

PRELIMINARY SITE PLAN
SOMERSET PINES
 PART OF THE S.W. 1/4 OF SECTION 32, T3N, R11E,
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

PARCEL DESCRIPTION

Lots 1 through 4, "Supervisor's Plat of Messmore Farms Subdivision of part of the Southwest 1/4 of Section 32, T3N, R11E, Avon Township (now City of Rochester Hills), Oakland County, Michigan, described as: Commencing at the South 1/4 corner of said Section 32; thence West 993.34 feet along the South line of said Section 32 and the centerline of South Boulevard (120.00 feet wide); thence North 60.00 feet to the Northerly right-of-way line of South Boulevard, the Southeast corner of Lot 4 and the Point of Beginning; thence West 658.68 feet along the Northerly right-of-way line of South Boulevard and the South line of Lots 1 through 4, inclusive; thence N08°13'44"W (recorded as N08°15'56"W) 1255.28 feet along the West line of "Supervisor's Plat of Messmore Farms Subdivision" to the Northwest corner of "Supervisor's Plat of Messmore Farms Subdivision"; thence N89°35'31"E 686.24 feet along the North line of "Supervisor's Plat of Messmore Farms Subdivision" to the Northeast corner of Lot 4; thence S06°57'14"E 1256.49 feet along the East line of Lot 4 to the Point of Beginning, containing 19.23 acres of land, more or less, subject to any easements and/or exceptions, recorded or otherwise.



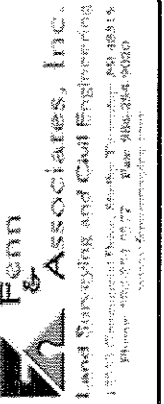
- BENCHMARKS:**
 BM#1 - 816.05 N.G.V.D. ARROW ON HYDRANT, NORTH SIDE OF SOUTH BOULEVARD, 165' EAST OF SOUTHWEST CORNER OF MESSMORE FARMS SUBDIVISION.
 BM#2 - 808.74 N.G.V.D. ARROW ON HYDRANT, NORTH SIDE OF SOUTH BOULEVARD, IN FRONT OF #2552 SOUTH BOULEVARD.
 BM#3 - 809.81 N.G.V.D. FOUND 60 PENNY NAIL, NORTH FACE OF UTILITY POLE, NORTH OF #2572 SOUTH BLVD.
 BM#4 - 812.47 N.G.V.D. SET PK NAIL, EAST FACE OF 20" BLACK CHERRY, TAG #256, 450' NORTH OF SOUTHWEST CORNER OF MESSMORE FARMS SUBDIVISION.

FENN & ASSOCIATES, INC. SITE PLAN SHEET INDEX:

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- 2) SITE PLAN
- 3) TOPOGRAPHIC & WETLAND SURVEY
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- 6) PRELIMINARY APPROACH PLAN
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- 10) PRELIMINARY BASIN CROSS-SECTIONS

LANDSCAPE PLANS UNDER SEPARATE COVER

NOT TO BE USED AS CONSTRUCTION DRAWINGS



PRELIMINARY SITE PLAN
 SITE CONDOMINIUM
SOMERSET PINES
 PART OF THE S.W. 1/4 OF SECTION 32, T3N, R11E,
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

DISTRIBUTION	
●	PRELIMINARY
●	APPROVAL
○	CONSTRUCTION
○	AS-BUILT
REVISIONS	
DATE	REMARKS
05/01/12	PER CITY
05/21/12	PER CITY

SEAL

CLIENT
 MV SOMERSET PROPERTIES, LLC
 850 W UNIVERSITY SUITE D
 ROCHESTER, MI 48307
 PHONE: 248-434-8223

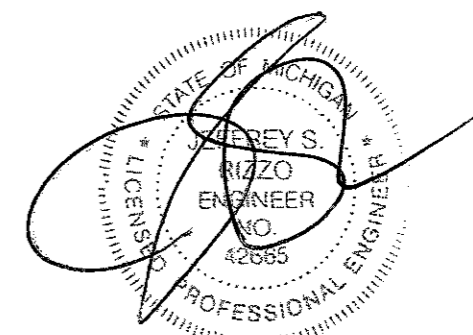
PROJECT NAME
SOMERSET PINES

PROJECT NUMBER
 C12-012

SHEET NAME
 COVER SHEET

DRAWING SCALE: NTS
 DATE: 05/11/12
 PROJECT MANAGER: J.S.R., P.E.
 DESIGNED BY: J.D.K.
 DRAWN BY: J.D.K./S.R.T.
 FIELD BY: T.D.
 CHECKED BY: J.S.R., P.E.

SHEET NUMBER
 1 OF 10



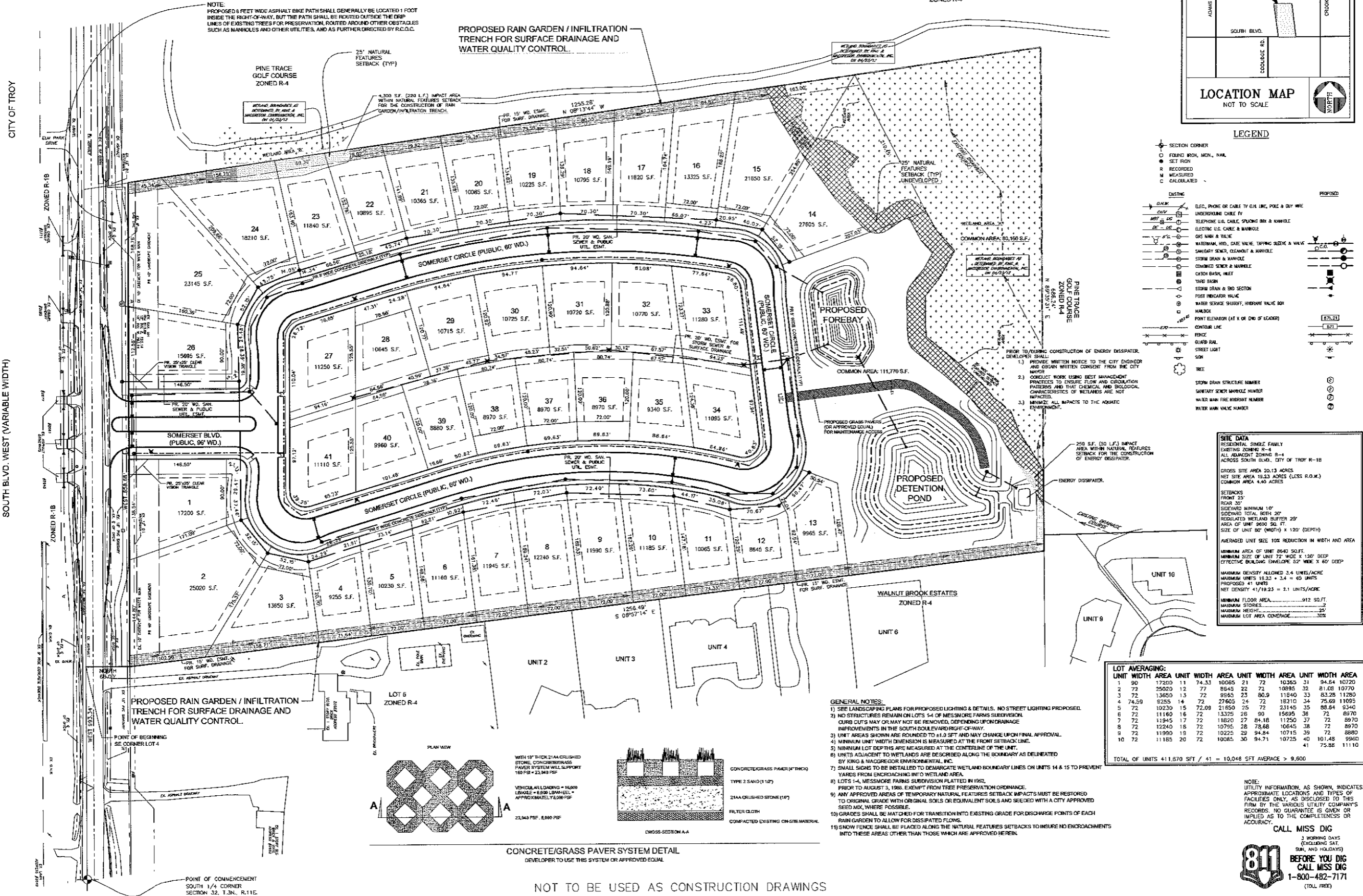
PARCEL DESCRIPTION
 Lots 1 through 4, "Superior's Plat of Messmore Farms Subdivision" of part of the Southwest 1/4 of Section 32, T3N, R11E, Acon Township (now City of Rochester Hills), Oakland County, Michigan, as recorded in Liber 66 of Plats, Page 16, Oakland County Records, described as: Commencing at the South 1/4 corner of said Section 32; thence West 993.34 feet along the South line of said Section 32 and the centerline of South Boulevard (120.00 feet wide); thence North 60.00 feet to the Northernly right-of-way line of South Boulevard; the Southeast corner of Lot 4 and the Point of Beginning; thence West 658.68 feet along the Northernly right-of-way line of South Boulevard and the South line of Lots 1 through 4, inclusive; thence N88°13'44"W (recorded as N88°13'56"W) 1255.28 feet along the West line of "Superior's Plat of Messmore Farms Subdivision" to the Northern corner of Superior's Plat of Messmore Farms Subdivision; thence N88°53'11"E 696.24 feet along the North line of "Superior's Plat of Messmore Farms Subdivision" to the Northeast corner of Lot 4; thence S66°57'14"E 1255.49 feet along the East line of Lot 4 to the Point of Beginning, containing 19.23 acres of land, more or less, subject to any easements and/or exceptions, recorded or otherwise.

FIRE DEPARTMENT NOTES
 1) CONSTRUCTION SITES SHALL BE SAFEGUARDED IN ACCORDANCE WITH IFC 2008 CHAPTER 14
 2) OPEN BURNING IS NOT PERMITTED INCLUDING THE BURNING OF TRASH, DEBRIS, OR LAND CLEARING MATERIALS.
 3) OPEN BURNING FOR WARMING OF SAND AND/OR WATER FOR THE PREPARATION OF MORTAR SHALL BE WITHIN THE CITY OF ROCHESTER HILLS BURN PERMIT GUIDELINES.
 FIRE PREVENTION ORDINANCE CHAPTER 56, SECTION 307.6.2 & 307.6.3

NOTE:
 THIS SITE WILL CONSIST OF APPROXIMATELY 2,500 SQ. FT. SINGLE FAMILY HOMES CONSTRUCTED OF MASONRY BRICK AND WOOD.

NOTE:
 PROPOSED 6 FEET WIDE ASPHALT BIKE PATH SHALL GENERALLY BE LOCATED 1 FOOT INSIDE THE RIGHT-OF-WAY, BUT THE PATH SHALL BE ROUTED OUTSIDE THE DRIVE LINES OF EXISTING TREES FOR PRESERVATION, ROUTED AROUND OTHER OBSTACLES SUCH AS MANHOLES AND OTHER UTILITIES, AND AS FURTHER DIRECTED BY R.C.C.C.

PROPOSED RAIN GARDEN / INFILTRATION TRENCH FOR SURFACE DRAINAGE AND WATER QUALITY CONTROL.



LEGEND

SECTION CORNER
 ○ FOUND IRON, MON., MAIL
 ● SET IRON
 R RECORDED
 M MEASURED
 C CALCULATED

EXISTING
 --- DRAIN
 --- CULV
 --- ELEC.
 --- SANITARY
 --- WATER
 --- STORM
 --- FENCE
 --- GUARD RAIL
 --- STREET LIGHT
 --- SIGN
 --- TREE

PROPOSED
 --- ELEC., PHONE OR CABLE TV O.H. LINE, POLE & OUT WIRE
 --- UNDERGROUND CABLE TV
 --- TELEPHONE U.G. CABLE, SPLICING BOX & MANHOLE
 --- ELECTRIC U.G. CABLE & MANHOLE
 --- GAS MAIN & VALVE
 --- WATERMAIN, HD., GATE VALVE, TAPPING BLEVE & VALVE
 --- SANITARY SINKER, CLEANOUT & MANHOLE
 --- STORM DRAIN & MANHOLE
 --- COMBINED SINKER & MANHOLE
 --- CATCH BASIN, INLET
 --- YARD BASIN
 --- STORM DRAIN & END SECTION
 --- POST INDICATOR VALVE
 --- WATER SERVICE SHURFIT, HYDRANT VALVE BOX
 --- MANHOLE
 --- POINT ELEVATION (AT X OR END OF LEGEND)
 --- CENTER LINE
 --- FENCE
 --- GUARD RAIL
 --- STREET LIGHT
 --- SIGN
 --- TREE

STORM DRAIN STRUCTURE NUMBER
 ○ SANITARY SINKER MANHOLE NUMBER
 ○ WATER MAIN FIRE HYDRANT NUMBER
 ○ WATER MAIN VALVE NUMBER

SITE DATA
 RESIDENTIAL SINGLE FAMILY
 EXISTING ZONING R-4
 ALL ADJACENT ZONING R-4
 ACROSS SOUTH BLVD., CITY OF TROY R-1B

GROSS SITE AREA 20.13 ACRES
 NET SITE AREA 19.23 ACRES (LESS R.O.W.)
 COMMON AREA 4.40 ACRES

SETBACKS
 FRONT 25'
 REAR 35'
 SIDEWARD MINIMUM 10'
 SCHEDULED TOTAL SOFT 20'
 REGULATED WETLAND BUFFER 25'
 AREA OF UNIT 9600 SQ. FT.
 SIZE OF UNIT 80' (WIDTH) X 120' (DEPTH)

AVERAGED UNIT SIZE FOR REDUCTION IN WIDTH AND AREA
 MINIMUM AREA OF UNIT 2640 SQ. FT.
 MINIMUM SIZE OF UNIT 7'2" WIDE X 120' DEEP
 EFFECTIVE BUILDING ENVELOPE 52' WIDE X 60' DEEP

MAXIMUM DENSITY ALLOWED 3.4 UNITS/ACRE
 MAXIMUM UNITS 19.23 x 3.4 = 65 UNITS
 PROPOSED 41 UNITS
 NET DENSITY 41/19.23 = 2.1 UNITS/ACRE

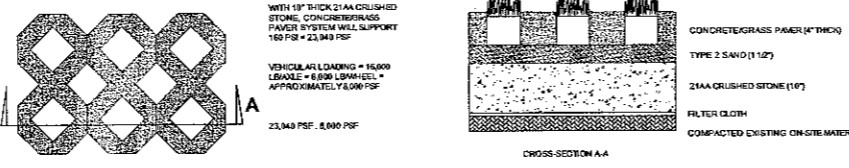
MINIMUM FLOOR AREA 912 SQ. FT.
MINIMUM STORES 2
MAXIMUM HEIGHT 25'
MAXIMUM LOT AREA CONTIGUOUS 30%

LOT AVERAGING:

UNIT	WIDTH	AREA	UNIT	WIDTH	AREA	UNIT	WIDTH	AREA
1	90	17200	11	74.33	10085	21	72	10365
2	72	25020	12	77	8645	22	72	10895
3	72	13680	13	72	8955	23	80.9	11840
4	74.59	9255	14	72	27405	24	72	18110
5	72	10230	15	72.09	21850	25	72	23145
6	72	11160	16	72	13325	26	90	15695
7	72	11945	17	72	11820	27	84.18	11250
8	72	12240	18	72	10755	28	78.68	10645
9	72	11990	19	72	10225	29	94.84	10715
10	72	11185	20	72	10085	30	94.71	10725
						31	72	8970
						32	72	8970
						33	72	8970
						34	72	8970
						35	72	8970
						36	72	8970
						37	72	8970
						38	72	8970
						39	72	8970
						40	72	8970
						41	72	8970

TOTAL OF UNITS 411,870 SFT / 41 = 10,046 SFT AVERAGE > 9,600

- GENERAL NOTES:**
- SEE LANDSCAPING PLANS FOR PROPOSED LIGHTING & DETAILS. NO STREET LIGHTING PROPOSED.
 - NO STRUCTURES REMAIN ON LOTS 1-4 OF MESSMORE FARMS SUBDIVISION. CURB CUTS MAY OR MAY NOT BE REMOVED, DEPENDING UPON DRAINAGE IMPROVEMENTS IN THE SOUTH BOULEVARD RIGHT-OF-WAY.
 - UNIT AREAS SHOWN ARE ROUNDED TO 0.10 SFT AND MAY VARY CHANGE UPON FINAL APPROVAL.
 - MINIMUM UNIT WIDTH DIMENSION IS MEASURED AT THE FRONT SETBACK LINE.
 - MINIMUM LOT DEPTHS ARE MEASURED AT THE CENTERLINE OF THE UNIT.
 - UNITS ADJACENT TO WETLANDS ARE DESCRIBED ALONG THE BOUNDARY AS DELINEATED BY KING & MACGREGOR ENVIRONMENTAL, INC.
 - SMALL SIGNS TO BE INSTALLED TO DEMARCATATE WETLAND BOUNDARY LINES ON UNITS 14 & 15 TO PREVENT YARDS FROM ENCRoACHING INTO WETLAND AREA.
 - LOTS 1-4, MESSMORE FARMS SUBDIVISION PLATTED IN 1992, PRIOR TO AUGUST 3, 1996, EXEMPT FROM TREE PRESERVATION ORDINANCE.
 - ANY APPROVED AREAS OF TEMPORARY NATURAL FEATURES SETBACK IMPACTS MUST BE RESTORED TO ORIGINAL GRADE WITH ORIGINAL SOILS OR EQUIVALENT SOILS AND SEEDED WITH A CITY APPROVED SEED MIX, WHERE POSSIBLE.
 - GRADES SHALL BE MATCHED FOR TRANSITION INTO EXISTING GRADE FOR DISCHARGE POINTS OF EACH RAIN GARDEN TO ALLOW FOR DISSIPATED FLOWS.
 - SNOW FENCE SHALL BE PLACED ALONG THE NATURAL FEATURES SETBACKS TO INSURE NO ENCRoACHMENTS INTO THESE AREAS OTHER THAN THOSE WHICH ARE APPROVED HEREIN.



CONCRETE/GRASS PAVER SYSTEM DETAIL
 DEVELOPER TO USE THIS SYSTEM OR APPROVED EQUAL

NOT TO BE USED AS CONSTRUCTION DRAWINGS

Fenn & Associates, Inc.
 Land Surveying and Civil Engineering
 110 W. University Suite 200
 Rochester, Michigan 48307
 Phone: 248-434-6233
 Fax: 248-434-6233
 www.fennandassociates.com

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REVISIONS

DATE	REVISIONS
08/05/12	PER CITY
06/21/12	PER CITY

CLIENT
 MV SOMERSET PROPERTIES, LLC
 880 W UNIVERSITY SUITE D
 ROCHESTER, MI 48307
 PHONE: 248-434-6233

PROJECT NAME
 SOMERSET PINES

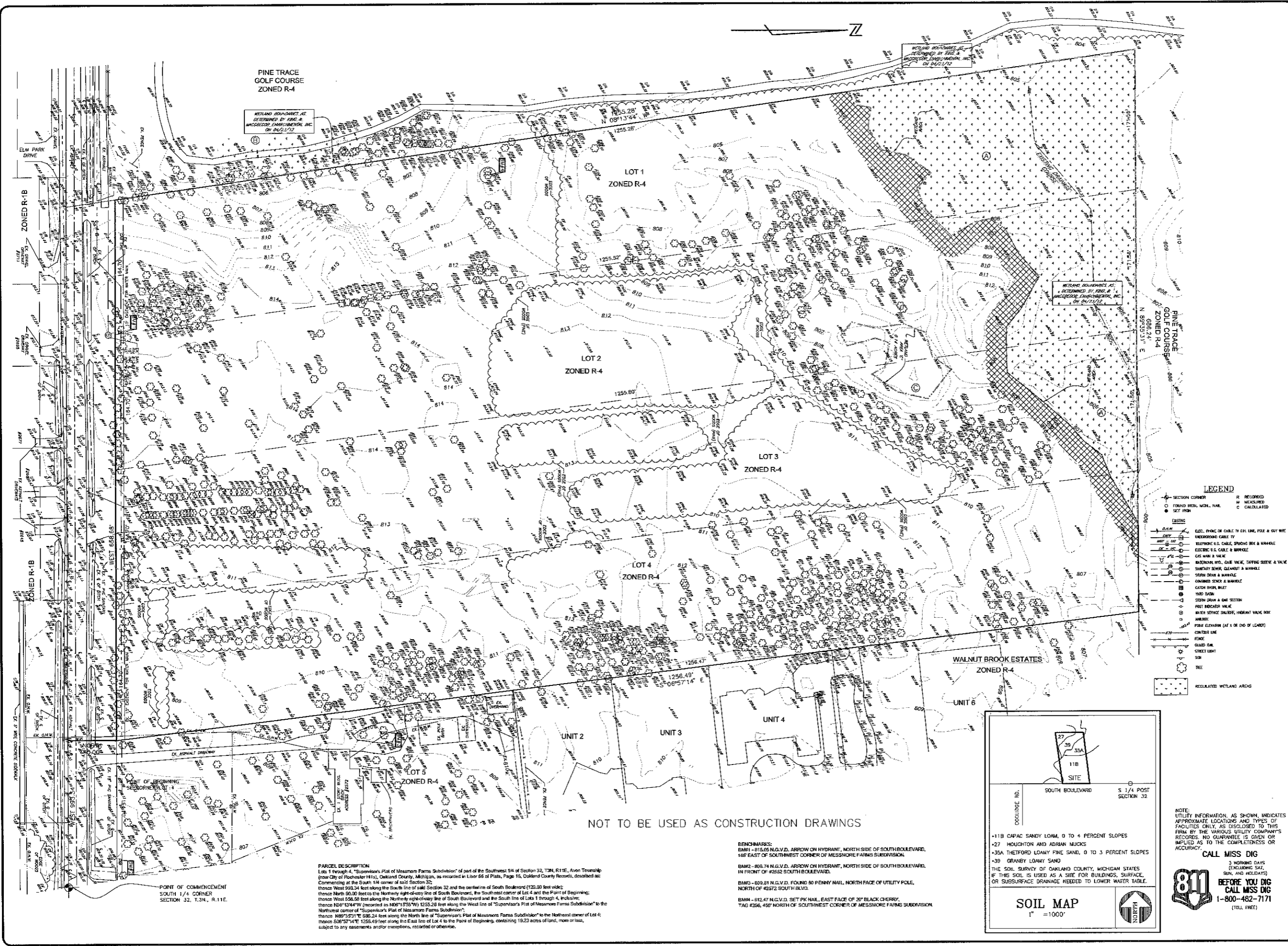
PROJECT NUMBER
 C12-012

SHEET NAME
 SITE PLAN

DRAWING SCALE: 1"=60'
DATE: 05/11/12
PROJECT MANAGER: J.S.R./P.E.
DESIGNED BY: J.D.K.
DRAWN BY: J.D.K./S.R.T.
FIELD BY: T.D.
CHECKED BY: J.S.R./P.E.

SHEET NUMBER
 2 OF 10

CITY FILE #08-012.2



PINE TRACE GOLF COURSE
ZONED R-4

LOT 1
ZONED R-4

LOT 2
ZONED R-4

LOT 3
ZONED R-4

LOT 4
ZONED R-4

LOT 5
ZONED R-4

WALNUT BROOK ESTATES
ZONED R-4

NOT TO BE USED AS CONSTRUCTION DRAWINGS

LEGEND

SECTION CORNER	RECORDED
WETLAND AREA	MEASURED
SET IRON	CALCULATED

EXISTING

- ELEC. PILING OR CABLE TV OR LINE, POLE & GUY WIRE
- MEASURING CABLE TO
- REPAIRING U.S. CABLE, SPONGE BOX & MANHOLE
- ELECTRIC U.S. CABLE & MANHOLE
- GAS MAIN & VALVE
- WATER MAIN, HD. GATE VALVE, TAPPING SERVICE & VALVE
- SEWER MAIN, GATE VALVE & MANHOLE
- SEWER MAIN & MANHOLE
- CONCRETE SEWER & MANHOLE
- CATCH BASIN, BUILT
- POD BASIN
- STONE DRAIN & ONE SECTION
- POST BOX/CHINA VALVE
- WATER SERVICE VALVE, HYDRANT VALVE BOX
- MANHOLE
- POINT ELEVATION (AT 1' OR 2' OF LEAD)
- CONTROL LINE
- GUARD RAIL
- STREET LIGHT
- SIGN
- TREE
- REGULATED WETLAND AREAS

SOIL MAP
1" = 1000'

NOTE: UTILITY INFORMATION, AS SHOWN, INDICATES APPROXIMATE LOCATIONS AND TYPES OF FACILITIES ONLY, AS DISCLOSED TO THIS FIRM BY THE VARIOUS UTILITY COMPANY'S RECORDS. NO GUARANTEE IS GIVEN OR IMPLIED AS TO THE COMPLETENESS OR ACCURACY.

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SUN. AND HOLIDAYS

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(TOLL FREE)

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Commencing at the South 1/4 corner of said Section 32;
thence West 993.34 feet along the South line of said Section 32 and the centerline of South Boulevard (120.00 feet wide);
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thence West 658.59 feet along the Northern right-of-way line of South Boulevard and the South line of Lots 1 through 4, including;
thence N06°10'44"W (recorded as N06°17'55"W) 1255.28 feet along the West line of "Supervisor's Plat of Messmore Farms Subdivision" to the Northeast corner of "Supervisor's Plat of Messmore Farms Subdivision";
thence N06°53'11"E 586.24 feet along the North line of "Supervisor's Plat of Messmore Farms Subdivision" to the Northeast corner of Lot 4;
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BENCHMARKS:
BM#1 - 816.05 N.G.V.D. ARROW ON HYDRANT, NORTH SIDE OF SOUTH BOULEVARD, 165' EAST OF SOUTHWEST CORNER OF MESSMORE FARMS SUBDIVISION.
BM#2 - 808.74 N.G.V.D. ARROW ON HYDRANT, NORTH SIDE OF SOUTH BOULEVARD, IN FRONT OF #2552 SOUTH BOULEVARD.
BM#3 - 809.81 N.G.V.D. FOUND 60 PENNY NAIL, NORTH FACE OF UTILITY POLE, NORTH OF #2572 SOUTH BLVD.
BM#4 - 812.47 N.G.V.D. SET PK NAIL, EAST FACE OF 20" BLACK CHERRY, TAG #256, 450' NORTH OF SOUTHWEST CORNER OF MESSMORE FARMS SUBDIVISION.

Fenn & Associates, Inc.
Land Surveying and Civil Engineering
11703 Greenfield Road, Suite 100, Plymouth, MI 48170
Phone: 800.254.9177 Fax: 586.224.9829

PRELIMINARY SITE PLAN
SITE CONDOMINIUM
SOMERSET PINES
PART OF THE S.W. 1/4 OF SECTION 32, T3N, R11E,
CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

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SEAL

CLIENT
MV SOMERSET PROPERTIES, LLC
850 W UNIVERSITY BLVD
ROCHESTER, MI 48307
PHONE: 248-434-8233

PROJECT NAME
SOMERSET PINES

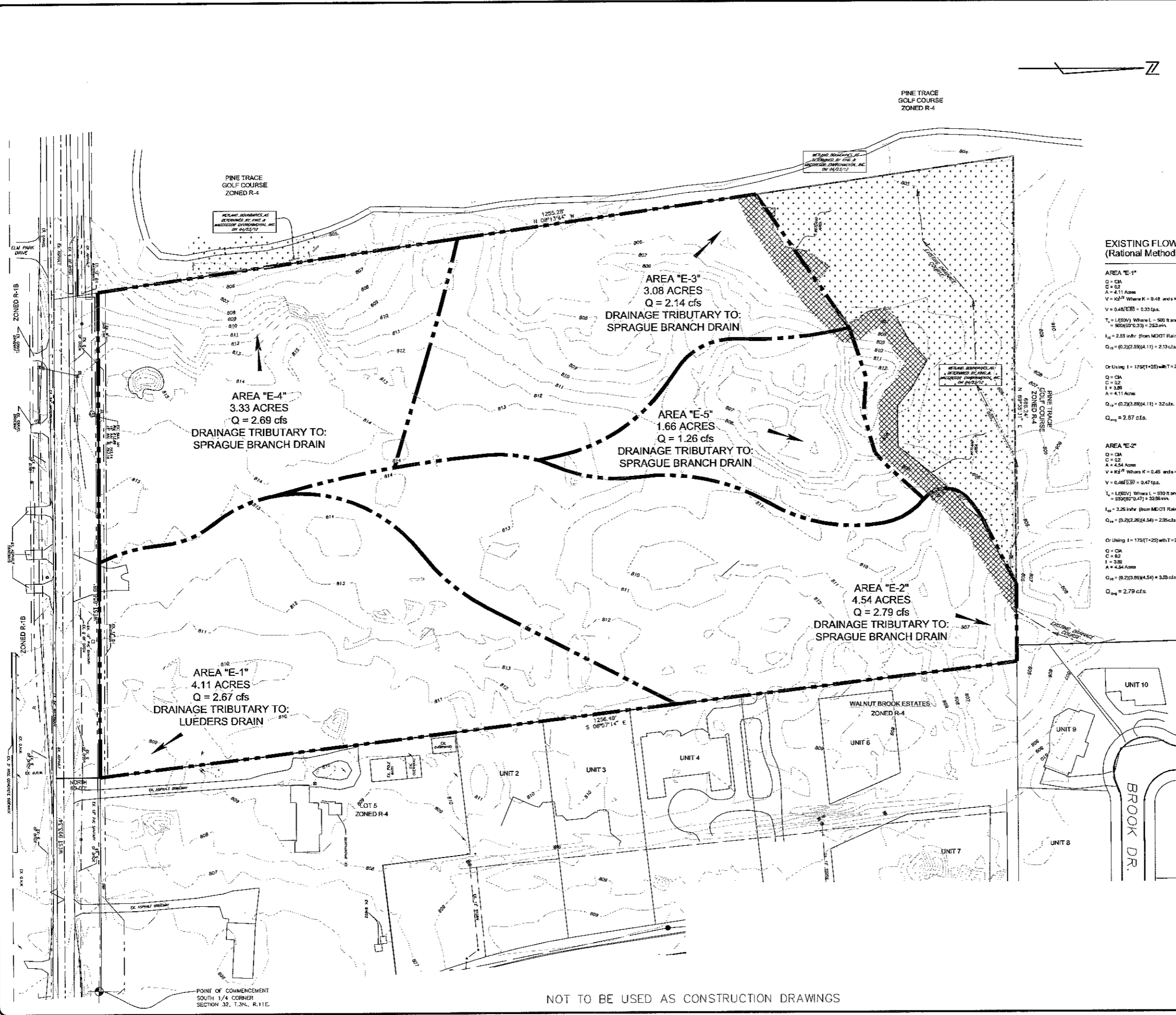
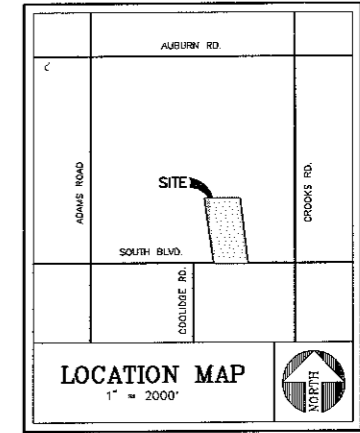
PROJECT NUMBER
C12-012

SHEET NAME
TOPOGRAPHIC & WETLAND SURVEY

DRAWING SCALE: 1"=50'
DATE: 05/11/12
PROJECT MANAGER: J.S.R., P.E.
DESIGNED BY: J.D.K.
DRAWN BY: J.D.K.
FIELD BY: T.D.
CHECKED BY: J.S.R., P.E.

SHEET NUMBER
3 OF 10

CITY FILE #06-012.2



**EXISTING FLOWS
(Rational Method)**

AREA "E-1"	AREA "E-2"	AREA "E-3"	AREA "E-4"	AREA "E-5"
Q = CA C = 0.2 A = 4.11 Acres V = Kd^2 Where K = 0.48 and $n = 0.025$ V = 0.48(7.35) = 0.33 fpa. $T_r = L(60V)$ Where L = 500 ft and V = 0.33 fpa. = 900(60*0.33) = 253 min. $I_{10} = 2.53$ in/hr (from MDOT Rainfall Intensity-Duration Table) $Q_{10} = (0.2)(4.11)(2.53) = 2.13$ cfs.	Q = CA C = 0.2 I = 3.89 A = 4.54 Acres V = Kd^2 Where K = 0.48 and $n = 0.025$ V = 0.48(7.35) = 0.47 fpa. $T_r = L(60V)$ Where L = 930 ft and V = 0.47 fpa. = 930(60*0.47) = 328 min. $I_{10} = 2.26$ in/hr (from MDOT Rainfall Intensity-Duration Table) $Q_{10} = (0.2)(4.54)(2.26) = 2.26$ cfs.	Q = CA C = 0.2 A = 3.05 Acres V = Kd^2 Where K = 0.48 and $n = 0.025$ V = 0.48(7.35) = 0.36 fpa. $T_r = L(60V)$ Where L = 650 ft and V = 0.36 fpa. = 650(60*0.36) = 152 min. $I_{10} = 3.03$ in/hr (from MDOT Rainfall Intensity-Duration Table) $Q_{10} = (0.2)(3.05)(3.03) = 1.87$ cfs.	Q = CA C = 0.2 I = 3.89 A = 3.33 Acres V = Kd^2 Where K = 0.48 and $n = 0.025$ V = 0.48(7.35) = 0.69 fpa. $T_r = L(60V)$ Where L = 415 ft and V = 0.69 fpa. = 415(60*0.69) = 170 min. $I_{10} = 4.18$ in/hr (from MDOT Rainfall Intensity-Duration Table) $Q_{10} = (0.2)(3.33)(4.18) = 2.79$ cfs.	Q = CA C = 0.2 A = 1.66 Acres V = Kd^2 Where K = 0.48 and $n = 0.025$ V = 0.48(7.35) = 0.57 fpa. $T_r = L(60V)$ Where L = 433 ft and V = 0.57 fpa. = 433(60*0.57) = 1207 min. $I_{10} = 3.63$ in/hr (from MDOT Rainfall Intensity-Duration Table) $Q_{10} = (0.2)(1.66)(3.63) = 1.23$ cfs.
Or Using $I = 1.75(T+25)$ with T = 20 Q = CA C = 0.2 I = 3.89 A = 4.11 Acres $Q_{10} = (0.2)(4.11)(3.89) = 3.20$ cfs. $Q_{24} = 2.67$ cfs.	Or Using $I = 1.75(T+25)$ with T = 20 Q = CA C = 0.2 I = 3.89 A = 4.54 Acres $Q_{10} = (0.2)(4.54)(3.89) = 3.50$ cfs. $Q_{24} = 2.79$ cfs.	Or Using $I = 1.75(T+25)$ with T = 20 Q = CA C = 0.2 I = 3.89 A = 3.05 Acres $Q_{10} = (0.2)(3.05)(3.89) = 2.39$ cfs. $Q_{24} = 1.87$ cfs.	Or Using $I = 1.75(T+25)$ with T = 20 Q = CA C = 0.2 I = 3.89 A = 3.33 Acres $Q_{10} = (0.2)(3.33)(3.89) = 2.59$ cfs. $Q_{24} = 2.69$ cfs.	Or Using $I = 1.75(T+25)$ with T = 20 Q = CA C = 0.2 I = 3.89 A = 1.66 Acres $Q_{10} = (0.2)(1.66)(3.89) = 1.29$ cfs. $Q_{24} = 1.26$ cfs.

****TOTAL Q (UNDEVELOPED) = 11.55 cfs****

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850 W UNIVERSITY SUIITE D
ROCHESTER, MI 48375
PHONE: 248-434-8233

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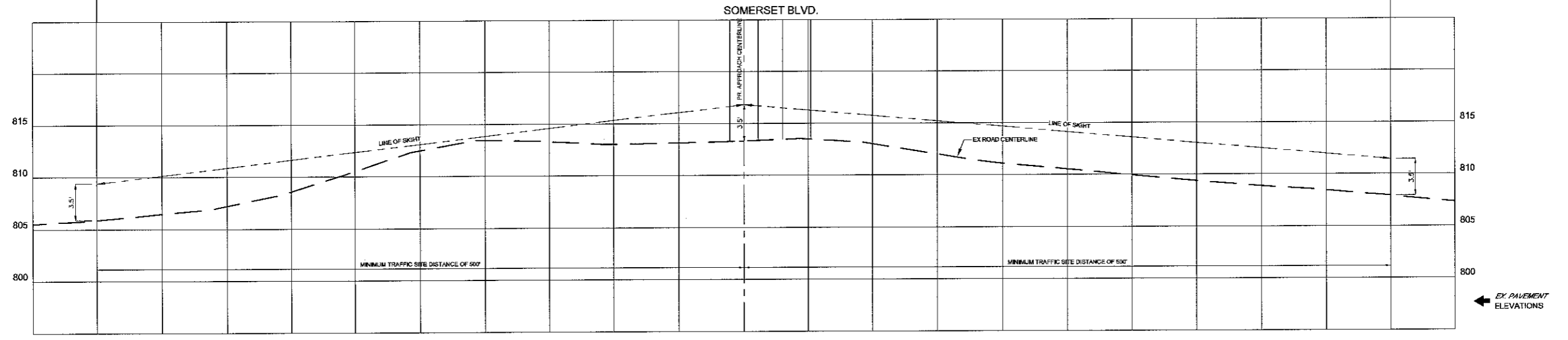
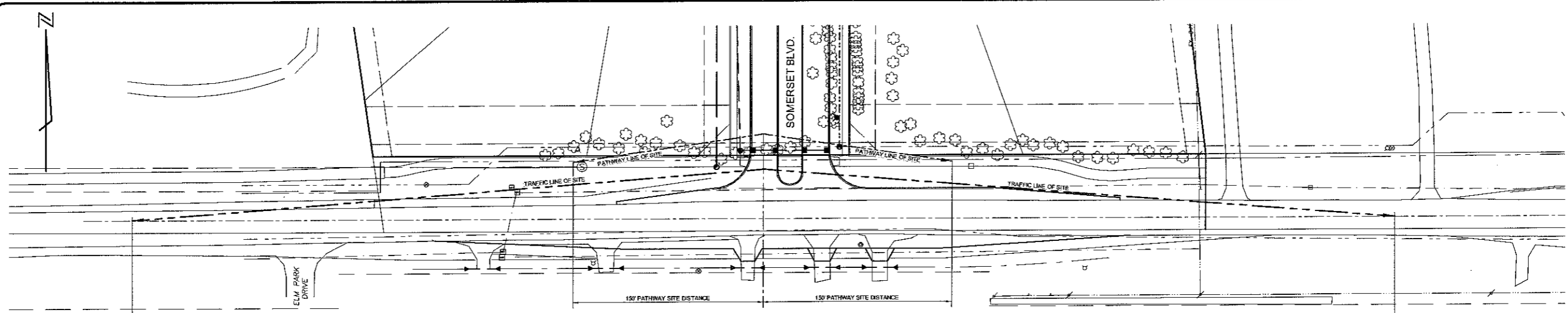
PROJECT NUMBER
C12-012

SHEET NAME
EXISTING DRAINAGE MAP

DRAWING SCALE:	1"=60'
DATE:	09/11/12
PROJECT MANAGER:	J.S.R., P.E.
DESIGNED BY:	J.D.K.
DRAWN BY:	J.D.K.
FIELD BY:	T.D.
CHECKED BY:	J.S.R., P.E.

SHEET NUMBER
4 OF 10

CITY FILE #06-012.2

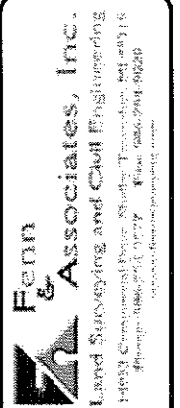


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PRELIMINARY SITE PLAN
 SITE CONDOMINIUM
SOMERSET PINES
 PART OF THE S.W. 1/4 OF SECTION 32, T3N, R11E,
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

DISTRIBUTION	
●	PRELIMINARY
●	APPROVAL
○	CONSTRUCTION
○	AS-BUILT

REVISIONS	
DATE	REMARKS
05/05/12	PER CITY
08/21/12	PER CITY

SEAL

CLIENT
 MV SOMERSET
 PROPERTIES, LLC
 850 W UNIVERSITY SUITE D
 ROCHESTER, MI 48307
 PHONE: 248-434-8233

PROJECT NAME
**SOMERSET
 PINES**

PROJECT NUMBER
C12-012

SHEET NAME
**SOUTH BLVD.
 PROFILE &
 SITE LINES**

DRAWING SCALE:	1"=30'
DATE:	05/11/12
PROJECT MANAGER:	J.S.R., P.E.
DESIGNED BY:	J.D.K.
DRAWN BY:	J.D.K./S.R.T.
FIELD BY:	T.D.
CHECKED BY:	J.S.R., P.E.

SHEET NUMBER
7 OF 10

PRELIMINARY SITE PLAN
 SITE CONDOMINIUM
SOMERSET PINES
 PART OF THE S.W. 1/4 OF SECTION 32, T3N, R11E,
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

DISTRIBUTION	
●	PRELIMINARY
○	APPROVAL
○	CONSTRUCTION
○	AS-BUILT
REVISIONS	
DATE	REMARKS
08/05/12	PER CITY
06/21/12	PER CITY

SEAL

CLIENT
 MV SOMERSET PROPERTIES, LLC
 830 W UNIVERSITY SUITE D
 ROCHESTER, MI 48307
 PHONE: 248-434-8233

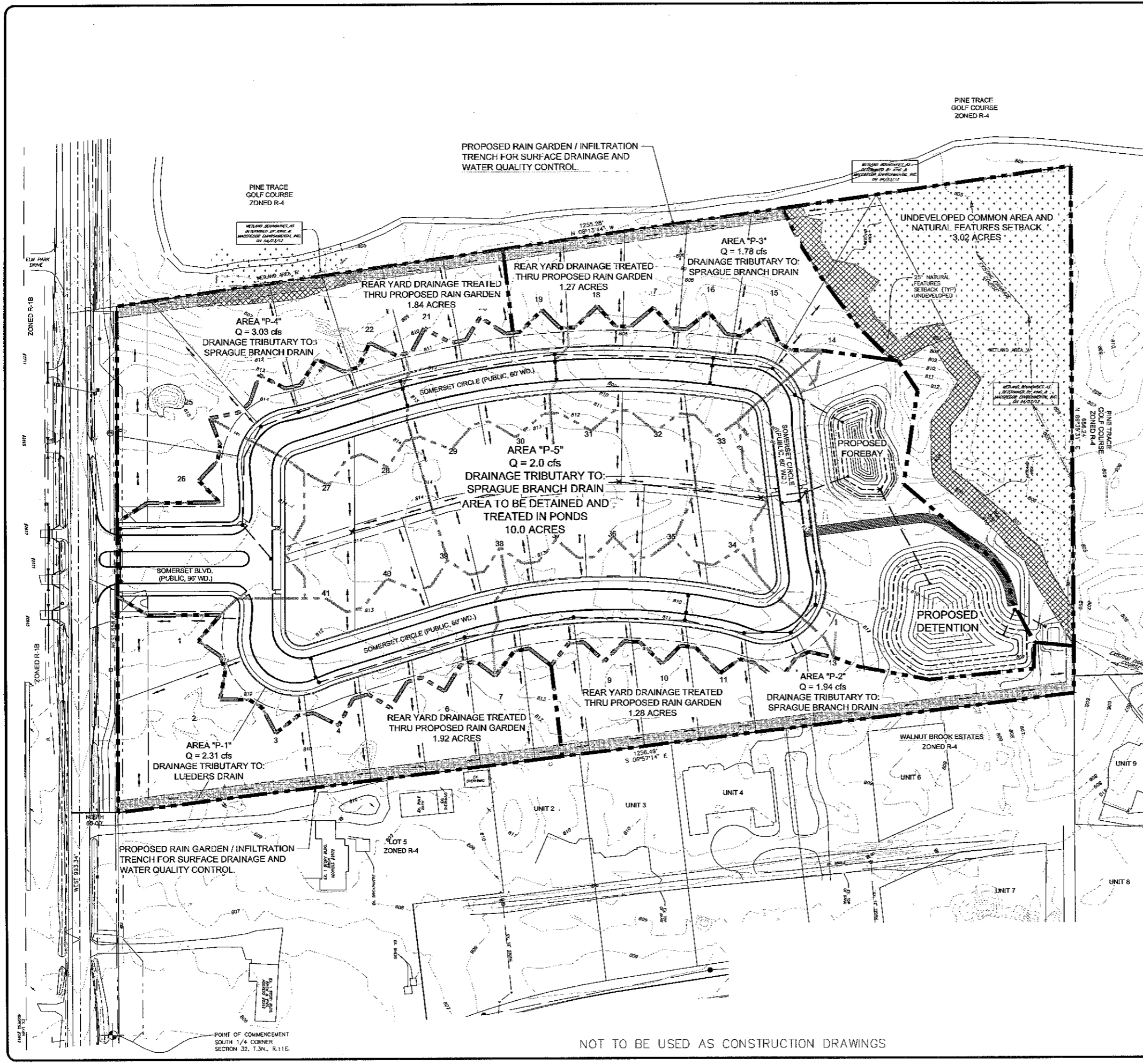
PROJECT NAME
SOMERSET PINES

PROJECT NUMBER
C12-012

SHEET NAME
PRELIMINARY DRAINAGE PLAN

DRAWING SCALE: 1"=50'
 DATE: 05/11/12
 PROJECT MANAGER: J.S.R., P.E.
 DESIGNED BY: J.D.K.
 DRAWN BY: J.D.K./S.R.T.
 FIELD BY: T.D.
 CHECKED BY: J.S.R., P.E.

SHEET NUMBER
8 OF 10



WEIGHTED "C" VALUE
 TOTAL AREA OF AREA OF BUILDINGS AND PAVEMENT = 18,32 AC = 710,899 SF
 C = 0.37
 AREA OF LAWN = 528,499 SF C = 0.2
 $C_{WTD} = \left(\frac{174,400}{710,899} \right) (0.9) + \left(\frac{528,499}{710,899} \right) (0.2) = 0.3717$
 USE C = 0.37

PROPOSED FLOWS (Rational Method)

AREA "P-1"
 Q = CIA
 C = 0.37
 A = 1.29 Acres
 V = Kd^2 Where K = 0.48 and d = 0.50%
 V = 0.48(0.50) = 0.24 fpa.
 $T_e = L(100V)$ Where L = 500 ft and V = 0.24 fpa.
 $= 500(50(0.24)) = 24,500$
 $I_e = 2.51$ in/hr (from MDOT Rainfall Intensity-Duration Table)
 $Q_{10} = (0.37)(2.51)(1.29) = 1.25$ cfs.
 $Q_{max} = 2.31$ cfs.

AREA "P-2"
 Q = CIA
 C = 0.37
 A = 1.29 Acres
 V = Kd^2 Where K = 0.48 and d = 1.00%
 V = 0.48(1.00) = 0.48 fpa.
 $T_e = L(100V)$ Where L = 300 ft and V = 0.48 fpa.
 $= 300(100(0.48)) = 14,400$
 $I_e = 4.30$ in/hr (from MDOT Rainfall Intensity-Duration Table)
 $Q_{10} = (0.37)(4.30)(1.29) = 2.04$ cfs.
 $Q_{max} = 1.94$ cfs.

AREA "P-3"
 Q = CIA
 C = 0.37
 A = 1.27 Acres
 V = Kd^2 Where K = 0.48 and d = 1.33%
 V = 0.48(1.33) = 0.63 fpa.
 $T_e = L(100V)$ Where L = 400 ft and V = 0.63 fpa.
 $= 400(100(0.63)) = 25,200$
 $I_e = 3.57$ in/hr (from MDOT Rainfall Intensity-Duration Table)
 $Q_{10} = (0.37)(3.57)(1.27) = 1.72$ cfs.
 $Q_{max} = 1.78$ cfs.

AREA "P-4"
 Q = CIA
 C = 0.37
 I = 3.89
 A = 1.27 Acres
 V = Kd^2 Where K = 0.48 and d = 2.04%
 V = 0.48(2.04) = 0.98 fpa.
 $T_e = L(100V)$ Where L = 245 ft and V = 0.98 fpa.
 $= 245(100(0.98)) = 24,010$
 $I_e = 5.0$ in/hr (from MDOT Rainfall Intensity-Duration Table)
 $Q_{10} = (0.37)(5.0)(1.27) = 2.31$ cfs.
 $Q_{max} = 1.78$ cfs.

AREA "P-5"
 OBTAINED TO 0.2 CFS/ACRE
 A = 10.0
 Q = 0.2 CFS/ACRE = (10.0)(0.2)
 Q = 2.0 cfs.

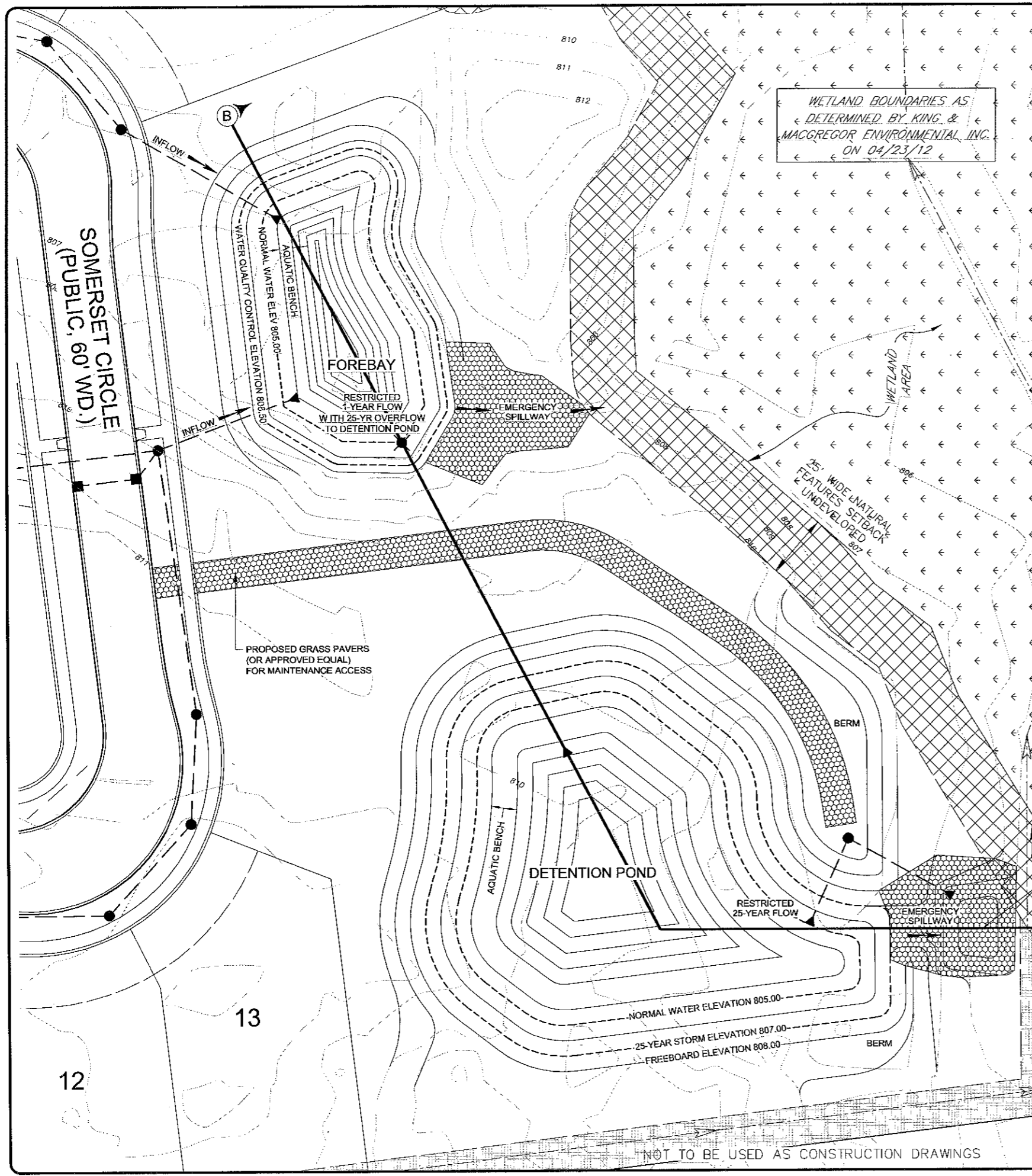
****TOTAL Q (DEVELOPED) = 11.06 cfs****

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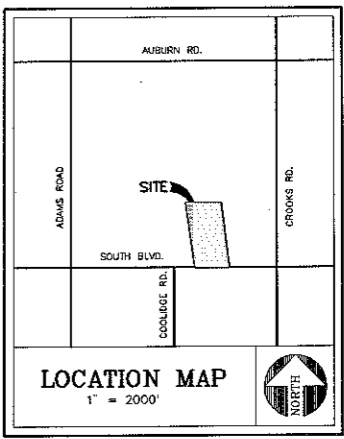
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POINT OF COMMENCEMENT
 SOUTH 1/4 CORNER
 SECTION 32, T3N., R11E.



WETLAND BOUNDARIES AS DETERMINED BY KING & MACGREGOR ENVIRONMENTAL, INC. ON 04/23/12

PINE TRACE GOLF COURSE ZONED R-4
686.24' N 89°35'31" E



WEIGHTED "C" VALUE
 TOTAL AREA OF BUILDINGS AND PAVEMENT = 10.00 AC = 435,600 SF
 AREA OF LAWN = 119,157 SF C = 0.9
 AREA OF LAWN = 316,443 SF C = 0.2
 $C_{avg} = \left(\frac{119,157}{435,600} \right) (0.9) + \left(\frac{316,443}{435,600} \right) (0.2) = 0.3913$
 USE C = 0.39

DETENTION CALCULATION 1 YEAR STORM PER OAKLAND COUNTY STANDARDS

ALLOWABLE DISCHARGE	C1 =	0.20 CFS/ACRE
TIME INITIAL	T =	20.00 MINUTES
AREA	A =	10.00 ACRES
RUNOFF COEFF	C =	0.39
TOTAL ALLOWABLE DISCHARGE	QA = C1 x A =	2.00 CFS
ALLOWABLE OUTFLOW	Q0 = QA / (A x C) =	0.51 CFS/ACRE
PEAK STORAGE TIME	T = 25 + (SQRT(2700 x Q0)) =	47.58 MINUTES
MAX. STORAGE VOLUME/ACRE	VS = (4320 x T / (T + 25)) - (40 x Q0 x T) =	1855.89 CUFT./ACRE
TOTAL STORAGE REQUIRED	VT = VS x A x C =	7238.35 CUFT.
STORAGE HEIGHT PROVIDED	H =	1.50 FEET
TOP AREA OF BASIN	AREA OF CONTOUR 806.50	A1 = 7500.00 SQFT.
BOTTOM AREA OF BASIN	AREA OF CONTOUR 805.00	A2 = 4700.00 SQFT.
TOTAL STORAGE VOLUME PROVIDED	V = ((A1 + A2 + SQRT(A1 x A2)) x H) / 3 =	9068.59 CUFT.
AREA OF ORIFICE	AR = C1 x A / (0.62 x SQRT(2 x 32.2 x H)) =	0.33 SQFT.
DIAMETER OF OUTLET	D = 2 x SQRT(144 x AR / PI) =	7.76 INCHES

USE 8-INCH RESTRICTOR

DETENTION CALCULATION 25 YEAR STORM PER OAKLAND COUNTY STANDARDS

ALLOWABLE DISCHARGE	C1 =	0.20 CFS/ACRE
TIME INITIAL	T =	20.00 MINUTES
AREA	A =	10.00 ACRES
RUNOFF COEFF	C =	0.39
TOTAL ALLOWABLE DISCHARGE	QA = C1 x A =	2.00 CFS
ALLOWABLE OUTFLOW	Q0 = QA / (A x C) =	0.51 CFS/ACRE
PEAK STORAGE TIME	T = 25 + (SQRT(2700 x Q0)) =	100.39 MINUTES
MAX. STORAGE VOLUME/ACRE	VS = (12900 x T / (T + 25)) - (40 x Q0 x T) =	8288.74 CUFT./ACRE
TOTAL STORAGE REQUIRED	VT = VS x A x C =	32248.10 CUFT.
STORAGE HEIGHT PROVIDED	H =	2.00 FEET
TOP AREA OF BASIN	AREA OF CONTOUR 807.00	A1 = 19700.00 SQFT.
BOTTOM AREA OF BASIN	AREA OF CONTOUR 806.00	A2 = 13500.00 SQFT.
TOTAL STORAGE VOLUME PROVIDED	V = ((A1 + A2 + SQRT(A1 x A2)) x H) / 3 =	33065.32 CUFT.
AREA OF ORIFICE	AR = C1 x A / (0.62 x SQRT(2 x 32.2 x H)) =	0.28 SQFT.
DIAMETER OF OUTLET	D = 2 x SQRT(144 x AR / PI) =	7.22 INCHES

USE 8-INCH RESTRICTOR

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Fennell & Associates, Inc.
 Land Surveying and Civil Engineering
 11779 Commerce Road, Westland, Michigan 48186
 Phone: 313.486.1977 Fax: 313.486.2444
 Website: www.fennellandassociates.com

PRELIMINARY SITE PLAN
 SITE CONDOMINIUM
SOMERSET PINES
 PART OF THE S.W. 1/4 OF SECTION 32, T3N, R11E,
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN

DISTRIBUTION	
●	PRELIMINARY
○	APPROVAL
○	CONSTRUCTION
○	AS-BUILT
REVISIONS	
DATE	REMARKS
06/05/12	PER CITY
06/21/12	PER CITY

SEAL

CLIENT
 MV SOMERSET PROPERTIES, LLC
 830 W UNIVERSITY SUITE D
 ROCHESTER, MI 48307
 PHONE: 248-434-8233

PROJECT NAME
SOMERSET PINES

PROJECT NUMBER
C-12-012

SHEET NAME
PRELIMINARY DETENTION BASINS & CALC'S

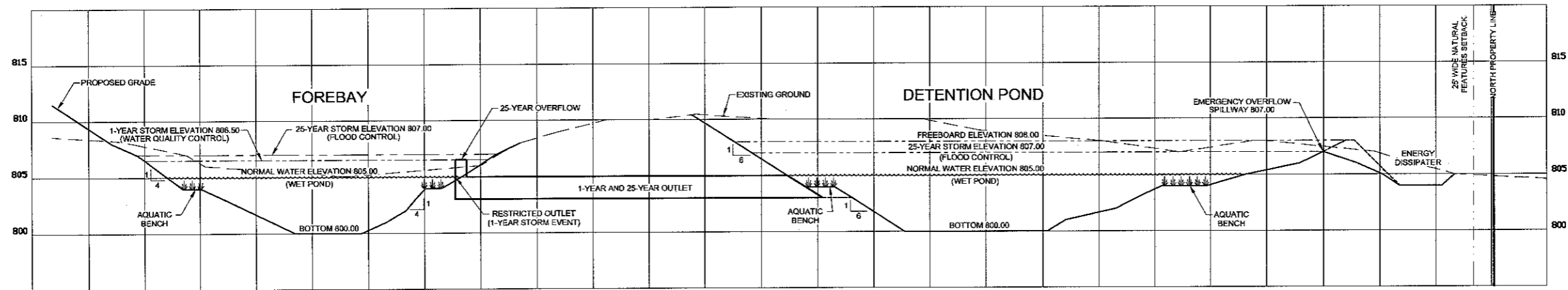
DRAWING SCALE: 1"=20'
 DATE: 05/11/12
 PROJECT MANAGER: J.S.R., P.E.
 DESIGNED BY: J.D.K.
 DRAWN BY: J.D.K./S.R.T.
 FIELD BY: T.O.
 CHECKED BY: J.S.R., P.E.

SHEET NUMBER
9 OF 10

CITY FILE #06-012.2

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PRELIMINARY SITE PLAN
SOMERSET PINES
 PART OF THE S.W. 1/4 OF SECTION 32, T3N, R11E,
 CITY OF ROCHESTER HILLS, OAKLAND COUNTY, MICHIGAN



SECTION "B-B"
 HORIZ. SCALE: 1"=20' VERT. SCALE: 1"=4'

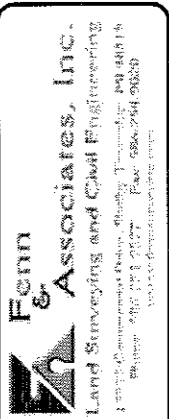
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 SITE CONDOMINIUM
SOMERSET PINES
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DISTRIBUTION	
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○	AS-BUILT
REVISIONS	
DATE	REMARKS
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06/21/12	PER CITY

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CLIENT
 MV SOMERSET
 PROPERTIES, LLC
 850 W UNIVERSITY SUTED
 ROCHESTER, MI 48307
 PHONE: 248-434-8233

PROJECT NAME
**SOMERSET
 PINES**

PROJECT NUMBER
C12-012

SHEET NAME
**PRELIMINARY
 BASIN CROSS
 SECTIONS**

DRAWING SCALE:	AS SHOWN
DATE:	05/11/12
PROJECT MANAGER:	J.S.R., P.E.
DESIGNED BY:	J.D.K.
DRAWN BY:	J.D.K.
FIELD BY:	T.D.
CHECKED BY:	J.S.R., P.E.

SHEET NUMBER
10 OF 10