FAMILY PARTNERS

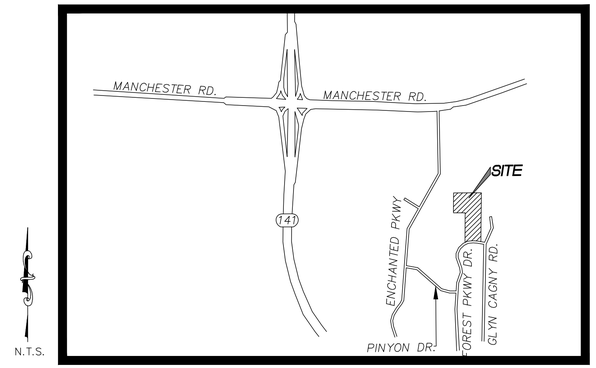
IMPROVEMENT PLANS - PHASE ONE

351, 353, 357, 359, 361, 363, 365, 369, 371, 375, 377 FOREST SUMMIT COURT AND COMMON GROUND OF VILLA PINES

LOTS 1 THRU 10 AND COMMON GROUND OF VILLA PINES
PLAT BOOK: 356 PAGE: 250
ST. LOUIS COUNTY MISSOURI

GENERAL NOTES:

1. THE UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NON-EXISTENCE, SIZE, TYPE, OR LOCATION OF THESE OR OTHER UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UTILITIES, SHOWN OR NOT SHOWN, AND SAID UTILITIES SHALL BE LOCATED IN THE FIELD PRIOR TO ANY CONSTRUCTION OF IMPROVEMENTS. THESE PROVISIONS SHALL IN NO WAY ABSOLVE ANY PARTY FROM COMPLYING WITH THE UNDERGROUND FACILITY SAFETY AND DAMAGE PREVENTION ACT, CHAPTER 319 RSMo.
2. BOUNDARY AND TOPOGRAPHIC SURVEY PROVIDED BY ALTEA, LLC.
3. ALL MATERIALS AND METHODS OF CONSTRUCTION TO MEET THE CURRENT STANDARDS AND SPECIFICATIONS OF CITY OF MANCHESTER.
4. ALL PROPOSED IMPROVEMENTS SHALL BE CONSTRUCTED TO CITY OF MANCHESTER STANDARDS.
5. ALL GRADED AREAS SHALL BE PROTECTED FROM EROSION BY EROSION CONTROL DEVICES AND/OR SEEDING AND MULCHING AS REQUIRED BY ST. LOUIS COUNTY & MISSOURI DNR.
6. PRIOR TO BEGINNING ANY WORK ON THE SITE, THE DEVELOPER SHALL HAVE A PRECONSTRUCTION CONFERENCE WITH THE CITY OF MANCHESTER PRIOR TO ANY CLEARING, GRADING, OR INSTALLATION OF IMPROVEMENTS.
7. GRADING CONTRACTOR SHALL INSTALL SILTATION CONTROL PRIOR TO STARTING THE GRADING. ADDITIONAL SILTATION CONTROL DEVICES SHALL BE INSTALLED PER CITY OF MANCHESTER STANDARDS.
8. ALL FILLS AND BACKFILLS SHALL BE MADE OF SELECTED EARTH MATERIALS, FREE FROM BROKEN MASONRY, ROCK, FROZEN EARTH, RUBBISH, ORGANIC MATERIAL AND DEBRIS.
9. GRADING CONTRACTOR SHALL KEEP EXISTING ROADWAYS CLEAN OF MUD AND DEBRIS AT ALL TIMES.
10. PROPOSED CONTOURS SHOWN ARE FINISHED ELEVATIONS ON PAVED AREAS.
11. NO GRADE SHALL EXCEED 3:1 SLOPE. UNLESS JUSTIFIED BY A GEOTECHNICAL REPORT, WHICH HAS BEEN ACCEPTED/APPROVED BY CITY OF MANCHESTER.
12. A GRADING PERMIT IS REQUIRED PRIOR TO ANY GRADING ON THE SITE. NO CHANGE IN WATERSHEDS SHALL BE PERMITTED.
13. INTERIM STORMWATER DRAINAGE CONTROL IN THE FORM OF SILTATION CONTROL MEASURES ARE REQUIRED.
14. THE DEVELOPER IS REQUIRED TO PROVIDE ADEQUATE STORMWATER SYSTEMS IN ACCORDANCE WITH CITY OF MANCHESTER STANDARDS.
15. ALL STORMWATER SHALL BE DISCHARGED AT AN ADEQUATE NATURAL DISCHARGE POINT. SINKHOLES ARE NOT ADEQUATE DISCHARGE POINTS.
16. ADEQUATE TEMPORARY OFF-STREET PARKING SHALL BE PROVIDED FOR CONSTRUCTION EMPLOYEES. PARKING ON NON-SURFACED AREAS SHALL BE PROHIBITED IN ORDER TO ELIMINATE THE CONDITION WHEREBY MUD FROM CONSTRUCTION AND EMPLOYEE VEHICLES IS TRACKED ONTO THE PAVEMENT CAUSING HAZARDOUS ROADWAY AND DRIVING CONDITIONS.
17. THE DEVELOPER IS ADVISED THAT UTILITY COMPANIES WILL REQUIRE COMPENSATION FOR RELOCATION OF THEIR UTILITY FACILITIES WITHIN PUBLIC ROAD RIGHT-OF-WAY. UTILITY RELOCATION COST SHALL BE CONSIDERED THE DEVELOPER'S RESPONSIBILITY. THE DEVELOPER SHOULD ALSO BE AWARE OF EXTENSIVE DELAYS IN UTILITY COMPANY RELOCATION AND ADJUSTMENTS. SUCH DELAYS WILL NOT CONSTITUTE A CAUSE TO OCCUPANCY PRIOR TO COMPLETION OF ROAD IMPROVEMENTS.
18. THE OWNER SHALL, AT ALL TIMES, CONTAIN MUD AND OTHER SPOILS ON THIS SITE. NO VEHICLE, TRAILER OR CONSTRUCTION EQUIPMENT IS TO DEPOSIT MUD OR ANY OTHER MATERIAL ON PUBLIC STREETS. PROJECT WILL BE STOPPED IF STREETS ARE NOT CLEANED IMMEDIATELY.
19. FOREST PARKWAY DR. SHALL BE KEPT OPEN TO TRAFFIC DURING ALL PHASES OF CONSTRUCTION OF IMPROVEMENTS IN THE RIGHT-OF-WAY. NO DRIVING LANES SHALL BE CLOSED WITHOUT PRIOR WRITTEN PERMISSION FROM CITY OF MANCHESTER.
20. THE CONTRACTOR SHALL FURNISH, MAINTAIN, AND REMOVE TRAFFIC CONTROL DEVICES FOR THE PURPOSE OF REGULATING, WARNING, AND DIRECTING TRAFFIC DURING ALL PHASES OF CONSTRUCTION. ALL FLAGMEN, BARRICADES, WARNING SIGNS, ETC. SHALL CONFORM TO THE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES.
21. ANY LAND DISTURBANCE ACTIVITY INVOLVING ONE ACRE OR MORE OF LAND IS A MAJOR LAND DISTURBANCE (MLD) AND A LAND DISTURBANCE PERMIT FOR THE MLD MUST BE OBTAINED FROM THE DEPARTMENT OF PUBLIC WORKS. ANY LAND DISTURBANCE ACTIVITY INVOLVING LESS THAN ONE ACRE OF LAND IS AN ORDINARY LAND DISTURBANCE AND THE APPROPRIATE PERMIT MUST BE OBTAINED FROM THE DEPARTMENT OF PUBLIC WORKS.



LOCATION MAP

CALL BEFORE YOU DIG!
1-800-DIG-RITE

SITE DATA:

LOCATOR NUMBERS/ADDRESSES:

230520893, 377 FOREST SUMMIT CT
230520903, 375 FOREST SUMMIT CT
230520912, 371 FOREST SUMMIT CT
230520921, 369 FOREST SUMMIT CT
230520930, 365 FOREST SUMMIT CT
230520949, 363 FOREST SUMMIT CT
230520958, 359 FOREST SUMMIT CT
230520967, 357 FOREST SUMMIT CT
230520976, 353 FOREST SUMMIT CT
230520985, 351 FOREST SUMMIT CT
230520994, 361 FOREST SUMMIT CT

PROPERTY OWNER:
BARTH HOLOHAN
12882 MANCHESTER ROAD
SAINT LOUIS MO, 63131
D.B. 23636, P.G. 2726

TOTAL SITE AREA: 150,718 S.F. OR 3.46 AC.
PHASE ONE AREA: 47,288 S.F. OR 1.08 AC.

EXISTING ZONING: C-1 COMMERCIAL & R-1 RESIDENTIAL WITH PRD OVERLAY

PROPOSED ZONING: – PRD

BUILDING SETBACKS: FRONT: 25' REAR: 20' SIDE: 10'

SITE BENCHMARK: CUT SQUARE WITH CROSS ON CONC CURB. ELEVATION: 565.68

GREEN SPACE CALCULATIONS (PHASE ONE)

EXISTING:

BUILDING/ROOF	7,265 S.F.
ASPH. PVMT.	7,776 S.F.
CONC. PVMT.	242 S.F.
GRASS/LAWN	32,005 S.F.

PERCENT GREEN SPACE
% = LAWN/GRASS/TOTAL AREAx100 = 100.0%
GREEN SPACE = 32,005 S.F./47,288 S.F. = 67.7%

FLOOR AREA RATIO (PHASE 1):

BUILDING AREA: 6,681 S.F. TOTAL
PHASE 1 AREA: 47,288 S.F.

FLOOR AREA RATIO: 6,681 S.F./47,288 S.F. = 14.1%

PROPOSED PARKING:

PHASE1:
SABRINA HOUSE: 11 SPACES INCLUDING 1 H.C. SPACE

TOTAL PHASE ONE = 11 SPACES (1 H.C. SPACE)

DENSITY:

PHASE ONE: 12 PERSONS/0.75 AC = 16 PERSONS/AC

DRAWING INDEX

C1	TITLE SHEET
C2	EXISTING PLAN
C3.1	OVERALL SITE PLAN
C3.2	SITE PLAN
C4	GRADING PLAN
C5	DETENTION BASIN DETAILS
C6.1	DRAINAGE AREA MAPS
C6.2	BMP DRAINAGE AREA MAP
C7	PROFILES
C8.1–C8.2	SITE DETAILS
C9.1–C9.3	SWPPP DETAILS

LEGEND

- FOUND MONUMENTATION
- CLEAN OUT
- ELECTRIC METER
- GUY WIRE
- UTILITY POLE
- TELEPHONE BOX/PEDESTAL
- SIGN
- MAILBOX
- BENCHMARK
- OVERHEAD ELECTRIC
- FIBER OPTIC LINE
- BURIED TELEPHONE
- BUSH
- DECIDUOUS TREE
- GAS VALVE
- SANITARY SEWER
- STORM SEWER
- GAS LINE
- WATER LINE
- EXISTING CONTOURS
- PROPOSED CONTOURS

ABBREVIATIONS

N/F	NOW OR FORMERLY
W	WIDE
DB.	DEED BOOK
PB.	PLAT BOOK
PG.	PAGE
CONC.	CONCRETE
SAN.	SANITARY
MH	MANHOLE
R	RADIUS
L	LENGTH
D	DELTA
TBR	TO BE REMOVED
TBR&R	TO BE REMOVED & REPLACED
UIP	TO BE USED IN PLACE
D.S.	ROOF DOWNSPOUT
w/	WITH
EX./EXIST.	EXISTING
E.O.P.	EDGE OF PAVEMENT
FM	FORCE MAIN

SERVICE DISTRICTS:

FIRE: WEST COUNTY EMS & FIRE PROTECTION
DISTRICT STATION 1
223 HENRY AVE
MANCHESTER, MO 63011
636.227.9350

AMBULANCE: WEST COUNTY EMS & FIRE PROTECTION
DISTRICT STATION 1
223 HENRY AVE
MANCHESTER, MO 63011
636.227.9350

SCHOOL: PARKWAY SCHOOL DISTRICT
455 N. WOODS MILL ROAD
CHESTERFIELD, MO 63017
314.415.8100

SEWER: METROPOLITAN ST. LOUIS SEWER DISTRICT
2350 MARKET STREET
ST. LOUIS, MO 63103
314.768.6260

WATER: MISSOURI AMERICAN WATER
727 CRAIG ROAD
ST. LOUIS, MO 63141
866.430.0820

GAS: LACLEDE GAS COMPANY
700 MARKET STREET
ST. LOUIS, MISSOURI 63101
636.621.6960

ELECTRIC: AMEREN UE
1901 CHOUTEAU AVE.
ST. LOUIS, MISSOURI 63103
800.552.7583

TELEPHONE: AT&T
800.288.2020

POST OFFICE: U.S. POST OFFICE
15455 MANCHESTER RD
BALLWIN, MISSOURI 63011
636.227.5783

CABLE TV: CHARTER COMMUNICATIONS
6524 MANCHESTER AVE.
ST. LOUIS, MISSOURI 63139
855.757.7328

STANDARD CONSTRUCTION:

ALL STORM AND SANITARY SEWER STRUCTURES AND APPURTENANCES TO BE DEDICATED TO MSD, OR TO BE PRIVATE UNDER MSD INSPECTION, SHALL CONFORM TO THE METROPOLITAN ST. LOUIS SEWER DISTRICT, STANDARD CONSTRUCTION SPECIFICATIONS FOR SEWERS AND DRAINAGE FACILITIES, 2009. THAT WILL INCLUDE STANDARD DETAILS SHOWN THEREIN, AND SHALL INCLUDE ALL SUBSEQUENT CHANGES MADE THERETO.

SOME RECENT CHANGES CONCERN PIPE FIELD TESTING AND PERFORMANCE, AND INCLUDE THE FOLLOWING:

PART 2 – MATERIALS OF CONSTRUCTION

HIGH DENSITY POLYETHYLENE (HDPE) PIPE IS NOT ALLOWED FOR GRAVITY SEWERS FOR STORM, COMBINED, OR SANITARY SEWERS THAT ARE "PUBLIC" OR "PRIVATE UNDER MSD INSPECTION".

POLYPROPYLENE (PP) PIPE IS ALLOWED AS FOLLOWS FOR GRAVITY SEWERS THAT ARE "PUBLIC" OR "PRIVATE UNDER MSD INSPECTION".

FOR USE IN SANITARY AND COMBINED SEWERS 12 TO 60 INCHES IN DIAMETER IT SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2764 "STANDARD SPECIFICATION FOR 6 TO 60 IN. POLYPROPYLENE (PP) CORRUGATED DOUBLE AND TRIPLE WALL PIPE AND FITTINGS FOR NON- PRESSURE SANITARY SEWER APPLICATIONS"

FOR USE IN STORM SEWERS 12 TO 24 INCHES IN DIAMETER IT SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2881 "STANDARD SPECIFICATION FOR 12 TO 60 IN. POLYPROPYLENE (PP) DUAL WALL PIPE AND FITTINGS FOR NON-PRESSURE STORM SEWER APPLICATIONS;" OR 8OR USE IN STORM SEWERS 12 TO 60 INCHES IN DIAMETER IT SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2764 "STANDARD SPECIFICATION FOR 6 TO 60 IN. POLYPROPYLENE (PP) CORRUGATED DOUBLE AND TRIPLE WALL PIPE AND FITTINGS FOR NON- PRESSURE SANITARY SEWER APPLICATIONS."

PART 4 –PIPE SEWER CONSTRUCTION

SECTION B, PIPE FIELD TESTS, PARAGRAPH 2, REACH INTEGRITY TESTING –DELETE THE FIRST SENTENCE AND THE FOLLOWING REPLACEMENT APPLIES:

ALL SANITARY AND COMBINED SEWERS SHALL SUSTAIN A MAXIMUM LEAKAGE LIMIT OF 100 GALLONS/INCH OF PIPE DIAMETER/MILE OF LINE/DAY, AS REQUIRED BY THE MISSOURI DEPARTMENT OF NATURAL RESOURCES SPECIFICATIONS.

SECTION B, PIPE FIELD TESTS, PARAGRAPH 2, REACH INTEGRITY TESTING, SUBPARAGRAPH C, INFILTRATION/EXFILTRATION TESTING –DELETE THE SIXTH SENTENCE, CONCERNING LEAKAGE LIMITS, AND THE FOLLOWING REPLACEMENT APPLIES:

THE MEASUREMENT OF LEAKAGE SHALL NOT EXCEED 100 GALLONS/INCH OF PIPE DIAMETER/MILE OF LINE/DAY, AS REQUIRED BY THE MISSOURI DEPARTMENT OF NATURAL RESOURCES SPECIFICATIONS.

SECTION B, PIPE FIELD TESTS, PARAGRAPH 4, MANHOLE TESTING, SUBPARAGRAPH A, VACUUM TESTING –AFTER THE FIRST SENTENCE, THE FOLLOWING ADDITION APPLIES:

THE VACUUM TEST MUST BE PERFORMED PRIOR TO BACKFILLING AROUND THE MANHOLE UNLESS THE CONTRACTOR PROVIDES DOCUMENTATION FROM THE PRECAST MANHOLE MANUFACTURER STATING THAT THE MANHOLE MAY BE VACUUM TESTED AFTER BACKFILLING HAS TAKEN PLACE. THE CONTRACTOR MUST SUBMIT THIS DOCUMENTATION PRIOR TO BACKFILLING AROUND ANY MANHOLE.

SECTION B, PIPE FIELD TESTS, PARAGRAPH 4, MANHOLE TESTING, SUBPARAGRAPH B, EXFILTRATION TESTING – DELETE THE SECOND SENTENCE, CONCERNING LEAKAGE LIMITS, AND THE FOLLOWING ADDITION APPLIES:

FOR EXFILTRATION TESTING, THE ALLOWABLE LEAKAGE LIMIT IS 100 GALLONS/INCH OF PIPE DIAMETER/MILE OF LINE/DAY WHEN THE AVERAGE HEAD ON THE TEST SECTION IS THREE FEET (3') OR LESS.

IF REINFORCED CONCRETE PIPE IS USED FOR SANITARY OR COMBINED SEWERS LARGER THAN 27", ALL PIPE AND JOINTS SHALL CONFORM TO ASTM C 361. IN ADDITION, IF THE DIAMETER IS LARGER THAN 48", THE JOINT TYPE MUST INCLUDE A GASKET THAT IS CONFINED IN A GROOVE IN THE SPIGOT OF THE PIPE.

PUBLIC SEWER MAINTENANCE:
MAINTENANCE OF THE SEWERS DESIGNATED "PUBLIC" SHALL BE THE RESPONSIBILITY OF THE METROPOLITAN ST. LOUIS SEWER DISTRICT UPON DEDICATION OF THE SEWERS TO THE DISTRICT.

CONTRACTOR'S INSURANCE (OFFSITE):
PRIOR TO OBTAINING A CONSTRUCTION PERMIT FROM THE METROPOLITAN ST. LOUIS SEWER DISTRICT, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE THE DISTRICT WITH A COPY OF AN EXECUTED CERTIFICATE OF INSURANCE INDICATING THAT THE PERMITTEE HAS OBTAINED AND WILL CONTINUE TO CARRY COMMERCIAL GENERAL LIABILITY AND COMPREHENSIVE AUTO LIABILITY INSURANCE. THE REQUIREMENTS AND LIMITS SHALL BE AS STATED IN THE RULES AND REGULATIONS AND ENGINEERING DESIGN REQUIREMENTS FOR SANITARY AND STORMWATER DRAINAGE FACILITIES, SECTION 10.090 (ADDENDUM).

SHOP DRAWING REVIEW NOTE:
THE PROJECT ENGINEER SHALL PROVIDE SHOP DRAWINGS SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN MISSOURI FOR APPROVAL TO MSD PRIOR TO CONSTRUCTION OF THESE STRUCTURES. STRUCTURES SHALL BE DESIGNED TO SUSTAIN HS-20 LOADS. PLEASE CONTACT THE DISTRICT'S CONSTRUCTION MANAGEMENT DIVISION AT (314) 355-2072 FOR QUESTIONS.

REMEDIATE SOIL PRIOR TO CONSTRUCTION NOTE:
AT THE COMPLETION OF SWPPP ACTIVITIES AND PRIOR TO BMP CONSTRUCTION: REMOVE ALL CONSTRUCTION SEDIMENT, L' OF ADDITIONAL NATIVE SOIL BELOW SEDIMENT, AND THEN TILL/RIP SUB GRADE 6-12 INCHES DEEP.

INFILTRATION BED:
TO PREVENT CONSTRUCTION SEDIMENT FROM CLOGGING INFILTRATION BED, AT NO TIME MAY CONSTRUCTION SEDIMENT ENTER THESE FACILITIES. ADDITIONALLY, THESE FACILITIES SHALL NOT BE CONSTRUCTED UNTIL ALL SURROUNDING AREA THAT DRAINS TO THEM IS FULLY STABLE/ESTABLISHED.

FUTURE DISTURBANCE NOTE (1) FOR PROJECTS THAT PROPOSE A BMP AND / OR DETENTION:

STORMWATER MANAGEMENT NOTE:
LAND AREA DISTURBED:

PREVIOUS PROJECTS: P-27956-00 2.91 AC DISTURBED (FROM 2008 STL. COUNTY AERIAL PHOTO)
20MSD-00014 1.13 AC DISTURBED
BALANCE BETWEEN (P-27956-00) AND (20MSD-00014) = 1.78 AC
NOTE: DISTURBED AREA FOR 20MSD-00014 OVERLAPS D.A. FROM P-27956-00.

PROJECT RUN-OFF DIFFERENTIAL
PREVIOUS DIFFERENTIAL (P-27956-00)
CURRENT DIFFERENTIAL (20MSD-00014)
TOTAL = 1.46 cfs

ANY FUTURE LAND DISTURBANCE, INCREASE IN IMPERVIOUS AREA, AND/OR CHANGE IN RUNOFF CONDITIONS ON THIS SITE MAY REQUIRE ADDITIONAL STORM WATER MANAGEMENT PER MSD REGULATIONS IN PLACE AT THAT TIME (INCLUDING TOTAL LAND DISTURBANCE AND/OR IMPERVIOUSNESS ADDED ON THIS PLAN, 20MSD-00014).

COMPACTED FILL REQUIREMENTS:
A REGISTERED PROFESSIONAL GEOTECHNICAL ENGINEER WILL VERIFY THAT ALL COMPRESSIBLE MATERIAL HAS BEEN REMOVED PRIOR TO FILL PLACEMENT AND THAT ALL FILL, AND FILLED AREAS, INCLUDING TRENCH BACKFILLS, UNDER BUILDINGS AND UNDER SANITARY AND STORM SEWER LINES CONSTRUCTED ABOVE THE ORIGINAL GROUND SURFACE, HAS BEEN COMPACTED TO 90% MODIFIED PROCTOR. FILL IS TO BE PLACED IN A MAXIMUM OF NINE-INCH (9") LIFTS. TESTS SHALL BE TAKEN AT A MAXIMUM OF FIFTY-FEET (50') WIDE INTERVALS ALONG THE ROUTE OF THE PIPE, AT A MAXIMUM INTERVAL, OF TWO FEET (2'), VERTICALLY AND LATERALLY ON EACH SIDE OF THE PIPE, AT A DISTANCE EQUAL TO THE DEPTH OF FILL OVER THE PIPE. A COPY OF THESE RESULTS WILL BE SUBMITTED TO MSD PRIOR TO PLACEMENT OF THE SEWER PIPE.

FOR SEWER PIPE (STORM, SANITARY, AND COMBINED) WITH A DESIGN GRADE LESS THAN ONE PERCENT (1%), VERIFICATION OF THE PIPE GRADE WILL BE REQUIERD TO PROVIDE DAILY DOCUMENTATION VERIFYING THAT THE AS-BUILT PIPE GRADE MEETS THE DESIGN GRADE THROUGH THE SUBMITTAL OF SIGNED CUT SHEETS TO THE MSD INSPECTOR UPON REQUEST.

MSD APPROVED BENCHMARK: STL CO. BM 18-136
NGVD29 ELEV = 596.22 FIUS
"U" ON TOP OF THE CURB AT THE NORTH END OF THE ISLAND; APPROXIMATELY ON THE CENTERLINE OF LABONNE PARKWAY AND 40' SOUTH OF THE CENTERLINE OF CARMAN ROAD.

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

TITLE SHEET

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

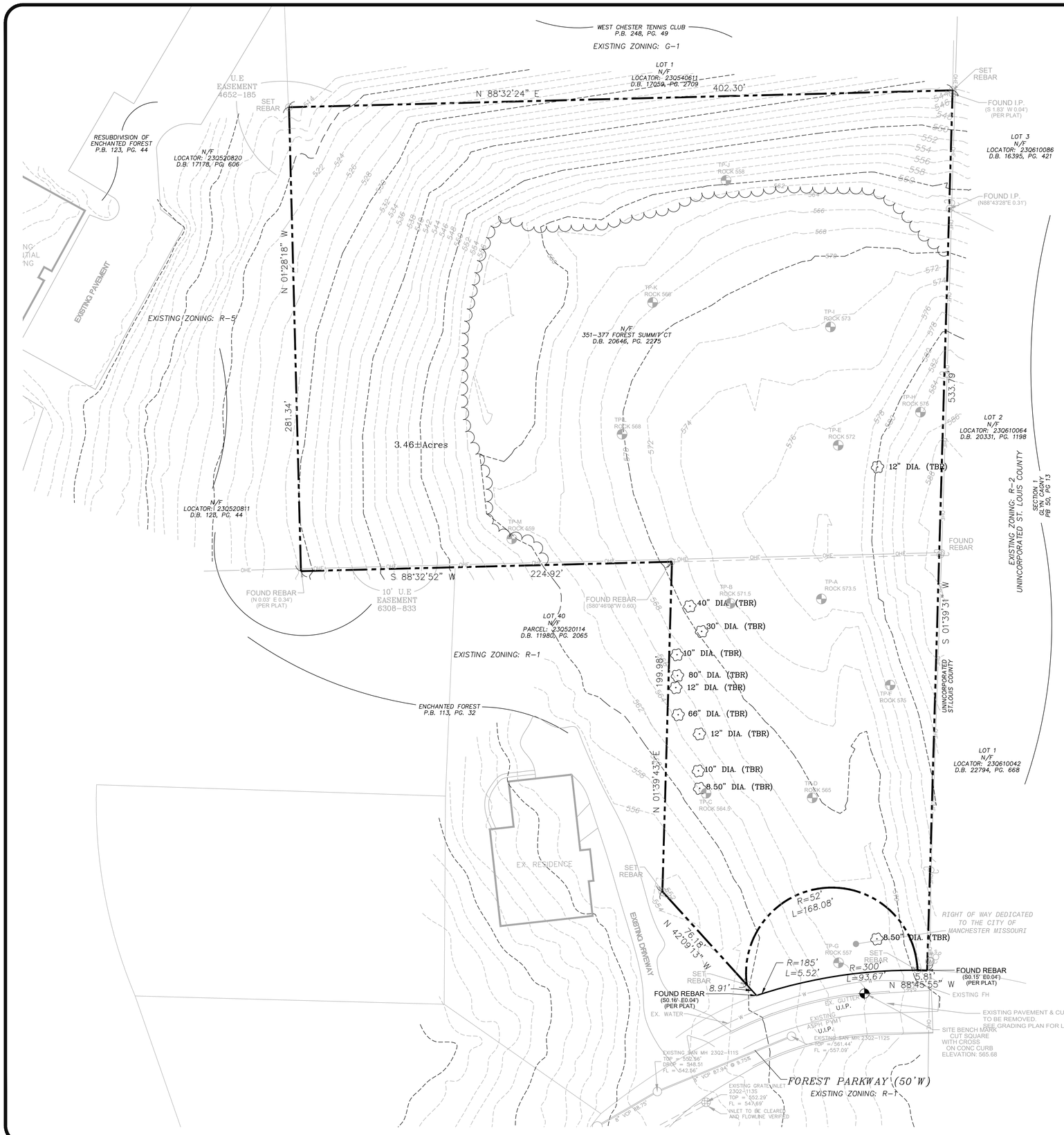
SEAL: STATE OF MISSOURI DAVID L. VONARX NUMBER 2004-017 PROFESSIONAL ENGINEER 2/12/2020 DAVID L. VONARX

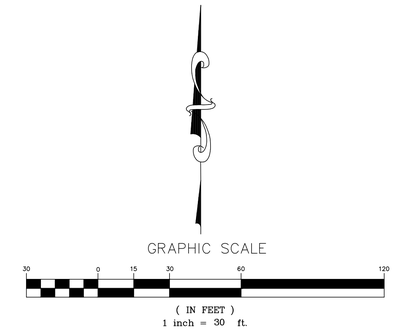
CIVIL ENGINEER

VonArx Engineering
10795 BUSINESS 21, SUITE A
HILLSBORO, MISSOURI 63050
OFFICE: (636) 797-8425
CELL: (314) 952-5038
dvonarx@vonarxengineering.com
CERTIFICATE OF AUTHORITY 10075

FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE: 1/13/2020
SCALE: NONE
Job Number: 15145
Sheet Number: C1





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MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

EXISTING CONDITIONS

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL:
STATE OF MISSOURI
GLYN L. VONARX
NUMBER
E-22944
REGISTERED
PROFESSIONAL ENGINEER
2/12/2020

CIVIL ENGINEER
VonArx Engineering
10765 BUSINESS 21, SUITE A
HILLSBORO, MISSOURI 63050
OFFICE: (636) 797-8425
CELL: (314) 952-5038
Glynarx@vonarxengineering.com
CERTIFICATE OF AUTHORITY 10075

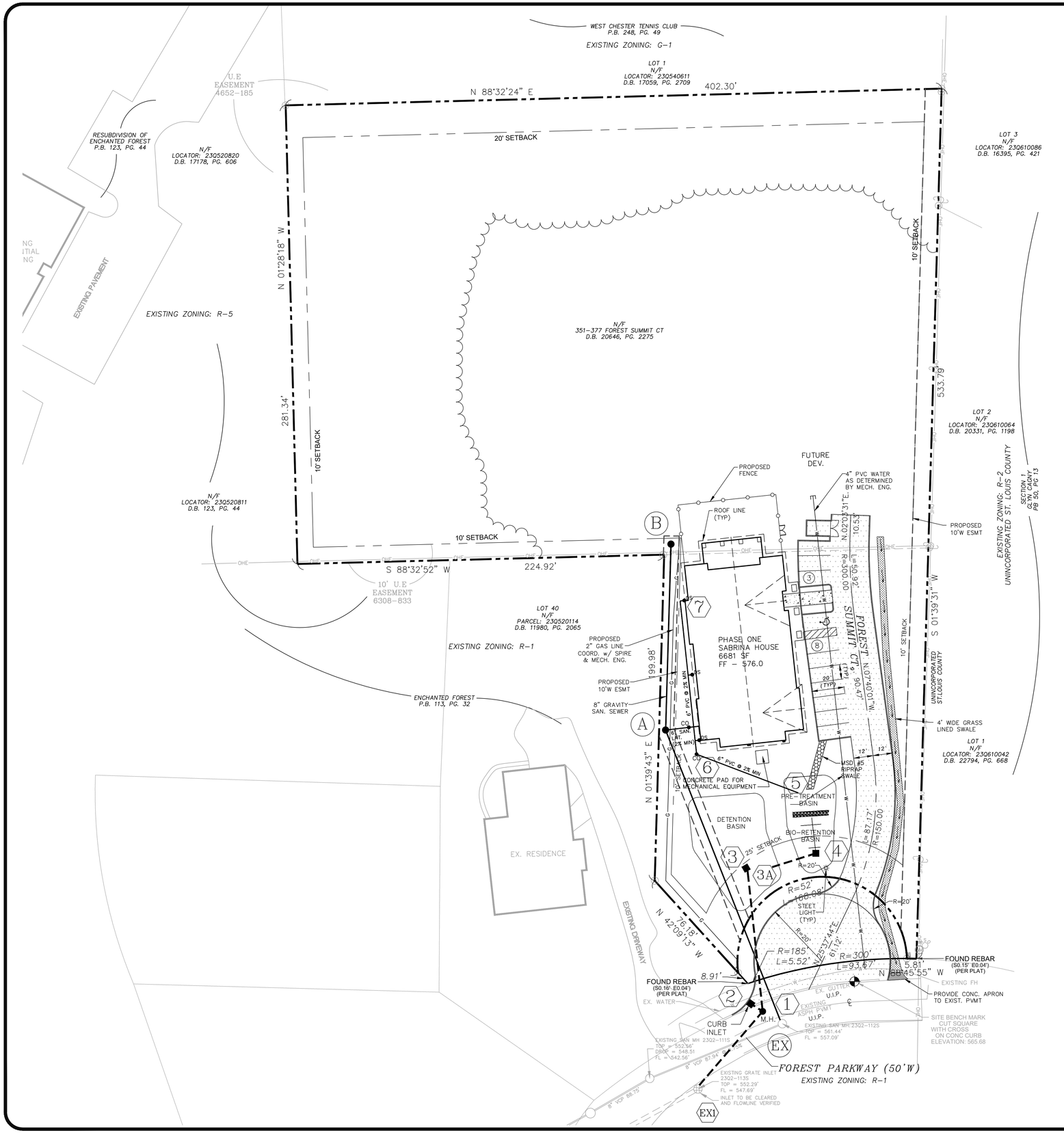
FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

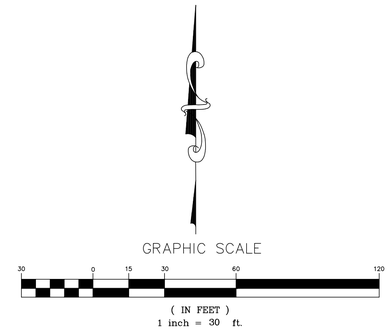
ISSUE DATE
1/13/2020

SCALE
1" = 30'

Job Number
15145

Sheet Number
C2





NOTE: FOR DOWNSPOUT LOCATIONS AND LATERAL PIPING, SEE SHEET C3.2

THE UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NON-EXISTENCE, SIZE, TYPE, OR LOCATION OF THESE OR OTHER UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UTILITIES, SHOWN OR NOT SHOWN, AND SAID UTILITIES SHALL BE LOCATED IN THE FIELD PRIOR TO ANY CONSTRUCTION OF IMPROVEMENTS. THESE PROVISIONS SHALL IN NO WAY ABSOLVE ANY PARTY FROM COMPLYING WITH THE UNDERGROUND FACILITY SAFETY AND DAMAGE PREVENTION ACT, CHAPTER 319 RSMo.

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

OVERALL SITE PLAN

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

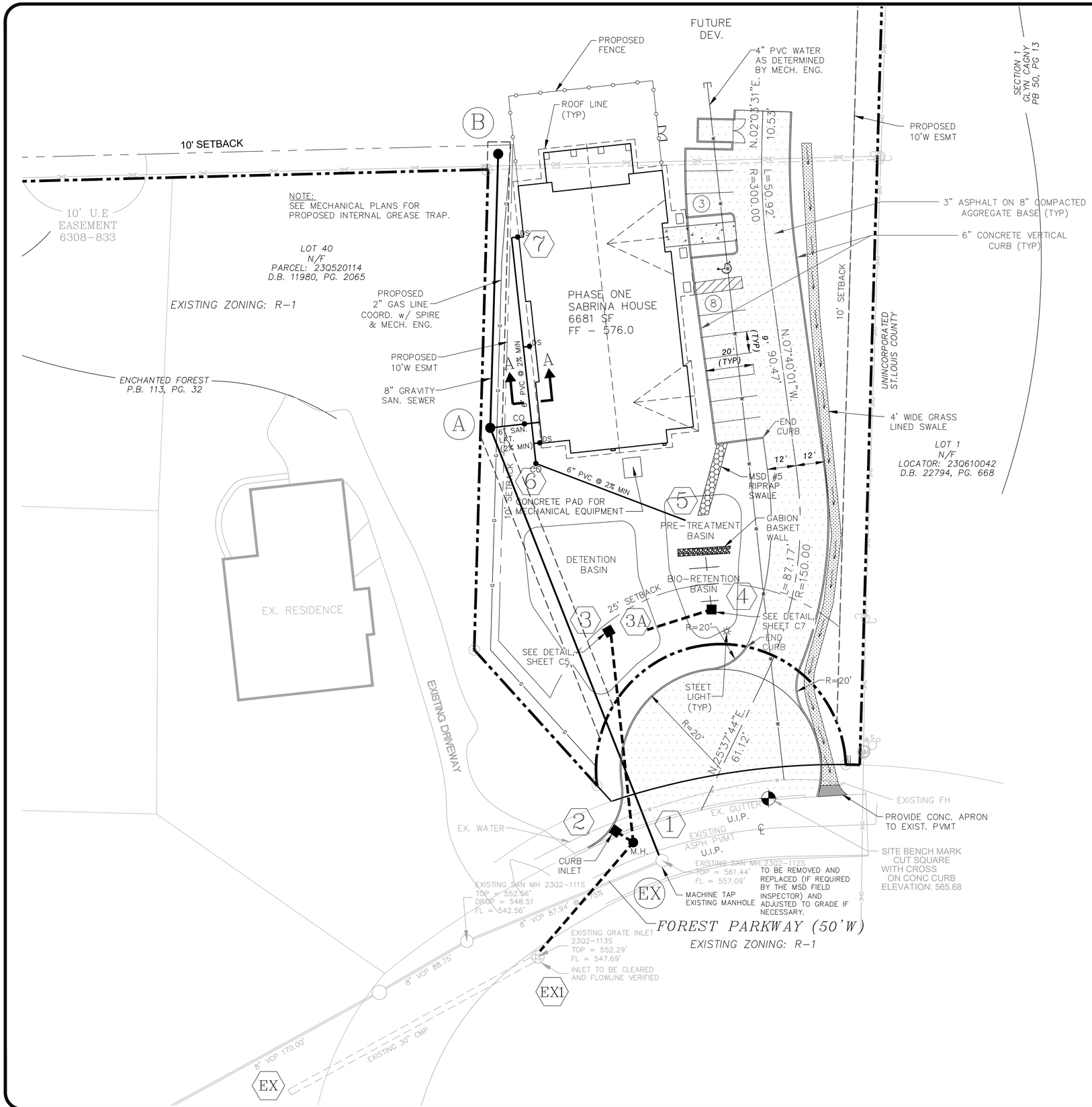
OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

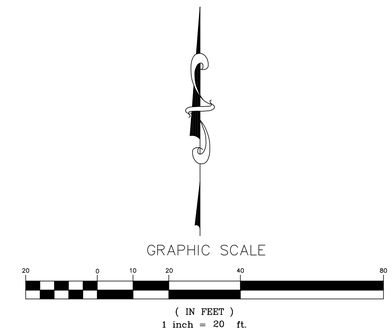
SEAL:
STATE OF MISSOURI
DAVID W. VON ARX
NUMBER
2006037
REGISTERED PROFESSIONAL ENGINEER
2/12/2020
DAVID W. VON ARX, P.E. #2006037

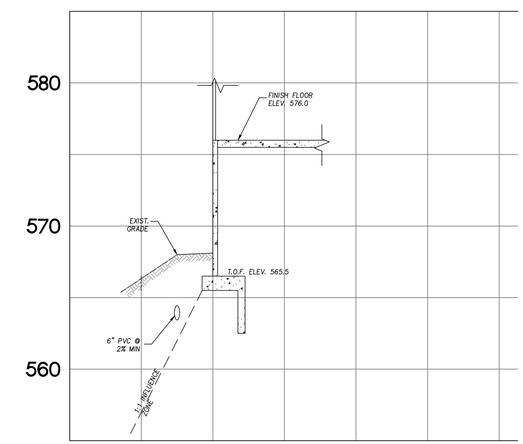
CIVIL ENGINEER
VonArx Engineering
10765 BUSINESS 21, SUITE A
HILLSBORO, MISSOURI 63050
OFFICE: (636) 797-8425
CELL: (314) 952-5038
dvonarx@vonarxengineering.com
DESIGN FIRM LICENSE OF AUTHORITY 2007

FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE	1/13/2020
SCALE	1" = 30'
Job Number	15145
Sheet Number	C3.1







SECTION A-A
SCALE: HORIZ. 1"=10'
VERT. 1"=5'

THE UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NON-EXISTENCE, SIZE, TYPE, OR LOCATION OF THESE OR OTHER UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UTILITIES, SHOWN OR NOT SHOWN, AND SAID UTILITIES SHALL BE LOCATED IN THE FIELD PRIOR TO ANY CONSTRUCTION OF IMPROVEMENTS. THESE PROVISIONS SHALL IN NO WAY ABSOLVE ANY PARTY FROM COMPLYING WITH THE UNDERGROUND FACILITY SAFETY AND DAMAGE PREVENTION ACT, CHAPTER 319 RSMo.

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014
SITE PLAN

Revisions	
Date	
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL: STATE OF MISSOURI DAVID L. VONARX NUMBER E-28247 REGISTERED PROFESSIONAL ENGINEER 2/12/2020

CIVIL ENGINEER
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CERT NO. E-2247 C-2247 LS-2007-0170275
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CELL: (314) 952-9238

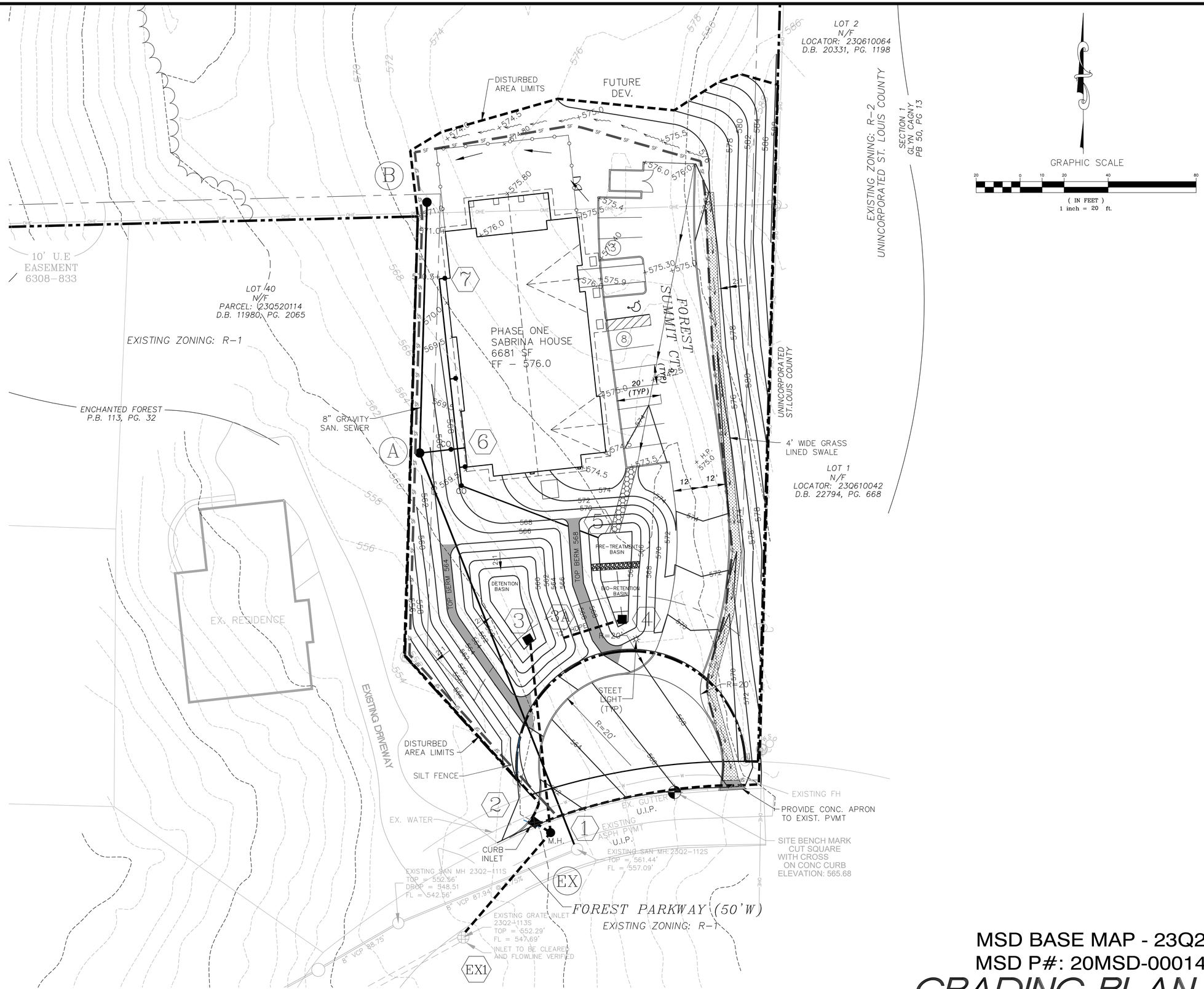
FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE
1/13/2020

SCALE
1" = 30'

Job Number
15145

Sheet Number
C3.2



MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

GRADING PLAN

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
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SEAL: STATE OF MISSOURI, DAVID L. VONARX, NUMBER E-23947, REGISTERED PROFESSIONAL ENGINEER, 2/12/2020

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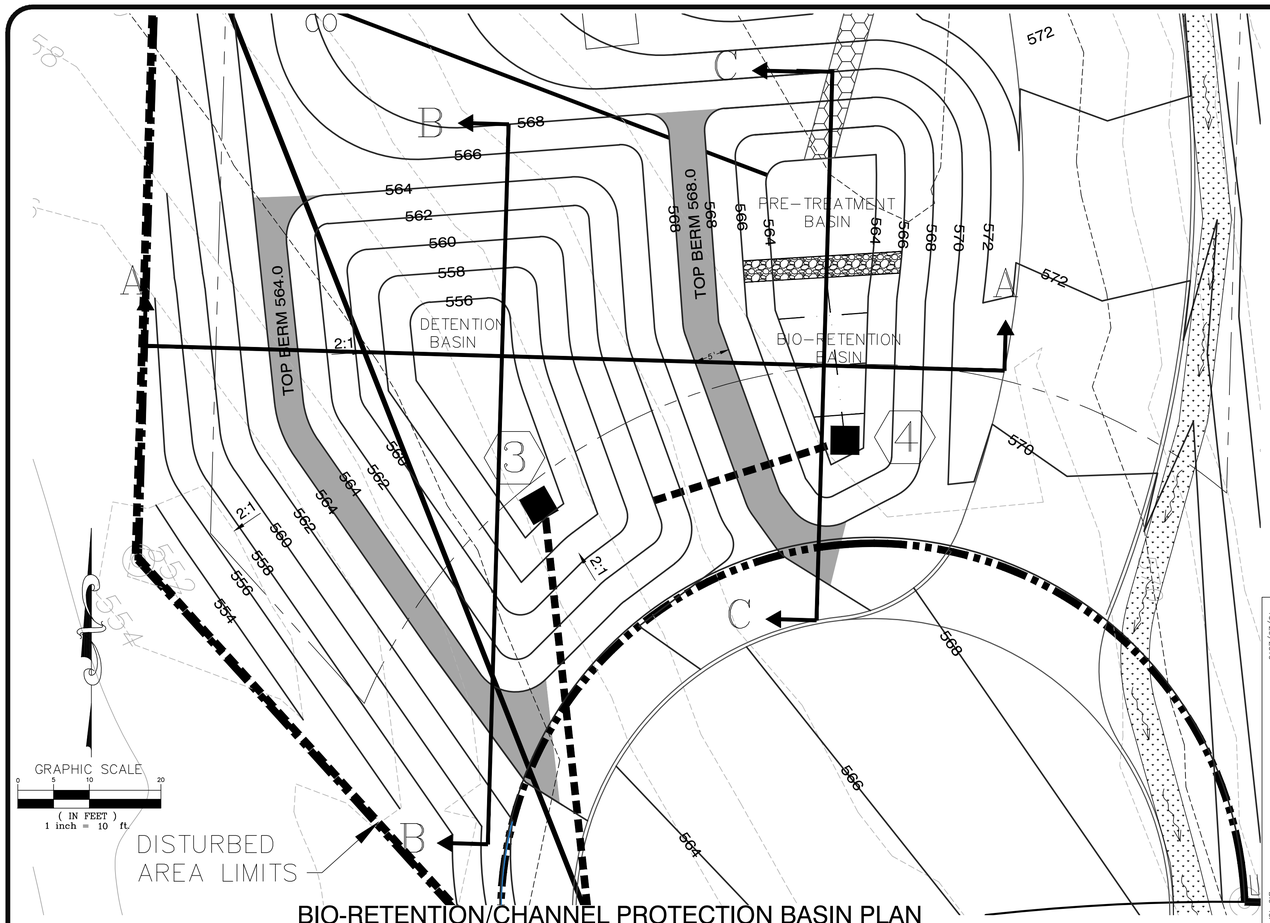
FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE
1/13/2020

SCALE
1" = 20'

Job Number
15145

Sheet Number
C4



BIO-RETENTION/CHANNEL PROTECTION BASIN PLAN

SCALE: 1"=10'

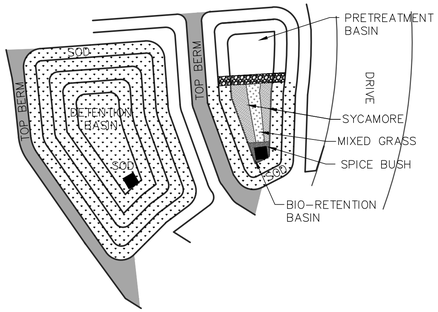
Commonly Used Species for Bioretention Areas

Trees	Shrubs	Herbaceous Species
Acer rubrum Red Maple	*Aesculus parviflora* Bottlebrush Buckeye	*Andropogon virginicus* Broomsedge
Berula nigra River Birch	*Cephalanthus occidentalis* Buttonbush	*Eupatorium perpurea* Joe Pye Weed
Juniperus virginiana Eastern Red Cedar	*Hamemelis virginiana* Witch Hazel	*Scirpus pungens* Three Square Bulrush
Chionanthus virginicus Fringe-tree	*Vaccinium corymbosum* Highbush Blueberry	*Iris versicolor* Blue Flag
Nyssa sylvatica Black Gum	*hex glabra* Inkberry	*Lobelia cardinalis* Cardinal Flower
Diospyros virginiana Persimmon	*hex verticillata* Winterberry	*Panicum virgatum* Switchgrass
Platanus occidentalis Sycamore	*Viburnum dentatum* Arrowwood	*Dichanthelium scoparium* Broom Panic Grass
Quercus palustris Pin Oak	*Lindera benzoin* Spicebush	*Rudbeckia laciniata* Tall Coneflower
Quercus phellos Willow Oak	*Myrica pennsylvanica* Bayberry	*Scirpus cyperinus* Woolgrass
SalLt nigra Black willow		*Vernonia noveboracensis* New York Ironweed

Note 1: For more options on plant selection for bioretention, consult Bioretention Manual (ETAB, 1993) or the Design of Stormwater Filtering Systems (Claytor and Schueler, 1997).

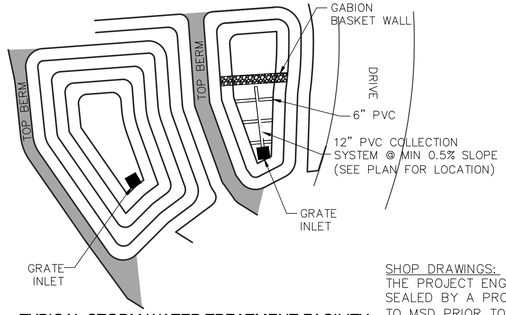
Planting Soil Characteristics	
Parameter	Value
pH range	5.2 to 7.0
Organic matter	1.5% to 4.0% (by weight)
Magnesium	35 lbs. per acre, minimum
Phosphorus (phosphate - P205)	75 lbs. per acre, minimum
Potassium (potash - 1(20)	85 lbs. per acre, minimum
Soluble salts	0 to 500 ppm
Clay	10 to 25%
Silt	30 to 55%
Sand	35 to 60%

Mulch Layer:
The mulch layer plays an important role in the performance of the bioretention system. The mulch layer helps maintain soil moisture and avoids surface sealing which reduces permeability. Mulch helps prevent erosion, and provides a microenvironment suitable for soil biota at the mulch/soil interface. It also serves as a pretreatment layer, trapping the finer sediments which remain suspended after the primary pretreatment. The mulch layer should be standard landscape style, single or double shredded hardwood mulch or chips. The mulch layer should be well aged (stockpiled or stored for at least 6 months), uniform in color, and free of other materials, such as weed seeds, soil, roots, etc. The mulch should be applied to a maximum depth of three inches. Grass clippings should not be used as a mulch material.



TYPICAL TREE PLANTING CONFIGURATION

SCALE: N.T.S.



TYPICAL STORM WATER TREATMENT FACILITY

SCALE: N.T.S.

2.Planting Soil

The soil shall be a uniform mix, free of stones, stumps, roots or other similar objects larger than two inches No other materials or substances shall be mixed or dumped within the bioretention area that may be harmful to plant growth, or prove a hindrance to the planting or maintenance operations. The planting soil shall be free of Bermuda grass, Quackgrass, Johnson grass, or other noxious weeds as specified under COMAR 15.08.01.05.

The planting soil shall be tested and shall meet the following criteria:
pHrange 5.2-7.0
organic matter 1.5 - 4% (by weight)
magnesium 35 lb./ac
phosphorus (phosphate - P205) 75 lb./ac
potassium (potash - K20) 85 lb./ac
soluble salts not to exceed 500 ppm

All bioretention areas shall have a minimum of one test. Each test shall consist of both the standard soil test for pH, phosphorus, and potassium and additional tests of organic matter, and soluble salts. A textural analysis is required from the site stockpiled topsoil. If topsoil is imported, then a texture analysis shall be performed for each location where the top soil was excavated.

Since different labs calibrate their testing equipment differently, all testing results shall come from the same testing facility.

Should the pH fall out of the acceptable range, it may be modified (higher) with lime or (lower) with iron sulfate plus sulfur.

3. Compaction

It is very important to minimize compaction of both the base of the bioretention area and the required backfill. When possible, use excavation hoes to remove original soil. If bioretention area is excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.
Compaction can be alleviated at the base of the bioretention facility by using a primary tilling operation such as a chisel plow, ripper, or sub-soiler These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Substitute methods must be approved by the engineer. Rototillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Rototill 2 to 3 inches of sand into the base of the bioretention facility before backfihling the optional sand layer. Pump any ponded water before preparing (rototilling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then rototill the sand/topsoil to create a gradation zone Backfill the remainder of the topsoil to final grade.

When backfilling the bioretention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bioretention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grade bioretention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

4. **Plant Installation**

Mulch should be placed to a uniform thickness of 2" to 3". Shredded hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bioretention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.
Root stock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8 of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.
Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.
Grasses and legume seed should be drilled into the soil to a depth of at least one inch. Grass and legume plugs shall be planted following the non-grass ground cover planting specifications.
The topsoil specifications provide enough organic material to adequately supply nutrients from natural cycling. The primary function of the bioretention structure is to improve water quality. Adding fertilizers defeats, or at a minimum, impedes this goal. Only add fertilizer if wood chips or mulch are used to amend the soil. Rototill urea fertilizer at a rate of 2 pounds per 1000 square feet

5. **Underdrains**

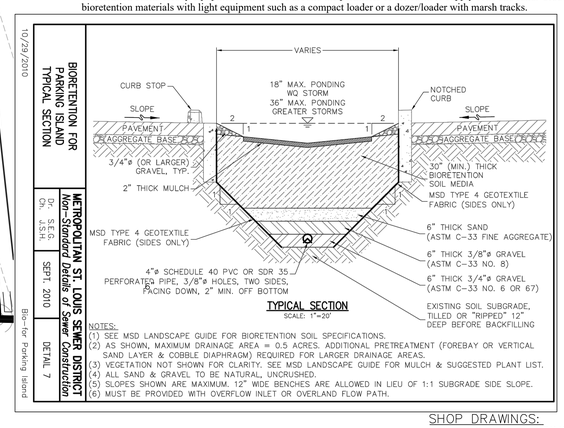
Underdrains are to be placed on a 3'-0" wide section of filter cloth Pipe is placed next, followed by the gravel bedding. The ends of underdrain pipes not terminating in an observation well shall be capped.
The main collector pipe for underdrain systems shall be constructed at a minimum slope of 0.5%. Observation wells and/or clean-out pipes must be provided (one minimum per every 1000 square feet of surface area).

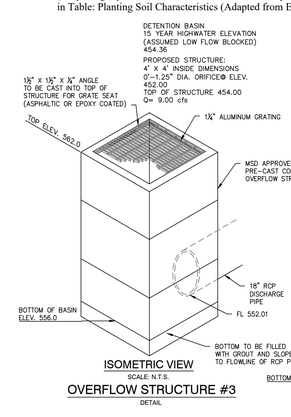
6. **Miscellaneous**

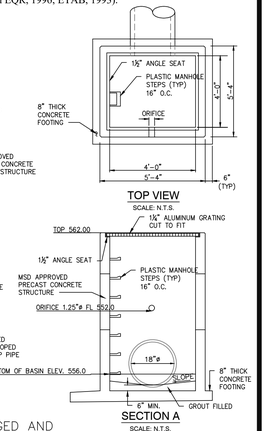
The bioretention facility may not be constructed until all contributing drainage areas have been stabilized.

7. **Bioretention**

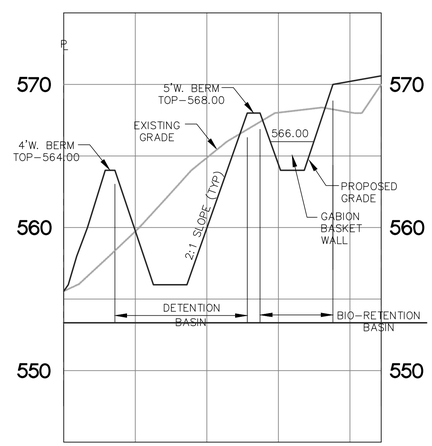
Soil Bed Characteristics:
The characteristics of the soil for the bioretention facility are perhaps as important as the facility location, size, and treatment volume. The soil must be permeable enough to allow runoff to filter through the media, while having characteristics suitable to promote and sustain a robust vegetative cover crop. In addition, much of the nutrient pollutant uptake (nitrogen and phosphorus) is accomplished through absorption and microbial activity within the soil profile. Therefore, soils must balance their chemical and physical properties to support biotic communities above and below ground. The planting soil should be a sandy loam, loamy sand, loam (USDA), or a loamy sand mix (should contain a minimum 35 to 60% sand, by volume). The clay content for these soils should be less than 25% by volume [Environmental Quality Resources (EQR), 1996; Engineering Technology Inc. and Biohabitats, Inc. (ETAB), 1993]. Soils should fall within the SM, ML, SC classifications or the Unified Soil Classification System (USCS). A permeability of at least 1.0 feet per day (0.5"/hr) is required (a conservative value of 0.5 feet per day is used for design). The soil should be free of stones, stumps, roots, or other woody material over 1" in diameter. Brush or seeds from noxious weeds (e.g., Johnson Grass, Mugwort, Nutsedge, and Canada Thistle or other noxious weeds as specified under COMAR 15.08.01.05.) should not be present in the soils. Placement of the planting soil should be in 12" to 18" lifts that are loosely compacted (tamped lightly with a backhoe bucket or traversed by dozer tracks). The specific characteristics are presented in Table: Planting Soil Characteristics (Adapted from EQR, 1996; ETAB, 1993).





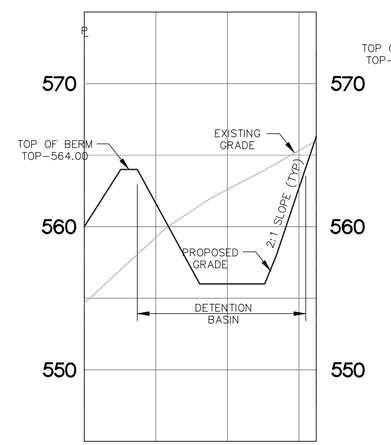


SHOP DRAWINGS:
THE PROJECT ENGINEER SHALL PROVIDE SHOP DRAWINGS SINGED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN MISSOURI FOR APPROVAL TO MSD PRIOR TO CONSTRUCTION. PLEASE CONTACT THE DISTRICT'S CONSTRUCTION MANAGEMENT DIVISION AT (314) 355-2072 FOR QUESTIONS.



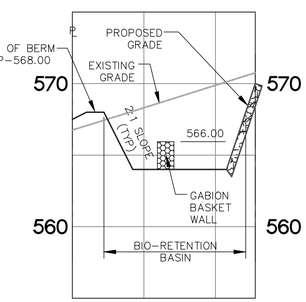
SECTION A-A

SCALE: HORIZ. 1"=30'



SECTION B-B

SCALE: HORIZ. 1"=30'
VERT. 1"=5'



SECTION C-C

SCALE: HORIZ. 1"=30'
VERT. 1"=5'

SHOP DRAWINGS:
THE PROJECT ENGINEER SHALL PROVIDE SHOP DRAWINGS SINGED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN MISSOURI FOR APPROVAL TO MSD PRIOR TO CONSTRUCTION. PLEASE CONTACT THE DISTRICT'S CONSTRUCTION MANAGEMENT DIVISION AT (314) 355-2072 FOR QUESTIONS.

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

DETENTION BASIN DETAILS

Revisions	
Date	
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
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SEAL:
STATE OF MISSOURI
DAVID L. VONARX
NUMBER
E-25647
REGISTERED PROFESSIONAL ENGINEER
2/12/2020
DAVID L. VONARX
DATE: 2/12/2020

CIVIL ENGINEER
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CERTIFICATE OF AUTHORITY 00975

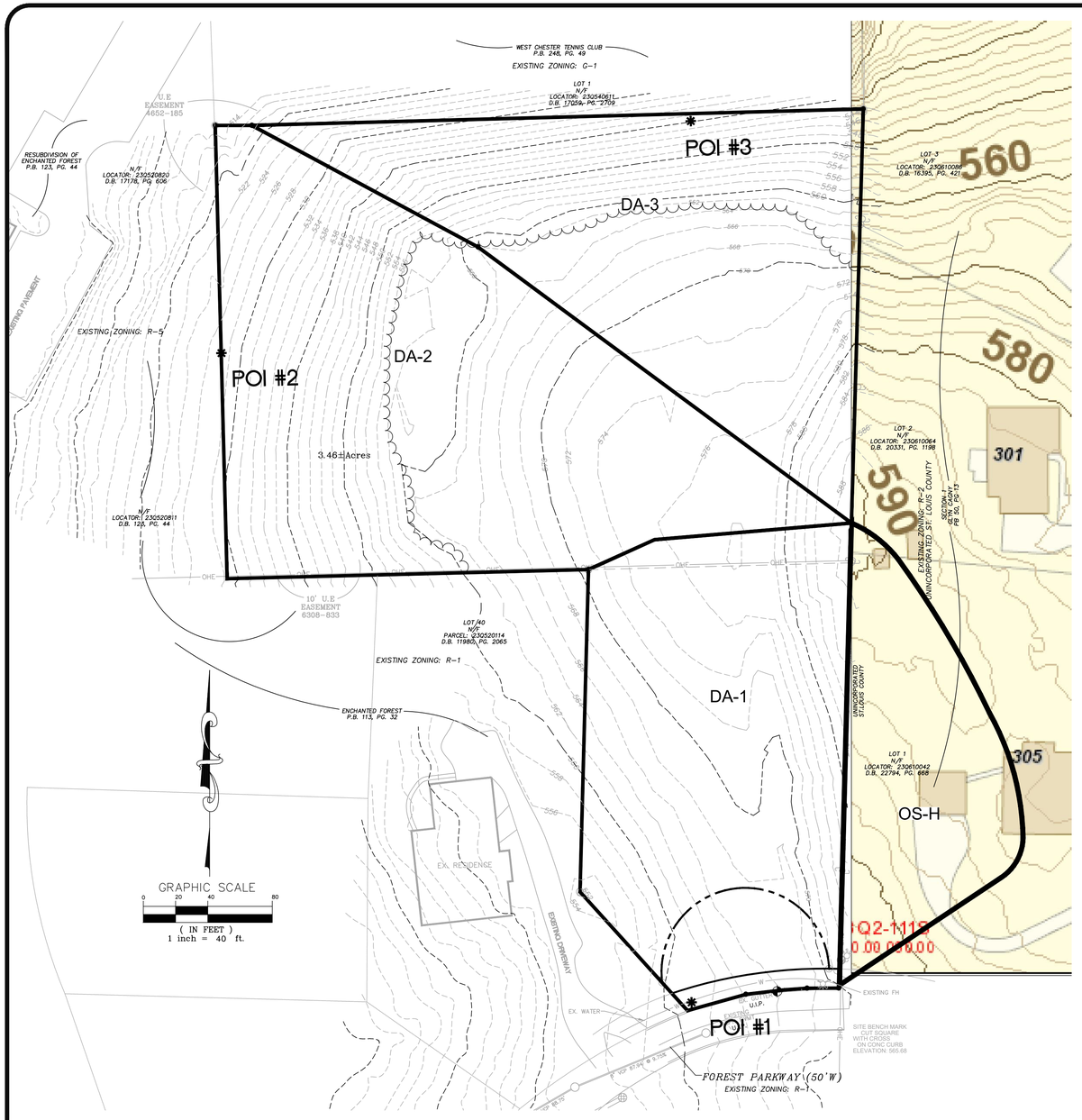
FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE
1/13/2020

SCALE
NOTED

Job Number
15145

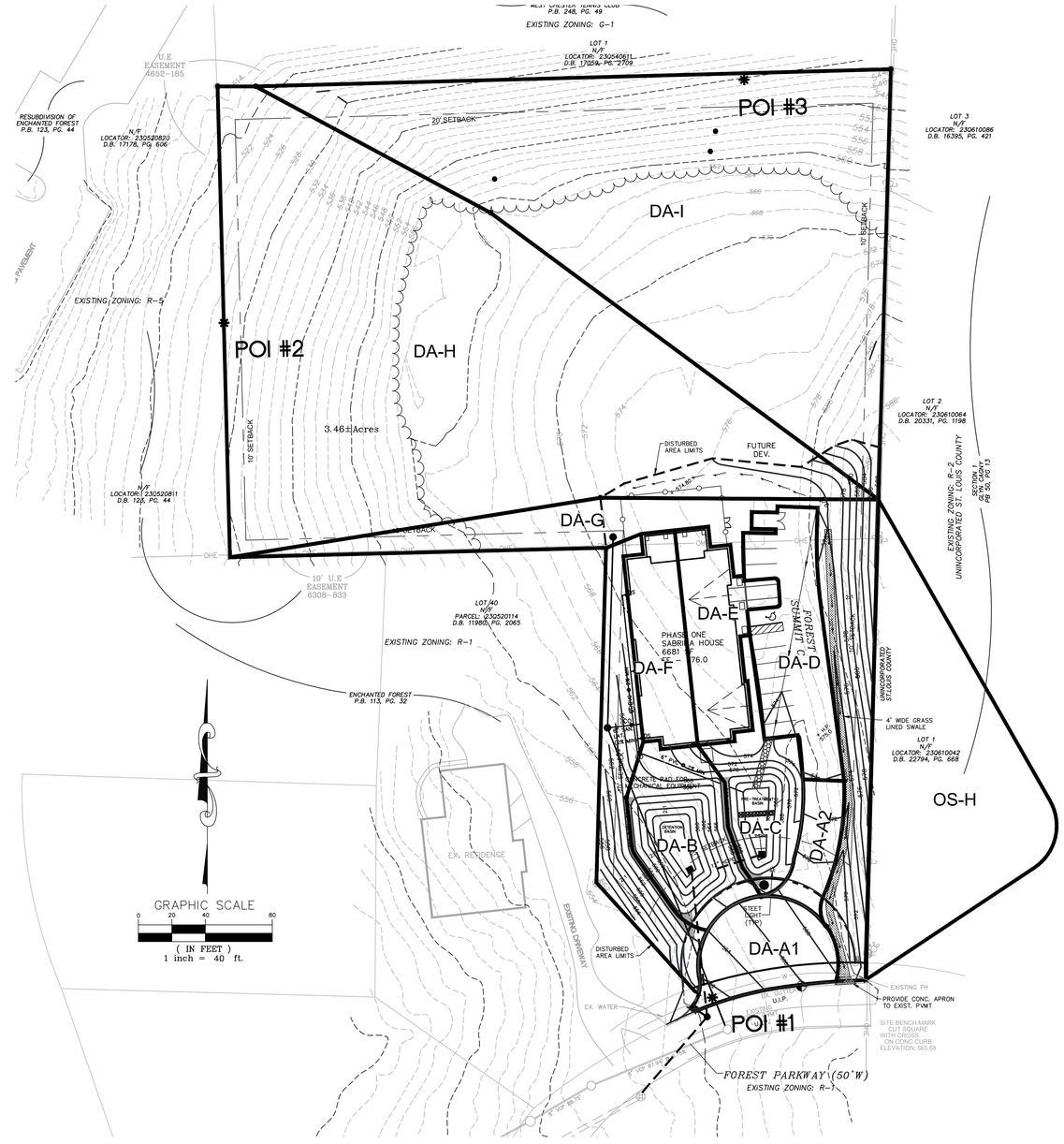
Sheet Number
C5



PRE-DEVELOPED DRAINAGE AREA MAP

SCALE: 1"=40'

NOTE: POI = POINT OF INTEREST



DEVELOPED DRAINAGE AREA MAP

SCALE: 1"=40'

NOTE: POI = POINT OF INTEREST

PRE-DEVELOPED DRAINAGE AREA MAP				
DA	PI(CFS/AC)	AREA (AC)	Q (CFS)	POI #
1	1.70	1.01	1.72	1
2	1.70	1.44	2.45	2
3	1.70	1.04	1.77	3
		TOTAL Q =	5.94	
OS-H	1.70	0.40	0.68	1

DIFFERENTIAL RUNNOFF CALCULATIONS

ENTIRE SITE
Q DIFF = Q POST – Q PRE
Q DIFF = 7.19 cfs – 5.94 cfs
Q DIFF = 1.25 cfs
THEREFORE STORM WATER DETENTION IS REQUIRED

POI #1
Q PRE = 1.72 CFS
Q POST = 3.18 CFS
Q DIFF = 3.18 CFS – 1.72 CFS
Q DIFF = 1.46 CFS

POST-DEVELOPED DRAINAGE AREAS				
DA	PI (CFS/AC)	AREA (AC)	Q (CFS)	POI #
A1	3.54	0.10	0.35	1
A2	3.54	0.05	0.18	1
B	1.70	0.12	0.20	1
C	1.70	0.10	0.17	1
D	3.54	0.14	0.50	1
E	3.54	0.10	0.35	1
F	4.20	0.22	0.92	1
G	1.70	0.30	0.51	1
H	1.70	1.32	2.24	2
I	1.70	1.04	1.77	3
		TOTAL Q =	7.19 cfs	
OS-H	1.70	0.40	0.68	

15 YR – 20 MIN. P.I.

5% IMPERVIOUS P.I. = 1.70 CFS/AC
40% IMPERVIOUS P.I. = 2.40 CFS/AC.
PAVEMENT P.I. = 3.54 CFS/AC.
PIPED ROOF P.I. = 4.20 CFS/AC.

POI #1: Qpost = 3.18 CFS
POI #2: Qpost = 2.24 CFS
POI #3: Qpost = 1.77 CFS
POST Qtotal = 7.19 CFS

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

DRAINAGE AREA MAPS

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
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(314) 863-9912

SEAL: STATE OF MISSOURI DAVID L. VONARX NUMBER E-22642 REGISTERED PROFESSIONAL ENGINEER 2/12/2020

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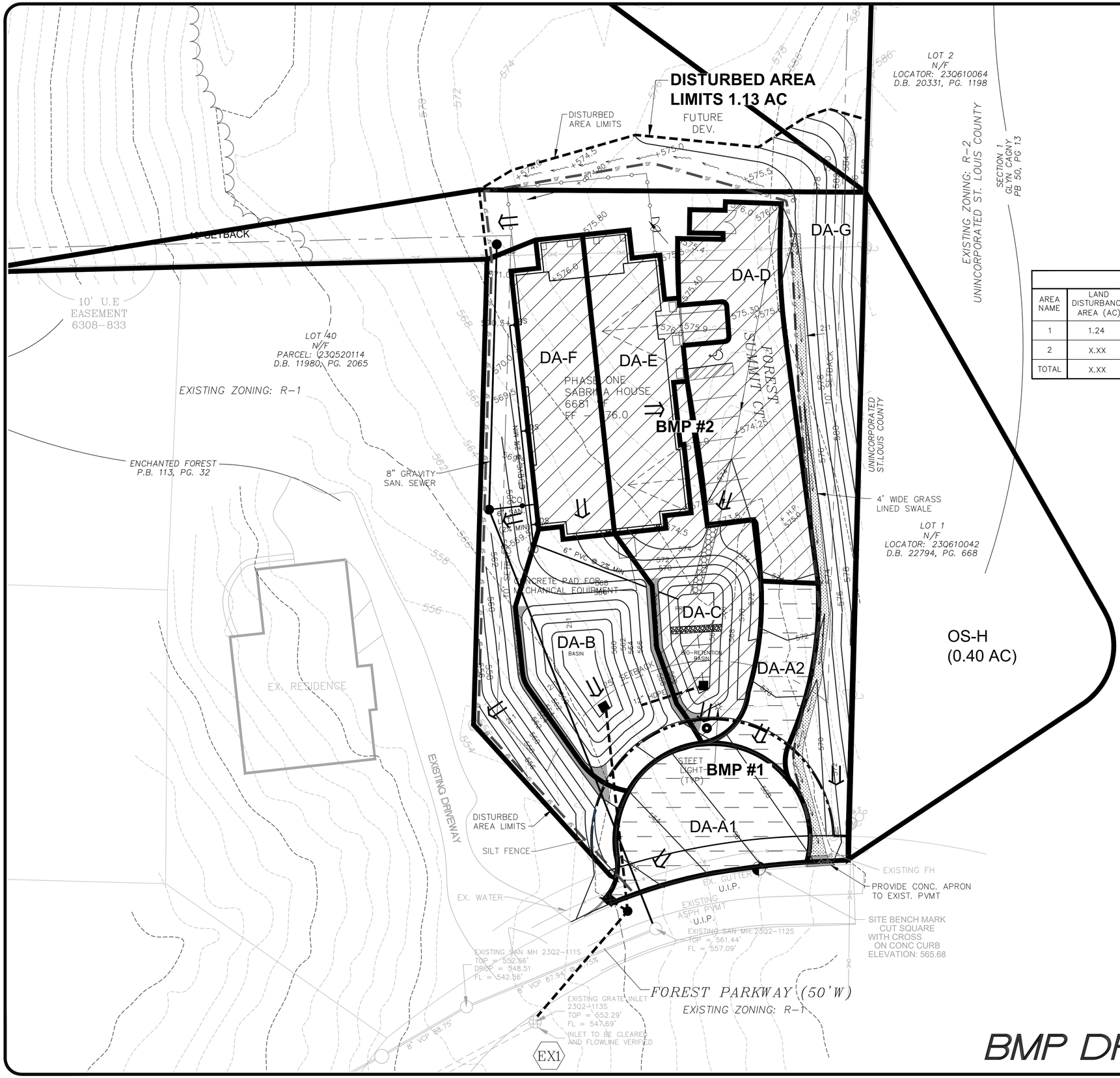
CERTIFICATE OF AUTHORITY: 1-0075

FAMILY PARTNERS
IMPROVEMENT PLANS – PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE: 1/13/2020
SCALE: 1" = 40'
Job Number: 15145
Sheet Number: C6.1



GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

BMP/STORMWATER CREDIT SUMMARY TABLE							
AREA NAME	LAND DISTURBANCE AREA (AC)	BMP TREATED AREA (AC)	STRUCTURAL BMP	WQ_v STORAGE REQUIRED (FT^3)	WQ_v STORAGE PROVIDED (FT^3)	WQ_f REQUIRED (cfs)	WQ_f PROVIDED (cfs)
1	1.24	1.54	HYDRODYNAMIC SEPARATOR	N/A	–	2.63	3.15
2	X.XX	X.XX	BIO-RETENTION	N/A		X.XX	X.XX
TOTAL	X.XX	X.XX		N/A		X.XX	X.XX

ANY FUTURE LAND DISTURBANCE, INCREASE IN IMPERVIOUS AREA, AND/OR CHANGE IN RUNOFF CONDITIONS ON THIS SITE MAY REQUIRE ADDITIONAL STORM WATER MANAGEMENT PER MSD REGULATIONS IN PLACE AT THAT TIME (INCLUDING TOTAL LAND DISTURBANCE AND/OR IMPERVIOUSNESS ADDED ON THIS PLAN, 20MSD-00014).

LAND DISTURBANCE AREA (THIS PROJECT) = 1.13 AC
LAND DISTURBANCE AREA (CUMULATIVE) = 2.09 AC

BMP TRIBUTARY AREAS	
BMP #1	0.14 AC
BMP #2	0.43 AC
DISTURBED AREA	1.13 AC

POST-DEVELOPED DRAINAGE AREAS			
DA	PI (CFS/AC)	AREA (AC)	Q (CFS)
A1	3.54	0.10	0.35
A2	3.54	0.05	0.18
B	1.70	0.12	0.20
C	1.70	0.10	0.17
D	3.54	0.14	0.50
E	3.54	0.10	0.35
F	4.20	0.22	0.92
G	1.70	0.30	0.49
H	1.70	1.32	2.24
I	1.70	1.04	1.77
		TOTAL Q =	7.17 cfs
OS-H	1.70	0.40	0.68

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

BMP DRAINAGE AREA MAP

Revisions	
Date	
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL: STATE OF MISSOURI DAVID LYNN LEVONARX NUMBER A-2004037 PROFESSIONAL ENGINEER
2/12/2020

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CERTIFICATE OF AUTHORITY 10375

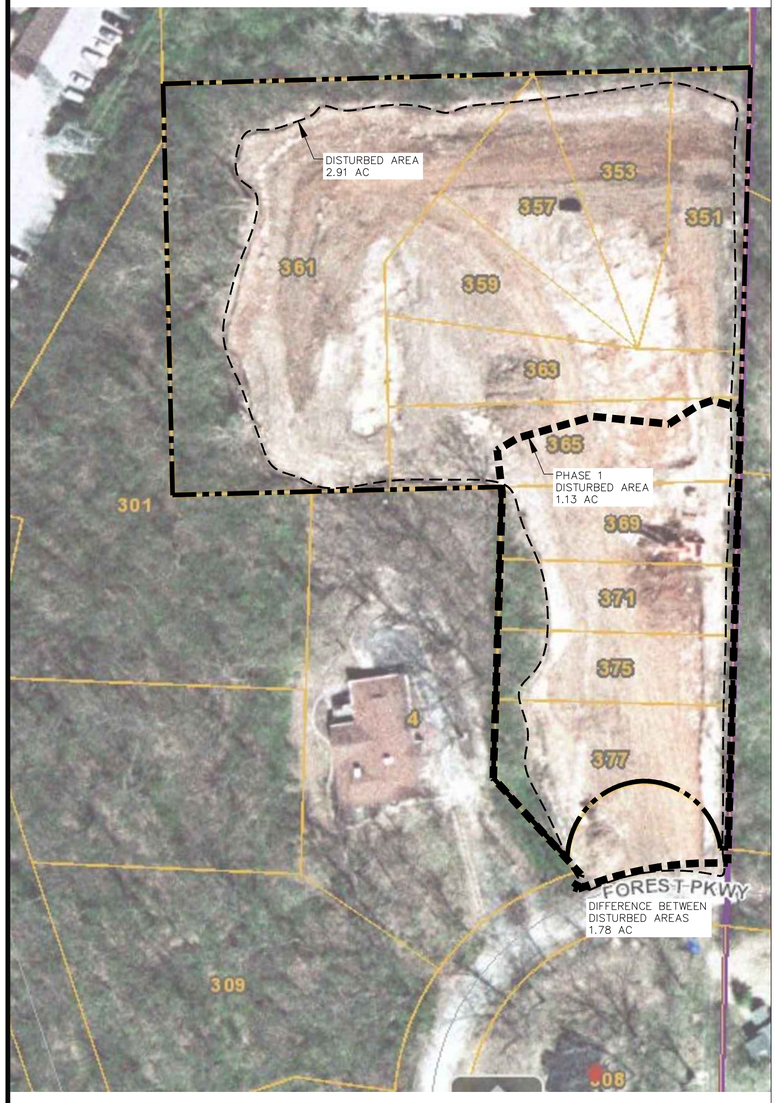
FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE
1/13/2020

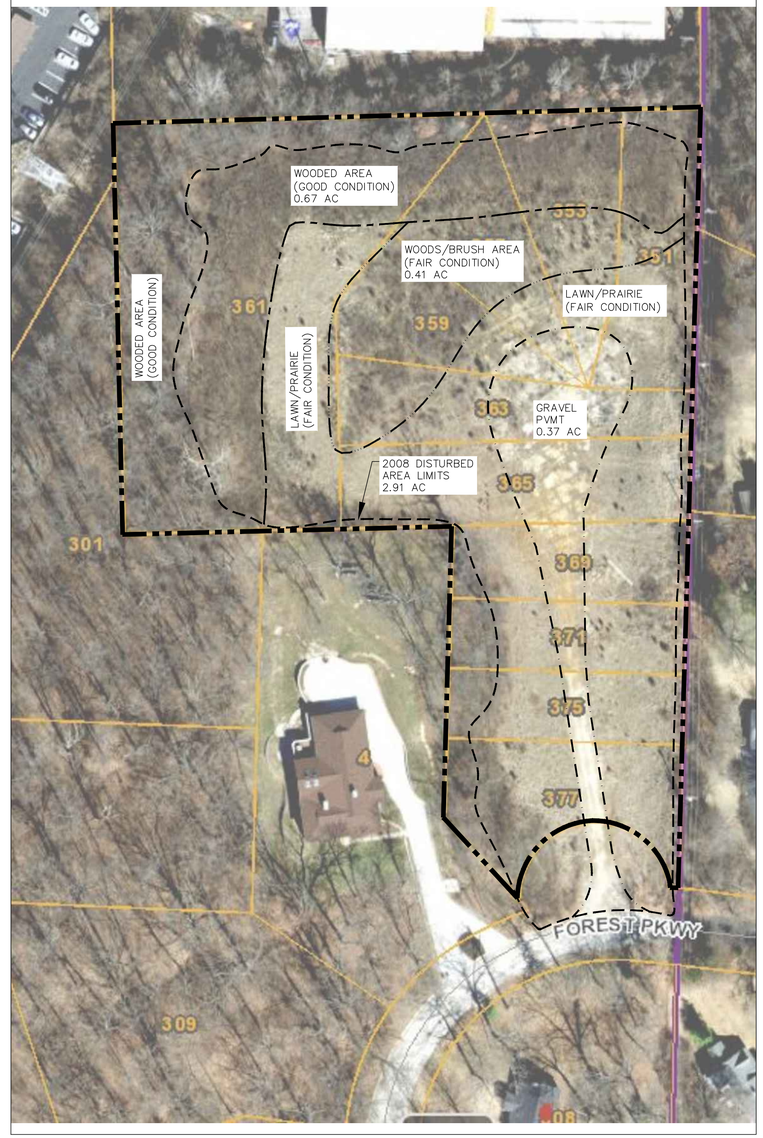
SCALE
1"=20'

Job Number
15145

Sheet Number
C6.2



2008 AERIAL FROM STL. COUNTY
GRADING FROM P27956-00
SCALE: 1"=50'



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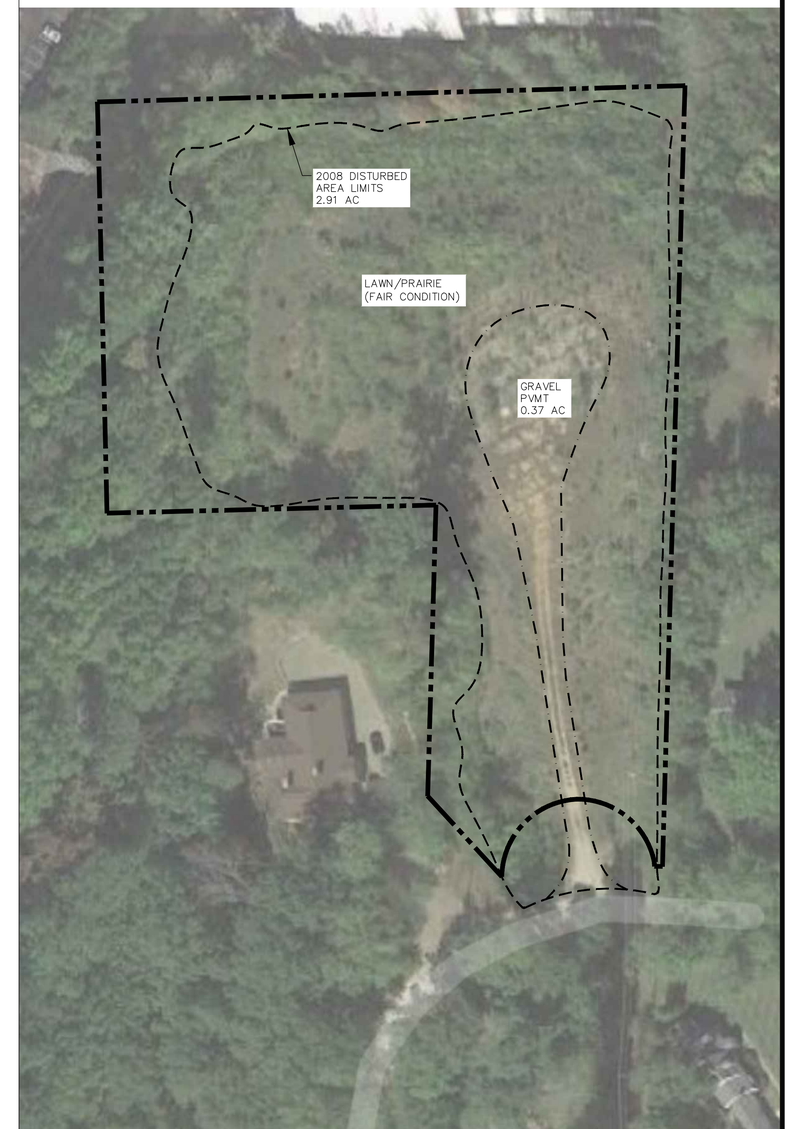


2020 AERIAL FROM GOOGLE IMAGE
SCALE: 1"=50'

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

HISTORICAL PHOTOS

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL:
STATE OF MISSOURI
LEON D. VONARX
NUMBER
E-22667
PROFESSIONAL ENGINEER
2/12/2020

CIVIL ENGINEER:
VonArx Engineering
10735 BUSINESS 21, SUITE A
HILLSBORO, MISSOURI 63050
OFFICE: (636) 797-8425
CELL: (314) 952-5038
dvonarx@vonarxengineering.com
CERTIFICATE OF AUTHORITY 10075

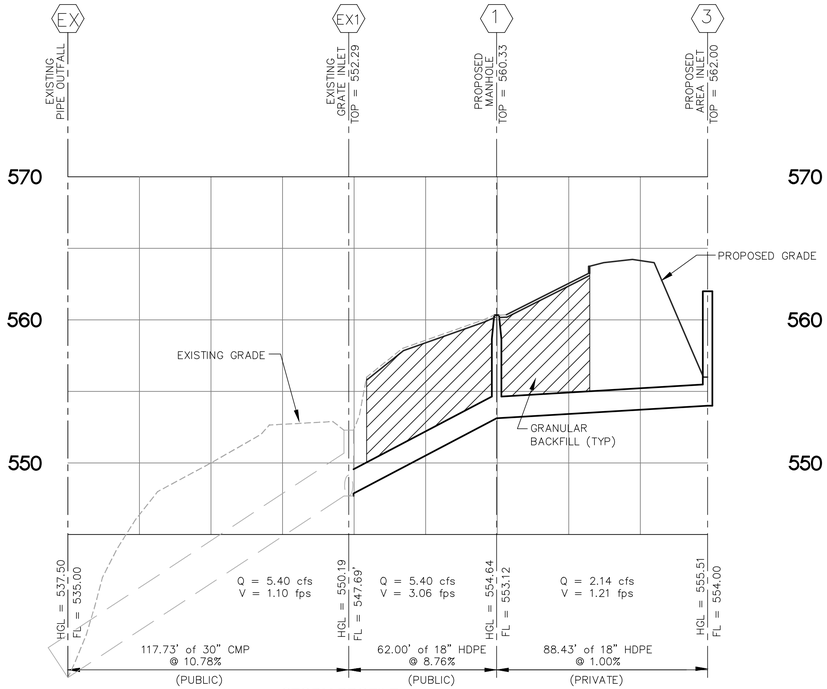
FAMILY PARTNERS
IMPROVEMENT PLANS - PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE
1/13/2020

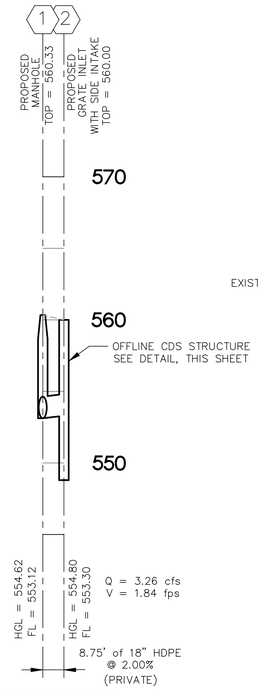
SCALE
1"=50'

Job Number
15145

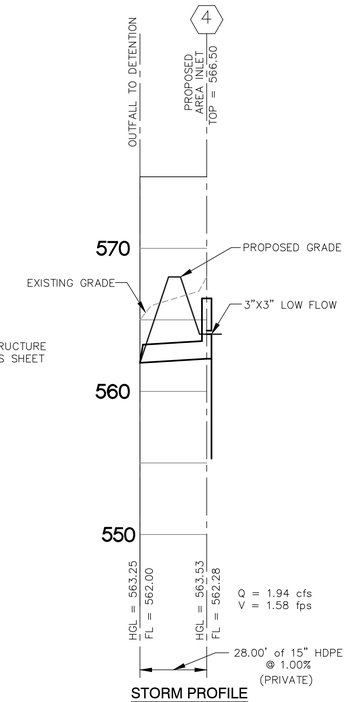
Sheet Number
C6.3



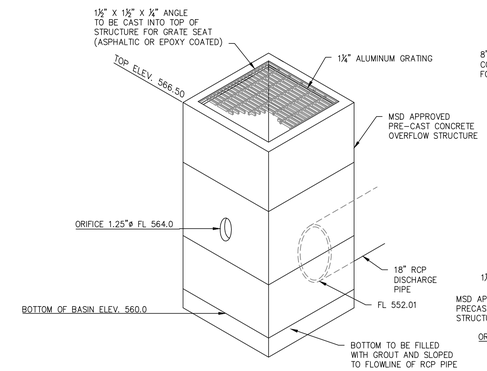
STORM PROFILE
SCALE: HORIZ. 1"=30'
VERT. 1"=5'



STORM PROFILE
SCALE: HORIZ. 1"=30'
VERT. 1"=5'

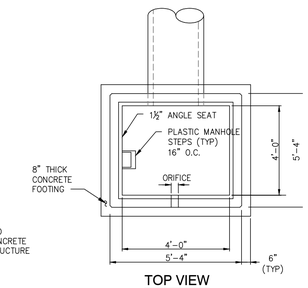


STORM PROFILE
SCALE: HORIZ. 1"=30'
VERT. 1"=5'

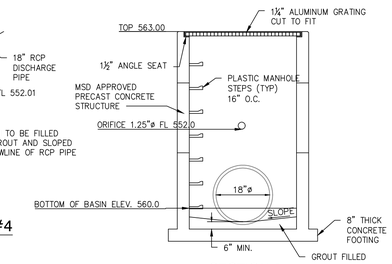


ISOMETRIC VIEW
SCALE: N.T.S.

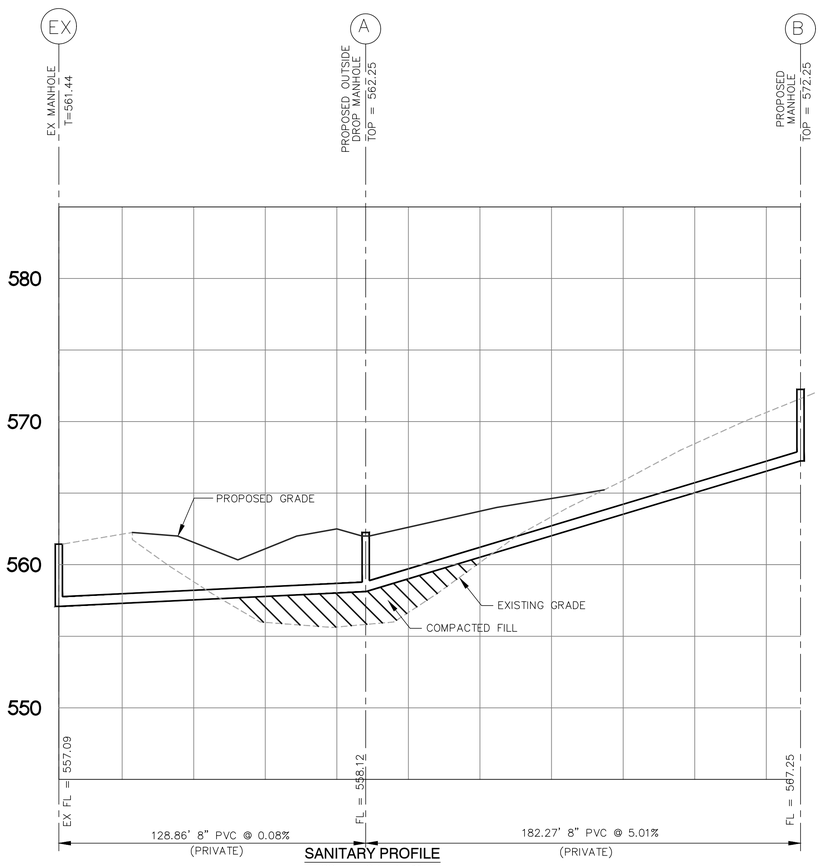
BIO-RETENTION STRUCTURE #4
DETAIL



TOP VIEW
SCALE: N.T.S.



SECTION A
SCALE: N.T.S.



SANITARY PROFILE
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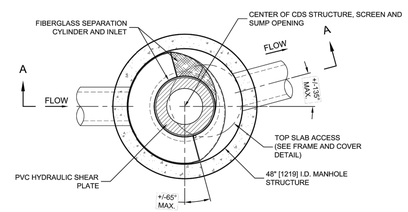
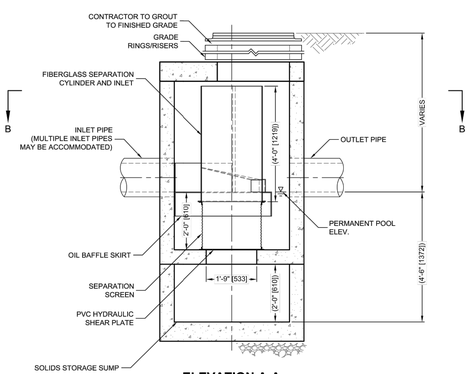
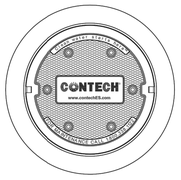
VERT. 1"=5'



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.



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

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

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.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS2015-4-C
INLINE CDS
STANDARD DETAIL

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

PROFILES

Revisions	
Date	
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL: STATE OF MISSOURI DAVID L. VONARX NUMBER E-28647 REGISTERED PROFESSIONAL ENGINEER 2/12/2020

CIVIL ENGINEER
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10795 BUSINESS 21, SUITE A
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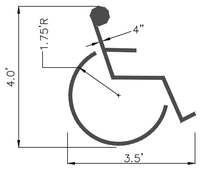
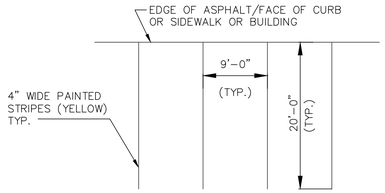
OFFICE: (636) 797-8425
CELL: (314) 952-5038
dvonarx@vonarxengineering.com
CDS2015-4-C-DETAILS-MSD-20MSD-00014.DWG

FAMILY PARTNERS
IMPROVEMENT PLANS – PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE	1/13/2020
SCALE	1" = 30'
Job Number	15145
Sheet Number	C7



HANDICAP SYMBOL DETAIL
N.T.S.



PARKING SPACE STRIPING
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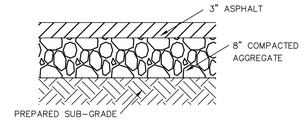
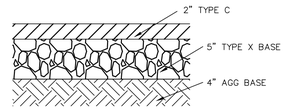
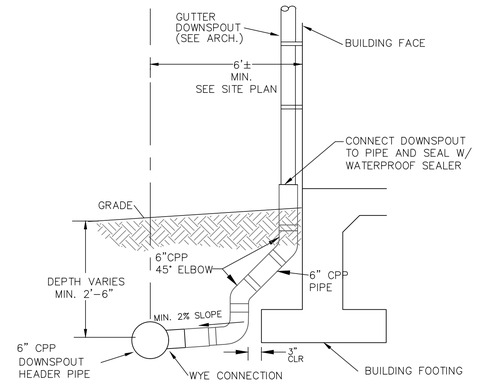


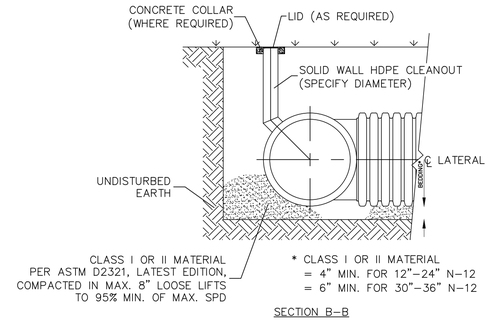
TYPICAL ASPHALT PAVEMENT DETAIL
N.T.S.



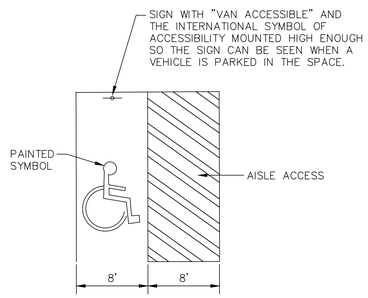
TYPICAL CUL-DE-SAC ASPHALT PAVEMENT DETAIL
N.T.S.



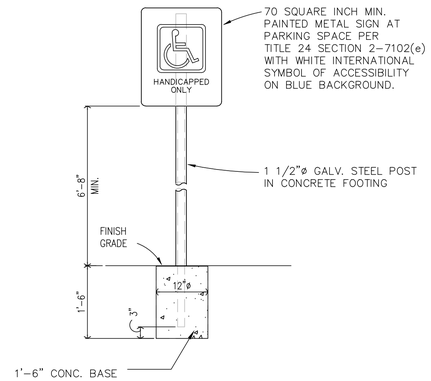
DOWNSPOUT CONNECTION



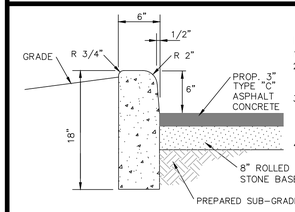
CLEANOUT DETAIL



HANDICAP PARKING SPACE DETAIL
N.T.S.

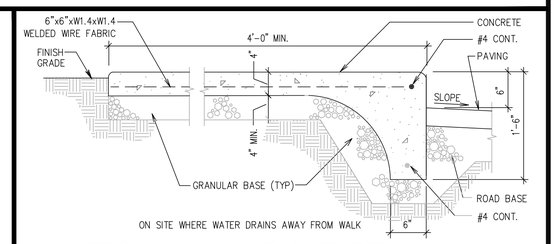


"HANDICAPPED PARKING" SIGN
N.T.S.

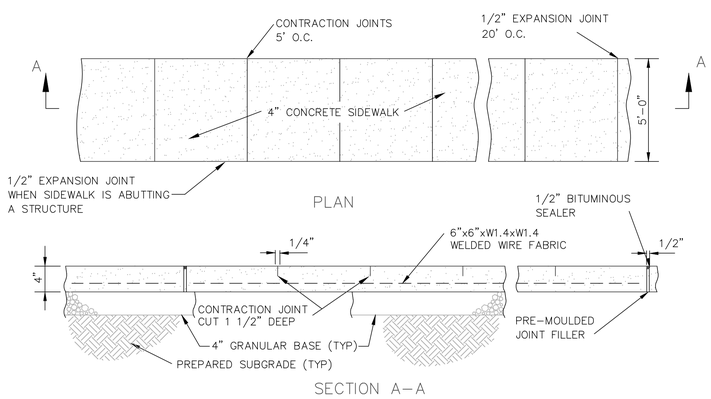


NOTES:
1. ALL CONCRETE SHALL BE MIN. FC.=3000 P.S.I.
2. ALL CONSTRUCTION MATERIALS AND METHODS OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF MANCHESTER STANDARDS.
3. ANY UNSUITABLE SOIL (AS DETERMINED BY SOILS ENGINEER) BELOW STRUCTURE SHALL BE REMOVED AND REPLACED WITH SELECT EARTHEN MATERIAL COMPACTED IN PLACE WITH VIBRATORY TAMPER.
4. PROVIDE 1/2" EXPANSION JOINTS AT 20' CENTERS.

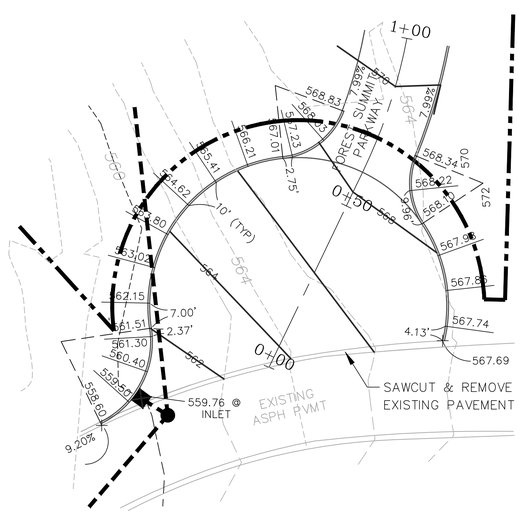
18" BARRIER CURB AND PAVEMENT DETAIL
N.T.S.



INTEGRAL WALK AND CURB DETAIL
N.T.S.

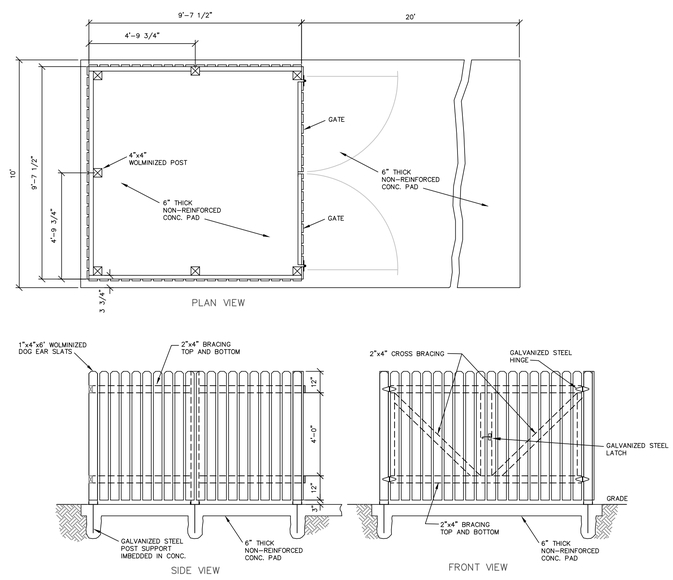


DETAIL OF CONCRETE SIDEWALK
N.T.S.



ROUNDING DETAIL
1"=20'

NOTE: ALL ELEVATIONS ON CUL-DE-SAC ARE SHOWN AT THE GUTTER LINE



DUMPSTER ENCLOSURE
N.T.S.

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014
DETAILS

Revisions	
Date	CITY OF MANCHESTER ISSUE FOR PERMIT
2/12/20	

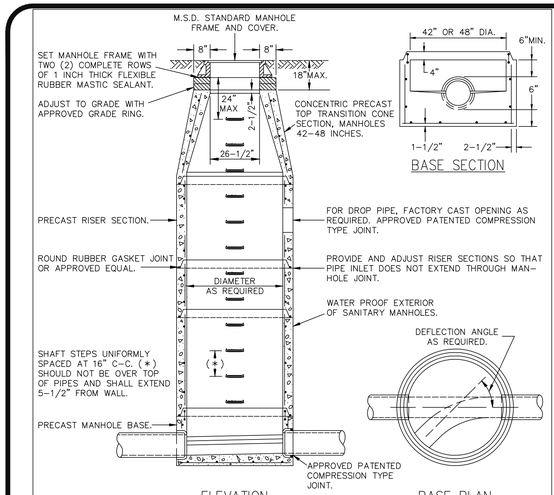
OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL:
STATE OF MISSOURI
DAVID L. VONARX
NUMBER
E-23947
REGISTERED
PROFESSIONAL ENGINEER
2/12/2020
DAVID L. VONARX E-23947

CIVIL ENGINEER
VonArx Engineering
10765 BUSINESS 21, SUITE A
HILLSBORO, MISSOURI 63050
dvonarx@vonarxengineering.com
COST REG NO. E-23947 AUTHORITY 10075
OFFICE: (636) 797-8425
CELL: (314) 952-5038

FAMILY PARTNERS
IMPROVEMENT PLANS – PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

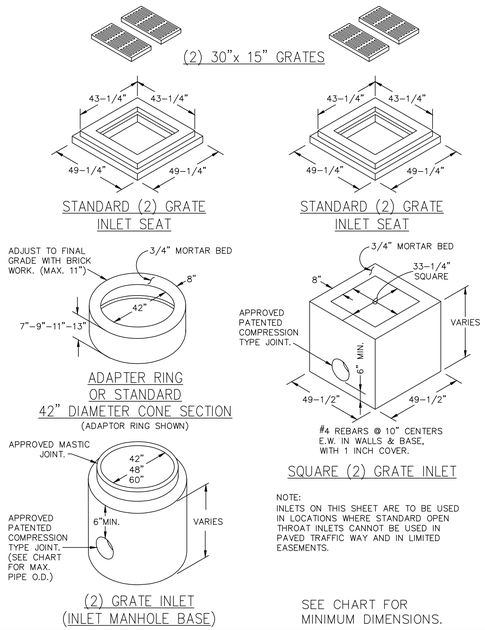
ISSUE DATE	1/13/2020
SCALE	AS NOTED
Job Number	15145
Sheet Number	C8.1



NOTES:

1) THE MINIMUM INSIDE DIAMETER FOR THE BASE AND RISER SECTIONS SHALL BE 42 INCHES FOR 8 INCH DIAMETER SANITARY SEWERS AND ALL STORM SEWERS. THE MINIMUM INSIDE DIAMETER FOR SANITARY SEWERS LARGER THAN 8 INCH DIAMETER IS 48 INCHES. MANHOLE SHALL MEET ASTM C-478 REQUIREMENTS.
2) FLOWLINE ELEVATION OF INCOMING PIPES SHALL BE 1 INCH HIGHER THAN THAT OF OUTGOING PIPE.
3) PIPE SIZES LARGER THAN 24 INCH DIAMETER MAY REQUIRE MANHOLE DIAMETERS OF 60 INCH, 72 INCH OR 96 INCH AS DETERMINED BY OUTSIDE DIAMETERS AND ORIENTATIONS OF CONNECTING PIPES.
4) ECCENTRIC CONES SHALL BE USED ON DIAMETERS 60 INCH AND LARGER. STEPS SHALL EXTEND DOWN VERTICAL WALL OF CONE.
5) PRIOR TO FABRICATION, SHOP DRAWINGS SHALL BE SUBMITTED TO THE DISTRICT FOR APPROVAL OF MAN-HOLES ON PIPE DIAMETERS LARGER THAN 24 INCH AND ALSO FOR THOSE STRUCTURES WITH A DROP PIPE CONNECTION.

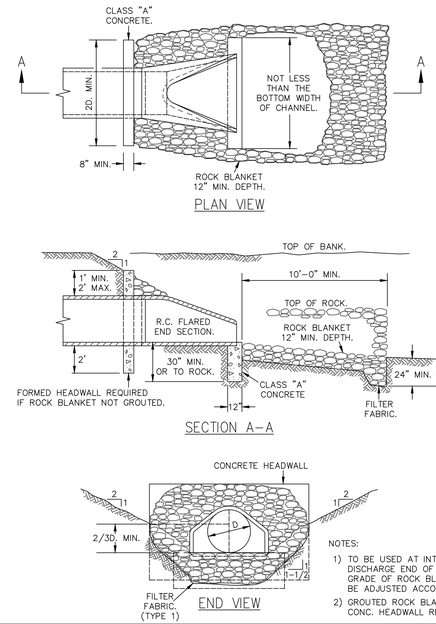
PRECAST CONCRETE MANHOLE	METROPOLITAN ST. LOUIS SEWER DISTRICT *Standard Details of Sewer Construction*		
	Dr. WSH/SAM Ch. J.C.K.	2009	SHEET 21 (REV)



NOTE:
INLETS ON THIS SHEET ARE TO BE USED IN LOCATIONS WHERE STANDARD OPEN THROAT INLETS CANNOT BE USED IN PAVED TRAFFIC WAY AND IN LIMITED EASEMENTS.

SEE CHART FOR MINIMUM DIMENSIONS.

2 GRATE INLETS PRECAST CONCRETE	METROPOLITAN ST. LOUIS SEWER DISTRICT *Standard Details of Sewer Construction*		
	Dr. JLG/SAM Ch. J.C.K.	2009	SHEET 35

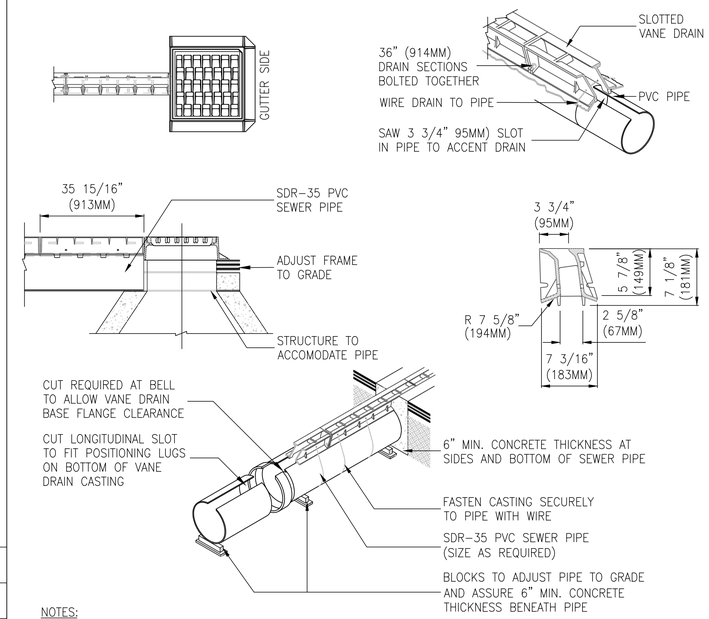


NOTES:

1) TO BE USED AT INTAKE AND DISCHARGE END OF PIPE. GRADE OF ROCK BLANKET TO BE ADJUSTED ACCORDINGLY.
2) GROUTED ROCK BLANKET OR CONC. HEADWALL REQUIRED.

FLARED END SECTION	METROPOLITAN ST. LOUIS SEWER DISTRICT *Standard Details of Sewer Construction*		
	Dr. WSH/SAM Ch. J.C.K.	2009	SHEET 61

SPECIFICATIONS:
THE SLOTTED VANE DRAIN REMOVES SHEET FLOW AT A RATE OF 0.5 CFS PER LINEAL FOOT OF DRAIN FOR LONGITUDINAL SLOPES OF 0% TO 6%. THE SLOTTED VANE DRAIN IS INSTALLED PERPENDICULAR TO THE FLOW EITHER AS A FREE STANDING UNIT OR IDEALLY EXTENDING FROM A GUTTER INLET FRAME AND GRATE INTO THE STREET. IT IS INTENDED TO MAXIMIZES FLOW CAPTURE AT SPECIFIC INLET LOCATIONS, THEREBY INCREASING EFFICIENCY OF INDIVIDUAL INLETS AND REDUCING THE NUMBER OF STRUCTURES REQUIRED DOWNSTREAM.



NOTES:
1. INSTALLATION TO BE COMPLETED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.
2. DO NOT SCALE DRAWINGS.
3. CONTRACTORS NOTE: FOR PRODUCT AND PURCHASING INFORMATION VISIT www.CADdetails.com/info REFERENCE NUMBER 071-007.

SLOTTED VANE DRAIN

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014

DETAILS

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
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12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL:
STATE OF MISSOURI
JAMES L. VONARX
NUMBER
E-22967
REGISTERED PROFESSIONAL ENGINEER
2/12/2020
DATE
JAMES L. VONARX, P.E.

CIVIL ENGINEER

VonArx Engineering
10735 BUSINESS 21, SUITE A
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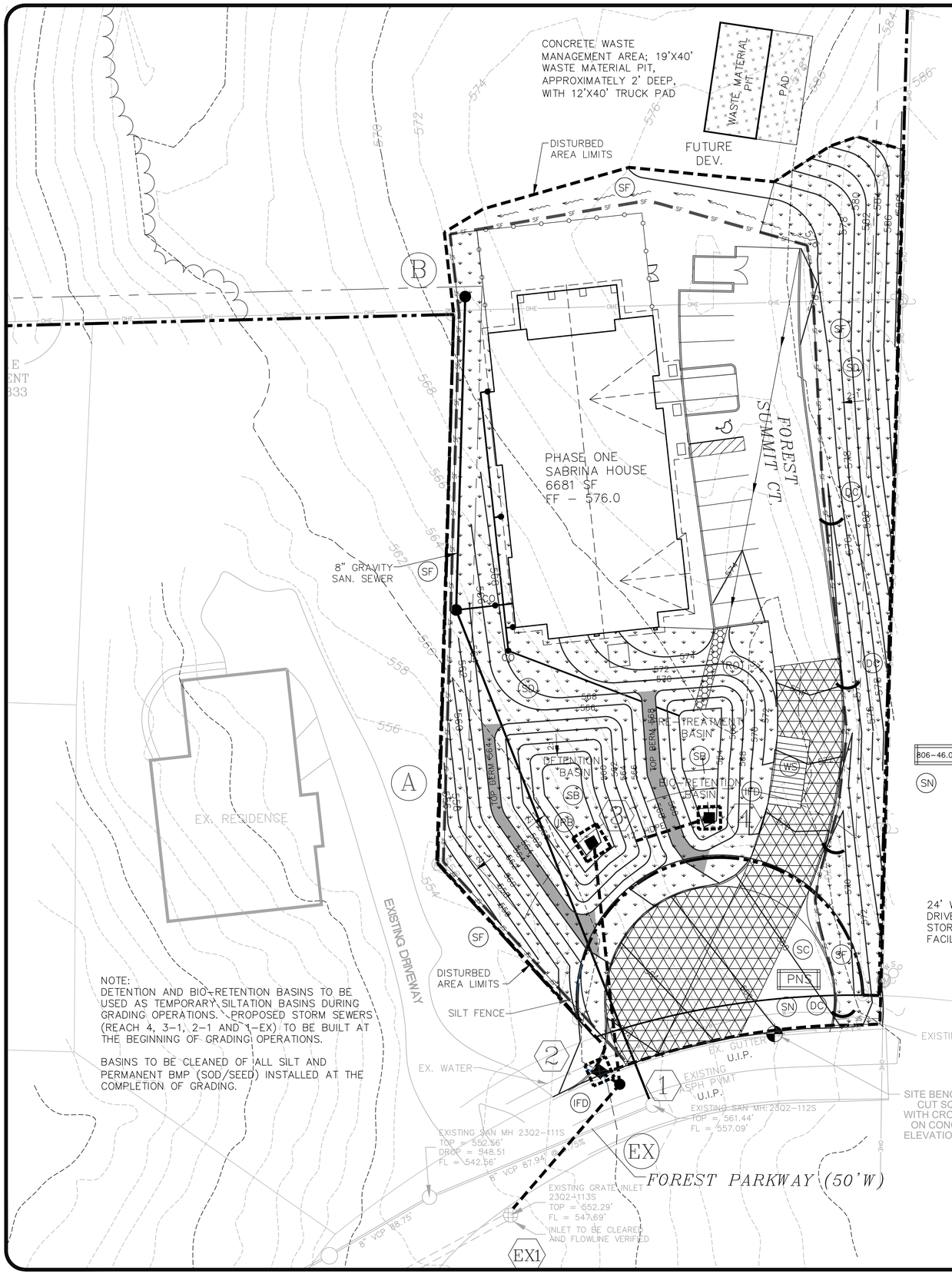
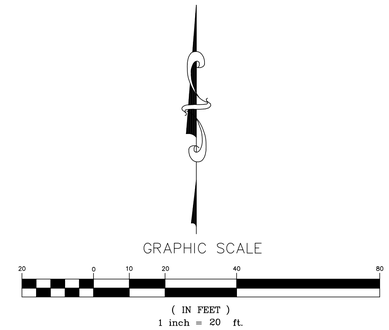
ISSUE DATE
1/13/2020

SCALE
AS NOTED

Job Number
15145

Sheet Number
C8.2





EROSION CONTROL LEGEND

DISTURBED AREA SUMMARY:

TOTAL DISTURBED AREA = 1.08± ACRES

- (SC) STABILIZED CONSTRUCTION ACCESS (SEE STL 806–46.01) – TEMPORARY BMP
- (WS) CONSTRUCTION WASHDOWN STATION (SEE STL 806–46.00) – TEMPORARY BMP
- (SF) SILT FENCE (SEE 806–70)
- (RO) ROCK OUTLET (SEE STL 806–55.10) – PERMANENT BMP
- (GB) GRAVEL BAGS (SEE STL 806–55.17 – TEMPORARY BMP
- (IPB) INLET PROTECTION BARRIER (SEE STL 806–45.02) – TEMPORARY BMP
- (IFD) INLET PROTECTION BARRIER – FABRIC DROP (SEE STL 806–45.12) – TEMPORARY BMP
- (SD) SOD/SEED – PERMANENT BMP
- (SB) SEDIMENT BASIN (SEE STL 806.40.01) – TEMPORARY BMP
- (SN) PNS PUBLIC NOTIFICATION SIGN (SEE STL PG. 411.42) – TEMPORARY BMP
- (DC) DITCH CHECK
- (CW) CONCRETE WASTE MANAGEMENT (SEE STL 806.4603) – TEMPORARY BMP

SUMMARY OF SWPPP QUANTITIES

ITEM #	ITEM	UNIT	QUANTITY	BMP TYPE
1	CONST. ENTRANCE	Ea	1	TEMPORARY BMP
2	WASHDOWN STATION	Ea	1	TEMPORARY BMP
3	CONCRETE WASTE MGT.	Ea	1	TEMPORARY BMP
4	SEDIMENT BASIN	LF	2	TEMPORARY BMP
5	ROCK OUTLET (FLUME)	Ea	1	TEMPORARY BMP
6	SILT FENCE	LF	745	TEMPORARY BMP
7	INLET PROTECTION	Ea	3	TEMPORARY BMP
8	SEED/MULCH	SY	2,549	PERMANENT BMP
9	SOD	SY	0	PERMANENT BMP

EARTHWORK NOTES:

BULK CUT ..... 8665.00 C.Y.
ADJUSTED CUT (FOR PAVEMENT).....10,453.00 C.Y.
BULK FILL..... 4225.00 C.Y.
ADJUSTED FILL (+ 15% SHRINKAGE)..... 4,858.75 C.Y.
TOTAL.....5,594.25 C.Y.

NOTES:

1. REMOVE TEMPORARY BMP ONCE UP–SLOPE AREA IS PERMANENTLY STABILIZED.
2. POTENTIAL SOURCES OF POLLUTION, WASTE AND CONSTRUCTION MATERIALS ON SITE AND APPLICABLE BMP (SHOWN IN PARENTHESIS):
   – SITE LITTER (TRASH RECEPTACLES w/ LIDS)
   – SANITARY WASTE (CONST. SITE RECEPTACLE ADJACENT TO CONST. TRAILER).
3. VEGETATED AREAS OUTSIDE OF THE CLEARING LIMITS SHALL BE LEFT UNDISTURBED.
4. THE CONTRACTOR, DEVELOPER AND/OR OWNER SHALL REQUEST THE COUNTY TO INSPECT AND APPROVE THE WORK COMPLETED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.

THE UTILITIES SHOWN HEREIN WERE PLOTTED FROM AVAILABLE INFORMATION AND DO NOT NECESSARILY REFLECT THE ACTUAL EXISTENCE, NON–EXISTENCE, SIZE, TYPE, OR LOCATION OF THESE OR OTHER UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION OF ALL UTILITIES, SHOWN OR NOT SHOWN, AND SAID UTILITIES SHALL BE LOCATED IN THE FIELD PRIOR TO ANY CONSTRUCTION OF IMPROVEMENTS. THESE PROVISIONS SHALL IN NO WAY ABSOLVE ANY PARTY FROM COMPLYING WITH THE UNDERGROUND FACILITY SAFETY AND DAMAGE PREVENTION ACT, CHAPTER 319 RSMo.

MSD BASE MAP - 23Q2
MSD P#: 20MSD-00014
SWPPP PLAN

Date	Revisions
2/12/20	CITY OF MANCHESTER ISSUE FOR PERMIT

OWNER/DEVELOPER:
FAMILY PARTNERS LLC
12880 MANCHESTER ROAD
ST. LOUIS, MO 63131
(314) 863-9912

SEAL: STATE OF MISSOURI DAVID L. VONARX NUMBER E-27877 REGISTERED PROFESSIONAL ENGINEER 2/12/2020

CIVIL ENGINEER
VonArx Engineering
10765 BUSINESS 21, SUITE A
HILLSBORO, MISSOURI 63050
OFFICE: (636) 797-8425
CELL: (314) 952-5038
dvonarx@vonarxengineering.com
CERTIFICATE OF AUTHORITY: E-2007

FAMILY PARTNERS
IMPROVEMENT PLANS – PHASE 1
MANCHESTER, MO 63021
ST. LOUIS COUNTY

ISSUE DATE: 1/13/2020
SCALE: 1" = 20'
Job Number: 15145
Sheet Number: C9.1