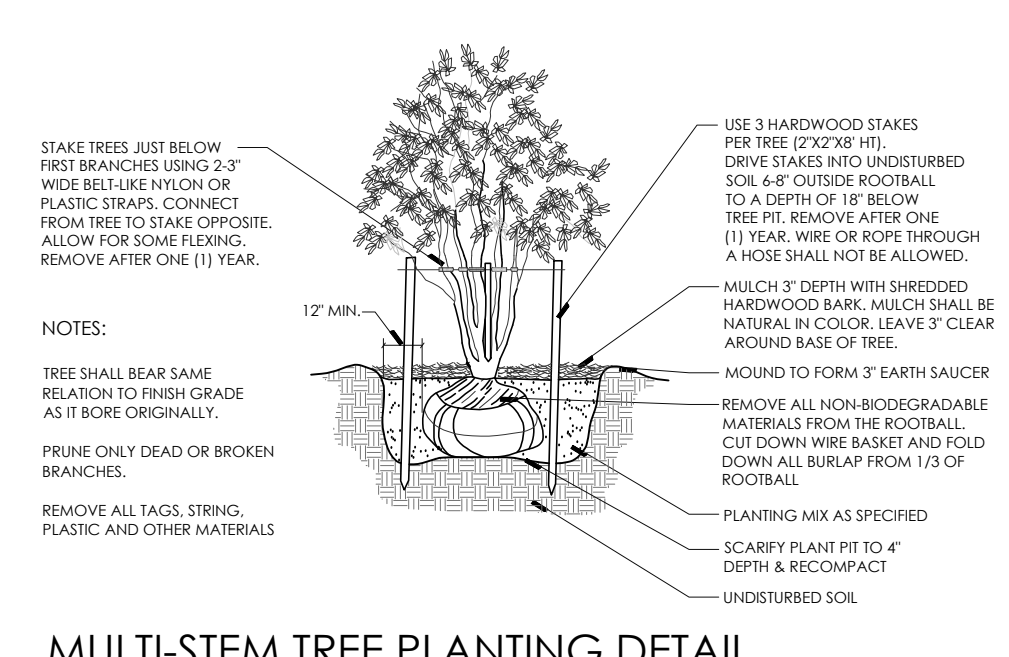
DECIDUOUS TREE PLANTING DETAIL



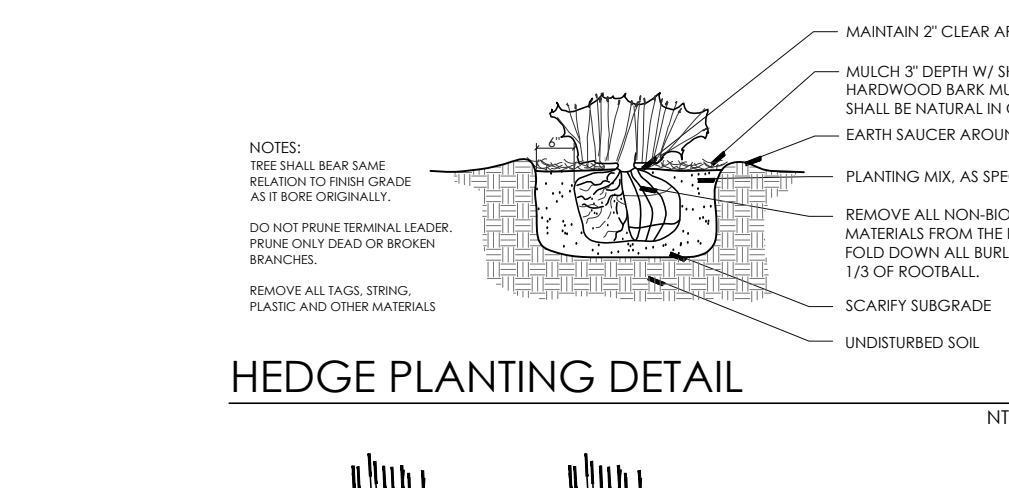
EVERGREEN TREE PLANTING DETAIL



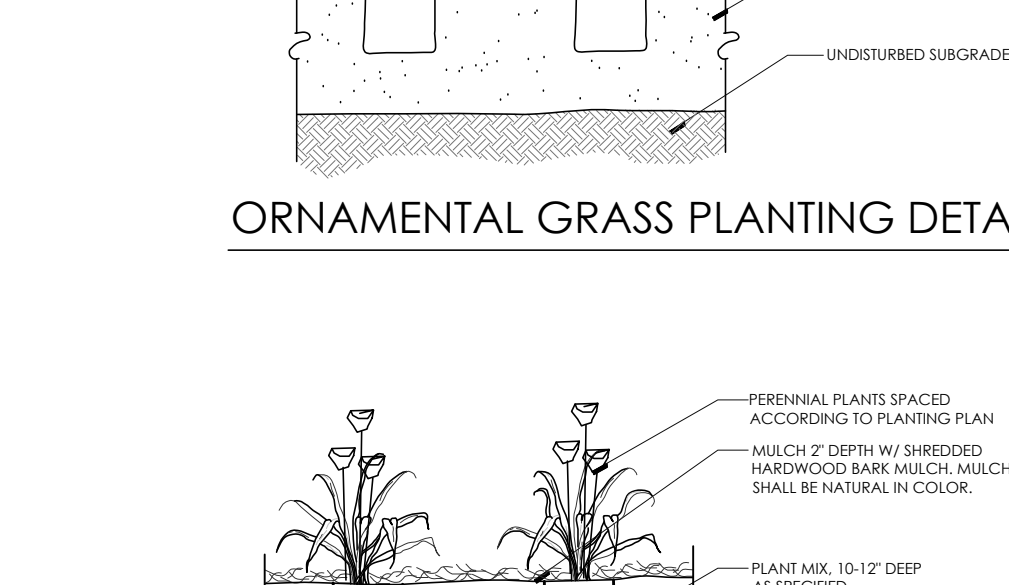
SHRUB PLANTING DETAIL
DECIDUOUS SHRUB



MULTI-STEM TREE PLANTING DETAIL



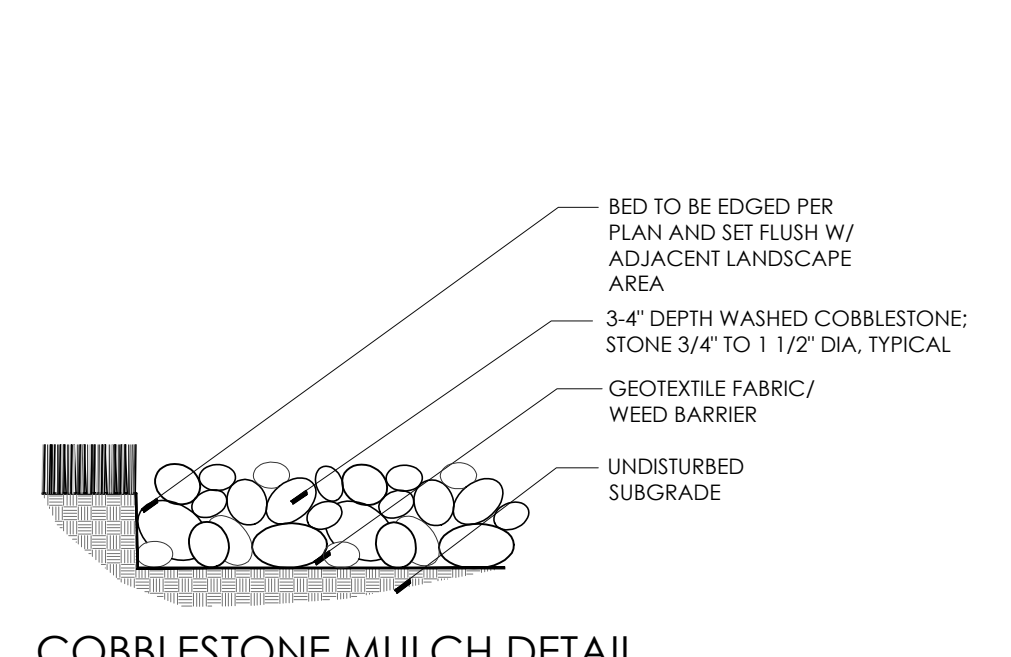
HEDGE PLANTING DETAIL



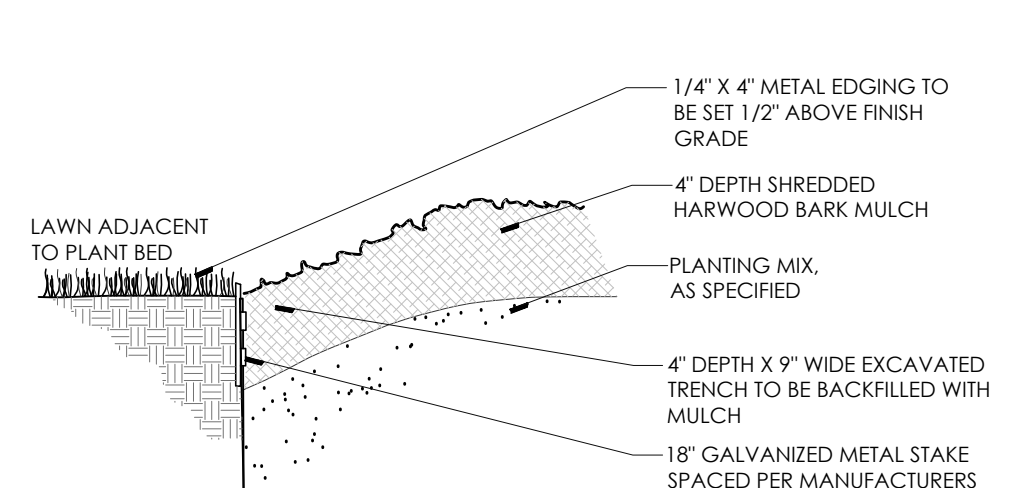
ORNAMENTAL GRASS PLANTING DETAIL



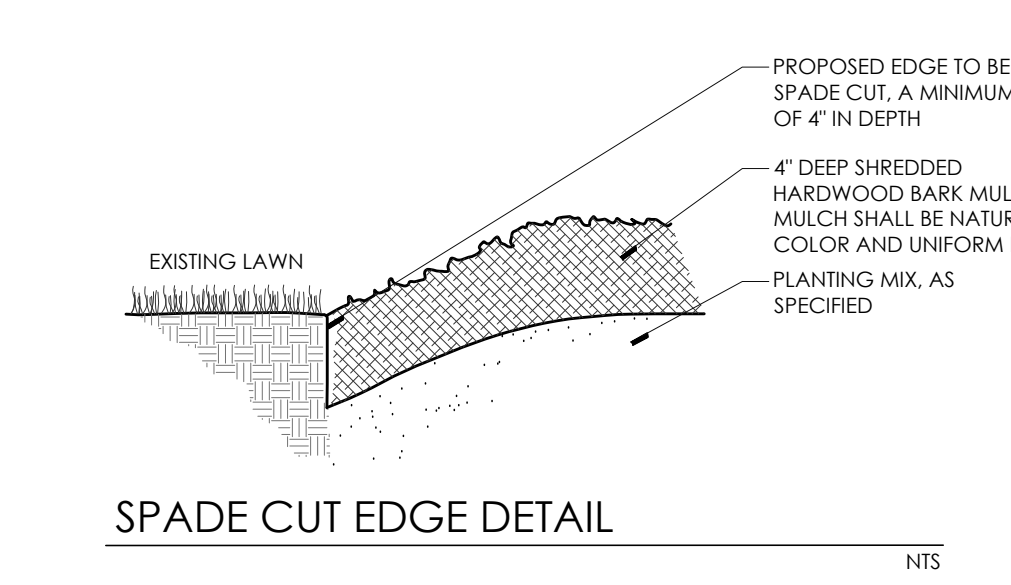
PERENNIAL PLANTING DETAIL



COBBLESTONE MULCH DETAIL



METAL EDGING DETAIL



SPADE CUT EDGE DETAIL

CONSTRUCTION NOTES:

- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING SURVEY INFORMATION INCLUDING THE UTILITY SYSTEMS BEFORE ANY DEMOLITION OR CONSTRUCTION WORK OCCURS. ANY DISCREPANCIES WITH THE SURVEY INFORMATION SHALL BE REPORTED TO THE ARCHITECT AND OWNER'S REPRESENTATIVE IMMEDIATELY.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING HIMSELF FAMILIAR WITH ALL UNDERGROUND UTILITIES, PIPES AND STRUCTURES. CONTRACTOR SHALL TAKE SOLE RESPONSIBILITY FOR COST INCURRED DUE TO DAMAGE AND REPLACEMENT OF SAID UTILITIES.
- CONTRACTOR SHALL NOT WILLFULLY PROCEED WITH CONSTRUCTION AS DESIGNED WHEN IT IS OBVIOUS THAT UNKNOWN OBSTRUCTIONS AND / OR GRADE DIFFERENCES EXIST THAT MAY NOT HAVE BEEN KNOWN DURING THE DESIGN. SUCH CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE CITY ENGINEER. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO LACK OF SUCH NOTIFICATION.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION WITH SUBCONTRACTORS AS REQUIRED TO ACCOMPLISH OPERATIONS.
- CONTRACTOR IS RESPONSIBLE FOR REPLACEMENT OF ANY EXISTING MATERIALS THAT ARE DAMAGED DURING CONSTRUCTION.
- SEE SPECIFICATIONS FOR CONSTRUCTION REQUIREMENTS, MATERIALS, AND EXECUTION.
- ALL PROPERTY LINES AND LOT LINES SHALL BE VERIFIED PRIOR TO COMMENCING WORK.
- CONTRACTOR SHALL SUBMIT ALL SAMPLES PER SPECIFICATIONS. ALL SAMPLES SHALL BE APPROVED BY THE ARCHITECT OR OWNER'S REPRESENTATIVE PRIOR TO CONSTRUCTION.
- DIMENSIONAL FLEXIBILITY SHALL BE WITHIN PLANT BEDS ONLY.
- CONTRACTOR SHALL COORDINATE ALL SITE LAYOUT WITH THE LANDSCAPE ARCHITECT AND REPORT ANY DIMENSIONAL DISCREPANCIES PRIOR TO CONSTRUCTION.
- HANDICAPPED RAMPS SHALL MEET ALL CURRENT BARrier FREE DESIGN CODES.

GENERAL SOD NOTE:

ALL LAWN AREAS DESIGNATED TO BE SODDED, SHALL BE SODDED WITH A BLENDED DURABLE BLUEGRASS SOD, TYPICALLY GROWN IN THE REGION. ALL TURF SHALL BE PLACED ON A MINIMUM 3" PREPARED TOPSOIL, AND WATERED DAILY UNTIL ESTABLISHMENT. IN AREAS SUBJECT TO EROSION, SODDED LAWN SHALL BE STABILIZED WHERE NECESSARY, AND LAID PERPENDICULAR TO SLOPES. SOD INSTALLATION SHALL OCCUR ONLY:
SPRING: APRIL TO JUNE
FALL: AUGUST 15 TO OCTOBER 15

GENERAL SEED NOTE:

ALL LAWN AREAS DESIGNATED TO BE SEEDED, SHALL BE HYDRO-SEEDED WITH SPECIFIED BLENDS, AND STABILIZED WITH WOOD CELLULOSE FIBER MULCH (2,000 LBS PER ACRE). IN AREAS SUBJECT TO EROSION, SEEDED LAWN SHALL BE FURTHER STABILIZED WHERE NECESSARY WITH BIODEGRADABLE EROSION BLANKET AND STAKED UNTIL ESTABLISHED. ALL SEED SHALL BE APPLIED OVER A MINIMUM 3" PREPARED TOPSOIL, AND SHALL BE KEPT MOIST AND WATERED DAILY UNTIL ESTABLISHED. SEEDING INSTALLATION SHALL OCCUR ONLY:
SPRING: APRIL TO JUNE
FALL: AUGUST 15 TO OCTOBER 15

TYPICAL SEEDED LAWN MIX:

ALL LAWN AREAS DESIGNATED TO BE SEEDED, SHALL BE HYDROSEEDDED WITH TYPICAL DROUGHT TOLERANT, DURABLE BLENDED SEED MIX, AT A RATE OF 220 LBS PER ACRE. MIX IS COMPRISED OF

- 30% NITE HAWK PERENNIAL RYE
- 30% KENTUCKY BLUEGRASS
- 20% CREEPING RED FESCUE
- 10% MERIT KENTUCKY BLUEGRASS
- 10% NEWPORT KENTUCKY BLUEGRASS

PLANTING NOTES:

- THE CONTRACTOR SHALL VERIFY ALL RIGHTS OF WAY, EASEMENTS, PROPERTY LINES AND LIMITS OF WORK, ETC. PRIOR TO COMMENCING WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING AND COORDINATING WITH ALL PERTINENT UTILITY COMPANIES 72 HOURS IN ADVANCE OF ANY DIGGING TO MAKE HIMSELF FAMILIAR WITH ALL UNDERGROUND UTILITIES, PIPES AND STRUCTURES. THE CONTRACTOR SHALL TAKE SOLE RESPONSIBILITY FOR ANY COST INCURRED DUE TO DAMAGE OF SAID UTILITIES.
- THE CONTRACTOR SHALL NOT WILLFULLY PROCEED WITH CONSTRUCTION AS DESIGNED WHEN IT IS OBVIOUS THAT UNKNOWN OBSTRUCTIONS AND / OR GRADE DIFFERENCES EXIST. SUCH CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE AND/OR LANDSCAPE ARCHITECT. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATION.
- ANY DISCREPANCIES BETWEEN DIMENSIONED LAYOUT AND ACTUAL FIELD CONDITIONS SHALL BE REPORTED TO THE OWNER'S REPRESENTATIVE AND LANDSCAPE ARCHITECT. FAILURE TO MAKE SUCH DISCREPANCIES KNOWN WILL RESULT IN CONTRACTOR'S RESPONSIBILITY AND LIABILITY FOR ANY CHANGES AND ASSOCIATED COST.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION WITH SUBCONTRACTORS AS REQUIRED TO ACCOMPLISH CONSTRUCTION INSTALLATION OPERATIONS.
- THE CONTRACTOR SHALL PROVIDE AND MAINTAIN POSITIVE SURFACE DRAINAGE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT, AND OR OWNER'S REPRESENTATIVE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY EXISTING MATERIALS THAT ARE DAMAGED DURING CONSTRUCTION.
- SEE SPECIFICATIONS, PLANT LIST AND PLANTING DETAILS FOR PLANTING REQUIREMENTS, MATERIALS AND EXECUTION.
- ALL TREES TO HAVE CLAY LOAM OR CLAY BALLS - TREES WITH SAND BALLS SHALL NOT BE ACCEPTED.
- ALL TREES TO BE APPROVED BY OWNER'S REPRESENTATIVE AND/OR LANDSCAPE ARCHITECT PRIOR TO DELIVERY TO THE SITE. ANY TREES DELIVERED TO THE SITE NOT PREVIOUSLY APPROVED MAY BE REJECTED AND ARE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- FINAL LOCATION OF ALL PLANT MATERIAL SHALL BE SUBJECT TO THE APPROVAL OF THE LANDSCAPE ARCHITECT.
- THE CONTRACTOR TO VERIFY PERCOLATION OF ALL PLANTING PITS PRIOR TO INSTALLATION OF PLANT MATERIAL.
- THE CONTRACTOR SHALL PLACE 3" DEPTH OF SHREDDED BARK MULCH IN ALL PLANTING BEDS, UNLESS OTHERWISE INDICATED.

DEMOLITION NOTES:

- IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING SURVEY INFORMATION INCLUDING THE UTILITY SYSTEMS BEFORE ANY DEMOLITION OR CONSTRUCTION WORK OCCURS. ANY DISCREPANCIES WITH THE SURVEY INFORMATION SHALL BE REPORTED TO THE ARCHITECT AND OWNER'S REPRESENTATIVE IMMEDIATELY.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING HIMSELF FAMILIAR WITH ALL UNDERGROUND UTILITIES, PIPES AND STRUCTURES. CONTRACTOR SHALL TAKE SOLE RESPONSIBILITY FOR COST INCURRED DUE TO DAMAGE AND REPLACEMENT OF SAID UTILITIES.
- ALL EXISTING IMPROVEMENTS, MATERIALS AND PLANT MATERIAL TO REMAIN WITHIN THE NEW CONSTRUCTION AREA SHALL BE PROPERLY AND ADEQUATELY PROTECTED FROM DAMAGE DURING THE DEMOLITION OPERATIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RESTORE TO THE ORIGINAL CONDITION ANY OF THESE EXISTING ITEMS THAT ARE DAMAGED OR DISTURBED IN ANY WAY.
- ALL MATERIALS TO BE REUSED OR SALVAGED SHALL BE STORED IN AN AREA DESIGNATED BY THE CITY ENGINEER FOR THAT PURPOSE. ALL SALVAGED MATERIALS SHALL REMAIN THE PROPERTY OF THE CITY ENGINEER.
- STREETS, SIDEWALKS AND ADJACENT PROPERTIES SHALL BE PROTECTED THROUGHOUT THE WORK AS REQUIRED BY LOCAL CODES AND REGULATIONS AND APPROVED BY THE OWNER.
- ALL MATERIAL SPECIFIED TO BE REMOVED SHALL BE DISPOSED OF OFF-SITE PER LOCAL CODES AND REGULATIONS. CONTRACTOR SHALL COORDINATE METHOD OF DISPOSAL WITH CITY ENGINEER PRIOR TO COMMENCEMENT OF WORK.
- MATERIALS TO BE REUSED OR SALVAGED SHALL BE STORED IN AN AREA DESIGNATED BY THE OWNER'S REPRESENTATIVE FOR THAT PURPOSE. ALL SALVAGED MATERIALS SHALL REMAIN THE PROPERTY OF THE OWNER.
- DURING DEMOLITION OPERATIONS EVERY EFFORT SHALL BE MADE TO CONTROL DUST, PER CITY REQUIREMENTS.
- TREES AND SHRUBS TO BE REMOVED WITHIN THE LIMITS OF WORK SHALL BE CLEARLY IDENTIFIED WITH BRIGHTLY COLORED RIBBON.
- GRUBBING SHALL INCLUDE ALL WEEDS, SHRUBS, STUMPS AND ROOT SYSTEMS OF REMOVED PLANT MATERIAL. GRUBBING SHALL BE TO THE DEPTHS BELOW PROPOSED IMPROVEMENTS INDICATED AS FOLLOWS: CONCRETE PAVING AND WALKWAYS-TOTAL DEPTH OF PAVING AND SUB-BASE: ASPHALT PAVING-TOTAL DEPTH OF PAVING AND SUB-BASE; LAWN AND OTHER PLANTING AREAS-REMOVE DEPTH REQUIRED OF STUMPS AND ROOTS OVER TWO (2) INCHES IN DIAMETER AND TURF.
- PROTECT EXISTING TREES TO REMAIN PER TYPICAL TREE PROTECTION DETAIL.
- STOCKPILED TOPSOIL SHALL BE STORED ON SITE AND REMAIN PROTECTED FROM CONTAMINATION PRIOR TO REDISTRIBUTION.
- SAWCUT AND REMOVE EXISTING ASPHALT AS REQUIRED TO INSTALL NEW SITE IMPROVEMENTS AND ADJUST GRADES WITHIN CITY STREETS. ALL WORK WITHIN CITY RIGHT OF WAY SHALL MEET CITY STANDARDS AND SPECIFICATIONS.
- ARRANGE FOR APPLICABLE UTILITY COMPANY TO RELOCATE EXISTING CABLES, WIRES, PHONE LINES, ETC. ALONG WITH EDISON POWER LINES AS REQUIRED.
- CONTRACTOR SHALL SECURE AND PAY FOR ALL APPLICABLE PERMITS AND FEES NECESSARY FOR THE COMPLETE CONSTRUCTION OF THE PROJECT.