CITYWIDE MASTER DRAINAGE PLAN

SEMINOLE, OKLAHOMA

FINAL REPORT

FEBRUARY 2016

www.meshekengr.com
1437 South Boulder Avenue, Suite 1550, Tulsa, OKlahoma 74119
918.392.5620 fax: 918.392.5621

MESHEK & ASSOCIATES, PLC

Table of Contents

SECTION 1. BACKGROUND 1

SECTION 2. STUDY METHODOLOGY 4

2.1 Hydrologic Analysis 4
2.2 Hydraulic Analysis 6

SECTION 3. MAGNOLIA CREEK DRAINAGE. BASIN 8

3.1 Existing Conditions Hydrology 8
3.2 Existing Conditions Hydraulics 16
3.3 Problem Areas 20
3.3.1 Problem Area 1 –N. Milt Phillips Avenue in Magnolia Creek Main Stem 20
3.3.2 Problem Area 2 – Downstream end of Tributary 4 Drainage Basin 20
3.3.3 Problem Area 3 –Existing Structures in Magnolia Creek Drainage Basins 20
3.3.4 Problem Area 4 –Neighborhood Upstream of Tributary 4 21
3.3.5 Problem Area 5 – Grisso Drive between Mocking Bird Lane and Sims Place ..21
3.4 Evaluation of Alternatives 23
3.4.1 Problem Area 1 –N. Milt Phillips Avenue in Magnolia Creek Main Stem 24
3.4.2 Problem Area 2 – Downstream end of Tributary 4 Drainage Basin 30
3.4.3 Problem Area 3 –Existing Structures in Magnolia Creek Drainage Basin 32
3.4.4 Problem Area 4 –Neighborhood Upstream on Tributary No: 4 36
3.4.5 Problem Area 5 - Storm Sewer Improvement along Grisso Drive 43
3.5 Recommended Plan 46

SECTION 4. WEWOKA CREEK TRIBUTARY DRAINAGE BASIN 47

4.1 Existing Conditions Hydrology 47
4.2 Existing Conditions Hydraulics 53
4.3 Problem Areas 56
4.3.1 Problem Area 1 –Residential Area Downstream of High School Practice Field and Commercial Structures along W. Broadway Avenue 56
4.3.2 Problem Area 2 –Residential Area along Coolidge Street 56
4.3.3 Problem Area 3 –Residential Area upstream of College Avenue 56
4.3.4 Problem Area 4 –Drainage Basins to the west of Coolidge Street 57
4.4 Evaluation of Problem Areas 59
4.4.1 Problem Area 1 –Residential Area Downstream of High School Practice Field and Commercial Structures along W Broadway Avenue 59
4.4.2 Problem Area 2 –Residential Area along Coolidge Street 63
4.4.3 Problem Area 3 –Residential Area upstream of College Avenue 67
4.4.4 Problem Area 4 –Drainage Basins to the west of Coolidge Street 69
4.5 Recommended Plan 72

Tables

TABLE 2-1 SEMINOLE MASTER DRAINAGE PLAN – TOTAL RAINFALL....6
TABLE 3-1 MAGNOLIA CREEK DRAINAGE BASIN–SUMMARY OF HYDROLOGIC COEFFICIENTS FOR EXISTING CONDITIONS....12
TABLE 3-2 MAGNOLIA CREEK DRAINAGE BASIN – EXISTING FLOW RATES AT MAJOR JUNCTIONS (CFS)....15
TABLE 4-1 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN–SUMMARY OF HYDROLOGIC COEFFICIENTS FOR EXISTING CONDITIONS.51
TABLE 4-2 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN – EXISTING FLOW RATES AT MAJOR JUNCTIONS (CFS)....52

List of Figures

FIGURE 1-1 SEMINOLE MASTER DRAINAGE PLAN – LOCATION MAP....2
FIGURE 1-2 SEMINOLE MASTER DRAINAGE PLAN – STUDIED DRAINAGE BASINS....3
FIGURE 3-1 MAGNOLIA CREEK DRAINAGE BASIN AND SUB BASINS....9
FIGURE 3-2 MAGNOLIA CREEK DRAINAGE BASIN HYDROLOGIC SOIL GROUPS....10
FIGURE 3-3 MAGNOLIA CREEK DRAINAGE BASIN EXISTING LAND USE....11
FIGURE 3-4 MAGNOLIA CREEK DRAINAGE BASIN STUDIED STREAMS AND CULVERT/BRIDGE CAPACITIES....18
FIGURE 3-5 MAGNOLIA CREEK DRAINAGE BASIN 1% STORM (100-YEAR) FLOODPLAIN....19
FIGURE 3-6 MAGNOLIA CREEK DRAINAGE BASIN PROBLEM AREAS....22
FIGURE 3-7 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 1, ALTERNATIVE 2....26
FIGURE 3-8 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 1, ALTERNATIVE 3....28
FIGURE 3-9 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 1 & 2, ALTERNATIVE 4....29
FIGURE 3-10 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 1 & 2, ALTERNATIVE 5....31
FIGURE 3-11 MAGNOLIA CREEK DRAINAGE BASIN - PROBLEM AREA 3, ALTERNATIVE 1....35
FIGURE 3-12 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 4, ALTERNATIVE 2....39
FIGURE 3-13 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 4, ALTERNATIVE 3....41
FIGURE 3-14 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 4, ALTERNATIVE 4....42
FIGURE 3-15 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 5, ALTERNATIVE 1....44
FIGURE 3-16 MAGNOLIA CREEK DRAINAGE BASIN – PROBLEM AREA 5, ALTERNATIVE 2....45
FIGURE 4-1 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN AND SUB BASINS....48
FIGURE 4-2 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN HYDROLOGIC SOIL GROUPS....49
FIGURE 4-3 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN EXISTING LAND USE....50
FIGURE 4-4 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN STUDIED STREAMS AND CULVERT/BRIDGE CAPACITIES....54
FIGURE 4-5 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN 100-YEAR FLOODPLAIN....55
FIGURE 4-6 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN PROBLEM AREAS....58
FIGURE 4-7 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN - PROBLEM AREA 1: ALTERNATIVE 1....60
FIGURE 4-8 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN - PROBLEM AREA 1: ALTERNATIVE 2....62
FIGURE 4-9 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN PROBLEM AREA 2: ALTERNATIVE 1....64
FIGURE 4-10 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN PROBLEM AREA 2: ALTERNATIVE 2....66
FIGURE 4-11 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN PROBLEM AREA 3: ALTERNATIVE 1....68
FIGURE 4-12 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN PROBLEM AREA 4: ALTERNATIVE 1....70
FIGURE 4-13 WEWOKA CREEK TRIBUTARY DRAINAGE BASIN PROBLEM AREA 4: ALTERNATIVE 2....71

List of Appendices

APPENDIX 3-A HYDROLOGIC COEFFICIENTS FOR EXISTING CONDITION....73
APPENDIX 3-B HEC-HMS SCHEMATIC....
APPENDIX 3-C HEC-HMS OUTPUT....
APPENDIX 3-D FEMA FLOODPLAIN AND FLOODWAY....
APPENDIX 3-E EXISTING FLOODPLAIN AND FLOODWAY....
APPENDIX 3-F WATER SURFACE PROFILES....

APPENDIX 3-G CULVERT CAPACITIES
APPENDIX 3-H COST ESTIMATES
APPENDIX 4-A HYDROLOGIC COEFFICIENTS FOR EXISTING CONDITION
APPENDIX 4-B HEC-HMS SCHEMATIC
APPENDIX 4-C HEC-HMS OUTPUT
APPENDIX 4-D FEMA FLOODPLAIN AND FLOODWAY
APPENDIX 4-E EXISTING FLOODPLAIN
APPENDIX 4-F WATER SURFACE PROFILES
APPENDIX 4-G COST ESTIMATES

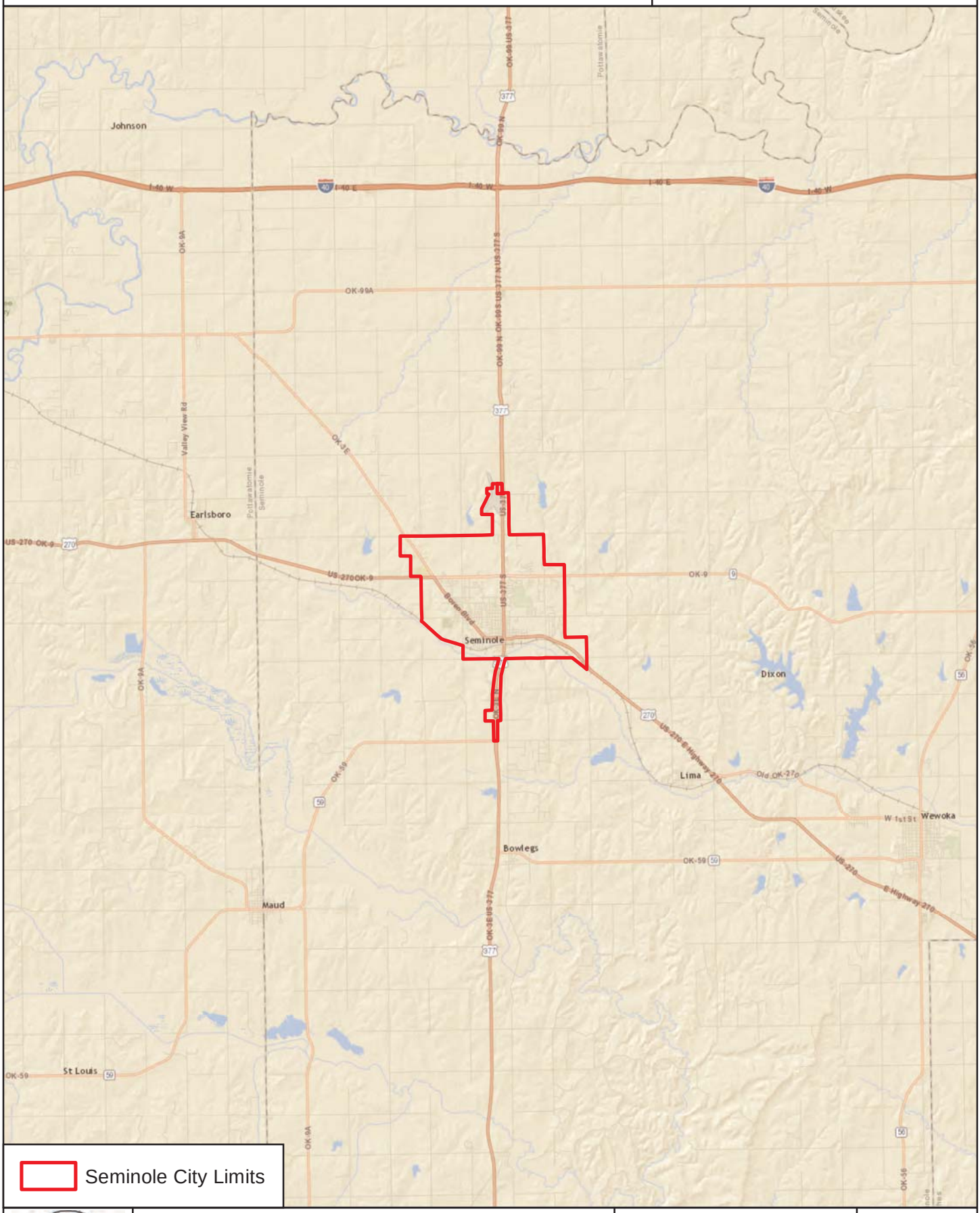
Section 1. BACKGROUND

In June 2015, the City of Seminole contracted the services of Meshek & Associates, PLC to prepare a city wide Master Drainage Plan. This study focuses on the Magnolia Creek watershed and a tributary of Wewoka Creek in the City of Seminole. Both of these basins drain into Wewoka Creek. The purpose of this study was to perform Hydrologic and Hydraulic analyses to determine the existing drainage and flood conditions, evaluate alternative analyses and provide conceptual designs for flood mitigation. **FIGURE 1-1** gives a general overview of the location and **FIGURE 1-2** shows the area studied in detail. Individual basin maps are shown within each section of this report. Each section discusses the existing hydrologic and hydraulic conditions of the basins, previous studies performed if there are any, problem areas, alternatives evaluated and the recommended plans.

City of Seminole Master Drainage Plan

0 2.75 5.5
Miles

N



Seminole City Limits

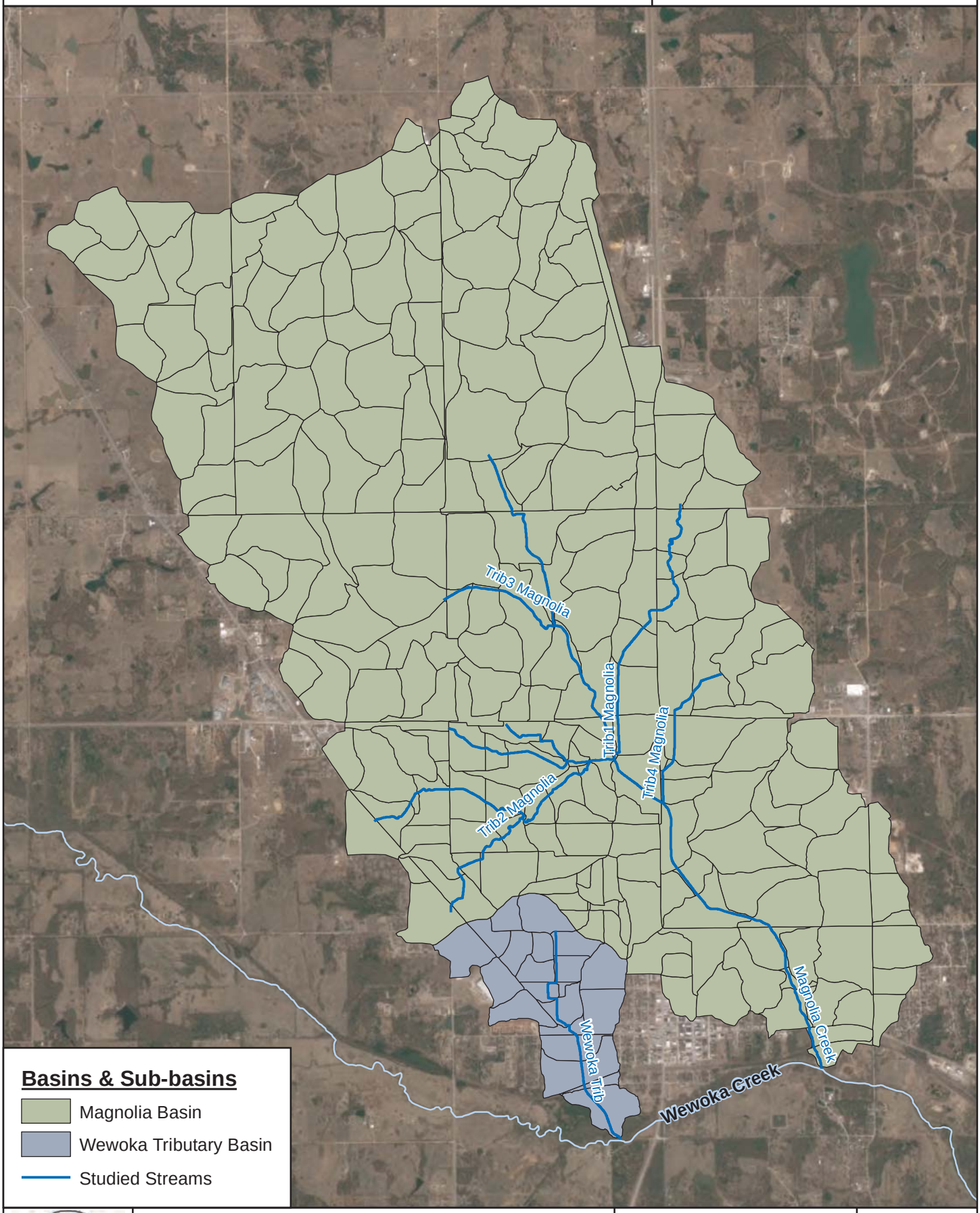
CITY OF SEMINOLE

Location Map

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 1-1

City of Seminole Master Drainage Plan



Studied Drainage Basins

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 1-2

Section 2. STUDY METHODOLOGY

Hydrologic and hydraulic modeling of the basins in Seminole was performed using HEC-HMS, HEC-GeoRAS and HEC-RAS, computer programs developed by the US Army Corps of Engineers. These programs are Windows-based and GIS-based versions of HEC-1 and HEC-2, long considered industry standards for hydrology and hydraulics. Storm sewer modeling where required was performed using StormCAD.

For each of the stream reaches studied, the major drainage features were identified and then modeled to determine their ability to convey the peak flows at each rainfall recurrence interval. Predicted areas of flooding were then mapped for the peak flows for the 100- and 500-year storms.

Computed flow rates for creek channels were input into the channel models for each stream reach, where appropriate. Cross-sections were obtained from the digital terrain models based upon the 2012 Oklahoma LIDAR topographic data prepared for Natural Resources Conservation Service (NRCS). Bridge and culvert data, as well as storm sewers, were measured in the field for all areas of detailed study.

Base data were prepared using HEC-GeoRAS; HEC-GeoRAS is a program developed by the US Army Corps of Engineers and is equipped with a set of procedures, tools, and utilities for processing geospatial data in ArcView using a Graphical User Interface (GUI). This interface enables the preparation of geometric data for import into HEC-RAS, for modeling purposes, and processes simulation results exported from HEC-RAS, for floodplain mapping purposes. The GIS data supplied to the HEC-RAS models included stream centerlines, flow path centerlines, main channel bank stations and reach lengths, and cross section geometric data. Additionally, Manning's "n" values were also exported from HEC-GeoRAS to HEC-RAS based on a GIS representation of land use.

Resulting 100-year peak flows at selected locations from the hydrologic analysis are tabulated in each section including flows for existing conditions. The HMS output, which shows flows at all locations for frequencies ranging from the 1- to 500-year floods, are also included in detail in **APPENDICES** for each section complete with the locations of HMS junctions in the HEC-HMS schematics.

2.1 Hydrologic Analysis

The following assumptions were incorporated in the hydrologic modeling and analysis processes:

A. Subdivision of Drainage Basins: Major drainage areas were subdivided based on the homogeneity of the watershed and the need to define flow rates for hydraulic analysis at various points within the basins. The sub basins vary in size within the basins; larger sub basins can be found in lesser developed areas and smaller sub

basins in the more developed and commercial areas. Each study basin section contains a figure with sub basin delineations.

B. Soil Types: Infiltration rates were correlated to runoff potential for the various soils types within the basins. All soils have a hydrologic soil group (HSG) classification that indicates the relative amount of runoff that can be expected from a soil type. Each subbasin was assigned a Curve Number (CN) based on the HSG classification of the open soil. The impervious areas were identified and used to weight the CN value assigned to each subbasin. These values are explained in detail and tabulated within the individual reports. Each study basin section contains a figure with HSG delineations.

C. Hydrograph Development: The SCS Unit Hydrograph method was used in the analysis. Utilizing the total rainfall values and the CN value described above, the storm runoff volume is calculated from a given total rainfall. Peak flow rates and hydrograph shape are determined based on experimental data developed by the Soil Conservation Service (NRCS). This method is described in Section 4, “Hydrology” of the National Engineering Handbook, USDA, SCS August 1972.

D. Rainfall: Table 2-1 below gives the rainfall depths used in the hydrologic analyses. The depths were obtained from NOAA’s National Weather Service Hydrometeorological Design Studies Center’s Precepitation Frequency Data Server.

E. Storage Routing: The stream reaches, within each basin where floodplains were developed, were studied in detail hydraulically using HEC-RAS. These streams are described in detail in separate sections of the report. The storage volumes for different flow rates were calculated during the hydraulic analysis for these reaches. These data were then applied to the HEC-HMS model, and runoff hydrographs were routed from point to point through the storage volumes calculated for each of these reaches. This enabled the effects of existing floodplain storage to be easily demonstrated. For those streams without hydraulic models, hydrographs were routed from point to point based on travel time.

F. Existing Stormwater Detention Facilities: Some large ponds exist in the basins among other smaller ponds constructed to offset development. These ponds have an effect on the hydraulics and hydrology and are described in detail in later chapters in this report.

Table 2-1 Seminole Master Drainage Plan – Total Rainfall

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.445 (0.345-0.563)	0.520 (0.403-0.657)	0.641 (0.496-0.811)	0.740 (0.570-0.939)	0.875 (0.656-1.12)	0.978 (0.722-1.26)	1.08 (0.778-1.41)	1.18 (0.826-1.56)	1.31 (0.893-1.76)	1.41 (0.944-1.91)
10-min	0.651 (0.506-0.824)	0.761 (0.590-0.963)	0.938 (0.726-1.19)	1.08 (0.835-1.38)	1.28 (0.961-1.64)	1.43 (1.06-1.85)	1.58 (1.14-2.06)	1.73 (1.21-2.28)	1.93 (1.31-2.57)	2.07 (1.38-2.79)
15-min	0.794 (0.617-1.00)	0.928 (0.720-1.17)	1.14 (0.885-1.45)	1.32 (1.02-1.68)	1.56 (1.17-2.00)	1.75 (1.29-2.25)	1.93 (1.39-2.52)	2.11 (1.48-2.78)	2.35 (1.59-3.14)	2.52 (1.69-3.40)
30-min	1.14 (0.886-1.44)	1.34 (1.04-1.70)	1.66 (1.29-2.10)	1.92 (1.48-2.44)	2.28 (1.71-2.92)	2.55 (1.88-3.28)	2.81 (2.02-3.66)	3.07 (2.15-4.05)	3.41 (2.32-4.56)	3.66 (2.45-4.94)
60-min	1.50 (1.17-1.90)	1.77 (1.37-2.23)	2.20 (1.70-2.79)	2.56 (1.97-3.25)	3.06 (2.30-3.94)	3.45 (2.55-4.47)	3.85 (2.78-5.03)	4.25 (2.98-5.62)	4.79 (3.26-6.41)	5.20 (3.47-7.00)
2-hr	1.86 (1.47-2.33)	2.19 (1.72-2.74)	2.73 (2.14-3.42)	3.20 (2.49-4.01)	3.85 (2.94-4.92)	4.36 (3.27-5.60)	4.89 (3.57-6.34)	5.43 (3.85-7.13)	6.16 (4.24-8.20)	6.73 (4.54-9.01)
3-hr	2.09 (1.66-2.60)	2.46 (1.94-3.05)	3.08 (2.43-3.83)	3.61 (2.84-4.50)	4.38 (3.37-5.58)	5.00 (3.78-6.39)	5.64 (4.16-7.30)	6.31 (4.51-8.27)	7.24 (5.02-9.61)	7.96 (5.41-10.6)
6-hr	2.50 (2.00-3.06)	2.93 (2.35-3.60)	3.69 (2.95-4.53)	4.35 (3.47-5.36)	5.33 (4.17-6.74)	6.12 (4.69-7.78)	6.96 (5.20-8.95)	7.85 (5.68-10.2)	9.09 (6.39-12.0)	10.1 (6.92-13.3)
12-hr	2.92 (2.37-3.54)	3.44 (2.79-4.17)	4.34 (3.51-5.27)	5.13 (4.14-6.25)	6.30 (4.99-7.88)	7.25 (5.63-9.12)	8.26 (6.25-10.5)	9.33 (6.84-12.1)	10.8 (7.69-14.2)	12.0 (8.34-15.8)
24-hr	3.40 (2.80-4.07)	3.98 (3.28-4.78)	5.00 (4.10-6.00)	5.89 (4.82-7.09)	7.21 (5.79-8.93)	8.29 (6.52-10.3)	9.43 (7.22-11.9)	10.6 (7.89-13.6)	12.3 (8.87-16.0)	13.7 (9.60-17.9)
2-day	3.97 (3.32-4.70)	4.60 (3.84-5.45)	5.70 (4.74-6.76)	6.67 (5.53-7.93)	8.10 (6.58-9.92)	9.27 (7.39-11.4)	10.5 (8.15-13.1)	11.8 (8.88-15.0)	13.7 (9.95-17.7)	15.1 (10.8-19.7)
3-day	4.34 (3.65-5.09)	5.02 (4.22-5.90)	6.21 (5.21-7.31)	7.25 (6.05-8.56)	8.77 (7.18-10.7)	10.0 (8.03-12.3)	11.3 (8.84-14.1)	12.7 (9.60-16.1)	14.6 (10.7-18.8)	16.1 (11.5-20.9)
4-day	4.63 (3.92-5.41)	5.36 (4.53-6.27)	6.61 (5.58-7.74)	7.71 (6.47-9.05)	9.30 (7.64-11.2)	10.6 (8.53-12.9)	11.9 (9.36-14.8)	13.4 (10.1-16.8)	15.3 (11.3-19.7)	16.9 (12.1-21.8)
7-day	5.39 (4.61-6.24)	6.17 (5.28-7.14)	7.51 (6.41-8.71)	8.68 (7.37-10.1)	10.4 (8.62-12.4)	11.8 (9.57-14.2)	13.2 (10.4-16.2)	14.7 (11.3-18.4)	16.8 (12.5-21.4)	18.4 (13.4-23.7)
10-day	6.06 (5.22-6.96)	6.88 (5.93-7.92)	8.30 (7.13-9.56)	9.52 (8.14-11.0)	11.3 (9.45-13.4)	12.7 (10.4-15.3)	14.2 (11.3-17.3)	15.8 (12.2-19.6)	17.9 (13.4-22.8)	19.6 (14.3-25.1)
20-day	7.92 (6.93-8.99)	8.95 (7.81-10.2)	10.6 (9.28-12.1)	12.1 (10.5-13.8)	14.1 (11.9-16.5)	15.7 (13.0-18.6)	17.4 (14.0-20.9)	19.1 (14.9-23.4)	21.3 (16.1-26.8)	23.1 (17.1-29.3)
30-day	9.46 (8.34-10.6)	10.7 (9.40-12.0)	12.7 (11.1-14.3)	14.3 (12.5-16.2)	16.6 (14.1-19.3)	18.4 (15.4-21.6)	20.2 (16.4-24.1)	22.0 (17.3-26.8)	24.4 (18.5-30.4)	26.2 (19.5-33.2)
45-day	11.4 (10.1-12.7)	12.9 (11.4-14.4)	15.3 (13.5-17.1)	17.2 (15.2-19.4)	19.9 (17.0-22.9)	21.9 (18.4-25.5)	23.9 (19.6-28.4)	25.9 (20.5-31.4)	28.5 (21.8-35.4)	30.4 (22.8-38.3)
60-day	13.0 (11.6-14.5)	14.7 (13.2-16.4)	17.5 (15.6-19.5)	19.8 (17.5-22.1)	22.8 (19.6-26.0)	25.0 (21.1-28.9)	27.2 (22.4-32.1)	29.4 (23.3-35.5)	32.2 (24.7-39.8)	34.3 (25.8-43.0)

2.2 Hydraulic Analysis

The following assumptions were incorporated in the hydraulic modeling and analysis processes:

A. Starting Water Surface Elevations: Normal depth was used as the downstream boundary condition for open channel analysis. Where smaller tributaries combine with other streams the actual downstream water surface elevation is used by the HEC-RAS model as a boundary condition.

B. Existing Storage Volumes: In those basins for which floodplains were developed, the storage volumes were computed reach by reach within the hydraulic model for various flow rates. These values were used in the final HEC-HMS model to determine

the effect of existing floodplain storage on peak flow rates. Final water surface profiles were then computed for each frequency.

C. Bridge and Culvert Analysis: Each roadway crossing in a detailed study area was modeled using the bridge or culvert modeling methods available within HEC-RAS. Each studied stream, within the individual watersheds depicting the level of overtopping of each of the bridges and culverts studied in detail using the frequency of storm that it would pass, is mapped in an Appendix of each section.

D. Flooded Buildings and Floodplain Mapping: The buildings that appear to be flooded at 100-year storm are shown on the Floodplain Figures in following sections and the resultant existing 100-year floodplains are also shown for each of the individual watersheds studied.

E. Storm Sewer Analysis: Known water surface elevations were used as a boundary condition for the storm analysis when available. The crown of the pipe was used in areas where the tailwater conditions were not known.

Section 3. MAGNOLIA CREEK DRAINAGE. BASIN

3.1 Existing Conditions Hydrology

The Magnolia Creek Drainage Basin is generally bound by EW. 1190 Rd to the north, NS. 353 Road to the west, Wewoka Creek to the south and Elks Road to the east. The Magnolia Creek Drainage Basin encompasses a drainage area of approximately 6634 acres. The basin drains south into Wewoka Creek. **FIGURE 3-1** provides the general overview and location of the Magnolia Creek Drainage Basin and sub basins.

The hydrologic soil groups for the basin are shown in **FIGURE 3-2**. The existing land use for the basin is depicted in **FIGURE 3-3**. More information on the hydrologic soil group can be found in **SECTION 2.1**.

The hydrologic coefficients input in the HEC-HMS model include the lag time, soil complex curve number (CN) and drainage area. A summary of these hydrologic coefficients is presented in **TABLE 3-1** on the following pages. More detailed data for the basin is included in **APPENDIX 3-A**. Reach routing data was developed using two methods. In areas without detailed hydraulic analysis, a simple lag routing was developed by measuring the flow length and dividing by an estimated velocity to determine a lag time. In open channel flow areas studied in detail, the Modified Puls method was used to account for floodplain storage. Rating curves were developed for each reach using the hydraulic models discussed in the next section.

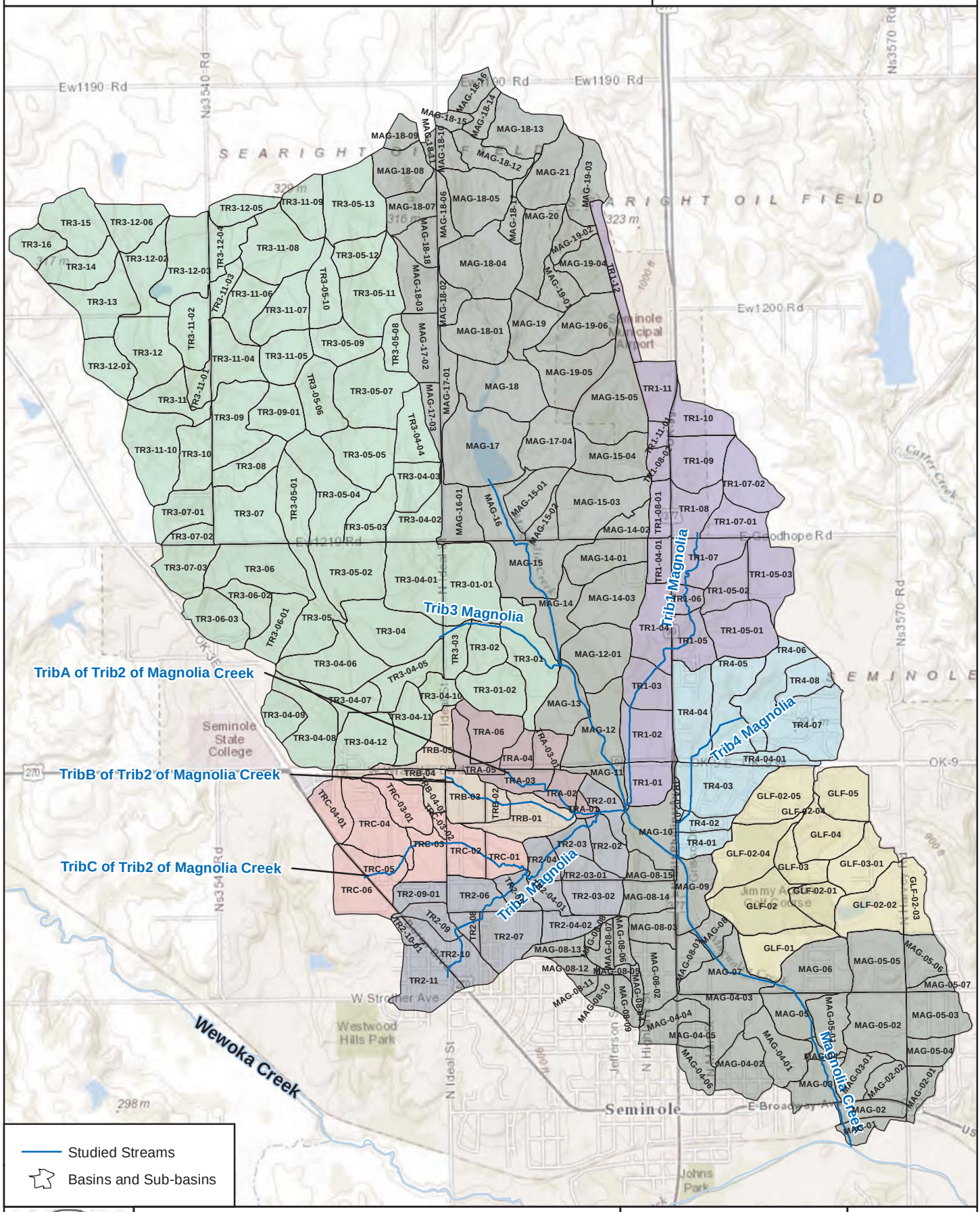
The flow rates for the existing conditions for the Magnolia Creek Drainage Basin were developed using HEC-HMS 4.0 and notable areas are listed in **TABLE 3-2**. The HEC-HMS schematics for existing conditions are located in **APPENDIX 3-B**. A complete list of output from HEC-HMS can be found in **APPENDIX 3-C**.

Existing FEMA Studies

Magnolia Creek and its Tributaries 1, 2 and 3 were previously studied using detailed methods and are currently mapped as an AE. Zone with a floodway on the Flood Insurance Rate Maps (FIRMs). The hydrologic and hydraulic analyses for the Flood Insurance Study (FIS) for the City of Seminole were prepared by HTB, Inc., for FEMA in April 1981. The studied stream for Magnolia Creek begins at the confluence with Wewoka Creek and extends to Goodhope Road, which is the city limit. Upstream of Goodhope Road, the existing floodplain and floodway continues for another 1.1 miles. Detailed study for Tributary 1 was extended approximately 0.3 miles upstream of N. Milt Philips Avenue/State Highway 99. The Tributary 2 analysis was mapping to a point just downstream of Van Drive. Tributary 3 and its tributary were extended outside the city limit. Outside of the city limits, the study was performed and completed by the Tulsa District of the U.S. Army Corps of Engineers (USACE) for FEMA in December 1987. A U.S. Geological Survey (USGS) regression equation was used to develop the peak discharges for Magnolia Creek. Water surface elevations for this stream were computed using USACE. HEC-2 program.

The effective FEMA floodplain and floodway are included in **APPENDIX 3-D**. These provide the current limits of regulatory floodplain boundaries for Magnolia Creek and its tributaries. The map panels are currently dated July 18, 2011.

City of Seminole Master Drainage Plan



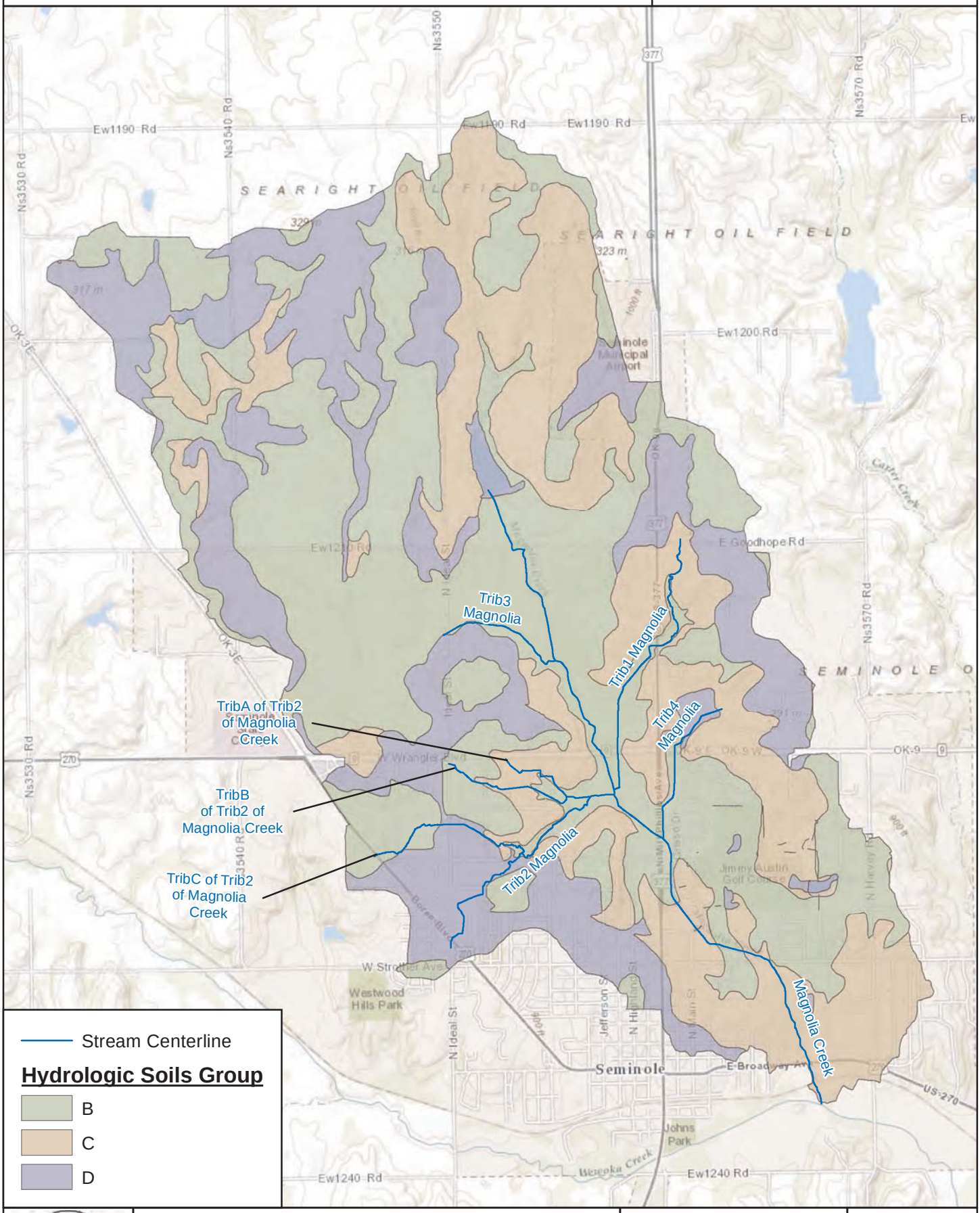
Magnolia Creek Drainage Basin & Sub-basins

CITY OF SEMINOLE

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-1

City of Seminole Master Drainage Plan



CITY OF SEMINOLE

Magnolia Creek Hydrologic Soils Group

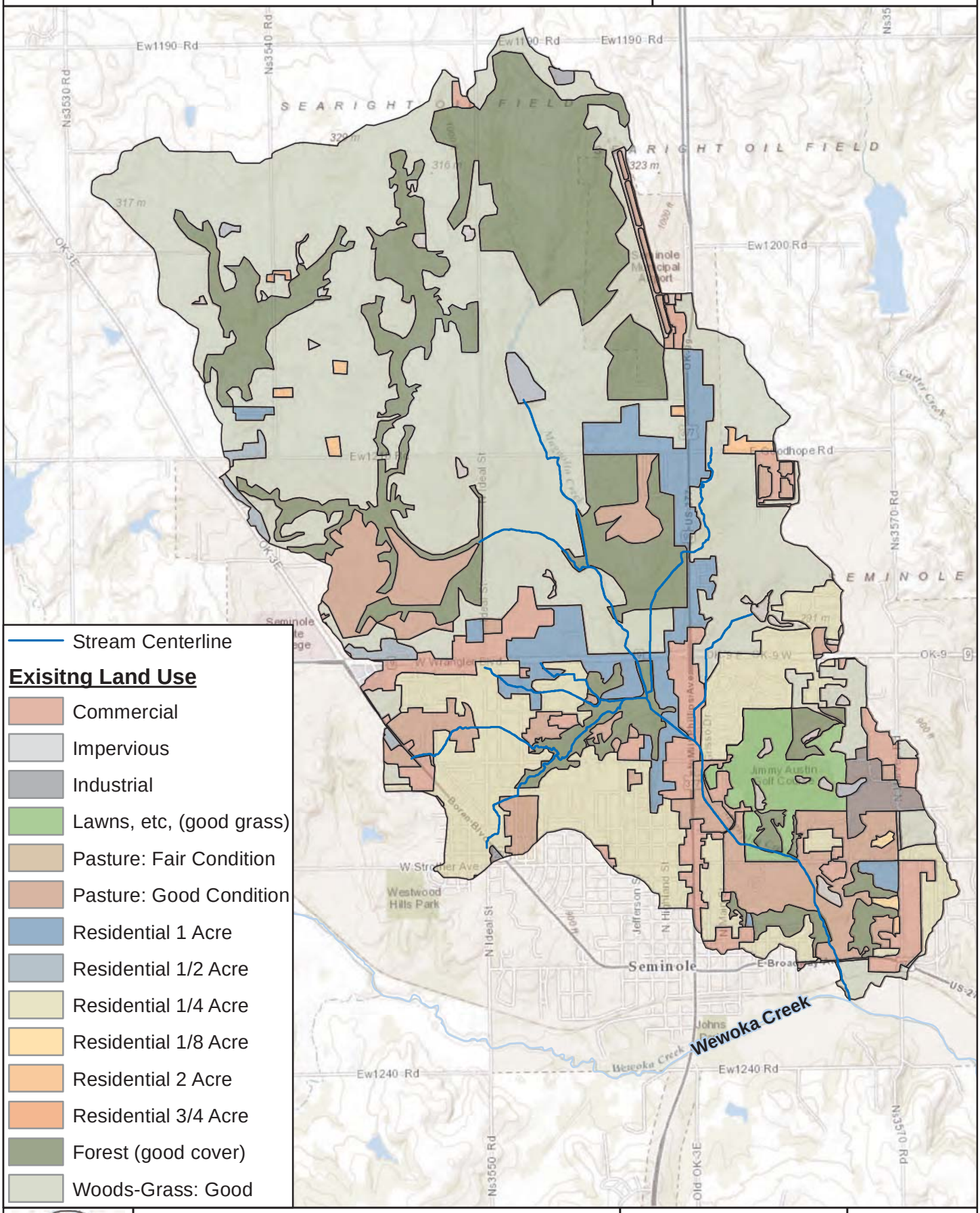
MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-2

City of Seminole Master Drainage Plan

0 0.5 1
Miles

N



Stream Centerline

Exisitng Land Use

- Commercial
- Impervious
- Industrial
- Lawns, etc, (good grass)
- Pasture: Fair Condition
- Pasture: Good Condition
- Residential 1 Acre
- Residential 1/2 Acre
- Residential 1/4 Acre
- Residential 1/8 Acre
- Residential 2 Acre
- Residential 3/4 Acre
- Forest (good cover)
- Woods-Grass: Good

CITY OF SEMINOLE

Magnolia Creek
Existing Land Use

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-3

Table 3-1 Magnolia Creek Drainage Basin–Summary of Hydrologic Coefficients for Existing Conditions

Drainage Area	Lag (Min)	CN	Area (Acres)
GLF-01	8.34	64.4	33.14
GLF-02	4.83	66.4	51.08
GLF-02-01	3.14	76.2	20.09
GLF-02-02	7.10	85.9	40.56
GLF-02-03	8.99	83.9	21.52
GLF-02-04	3.27	65.4	44.19
GLF-02-05	12.80	77.9	39.32
GLF-03	4.81	70.3	19.85
GLF-03-01	10.63	78.6	32.29
GLF-04	4.46	72.2	34.71
GLF-05	10.09	69.5	31.55
MAG-01	44.80	72.0	11.56
MAG-02	11.00	82.0	15.04
MAG-02-01	6.16	89.5	14.71
MAG-02-02	3.87	81.1	17.61
MAG-03	7.67	77.2	22.57
MAG-03-01	8.32	72.7	21.42
MAG-04	1.76	72.7	4.58
MAG-04-01	15.52	72.3	33.26
MAG-04-02	8.51	81.8	31.46
MAG-04-03	13.00	73.3	31.09
MAG-04-04	8.18	85.2	24.74
MAG-04-05	3.43	86.8	9.67
MAG-04-06	4.08	90.3	16.59
MAG-05	7.12	70.7	23.68
MAG-05-01	4.28	83.1	23.50
MAG-05-02	5.67	72.9	46.10
MAG-05-03	6.26	88.6	32.23
MAG-05-04	3.82	88.4	15.56
MAG-05-05	5.25	74.9	41.16
MAG-05-06	5.10	67.8	21.99
MAG-05-07	4.20	83.3	6.37
MAG-06	11.11	67.0	43.14
MAG-07	9.70	73.1	34.99
MAG-08	8.13	79.7	12.90
MAG-08-01	5.55	83.1	14.24
MAG-08-02	11.12	86.2	29.94
MAG-08-03	1.60	81.0	17.85
MAG-08-04	5.22	86.3	5.98
MAG-08-05	3.02	87.0	3.37
MAG-08-06	5.63	82.5	10.09
MAG-08-07	4.08	86.0	10.38
MAG-08-08	3.12	87.0	3.42
MAG-08-09	3.43	84.9	10.47
MAG-08-10	2.80	87.3	8.06
MAG-08-11	2.65	90.7	5.52
MAG-08-12	3.94	87.0	7.78
MAG-08-13	4.09	87.0	11.15
MAG-08-14	5.27	83.7	20.81
MAG-08-15	5.48	79.1	11.59
MAG-09	9.62	74.1	30.95
MAG-10	16.01	77.1	37.72
MAG-11	8.21	68.0	13.12
MAG-12	27.33	62.1	44.04
MAG-12-01	10.84	59.5	42.37
MAG-13	6.68	67.8	29.63
MAG-14	10.92	56.3	28.84
MAG-14-01	9.26	61.0	31.76
MAG-14-02	6.40	70.2	14.55
MAG-14-03	9.70	63.1	43.97
MAG-15	11.30	57.9	50.79
MAG-15-01	7.44	61.0	26.85
MAG-15-02	5.60	59.6	10.92
MAG-15-03	7.21	66.5	56.74
MAG-15-04	5.19	64.9	34.76
MAG-15-05	12.47	71.8	59.42
MAG-16	7.13	60.5	27.17
MAG-16-01	9.44	71.7	24.48
MAG-17	3.55	77.5	71.22
MAG-17-01	5.48	72.9	16.23
MAG-17-02	4.93	69.2	26.29
MAG-17-03	6.89	62.1	11.94
MAG-17-04	7.61	65.4	35.26
MAG-18	8.70	69.4	53.48
MAG-18-01	7.07	68.7	43.80
MAG-18-02	4.65	73.6	12.60
MAG-18-03	5.50	74.6	25.68
MAG-18-04	7.76	66.9	57.16
MAG-18-05	7.09	64.6	42.26
MAG-18-06	4.96	69.8	13.20

Drainage Area	Lag (Min)	CN	Area (Acres)
MAG-18-07	4.04	66.6	22.20
MAG-18-08	4.49	68.0	30.12
MAG-18-09	3.79	68.3	10.33
MAG-18-10	4.56	66.3	11.67
MAG-18-11	3.44	66.1	4.41
MAG-18-12	5.16	64.7	23.69
MAG-18-13	7.11	66.6	37.53
MAG-18-14	4.49	70.0	11.20
MAG-18-15	4.42	66.6	6.75
MAG-18-16	5.56	67.5	16.35
MAG-18-17	7.00	55.0	12.05
MAG-18-18	3.89	70.0	17.71
MAG-19	6.42	66.9	27.48
MAG-19-01	5.27	70.0	17.85
MAG-19-02	4.86	70.7	13.89
MAG-19-03	7.56	67.1	28.12
MAG-19-04	2.13	71.5	24.58
MAG-19-05	9.12	73.1	42.63
MAG-19-06	5.93	71.1	40.70
MAG-20	7.50	67.1	32.22
MAG-21	8.50	65.9	39.58
TRA-01	8.35	64.1	4.53
TRA-02	8.30	74.7	14.58
TRA-03	4.79	80.5	16.20
TRA-03-01	8.17	75.3	14.41
TRA-04	6.96	75.4	11.70
TRA-05	4.47	83.0	16.62
TRA-06	19.47	83.3	30.18
TRB-01	9.01	77.5	34.26
TRB-02	10.08	76.2	10.04
TRB-03	3.27	73.5	24.00
TRB-04	8.95	93.0	11.41
TRB-04-01	9.30	85.6	10.20
TRB-05	6.17	87.8	22.66
TRC-01	3.22	70.4	18.44
TRC-02	6.22	83.8	24.52
TRC-03	3.82	75.2	22.47
TRC-03-01	9.15	80.4	26.31
TRC-03-02	6.78	80.6	3.68
TRC-04	10.74	72.2	44.25

Drainage Area	Lag (Min)	CN	Area (Acres)
TRC-04-01	3.19	74.1	21.29
TRC-05	42.52	75.6	20.36
TRC-06	3.75	77.1	30.77
TR1-01	7.04	78.5	23.62
TR1-02	5.82	68.3	34.49
TR1-03	7.03	63.1	26.67
TR1-04	6.53	71.1	35.47
TR1-04-01	3.67	79.3	13.35
TR1-05	7.57	64.1	24.63
TR1-05-01	10.72	72.9	41.57
TR1-05-02	4.56	74.1	23.26
TR1-05-03	6.86	84.1	34.24
TR1-06	6.67	69.1	10.43
TR1-07	4.34	75.6	33.50
TR1-07-01	6.92	71.8	23.08
TR1-07-02	8.19	58.0	32.67
TR1-08	3.84	76.3	26.00
TR1-08-01	5.04	80.1	15.08
TR1-08-02	8.66	67.1	8.84
TR1-09	9.87	74.6	35.44
TR1-10	10.85	64.5	24.61
TR1-11	4.93	78.0	24.57
TR1-11-01	5.21	65.7	6.56
TR1-12	5.38	80.2	18.48
TR2-01	16.04	67.0	17.03
TR2-02	6.40	72.6	20.00
TR2-03	7.94	63.8	16.24
TR2-03-01	3.57	78.3	11.48
TR2-03-02	10.93	78.7	24.31
TR2-04	22.59	71.1	16.17
TR2-04-01	10.69	84.6	12.26
TR2-04-02	9.68	86.8	17.70
TR2-05	6.49	77.2	14.56
TR2-06	3.60	83.2	23.14
TR2-07	4.02	79.3	36.70
TR2-08	6.08	83.5	8.98
TR2-09	3.94	87.0	14.59
TR2-09-01	7.89	87.0	14.83
TR2-10	11.23	85.0	29.91
TR2-10-01	7.44	86.5	5.59

Drainage Area	Lag (Min)	CN	Area (Acres)
TR2-11	10.13	83.9	37.69
TR3-01	8.87	64.9	49.55
TR3-01-01	8.72	59.6	53.93
TR3-01-02	8.14	73.6	33.72
TR3-02	10.77	72.3	21.10
TR3-03	5.29	73.5	15.33
TR3-04	4.74	58.0	54.23
TR3-04-01	11.06	64.2	51.24
TR3-04-02	6.94	73.3	24.23
TR3-04-03	4.72	65.5	23.43
TR3-04-04	10.38	57.8	28.01
TR3-04-05	7.20	68.7	25.62
TR3-04-06	6.59	61.2	46.14
TR3-04-07	5.97	59.5	19.65
TR3-04-08	4.21	64.5	42.96
TR3-04-09	7.96	64.0	18.22
TR3-04-10	4.57	69.2	14.19
TR3-04-11	5.09	69.4	28.20
TR3-04-12	4.05	70.4	37.98
TR3-05	5.13	59.0	36.11
TR3-05-01	9.99	58.1	32.57
TR3-05-02	5.19	59.5	49.36
TR3-05-03	4.41	58.9	26.71
TR3-05-04	9.66	60.5	53.81
TR3-05-05	5.09	62.0	41.87
TR3-05-06	7.33	65.4	32.61
TR3-05-07	7.19	62.3	55.01
TR3-05-08	7.98	63.2	15.63
TR3-05-09	6.25	73.7	24.96
TR3-05-10	3.19	76.5	27.71
TR3-05-11	9.39	63.7	48.32
TR3-05-12	8.00	70.1	19.43
TR3-05-13	8.05	72.8	51.65
TR3-06	9.64	62.1	51.15
TR3-06-01	7.35	63.7	26.20
TR3-06-02	6.18	75.1	20.73
TR3-06-03	6.35	74.2	31.73
TR3-07	8.54	58.5	49.49
TR3-07-01	5.06	73.3	26.76
TR3-07-02	5.49	80.0	10.72
TR3-07-03	4.78	73.2	29.37
TR3-08	9.10	61.3	24.15
TR3-09	6.06	69.5	44.89
TR3-09-01	8.32	65.5	28.49
TR3-10	1.93	74.5	27.56
TR3-11	6.92	62.9	23.32
TR3-11-01	8.03	63.0	12.52
TR3-11-02	5.34	69.7	32.63
TR3-11-03	4.64	77.1	12.60
TR3-11-04	9.33	65.4	31.16
TR3-11-05	13.45	64.3	27.68
TR3-11-06	8.92	74.8	26.38
TR3-11-07	6.97	77.0	31.93
TR3-11-08	8.36	70.3	50.38
TR3-11-09	7.66	75.6	24.36
TR3-11-10	2.88	64.5	52.11
TR3-12	5.02	63.4	44.73
TR3-12-01	5.50	74.0	25.94
TR3-12-02	4.43	65.0	31.34
TR3-12-03	5.15	68.0	46.24
TR3-12-04	2.17	75.7	20.75
TR3-12-05	4.71	76.8	18.55
TR3-12-06	15.37	62.1	28.46
TR3-13	5.50	77.9	40.09
TR3-14	5.07	77.4	30.51
TR3-15	11.24	63.3	36.74
TR3-16	9.27	76.8	18.94
TR4-01	7.16	78.3	14.90
TR4-02	6.41	78.8	10.55
TR4-02-01	5.53	93.7	2.86
TR4-03	7.35	75.7	49.01
TR4-04	2.58	77.2	45.89
TR4-04-01	6.56	81.7	16.20
TR4-05	4.41	71.8	44.94
TR4-06	5.89	78.9	38.74
TR4-07	5.08	84.3	53.43
TR4-08	6.87	81.0	19.38

Table 3-2 Magnolia Creek Drainage Basin – Existing Flow Rates at Major Junctions (cfs)

HMS ID	Location	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
Magnolia Creek									
J-MAG-16	Goodhope Road	39	52	109	151	202	243	283	382
J-MAG-14	Confluence with Tributary No:3	597	878	1688	2359	3267	4138	5166	7827
J-MAG-12	Upstream of W Wrangler Boulevard	589	875	1682	2362	3309	4157	5112	7539
J-MAG-11	Confluence of Tributary No:1 and Tributary No:2	905	1367	2542	3589	4991	5800	6537	9117
J-MAG-10	Upstream of N Milt Philips Ave / State Highway 99	893	1366	2527	3568	4972	5785	6538	9142
J-MAG-09-UP	Confluence of Tributary No:4	956	1503	2787	3853	5295	6147	6881	9562
J-MAG-09	Upstream of Grisso Drive	953	1485	2790	3816	5213	6035	6893	9583
J-MAG-08	Upstream of Lloyd Simmons Boulevard	964	1428	2822	3840	5235	6051	6977	9741
J-MAG-06	Upstream of E Strothers Avenue	992	1449	2668	3812	5207	6115	7114	9929
J-MAG-03	Upstream of E Broadway Avenue	1023	1425	2651	3864	5245	6199	7225	10067
J-MAG-01	Upstream of confluence with Wewoka Creek	1027	1407	2472	3705	5213	6179	7209	10087
Tributary No:1 to Magnolia Creek									
J-TR1-08	Goodhope Road	130	190	356	495	680	822	967	1308
J-TR1-05	Upstream of N Milt Philips Ave / State Highway 99	212	279	413	524	619	680	718	851
J-TR1-02	Upstream of W Wrangler Boulevard	178	238	326	370	502	584	658	807
Tributary No:2 to Magnolia Creek									
J-TR2-11	Upstream of Boren Boulevard/ State Highway 3E	56	72	113	144	183	212	240	304
J-TR2-08	Upstream of Van Drive	149	190	295	375	467	560	635	791
J-TR2-04-UP	Confluence with Tributary C	283	371	622	885	1236	1517	1793	2382
J-TR2-04	Coolidge Street	281	365	632	899	1262	1535	1835	2447
J-TR2-02	Confluence with Tributary A	441	565	1016	1410	1934	2382	2834	3894
J-TR2-01	Upstream of Confluence with Magnolia Creek	441	564	1000	1412	1955	2391	2866	3939
Tributary A to Tributary No:2									
J-TRA-03-UP	Downstream of W Wrangler Boulevard	58	78	128	167	218	255	292	378
Tributary B to Tributary No:2									
J-TRB-04	N Ideal Street	91	113	167	207	257	293	328	408
J-TRB-03	Upstream of John Street	87	112	179	223	293	347	387	477
J-TRB-02	Sheila Lane	92	120	193	242	319	386	435	540
J-TRB-01	Upstream of Confluence with Tributary A	101	132	217	284	378	466	537	696
Tributary C to Tributary No:2									
J-TRC-06	Upstream of Boren Boulevard/ State Highway 3E	46	64	109	145	191	225	258	335
J-TRC-03	Upstram of N Ideal Street	103	144	260	362	538	658	745	1056
J-TRC-02	John Street	104	145	270	385	571	705	806	1146
J-TRC-01	Upstream of Confleunce with Tributary No:2	105	147	274	388	570	721	838	1163
Tributary No:3 to Magnolia Creek									
J-TR3-04	Upstream of N Ideal Street	509	757	1460	2145	2979	3757	4511	6506
J-TR3-01	Upstream of Confluence with Magnolia Creek	510	760	1482	2123	2981	3708	4504	6479
Tributary No:4 to Magnolia Creek									
J-TR4-04	Upstream of E Wrangler Boulevard	98	169	240	311	491	561	646	858
J-TR4-01	Upstream of Confluence with Magnolia Creek	103	139	263	376	610	692	786	1024

3.2 Existing Conditions Hydraulics

Detailed hydraulic models were created for the following streams: Magnolia Creek and its tributaries - Tributary 1, Tributary 2, Tributary 3 and Tributary 4. Studied streams are shown in **FIGURE 3-4**. Detailed descriptions of these areas are discussed below. HEC-RAS Version 4.1.0 was used to develop the hydraulic models for these tributaries.

Magnolia Creek

The upper limit of the stream begins at a pond approximately 886 feet southeast of the EW. 1190 Road and NS. 3550 Road intersection and generally flows in southeast direction. The stream studied in detail extends to the City of Seminole limit, Goodhope Road (Station 17605) which is approximately 3.3 miles upstream of its confluence with Wewoka Creek. Until the stream reaches Station 14188 downstream of its confluence with Tributary 3, it flows largely through undeveloped areas with its floodplain covering mostly pasture land. Even though Tributary 1 confluences with Magnolia Creek downstream of W. Wrangler Boulevard (Station 11401), combined flow rates are used in the model from upstream of Wrangler Boulevard. The structures under Wrangler Boulevard were modeled as a single structure with multiple opening in HEC-RAS as the floodplains from both creeks combine upstream of this structure. Downstream of W. Wrangler Boulevard to N. Milt Phillips Avenue (Station 8701), the creek is bounded by wooded or pasture lands. In this reach, the floodplain on east side extends to the commercial area that lies on west side of N. Milt Phillips Avenue. Downstream of N. Milt Phillips Avenue to Lloyd Simmons Boulevard, the floodplains consist of both residential and commercial structures. Downstream of Lloyd Simmons Boulevard (Station 5982), floodplains on both sides of the creek are mostly undeveloped with a few residential buildings on south side. Downstream of E. Strothers Avenue (Station 3898) floodplains are undeveloped until the confluence with Magnolia Creek.

Tributary 1 to Magnolia Creek

Tributary 1 study area lies to the northeast of the main channel. This tributary starts near Goodhope Road, approximately 1.5 mile upstream from its confluence with Magnolia Creek near W. Wrangler Boulevard. Tributary 1 has a drainage area of approximately 517 acres. The floodplain for this tributary includes some commercial development on the east side near W. Wrangler Boulevard where the floodplain is combined floodplains from Magnolia Creek.

Tributary 2 to Magnolia Creek

Tributary 2 area lies to the west of main channel. This tributary starts near Boren Boulevard, approximately 1.3 miles upstream from its confluence with Magnolia creek, downstream of W. Wrangler Boulevard. Tributary 2 has a 755 acre drainage area. Between Boren Boulevard and Coolidge Street, the stream flows through residential areas. Downstream of Coolidge Street, the floodplains are undeveloped with wooded and pasture areas lining the stream. Tributary 2 has three other tributaries which are named as Tributary A, B, and C.

Tributary A extends to W. Wrangler Boulevard, approximately 0.5 miles northwest from its confluence with Tributary 2 and flows primarily through residential areas. Tributary A joins Tributary 2 approximately 600 feet upstream of its confluence with Magnolia Creek. Tributary B

starts downstream of N. Ideal Street approximately 200 feet south of W. Wrangler Boulevard. This stream also flows through residential areas. The storm sewer portions in Tributaries A and B are modeled as culverts in HEC-RAS. Tributary C starts upstream of Boren Boulevard, approximately 0.9 miles upstream of its confluence with Tributary 2 near Reid Street. This tributary also flows through residential areas.

Tributary 3 to Magnolia Creek

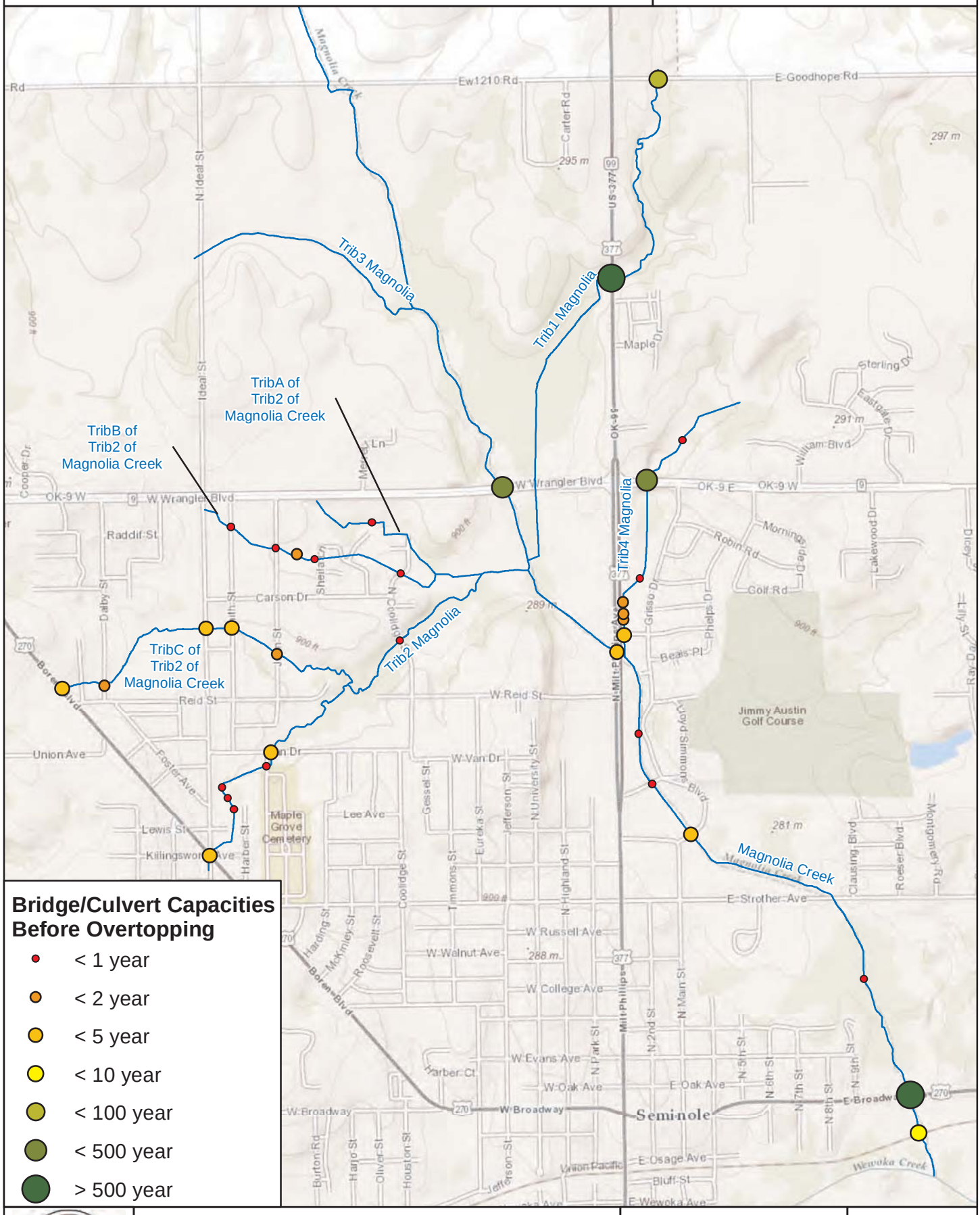
Tributary 3 is west of main channel and was studied approximately 0.6 miles to N. Ideal Street from its confluence with Magnolia Creek. Tributary 3 has a 2142 acre drainage basin.

Tributary 4 to Magnolia Creek

Tributary 4 area lies to the north of the main channel. This tributary starts approximately 0.75 miles upstream from its confluence with Magnolia Creek. This tributary extends upstream along the east side of N. Milt Phillips Avenue for approximately 815 feet through commercial developments. From there it continues upstream with residential areas on the east side and commercial areas on the west side up to E. Wrangler Boulevard. Upstream of Wrangler Boulevard, the immediate floodplains are undeveloped.

Manning's "n" values used for the channel range from 0.02 to 0.05 and for floodplains it varied from 0.013 to 0.10. A field survey was conducted to measure all the storm sewers, culverts and bridges along Magnolia Creek and its tributaries. These structures were entered into the HEC-RAS model. Normal depth was used as the starting boundary condition. Flow rates from HEC-HMS model were used to perform the backwater analysis. The existing pond weir outlets were rated using HEC-RAS and the pond outflow was determined from the HEC-HMS modeling. Once the hydraulic analysis was complete, floodplains, floodway and water surface profiles were created. **FIGURE 3-5** shows the areas and the buildings that are flooded during a 1% storm (100-year) storm event. These are also shown at a larger scale on the floodplain atlas in **APPENDIX 3-E.**

City of Seminole Master Drainage Plan



Bridge/Culvert Capacities Before Overtopping

- < 1 year
- < 2 year
- < 5 year
- < 10 year
- < 100 year
- < 500 year
- > 500 year

CITY OF SEMINOLE

Magnolia Creek Studied Streams & Culvert/Bridge Capacities

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-4

City of Seminole Master Drainage Plan

0 0.25 0.5
Miles

N



CITY OF SEMINOLE

Magnolia Creek
Updated Existing 100 year Floodplain

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-5

3.3 Problem Areas

The completed models and corresponding results from several different storm events were used to identify the general problem areas throughout the city. TA hydrologic model of the May 6, 2015 storm was developed using the rainfall data for May 2015 event prepared by Vieux & Associates, Inc. The highest records within the Magnolia Creek Drainage Basin was 3.7 inches over a 12-hour period. Approximately 2.5 inches of this total rain was in a 2-hour period. A comparison of this rainfall depth with National Weather Service Hydrometeorological Design Studies Center's Precipitation Frequency Data showed that the May 2015 event was approximately a 20% storm (5-year) event. Photographs from May 2015 flood collected from the city helped to determine the magnitude of flooding. As per the new existing condition model developed, the flood level found in some of the buildings identified on Magnolia Creek floodplain near N. Milt Phillips Avenue are prone to flooding from events as low as the 20% storm (5-year) frequency.

3.3.1 Problem Area 1 –N. Milt Phillips Avenue in Magnolia Creek Main Stem

Downstream of Wrangler Boulevard, Magnolia Creek flows through more developed areas. Near N. Milt Phillips Avenue, there are several commercial and residential buildings that are in the 100-year (1% Annual Chance) floodplain. Many of these structures are commercial and most of them have a finished floor close to the ground elevation. From the hydraulic analysis, it is obvious that several buildings and structures along this creek experience flooding during 100-year (1% Annual Chance) storm event. The existing culvert at N. Milt Phillips Avenue has a 2-year (50% Annual Chance Storm) capacity. Several structures along N. Milt Phillips Avenue will experience flooding from storm events as low as 5-year (20% Annual Chance). In existing conditions, improving the structure under N. Milt Phillips Avenue to increase its capacity would require raising a long stretch of roadway section and since it is a commercial corridor, it would require reconstructing the entrances to all of the businesses where improvements are required.

3.3.2 Problem Area 2 – Downstream end of Tributary 4 Drainage Basin

Tributary 4 to Magnolia Creek confluences with Magnolia Creek downstream of N. Milt Phillips Avenue. During a 1% storm (100-year) event on Magnolia Creek, this tributary will experience flooding that is caused by backwater from Magnolia Creek. Hence the creek was analyzed with normal depth as the downstream condition to assess the situation in local rain events and it was found that the channel is inadequate to carry the flow from a local event in this basin too. The lower 1100 feet of this tributary is bound by commercial structures, residential structures and N. Milt Phillips Avenue. There is no room for channel improvements along this reach without purchasing properties. Most structures in the downstream end are commercial entrances and improving those structures does not help lower the water surface in this portion of the creek.

3.3.3 Problem Area 3 –Existing Structures in Magnolia Creek Drainage Basins

There are a total of 10 bridge/culvert crossings in the main stem of Magnolia Creek, of which three are pedestrian/private structures. Major roadway crossings are across E. Broadway Avenue (500-year capacity), Strothers Avenue (50-year capacity), Lloyd Simmons Boulevard (50% storm (2-year) capacity), N. Milt Phillips Avenue/Highway 99 (2-year capacity) and Wrangler Boulevard (100-year capacity). Tributary 1 has two bridge/culvert crossings and Tributary 2 has seven

crossings, of which four are private. Tributary 3 has one major roadway crossing in the studied section. Tributary 4 has total of seven crossings, of which four are entrances to commercial businesses. Most of the structures in Tributary 2 have a capacity of 2-year or less. The capacity of all existing structures along the studied stream reaches are shown in **FIGURE 3-4** and a tabular format inventory is included in **APPENDIX 3-G**.

3.3.4 Problem Area 4 –Neighborhood Upstream of Tributary 4

Another problem area identified was the neighborhood on the upstream end of Tributary 4. The storm sewers in this neighborhood drain into a pond located on the southwest side of this neighborhood and have less than a 20% storm (5-year) capacity in existing conditions. The overland water flows to the detention pond located on the south side of this neighborhood flooding many residential properties. Many houses on William Boulevard and Eastgate Drive are flooded during a storm event.

3.3.5 Problem Area 5 – Grisso Drive between Mocking Bird Lane and Sims Place

Problem Area 5 is along Grisso Drive within the Tributary 4 drainage basin. In this area, the basin drains eastward into Tributary 4 flooding several residential structures on the east side of Grisso Drive. In existing conditions, these houses are in the 1% storm (100-year) floodplain of Tributary 4 as well as Magnolia Creek. Water flows east to the intersection of Grisso Drive through the ditches along Gibson Drive, Hoffman Drive, and Sim's place. The cross drains at these intersections and the pipes and channels that further convey this water to the creek are inadequate to carry even small frequency flows in existing conditions. 10% storm (10-year) flow rates near Gibson Drive, Hoffman Drive and Sims Place intersections are approximately 115cfs, 36 cfs and 38 cfs, respectively. 4% Storm (25-year) flow rates at these locations are 154 cfs, 43 cfs and 47 cfs, respectively. The overflow water at these locations causes flooding to the residential structures along this reach.

The locations of these problem areas except Problem Area 3 (shown in **FIGURE 3-4**) in the Magnolia Creek drainage basin are shown in **FIGURE 3-6.**

City of Seminole Master Drainage Plan

0 500 1,000
Feet

N



CITY OF SEMINOLE

Magnolia Creek Problem Areas

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-6

3.4 Evaluation of Alternatives

Without improvements to the problem areas described in Section 3.3, current flooding problems will continue to worsen. In all cases the "No Action" alternative was considered, and is equal to present value of the actual flooding damages to the buildings.

The structural value for each of the properties was computed using the estimated square footage of the building and average building costs. The content value for each of the properties was estimated at 50% of the structural value for residential and 100% of the structural value for commercial.

There are a number of other costs, some of them intangible, which must be identified as a part of this approach. The actual cost of a "No Action" approach to the master plan is the decreased quality of life brought about by the following:

- Increasing risk of loss of life.
- Increasing flood damages:
  - Flooded buildings and contents
  - Roadway pavement damage
  - Bridge and culvert damage
  - Utilities and other public facilities
- Increasing inconvenience due to road closings
- Loss of emergency vehicle access during flooding
- Decreased property values and development potential

FIGURE 3-4 shows the overtopped bridges and culverts in the Magnolia Creek drainage basin based on the frequency of overtopping. In this basin, most of the sub basins upstream of Wrangler Boulevard are currently undeveloped and have a potential for future development. The condition could worsen as urbanization continues, making certain streets difficult to access for both residents and for emergency vehicles when the need arises. The floodplain map included in **APPENDIX 3-E.** also shows the areas where floodwaters exceed the capacity of the stream. These maps illustrate the areas where flood hazards currently exist. Several alternatives were considered for flood mitigation within the Magnolia Creek drainage basin. While evaluating the alternatives, Problem Areas 1 and 2 are evaluated together as most of the alternatives in each tributary are mutually beneficial to alleviate flooding in both creeks. Problem Area 2 alternatives include some improvements proposed in Magnolia Creek too. The different alternatives evaluated for the Magnolia Creek drainage basin are discussed in Section 3.4.1.

3.4.1 Problem Area 1 –N. Milt Phillips Avenue in Magnolia Creek Main Stem

Alternative 1 - No Action

Flood damage estimates were prepare for the buildings in the floodplain downstream from Wrangler Road. This was accomplished by comparing the estimated finished floor elevations of the buildings to the 10% (10-year), 20% (50-year), 1% (100-year) and 0.2% (500-year) storm events floodplains. FEMA's Benefit-Cost Analysis (BCA) software was used to compute flood damages. The present worth cost of average annual damages to the buildings identified in the floodplains for Magnolia Creek Drainage basin within City of Seminole are estimated to be approximately $19,230,869. This value becomes the direct cost of adopting "No Action" as the master plan for this watershed.

Alternative 2 – Stormwater Detention Upstream of Wrangler Boulevard

Alternative 2 for Magnolia Creek basin proposes a dry regional detention facility to the north of Wrangler Boulevard and to the west of N. Milt Phillips Avenue/ Highway 99 as shown in Figure shown in **FIGURE 3-7A**. The proposed detention facility would have a surface area of approximately 204 acres at an elevation of 890 feet, compared to 128 acres of floodplain area for existing conditions. The 1% storm (100-year) water surface elevation at the pond would be 886.2 feet. At this elevation it would have approximately 1001 acre-feet of storage, compared to an existing storage volume in this reach of 252 acre-feet. The modelled outlet structure is a 12-inch RCP at a flow line elevation of 870 feet, and would be verified during design. This alternative requires building a dam upstream of Wrangler Boulevard to an elevation of 890 feet.

The proposed detention facility extends from Wrangler Road on the south to Goodhope Road on the north, N. Ideal Street on the west and N. Milt Phillips Avenue on the east. This proposed pond controls flow from the Magnolia Creek main stem, Tributary 1 and Tributary 3. In existing conditions, the flowrate upstream of Wrangler Boulevard is approximately 5100 cfs from Magnolia Creek and 658 cfs from Tributary 1. In proposed conditions, this flow rate will be reduced to 12 cfs. This lowers the flowrates downstream and thus improves the capacity of most structures downstream. Strothers Avenue structure which had a 2% Storm (50-year) capacity in existing conditions would have a 0.2% storm (500-year) capacity and the existing 50% storm (2-year) capacity structures under Lloyd Simmons Boulevard and N. Milt Phillips Avenue would have 10% storm (10-year) capacities with the regional detention facility upstream.

Upstream of N. Milt Phillips Avenue, the 1% storm (100-year) water surface elevation drops from 871.75 feet in the existing condition to 870.03 feet and upstream of Lloyd Simmons Boulevard it drops from 870.11 in the existing condition to 867.65 feet. Even though this alternative doesn't remove all buildings from the floodplain, the lower water surface elevation will reduce the damage caused by the flooding in Magnolia Creek.

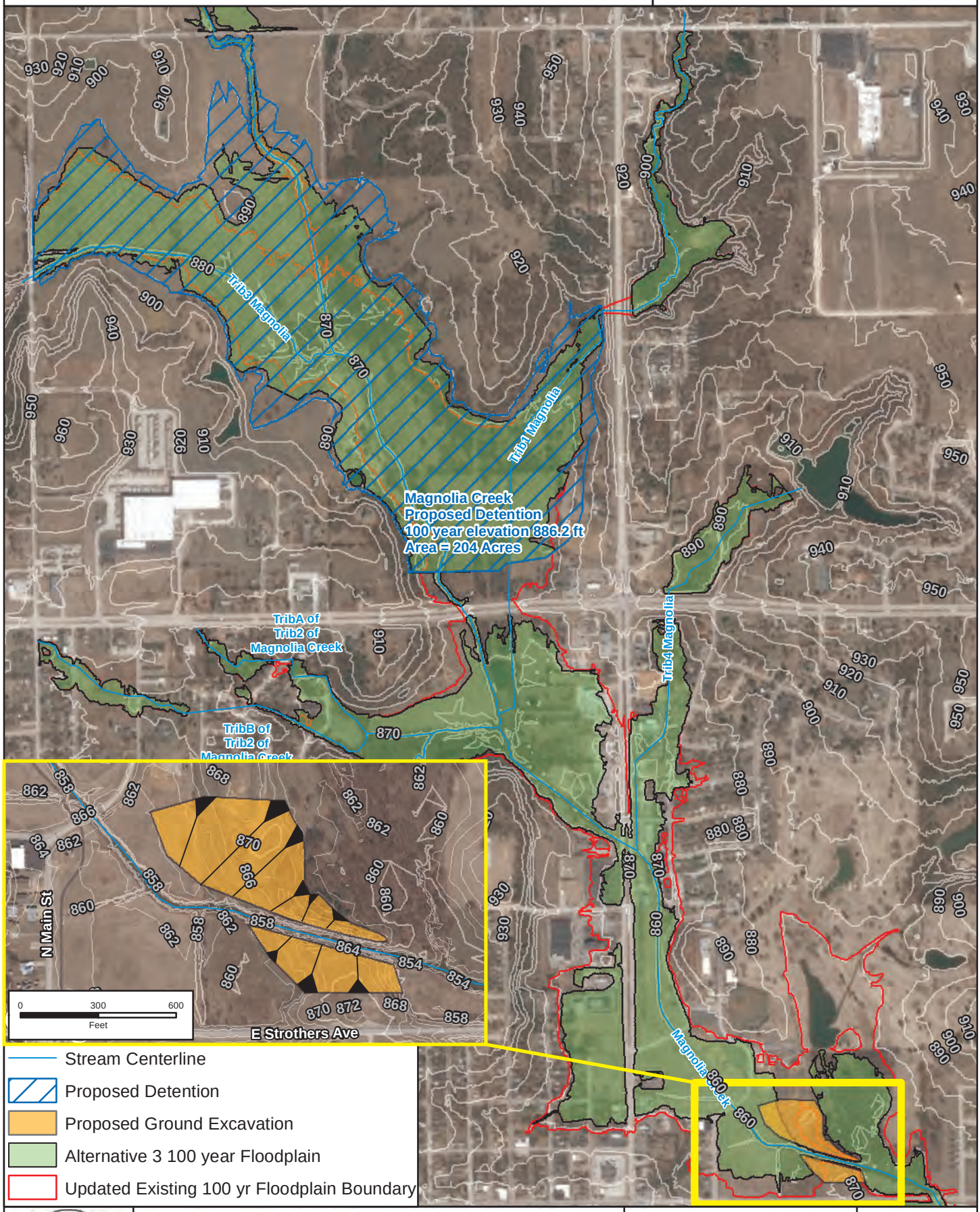
This alternative also addresses the flooding on the downstream end of Tributary 4 discussed in Problem Area 2. The lowered water surface elevation in Magnolia Creek lowers the tailwater

condition for Tributary 4 and it helps to remove a few buildings from the floodplain and lowers the damage for other buildings remaining in the floodplain.

This alternative also proposes excavating the high grounds on both sides of the floodplain between Lloyd Simmons Boulevard and E. Strothers Avenue to remove the constriction formed by these natural high points. On the east side of the channel, the natural ground shown in **FIGURE 3-7** would be excavated to an elevation of 864 feet at the upstream end and sloped gradually to an elevation of 862 feet at the existing channel banks. On the west side of the channel, the natural ground will be excavated to an elevation of 861 feet. This will improve the conveyance of the reduced flow rates from the proposed stormwater detention facility.

The estimated cost for this alternative is $2,571,000 and is detailed in **APPENDIX 3-H.** Construction of this stormwater detention facility will require approximately 76 acres of flowage easement beyond the current 1% storm (100-year) floodplain. The cost of this flowage easement is not included in the conceptual design cost. The present worth of avoided flood damages calculated for this alternative over a 50-year project life are $8,066,173.

City of Seminole Master Drainage Plan



Magnolia Creek Drainage Basin
Problem Area 1 Alternative 2

1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-7

Alternative 3 - Channelization between E. Strothers Avenue and Milt Phillips Avenue + Regional Detention in Magnolia Creek as in Alternative 3 - This alternative proposes channelizing approximately 4000 feet of stream between N. Milt Phillips Avenue and Strothers Avenue with a 20' wide bottom and 9' deep trapezoidal channel. This channel improvement is proposed along with the regional detention recommended in Alternative 2. This alternative also requires the replacement of the existing 35' bridge structure under Lloyd Simmons Boulevard with a 70' wide bridge. This removes a few more buildings on west side of N. Main Street from the floodplain. This alternative lowers the water surface elevation downstream of N. Milt Phillips Avenue and eliminates a few more commercial and residential structures from the 1% storm (100-year) floodplain. This alternative improves the capacity of the existing structure under N. Milt Phillips Avenue to the 2% Storm (50-year) event. A schematic of this improvement is shown in **FIGURE 3-8**.

This channelization project costs an additional $1,331,000 to the Alternative 2. Thus the total cost estimated for this alternative is approximately $3,431,700 and is detailed in in **APPENDIX 3-H**. This cost does not include the cost right of way or flowage easements above the proposed dam. The benefits calculated for this alternative over a 50-year project life are $7,791,531.

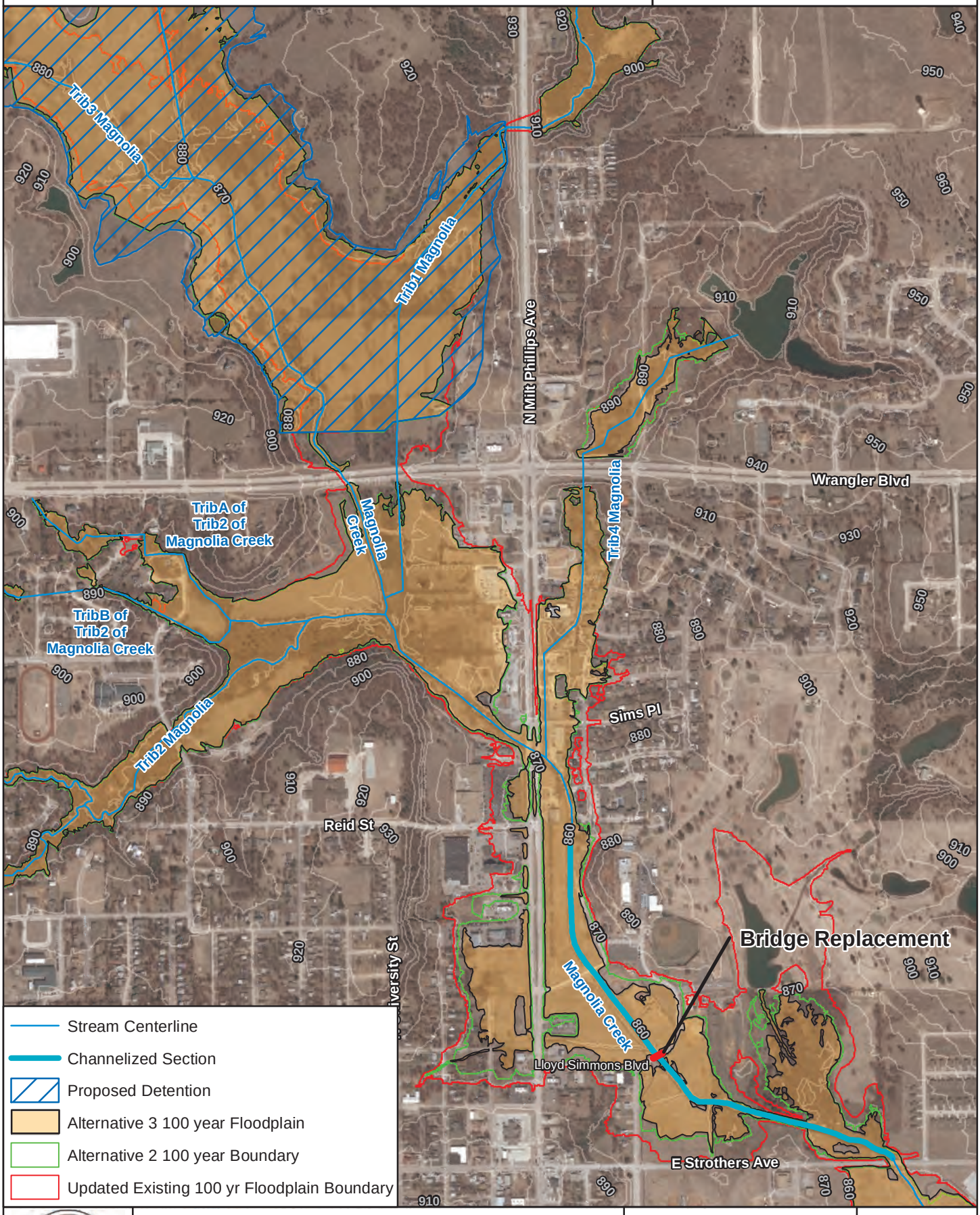
Alternative 4 -Detentions upstream of Wrangler Boulevard on Magnolia Creek and Tributary 4
Alternative 4 addresses the flooding issues in both the Tributary 4 and Magnolia Creek drainage basins. This alternative proposes a regional detention facility to the north of Wrangler Boulevard on Tributary 4 along with the regional detention proposed as in Alternative 2 on Magnolia Creek. The 1% storm (100-year) water surface elevation at this proposed detention site is 894.2 feet, compared to an existing 1% storm (100-year) elevation of 894.4. This pond provides approximately 86 acre-feet of storage. The proposed outlet structure is a 24" RCP at a flowline elevation of 878 feet. This alternative reduces the 1% storm (100-year) flow rate downstream of Wrangler Boulevard from 646 cfs in existing conditions to 45 cfs. A schematic of this improvement is shown in **FIGURE 3-9**.

Adding this pond costs an additional $2,019,100 to the Alternative 3. Thus the total cost estimated for alternative 4 is approximately $ 4,590,000 and is detailed in in **APPENDIX 3-H**. Construction of the Tributary 4 pond would require an additional 15 acres of land and the cost of land that needs to be purchased for the construction of this improvements is not included in the conceptual design cost. The benefits calculated for this alternative over a 50-year project life is $8,755,556.

City of Seminole Master Drainage Plan

0 500 1,000
Feet

N



CITY OF SEMINOLE

Magnolia Creek Drainage Basin
Problem Area 1 Alternative 3

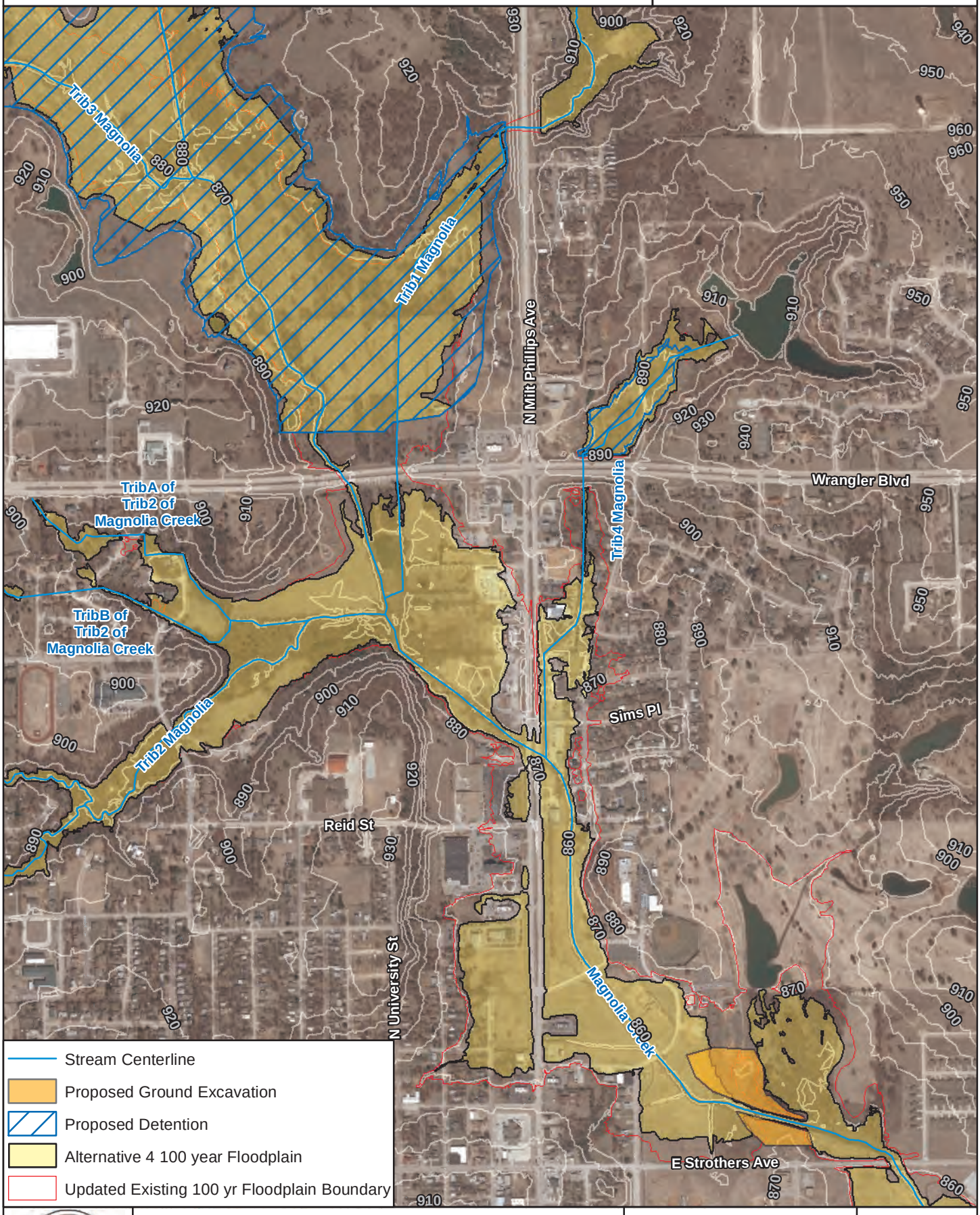
MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-8

City of Seminole Master Drainage Plan

0 500 1,000
Feet

N



CITY OF SEMINOLE

Magnolia Creek Drainage Basin
Problem Area 1 & 2 Alternative 4

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-9

Alternative 5 - Detentions ponds in Magnolia Creek and Tributary 4 + Channelization between E. Strothers Avenue and N. Milt Phillips Avenue – This alternative is a combination of Alternative 2, 3 and 4. Lower flow rates and channelization in Magnolia Creek lowers the water surface elevation downstream of N. Milt Phillips Avenue. The lower end of Tributary 4 has a wide floodplain from the backwater created from Magnolia Creek. Channelization in Magnolia Creek lowers the water surface elevation in Magnolia Creek and helps to lower the backwater elevation on Tributary 4. Even though the actual extents of the floodplain do not change much in this alternative, the water surface is lowered which helps reduce damages to many properties within the floodplain. A schematic of this improvement is shown in **FIGURE 3-10**.

The total cost estimated for alternative 4 is approximately $ 5,450,800 and is detailed in in **APPENDIX 3-H**. Again, this cost does not include the cost of land that needs to be purchased for the construction of the improvements. The benefits calculated for this alternative over a 50-year project life is $8,719,190.

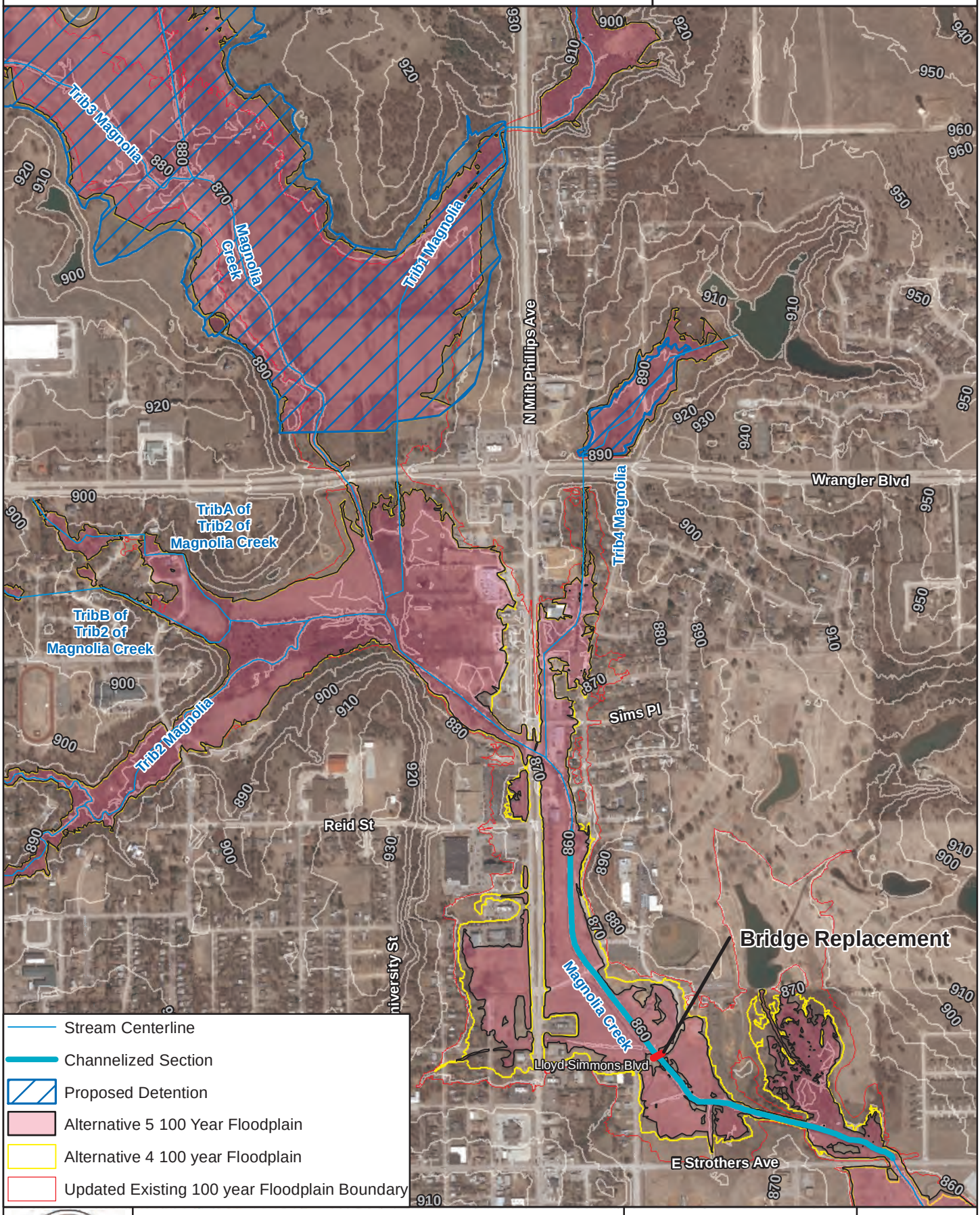
3.4.2 Problem Area 2 – Downstream end of Tributary 4 Drainage Basin

Problem Area 2 is already discussed as part of Problem Area 1. The alternatives 5 and 6 discussed in Section 3.4.1 also help to mitigate flooding problems in Problem Area 2.

City of Seminole Master Drainage Plan

0 500 1,000
Feet

N



CITY OF SEMINOLE

Magnolia Creek Drainage Basin
Problem Area 1 & 2 Alternative 5

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-10

3.4.3 Problem Area 3 –Existing Structures in Magnolia Creek Drainage Basin

Alternative 1 - Culvert Improvements

Alternative 1 for Magnolia Creek Problem Area 3 recommends replacing all State Highway structures with at least 50-year (2% Annual Chance Storm) capacity structures and other roadways with 10% storm (10-year) capacity structures. Private roadways and pedestrian structures are not included in this recommendation. Proposed culvert improvements for each creek are given below:

Magnolia Creek: There are six major roadway crossings across Magnolia Creek. Goodhope Road has a 2% Storm (50-year) capacity, Wrangler Boulevard/State Highway 9 has a 1% storm (100-year) capacity, Strothers Avenue has a 2% Storm (50-year) capacity and Broadway Avenue/ Highway 270 has a 1% storm (100-year) capacity in existing conditions. Two other road way crossings, Lloyd Simmons Boulevard and N. Milt Phillips Avenue/ Highway 99, have only 50% storm (2-year) capacities.

In existing conditions, it is not feasible to provide larger structures to improve their capacities. In order to replace the existing structure at N. Milt Phillips Avenue/ Highway 99 to have a 10% storm (10-year) capacity, a very long section of the roadway needs to be raised at least by 2.5 feet. Since this stretch of roadway has commercial entrances to buildings that have a finished floor elevations approximately the same elevation at the existing road, all of the entrances would have to be reconstructed and it would impact the visibility of the businesses. Also raising the road to add a 10% storm (10-year) capacity structure increases the water surface elevation for higher frequency storm events and thereby add more structures into 100-year (1% Annual Chance Storm) floodplain. To improve Lloyd Simmons Boulevard to a 10% storm (10-year) capacity, a long stretch of this road would also have to be elevated. Therefore, no recommendations are proposed for these structures. If a regional detention facility, as in proposed alternative 1, is adopted, both of these structures will have a 10% storm (10-year) capacity because of the reduced flow rates through these structures.

Tributary 1: Existing structures along Tributary 1 are under Goodhope Road and N. Milt Phillips Avenue and they have a 2% Storm (50-year) and 1% storm (100-year) capacity, respectively. Therefore, no improvements are required for these structures.

Tributary 2: In existing conditions, Boren Boulevard and Van Drive structures have a 50% storm (2-year) capacity and the structure at Coolidge Street has less than a 100% storm (1-year) capacity. Recommendations include replacing the existing 3'X4' RCB under Boren Boulevard with 2-5'X4' RCB structure to achieve a 2% storm (50-year) capacity, replacing the existing 8'X4' RCB under Van Drive with 2-8'X4' RCB for a 10% storm (10-year) capacity and replacing existing 2-48" CMPs under Coolidge Street with 2-8X8 RCBs to have a 10% storm (10-year) capacity. The culvert replacement costs for Coolidge Street, Van Drive and Boren Boulevard are $225,600, $201,000 and $363,300, respectively. The cost estimates are included in **APPENDIX 3-H**.

Tributary A: This tributary has only a 500 feet long storm sewer structure with a 36" and 30" CMP which flows under a neighborhood near Whispering Oaks Drive. In existing conditions, this storm sewer has less than a 100% storm (1-year) capacity. In order to achieve a 50% storm (2-year) capacity, the existing system should be replaced with a 2-5'x3' RCB. The cost estimated for this storm sewer improvement is approximately $760,200 and is detailed in **APPENDIX 3-H**.

Tributary B: This tributary has four structures. All of these structures have less than a 100% storm (1-year) capacity in existing conditions. Alternative 1 recommends replacing the existing 2-24" CMP under Smith Street with 2-6'X3' RCB, 36" CMP under John Street with 2-5'X4' RCB, 48" CMP storm sewer with 2-6'X4' RCB and 2-36" CMP under Pecan Drive with 2-6'X5' RCB. This would increase the capacity of all structures along Tributary B to the 10% storm (10-year) frequency. Along with replacing the culverts, some of the roadways would have to be elevated to accommodate the new structure. Smith Street would have to be elevated approximately 0.8 feet for approximately 330 to achieve a minimum road elevation of 909 feet. Approximately 275 feet of John Street would be elevated by an average of 1.0 foot to have a minimum elevation of 901.1 feet. Pecan Drive improvements would be the most significant with 365 feet of roadway being elevated by an average of 2.4 feet to have a minimum roadway elevation of 880.8 feet. The culvert replacement cost estimate for Pecan Drive, John Street and Smith Street are $584,800, $375,500 and $435,100, respectively. The cost estimated for replacing the storm sewer system is approximately $1,319,300. Details of these cost estimate can be found in **APPENDIX 3-H**.

Tributary C: This tributary has five structures. The culverts under Boren Boulevard, N. Ideal Street and Smith Street have 50% storm (2-year) capacities and structures under Dalby Street and John Street have 100% storm (1-year) capacities in existing conditions. The proposed recommendations include replacing the existing 3'X3' RCB under Boren Boulevard/State Highway 3E. with 2-5'X4' RCBs to achieve a 1% storm (100-year) capacity for this structure. Other proposed improvements are replacing the existing 42" steel pipe at Dalby Street with 2-4'X3' RCBs and replacing the existing 4'X5' stone box under N. Ideal Street with an 8'X6' RCB, replacing the existing 6'X4' RCB under Smith Street 2-10'X5' RCBs and replacing the existing 60" CMP under John Street with 2-6'X5' RCBs to have a 10% storm (10-year) capacity for all of these structures. Smith Street would have to be elevated for approximately 350 feet by an average of 0.65 feet to have a minimum elevation of 899 feet. Approximately 160 feet of John Street would have to be raised by an average of 0.5 feet to have a minimum elevation of 895 feet. The culvert replacement cost estimates for John Street, Smith Street, N. Ideal Street, Dalby Street and Boren Boulevard are $267,000, $513,700, $157,900, $126,000 and $142,600 respectively and are detailed in **APPENDIX 3-H**.

Tributary 3 and 4: No recommendations are proposed for Tributary 3 as there are no structures in the studied stream section. In Tributary 4, the existing structure under Wrangler Boulevard has a 1% storm (100-year) capacity. Other structures on this creek are driveway culverts to the commercial structures along N. Milt Phillips Avenue and hence no recommendations are proposed.

FIGURE 3-11 shows the improvements proposed in Problem Area 3, Alternative 1 A tabular format including the details of proposed structures and additional comments are included in **APPENDIX 3-G.**

City of Seminole Master Drainage Plan

0 600 1,200
Feet

N



Stream Centerline

Capacity Increases

- < 1 year to 2 year
- < 1 year to 10 year
- < 2 year to 10 year
- < 5 year to 10 year
- < 5 year to 50 year
- < 5 year to 100 year

Id	Capacity	Proposed Structure	Proposed Capacity
12	< 1 year	2-8X8 RCB	10-Year
13	< 5 year	2-8X4 RCB	10-Year
18	< 5 year	2-5X4 RCB	50-Year
19	< 1 year	2-5X3 RCB	2-Year
20	< 1 year	2-6X5 RCB	10-Year
21	< 1 year	2-6X4 RCB	10-Year
23	< 1 year	2-5X4 RCB	10-Year
24	< 1 year	2-6X3 RCB	10-Year
25	< 2 year	2-6X5 RCB	10-Year
26	< 5 year	2-10X5 RCB	10-Year
27	< 5 year	8X6 RCB	10-Year
28	< 2 year	2-4X3 RCB	10-Year
29	< 5 year	2-5X4 RCB	100-Year

CITY OF SEMINOLE

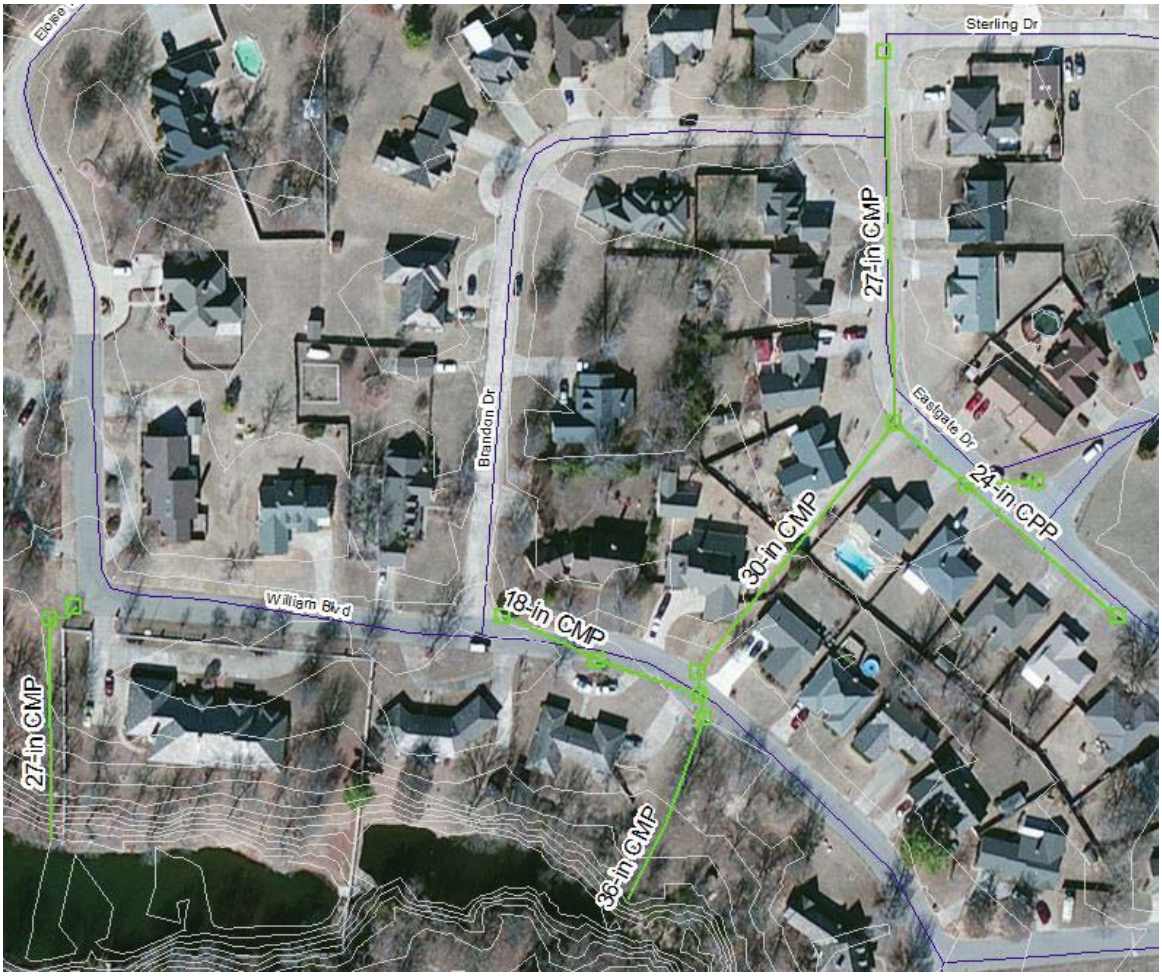
Magnolia Creek
Problem Area 3 Alternative 1
Culvert/Bridge Capacities

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-11

3.4.4 Problem Area 4 –Neighborhood Upstream on Tributary No: 4

The basins in this neighborhood were further subdivided into smaller basins to estimate flow rates more accurately at inlet locations and problem area locations. The existing system includes approximately 300 feet of 27” CMP running south along Eastgate Drive. To the west of Eastgate Drive and Kimberly Court intersection, a 24” CPP which collects water from the basins on east side and joins this system. From there the existing system is conveyed into a 36” CMP which runs southwest between the houses, crosses William Boulevard and discharges into an existing pond. In existing conditions, this storm sewer system has only about 50% storm (2-year) capacity. An 18” CMP which collects water from William Boulevard and Brandon Drive intersection flows into a 1’X2.5’ RCB that connects to the 36” CMP coming from Eastgate Drive. Also there is another stand-alone 27” CMP that drains southwest from the intersection of Eloise Circle and William Boulevard. StormCAD (Version V8i) model was used to determine the capacity of existing system and to design proposed systems. The existing storm sewer systems and its alignment are shown in figure below:



This neighborhood area was also analyzed using HEC-RAS (Version 5.0) 2D modeling. Runoff from HEC-HMS model was entered as precipitation into the 2D model. A general flow pattern from this 2D model for a 1% storm (100-year) event through the neighborhood is shown below. As per the 2D model, the existing overflow water from Sterling Drive flows south and turns west at Brandon Drive intersection. During a 1% storm (100-year) event the water surface elevation on this street gets as deep as one foot. None of the properties along Brandon Drive are affected by this flooding. However, the overflow water that flows south on Brandon Drive causes up to 0.9 feet deep flooding near its intersection with William Boulevard.

Most of this water starts to overflow towards the pond through the residential properties on the south side of William Boulevard before it gets into the existing storm sewer system at Eloise Circle and William Boulevard intersection.



Other properties that are affected are the houses along Eastgate Drive. Water from the north and east basins come to the lower point on this road to the west of its intersection with Kimberly Court. The excess water that cannot get into the existing 36" CMP flows overland in the southwest direction, flooding many properties along Eastgate Drive and William Boulevard.

The alternatives evaluated for this area are discussed on the following pages.

Alternative 1 - No Action

The present worth cost of damages on the upstream end of Tributary 4 over a 50-year period is approximately$10,034,452. This value becomes the direct cost of adopting "No Action" as the master plan for this watershed.

Alternative 2 –Proposed Storm Sewer with 10-Year Capacity

Alternative 2 for the neighborhood upstream of Tributary 4 recommends resizing the existing storm sewer on the streets with a 10% storm (10-year) capacity system. StormCAD (Version 8i) was used to model the proposed system. The proposed system includes approximately 360 feet of 24" RCP running south from Sterling Drive on Eastgate Drive, approximately 200 feet of 24" RCP running northwest on Eastgate Drive which collects water from the basin draining through Kimberly Court near that intersection and continues north west for approximately 80 feet in a 30" RCP and joins the 24" RCP coming from north. From this intersection the pipe runs approximately 310 feet southwest between the houses in a 36" RCP. At William Boulevard it is enlarged to a 42" RCP and continues southwest another 200 feet before it discharges into the existing pond. Another system proposed on William Boulevard captures water near that intersection and goes approximately 360 feet west in a 24" RCP and connects to an existing 27" CMP that drains to the pond. Proposed pipe recommendations for a 10% storm (10-year) system is shown in **FIGURE 3-12.** The cost estimate for this alternative is $597,500 and is detailed in **APPENDIX 3-H**.

City of Seminole Master Drainage Plan

0 100 200
Feet

N



Magnolia Creek Drainage Basin Problem Area 4 Alternative 2

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-12

Alternative 3 –Proposed Storm Sewer with 2% Storm (50-Year) Capacity

Alternative 3 for the neighborhood upstream of Tributary 4 recommends resizing the existing storm sewer on the streets with a 2% Storm (50-year) capacity system. This proposed system includes approximately 360 feet of 30" RCP running south from Sterling Drive on Eastgate Drive, approximately 200 feet of 30" RCP running northwest on Eastgate Drive which collects water from the basin draining through Kimberly Court near that intersection and continues north west for approximately 80 feet before joining the 24" RCP coming from the north. This alternative also proposes replacing the existing 24" CMP from Kimberly Court with a 24" RCP. From this intersection the pipe runs approximately 310 feet southwest between the houses in a 42" RCP. At William Boulevard it collects more water and continues southwest another 200 feet before it discharges into the existing pond. Another system proposed on William Boulevard captures water near that intersection and goes approximately 360 feet west in a 24" RCP and connects to an existing 27" CMP that drains to the pond. Proposed pipe recommendations for a 2% stsorm (50-year) system is shown in **FIGURE 3-13.** The cost estimate for this alternative is $661,500 and is detailed in **APPENDIX 3-H**.

Alternative 4 –Proposed Storm Sewer with 1% Storm (100-Year) Capacity

Alternative 4 for the neighborhood upstream of Tributary 4 recommends resizing the existing storm sewer on the streets with a 1% storm (100-year) capacity system. This proposed system includes approximately 360 feet of 30" RCP running south from Sterling Drive on Eastgate Drive, approximately 200 feet of 30" RCP running northwest on Eastgate Drive which collects water from the basin draining through Kimberly Court near that intersection, continues north west for approximately 80 feet in a 36" RCP and joins the 24" RCP coming from north. This alternative also proposes replacing the existing 24" CMP from Kimberly Court with a 24" RCP. From this intersection the pipe runs approximately 310 feet southwest between the houses in a 42" RCP. At William Boulevard it collects more water and continues southwest another 200 feet before it discharges into the existing pond. Another system proposed on William Boulevard captures water near that intersection and goes approximately 360 feet west in a 24" RCP and connects to an existing 27" CMP that drains to the pond. Proposed pipe recommendations for a 1% storm (100-year) system are shown in **FIGURE 3-14.** The cost estimate for this alternative is $692,400 and is detailed in **APPENDIX 3-H**.

City of Seminole Master Drainage Plan

0 100 200
Feet

N



Magnolia Creek Drainage Basin
Problem Area 4 Alternative 3

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-13

City of Seminole Master Drainage Plan

0 100 200
Feet

N



Inlets/Junctions
Existing Storm System
Proposed Storm System
Sub-basins

CITY OF SEMINOLE

Magnolia Creek Drainage Basin
Problem Area 4 Alternative 4

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-14

3.4.5 Problem Area 5 - Storm Sewer Improvement along Grisso Drive

Storm Sewer Improvements – This alternative proposes capturing water at several different locations along Grisso Drive and conveying it through a storm sewer to Tributary 4. Downstream of Wrangler Boulevard, Tributary 4 drains southeast into the creek. Water coming along the road and through the undersized ditches floods many houses on the west side of Grisso Drive. Several houses in this area are in the 1% storm (100-year) floodplain of Tributary 4 or Magnolia Creek. Therefore, the storm sewers recommended in this alternative do not help remove buildings from 1% storm (100-year) floodplain.

No damage calculations were prepared for this alternative. The structures in the 1% storm (100-year) floodplain are counted in damage calculations for Problem Areas 1 and 2. Also with the limited elevation difference between the ground and channel bottom, the pipes can only be sized for smaller events. The recommendations help to reduce the frequency of flooding caused by the rain on local basins. Proposed recommendations include a 10% storm (10-year) and 4% storm (25-year) capacity pipes from the Gibson Drive, Hoffman Drive and Sims Place intersections on Grisso Drive.

Alternative 1 – Proposed Storm Sewer with 10-Year Capacity

A 10% storm (10-year) rainfall event can be conveyed with approximately 200 feet of 6'X4' RCB at the Gibson Drive intersection, 400 feet of 36" RCP near the Hoffman Drive intersection and approximately 400 feet of 36" RCP near the Sims Place intersection. Proposed pipe recommendations for a 10% storm (10-year) system is shown in **FIGURE 3-15.** The cost estimate for 10-Year alternative is $631,200 and is detailed in **APPENDIX 3-H.**

Alternative 2 – Proposed Storm Sewer with 25-Year Capacity

A 4% storm (25-year) rainfall event in this local basin can be handled with approximately 200 feet of 8'X4' RCB at the Gibson Drive intersection, 400 feet of 42" RCP near the Hoffman Drive intersection and approximately 400 feet of 42" RCP near the Sims Place intersection. Proposed pipe recommendations for a 4% storm (25-year) system is shown in **FIGURE 3-16.** The cost estimate for 4% storm (25-year) alternative is $641,000 and is detailed in **APPENDIX 3-H.**

City of Seminole Master Drainage Plan

0 100 200
Feet

N



CITY OF SEMINOLE

Magnolia Creek Drainage Basin
Problem Area 5 Alternative 1

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-15

City of Seminole Master Drainage Plan

0 100 200
Feet

N



CITY OF SEMINOLE

Magnolia Creek Drainage Basin
Problem Area 5 Alternative 2

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 3-16

3.5 Recommended Plan

Recommendation –

Section 4. WEWOKA CREEK TRIBUTARY DRAINAGE BASIN

4.1 Existing Conditions Hydrology

The Wewoka Creek Tributary drainage basin is generally bound by Lee Avenue to the north, N. Ideal Street to the west, Wewoka Creek to the south and N. Highland Street to the east. The Wewoka Creek Tributary drainage basin encompasses a drainage area of approximately 343 acres. The basin drains south into Wewoka Creek. **FIGURE 4-1** provides the general overview and location of the Wewoka Creek Tributary sub basins.

The hydrologic soil groups for the basin are shown in **FIGURE 4-2**. The existing land use for the basin is depicted in **FIGURE 4-3**. More information on the hydrologic soil group can be found in **SECTION 2.1**.

The hydrologic coefficients in the HEC-HMS model include the lag time, soil complex curve number (CN) and drainage area. A summary of these hydrologic coefficients is presented in **TABLE 4-1**. More detailed data for the basin is provided in **APPENDIX 4-A**. Reach routing data was developed using two methods. In areas without detailed hydraulic analysis, a simple lag routing was developed by measuring the flow length and dividing by an estimated velocity to determine a lag time. In open channel flow areas studied in detail, the Modified Puls method was used to account for floodplain storage. Rating curves were developed for each reach using the hydraulic models discussed in the next section.

The flow rates for existing conditions for the Wewoka Creek Tributary drainage basin were developed using HEC-HMS and notable areas are listed in **TABLE 4-2**. The HEC-HMS schematics for existing conditions are located in **APPENDIX 4-B**. A complete list of output from HEC-HMS can be found in **APPENDIX 4-C**.

Wewoka Creek Tributary is not a FEMA mapped stream. The lower end of the tributary has a Zone A floodplain caused by the backwater from Wewoka Creek. This existing Zone A floodplain is shown in **APPENDIX 4-D**.

City of Seminole Master Drainage Plan



CITY OF SEMINOLE

Wewoka Tributary Drainage Basin & Sub-basins

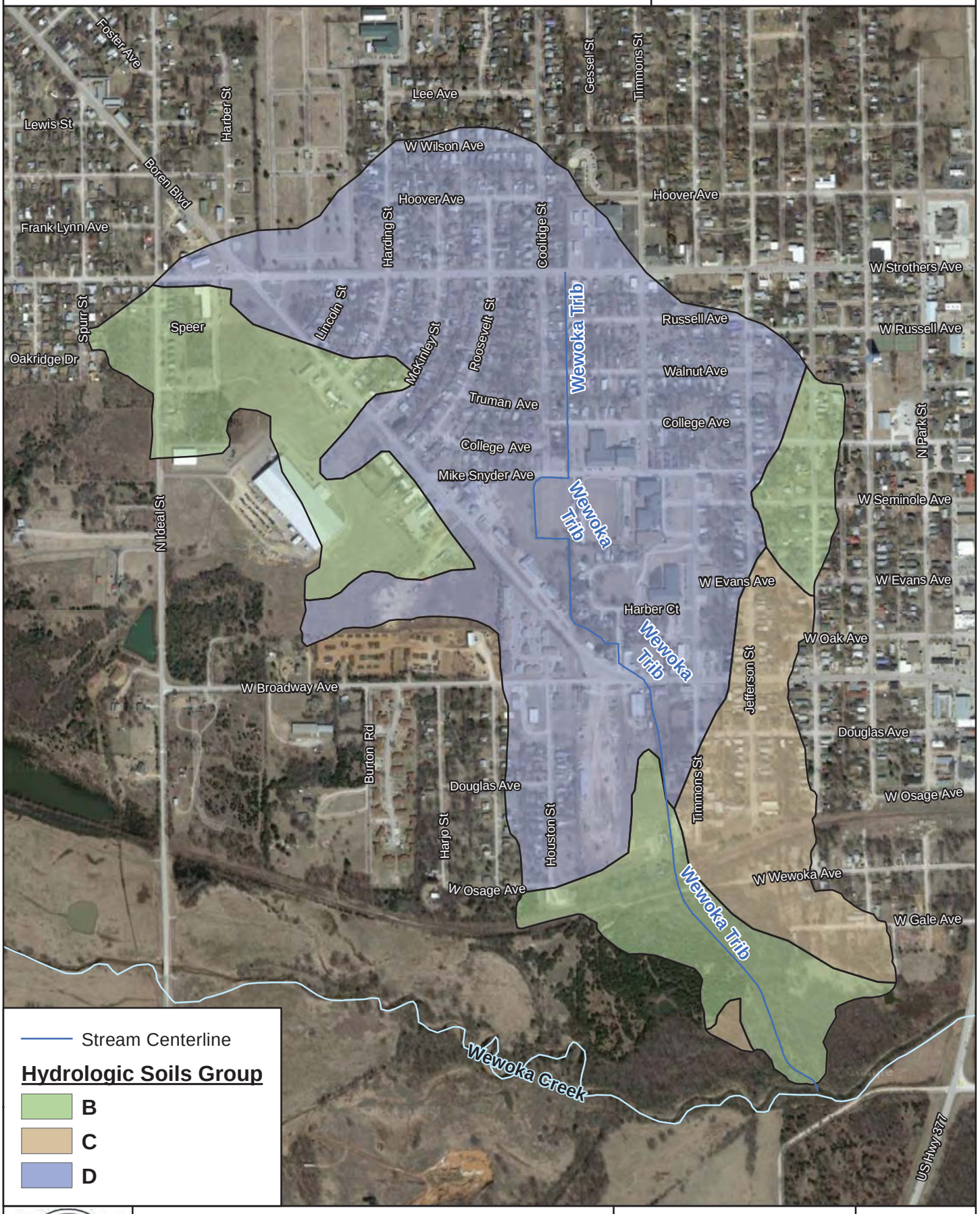
MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-1

City of Seminole Master Drainage Plan

0 0.1 0.2
Miles

N



Stream Centerline

Hydrologic Soils Group

- **B**
- **C**
- **D**

CITY OF SEMINOLE

Wewoka Tributary
Hydrologic Soils Group

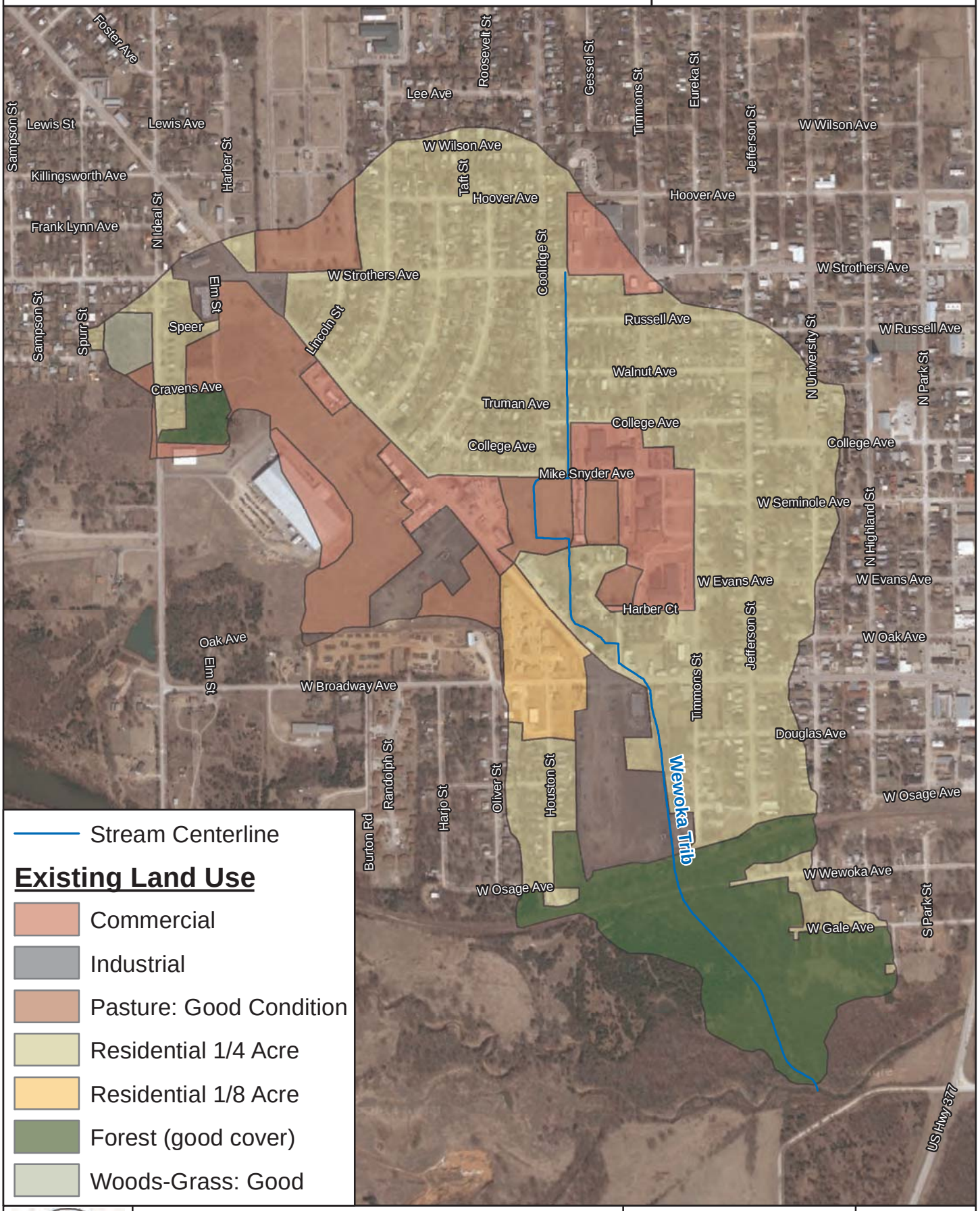
MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-2

City of Seminole Master Drainage Plan

0 0.1 0.2
Miles

N



Stream Centerline

Existing Land Use

- Commercial
- Industrial
- Pasture: Good Condition
- Residential 1/4 Acre
- Residential 1/8 Acre
- Forest (good cover)
- Woods-Grass: Good

CITY OF SEMINOLE

Wewoka Tributary Existing Land Use

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-3

Table 4-1 Wewoka Creek Tributary Drainage Basin – Summary of Hydrologic Coefficients for Existing Conditions

Drainage Area	Lag (Min)	CN	Area (Acres)
WEW-01	6.48	61.3	32.60
WEW-02	4.47	69.2	5.03
WEW-03	8.81	81.0	35.38
WEW-04	4.08	89.0	20.44
WEW-05	2.00	89.5	7.45
WEW-05-01	7.61	84.3	24.13
WEW-05-02	5.17	83.9	23.92
WEW-06	6.00	88.8	15.61
WEW-06-01	9.28	83.2	19.23
WEW-07	3.34	86.5	8.33
WEW-07-01	1.63	87.4	1.94
WEW-07-02	6.06	87.0	11.48
WEW-08	4.82	89.9	10.95
WEW-08-01	3.51	87.0	8.41
WEW-08-02	2.57	85.1	13.28
WEW-08-03	7.23	85.4	11.74
WEW-08-04	7.20	69.7	26.96
WEW-08-05	4.34	76.3	17.39
WEW-08-06	3.60	85.1	11.19
WEW-09	4.98	87.3	14.04
WEW-10	6.11	88.3	23.27

Table 4-2 Wewoka Creek Tributary Drainage Basin – Existing Flow Rates at Major Junctions (cfs)

HMS ID	Location	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
Wewoka Creek Tributary									
J-WEW-10	W Strothers Avenue	53	66	97	121	150	171	192	238
J-WEW-09	Upstream of Walnut Avenue	60	76	115	146	184	212	242	306
J-WEW-08-UP	Downstream of Walnut Avenue	159	211	340	444	572	669	765	991
J-WEW-08	Mike Snyder Avenue	130	188	356	462	627	725	814	1056
J-WEW-04-UP	Downstream of W Broadway Avenue	221	283	421	574	832	1012	1188	1582
J-WEW-03	Upstream of Railroad	229	296	455	583	836	1033	1223	1645
J-WEW-02	Upstream of W Wewoka Avenue	229	297	457	585	838	1036	1226	1652
J-WEW-01	Upstream of Confluence with Wewoka Creek	224	290	456	588	841	1040	1234	1676

4.2 Existing Conditions Hydraulics

A detailed hydraulic model was created for Wewoka Creek Tributary. The studied stream is shown in **FIGURE 4-4**. Detailed descriptions of these areas are discussed below. HEC-RAS version 4.1.0 was used to develop the hydraulic models for this tributary.

Wewoka Creek Tributary

The studied stream begins at W. Strothers Avenue and generally flows in a southerly direction. The stream extends approximately 1.2 miles upstream of its confluence with Wewoka Creek. A majority of the stream flows through fully developed areas. From W. Strothers Avenue to Walnut Avenue, it flows in an open channel. Between Walnut Avenue and College Avenue it is conveyed through a 42" RCP. Upstream of College Avenue, the 42" RCP opens into a 5'X5' RCB to go under the road and discharges into an open channel section. The stream continues in an open channel section until upstream of Jackson Street. There it enters into a 4' X 4' RCB and is underground until the south side of W. Broadway Avenue. At some point before it daylights, the box changes to a 7.5' X 3' RCB. On the south side of W. Broadway Avenue, this system discharges back to an open channel. There are a few buildings on the south side of Broadway that are built over the channel. Downstream from there the creek flows again as an open channel until the confluence with Wewoka Creek.

Manning's "n" values used for the channel range from 0.035 to 0.045 and for floodplains it varied from 0.013 to 0.10. A field survey was conducted to measure all the storm sewers, culverts and bridges along Wewoka Creek Tributary. These structures were entered into the HEC-RAS model. Normal depth was used as the starting boundary condition. Flow rates from HEC-HMS model were used to perform the backwater analysis. Once the hydraulic analysis was complete, floodplains and water surface profiles were created and are included in **APPENDIX 4-E** and **APPENDIX 4-F**. **FIGURE 4-5** shows the areas and the buildings that are flooded during a 1% Annual Chance Storm (100-year) event.

City of Seminole Master Drainage Plan



Wewoka Tributary Studied Streams & Culvert/Bridge Capacities

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-4

City of Seminole Master Drainage Plan

0 300 600
Feet

N



Wewoka Tributary
Updated Existing 100 year Floodplain

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-5

4.3 Problem Areas

The completed models and corresponding results from several different storm events were used to identify the general problem areas along Wewoka Creek Tributary. This creek is a small channel running through a fully developed area. In existing conditions, many structures along the creek between the Railroad near downstream end and W. Strothers Avenue are in 100-year floodplain. In some parts, the creek flows through storm sewers which are inadequate to handle even smaller frequency flows.

4.3.1 Problem Area 1 –Residential Area Downstream of High School Practice Field and Commercial Structures along W. Broadway Avenue

Between Mike Snyder Avenue and W. Broadway Avenue, several houses on the east side of the channel are in 1% Annual Chance Storm (100-year) event floodplain. The houses in this area have a raised finish floor elevation and during May 2015 rain event, the water levels were approximately 6 inches below the finish floor elevation. Upstream of Jackson Street, the channel changes to a 4'X4' RCB that goes under Jackson Street and W. Broadway Avenue and then daylights downstream of Broadway Avenue. This existing storm sewer is inadequate to carry even a 100% Annual Chance Storm (1-year) event through it. Once capacity is exceeded, the overflow water flows through the road and floods several commercial structures along W. Broadway Avenue. Downstream of Broadway Avenue where the storm sewer discharges into the open channel, a building is built over the channel.

4.3.2 Problem Area 2 –Residential Area along Coolidge Street

Between Walnut Avenue and Mike Snyder Avenue, there are several residential structures that are impacted once the water exceeds the capacity of the creek. The basins from the west side of Coolidge Street join the creek downstream of Walnut Avenue. The 1% Annual Chance Storm (100-year) event flow rate from this area alone is approximately 550 cfs and the total flow rate where it joins the Wewoka Creek Tributary is approximately 765 cfs. The 42" pipe at this location has less than a 100% Annual Chance Storm (1-year) event capacity. The channel downstream of College Avenue is also inadequate to carry this flow, the overflow water makes its way down through Coolidge Street, crosses Mike Snyder Avenue, through the low area on the road near the Coolidge Street intersection, and flows back into the channel downstream of Mike Snyder Avenue. Several houses along Coolidge Street are in 1% Annual Chance Storm (100-year) event floodplain and the water gets close to 4-foot deep in the street during a 1% Annual Chance Storm (100-year) event.

4.3.3 Problem Area 3 –Residential Area upstream of College Avenue

Between W. Strothers and Walnut Avenue, the stream flows through a narrow open channel. Between Walnut Avenue and College Avenue, the stream flows into a 42" RCP which then opens into a 5'X5' RCB on the upstream side of College Avenue. Downstream of College Avenue the box

daylights into an open channel. The open channel and the pipe are inadequate to carry the flow rates from the smaller events and causes flooding to structures along this reach.

4.3.4 Problem Area 4 –Drainage Basins to the west of Coolidge Street

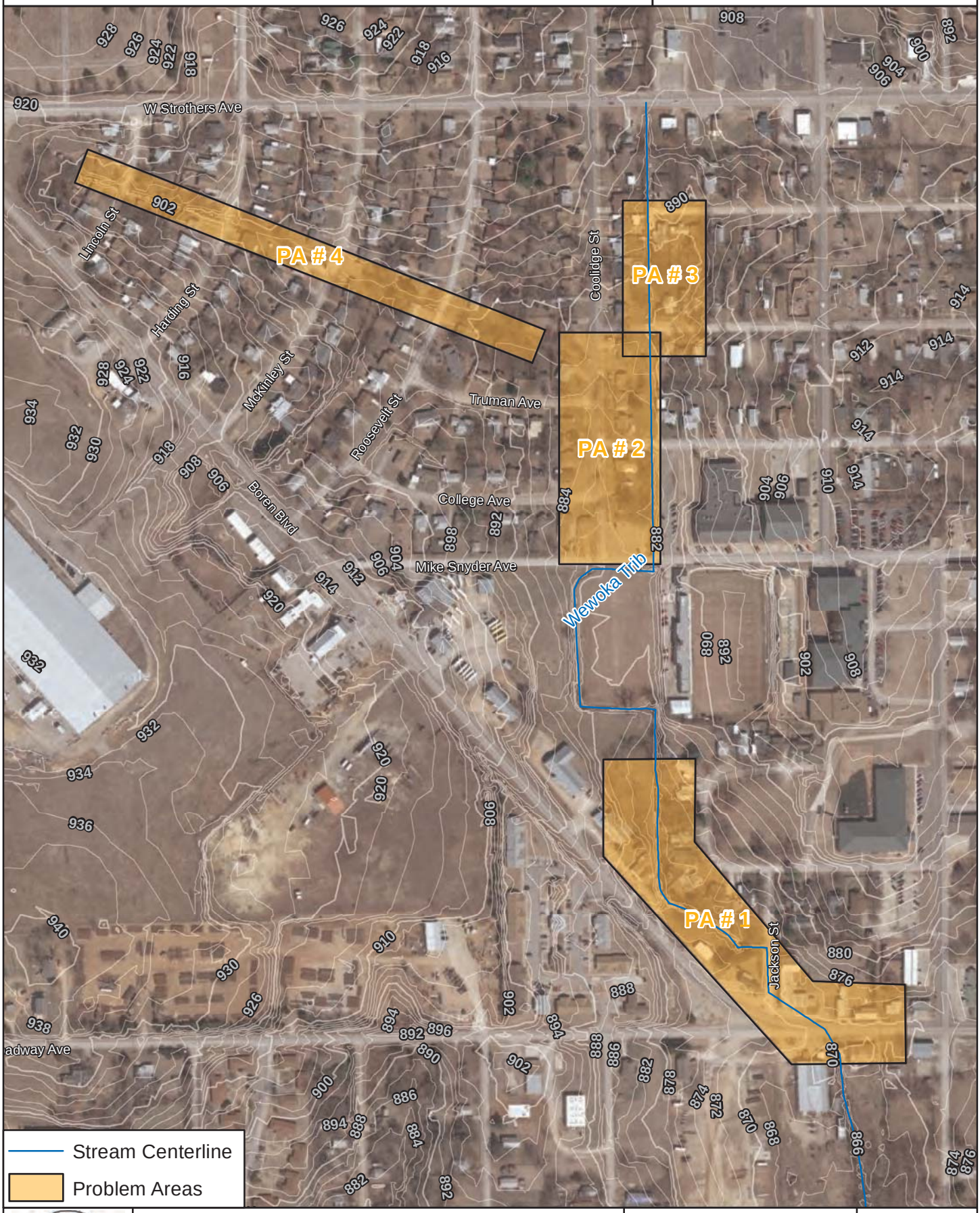
Problem area 4 lies in the basins to the north of Mike Snyder Avenue and west of Coolidge Street. The flow from these basins is conveyed in open ditches and storm sewers between residential areas and drains into Wewoka Creek Tributary near College Avenue. These ditches and storm sewers are inadequate to carry higher frequency storm events.

The locations of these problem areas in the Wewoka Creek Tributary drainage basin are shown in **FIGURE 4-6.**

City of Seminole Master Drainage Plan

0 200 400
Feet

N



CITY OF SEMINOLE

Wewoka Tributary Problem Areas

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-6

4.4 Evaluation of Problem Areas

Several alternatives were considered for flood mitigation within the Wewoka Creek Tributary drainage basin. The overall damages for the Wewoka Creek Tributary was assessed and the total benefit from each proposed alternative is explained in the following sections. The present worth value of damages on Wewoka Creek Tributary drainage basin over a 50-year period is about $3,219,443. This value becomes the direct cost of adopting "No Action" as the master plan for this watershed.

Since the flooding is caused mostly by undersized channels and pipes, the proposed alternatives are combinations of projects through several areas in the basin. For the basins on the west side a 10-year and 100-year storm sewer system is proposed. The proposed alternatives evaluated for the Wewoka Creek Tributary drainage basin are as follows:

4.4.1 Problem Area 1 –Residential Area Downstream of High School Practice Field and Commercial Structures along W Broadway Avenue

Alternative 1 -Detention downstream of Mike Snyder Avenue

This alternative recommends a detention facility downstream of Mike Snyder Avenue on the High School property to provide some storage and mitigate the flooding downstream of the pond. The proposed detention facility would have a water surface elevation of 884.3 feet during a 1% Annual Chance Storm (100-year) event and at this elevation its surface area is approximately 3.4 acres and provides 28 acre-feet storage. The outlet structures include 2-48" RCP at a flow line elevation of 874 feet and a 50-foot long weir opening at an elevation of 884 feet.

The 1% Annual Chance Storm (100-year) event inflow into this pond is 875 cfs and the outflow from the pond is approximately 385 cfs. This alternative would also disconnect the basins on west side of Coolidge Avenue from the main stem of the creek and convey that water down to the pond through 525 feet of 12'X10' RCB along Coolidge Street. This alternative would reduce the water surface elevation downstream of the pond approximately by 1-foot. The proposed pond would cause some backwater upstream of Mike Snyder Avenue. However, the proposed backwater elevation upstream of the pond is lower than the existing 1% Annual Chance Storm (100-year) event elevation. A schematic of this improvement is shown in **FIGURE 4-7**.

The estimated cost for this alternative is $3,066,500 and is detailed in **APPENDIX 4-G.** Construction of this pond requires approximately 4 acres of land and the cost of land that needs to be purchased for the construction of this improvements is not included in the cost estimate. The benefits calculated for this alternative over a 50-year project life is $1,633,209.

City of Seminole Master Drainage Plan



Wewoka Tributary
Problem Area 1
Proposed Alternative 1

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-7

Alternative 2 - Detention downstream of Mike Snyder Avenue + Replacing the Existing Storm Sewer under Jackson Street and W Broadway Avenue

This alternative proposes the detention pond as in Alternative 1 and also recommends replacing the existing 4'X4' RCB under Jackson Street and W. Broadway Avenue with a 2-8'X6' RCB. This proposed alternative improves the structure to a 1% Annual Chance Storm (100-year) capacity and helps to eliminate several structures along Broadway Avenue from 1% Annual Chance Storm (100-year) event floodplain. It also lowers the water surface upstream of Jackson Street. A schematic of this improvement is shown in **FIGURE 4-8**.

The estimated cost for this alternative is $4,733,200 and is detailed in **APPENDIX 4-G.** This cost does not include the cost of land that needs to be purchased for the construction of the improvements. The benefits calculated for this alternative over a 50-year project life is $1,853,325.

City of Seminole Master Drainage Plan

0 200 400
Feet



Wewoka Tributary
Problem Area 1
Proposed Alternative 2

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-8

4.4.2 Problem Area 2 –Residential Area along Coolidge Street

Alternative 1 -Detention downstream of Mike Snyder Avenue + Replacing the Existing Storm Sewer under Jackson Street and W. Broadway Avenue +Two Additional Detention facilities in the West Basins

This alternative proposes the detention and storm sewer replacement, as in Problem Area 1: Alternative 2, and also recommends two detention facilities in the upstream basins as shown in **FIGURE 4-9.** The existing ponds in those locations do not provide much storage. This alternative proposes some grading to improve the storage of these existing ponds.

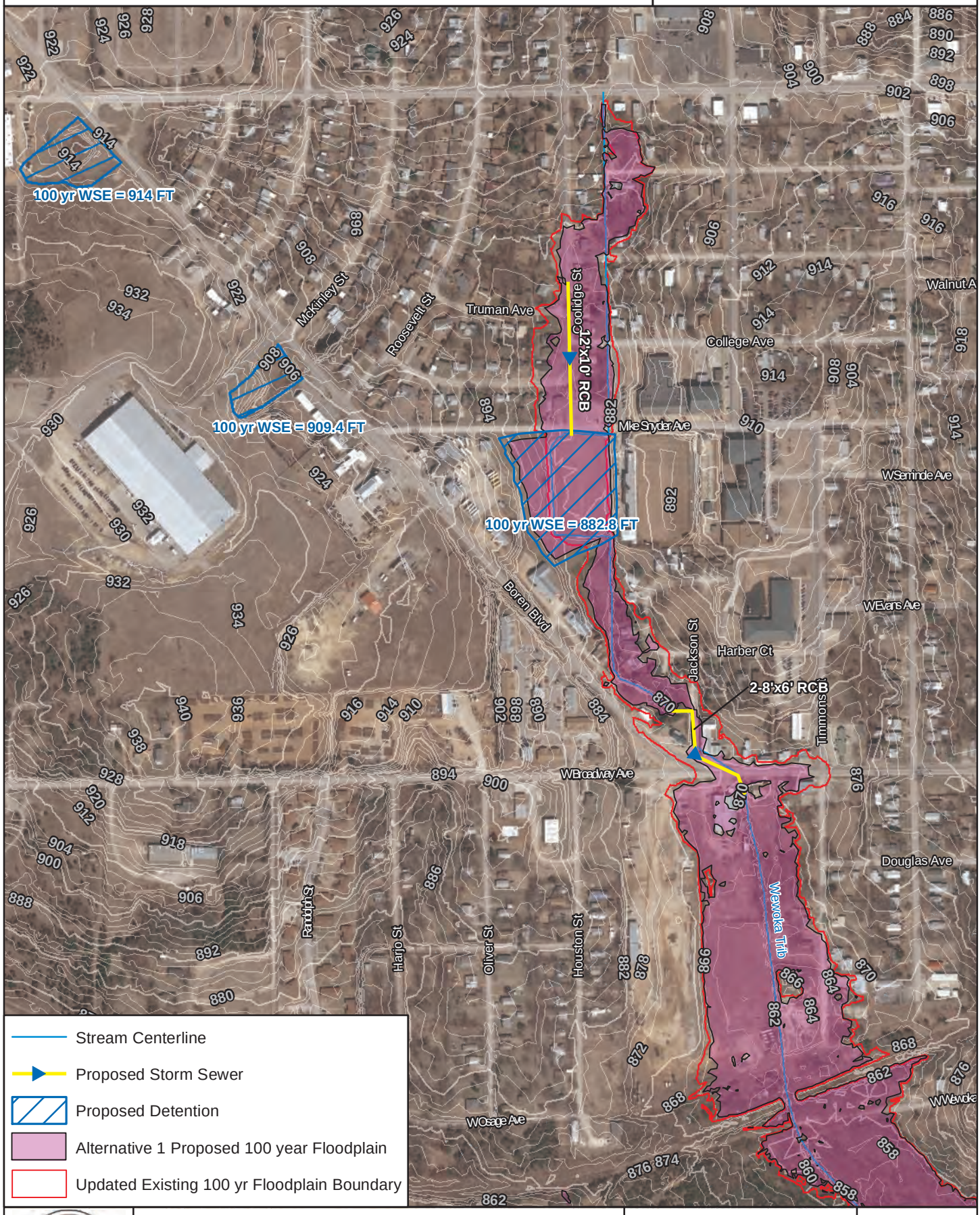
The proposed pond in sub-basin WEW-08-05 will capture approximately 85% percent of the total flow in that basin. The 100-year elevation in the pond is 909.4 feet and at this elevation, the pond has 3.2 acre-feet of storage and has a surface area of approximately 0.75 acres. During a 1% Annual Chance Storm (100-year) event, the inflow to the pond is 114 cfs and the outflow is 19 cfs. The outlet structure is a 12" RCP and the weir elevation is set at 910 feet.

The proposed pond in sub-basin WEW-08-04 will capture approximately 92% percent of the total flow in the basin. The 100-year elevation in the pond is 914 feet and at this elevation, the pond provides 4.4 acre-feet of storage and has approximately 1.2 acres of surface area. During a 1% Annual Chance Storm (100-year) event , the inflow to the pond is 146 cfs and the outflow is 29 cfs. The outlet structure is a 24" RCP and the weir overtopping starts at 914 feet.

Having these two additional ponds upstream helps to lower the water surface elevation in the downstream pond from 884.3 feet in Problem Area 1: Alternative 1 to 882.8 feet. This alternative also improves the drainage condition in Problem Area 4. Lower flow rates from upstream basins improve the capacity of existing open ditches and the storm sewers through the residential areas to the west. A schematic of this improvement is shown in **FIGURE 4-9**.

The estimated cost for this alternative is $5,610,500 and is detailed in **APPENDIX 4-G.** Construction of these new ponds requires approximately 2 acres of land in addition to the 4 acres for the detention downstream of Mike Snyder Avenue and the cost of land that needs to be purchased for the construction of this improvements is not included in the cost estimate. The benefits calculated for this alternative over a 50-year project life is $1,905,970.

City of Seminole Master Drainage Plan



CITY OF SEMINOLE

Wewoka Tributary
Problem Area 2
Proposed Alternative 1

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-9

Alternative 2 –Acquisition of properties near Mike Snyder Avenue + Extending detention to upstream of Mike Snyder Avenue

This alternative proposes the upstream detention in the west basins and the storm sewer replacement at W. Broadway Avenue as in Alternative 1. This also proposes acquisition of 4 houses upstream of Mike Snyder Avenue and extending the detention area to the upstream side of the road. This requires replacing the structure underneath Mike Snyder Avenue with a 2-12X10 RCB as flow equalizing structure. The outlet structure for the pond include 2-48" RCPs and a 25 foot long weir set at an elevation 881.6 feet. This proposed pond has a 1% Annual Chance Storm (100-year) event elevation of 882 feet and at this elevation it has approximately 25 acre-feet storage. A schematic of this improvement is shown in Figure 4-10. Since the pond at Mike Snyder Avenue is extended in this alternative, there is an option to discharge the proposed 12X10 RCB along Coolidge Avenue at the upstream end of the extended pond. This would require resizing the pipe to adjust to the depth at upstream end.

The estimated cost for this alternative is $5,719,200 and is detailed in **APPENDIX 4-G.** This cost does not include the cost of land that needs to be purchased for the construction of the improvements. The acquisition of 4 houses costs approximately $499,000. The benefits calculated for this alternative over a 50-year project life is $1,765,379.

City of Seminole Master Drainage Plan



CITY OF SEMINOLE

Wewoka Tributary
Problem Area 2
Proposed Alternative 2

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-10

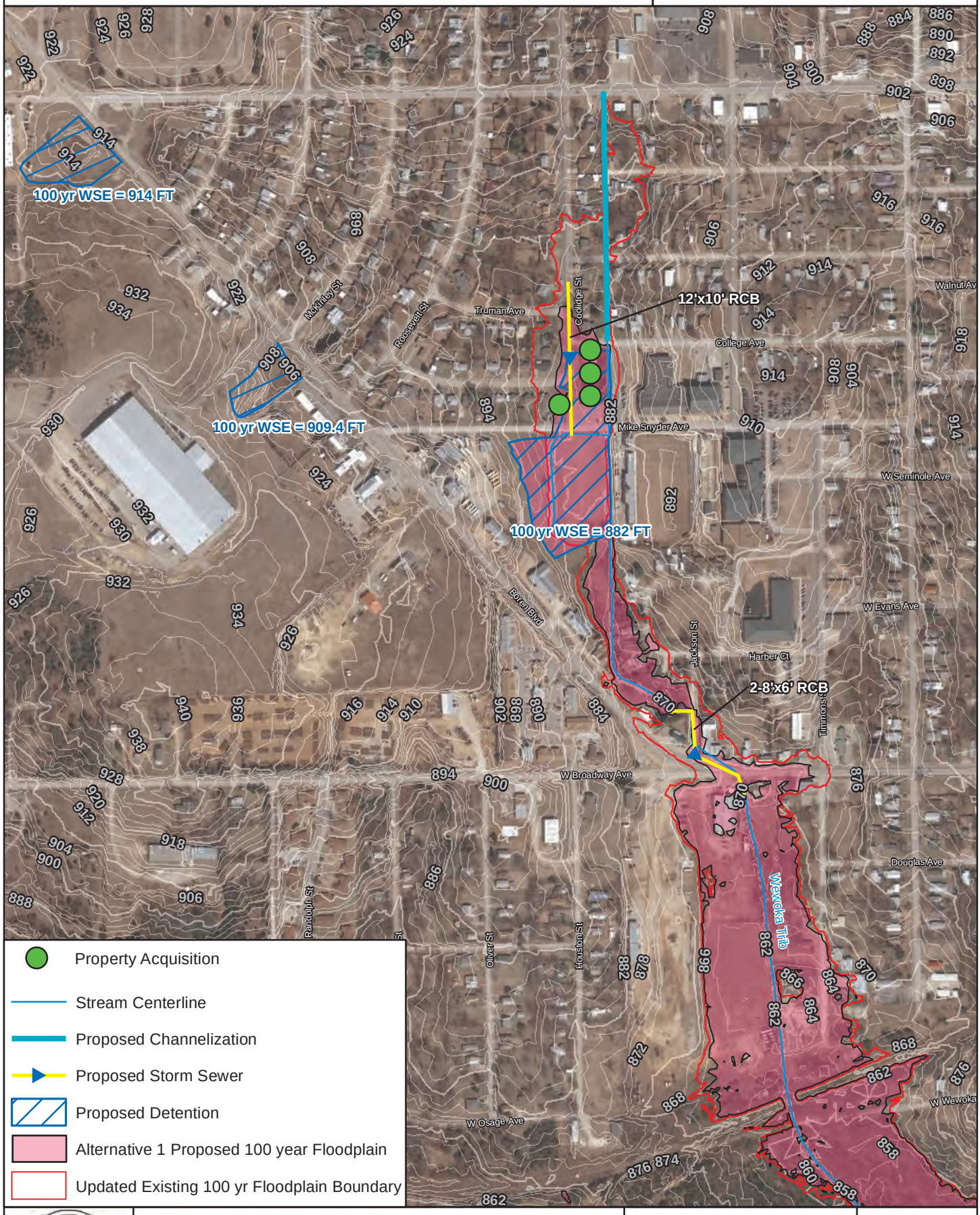
4.4.3 Problem Area 3 –Residential Area upstream of College Avenue

Alternative 1 – Channelization upstream of College Avenue

This alternative proposes channelization upstream of College Avenue along with all proposed recommendations shown in Problem Area 2. The proposed improvement recommends constructing a 1000 foot section of 6-foot wide and 5-foot deep vertical wall concrete channel between Strothers Avenue and College Avenue. This alternative helps to convey the 100-year flow through the proposed channel and eliminates all buildings along this channel section from the 1% Annual Chance Storm (100-year) event floodplain. A schematic of this improvement is shown in **FIGURE 4-11**.

The estimated cost for this alternative is $6,262,500 and is detailed in **APPENDIX 4-G.** The cost of land that needs to be purchased for the construction of these improvements is not included in the cost estimate. The benefits calculated for this alternative over a 50-year project life is $2,421,581.

City of Seminole Master Drainage Plan



CITY OF SEMINOLE

Wewoka Tributary
Problem Area 3
Proposed Alternative 1

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-11

4.4.4 Problem Area 4 –Drainage Basins to the west of Coolidge Street

Alternative 1 - Replacing the existing open channels and storm sewer systems with a 1% Annual Chance Storm (100-year) Capacity Storm Sewer Systems in West Basins

Alternative 1 for this problem area in the Wewoka Creek Tributary basin proposes replacing the existing open channels and storm sewer systems within the basins to the west of Coolidge Street with a 100-year storm sewer system. For the existing condition flow rates, this proposed system requires approximately 330 feet of 5'X3' RCB from upstream of Lincoln Street to Harding Street, approximately 630 feet of 10'X8' RCB from Harding Street to Roosevelt Street and another 630 feet of 10'X10'RCBs from Roosevelt Street to downstream of Coolidge Street. From there it will be taken to the pond through the 12'X10' RCB storm sewer proposed in previous alternatives.

A schematic of this improvement is shown in **FIGURE 4-12**. The estimated cost for this alternative is $3,594,100 and is detailed in **APPENDIX 4-G.**

Alternative 2 - Replacing the existing open channels and storm sewer systems with a 1% Annual Chance Storm (100-year) Capacity Storm Sewer System in West Basins along with improving the Detention in Two upstream basins

If the upstream ponds recommended in previous alternatives are adopted, it would reduce the flow rates in these west basins. In that scenario, the proposed system requires approximately 330 feet of 36" RCP from upstream of Lincoln Street to Harding Street, approximately 630 feet of 8'X6' RCB from Harding Street to Roosevelt Street and another 630 feet of 8'X 8' RCB from Roosevelt Street to downstream of Coolidge Street. From there it will be taken to the pond through the 12'X10' RCB storm sewer proposed in previous alternatives.

A schematic of this improvement is shown in **FIGURE 4-13**. The estimated cost for this alternative is $2,542,900 and is detailed in **APPENDIX 4-G.**

City of Seminole Master Drainage Plan

0 125 250
Feet

N



Stream Centerline
Proposed Storm Sewer
Storm Sewer Junctions

CITY OF SEMINOLE

Wewoka Tributary
Problem Area 4
Proposed Alternative 1

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-12

City of Seminole Master Drainage Plan

0 200 400
Feet

N



CITY OF SEMINOLE

Wewoka Tributary
Problem Area 4
Proposed Alternative 2

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Figure 4-13

4.5 Recommended Plan

Recommendation –

Appendix 3-A
Hydrologic Coefficients for Existing Condition

APPENDIX 3-A - Existing Conditions - Summary of Hydrologic Coefficients

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		2535	2050																		
GLF-01	Overland	95		2.73	1.16	1.37			Commercial	0	89	92	94	95	0.0	0.4	0.0	0.0	64.4	33.1	0.05179
	Channel (ditch)	1955		4.26	3.10	10.52			Forest (good cover)	39	25	55	70	77	0.0	9.4	29.7	0.0			
	Paved				0.00	0.00			Lawns, etc, (good grass)	48	39	61	74	80	0.0	38.9	8.8	0.0			
	Pipe				0.00	0.00			Pasture: Good Condition	13	39	61	74	80	0.0	12.8	0.0	0.0			
	Stream	485			4.00	2.02	8.3	0.14													
		1522	576																		
GLF-02	Overland	97		2.85	1.18	1.37			Commercial	4	89	92	94	95	0.0	0.3	3.3	0.0	66.4	51.1	0.07980
	Channel (ditch)	478		3.78	2.92	2.73			Forest (good cover)	0	25	55	70	77	0.0	0.1	0.2	0.0			
	Paved				0.00	0.00			Impervious	6	98	98	98	98	0.0	1.6	0.6	4.2			
	Pipe				0.00	0.00			Lawns, etc, (good grass)	90	39	61	74	80	0.0	76.2	12.4	1.0			
	Stream	947			4.00	3.94	4.8	0.08													
		940	940																		
GLF-02-01	Overland	87		4.02	1.41	1.03			Impervious	15	98	98	98	98	0.0	0.2	5.7	9.0	76.2	20.1	0.03138
	Channel (ditch)	853		5.04	3.38	4.21			Lawns, etc, (good grass)	85	39	61	74	80	0.0	12.7	67.3	5.2			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.1	0.05													
		1303	1235																		
GLF-02-02	Overland				0.00	0.00			Commercial	13	89	92	94	95	0.0	12.8	0.0	0.0	85.9	40.6	0.06338
	Channel (ditch)	1235		1.51	1.82	11.30			Impervious	11	98	98	98	98	0.0	0.2	2.2	8.8			
	Paved	68		1.11	2.10	0.54			Industrial	60	81	88	91	93	0.0	53.7	5.3	0.9			
	Pipe				0.00	0.00			Lawns, etc, (good grass)	8	39	61	74	80	0.0	5.2	2.6	0.6			
	Stream				0.00	0.00	7.1	0.12	Pasture: Good Condition	8	39	61	74	80	0.0	7.7	0.0	0.0			
		1366	723																		
GLF-02-03	Overland				0.00	0.00			Commercial	43	89	92	94	95	0.0	39.3	3.3	0.0	83.9	21.5	0.03362
	Channel (ditch)	723		0.65	1.18	10.19			Industrial	38	81	88	91	93	0.0	38.0	0.0	0.0			
	Paved	643		1.27	2.24	4.79			Woods-Grass: Good	19	32	58	72	79	0.0	19.4	0.0	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	9.0	0.15													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		973	790																		
GLF-02-04	Overland				0.00	0.00			Commercial	2	89	92	94	95	0.0	0.4	1.3	0.0	65.4	44.2	0.06904
	Channel (ditch)	790		3.55	2.82	4.66			Forest (good cover)	1	25	55	70	77	0.0	0.0	1.2	0.0			
	Paved	184		3.73	3.86	0.79			Impervious	5	98	98	98	98	0.0	1.5	0.0	3.5			
	Pipe				0.00	0.00			Lawns, etc, (good grass)	79	39	61	74	80	0.0	78.1	0.4	0.9			
	Stream				0.00	0.00	3.3	0.05	Pasture: Good Condition	1	39	61	74	80	0.0	1.0	0.0	0.0			
									Residential 1/4 acre	10	61	75	83	87	0.0	9.4	0.7	0.0			
									Woods-Grass: Good	2	32	58	72	79	0.0	0.0	1.6	0.0			
		2690	2353																		
GLF-02-05	Overland				0.00	0.00			Commercial	0	89	92	94	95	0.0	0.0	0.0	0.2	77.9	39.3	0.06143
	Channel (ditch)	2353		2.28	2.25	17.42			Lawns, etc, (good grass)	2	39	61	74	80	0.0	1.8	0.0	0.0			
	Paved	336		0.52	1.43	3.93			Residential 1/4 acre	78	61	75	83	87	0.0	32.4	42.5	2.9			
	Pipe				0.00	0.00			Woods-Grass: Good	20	32	58	72	79	0.0	0.0	20.3	0.0			
	Stream				0.00	0.00	12.8	0.21													
		1589	864																		
GLF-03	Overland	95		7.90	1.98	0.80			Forest (good cover)	48	25	55	70	77	0.0	0.1	48.0	0.0	70.3	19.9	0.03102
	Channel (ditch)	770		4.16	3.06	4.19			Lawns, etc, (good grass)	52	39	61	74	80	0.0	13.7	38.3	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	725			4.00	3.02	4.8	0.08													
		2199	443																		
GLF-03-01	Overland	119		2.63	1.14	1.74			Commercial	35	89	92	94	95	0.0	35.2	0.0	0.0	78.6	32.3	0.05046
	Channel (ditch)	324		1.33	1.71	3.16			Industrial	20	81	88	91	93	0.0	20.0	0.0	0.0			
	Paved	1756		1.31	2.28	12.82			Lawns, etc, (good grass)	13	39	61	74	80	0.0	2.2	11.0	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	32	32	58	72	79	0.0	26.0	5.5	0.0			
	Stream				0.00	0.00	10.6	0.18													
		1510	590																		
GLF-04	Overland	60		5.57	1.66	0.60			Commercial	1	89	92	94	95	0.0	0.5	0.0	0.0	72.2	34.7	0.05424
	Channel (ditch)	529		5.20	3.43	2.57			Forest (good cover)	42	25	55	70	77	0.0	0.0	41.6	0.0			
	Paved	629		2.96	3.44	3.05			Impervious	5	98	98	98	98	0.0	0.0	4.9	0.0			
	Pipe				0.00	0.00			Lawns, etc, (good grass)	16	39	61	74	80	0.0	0.1	16.1	0.0			
	Stream	291			4.00	1.21	4.5	0.07	Residential 1/4 acre	9	61	75	83	87	0.0	0.0	9.4	0.0			
									Woods-Grass: Good	27	32	58	72	79	0.0	12.1	15.4	0.0			

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		1895	1895																		
GLF-05	Overland	88		1.99	0.99	1.48			Commercial	4	89	92	94	95	0.0	3.8	0.0	0.0	69.5	31.6	0.04930
	Channel (ditch)	1807		1.74	1.96	15.35			Impervious	5	98	98	98	98	0.0	0.0	4.8	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	14	61	75	83	87	0.0	0.8	10.0	3.6			
	Pipe				0.00	0.00			Woods-Grass: Good	77	32	58	72	79	0.0	46.1	26.1	4.8			
	Stream				0.00	0.00	10.1	0.17													
		1959	1578																		
MAG-01	Overland	88		2.97	1.21	1.21			Woods-Grass: Good	100	32	58	72	79	0.0	0.0	100.0	0.0	72.0	11.6	0.01806
	Channel (ditch)	1490		0.06	0.35	71.86															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	382			4.00	1.59	44.8	0.75													
		1770	1522																		
MAG-02	Overland	92		5.98	1.72	0.89			Commercial	42	89	92	94	95	0.0	0.0	41.6	0.0	82.0	15.0	0.02351
	Channel (ditch)	1430		0.96	1.45	16.47			Impervious	3	98	98	98	98	0.0	0.0	3.4	0.0			
	Paved	191		4.64	4.31	0.74			Woods-Grass: Good	55	32	58	72	79	0.0	0.0	55.0	0.0			
	Pipe				0.00	0.00															
	Stream	57			4.00	0.24	11.0	0.18													
		1867	314																		
MAG-02-01	Overland	97		1.97	0.98	1.65			Commercial	69	89	92	94	95	0.0	0.0	68.6	0.0	89.5	14.7	0.02299
	Channel (ditch)	217		2.41	2.31	1.56			Residential 1/4 acre	22	61	75	83	87	0.0	0.0	21.7	0.0			
	Paved	744		2.84	3.37	3.68			Woods-Grass: Good	10	32	58	72	79	0.0	0.0	9.7	0.0			
	Pipe				0.00	0.00															
	Stream	809			4.00	3.37	6.2	0.10													
		957	749																		
MAG-02-02	Overland	88		3.29	1.27	1.15			Commercial	30	89	92	94	95	0.0	0.0	30.0	0.0	81.1	17.6	0.02752
	Channel (ditch)	661		2.78	2.49	4.43			Forest (good cover)	18	25	55	70	77	0.0	0.0	17.7	0.0			
	Paved	208		3.83	3.92	0.88			Impervious	1	98	98	98	98	0.0	0.0	0.6	0.0			
	Pipe				0.00	0.00			Pasture: Good Condition	29	39	61	74	80	0.0	0.0	29.0	0.0			
	Stream				0.00	0.00	3.9	0.06	Residential 1/4 acre	17	61	75	83	87	0.0	0.0	17.1	0.0			
									Residential 2 acre	6	46	65	77	82	0.0	0.0	5.6	0.0			

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		1650	1322																		
MAG-03	Overland	97		2.99	1.21	1.33			Commercial	5	89	92	94	95	0.0	0.0	5.1	0.0	77.2	22.6	0.03527
	Channel (ditch)	1225		1.85	2.03	10.08			Forest (good cover)	25	25	55	70	77	0.0	0.0	24.7	0.0			
	Paved				0.00	0.00			Impervious	2	98	98	98	98	0.0	0.0	1.6	0.0			
	Pipe				0.00	0.00			Pasture: Good Condition	38	39	61	74	80	0.0	0.0	37.5	0.0			
	Stream	328			4.00	1.37	7.7	0.13	Residential 1/4 acre	31	61	75	83	87	0.0	0.0	31.1	0.0			
		1868	1868																		
MAG-03-01	Overland	94		1.81	0.94	1.67			Forest (good cover)	41	25	55	70	77	0.0	0.0	41.5	0.0	72.7	21.4	0.03347
	Channel (ditch)	1773		2.63	2.42	12.21			Impervious	1	98	98	98	98	0.0	0.0	1.3	0.0			
	Paved				0.00	0.00			Pasture: Good Condition	57	39	61	74	80	0.0	0.0	57.2	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	8.3	0.14													
		644	77																		
MAG-04	Overland	77		9.87	2.21	0.58			Forest (good cover)	36	25	55	70	77	0.0	0.0	35.6	0.0	72.7	4.6	0.00716
	Channel (ditch)				0.00	0.00			Pasture: Good Condition	63	39	61	74	80	0.0	0.0	62.6	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	2	61	75	83	87	0.0	0.0	1.9	0.0			
	Pipe				0.00	0.00															
	Stream	567			4.00	2.36	1.8	0.03													
		1941	1941																		
MAG-04-01	Overland	95		0.09	0.21	7.44			Forest (good cover)	37	25	55	70	77	0.0	0.0	36.9	0.0	72.3	33.3	0.05196
	Channel (ditch)	1845		1.27	1.67	18.42			Pasture: Good Condition	41	39	61	74	80	0.0	16.8	24.6	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	22	61	75	83	87	0.0	0.0	21.7	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	15.5	0.26													
		1878	970																		
MAG-04-02	Overland	104		2.55	1.12	1.54			Commercial	19	89	92	94	95	0.0	0.0	8.3	11.1	81.8	31.5	0.04916
	Channel (ditch)	866		1.31	1.70	8.50			Forest (good cover)	22	25	55	70	77	0.0	0.0	22.0	0.0			
	Paved	908		3.34	3.65	4.14			Pasture: Good Condition	13	39	61	74	80	0.0	0.2	12.4	0.0			
	Pipe				0.00	0.00			Residential 1 acre	4	51	68	79	84	0.0	0.0	4.1	0.0			
	Stream				0.00	0.00	8.5	0.14	Residential 1/4 acre	42	61	75	83	87	0.0	0.0	22.2	19.6			

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		2162	1312																		
MAG-04-03	Overland				0.00	0.00			Commercial	7	89	92	94	95	0.0	0.0	5.4	1.4	73.3	31.1	0.04858
	Channel (ditch)	1312		0.71	1.24	17.69			Forest (good cover)	9	25	55	70	77	0.0	0.0	9.0	0.0			
	Paved	850		3.19	3.57	3.97			Pasture: Good Condition	67	39	61	74	80	0.0	25.9	40.8	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	18	61	75	83	87	0.0	0.0	16.3	1.3			
	Stream				0.00	0.00	13.0	0.22													
		2417	794																		
MAG-04-04	Overland	142		2.59	1.13	2.10			Commercial	25	89	92	94	95	0.0	0.0	1.4	24.1	85.2	24.7	0.03866
	Channel (ditch)	652		4.70	3.26	3.33			Residential 1/4 acre	75	61	75	83	87	0.0	23.5	24.0	27.1			
	Paved	1623		2.73	3.30	8.20															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	8.2	0.14													
		1131	663																		
MAG-04-05	Overland				0.00	0.00			Commercial	31	89	92	94	95	0.0	0.0	7.1	24.3	86.8	9.7	0.01511
	Channel (ditch)	663		3.48	2.79	3.96			Residential 1/4 acre	69	61	75	83	87	0.0	0.0	66.2	2.4			
	Paved	468		4.92	4.44	1.76															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.4	0.06													
		1237	288																		
MAG-04-06	Overland				0.00	0.00			Commercial	49	89	92	94	95	0.0	0.0	0.0	48.8	90.3	16.6	0.02592
	Channel (ditch)	288		2.67	2.44	1.97			Residential 1/4 acre	51	61	75	83	87	0.0	0.0	15.7	35.5			
	Paved	949		2.69	3.28	4.83															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.1	0.07													
		1808	934																		
MAG-05	Overland	102		2.00	0.99	1.71			Commercial	1	89	92	94	95	0.0	1.2	0.0	0.0	70.7	23.7	0.03699
	Channel (ditch)	832		2.04	2.13	6.52			Pasture: Good Condition	99	39	61	74	80	0.0	26.7	72.1	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	874			4.00	3.64	7.1	0.12													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
MAG-05-01		891	772																83.1	23.5	0.03672
	Overland	106		3.50	1.31	1.35			Commercial	23	89	92	94	95	0.0	21.9	1.5	0.0			
	Channel (ditch)	666		2.14	2.18	5.10			Forest (good cover)	3	25	55	70	77	0.0	2.2	0.4	0.0			
	Paved	118		2.10	2.89	0.68			Impervious	23	98	98	98	98	0.0	0.0	14.3	9.2			
	Pipe				0.00	0.00			Pasture: Good Condition	51	39	61	74	80	0.0	6.7	35.4	8.4			
	Stream				0.00	0.00	4.3	0.07													
MAG-05-02		2163	518																72.9	46.1	0.07203
	Overland				0.00	0.00			Commercial	3	89	92	94	95	0.0	0.0	3.4	0.0			
	Channel (ditch)	518		4.75	3.27	2.64			Forest (good cover)	40	25	55	70	77	0.0	14.3	25.8	0.0			
	Paved	474		4.14	4.07	1.94			Pasture: Good Condition	17	39	61	74	80	0.0	6.6	10.5	0.0			
	Pipe				0.00	0.00			Residential 1 acre	29	51	68	79	84	0.0	0.7	28.7	0.0			
	Stream	1172			4.00	4.88	5.7	0.09	Residential 1/8 acre	8	77	85	90	92	0.0	0.0	8.4	0.0			
									Residential 2 acre	2	46	65	77	82	0.0	0.0	1.6	0.0			
MAG-05-03		1423	781																88.6	32.2	0.05036
	Overland	102		1.26	0.79	2.15			Commercial	51	89	92	94	95	0.0	0.0	51.2	0.0			
	Channel (ditch)	680		2.16	2.19	5.17			Residential 1/4 acre	49	61	75	83	87	0.0	0.0	48.8	0.0			
	Paved	642		2.96	3.44	3.11															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.3	0.10													
MAG-05-04		1158	644																88.4	15.6	0.02431
	Overland	92		3.40	1.29	1.19			Commercial	49	89	92	94	95	0.0	0.0	48.9	0.0			
	Channel (ditch)	552		5.02	3.37	2.73			Residential 1/4 acre	51	61	75	83	87	0.0	0.0	51.1	0.0			
	Paved	514		3.08	3.51	2.44															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.8	0.06													
MAG-05-05		1768	845																74.9	41.2	0.06431
	Overland				0.00	0.00			Commercial	0	89	92	94	95	0.0	0.0	0.1	0.0			
	Channel (ditch)	845		3.77	2.91	4.84			Impervious	2	98	98	98	98	0.0	1.1	0.6	0.0			
	Paved	167		3.37	3.67	0.76			Industrial	23	81	88	91	93	0.0	22.8	0.0	0.0			
	Pipe				0.00	0.00			Pasture: Good Condition	66	39	61	74	80	0.0	31.6	34.7	0.0			
	Stream	756			4.00	3.15	5.2	0.09	Residential 1 acre	1	51	68	79	84	0.0	0.0	0.6	0.0			
									Residential 1/4 acre	1	61	75	83	87	0.0	0.0	0.5	0.0			
									Residential 1/8 acre	8	77	85	90	92	0.0	0.1	7.8	0.0			

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
MAG-05-06		1224	1224																67.8	22.0	0.03435
	Overland	98		1.19	0.76	2.13			Impervious	5	98	98	98	98	0.0	2.7	1.9	0.0			
	Channel (ditch)	1127		3.86	2.95	6.38			Industrial	1	81	88	91	93	0.0	0.8	0.0	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	14	61	75	83	87	0.0	1.5	12.1	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	81	32	58	72	79	0.0	49.7	31.2	0.0			
	Stream				0.00	0.00	5.1	0.09													
MAG-05-07		1082	1025																83.3	6.4	0.00995
	Overland	83		1.57	0.88	1.57			Commercial	3	89	92	94	95	0.0	0.0	3.1	0.0			
	Channel (ditch)	943		4.07	3.03	5.19			Residential 1/4 acre	97	61	75	83	87	0.0	0.0	96.9	0.0			
	Paved				0.00	0.00															
	Pipe	56		1.24	4.00	0.23															
	Stream				0.00	0.00	4.2	0.07													
MAG-06		2474	1340																67.0	43.1	0.06740
	Overland	106		1.95	0.98	1.81			Commercial	5	89	92	94	95	0.0	4.9	0.0	0.0			
	Channel (ditch)	1234		1.28	1.68	12.26			Forest (good cover)	5	25	55	70	77	0.0	2.7	2.7	0.0			
	Paved	1134		4.51	4.25	4.45			Industrial	0	81	88	91	93	0.0	0.4	0.0	0.0			
	Pipe				0.00	0.00			Lawns, etc, (good grass)	10	39	61	74	80	0.0	4.7	5.0	0.0			
	Stream				0.00	0.00	11.1	0.19	Pasture: Good Condition	55	39	61	74	80	0.0	53.8	1.1	0.0			
									Residential 1/4 acre	25	61	75	83	87	0.0	24.7	0.0	0.0			
MAG-07		2529	1244																73.1	35.0	0.05467
	Overland	96		5.30	1.62	0.99			Commercial	8	89	92	94	95	0.0	1.5	6.5	0.0			
	Channel (ditch)	1148		1.73	1.96	9.78			Forest (good cover)	3	25	55	70	77	0.0	2.4	0.3	0.0			
	Paved	89		3.21	3.58	0.41			Lawns, etc, (good grass)	30	39	61	74	80	0.0	23.7	6.7	0.0			
	Pipe				0.00	0.00			Pasture: Good Condition	39	39	61	74	80	0.0	6.3	32.4	0.0			
	Stream	1197			4.00	4.99	9.7	0.16	Residential 1/4 acre	20	61	75	83	87	0.0	0.0	20.2	0.0			
MAG-08		1311	490																79.7	12.9	0.02016
	Overland				0.00	0.00			Commercial	28	89	92	94	95	0.0	1.4	27.0	0.0			
	Channel (ditch)	490		0.31	0.82	10.02			Lawns, etc, (good grass)	26	39	61	74	80	0.0	0.0	25.9	0.0			
	Paved	750		3.75	3.87	3.23			Pasture: Good Condition	46	39	61	74	80	0.0	0.0	45.7	0.0			
	Pipe				0.00	0.00															
	Stream	71			4.00	0.30	8.1	0.14													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
MAG-08-01		1244	357																83.1	14.2	0.02225
	Overland				0.00	0.00			Commercial	42	89	92	94	95	0.0	0.0	42.2	0.0			
	Channel (ditch)	357		0.53	1.07	5.59			Pasture: Good Condition	50	39	61	74	80	0.0	0.0	50.5	0.0			
	Paved	75		4.88	4.42	0.28			Residential 1/4 acre	7	61	75	83	87	0.0	0.0	7.3	0.0			
	Pipe				0.00	0.00															
	Stream	812			4.00	3.38	5.6	0.09													
MAG-08-02		2085	985																86.2	29.9	0.04678
	Overland	88		1.33	0.81	1.81			Commercial	21	89	92	94	95	0.0	0.0	13.0	8.0			
	Channel (ditch)	897		0.70	1.23	12.12			Pasture: Good Condition	6	39	61	74	80	0.0	0.0	5.7	0.0			
	Paved	1101		3.98	3.99	4.60			Residential 1/4 acre	73	61	75	83	87	0.0	6.9	19.7	46.7			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	11.1	0.19													
MAG-08-03		669	361																81.0	17.9	0.02789
	Overland	96		18.13	3.00	0.53			Commercial	27	89	92	94	95	0.0	13.4	13.3	0.0			
	Channel (ditch)	265		9.49	4.66	0.95			Pasture: Good Condition	31	39	61	74	80	0.0	1.7	28.9	0.0			
	Paved	308		4.73	4.35	1.18			Residential 1 acre	18	51	68	79	84	0.0	0.2	18.2	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	24	61	75	83	87	0.0	11.6	12.6	0.0			
	Stream				0.00	0.00	1.6	0.03													
MAG-08-04		1302	881																86.3	6.0	0.00934
	Overland	100		0.87	0.65	2.54			Residential 1/4 acre	100	61	75	83	87	0.0	5.5	0.0	94.5			
	Channel (ditch)	781		4.45	3.17	4.11															
	Paved	235		2.34	3.05	1.28															
	Pipe				0.00	0.00															
	Stream	186			4.00	0.78	5.2	0.09													
MAG-08-05		947	201																87.0	3.4	0.00526
	Overland	102		4.36	1.47	1.16			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0			
	Channel (ditch)	99		6.62	3.88	0.42															
	Paved	746		3.26	3.61	3.44															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.0	0.05													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		1598	1084																		
MAG-08-06	Overland	89		1.18	0.76	1.95			Residential 1 acre	0	51	68	79	84	0.0	0.0	0.0	0.0	82.5	10.1	0.01576
	Channel (ditch)	995		4.37	3.14	5.28			Residential 1/4 acre	100	61	75	83	87	0.0	17.6	58.5	23.8			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	515			4.00	2.14	5.6	0.09													
		1124	917																		
MAG-08-07	Overland	103		1.70	0.91	1.87			Residential 1/4 acre	100	61	75	83	87	0.0	4.6	11.6	83.8	86.0	10.4	0.01622
	Channel (ditch)	814		4.95	3.34	4.06															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	208			4.00	0.87	4.1	0.07													
		622	622																		
MAG-08-08	Overland	94		1.67	0.91	1.73			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0	87.0	3.4	0.00535
	Channel (ditch)	528		2.87	2.53	3.47															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.1	0.05													
		1156	184																		
MAG-08-09	Overland	91		2.73	1.16	1.30			Residential 1/4 acre	100	61	75	83	87	0.0	17.3	0.0	82.7	84.9	10.5	0.01636
	Channel (ditch)	93		3.03	2.60	0.60															
	Paved	972		4.51	4.25	3.81															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.4	0.06													
		707	393																		
MAG-08-10	Overland	99		2.28	1.06	1.56			Commercial	3	89	92	94	95	0.0	0.0	0.0	3.1	87.3	8.1	0.01260
	Channel (ditch)	294		3.22	2.69	1.82			Residential 1/4 acre	97	61	75	83	87	0.0	0.0	0.0	96.9			
	Paved	84		4.54	4.27	0.33															
	Pipe				0.00	0.00															
	Stream	231			4.00	0.96	2.8	0.05													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		810	203																		
MAG-08-11	Overland	94		4.22	1.44	1.08			Commercial	46	89	92	94	95	0.0	0.0	0.0	46.0	90.7	5.5	0.00863
	Channel (ditch)	109		5.53	3.54	0.52			Residential 1/4 acre	54	61	75	83	87	0.0	0.0	0.0	54.0			
	Paved	314		2.70	3.28	1.59															
	Pipe				0.00	0.00															
	Stream	294			4.00	1.22	2.6	0.04													
		1144	627																		
MAG-08-12	Overland	107		2.39	1.08	1.64			Commercial	0	89	92	94	95	0.0	0.0	0.0	0.0	87.0	7.8	0.01215
	Channel (ditch)	520		4.34	3.13	2.77			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	517			4.00	2.15	3.9	0.07													
		840	418																		
MAG-08-13	Overland	89		1.39	0.82	1.81			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0	87.0	11.2	0.01742
	Channel (ditch)	329		2.26	2.24	2.44															
	Paved	422		1.90	2.75	2.56															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.1	0.07													
		1775	115																		
MAG-08-14	Overland	115		3.15	1.25	1.54			Commercial	49	89	92	94	95	0.0	44.6	4.2	0.0	83.7	20.8	0.03251
	Channel (ditch)				0.00	0.00			Residential 1 acre	36	51	68	79	84	0.0	19.7	16.5	0.0			
	Paved	1660		3.64	3.82	7.25			Residential 1/4 acre	15	61	75	83	87	0.0	2.0	12.9	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	5.3	0.09													
		1231	697																		
MAG-08-15	Overland	85		1.95	0.98	1.45			Commercial	40	89	92	94	95	0.0	40.0	0.0	0.0	79.1	11.6	0.01811
	Channel (ditch)	612		8.10	4.30	2.37			Forest (good cover)	22	25	55	70	77	0.0	2.2	20.0	0.0			
	Paved	534		0.71	1.68	5.31			Residential 1 acre	38	51	68	79	84	0.0	25.0	12.8	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	0	61	75	83	87	0.0	0.0	0.0	0.0			
	Stream				0.00	0.00	5.5	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		2215	548																		
MAG-09	Overland	57		6.61	1.81	0.53			Commercial	22	89	92	94	95	0.0	11.0	10.8	0.0	74.1	31.0	0.04836
	Channel (ditch)	490		0.65	1.18	6.90			Lawns, etc, (good grass)	14	39	61	74	80	0.0	1.8	12.4	0.0			
	Paved	537		1.33	2.29	3.90			Pasture: Good Condition	37	39	61	74	80	0.0	31.7	5.5	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	27	61	75	83	87	0.0	26.8	0.0	0.0			
	Stream	1131			4.00	4.71	9.6	0.16													
		2408	853																		
MAG-10	Overland	40		3.26	1.27	0.53			Commercial	42	89	92	94	95	0.0	28.2	13.8	0.0	77.1	37.7	0.05894
	Channel (ditch)	812		0.24	0.71	19.03			Forest (good cover)	25	25	55	70	77	0.0	13.9	10.9	0.0			
	Paved	333		1.87	2.73	2.04			Residential 1 acre	33	51	68	79	84	0.0	30.5	2.8	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	0	32	58	72	79	0.0	0.0	0.0	0.0			
	Stream	1222			4.00	5.09	16.0	0.27													
		2358	1160																		
MAG-11	Overland				0.00	0.00			Forest (good cover)	33	25	55	70	77	0.0	29.5	3.8	0.0	68.0	13.1	0.02050
	Channel (ditch)	1160		2.30	2.26	8.54			Residential 1 acre	67	51	68	79	84	0.0	32.8	33.9	0.0			
	Paved	34		0.98	1.97	0.29															
	Pipe				0.00	0.00															
	Stream	1165			4.00	4.85	8.2	0.14													
		2421	2299																		
MAG-12	Overland	90		4.84	1.55	0.97			Forest (good cover)	23	25	55	70	77	0.0	18.2	5.3	0.0	62.1	44.0	0.06881
	Channel (ditch)	2210		0.33	0.84	44.07			Residential 1 acre	7	51	68	79	84	0.0	2.4	4.9	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	69	32	58	72	79	0.0	49.8	19.2	0.2			
	Pipe				0.00	0.00															
	Stream	122			4.00	0.51	27.3	0.46													
		2177	2177																		
MAG-12-01	Overland	102		3.74	1.36	1.25			Forest (good cover)	78	25	55	70	77	0.0	56.3	21.6	0.0	59.5	42.4	0.06621
	Channel (ditch)	2075		1.91	2.06	16.82			Pasture: Good Condition	15	39	61	74	80	0.0	12.9	1.6	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	8	32	58	72	79	0.0	7.6	0.0	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	10.8	0.18													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		1844	1177																		
MAG-13	Overland	98		1.63	0.90	1.83			Forest (good cover)	4	25	55	70	77	0.0	3.7	0.0	0.0	67.8	29.6	0.04630
	Channel (ditch)	1079		3.53	2.81	6.39			Residential 1 acre	18	51	68	79	84	0.0	0.0	11.4	6.4			
	Paved	136		2.59	3.21	0.71			Woods-Grass: Good	78	32	58	72	79	0.0	37.3	40.4	0.7			
	Pipe				0.00	0.00															
	Stream	531			4.00	2.21	6.7	0.11													
		2565	1479																		
MAG-14	Overland	98		3.90	1.39	1.17			Forest (good cover)	59	25	55	70	77	0.0	59.3	0.0	0.0	56.3	28.8	0.04506
	Channel (ditch)	1382		1.54	1.84	12.51			Pasture: Good Condition	4	39	61	74	80	0.0	4.2	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	36	32	58	72	79	0.0	36.5	0.0	0.0			
	Pipe				0.00	0.00															
	Stream	1086			4.00	4.52	10.9	0.18													
		2708	1132																		
MAG-14-01	Overland	71		1.06	0.72	1.65			Forest (good cover)	73	25	55	70	77	0.0	66.6	2.3	4.2	61.0	31.8	0.04962
	Channel (ditch)	1060		3.46	2.79	6.34			Pasture: Good Condition	17	39	61	74	80	0.0	9.9	0.0	7.5			
	Paved	463		1.91	2.76	2.80			Residential 1 acre	10	51	68	79	84	0.0	1.2	6.2	2.2			
	Pipe				0.00	0.00															
	Stream	1113			4.00	4.64	9.3	0.15													
		1553	1553																		
MAG-14-02	Overland	89		3.19	1.25	1.18			Residential 1 acre	74	51	68	79	84	0.0	53.9	0.0	20.6	70.2	14.6	0.02274
	Channel (ditch)	1464		2.96	2.57	9.48			Woods-Grass: Good	26	32	58	72	79	0.0	18.4	0.0	7.1			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.4	0.11													
		2688	1799																		
MAG-14-03	Overland	100		1.72	0.92	1.82			Forest (good cover)	41	25	55	70	77	0.0	22.2	18.3	0.5	63.1	44.0	0.06871
	Channel (ditch)	1699		3.16	2.66	10.64			Pasture: Good Condition	55	39	61	74	80	0.0	47.4	7.2	0.1			
	Paved				0.00	0.00			Residential 1 acre	4	51	68	79	84	0.0	0.0	4.3	0.0			
	Pipe				0.00	0.00															
	Stream	889			4.00	3.70	9.7	0.16													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		3009	1577																		
MAG-15	Overland	92		2.60	1.13	1.36			Forest (good cover)	12	25	55	70	77	0.0	12.1	0.0	0.0	57.9	50.8	0.07936
	Channel (ditch)	1484		2.08	2.15	11.51			Residential 1 acre	1	51	68	79	84	0.0	0.8	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	87	32	58	72	79	0.0	86.0	0.7	0.4			
	Pipe				0.00	0.00															
	Stream	1432			4.00	5.97	11.3	0.19													
		2169	2169																		
MAG-15-01	Overland	89		3.62	1.34	1.11			Woods-Grass: Good	100	32	58	72	79	0.0	78.4	21.6	0.0	61.0	26.8	0.04195
	Channel (ditch)	2079		4.19	3.07	11.29															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	7.4	0.12													
		1731	1362																		
MAG-15-02	Overland	100		6.77	1.83	0.91			Residential 1 acre	11	51	68	79	84	0.0	10.7	0.0	0.0	59.6	10.9	0.01707
	Channel (ditch)	1262		4.14	3.05	6.89			Woods-Grass: Good	89	32	58	72	79	0.0	85.3	4.0	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	369			4.00	1.54	5.6	0.09													
		2591	889																		
MAG-15-03	Overland	86		1.35	0.81	1.76			Forest (good cover)	3	25	55	70	77	0.0	0.4	3.0	0.0	66.5	56.7	0.08866
	Channel (ditch)	803		7.88	4.24	3.15			Residential 1 acre	46	51	68	79	84	0.0	43.4	2.6	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	51	32	58	72	79	0.0	27.3	23.2	0.0			
	Pipe				0.00	0.00															
	Stream	1702			4.00	7.09	7.2	0.12													
		1896	1150																		
MAG-15-04	Overland	91		2.69	1.15	1.32			Forest (good cover)	85	25	55	70	77	0.0	25.7	58.9	0.0	64.9	34.8	0.05431
	Channel (ditch)	1058		7.67	4.18	4.22			Woods-Grass: Good	15	32	58	72	79	0.0	11.3	4.1	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	746			4.00	3.11	5.2	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		3285	2585																		
MAG-15-05	Overland	93		1.71	0.92	1.70			Forest (good cover)	48	25	55	70	77	0.0	3.3	44.4	0.0	71.8	59.4	0.09285
	Channel (ditch)	2491		2.95	2.57	16.17			Impervious	4	98	98	98	98	0.0	0.6	0.0	3.0			
	Paved				0.00	0.00			Pasture: Good Condition	1	39	61	74	80	0.0	0.4	0.2	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	48	32	58	72	79	0.0	9.8	13.7	24.6			
	Stream	700			4.00	2.92	12.5	0.21													
		2142	1098																		
MAG-16	Overland	68		10.28	2.26	0.50			Woods-Grass: Good	100	32	58	72	79	0.0	85.5	8.5	6.0	60.5	27.2	0.04246
	Channel (ditch)	1030		2.68	2.44	7.03															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1044			4.00	4.35	7.1	0.12													
		2630	1310																		
MAG-16-01	Overland	30		3.56	1.33	0.38			Woods-Grass: Good	100	32	58	72	79	0.0	13.5	64.3	22.2	71.7	24.5	0.03824
	Channel (ditch)	1280		2.88	2.53	8.41															
	Paved	1320		2.53	3.17	6.93															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	9.4	0.16													
		1184	748																		
MAG-17	Overland	90		3.98	1.40	1.08			Impervious	24	98	98	98	98	0.0	0.2	0.8	23.3	77.5	71.2	0.11127
	Channel (ditch)	657		5.79	3.63	3.02			Woods-Grass: Good	76	32	58	72	79	0.0	10.6	56.3	8.7			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	437			4.00	1.82	3.5	0.06													
		1654	22																		
MAG-17-01	Overland	22		9.95	2.22	0.16			Woods-Grass: Good	100	32	58	72	79	0.0	0.0	86.5	13.5	72.9	16.2	0.02536
	Channel (ditch)				0.00	0.00															
	Paved	1171		1.92	2.77	7.06															
	Pipe				0.00	0.00															
	Stream	461			4.00	1.92	5.5	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
MAG-17-02		1123	1123																		
	Overland	92		5.92	1.71	0.90			Forest (good cover)	9	25	55	70	77	0.0	5.2	2.5	1.4	69.2	26.3	0.04108
	Channel (ditch)	1031		2.47	2.35	7.32			Woods-Grass: Good	91	32	58	72	79	0.0	39.0	0.9	51.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.9	0.08													
MAG-17-03		1513	1513																		
	Overland	100		2.00	0.99	1.68			Forest (good cover)	70	25	55	70	77	0.0	49.0	20.9	0.0	62.1	11.9	0.01866
	Channel (ditch)	1413		2.59	2.40	9.80			Woods-Grass: Good	30	32	58	72	79	0.0	8.0	22.2	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.9	0.11													
MAG-17-04		2013	2013																		
	Overland	77		0.40	0.44	2.89			Woods-Grass: Good	100	32	58	72	79	0.0	47.3	51.8	0.9	65.4	35.3	0.05510
	Channel (ditch)	1936		4.82	3.30	9.78															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	7.6	0.13													
MAG-18		2916	1235																		
	Overland	91		0.65	0.56	2.70			Forest (good cover)	5	25	55	70	77	0.0	1.3	3.3	0.0	69.4	53.5	0.08356
	Channel (ditch)	1144		6.96	3.98	4.79			Woods-Grass: Good	95	32	58	72	79	0.0	17.8	75.1	2.5			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1681			4.00	7.00	8.7	0.14													
MAG-18-01		2695	783																		
	Overland	102		3.58	1.33	1.28			Forest (good cover)	48	25	55	70	77	0.0	9.0	39.2	0.0	68.7	43.8	0.06843
	Channel (ditch)	681		8.67	4.46	2.55			Woods-Grass: Good	52	32	58	72	79	0.0	10.4	34.2	7.2			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1911			4.00	7.96	7.1	0.12													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		1539	785																		
MAG-18-02	Overland	84		4.22	1.44	0.98			Forest (good cover)	70	25	55	70	77	0.0	0.0	53.5	16.3	73.6	12.6	0.01969
	Channel (ditch)	700		4.59	3.22	3.63			Woods-Grass: Good	30	32	58	72	79	0.0	0.0	4.0	26.3			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	754			4.00	3.14	4.6	0.08													
		1565	1565																		
MAG-18-03	Overland	84		1.02	0.71	1.98			Forest (good cover)	18	25	55	70	77	0.0	1.1	0.0	16.4	74.6	25.7	0.04013
	Channel (ditch)	1481		5.21	3.43	7.19			Impervious	8	98	98	98	98	0.0	0.0	0.0	8.5			
	Paved				0.00	0.00			Woods-Grass: Good	74	32	58	72	79	0.0	25.9	0.0	48.1			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	5.5	0.09													
		2900	936																		
MAG-18-04	Overland	83		7.11	1.88	0.73			Forest (good cover)	89	25	55	70	77	0.0	29.3	56.1	3.2	66.9	57.2	0.08932
	Channel (ditch)	853		5.52	3.54	4.02			Woods-Grass: Good	11	32	58	72	79	0.0	0.0	0.0	11.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1964			4.00	8.18	7.8	0.13													
		2778	979																		
MAG-18-05	Overland	90		3.66	1.34	1.11			Forest (good cover)	100	25	55	70	77	0.0	36.0	64.0	0.0	64.6	42.3	0.06603
	Channel (ditch)	889		9.37	4.63	3.20															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1799			4.00	7.50	7.1	0.12													
		0	908																		
MAG-18-06	Overland	93		4.47	1.49	1.04			Forest (good cover)	86	25	55	70	77	0.0	13.8	62.2	10.2	69.8	13.2	0.02063
	Channel (ditch)	815		7.20	4.05	3.36			Woods-Grass: Good	14	32	58	72	79	0.0	0.0	1.2	12.8			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	931			4.00	3.88	5.0	0.08													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	769																		
MAG-18-07	Overland	94		2.31	1.07	1.48			Forest (good cover)	48	25	55	70	77	0.0	3.9	42.4	1.8	66.6	22.2	0.03469
	Channel (ditch)	675		8.18	4.32	2.60			Woods-Grass: Good	52	32	58	72	79	0.0	28.5	23.4	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	636			4.00	2.65	4.0	0.07													
		0	504																		
MAG-18-08	Overland	91		1.37	0.82	1.86			Commercial	7	89	92	94	95	0.0	3.5	3.4	0.0	68.0	30.1	0.04706
	Channel (ditch)	412		8.37	4.38	1.57			Forest (good cover)	58	25	55	70	77	0.0	7.3	51.1	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	35	32	58	72	79	0.0	23.5	9.2	1.9			
	Pipe				0.00	0.00															
	Stream	973			4.00	4.05	4.5	0.07													
		0	751																		
MAG-18-09	Overland	80		0.61	0.55	2.44			Commercial	17	89	92	94	95	0.0	13.8	2.9	0.0	68.3	10.3	0.01614
	Channel (ditch)	671		3.69	2.88	3.88			Woods-Grass: Good	83	32	58	72	79	0.0	50.4	33.0	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.8	0.06													
		0	771																		
MAG-18-10	Overland	99		1.84	0.95	1.73			Forest (good cover)	62	25	55	70	77	0.0	4.4	57.8	0.0	66.3	11.7	0.01824
	Channel (ditch)	672		5.70	3.60	3.12			Woods-Grass: Good	38	32	58	72	79	0.0	27.4	10.4	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	661			4.00	2.76	4.6	0.08													
		0	0																		
MAG-18-11	Overland				0.00	0.00			Commercial	27	89	92	94	95	0.0	26.6	0.0	0.0	66.1	4.4	0.00689
	Channel (ditch)				0.00	0.00			Forest (good cover)	30	25	55	70	77	0.0	30.1	0.0	0.0			
	Paved	941		1.88	2.73	5.73			Woods-Grass: Good	43	32	58	72	79	0.0	43.3	0.0	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.4	0.06													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1348																		
MAG-18-12	Overland	95		4.42	1.48	1.08			Forest (good cover)	98	25	55	70	77	0.0	35.8	62.6	0.0	64.7	23.7	0.03701
	Channel (ditch)	1253		7.23	4.06	5.14			Woods-Grass: Good	2	32	58	72	79	0.0	0.0	1.6	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	572			4.00	2.38	5.2	0.09													
		0	1400																		
MAG-18-13	Overland	91		0.91	0.67	2.26			Forest (good cover)	41	25	55	70	77	0.0	7.5	33.1	0.0	66.6	37.5	0.05864
	Channel (ditch)	1309		4.87	3.32	6.58			Industrial	13	81	88	91	93	0.0	12.5	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	47	32	58	72	79	0.0	39.0	7.9	0.0			
	Pipe				0.00	0.00															
	Stream	721			4.00	3.00	7.1	0.12													
		0	665																		
MAG-18-14	Overland	99		1.24	0.78	2.12			Forest (good cover)	85	25	55	70	77	0.0	0.0	85.0	0.0	70.0	11.2	0.01751
	Channel (ditch)	566		6.79	3.93	2.40			Woods-Grass: Good	15	32	58	72	79	0.0	2.2	12.8	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	713			4.00	2.97	4.5	0.07													
		0	683																		
MAG-18-15	Overland	90		1.05	0.72	2.09			Forest (good cover)	34	25	55	70	77	0.0	0.0	34.0	0.0	66.6	6.8	0.01055
	Channel (ditch)	593		2.46	2.34	4.23			Woods-Grass: Good	66	32	58	72	79	0.0	34.0	32.0	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	250			4.00	1.04	4.4	0.07													
		0	945																		
MAG-18-16	Overland	87		1.15	0.75	1.93			Forest (good cover)	36	25	55	70	77	0.0	0.0	36.3	0.0	67.5	16.4	0.02555
	Channel (ditch)	859		2.87	2.53	5.65			Woods-Grass: Good	64	32	58	72	79	0.0	27.0	36.6	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	404			4.00	1.68	5.6	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
MAG-18-17		0	166																		
	Overland	166		4.46	1.48	1.86			Forest (good cover)	100	25	55	70	77	0.0	100.0	0.0	0.0	55.0	12.0	0.01883
	Channel (ditch)				0.00	0.00															
	Paved	1857		3.15	3.55	8.72															
	Pipe				0.00	0.00															
	Stream	260			4.00	1.08	7.0	0.12													
MAG-18-18		0	1263																		
	Overland	94		2.55	1.12	1.40			Forest (good cover)	46	25	55	70	77	0.0	8.5	0.0	37.2	70.0	17.7	0.02767
	Channel (ditch)	1169		6.47	3.84	5.08			Woods-Grass: Good	54	32	58	72	79	0.0	29.4	0.5	24.5			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.9	0.06													
MAG-19		0	736																		
	Overland	98		4.72	1.53	1.07			Forest (good cover)	100	25	55	70	77	0.0	20.9	79.0	0.0	66.9	27.5	0.04294
	Channel (ditch)	639		9.89	4.76	2.23			Woods-Grass: Good	0	32	58	72	79	0.0	0.0	0.2	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1776			4.00	7.40	6.4	0.11													
MAG-19-01		0	885																		
	Overland	84		1.20	0.77	1.82			Forest (good cover)	100	25	55	70	77	0.0	0.0	100.0	0.0	70.0	17.8	0.02789
	Channel (ditch)	802		9.47	4.66	2.87															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	982			4.00	4.09	5.3	0.09													
MAG-19-02		0	435																		
	Overland	93		3.92	1.39	1.11			Forest (good cover)	90	25	55	70	77	0.0	0.0	89.7	0.0	70.7	13.9	0.02171
	Channel (ditch)	342		11.90	5.24	1.09			Impervious	2	98	98	98	98	0.0	0.0	1.9	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	8	32	58	72	79	0.0	0.0	8.4	0.0			
	Pipe				0.00	0.00															
	Stream	1415			4.00	5.89	4.9	0.08													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
MAG-19-03		0	1314																		
	Overland	134		3.49	1.31	1.70			Forest (good cover)	32	25	55	70	77	0.0	20.7	11.8	0.0	67.1	28.1	0.04393
	Channel (ditch)	1181		3.16	2.66	7.40			Impervious	3	98	98	98	98	0.0	0.1	2.8	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	65	32	58	72	79	0.0	13.9	50.7	0.0			
	Pipe				0.00	0.00															
	Stream	839			4.00	3.49	7.6	0.13													
MAG-19-04		0	838																		
	Overland				0.00	0.00			Forest (good cover)	66	25	55	70	77	0.0	0.0	66.2	0.0	71.5	24.6	0.03840
	Channel (ditch)	838		7.84	4.23	3.30			Impervious	6	98	98	98	98	0.0	3.7	2.1	0.0			
	Paved	33		1.25	2.22	0.25			Woods-Grass: Good	28	32	58	72	79	0.0	5.1	22.9	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	2.1	0.04													
MAG-19-05		0	1179																		
	Overland	91		0.55	0.52	2.90			Forest (good cover)	40	25	55	70	77	0.0	0.6	37.5	2.3	73.1	42.6	0.06662
	Channel (ditch)	1089		4.09	3.04	5.98			Woods-Grass: Good	60	32	58	72	79	0.0	5.8	15.5	38.3			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1515			4.00	6.31	9.1	0.15													
MAG-19-06		0	677																		
	Overland				0.00	0.00			Forest (good cover)	70	25	55	70	77	0.0	0.3	69.2	0.6	71.1	40.7	0.06359
	Channel (ditch)	677		3.10	2.63	4.29			Impervious	1	98	98	98	98	0.0	1.0	0.0	0.0			
	Paved	40		2.13	2.91	0.23			Woods-Grass: Good	29	32	58	72	79	0.0	5.9	8.0	15.1			
	Pipe				0.00	0.00															
	Stream	1287			4.00	5.36	5.9	0.10													
MAG-20		0	469																		
	Overland	94		5.31	1.62	0.97			Forest (good cover)	100	25	55	70	77	0.0	19.5	80.5	0.0	67.1	32.2	0.05034
	Channel (ditch)	375		9.94	4.78	1.31															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	2455			4.00	10.23	7.5	0.13													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1679																		
MAG-21	Overland	89		0.59	0.54	2.76			Forest (good cover)	76	25	55	70	77	0.0	23.7	52.0	0.0	65.9	39.6	0.06184
	Channel (ditch)	1590		4.22	3.08	8.60			Woods-Grass: Good	24	32	58	72	79	0.0	7.5	16.8	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	674			4.00	2.81	8.5	0.14													
		0	1332																		
TR1-01	Overland				0.00	0.00			Commercial	41	89	92	94	95	0.0	4.3	37.0	0.0	78.5	23.6	0.03691
	Channel (ditch)	1332		1.61	1.89	11.77			Forest (good cover)	13	25	55	70	77	0.0	13.2	0.0	0.0			
	Paved	111		2.10	2.89	0.64			Residential 1 acre	45	51	68	79	84	0.0	31.7	13.8	0.0			
	Pipe				0.00	0.00															
	Stream	360			4.00	1.50	8.3	0.14													
		0	1295																		
TR1-02	Overland				0.00	0.00			Commercial	14	89	92	94	95	0.0	0.7	12.9	0.0	68.3	34.5	0.05388
	Channel (ditch)	1295		1.56	1.85	11.65			Forest (good cover)	5	25	55	70	77	0.0	5.2	0.0	0.0			
	Paved	87		5.88	4.86	0.30			Residential 1 acre	31	51	68	79	84	0.0	13.6	17.6	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	50	32	58	72	79	0.0	46.6	3.4	0.0			
	Stream	455			4.00	1.89	8.3	0.14													
		0	840																		
TR1-03	Overland	97		6.67	1.82	0.89			Forest (good cover)	97	25	55	70	77	0.0	47.8	49.0	0.0	63.1	26.7	0.04168
	Channel (ditch)	743		4.86	3.31	3.74			Residential 1 acre	3	51	68	79	84	0.0	0.0	3.2	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	803			4.00	3.35	4.8	0.08													
		0	2185																		
TR1-04	Overland	93		3.97	1.40	1.11			Forest (good cover)	60	25	55	70	77	0.0	14.2	45.5	0.0	71.1	35.5	0.05542
	Channel (ditch)	2092		3.46	2.79	12.52			Pasture: Good Condition	5	39	61	74	80	0.0	0.0	5.3	0.0			
	Paved				0.00	0.00			Residential 1 acre	35	51	68	79	84	0.0	0.8	34.2	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	8.2	0.14													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1490																		
TR1-04-01	Overland	91		2.02	1.00	1.52			Forest (good cover)	0	25	55	70	77	0.0	0.0	0.0	0.0	79.3	13.3	0.02086
	Channel (ditch)	1399		2.40	2.31	10.08			Residential 1 acre	100	51	68	79	84	0.0	0.0	94.7	5.3			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	7.0	0.12													
		0	792																		
TR1-05	Overland	91		0.86	0.65	2.33			Residential 1 acre	24	51	68	79	84	0.0	13.4	10.9	0.0	64.1	24.6	0.03848
	Channel (ditch)	701		7.46	4.13	2.83			Woods-Grass: Good	76	32	58	72	79	0.0	58.3	17.4	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	548			4.00	2.28	4.5	0.07													
		0	1722																		
TR1-05-01	Overland	77		0.01	0.08	16.20			Woods-Grass: Good	100	32	58	72	79	0.0	23.2	17.3	59.4	72.9	41.6	0.06495
	Channel (ditch)	1645		1.78	1.98	13.82															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	584			4.00	2.44	19.5	0.32													
		0	1079																		
TR1-05-02	Overland				0.00	0.00			Commercial	4	89	92	94	95	0.0	0.0	0.9	2.8	74.1	23.3	0.03634
	Channel (ditch)	1079		1.85	2.02	8.89			Woods-Grass: Good	96	32	58	72	79	0.0	1.2	74.1	21.1			
	Paved	105		1.04	2.03	0.86															
	Pipe				0.00	0.00															
	Stream	1264			4.00	5.27	9.0	0.15													
		0	1367																		
TR1-05-03	Overland				0.00	0.00			Commercial	39	89	92	94	95	0.0	1.3	1.1	37.0	84.1	34.2	0.05350
	Channel (ditch)	1367		0.96	1.45	15.74			Pasture: Good Condition	35	39	61	74	80	0.0	2.2	1.4	31.9			
	Paved	140		1.21	2.19	1.07			Woods-Grass: Good	25	32	58	72	79	0.0	4.7	0.0	20.6			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	10.1	0.17													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	398																		
TR1-06	Overland	94		1.47	0.85	1.85			Residential 1 acre	21	51	68	79	84	0.0	0.0	21.0	0.0	69.1	10.4	0.01630
	Channel (ditch)	304		11.40	5.12	0.99			Woods-Grass: Good	79	32	58	72	79	0.0	31.1	47.9	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	629			4.00	2.62	3.3	0.05													
		0	1127																		
TR1-07	Overland				0.00	0.00			Commercial	0	89	92	94	95	0.0	0.0	0.0	0.4	75.6	33.5	0.05235
	Channel (ditch)	1127		2.43	2.33	8.08			Residential 1 acre	26	51	68	79	84	0.0	0.4	25.1	1.0			
	Paved	116		1.03	2.01	0.96			Residential 2 acre	2	46	65	77	82	0.0	0.0	0.0	1.8			
	Pipe				0.00	0.00			Woods-Grass: Good	71	32	58	72	79	0.0	2.2	44.4	24.6			
	Stream	1412			4.00	5.89	9.0	0.15													
		0	1728																		
TR1-07-01	Overland	91		2.21	1.04	1.46			Commercial	1	89	92	94	95	0.0	0.0	0.0	1.0	71.8	23.1	0.03607
	Channel (ditch)	1636		2.04	2.13	12.82			Residential 2 acre	43	46	65	77	82	0.0	3.1	0.0	40.0			
	Paved				0.00	0.00			Woods-Grass: Good	56	32	58	72	79	0.0	36.9	5.8	13.1			
	Pipe				0.00	0.00															
	Stream	295			4.00	1.23	9.3	0.16													
		0	815																		
TR1-07-02	Overland	84		1.28	0.79	1.76			Woods-Grass: Good	100	32	58	72	79	0.0	100.0	0.0	0.0	58.0	32.7	0.05105
	Channel (ditch)	732		0.94	1.43	8.52															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.2	0.10													
		0	648																		
TR1-08	Overland	90		2.50	1.11	1.35			Residential 1 acre	51	51	68	79	84	0.0	0.0	7.0	44.2	76.3	26.0	0.04062
	Channel (ditch)	558		5.06	3.38	2.75			Residential 2 acre	0	46	65	77	82	0.0	0.1	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	49	32	58	72	79	0.0	17.8	15.9	15.0			
	Pipe				0.00	0.00															
	Stream	303			4.00	1.26	3.2	0.05													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1538																		
TR1-08-01	Overland	93		4.55	1.50	1.03			Residential 1 acre	26	51	68	79	84	0.0	0.0	0.0	26.0	80.1	15.1	0.02356
	Channel (ditch)	1446		2.99	2.58	9.33			Residential 2 acre	14	46	65	77	82	0.0	0.1	0.0	13.7			
	Paved				0.00	0.00			Woods-Grass: Good	60	32	58	72	79	0.0	2.8	0.0	57.4			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.2	0.10													
		0	1050																		
TR1-08-02	Overland	80		2.67	1.15	1.16			Forest (good cover)	1	25	55	70	77	0.0	1.0	0.2	0.0	67.1	8.8	0.01381
	Channel (ditch)	971		4.29	3.11	5.20			Residential 1 acre	15	51	68	79	84	0.0	0.0	0.0	15.2			
	Paved				0.00	0.00			Woods-Grass: Good	84	32	58	72	79	0.0	59.0	0.0	24.6			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.8	0.06													
		0	1221																		
TR1-09	Overland	92		1.24	0.78	1.96			Residential 1 acre	43	51	68	79	84	0.0	0.0	0.0	43.5	74.6	35.4	0.05537
	Channel (ditch)	1129		1.74	1.96	9.59			Woods-Grass: Good	57	32	58	72	79	0.0	31.4	0.0	25.1			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	885			4.00	3.69	9.1	0.15													
		0	1425																		
TR1-10	Overland	182		1.94	0.98	3.12			Residential 1 acre	12	51	68	79	84	0.0	0.0	0.0	12.0	64.5	24.6	0.03846
	Channel (ditch)	1242		2.87	2.53	8.18			Woods-Grass: Good	88	32	58	72	79	0.0	72.0	0.0	16.1			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.8	0.11													
		0	1279																		
TR1-11	Overland				0.00	0.00			Commercial	34	89	92	94	95	0.0	30.2	0.0	3.6	78.0	24.6	0.03840
	Channel (ditch)	1279		0.85	1.36	15.64			Impervious	13	98	98	98	98	0.0	2.1	0.0	10.5			
	Paved	449		2.77	3.32	2.25			Pasture: Good Condition	23	39	61	74	80	0.0	9.2	0.0	13.8			
	Pipe				0.00	0.00			Woods-Grass: Good	31	32	58	72	79	0.0	30.5	0.0	0.0			
	Stream				0.00	0.00	10.7	0.18													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	799																		
TR1-11-01	Overland	97		2.53	1.12	1.44			Commercial	2	89	92	94	95	0.0	1.8	0.0	0.0	65.7	6.6	0.01024
	Channel (ditch)	702		4.05	3.02	3.88			Pasture: Good Condition	2	39	61	74	80	0.0	2.0	0.0	0.0			
	Paved				0.00	0.00			Residential 1 acre	12	51	68	79	84	0.0	0.3	0.0	12.1			
	Pipe				0.00	0.00			Woods-Grass: Good	84	32	58	72	79	0.0	65.4	0.0	18.3			
	Stream				0.00	0.00	3.2	0.05													
		0	3840																		
TR1-12	Overland	87		2.25	1.05	1.38			Impervious	38	98	98	98	98	0.0	16.7	13.4	8.2	80.2	18.5	0.02887
	Channel (ditch)	3753		0.38	0.90	69.48			Pasture: Good Condition	61	39	61	74	80	0.0	31.0	12.7	17.6			
	Paved				0.00	0.00			Woods-Grass: Good	0	32	58	72	79	0.0	0.1	0.2	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	42.5	0.71													
		0	902																		
TR2-01	Overland	87		2.60	1.13	1.29			Forest (good cover)	54	25	55	70	77	0.0	21.3	33.1	0.0	67.0	17.0	0.02662
	Channel (ditch)	814		7.36	4.10	3.31			Residential 1 acre	46	51	68	79	84	0.0	35.8	9.7	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	398			4.00	1.66	3.8	0.06													
		0	1186																		
TR2-02	Overland	92		2.95	1.21	1.28			Commercial	22	89	92	94	95	0.0	18.4	3.9	0.0	72.6	20.0	0.03125
	Channel (ditch)	1094		4.17	3.06	5.95			Forest (good cover)	54	25	55	70	77	0.0	18.0	35.9	0.0			
	Paved	515		2.27	3.01	2.86			Pasture: Good Condition	12	39	61	74	80	0.0	5.0	7.1	0.0			
	Pipe				0.00	0.00			Residential 1 acre	12	51	68	79	84	0.0	4.6	7.0	0.0			
	Stream	398			4.00	1.66	7.0	0.12													
		0	1152																		
TR2-03	Overland	90		1.25	0.78	1.92			Commercial	1	89	92	94	95	0.0	0.0	0.7	0.0	63.8	16.2	0.02537
	Channel (ditch)	1061		4.03	3.01	5.88			Forest (good cover)	58	25	55	70	77	0.0	37.2	21.2	0.0			
	Paved				0.00	0.00			Pasture: Good Condition	33	39	61	74	80	0.0	25.0	7.6	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	8	61	75	83	87	0.0	0.0	8.2	0.2			
	Stream	456			4.00	1.90	5.8	0.10													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1010																		
TR2-03-01	Overland	99		1.00	0.70	2.37			Commercial	25	89	92	94	95	0.0	23.7	1.6	0.0	78.3	11.5	0.01793
	Channel (ditch)	911		1.99	2.10	7.22			Forest (good cover)	35	25	55	70	77	0.0	3.6	31.3	0.0			
	Paved				0.00	0.00			Pasture: Good Condition	11	39	61	74	80	0.0	1.9	9.4	0.0			
	Pipe				0.00	0.00			Residential 1 acre	2	51	68	79	84	0.0	0.9	0.9	0.0			
	Stream	508			4.00	2.12	7.0	0.12	Residential 1/4 acre	27	61	75	83	87	0.0	6.2	20.1	0.5			
		0	1071																		
TR2-03-02	Overland	90		0.89	0.66	2.27			Pasture: Good Condition	12	39	61	74	80	0.0	10.8	0.0	1.6	78.7	24.3	0.03798
	Channel (ditch)	981		2.56	2.39	6.85			Residential 1 acre	0	51	68	79	84	0.0	0.0	0.0	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	88	61	75	83	87	0.0	39.1	16.3	32.1			
	Pipe				0.00	0.00															
	Stream	426			4.00	1.77	6.5	0.11													
		0	685																		
TR2-04	Overland	94		1.18	0.76	2.06			Commercial	11	89	92	94	95	0.0	0.1	10.5	0.0	71.1	16.2	0.02526
	Channel (ditch)	591		4.73	3.27	3.01			Forest (good cover)	64	25	55	70	77	0.0	27.6	34.8	1.7			
	Paved				0.00	0.00			Pasture: Good Condition	8	39	61	74	80	0.0	1.4	6.8	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	17	61	75	83	87	0.0	0.0	12.9	4.2			
	Stream	253			4.00	1.05	3.7	0.06													
		0	849																		
TR2-04-01	Overland	91		0.18	0.29	5.20			Forest (good cover)	15	25	55	70	77	0.0	0.0	3.6	11.7	84.6	12.3	0.01915
	Channel (ditch)	758		2.43	2.33	5.43			Residential 1/4 acre	85	61	75	83	87	0.0	4.9	0.3	79.5			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	476			4.00	1.99	7.6	0.13													
		0	1673																		
TR2-04-02	Overland	95		1.93	0.97	1.63			Residential 1/4 acre	100	61	75	83	87	0.0	1.3	0.0	98.7	86.8	17.7	0.02766
	Channel (ditch)	1578		1.20	1.62	16.24															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	10.7	0.18													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	592																		
TR2-05	Overland	91		2.49	1.11	1.37			Forest (good cover)	32	25	55	70	77	0.0	6.9	0.0	24.7	77.2	14.6	0.02275
	Channel (ditch)	501		3.38	2.75	3.03			Residential 1/4 acre	68	61	75	83	87	0.0	40.4	5.5	22.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	769			4.00	3.20	4.6	0.08													
		0	1193																		
TR2-06	Overland	97		4.70	1.52	1.07			Forest (good cover)	19	25	55	70	77	0.0	7.3	0.0	11.8	83.2	23.1	0.03616
	Channel (ditch)	1096		1.67	1.92	9.52			Residential 1/4 acre	81	61	75	83	87	0.0	2.8	0.0	78.2			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	206			4.00	0.86	6.9	0.11													
		0	88																		
TR2-07	Overland	88		0.86	0.65	2.26			Pasture: Good Condition	38	39	61	74	80	0.0	8.6	0.0	29.3	79.3	36.7	0.05734
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	62	61	75	83	87	0.0	28.7	0.0	33.4			
	Paved	706		2.93	3.42	3.44															
	Pipe				0.00	0.00															
	Stream	1300			4.00	5.42	6.7	0.11													
		0	815																		
TR2-08	Overland	86		2.29	1.06	1.36			Pasture: Good Condition	50	39	61	74	80	0.0	0.0	0.0	49.6	83.5	9.0	0.01403
	Channel (ditch)	728		2.81	2.50	4.85			Residential 1/4 acre	50	61	75	83	87	0.0	0.0	0.0	50.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	247			4.00	1.03	4.3	0.07													
		0	314																		
TR2-09	Overland	105		2.53	1.12	1.57			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0	87.0	14.6	0.02280
	Channel (ditch)	209		4.08	3.03	1.15															
	Paved	1752		2.75	3.31	8.81															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.9	0.12													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1850																		
TR2-09-01	Overland	80		4.53	1.49	0.89			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0	87.0	14.8	0.02317
	Channel (ditch)	1771		2.40	2.31	12.77															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	8.2	0.14													
		0	360																		
TR2-10	Overland				0.00	0.00			Industrial	1	81	88	91	93	0.0	0.0	0.0	0.6	85.0	29.9	0.04673
	Channel (ditch)	360		2.53	2.37	2.53			Pasture: Good Condition	29	39	61	74	80	0.0	0.0	0.0	28.8			
	Paved	649		1.97	2.80	3.86			Residential 1/4 acre	71	61	75	83	87	0.0	0.0	0.0	70.6			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.8	0.06													
		0	917																		
TR2-10-01	Overland	134		1.10	0.73	3.03			Residential 1/4 acre	93	61	75	83	87	0.0	0.0	0.0	93.3	86.5	5.6	0.00873
	Channel (ditch)	783		3.42	2.77	4.71			Woods-Grass: Good	7	32	58	72	79	0.0	0.0	0.0	6.7			
	Paved	142		3.26	3.61	0.65															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	5.0	0.08													
		0	686																		
TR2-11	Overland	82		1.56	0.87	1.56			Industrial	5	81	88	91	93	0.0	0.0	0.0	4.5	83.9	37.7	0.05889
	Channel (ditch)	605		1.31	1.70	5.93			Residential 1/4 acre	95	61	75	83	87	0.0	27.9	0.0	67.4			
	Paved	1350		2.63	3.24	6.94			Woods-Grass: Good	0	32	58	72	79	0.0	0.1	0.0	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	8.7	0.14													
		0	1062																		
TR3-01	Overland	92		6.61	1.81	0.84			Commercial	0	89	92	94	95	0.0	0.0	0.0	0.0	64.9	49.6	0.07743
	Channel (ditch)	970		1.18	1.61	10.04			Forest (good cover)	8	25	55	70	77	0.0	7.7	0.0	0.0			
	Paved				0.00	0.00			Residential 1 acre	6	51	68	79	84	0.0	0.0	1.1	5.4			
	Pipe				0.00	0.00			Woods-Grass: Good	86	32	58	72	79	0.0	52.1	22.4	11.4			
	Stream	1336			4.00	5.57	9.9	0.16													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	2028																		
TR3-01-01	Overland	92		1.72	0.92	1.67			Forest (good cover)	0	25	55	70	77	0.0	0.0	0.0	0.0	59.6	53.9	0.08427
	Channel (ditch)	1936		1.75	1.97	16.41			Woods-Grass: Good	100	32	58	72	79	0.0	92.2	1.0	6.8			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	10.8	0.18													
		0	489																		
TR3-01-02	Overland	94		2.20	1.04	1.51			Commercial	21	89	92	94	95	0.0	14.3	0.0	6.7	73.6	33.7	0.05268
	Channel (ditch)	395		5.05	3.38	1.95			Impervious	5	98	98	98	98	0.0	0.0	0.0	4.9			
	Paved	658		1.34	2.30	4.76			Residential 1 acre	3	51	68	79	84	0.0	0.0	0.0	3.2			
	Pipe				0.00	0.00			Woods-Grass: Good	71	32	58	72	79	0.0	44.7	0.2	25.9			
	Stream				0.00	0.00	4.9	0.08													
		0	1028																		
TR3-02	Overland	94		1.23	0.78	2.03			Woods-Grass: Good	100	32	58	72	79	0.0	31.9	0.0	68.1	72.3	21.1	0.03297
	Channel (ditch)	934		7.03	4.00	3.89															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	664			4.00	2.77	5.2	0.09													
		0	1394																		
TR3-03	Overland	79		5.55	1.66	0.80			Woods-Grass: Good	100	32	58	72	79	0.0	26.0	0.0	74.0	73.5	15.3	0.02395
	Channel (ditch)	1315		5.91	3.66	5.99															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	523			4.00	2.18	5.4	0.09													
		0	1716																		
TR3-04	Overland	93		1.78	0.94	1.65			Forest (good cover)	18	25	55	70	77	0.0	17.3	0.0	0.3	58.0	54.2	0.08474
	Channel (ditch)	1623		1.13	1.58	17.18			Pasture: Good Condition	12	39	61	74	80	0.0	12.0	0.0	0.4			
	Paved				0.00	0.00			Woods-Grass: Good	70	32	58	72	79	0.0	70.1	0.0	0.0			
	Pipe				0.00	0.00															
	Stream	1899			4.00	7.91	16.0	0.27													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	648																		
TR3-04-01	Overland	81		1.16	0.76	1.78			Forest (good cover)	5	25	55	70	77	0.0	5.3	0.0	0.0	64.2	51.2	0.08006
	Channel (ditch)	567		6.14	3.74	2.53			Impervious	4	98	98	98	98	0.0	0.0	0.0	4.3			
	Paved				0.00	0.00			Woods-Grass: Good	90	32	58	72	79	0.0	67.6	2.3	20.5			
	Pipe				0.00	0.00															
	Stream	1525			4.00	6.35	6.4	0.11													
		0	1595																		
TR3-04-02	Overland	80		1.23	0.78	1.73			Woods-Grass: Good	100	32	58	72	79	0.0	16.3	32.3	51.3	73.3	24.2	0.03786
	Channel (ditch)	1515		3.51	2.80	9.00															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	601			4.00	2.50	7.9	0.13													
		0	697																		
TR3-04-03	Overland	94		3.81	1.37	1.15			Woods-Grass: Good	100	32	58	72	79	0.0	59.7	14.1	26.2	65.5	23.4	0.03662
	Channel (ditch)	603		6.03	3.70	2.72															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	503			4.00	2.09	3.6	0.06													
		0	1548																		
TR3-04-04	Overland	95		0.64	0.56	2.83			Forest (good cover)	14	25	55	70	77	0.0	14.0	0.0	0.0	57.8	28.0	0.04376
	Channel (ditch)	1453		1.45	1.78	13.58			Woods-Grass: Good	86	32	58	72	79	0.0	84.3	1.6	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	435			4.00	1.81	10.9	0.18													
		0	1967																		
TR3-04-05	Overland	90		3.37	1.29	1.16			Forest (good cover)	35	25	55	70	77	0.0	4.4	0.0	30.4	68.7	25.6	0.04004
	Channel (ditch)	1877		0.34	0.86	36.49			Pasture: Good Condition	63	39	61	74	80	0.0	48.7	0.0	14.6			
	Paved				0.00	0.00			Woods-Grass: Good	2	32	58	72	79	0.0	0.0	0.0	1.8			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	22.6	0.38													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	2656																		
TR3-04-06	Overland	82		5.94	1.71	0.80			Forest (good cover)	15	25	55	70	77	0.0	14.6	0.0	0.0	61.2	46.1	0.07210
	Channel (ditch)	2574		2.84	2.52	17.02			Pasture: Good Condition	85	39	61	74	80	0.0	79.9	0.0	5.5			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	10.7	0.18													
		0	2089																		
TR3-04-07	Overland	95		5.39	1.63	0.97			Forest (good cover)	25	25	55	70	77	0.0	25.3	0.0	0.0	59.5	19.7	0.03070
	Channel (ditch)	1995		2.16	2.19	15.16			Pasture: Good Condition	74	39	61	74	80	0.0	74.4	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	0	32	58	72	79	0.0	0.3	0.0	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	9.7	0.16													
		0	1534																		
TR3-04-08	Overland	69		0.92	0.67	1.72			Commercial	0	89	92	94	95	0.0	0.0	0.5	0.0	64.5	43.0	0.06712
	Channel (ditch)	1464		3.21	2.68	9.10			Forest (good cover)	15	25	55	70	77	0.0	15.3	0.0	0.0			
	Paved				0.00	0.00			Pasture: Good Condition	44	39	61	74	80	0.0	38.3	0.0	6.0			
	Pipe				0.00	0.00			Residential 1/2 acre	15	54	70	80	85	0.0	1.7	10.4	2.7			
	Stream				0.00	0.00	6.5	0.11	Woods-Grass: Good	25	32	58	72	79	0.0	18.3	4.0	2.7			
		0	976																		
TR3-04-09	Overland	96		5.12	1.59	1.00			Commercial	2	89	92	94	95	0.0	2.2	0.0	0.0	64.0	18.2	0.02847
	Channel (ditch)	881		3.85	2.94	4.99			Pasture: Good Condition	73	39	61	74	80	0.0	64.5	0.0	8.0			
	Paved				0.00	0.00			Woods-Grass: Good	25	32	58	72	79	0.0	18.3	0.0	7.1			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.6	0.06													
		0	777																		
TR3-04-10	Overland	88		1.22	0.77	1.90			Forest (good cover)	53	25	55	70	77	0.0	4.4	0.0	49.1	69.2	14.2	0.02218
	Channel (ditch)	689		7.21	4.05	2.83			Woods-Grass: Good	47	32	58	72	79	0.0	36.8	0.0	9.7			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	470			4.00	1.96	4.0	0.07													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1656																		
TR3-04-11	Overland	93		3.62	1.34	1.16			Commercial	9	89	92	94	95	0.0	2.7	0.0	6.0	69.4	28.2	0.04407
	Channel (ditch)	1563		3.75	2.90	8.97			Forest (good cover)	37	25	55	70	77	0.0	19.7	0.0	17.1			
	Paved				0.00	0.00			Pasture: Good Condition	5	39	61	74	80	0.0	5.3	0.0	0.0			
	Pipe				0.00	0.00			Residential 1 acre	5	51	68	79	84	0.0	1.3	0.0	3.5			
	Stream				0.00	0.00	6.1	0.10	Woods-Grass: Good	44	32	58	72	79	0.0	23.5	0.0	20.9			
		0	746																		
TR3-04-12	Overland	84		3.91	1.39	1.01			Commercial	5	89	92	94	95	0.0	0.0	2.7	2.2	70.4	38.0	0.05934
	Channel (ditch)	662		4.70	3.26	3.39			Forest (good cover)	6	25	55	70	77	0.0	6.2	0.0	0.0			
	Paved				0.00	0.00			Pasture: Good Condition	37	39	61	74	80	0.0	32.4	4.7	0.0			
	Pipe				0.00	0.00			Residential 1/2 acre	21	54	70	80	85	0.0	0.0	21.4	0.0			
	Stream	521			4.00	2.17	3.9	0.07	Woods-Grass: Good	30	32	58	72	79	0.0	7.1	7.1	16.1			
		0	1639																		
TR3-05	Overland	98		3.07	1.23	1.33			Forest (good cover)	25	25	55	70	77	0.0	25.0	0.0	0.0	59.0	36.1	0.05642
	Channel (ditch)	1541		4.54	3.20	8.03			Pasture: Good Condition	50	39	61	74	80	0.0	49.3	0.0	1.1			
	Paved				0.00	0.00			Woods-Grass: Good	25	32	58	72	79	0.0	24.6	0.0	0.0			
	Pipe				0.00	0.00															
	Stream	911			4.00	3.79	7.9	0.13													
		0	1432																		
TR3-05-01	Overland	139		2.70	1.15	2.01			Residential 2 acre	1	46	65	77	82	0.0	1.3	0.0	0.0	58.1	32.6	0.05089
	Channel (ditch)	1293		1.28	1.68	12.85			Woods-Grass: Good	99	32	58	72	79	0.0	98.7	0.0	0.0			
	Paved	926		3.99	4.00	3.86															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	11.2	0.19													
		0	1028																		
TR3-05-02	Overland	93		1.23	0.78	2.00			Forest (good cover)	30	25	55	70	77	0.0	22.0	4.0	3.6	59.5	49.4	0.07712
	Channel (ditch)	935		4.11	3.04	5.13			Woods-Grass: Good	70	32	58	72	79	0.0	63.3	6.7	0.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1264			4.00	5.26	7.4	0.12													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	2063																		
TR3-05-03	Overland	87		2.54	1.12	1.30			Forest (good cover)	15	25	55	70	77	0.0	8.3	6.5	0.0	58.9	26.7	0.04174
	Channel (ditch)	1976		2.02	2.11	15.58			Woods-Grass: Good	85	32	58	72	79	0.0	82.2	3.0	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	10.1	0.17													
		0	1523																		
TR3-05-04	Overland	87		3.35	1.29	1.13			Forest (good cover)	20	25	55	70	77	0.0	9.8	0.4	9.6	60.5	53.8	0.08408
	Channel (ditch)	1436		3.24	2.69	8.89			Residential 2 acre	2	46	65	77	82	0.0	1.7	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	79	32	58	72	79	0.0	74.3	1.1	3.1			
	Pipe				0.00	0.00															
	Stream	1145			4.00	4.77	8.9	0.15													
		0	1461																		
TR3-05-05	Overland	98		1.25	0.78	2.08			Forest (good cover)	29	25	55	70	77	0.0	8.7	0.0	19.9	62.0	41.9	0.06542
	Channel (ditch)	1363		2.84	2.52	9.03			Woods-Grass: Good	71	32	58	72	79	0.0	68.9	0.0	2.5			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	824			4.00	3.43	8.7	0.15													
		0	895																		
TR3-05-06	Overland	88		0.18	0.30	4.95			Forest (good cover)	40	25	55	70	77	0.0	13.8	0.0	26.4	65.4	32.6	0.05096
	Channel (ditch)	807		4.76	3.28	4.10			Woods-Grass: Good	60	32	58	72	79	0.0	46.4	0.0	13.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1086			4.00	4.52	8.1	0.14													
		0	933																		
TR3-05-07	Overland	86		1.63	0.89	1.60			Forest (good cover)	54	25	55	70	77	0.0	33.4	0.0	21.0	62.3	55.0	0.08595
	Channel (ditch)	847		2.63	2.42	5.83			Woods-Grass: Good	46	32	58	72	79	0.0	39.3	0.0	6.3			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	2524			4.00	10.52	10.8	0.18													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1076																		
TR3-05-08	Overland	93		4.86	1.55	0.99			Forest (good cover)	44	25	55	70	77	0.0	20.7	0.0	23.6	63.2	15.6	0.02442
	Channel (ditch)	983		3.10	2.64	6.22			Woods-Grass: Good	56	32	58	72	79	0.0	49.2	0.0	6.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	383			4.00	1.60	5.3	0.09													
		0	614																		
TR3-05-09	Overland	94		0.80	0.63	2.49			Forest (good cover)	56	25	55	70	77	0.0	6.2	0.0	49.6	73.7	25.0	0.03900
	Channel (ditch)	521		4.11	3.04	2.85			Woods-Grass: Good	44	32	58	72	79	0.0	13.5	0.0	30.7			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	612			4.00	2.55	4.7	0.08													
		0	1589																		
TR3-05-10	Overland	90		0.70	0.58	2.57			Forest (good cover)	26	25	55	70	77	0.0	7.5	0.0	18.8	76.5	27.7	0.04330
	Channel (ditch)	1499		1.65	1.91	13.09			Woods-Grass: Good	74	32	58	72	79	0.0	1.3	0.0	72.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	667			4.00	2.78	11.1	0.18													
		0	224																		
TR3-05-11	Overland	82		1.13	0.74	1.84			Forest (good cover)	52	25	55	70	77	0.0	29.9	0.0	22.1	63.7	48.3	0.07550
	Channel (ditch)	142		3.90	2.96	0.80			Impervious	5	98	98	98	98	0.0	2.7	0.0	2.6			
	Paved	1056		3.34	3.65	4.82			Woods-Grass: Good	43	32	58	72	79	0.0	41.3	0.0	1.5			
	Pipe				0.00	0.00															
	Stream	985			4.00	4.10	6.9	0.12													
		0	416																		
TR3-05-12	Overland	87		1.06	0.72	2.00			Forest (good cover)	45	25	55	70	77	0.0	16.7	0.0	28.3	70.1	19.4	0.03036
	Channel (ditch)	329		5.50	3.53	1.55			Impervious	6	98	98	98	98	0.0	4.6	0.0	0.9			
	Paved	306		6.13	4.96	1.03			Woods-Grass: Good	49	32	58	72	79	0.0	25.7	0.0	23.7			
	Pipe				0.00	0.00															
	Stream	785			4.00	3.27	4.7	0.08													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1433																		
TR3-05-13	Overland	94		2.40	1.09	1.45			Forest (good cover)	19	25	55	70	77	0.0	3.9	0.0	15.5	72.8	51.7	0.08071
	Channel (ditch)	1339		1.65	1.91	11.71			Impervious	1	98	98	98	98	0.0	0.5	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	80	32	58	72	79	0.0	24.2	0.0	56.0			
	Pipe				0.00	0.00															
	Stream	994			4.00	4.14	10.4	0.17													
		0	1038																		
TR3-06	Overland	83		18.13	3.00	0.46			Forest (good cover)	4	25	55	70	77	0.0	1.7	0.0	2.6	62.1	51.1	0.07992
	Channel (ditch)	954		4.85	3.31	4.80			Woods-Grass: Good	96	32	58	72	79	0.0	78.5	0.0	17.3			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1615			4.00	6.73	7.2	0.12													
		0	938																		
TR3-06-01	Overland	90		1.44	0.84	1.78			Forest (good cover)	55	25	55	70	77	0.0	37.5	0.0	17.3	63.7	26.2	0.04094
	Channel (ditch)	848		6.74	3.92	3.61			Pasture: Good Condition	27	39	61	74	80	0.0	20.3	0.0	6.8			
	Paved				0.00	0.00			Residential 1/2 acre	1	54	70	80	85	0.0	0.0	0.0	0.9			
	Pipe				0.00	0.00			Woods-Grass: Good	17	32	58	72	79	0.0	11.5	0.0	5.8			
	Stream	1340			4.00	5.59	6.6	0.11													
		0	1104																		
TR3-06-02	Overland	95		12.13	2.45	0.64			Forest (good cover)	36	25	55	70	77	0.0	5.6	0.0	30.3	75.1	20.7	0.03240
	Channel (ditch)	1009		3.93	2.97	5.65			Woods-Grass: Good	64	32	58	72	79	0.0	9.1	0.0	55.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	875			4.00	3.65	6.0	0.10													
		0	1292																		
TR3-06-03	Overland	89		0.79	0.62	2.38			Forest (good cover)	28	25	55	70	77	0.0	4.0	0.0	24.5	74.2	31.7	0.04958
	Channel (ditch)	1204		8.20	4.33	4.63			Residential 1/2 acre	16	54	70	80	85	0.0	14.6	0.0	1.8			
	Paved				0.00	0.00			Woods-Grass: Good	55	32	58	72	79	0.0	10.4	0.0	44.7			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.2	0.07													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1464																		
TR3-07	Overland	85		4.88	1.55	0.92			Residential 2 acre	7	46	65	77	82	0.0	6.9	0.0	0.0	58.5	49.5	0.07733
	Channel (ditch)	1379		2.67	2.44	9.41			Woods-Grass: Good	93	32	58	72	79	0.0	93.1	0.0	0.1			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	703			4.00	2.93	8.0	0.13													
		0	749																		
TR3-07-01	Overland	80		0.89	0.66	2.02			Residential 1 acre	21	51	68	79	84	0.0	2.0	4.7	13.9	73.3	26.8	0.04182
	Channel (ditch)	669		4.40	3.15	3.54			Residential 1/2 acre	6	54	70	80	85	0.0	3.1	0.0	2.8			
	Paved				0.00	0.00			Woods-Grass: Good	73	32	58	72	79	0.0	28.2	1.8	43.5			
	Pipe				0.00	0.00															
	Stream	492			4.00	2.05	4.6	0.08													
		0	1499																		
TR3-07-02	Overland	89		1.39	0.82	1.79			Residential 1/2 acre	66	54	70	80	85	0.0	10.1	0.0	55.7	80.0	10.7	0.01674
	Channel (ditch)	1410		5.46	3.52	6.68			Woods-Grass: Good	34	32	58	72	79	0.0	6.7	0.0	27.4			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	5.1	0.08													
		0	581																		
TR3-07-03	Overland				0.00	0.00			Forest (good cover)	17	25	55	70	77	0.0	2.1	0.0	14.4	73.2	29.4	0.04589
	Channel (ditch)	581		8.90	4.52	2.14			Residential 1/2 acre	15	54	70	80	85	0.0	14.9	0.0	0.2			
	Paved	68		1.23	2.21	0.52			Woods-Grass: Good	68	32	58	72	79	0.0	17.4	0.0	50.9			
	Pipe				0.00	0.00															
	Stream	983			4.00	4.09	4.1	0.07													
		0	885																		
TR3-08	Overland	84		1.11	0.74	1.91			Residential 2 acre	14	46	65	77	82	0.0	8.3	0.0	6.0	61.3	24.1	0.03773
	Channel (ditch)	801		5.19	3.43	3.89			Woods-Grass: Good	86	32	58	72	79	0.0	79.4	0.0	6.3			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	659			4.00	2.75	5.1	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	2254																		
TR3-09	Overland	93		4.49	1.49	1.04			Forest (good cover)	2	25	55	70	77	0.0	0.1	1.8	0.0	69.5	44.9	0.07013
	Channel (ditch)	2161		3.23	2.69	13.40			Residential 2 acre	1	46	65	77	82	0.0	0.0	0.0	0.6			
	Paved				0.00	0.00			Woods-Grass: Good	97	32	58	72	79	0.0	43.5	2.2	51.8			
	Pipe				0.00	0.00															
	Stream	530			4.00	2.21	10.0	0.17													
		0	1130																		
TR3-09-01	Overland	99		1.38	0.82	2.01			Impervious	3	98	98	98	98	0.0	0.0	0.0	3.1	65.5	28.5	0.04451
	Channel (ditch)	1031		4.77	3.28	5.23			Residential 2 acre	2	46	65	77	82	0.0	1.8	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	95	32	58	72	79	0.0	66.0	0.0	29.1			
	Pipe				0.00	0.00															
	Stream	337			4.00	1.40	5.2	0.09													
		0	1211																		
TR3-10	Overland	95		2.19	1.04	1.53			Forest (good cover)	37	25	55	70	77	0.0	11.8	9.1	16.2	74.5	27.6	0.04307
	Channel (ditch)	1116		5.37	3.49	5.33			Residential 1 acre	4	51	68	79	84	0.0	0.1	1.2	2.7			
	Paved				0.00	0.00			Residential 2 acre	1	46	65	77	82	0.0	0.0	0.0	0.6			
	Pipe				0.00	0.00			Woods-Grass: Good	58	32	58	72	79	0.0	2.4	2.8	52.9			
	Stream	118			4.00	0.49	4.4	0.07													
		0	879																		
TR3-11	Overland	94		0.32	0.39	4.00			Forest (good cover)	70	25	55	70	77	0.0	34.8	32.5	2.2	62.9	23.3	0.03643
	Channel (ditch)	785		5.33	3.47	3.76			Woods-Grass: Good	30	32	58	72	79	0.0	22.5	0.0	7.9			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	2002			4.00	8.34	9.7	0.16													
		0	456																		
TR3-11-01	Overland	97		1.19	0.76	2.11			Forest (good cover)	92	25	55	70	77	0.0	52.0	24.4	15.5	63.0	12.5	0.01957
	Channel (ditch)	359		9.51	4.67	1.28			Impervious	0	98	98	98	98	0.0	0.0	0.0	0.0			
	Paved				0.00	0.00			Residential 3/4 acre	1	53	69	80	85	0.0	1.4	0.0	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	7	32	58	72	79	0.0	3.3	2.9	0.7			
	Stream	1222			4.00	5.09	5.1	0.08													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	866																		
TR3-11-02	Overland	97		1.49	0.86	1.89			Forest (good cover)	26	25	55	70	77	0.0	11.1	14.7	0.0	69.7	32.6	0.05098
	Channel (ditch)	769		1.98	2.09	6.12			Impervious	2	98	98	98	98	0.0	0.0	1.9	0.0			
	Paved				0.00	0.00			Residential 3/4 acre	2	53	69	80	85	0.0	1.9	0.0	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	70	32	58	72	79	0.0	22.8	10.5	37.1			
	Stream	1008			4.00	4.20	7.3	0.12													
		0	1349																		
TR3-11-03	Overland	85		2.64	1.14	1.24			Woods-Grass: Good	100	32	58	72	79	0.0	9.0	0.0	91.0	77.1	12.6	0.01968
	Channel (ditch)	1264		1.74	1.96	10.74															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	7.2	0.12													
		0	810																		
TR3-11-04	Overland	84		0.23	0.33	4.19			Forest (good cover)	55	25	55	70	77	0.0	6.9	43.1	4.6	65.4	31.2	0.04869
	Channel (ditch)	726		4.11	3.04	3.98			Residential 3/4 acre	5	53	69	80	85	0.0	4.2	0.9	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	40	32	58	72	79	0.0	34.0	5.7	0.6			
	Pipe				0.00	0.00															
	Stream	1229			4.00	5.12	8.0	0.13													
		0	1297																		
TR3-11-05	Overland	95		1.26	0.79	2.02			Forest (good cover)	8	25	55	70	77	0.0	1.6	5.9	0.0	64.3	27.7	0.04325
	Channel (ditch)	1202		2.55	2.38	8.40			Impervious	4	98	98	98	98	0.0	0.0	3.9	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	89	32	58	72	79	0.0	67.6	5.0	15.9			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.3	0.10													
		0	425																		
TR3-11-06	Overland	98		2.38	1.08	1.52			Forest (good cover)	9	25	55	70	77	0.0	0.0	8.8	0.0	74.8	26.4	0.04122
	Channel (ditch)	326		3.60	2.84	1.91			Impervious	6	98	98	98	98	0.0	0.0	5.8	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	85	32	58	72	79	0.0	8.8	37.4	39.2			
	Pipe				0.00	0.00															
	Stream	453			4.00	1.89	3.2	0.05													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1436																		
TR3-11-07	Overland	93		0.90	0.66	2.34			Forest (good cover)	33	25	55	70	77	0.0	0.0	17.5	15.3	77.0	31.9	0.04989
	Channel (ditch)	1343		2.21	2.22	10.09			Woods-Grass: Good	67	32	58	72	79	0.0	0.0	2.1	65.1			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	772			4.00	3.22	9.4	0.16													
		0	1291																		
TR3-11-08	Overland	90		3.08	1.23	1.22			Woods-Grass: Good	100	32	58	72	79	0.0	39.7	5.1	55.2	70.3	50.4	0.07871
	Channel (ditch)	1202		3.64	2.86	7.00															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1226			4.00	5.11	8.0	0.13													
		0	1512																		
TR3-11-09	Overland	95		3.85	1.38	1.14			Woods-Grass: Good	100	32	58	72	79	0.0	16.4	0.0	83.6	75.6	24.4	0.03806
	Channel (ditch)	1417		2.08	2.15	10.99															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	310			4.00	1.29	8.1	0.13													
		0	1073																		
TR3-11-10	Overland	89		2.51	1.11	1.34			Forest (good cover)	51	25	55	70	77	0.0	15.9	24.8	10.2	64.5	52.1	0.08143
	Channel (ditch)	984		2.40	2.31	7.09			Residential 1 acre	1	51	68	79	84	0.0	0.9	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	48	32	58	72	79	0.0	36.4	6.9	4.9			
	Pipe				0.00	0.00															
	Stream	1832			4.00	7.63	9.6	0.16													
		0	585																		
TR3-12	Overland	93		1.00	0.70	2.23			Forest (good cover)	43	25	55	70	77	0.0	14.9	27.6	0.0	63.4	44.7	0.06989
	Channel (ditch)	491		5.34	3.48	2.35			Impervious	0	98	98	98	98	0.0	0.0	0.0	0.0			
	Paved				0.00	0.00			Woods-Grass: Good	57	32	58	72	79	0.0	42.7	8.6	6.2			
	Pipe				0.00	0.00															
	Stream	1838			4.00	7.66	7.3	0.12													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1143																		
TR3-12-01	Overland	98		1.08	0.73	2.24			Impervious	3	98	98	98	98	0.0	0.0	3.4	0.0	74.0	25.9	0.04052
	Channel (ditch)	1045		2.10	2.16	8.07			Woods-Grass: Good	97	32	58	72	79	0.0	25.3	4.3	67.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.2	0.10													
		0	1251																		
TR3-12-02	Overland	92		1.81	0.94	1.63			Forest (good cover)	12	25	55	70	77	0.0	0.0	8.1	3.7	65.0	31.3	0.04896
	Channel (ditch)	1159		4.53	3.20	6.04			Impervious	0	98	98	98	98	0.0	0.2	0.0	0.1			
	Paved				0.00	0.00			Woods-Grass: Good	88	32	58	72	79	0.0	62.5	2.0	23.4			
	Pipe				0.00	0.00															
	Stream	698			4.00	2.91	6.3	0.11													
		0	1493																		
TR3-12-03	Overland	84		1.61	0.89	1.58			Impervious	6	98	98	98	98	0.0	0.0	0.0	5.9	68.0	46.2	0.07225
	Channel (ditch)	1408		2.69	2.45	9.58			Woods-Grass: Good	94	32	58	72	79	0.0	57.9	0.0	36.2			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	736			4.00	3.07	8.5	0.14													
		0	738																		
TR3-12-04	Overland	94		5.11	1.59	0.98			Woods-Grass: Good	100	32	58	72	79	0.0	15.7	0.0	84.3	75.7	20.8	0.03243
	Channel (ditch)	644		3.55	2.82	3.81															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	874			4.00	3.64	5.1	0.08													
		0	1509																		
TR3-12-05	Overland	91		2.17	1.03	1.47			Woods-Grass: Good	100	32	58	72	79	0.0	10.4	0.0	89.6	76.8	18.6	0.02899
	Channel (ditch)	1418		4.21	3.08	7.68															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	5.5	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	921																		
TR3-12-06	Overland	89		1.58	0.88	1.69			Woods-Grass: Good	100	32	58	72	79	0.0	80.6	0.0	19.4	62.1	28.5	0.04446
	Channel (ditch)	832		3.61	2.85	4.87															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	337			4.00	1.40	4.8	0.08													
		0	1470																		
TR3-13	Overland	93		7.07	1.87	0.83			Forest (good cover)	18	25	55	70	77	0.0	0.0	5.1	12.8	77.9	40.1	0.06264
	Channel (ditch)	1378		2.71	2.46	9.33			Woods-Grass: Good	82	32	58	72	79	0.0	1.3	2.2	78.6			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1201			4.00	5.00	9.1	0.15													
		0	1328																		
TR3-14	Overland	93		7.83	1.97	0.79			Forest (good cover)	4	25	55	70	77	0.0	0.0	0.0	4.0	77.4	30.5	0.04767
	Channel (ditch)	1235		4.68	3.25	6.33			Woods-Grass: Good	96	32	58	72	79	0.0	7.2	0.0	88.8			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	716			4.00	2.98	6.1	0.10													
		0	1238																		
TR3-15	Overland	79		1.38	0.82	1.60			Woods-Grass: Good	100	32	58	72	79	0.0	74.7	0.0	25.3	63.3	36.7	0.05741
	Channel (ditch)	1159		2.07	2.14	9.02															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	782			4.00	3.26	8.3	0.14													
		0	382																		
TR3-16	Overland	88		1.98	0.99	1.48			Woods-Grass: Good	100	32	58	72	79	0.0	10.5	0.0	89.5	76.8	18.9	0.02959
	Channel (ditch)	294		6.36	3.80	1.29															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	105			4.00	0.44	1.9	0.03													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	258																		
TR4-01	Overland	100		3.51	1.32	1.27			Commercial	20	89	92	94	95	0.0	19.6	0.0	0.0	78.3	14.9	0.02328
	Channel (ditch)	158		3.39	2.76	0.96			Residential 1/4 acre	80	61	75	83	87	0.0	80.4	0.0	0.0			
	Paved	1253		1.61	2.53	8.25															
	Pipe				0.00	0.00															
	Stream	252			4.00	1.05	6.9	0.12													
		0	1425																		
TR4-02	Overland	71		1.94	0.98	1.22			Commercial	22	89	92	94	95	0.0	22.5	0.0	0.0	78.8	10.6	0.01649
	Channel (ditch)	1354		1.65	1.91	11.81			Lawns, etc, (good grass)	0	39	61	74	80	0.0	0.0	0.0	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	78	61	75	83	87	0.0	77.5	0.0	0.0			
	Pipe				0.00	0.00															
	Stream	86			4.00	0.36	8.0	0.13													
		0	921																		
TR4-02-01	Overland				0.00	0.00			Commercial	100	89	92	94	95	0.0	13.5	86.5	0.0	93.7	2.9	0.00447
	Channel (ditch)	921		1.95	2.08	7.38															
	Paved	175		3.93	3.96	0.74															
	Pipe				0.00	0.00															
	Stream	190			4.00	0.79	5.3	0.09													
		0	741																		
TR4-03	Overland	94		0.62	0.55	2.86			Commercial	7	89	92	94	95	0.0	2.6	4.4	0.0	75.7	49.0	0.07658
	Channel (ditch)	647		2.61	2.41	4.47			Residential 1/4 acre	79	61	75	83	87	0.0	59.2	19.3	0.0			
	Paved	106		4.88	4.42	0.40			Woods-Grass: Good	15	32	58	72	79	0.0	11.7	2.9	0.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.6	0.08													
		0	1816																		
TR4-04	Overland	96		2.57	1.12	1.42			Commercial	7	89	92	94	95	0.0	0.0	4.6	2.6	77.2	45.9	0.07170
	Channel (ditch)	1720		2.73	2.47	11.63			Residential 1 acre	36	51	68	79	84	0.0	0.1	36.2	0.2			
	Paved				0.00	0.00			Residential 1/4 acre	0	61	75	83	87	0.0	0.0	0.3	0.0			
	Pipe				0.00	0.00			Woods-Grass: Good	56	32	58	72	79	0.0	5.4	24.7	25.9			
	Stream	602			4.00	2.51	9.3	0.16													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	2563																		
TR4-04-01	Overland	70		1.56	0.87	1.34			Commercial	2	89	92	94	95	0.0	0.0	0.0	2.2	81.7	16.2	0.02531
	Channel (ditch)	2493		1.76	1.97	21.09			Pasture: Good Condition	1	39	61	74	80	0.0	0.0	0.0	1.2			
	Paved				0.00	0.00			Residential 1/4 acre	75	61	75	83	87	0.0	0.0	52.0	22.6			
	Pipe				0.00	0.00			Woods-Grass: Good	22	32	58	72	79	0.0	0.0	22.0	0.0			
	Stream				0.00	0.00	13.5	0.22													
		0	2037																		
TR4-05	Overland	95		1.17	0.76	2.10			Residential 1/4 acre	3	61	75	83	87	0.0	0.0	2.9	0.0	71.8	44.9	0.07022
	Channel (ditch)	1942		3.59	2.84	11.39			Woods-Grass: Good	97	32	58	72	79	0.0	17.5	51.4	28.2			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	331			4.00	1.38	8.9	0.15													
		0	1264																		
TR4-06	Overland	95		1.01	0.70	2.24			Impervious	13	98	98	98	98	0.0	0.0	12.8	0.5	78.9	38.7	0.06053
	Channel (ditch)	1170		1.95	2.08	9.37			Residential 1/4 acre	11	61	75	83	87	0.0	0.0	8.7	2.7			
	Paved				0.00	0.00			Woods-Grass: Good	75	32	58	72	79	0.0	2.9	36.4	36.0			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	7.0	0.12													
		0	417																		
TR4-07	Overland	46		2.29	1.06	0.72			Commercial	2	89	92	94	95	0.0	0.0	0.0	2.4	84.3	53.4	0.08348
	Channel (ditch)	371		2.22	2.22	2.78			Impervious	3	98	98	98	98	0.0	0.0	3.4	0.0			
	Paved	1302		1.09	2.08	10.44			Pasture: Good Condition	9	39	61	74	80	0.0	0.0	0.0	9.3			
	Pipe				0.00	0.00			Residential 1/4 acre	74	61	75	83	87	0.0	3.3	10.4	59.8			
	Stream				0.00	0.00	8.4	0.14	Woods-Grass: Good	11	32	58	72	79	0.0	1.6	7.5	2.3			
		0	125																		
TR4-08	Overland	125		0.14	0.26	8.15			Residential 1/4 acre	25	61	75	83	87	0.0	0.0	0.0	25.0	81.0	19.4	0.03028
	Channel (ditch)				0.00	0.00			Woods-Grass: Good	75	32	58	72	79	0.0	0.0	0.5	74.5			
	Paved	145		1.65	2.56	0.94															
	Pipe				0.00	0.00															
	Stream	884			4.00	3.68	7.7	0.13													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	538																		
TRA-01	Overland	100		2.67	1.15	1.45			Forest (good cover)	55	25	55	70	77	0.0	35.5	19.7	0.0	64.1	4.5	0.00708
	Channel (ditch)	438		9.09	4.56	1.60			Residential 1 acre	45	51	68	79	84	0.0	42.1	2.6	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	420			4.00	1.75	2.9	0.05													
		0	860																		
TRA-02	Overland	96		1.32	0.81	1.99			Forest (good cover)	37	25	55	70	77	0.0	7.4	29.5	0.0	74.7	14.6	0.02278
	Channel (ditch)	764		4.57	3.21	3.97			Pasture: Good Condition	1	39	61	74	80	0.0	0.8	0.0	0.0			
	Paved				0.00	0.00			Residential 1 acre	30	51	68	79	84	0.0	0.3	29.3	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	32	61	75	83	87	0.0	12.3	20.1	0.0			
	Stream	580			4.00	2.42	5.0	0.08													
		0	627																		
TRA-03	Overland				0.00	0.00			Commercial	4	89	92	94	95	0.0	3.9	0.0	0.0	80.5	16.2	0.02532
	Channel (ditch)	627		2.89	2.54	4.11			Residential 1 acre	43	51	68	79	84	0.0	7.1	35.8	0.0			
	Paved	113		2.28	3.01	0.63			Residential 1/4 acre	53	61	75	83	87	0.0	3.9	49.3	0.0			
	Pipe				0.00	0.00															
	Stream	1063			4.00	4.43	5.5	0.09													
		0	559																		
TRA-03-01	Overland	102		1.38	0.82	2.06			Residential 1 acre	83	51	68	79	84	0.0	28.6	26.0	28.6	75.3	14.4	0.02251
	Channel (ditch)	458		2.22	2.22	3.43			Woods-Grass: Good	17	32	58	72	79	0.0	8.7	2.3	5.8			
	Paved	321		2.00	2.82	1.90															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.4	0.07													
		0	1095																		
TRA-04	Overland	86		1.59	0.88	1.61			Residential 1 acre	100	51	68	79	84	0.0	46.9	21.3	31.7	75.4	11.7	0.01828
	Channel (ditch)	1009		2.62	2.42	6.96															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	5.1	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	292																		
TRA-05	Overland	73		2.91	1.20	1.01			Commercial	44	89	92	94	95	0.0	27.4	0.0	16.1	83.0	16.6	0.02597
	Channel (ditch)	219		1.94	2.07	1.76			Pasture: Good Condition	13	39	61	74	80	0.0	0.0	0.0	13.4			
	Paved	210		4.22	4.11	0.85			Residential 1 acre	24	51	68	79	84	0.0	14.2	9.9	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	8	61	75	83	87	0.0	7.7	0.0	0.0			
	Stream				0.00	0.00	2.2	0.04	Woods-Grass: Good	11	32	58	72	79	0.0	2.1	0.0	9.3			
		0	402																		
TRA-06	Overland	86		2.21	1.04	1.38			Commercial	57	89	92	94	95	0.0	17.3	0.0	39.4	83.3	30.2	0.04715
	Channel (ditch)	316		11.03	5.04	1.05			Residential 1 acre	33	51	68	79	84	0.0	24.3	0.0	8.9			
	Paved	947		2.12	2.91	5.43			Woods-Grass: Good	10	32	58	72	79	0.0	9.5	0.0	0.5			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.7	0.08													
		0	2219																		
TRB-01	Overland	95		0.36	0.42	3.81			Commercial	10	89	92	94	95	0.0	2.8	7.1	0.0	77.5	34.3	0.05354
	Channel (ditch)	2124		1.59	1.87	18.90			Forest (good cover)	9	25	55	70	77	0.0	4.1	4.6	0.0			
	Paved				0.00	0.00			Pasture: Good Condition	14	39	61	74	80	0.0	11.8	1.9	0.0			
	Pipe				0.00	0.00			Residential 1 acre	2	51	68	79	84	0.0	1.6	0.0	0.0			
	Stream	700			4.00	2.92	15.4	0.26	Residential 1/4 acre	66	61	75	83	87	0.0	22.3	43.7	0.0			
		0	561																		
TRB-02	Overland	89		0.75	0.61	2.46			Commercial	5	89	92	94	95	0.0	5.1	0.0	0.0	76.2	10.0	0.01569
	Channel (ditch)	472		1.59	1.88	4.19			Residential 1 acre	56	51	68	79	84	0.0	29.7	26.4	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	39	61	75	83	87	0.0	22.3	16.4	0.0			
	Pipe				0.00	0.00															
	Stream	602			4.00	2.51	5.5	0.09													
		0	824																		
TRB-03	Overland	95		1.43	0.84	1.90			Commercial	0	89	92	94	95	0.0	0.2	0.0	0.0	73.5	24.0	0.03749
	Channel (ditch)	729		2.01	2.11	5.76			Residential 1 acre	28	51	68	79	84	0.0	24.4	3.8	0.0			
	Paved				0.00	0.00			Residential 1/4 acre	72	61	75	83	87	0.0	71.6	0.0	0.0			
	Pipe				0.00	0.00															
	Stream	191			4.00	0.80	5.1	0.08													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
TRB-04		0	2569																93.0	11.4	0.01782
	Overland				0.00	0.00			Commercial	89	89	92	94	95	0.0	0.2	29.7	59.5			
	Channel (ditch)	2569		2.46	2.34	18.28			Residential 1/4 acre	11	61	75	83	87	0.0	7.2	0.0	3.3			
	Paved	45		0.68	1.64	0.46															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	11.2	0.19													
TRB-04-01		0	1082																85.6	10.2	0.01593
	Overland	68		2.33	1.07	1.06			Commercial	24	89	92	94	95	0.0	0.0	0.0	23.6			
	Channel (ditch)	1014		0.64	1.17	14.39			Residential 1/4 acre	76	61	75	83	87	0.0	27.4	0.0	49.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	9.3	0.15													
TRB-05		0	1661																87.8	22.7	0.03541
	Overland	86		2.57	1.13	1.27			Commercial	54	89	92	94	95	0.0	5.2	0.1	48.5			
	Channel (ditch)	1575		2.71	2.46	10.67			Pasture: Good Condition	8	39	61	74	80	0.0	0.0	0.0	8.0			
	Paved				0.00	0.00			Residential 1 acre	20	51	68	79	84	0.0	0.0	0.0	20.2			
	Pipe				0.00	0.00			Woods-Grass: Good	18	32	58	72	79	0.0	3.5	0.0	14.5			
	Stream				0.00	0.00	7.2	0.12													
TRC-01		0	606																70.4	18.4	0.02881
	Overland	93		0.81	0.63	2.47			Commercial	0	89	92	94	95	0.0	0.0	0.0	0.0			
	Channel (ditch)	513		2.60	2.41	3.55			Forest (good cover)	26	25	55	70	77	0.0	7.9	17.6	0.6			
	Paved				0.00	0.00			Pasture: Good Condition	44	39	61	74	80	0.0	29.9	12.7	1.4			
	Pipe				0.00	0.00			Residential 1/4 acre	30	61	75	83	87	0.0	11.1	5.5	13.3			
	Stream	1119			4.00	4.66	6.4	0.11													
TRC-02		0	695																83.8	24.5	0.03832
	Overland	94		1.71	0.92	1.71			Residential 1/4 acre	100	61	75	83	87	0.0	26.3	0.7	73.0			
	Channel (ditch)	601		2.59	2.40	4.17															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	803			4.00	3.34	5.5	0.09													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1356																		
TRC-03	Overland	91		0.89	0.66	2.30			Pasture: Good Condition	49	39	61	74	80	0.0	41.7	0.0	7.7	75.2	22.5	0.03511
	Channel (ditch)	1265		2.61	2.41	8.74			Residential 1/4 acre	51	61	75	83	87	0.0	3.7	0.0	46.8			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	290			4.00	1.21	7.3	0.12													
		0	538																		
TRC-03-01	Overland				0.00	0.00			Commercial	15	89	92	94	95	0.0	0.0	1.5	13.1	80.4	26.3	0.04112
	Channel (ditch)	538		3.70	2.88	3.11			Pasture: Good Condition	14	39	61	74	80	0.0	14.2	0.0	0.0			
	Paved	240		2.81	3.35	1.19			Residential 1/4 acre	71	61	75	83	87	0.0	33.7	0.0	37.6			
	Pipe				0.00	0.00															
	Stream				0.00	0.00	2.6	0.04													
		0	941																		
TRC-03-02	Overland	74		0.20	0.31	3.90			Residential 1/4 acre	100	61	75	83	87	0.0	53.1	0.0	46.9	80.6	3.7	0.00576
	Channel (ditch)	868		1.91	2.06	7.03															
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.6	0.11													
		0	647																		
TRC-04	Overland				0.00	0.00			Commercial	5	89	92	94	95	0.0	0.0	3.3	1.7	72.2	44.3	0.06915
	Channel (ditch)	647		2.60	2.41	4.48			Pasture: Good Condition	44	39	61	74	80	0.0	44.3	0.0	0.0			
	Paved	433		1.60	2.52	2.86			Residential 1/4 acre	47	61	75	83	87	0.0	24.7	3.2	19.5			
	Pipe				0.00	0.00			Woods-Grass: Good	3	32	58	72	79	0.0	1.4	0.0	1.9			
	Stream				0.00	0.00	4.4	0.07													
		0	664																		
TRC-04-01	Overland				0.00	0.00			Commercial	40	89	92	94	95	0.0	7.2	1.9	30.5	74.1	21.3	0.03326
	Channel (ditch)	664		3.29	2.72	4.07			Pasture: Good Condition	6	39	61	74	80	0.0	6.3	0.0	0.0			
	Paved	744		1.18	2.16	5.74			Residential 1 acre	2	51	68	79	84	0.0	1.6	0.0	0.0			
	Pipe				0.00	0.00			Residential 1/2 acre	0	54	70	80	85	0.0	0.0	0.0	0.0			
	Stream				0.00	0.00	5.9	0.10	Residential 1/4 acre	1	61	75	83	87	0.0	0.7	0.0	0.0			
									Woods-Grass: Good	52	32	58	72	79	0.0	46.1	0.0	5.7			

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1000																		
TRC-05	Overland	92		2.12	1.02	1.50			Commercial	25	89	92	94	95	0.0	14.3	0.0	10.3	75.6	20.4	0.03182
	Channel (ditch)	908		4.22	3.08	4.91			Pasture: Good Condition	43	39	61	74	80	0.0	41.6	0.0	1.3			
	Paved				0.00	0.00			Residential 1/2 acre	0	54	70	80	85	0.0	0.0	0.0	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	32	61	75	83	87	0.0	17.1	0.0	15.4			
	Stream	495			4.00	2.06	5.1	0.08													
		0	1127																		
TRC-06	Overland	92		1.47	0.85	1.80			Commercial	31	89	92	94	95	0.0	9.0	0.0	22.5	77.1	30.8	0.04807
	Channel (ditch)	1036		2.25	2.24	7.72			Pasture: Good Condition	26	39	61	74	80	0.0	26.1	0.0	0.1			
	Paved				0.00	0.00			Residential 1/2 acre	10	54	70	80	85	0.0	9.7	0.0	0.0			
	Pipe				0.00	0.00			Residential 1/4 acre	14	61	75	83	87	0.0	0.0	0.0	13.8			
	Stream	463			4.00	1.93	6.9	0.11	Woods-Grass: Good	19	32	58	72	79	0.0	10.3	0.0	8.6			
		0	877																		
WEW-01	Overland	95		3.35	1.28	1.23			Forest (good cover)	91	25	55	70	77	0.0	66.3	24.5	0.0	61.3	32.6	0.05094
	Channel (ditch)	782		3.94	2.98	4.38			Residential 1/4 acre	9	61	75	83	87	0.0	0.0	9.3	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1247			4.00	5.20	6.5	0.11													
		0	970																		
WEW-02	Overland				0.00	0.00			Forest (good cover)	78	25	55	70	77	0.0	24.2	53.8	0.0	69.2	5.0	0.00785
	Channel (ditch)	970		2.30	2.26	7.15			Residential 1/4 acre	22	61	75	83	87	0.0	0.0	22.0	0.0			
	Paved	92		6.49	5.10	0.30															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.5	0.07													
		0	1690																		
WEW-03	Overland	84		3.18	1.25	1.12			Forest (good cover)	22	25	55	70	77	0.0	12.3	5.6	3.9	81.0	35.4	0.05528
	Channel (ditch)	1606		2.25	2.24	11.97			Industrial	23	81	88	91	93	0.0	9.7	1.1	12.1			
	Paved				0.00	0.00			Residential 1/4 acre	55	61	75	83	87	0.0	1.8	34.8	18.7			
	Pipe				0.00	0.00															
	Stream	384			4.00	1.60	8.8	0.15													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	360																		
WEW-04	Overland				0.00	0.00			Industrial	30	81	88	91	93	0.0	1.4	0.0	28.3	89.0	20.4	0.03193
	Channel (ditch)	360		5.97	3.68	1.63			Residential 1/4 acre	52	61	75	83	87	0.0	1.8	11.6	38.2			
	Paved	107		4.36	4.18	0.43			Residential 1/8 acre	19	77	85	90	92	0.0	0.0	0.0	18.6			
	Pipe	965		1.62	4.00	4.02															
	Stream	174			4.00	0.72	4.1	0.07													
		0	222																		
WEW-05	Overland	83		9.58	2.18	0.63			Commercial	1	89	92	94	95	0.0	0.0	0.0	0.5	89.5	7.4	0.01164
	Channel (ditch)	139		9.89	4.76	0.49			Industrial	10	81	88	91	93	0.0	0.0	0.0	9.8			
	Paved	364		2.24	2.99	2.03			Residential 1/4 acre	53	61	75	83	87	0.0	0.0	0.0	53.2			
	Pipe	42		0.36	4.00	0.18			Residential 1/8 acre	37	77	85	90	92	0.0	0.0	0.0	36.5			
	Stream				0.00	0.00	2.0	0.03													
		0	852																		
WEW-05-01	Overland				0.00	0.00			Commercial	11	89	92	94	95	0.0	0.0	0.0	11.3	84.3	24.1	0.03770
	Channel (ditch)	852		1.19	1.61	8.79			Residential 1/4 acre	89	61	75	83	87	0.0	19.9	29.5	39.3			
	Paved	698		5.14	4.54	2.56															
	Pipe	319		1.82	4.00	1.33															
	Stream				0.00	0.00	7.6	0.13													
		0	84																		
WEW-05-02	Overland	84		1.58	0.88	1.59			Commercial	6	89	92	94	95	0.0	0.0	0.0	5.7	83.9	23.9	0.03737
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	94	61	75	83	87	0.0	30.0	0.0	64.3			
	Paved	770		1.70	2.60	4.93															
	Pipe				0.00	0.00															
	Stream	503			4.00	2.09	5.2	0.09													
		0	737																		
WEW-06	Overland	91		2.35	1.08	1.41			Commercial	35	89	92	94	95	0.0	0.0	0.0	34.5	88.8	15.6	0.02439
	Channel (ditch)	647		2.30	2.26	4.77			Pasture: Good Condition	16	39	61	74	80	0.0	0.0	0.0	16.4			
	Paved	68		1.29	2.26	0.50			Residential 1/4 acre	46	61	75	83	87	0.0	0.0	0.0	45.9			
	Pipe	89		3.18	4.00	0.37			Residential 1/8 acre	3	77	85	90	92	0.0	0.0	0.0	3.2			
	Stream	709			4.00	2.95	6.0	0.10													

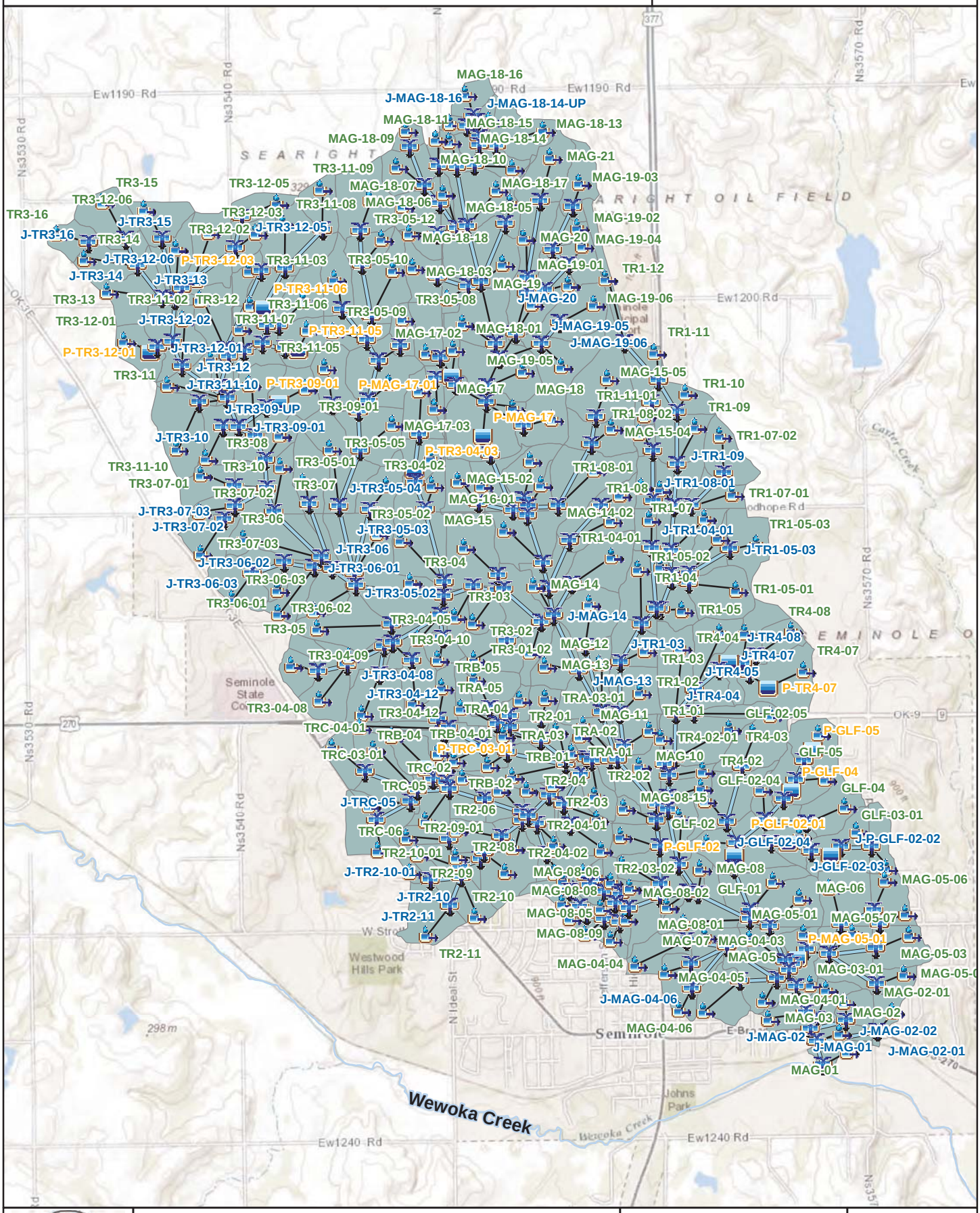
Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1613																		
WEW-06-01	Overland	93		1.49	0.85	1.82			Commercial	5	89	92	94	95	0.0	1.7	0.0	3.6	83.2	19.2	0.03005
	Channel (ditch)	1519		2.47	2.34	10.80			Industrial	30	81	88	91	93	0.0	12.1	0.0	17.9			
	Paved				0.00	0.00			Pasture: Good Condition	48	39	61	74	80	0.0	15.3	0.0	32.5			
	Pipe				0.00	0.00			Residential 1/8 acre	17	77	85	90	92	0.0	0.0	0.0	16.9			
	Stream	680			4.00	2.83	9.3	0.15													
		0	0																		
WEW-07	Overland				0.00	0.00			Commercial	42	89	92	94	95	0.0	0.0	0.0	42.0	86.5	8.3	0.01302
	Channel (ditch)				0.00	0.00			Pasture: Good Condition	55	39	61	74	80	0.0	0.0	0.0	54.9			
	Paved	749		4.42	4.21	2.97			Residential 1/4 acre	3	61	75	83	87	0.0	0.0	0.0	3.1			
	Pipe				0.00	0.00															
	Stream	623			4.00	2.59	3.3	0.06													
		0	350																		
WEW-07-01	Overland				0.00	0.00			Commercial	48	89	92	94	95	0.0	0.0	0.0	48.4	87.4	1.9	0.00302
	Channel (ditch)	350		4.55	3.20	1.82			Pasture: Good Condition	50	39	61	74	80	0.0	0.0	0.0	50.1			
	Paved	135		3.00	3.46	0.65			Residential 1/4 acre	1	61	75	83	87	0.0	0.0	0.0	1.4			
	Pipe	59		0.85	4.00	0.25															
	Stream				0.00	0.00	1.6	0.03													
		0	102																		
WEW-07-02	Overland	102		1.10	0.73	2.32			Commercial	0	89	92	94	95	0.0	0.0	0.0	0.1	87.0	11.5	0.01793
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	99.9			
	Paved	999		1.16	2.14	7.77															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.1	0.10													
		0	84																		
WEW-08	Overland	84		1.48	0.85	1.64			Commercial	36	89	92	94	95	0.0	0.0	0.0	36.3	89.9	10.9	0.01710
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	64	61	75	83	87	0.0	0.0	0.0	63.7			
	Paved	775		3.03	3.48	3.71															
	Pipe				0.00	0.00															
	Stream	642			4.00	2.68	4.8	0.08													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	97																		
WEW-08-01	Overland	97		3.06	1.23	1.31			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0	87.0	8.4	0.01315
	Channel (ditch)				0.00	0.00															
	Paved	529		3.45	3.71	2.37															
	Pipe	95		0.38	4.00	0.40															
	Stream	424			4.00	1.77	3.5	0.06													
		0	0																		
WEW-08-02	Overland				0.00	0.00			Residential 1/4 acre	100	61	75	83	87	0.0	15.5	0.0	84.5	85.1	13.3	0.02075
	Channel (ditch)				0.00	0.00															
	Paved	452		5.15	4.55	1.66															
	Pipe	491		1.38	4.00	2.04															
	Stream	141			4.00	0.59	2.6	0.04													
		0	1075																		
WEW-08-03	Overland	95		0.76	0.61	2.60			Industrial	9	81	88	91	93	0.0	0.0	0.0	8.9	85.4	11.7	0.01834
	Channel (ditch)	979		2.03	2.12	7.69			Pasture: Good Condition	21	39	61	74	80	0.0	0.0	0.0	20.6			
	Paved				0.00	0.00			Residential 1/4 acre	71	61	75	83	87	0.0	5.8	0.0	64.7			
	Pipe				0.00	0.00															
	Stream	421			4.00	1.75	7.2	0.12													
		0	121																		
WEW-08-04	Overland				0.00	0.00			Commercial	5	89	92	94	95	0.0	4.7	0.0	0.0	69.7	27.0	0.04212
	Channel (ditch)	121		3.90	2.96	0.68			Forest (good cover)	9	25	55	70	77	0.0	9.0	0.0	0.0			
	Paved	1592		1.39	2.35	11.31			Industrial	11	81	88	91	93	0.0	3.1	0.0	7.7			
	Pipe				0.00	0.00			Pasture: Good Condition	42	39	61	74	80	0.0	35.6	0.0	6.2			
	Stream				0.00	0.00	7.2	0.12	Residential 1/4 acre	25	61	75	83	87	0.0	23.1	0.0	1.5			
									Woods-Grass: Good	9	32	58	72	79	0.0	9.1	0.0	0.0			
		0	958																		
WEW-08-05	Overland	89		1.60	0.89	1.68			Commercial	39	89	92	94	95	0.0	34.1	0.0	4.6	76.3	17.4	0.02718
	Channel (ditch)	869		3.21	2.68	5.40			Pasture: Good Condition	59	39	61	74	80	0.0	44.9	0.0	13.7			
	Paved				0.00	0.00			Residential 1/4 acre	3	61	75	83	87	0.0	1.3	0.0	1.4			
	Pipe				0.00	0.00															
	Stream	34			4.00	0.14	4.3	0.07													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	55																		
WEW-08-06	Overland	55		2.01	0.99	0.92			Pasture: Good Condition	27	39	61	74	80	0.0	0.0	0.0	26.9	85.1	11.2	0.01748
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	73	61	75	83	87	0.0	0.0	0.0	73.1			
	Paved	986		2.63	3.24	5.07															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.6	0.06													
		0	0																		
WEW-09	Overland				0.00	0.00			Commercial	4	89	92	94	95	0.0	0.0	0.0	4.1	87.3	14.0	0.02194
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	96	61	75	83	87	0.0	0.0	0.0	95.9			
	Paved	1221		2.18	2.95	6.91															
	Pipe				0.00	0.00															
	Stream	335			4.00	1.40	5.0	0.08													
		0	53																		
WEW-10	Overland	53		1.92	0.97	0.91			Commercial	17	89	92	94	95	0.0	0.0	0.0	16.5	88.3	23.3	0.03637
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	83	61	75	83	87	0.0	0.0	0.0	83.5			
	Paved	1646		2.20	2.96	9.27															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.1	0.10													

Appendix 3-B
HEC-HMS Schematic

City of Seminole Master Drainage Plan



CITY OF SEMINOLE

Magnolia Creek HEC-HMS Schematic

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Appendix B

Appendix 3-C
HEC-HMS Output

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
D-WEW-06	73	117	293	450	632	783	924	1245	0.30283
D-WEW-08	82	140	308	414	579	677	766	1008	0.21442
D-WEW-08-UP	111	163	292	396	524	621	717	943	0.19732
GLF-01	11	20	48	72	105	131	158	222	0.05179
GLF-02	29	48	104	152	217	268	319	440	0.07980
GLF-02-01	30	41	72	96	127	151	174	226	0.03138
GLF-02-02	78	99	150	190	238	273	307	386	0.06338
GLF-02-03	34	43	68	87	110	127	144	183	0.03362
GLF-02-04	25	43	96	142	203	251	300	417	0.06904
GLF-02-05	37	51	86	115	152	179	207	270	0.06143
GLF-03	17	25	49	69	96	116	136	183	0.03102
GLF-03-01	35	47	80	105	138	162	187	242	0.05046
GLF-04	35	51	96	132	180	216	252	336	0.05424
GLF-05	18	27	55	78	109	133	157	214	0.04930
J-GLF-01	30	130	391	560	787	963	1144	1604	0.57547
J-GLF-02	28	123		518	711	864	1020	1475	0.52368
J-GLF-02-01	26	35	62	83	110	130	170	305	0.12839
J-GLF-02-02	0	0	3	15	51	93	139	259	0.09700
J-GLF-02-03	34	43	68	87	110	127	144	183	0.03362
J-GLF-02-04	47	66	123	180	257	317	378	523	0.13047
J-GLF-02-05	37	51	86	115	152	179	207	270	0.06143
J-GLF-03	68	97	177	243	330	396	463	669	0.18502
J-GLF-03-01	35	47	80	105	138	162	187	242	0.05046
J-GLF-04	26	40	77	109	151	184	218	359	0.10354
J-GLF-05	14	22	45	64	89	109	129	216	0.04930
J-MAG-01	1027	1407	2472	3705	5213	6179	7209	10087	9.83086
J-MAG-02	1026	1410	2509	3768	5248	6208	7237	10091	9.81279
J-MAG-02-UP	1024	1426	2654	3867	5250	6204	7231	10077	9.76630
J-MAG-02-01	35	43	63	78	96	109	122	151	0.02299
J-MAG-02-02	33	44	71	92	118	137	156	198	0.02752
J-MAG-03	1023	1425	2651	3864	5245	6199	7225	10067	9.73877
J-MAG-03-01	17	25	47	65	88	106	124	165	0.03347
J-MAG-04	1023	1448	2715	3874	5248	6193	7216	10058	9.67003
J-MAG-04-UP	1024	1465	2721	3878	5256	6197	7220	10067	9.66287
J-MAG-04-01	187	245	394	512	660	771	880	1132	0.22940
J-MAG-04-02	45	59	95	124	158	184	210	268	0.04916
J-MAG-04-03	124	159	248	317	403	468	531	676	0.12828
J-MAG-04-04	43	55	84	107	135	155	175	221	0.03866
J-MAG-04-05	25	31	47	59	73	84	94	117	0.01511
J-MAG-04-06	47	58	84	103	126	143	160	197	0.02592

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
J-MAG-05	1012	1453	2697	3846	5214	6148	7162	9977	9.43348
J-MAG-05-01	38	52	321	593	820	963	1103	1427	0.29203
J-MAG-05-01-IN	230	305	498	652	845	991	1134	1465	0.29203
J-MAG-05-02	207	274	449	588	764	896	1026	1328	0.25531
J-MAG-05-03	73	91	134	167	207	236	264	327	0.05036
J-MAG-05-04	42	52	77	95	118	134	150	186	0.02431
J-MAG-05-05	65	92	167	229	309	369	429	568	0.10861
J-MAG-05-06	27	39	73	102	139	168	196	262	0.04430
J-MAG-05-07	13	17	27	34	43	50	57	72	0.00995
J-MAG-06	992	1449	2668	3812	5207	6115	7114	9929	9.10445
J-MAG-07	990	1446	2664	3806	5206	6110	7104	9907	9.03705
J-MAG-08	964	1428	2822	3840	5235	6051	6977	9741	8.40692
J-MAG-08-01	299	382	586	743	935	1077	1215	1531	0.26663
J-MAG-08-02	282	360	553	701	882	1015	1145	1442	0.24439
J-MAG-08-03	71	92	146	189	241	280	318	406	0.07851
J-MAG-08-04	167	211	319	401	501	574	645	807	0.11910
J-MAG-08-05	9	11	17	21	27	30	34	42	0.00526
J-MAG-08-06	52	66	102	129	162	187	210	264	0.03734
J-MAG-08-07	34	43	65	81	101	116	130	163	0.02157
J-MAG-08-08	9	11	17	22	27	31	34	43	0.00535
J-MAG-08-09	95	120	180	225	280	321	360	449	0.06716
J-MAG-08-10	74	93	138	172	214	244	273	340	0.05080
J-MAG-08-11	57	72	107	133	165	189	212	263	0.03820
J-MAG-08-12	45	57	85	107	133	152	171	213	0.02957
J-MAG-08-13	28	35	52	65	81	93	104	130	0.01742
J-MAG-08-14	56	73	117	151	193	224	254	323	0.05062
J-MAG-08-15	17	23	39	51	66	77	88	114	0.01811
J-MAG-09	953	1485	2790	3816	5213	6035	6893	9583	8.12013
J-MAG-09-UP	956	1503	2787	3853	5295	6147	6881	9562	8.07176
J-MAG-10	893	1366	2527	3568	4972	5785	6538	9142	7.60943
J-MAG-11	905	1367	2542	3589	4991	5800	6537	9117	7.55049
J-MAG-12	589	875	1682	2362	3309	4157	5112	7539	5.54465
J-MAG-12-01	6	13	39	63	98	126	156	228	0.06621
J-MAG-13	592	874	1679	2342	3281	4134	5105	7615	5.40963
J-MAG-14	597	878	1688	2359	3267	4138	5166	7827	5.36333
J-MAG-14-UP	110	176	396	592	859	1071	1293	1797	1.90256
J-MAG-14-01	17	29	67	100	146	182	219	307	0.07236
J-MAG-14-02	11	16	32	45	62	76	89	120	0.02274
J-MAG-14-03	12	22	55	84	124	157	190	269	0.06871
J-MAG-15	102	162	352	516	735	911	1095	1535	1.83019

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
J-MAG-15-UP	99	153	324	462	651	801	954	1324	1.75083
J-MAG-15-01	6	12	33	52	79	100	122	176	0.04195
J-MAG-15-02	67	103	217	321	463	575	690	968	0.29483
J-MAG-15-03	61	93	185	271	388	480	574	800	0.23581
J-MAG-15-04	47	70	136	193	267	325	384	524	0.14716
J-MAG-15-05	37	55	104	145	199	241	282	380	0.09285
J-MAG-16	39	52	109	151	202	243	283	382	1.45600
J-MAG-16-01	17	26	49	68	93	112	131	176	0.03824
J-MAG-17	37	38	41	43	46	48	49	239	1.37530
J-MAG-17-01	0	2	14	35	109	222	319	447	0.08509
J-MAG-17-02	20	30	61	87	121	148	174	236	0.04108
J-MAG-17-03	3	6	16	25	38	48	58	83	0.01866
J-MAG-17-04	14	25	56	84	121	150	180	250	0.05510
J-MAG-18	306	481	984	1422	2013	2475	2946	4074	1.12384
J-MAG-18-UP	279	440	903	1303	1837	2254	2679	3695	1.04028
J-MAG-18-01	160	255	533	777	1104	1360	1621	2249	0.62302
J-MAG-18-02	40	56	101	138	185	220	255	336	0.05982
J-MAG-18-03	29	41	72	98	132	157	182	239	0.04013
J-MAG-18-04	145	232	485	706	1004	1238	1477	2049	0.55459
J-MAG-18-05	110	178	375	547	778	958	1141	1575	0.38662
J-MAG-18-06	58	92	189	272	382	468	554	755	0.14619
J-MAG-18-07	38	61	126	183	259	318	378	518	0.09789
J-MAG-18-08	27	42	87	125	176	215	255	348	0.06320
J-MAG-18-09	8	12	25	36	51	62	73	99	0.01614
J-MAG-18-10	56	91	195	285	405	499	595	822	0.17440
J-MAG-18-11	3	5	10	14	21	25	30	42	0.00689
J-MAG-18-12	48	79	169	247	352	434	517	712	0.14926
J-MAG-18-12-UP	40	65	137	199	283	347	412	566	0.11225
J-MAG-18-13	18	30	66	96	138	170	203	281	0.05864
J-MAG-18-14	22	35	72	103	145	178	210	288	0.05361
J-MAG-18-14-UP	14	22	47	68	97	120	142	195	0.03611
J-MAG-18-15	4	7	14	21	30	37	43	60	0.01055
J-MAG-18-16	10	16	33	48	68	84	100	136	0.02555
J-MAG-18-17	1	2	9	16	27	36	46	70	0.01883
J-MAG-18-18	16	24	46	65	91	110	129	174	0.02767
J-MAG-19	85	137	287	417	591	726	863	1189	0.28705
J-MAG-19-UP	71	113	236	342	484	595	708	975	0.24411
J-MAG-19-01	54	83	164	232	323	392	463	627	0.13193
J-MAG-19-02	21	33	69	99	139	170	202	277	0.06564
J-MAG-19-03	14	23	49	72	102	126	150	206	0.04393

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
J-MAG-19-04	41	62	124	176	245	298	352	479	0.10404
J-MAG-19-05	66	97	184	256	350	421	493	659	0.13021
J-MAG-19-06	34	50	96	135	185	224	263	352	0.06359
J-MAG-20	28	45	97	142	203	251	300	417	0.11218
J-MAG-21	17	28	62	91	132	163	195	271	0.06184
J-P-GLF-02	144	207	378	521	722	885	1052	1482	0.52368
J-P-GLF-02-02	104	133	204	259	326	376	424	535	0.09700
J-P-GLF-04	38	56	110	155	214	260	306	415	0.10354
J-P-MAG-17-IN	380	591	1199	1723	2453	3139	3841	5287	1.37530
J-P-TR4-06	187	245	392	506	648	753	855	1088	0.17429
J-TRA-01	170	227	390	525	712	853	1007	1330	0.34497
J-TRA-02	172	229	395	530	718	871	1008	1339	0.33789
J-TRA-03	67	97	179	244	326	383	438	602	0.13923
J-TRA-03-UP	58	78	128	167	218	255	292	378	0.09140
J-TRA-03-01	14	20	35	48	64	76	88	116	0.02251
J-TRA-04	13	18	31	42	56	67	77	101	0.01828
J-TRA-05	47	61	98	128	165	192	219	282	0.07312
J-TRA-06	31	41	65	83	107	124	141	181	0.04715
J-TRB-01	101	132	217	284	378	466	537	696	0.17588
J-TRB-02	92	120	193	242	319	386	435	540	0.12234
J-TRB-03	87	112	179	223	293	347	387	477	0.10666
J-TRB-04	91	113	167	207	257	293	328	408	0.06916
J-TRB-04-01	17	22	33	42	53	61	69	86	0.01593
J-TRB-05	50	63	93	116	145	165	185	230	0.03541
J-TRC-01	105	147	274	388	570	721	838	1163	0.33140
J-TRC-02	104	145	270	385	571	705	806	1146	0.30259
J-TRC-03	103	144	260	362	538	658	745	1056	0.26427
J-TRC-03-01	21	28	46	61	104	144	166	214	0.04112
J-TRC-03-02	6	7	12	16	20	23	27	34	0.00576
J-TRC-04	71	103	188	261	374	468	558	764	0.18230
J-TRC-04-01	28	39	70	95	128	152	176	232	0.03326
J-TRC-05	36	49	87	119	165	201	233	313	0.07989
J-TRC-06	46	64	109	145	191	225	258	335	0.04807
J-TR1-01	169	235	329	357	484	572	655	811	0.80714
J-TR1-02	178	238	326	370	502	584	658	807	0.77022
J-TR1-03	200	251	404	529	594	679	720	869	0.71634
J-TR1-04	223	284	416	533	628	694	731	865	0.67466
J-TR1-04-UP	217	282	417	527	623	685	722	855	0.61924
J-TR1-04-01	23	31	51	67	87	102	117	149	0.02086
J-TR1-05	212	279	413	524	619	680	718	851	0.59838

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
J-TR1-05-UP	229	317	555	703	812	893	977	1243	0.55989
J-TR1-05-01	106	143	239	317	415	488	561	729	0.15479
J-TR1-05-02	76	99	158	204	261	304	346	443	0.08984
J-TR1-05-03	61	79	122	156	197	228	257	325	0.05350
J-TR1-06	145	210	372	519	570	660	684	740	0.40511
J-TR1-07	142	206	384	525	672	700	739	828	0.38880
J-TR1-07-01	19	30	70	107	156	196	237	335	0.08712
J-TR1-07-02	4	9	30	51	80	104	129	191	0.05105
J-TR1-08	130	190	356	495	680	822	967	1308	0.33646
J-TR1-08-01	25	35	59	79	104	123	141	185	0.03737
J-TR1-08-02	4	7	15	21	30	37	45	61	0.01381
J-TR1-09	85	122	221	304	411	493	574	766	0.17134
J-TR1-10	61	86	152	209	283	340	396	530	0.11597
J-TR1-11	53	72	121	162	215	255	295	387	0.07751
J-TR1-11-01	3	6	12	18	26	33	39	54	0.01024
J-TR1-12	30	39	64	84	109	127	145	185	0.02887
J-TR2-01	441	564	1000	1412	1955	2391	2866	3939	1.17820
J-TR2-02	441	565	1016	1410	1934	2382	2834	3894	1.15159
J-TR2-03	290	377	659	934	1319	1607	1922	2602	0.77536
J-TR2-03-01	34	46	77	102	133	157	180	235	0.05592
J-TR2-03-02	26	35	59	78	103	121	139	180	0.03798
J-TR2-04	281	365	632	899	1262	1535	1835	2447	0.69408
J-TR2-04-UP	283	371	622	885	1236	1517	1793	2382	0.66882
J-TR2-04-01	49	62	94	119	150	172	194	244	0.04681
J-TR2-04-02	31	39	59	74	92	105	119	149	0.02766
J-TR2-05	177	225	369	471	600	709	822	1071	0.29061
J-TR2-06	171	218	357	450	574	676	787	1011	0.26786
J-TR2-07	161	204	336	421	535	635	747	959	0.23170
J-TR2-08	149	190	295	375	467	560	635	791	0.17436
J-TR2-09	144	183	285	364	459	527	597	758	0.16033
J-TR2-09-01	29	36	54	68	84	97	109	136	0.02317
J-TR2-10	105	135	213	272	343	396	448	567	0.11436
J-TR2-10-01	11	14	21	26	32	37	42	52	0.00873
J-TR2-11	56	72	113	144	183	212	240	304	0.05889
J-TR3-01	510	760	1482	2123	2981	3708	4504	6479	3.34701
J-TR3-01-UP	507	754	1465	2133	2981	3705	4500	6483	3.21690
J-TR3-01-01	8	18	55	90	139	178	219	320	0.08427
J-TR3-01-02	30	42	77	106	144	172	200	266	0.05268
J-TR3-02	503	749	1453	2117	2957	3675	4464	6430	3.13263
J-TR3-03	504	749	1452	2121	2971	3713	4482	6447	3.09966

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
J-TR3-04	509	757	1460	2145	2979	3757	4511	6506	3.07570
J-TR3-04-01	38	61	129	190	296	445	563	787	0.19830
J-TR3-04-02	23	34	65	93	182	276	350	488	0.11824
J-TR3-04-03	4	7	18	33	113	159	201	290	0.08037
J-TR3-04-04	3	7	23	39	61	80	99	147	0.04376
J-TR3-04-05	104	176	386	570	817	1012	1210	1681	0.36402
J-TR3-04-05-UP	75	123	267	393	561	692	825	1140	0.22970
J-TR3-04-06	10	22	60	95	144	182	222	319	0.07210
J-TR3-04-07	55	93	207	306	440	546	653	908	0.18563
J-TR3-04-08	22	40	95	144	211	263	317	445	0.09559
J-TR3-04-09	6	11	26	40	58	73	88	124	0.02847
J-TR3-04-10	11	17	34	48	67	82	96	130	0.02218
J-TR3-04-11	21	33	65	93	129	157	186	251	0.04407
J-TR3-04-12	34	51	100	140	194	235	276	371	0.05934
J-TR3-05	469	698	1343	1974	2747	3474	4164	6034	2.42865
J-TR3-05-UP	335	493	938	1394	1955	2483	2982	4491	1.67365
J-TR3-05-01	4	8	28	47	74	96	119	175	0.05089
J-TR3-05-02	135	215	446	646	919	1131	1351	1881	0.69858
J-TR3-05-03	4	11	34	57	88	113	139	201	0.04174
J-TR3-05-04	128	203	421	608	862	1061	1266	1758	0.57972
J-TR3-05-05	121	190	390	563	795	976	1162	1609	0.49564
J-TR3-05-05-UP	116	178	366	528	745	914	1087	1500	0.43022
J-TR3-05-06	14	23	53	79	114	141	169	235	0.05096
J-TR3-05-07	109	164	328	473	667	818	973	1342	0.37926
J-TR3-05-07-UP	100	149	285	401	554	672	796	1093	0.29330
J-TR3-05-08	5	9	21	33	48	61	74	104	0.02442
J-TR3-05-09	96	143	272	381	525	635	747	1014	0.26888
J-TR3-05-10	42	58	100	133	176	208	240	312	0.04330
J-TR3-05-11	68	104	204	289	402	489	576	785	0.18657
J-TR3-05-12	55	81	151	210	287	345	404	541	0.11107
J-TR3-05-13	43	62	115	159	217	260	304	405	0.08071
J-TR3-06	333	488	926	1376	1929	2448	2938	4434	1.62276
J-TR3-06-01	60	87	164	227	310	374	438	588	0.12292
J-TR3-06-02	52	73	130	178	238	284	330	435	0.08198
J-TR3-06-03	32	46	83	113	152	182	211	279	0.04958
J-TR3-07	312	459	872	1298	1830	2319	2779	4234	1.41993
J-TR3-07-UP	308	451	853	1269	1791	2266	2712	4148	1.34260
J-TR3-07-01	28	40	74	102	137	164	191	254	0.04182
J-TR3-07-02	48	67	119	161	215	256	296	389	0.06263
J-TR3-07-03	31	45	83	114	153	184	214	283	0.04589

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
J-TR3-08	289	425	809	1208	1716	2171	2598	4009	1.23815
J-TR3-09	286	419	796	1189	1690	2137	2554	3954	1.20042
J-TR3-09-UP	275	403	766	1147	1637	2069	2473	3852	1.13029
J-TR3-09-01	5	8	18	27	39	57	96	173	0.04451
J-TR3-10	41	57	101	137	183	218	252	330	0.04307
J-TR3-11	263	385	731	1096	1566	1980	2336	3674	1.04271
J-TR3-11-01	131	193	363	506	768	982	1158	1566	0.39004
J-TR3-11-01-UP	129	188	352	490	749	954	1123	1517	0.37047
J-TR3-11-02	36	51	95	133	183	221	259	349	0.07066
J-TR3-11-03	18	24	42	55	73	86	99	128	0.01968
J-TR3-11-04	105	153	284	394	636	790	928	1252	0.29981
J-TR3-11-04-UP	95	137	250	344	562	690	808	1083	0.25112
J-TR3-11-05	2	3	11	40	70	88	106	150	0.04325
J-TR3-11-06	95	136	247	339	503	607	708	943	0.20788
J-TR3-11-07	38	52	90	120	158	187	216	281	0.04989
J-TR3-11-08	55	81	150	208	284	342	400	536	0.11677
J-TR3-11-09	25	35	62	84	112	133	154	202	0.03806
J-TR3-11-10	28	48	111	166	242	300	360	501	0.08143
J-TR3-12	118	172	327	525	724	879	1104	2020	0.53481
J-TR3-12-UP	107	153	286	460	630	762	1029	1849	0.46492
J-TR3-12-01	1	2	30	83	129	154	179	237	0.04052
J-TR3-12-02	106	152	284	396	542	657	967	1713	0.42439
J-TR3-12-03	0	0	0	8	48	138	304	686	0.13367
J-TR3-12-04	43	60	105	142	189	224	259	340	0.06141
J-TR3-12-05	25	35	60	81	106	125	144	188	0.02899
J-TR3-12-06	6	11	27	42	63	79	97	139	0.04446
J-TR3-13	93	129	230	313	420	501	583	775	0.19730
J-TR3-14	50	73	137	192	264	320	376	510	0.13466
J-TR3-15	29	44	90	128	180	221	262	359	0.08699
J-TR3-16	20	27	47	62	83	98	113	148	0.02959
J-TR4-01	103	139	263	376	610	692	786	1024	0.46233
J-TR4-02	100	137	273	421	632	726	832	1066	0.43905
J-TR4-02-01	8	10	14	17	20	23	25	31	0.00447
J-TR4-03	125	172	298	402	632	733	839	1077	0.41810
J-TR4-04	98	169	240	311	491	561	646	858	0.34152
J-TR4-04-01	26	34	55	71	91	106	120	153	0.02531
J-TR4-05	98	266	334	357	404	467	545	720	0.24451
J-TR4-06	121	186	315	408	675	759	854	1087	0.17429
J-TR4-07	108	138	215	274	346	399	450	567	0.08348
J-TR4-08	29	39	63	82	105	123	140	179	0.03028

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
J-WEW-01	224	290	456	588	841	1040	1234	1676	0.53554
J-WEW-02	229	297	457	585	838	1036	1226	1652	0.48460
J-WEW-03	229	296	455	583	836	1033	1223	1645	0.47675
J-WEW-04	227	291	436	575	828	1021	1201	1608	0.42147
J-WEW-04-UP	221	283	421	574	832	1012	1188	1582	0.38954
J-WEW-05	154	198	363	511	718	867	1011	1336	0.31446
J-WEW-05-01	88	113	176	225	284	327	370	466	0.07507
J-WEW-05-02	47	61	95	121	153	177	200	252	0.03737
J-WEW-06	153	197	373	530	712	863	1004	1325	0.30283
J-WEW-06-UP	145	190	358	508	678	820	952	1254	0.27844
J-WEW-06-01	29	37	59	75	96	111	126	160	0.03005
J-WEW-07	139	181	341	481	632	761	881	1154	0.24839
J-WEW-07-UP	89	152	336	450	631	751	834	1099	0.23235
J-WEW-07-01	6	7	11	14	17	19	22	27	0.00302
J-WEW-07-02	25	31	47	59	73	83	94	117	0.01793
J-WEW-08	130	188	356	462	627	725	814	1056	0.21442
J-WEW-08-MID	154	208	338	441	571	668	763	989	0.19732
J-WEW-08-UP	159	211	340	444	572	669	765	991	0.19732
J-WEW-08-01	112	149	242	317	411	481	550	710	0.13901
J-WEW-08-02	98	130	215	284	369	434	498	645	0.12586
J-WEW-08-03	57	77	129	172	226	266	307	400	0.07794
J-WEW-08-04	18	28	55	78	109	132	156	211	0.04212
J-WEW-08-05	24	33	57	76	101	119	138	179	0.02718
J-WEW-08-06	26	34	51	65	82	94	106	132	0.01748
J-WEW-09	60	76	115	146	184	212	242	306	0.05831
J-WEW-10	53	66	97	121	150	171	192	238	0.03637
MAG-01	4	5	10	14	20	24	29	39	0.01806
MAG-02	19	25	41	53	68	79	90	115	0.02351
MAG-02-01	35	43	63	78	96	109	122	151	0.02299
MAG-02-02	33	44	71	92	118	137	156	198	0.02752
MAG-03	26	36	61	82	108	128	147	191	0.03527
MAG-03-01	17	25	47	65	88	106	124	165	0.03347
MAG-04	6	9	16	22	30	35	41	54	0.00716
MAG-04-01	19	29	53	74	102	123	144	194	0.05196
MAG-04-02	45	59	95	124	158	184	210	268	0.04916
MAG-04-03	21	31	57	78	106	128	149	200	0.04858
MAG-04-04	43	55	84	107	135	155	175	221	0.03866
MAG-04-05	25	31	47	59	73	84	94	117	0.01511
MAG-04-06	47	58	84	103	126	143	160	197	0.02592
MAG-05	17	26	51	71	99	120	141	190	0.03699

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
MAG-05-01	47	61	97	124	158	183	207	262	0.03672
MAG-05-02	45	65	120	165	224	269	313	415	0.07203
MAG-05-03	73	91	134	167	207	236	264	327	0.05036
MAG-05-04	42	52	77	95	118	134	150	186	0.02431
MAG-05-05	48	67	119	162	217	258	299	393	0.06431
MAG-05-06	14	23	47	68	96	118	139	191	0.03435
MAG-05-07	13	17	27	34	43	50	57	72	0.00995
MAG-06	18	30	63	92	132	162	194	268	0.06740
MAG-07	27	39	73	100	136	164	191	255	0.05467
MAG-08	17	23	37	49	64	75	85	110	0.02016
MAG-08-01	26	34	54	69	87	101	114	145	0.02225
MAG-08-02	47	60	91	115	145	166	188	236	0.04678
MAG-08-03	40	53	85	110	141	163	185	235	0.02789
MAG-08-04	13	17	25	32	40	46	51	64	0.00934
MAG-08-05	9	11	17	21	27	30	34	42	0.00526
MAG-08-06	18	23	37	48	61	71	80	102	0.01576
MAG-08-07	25	31	47	60	75	86	96	120	0.01622
MAG-08-08	9	11	17	22	27	31	34	43	0.00535
MAG-08-09	25	32	48	61	77	88	100	125	0.01636
MAG-08-10	22	28	42	52	65	74	83	103	0.01260
MAG-08-11	18	22	31	38	47	53	59	73	0.00863
MAG-08-12	20	25	37	46	57	66	73	91	0.01215
MAG-08-13	28	35	52	65	81	93	104	130	0.01742
MAG-08-14	40	52	81	104	132	152	172	218	0.03251
MAG-08-15	17	23	39	51	66	77	88	114	0.01811
MAG-09	26	37	67	92	124	149	173	229	0.04836
MAG-10	30	42	72	97	129	153	176	232	0.05894
MAG-11	7	11	23	34	47	58	69	95	0.02050
MAG-12	7	12	31	48	72	92	112	163	0.06881
MAG-12-01	6	13	39	63	98	126	156	228	0.06621
MAG-13	17	27	57	82	116	143	169	232	0.04630
MAG-14	2	5	20	35	57	76	95	142	0.04506
MAG-14-01	6	13	35	56	84	108	131	189	0.04962
MAG-14-02	11	16	32	45	62	76	89	120	0.02274
MAG-14-03	12	22	55	84	124	157	190	269	0.06871
MAG-15	5	12	40	68	107	140	174	258	0.07936
MAG-15-01	6	12	33	52	79	100	122	176	0.04195
MAG-15-02	2	4	14	22	34	44	53	78	0.01707
MAG-15-03	27	45	98	144	206	255	304	421	0.08866
MAG-15-04	16	28	63	94	136	170	204	284	0.05431

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
MAG-15-05	37	55	104	145	199	241	282	380	0.09285
MAG-16	5	11	32	52	79	101	124	179	0.04246
MAG-16-01	17	26	49	68	93	112	131	176	0.03824
MAG-17	112	153	259	344	451	530	608	786	0.11127
MAG-17-01	16	23	43	59	80	96	111	148	0.02536
MAG-17-02	20	30	61	87	121	148	174	236	0.04108
MAG-17-03	3	6	16	25	38	48	58	83	0.01866
MAG-17-04	14	25	56	84	121	150	180	250	0.05510
MAG-18	32	49	99	141	197	240	283	385	0.08356
MAG-18-01	27	42	86	123	173	211	250	341	0.06843
MAG-18-02	14	20	36	50	67	80	93	123	0.01969
MAG-18-03	29	41	72	98	132	157	182	239	0.04013
MAG-18-04	28	46	98	143	204	252	300	414	0.08932
MAG-18-05	16	29	66	100	145	181	217	305	0.06603
MAG-18-06	10	16	31	45	62	75	89	120	0.02063
MAG-18-07	14	23	48	71	101	124	148	204	0.03469
MAG-18-08	21	33	68	98	138	169	200	272	0.04706
MAG-18-09	8	12	25	36	51	62	73	99	0.01614
MAG-18-10	7	11	24	35	50	62	74	102	0.01824
MAG-18-11	3	5	10	14	21	25	30	42	0.00689
MAG-18-12	10	19	42	64	93	115	138	193	0.03701
MAG-18-13	18	30	66	96	138	170	203	281	0.05864
MAG-18-14	9	14	28	39	55	66	78	105	0.01751
MAG-18-15	4	7	14	21	30	37	43	60	0.01055
MAG-18-16	10	16	33	48	68	84	100	136	0.02555
MAG-18-17	1	2	9	16	27	36	46	70	0.01883
MAG-18-18	16	24	46	65	91	110	129	174	0.02767
MAG-19	15	24	51	75	106	131	156	215	0.04294
MAG-19-01	14	21	42	59	82	100	117	158	0.02789
MAG-19-02	12	18	35	49	67	82	96	128	0.02171
MAG-19-03	14	23	49	72	102	126	150	206	0.04393
MAG-19-04	29	42	79	109	149	178	208	278	0.03840
MAG-19-05	34	49	91	126	171	205	239	319	0.06662
MAG-19-06	34	50	96	135	185	224	263	352	0.06359
MAG-20	16	27	57	83	118	145	172	237	0.05034
MAG-21	17	28	62	91	132	163	195	271	0.06184
P-GLF-02	28	123	366	518	711	864	1020	1475	0.52368
P-GLF-02-01	26	35	62	83	110	130	170	305	0.12839
P-GLF-02-02	0	0	3	15	51	93	139	259	0.09700
P-GLF-04	26	40	77	109	151	184	218	359	0.10354

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
P-GLF-05	14	22	45	64	89	109	129	216	0.04930
P-MAG-05-01	38	52	321	593	820	963	1103	1427	0.29203
P-MAG-17	37	38	41	43	46	48	49	239	1.37530
P-MAG-17-01	0	2	14	35	109	222	319	447	0.08509
P-TRC-03-01	21	28	46	61	104	144	166	214	0.04112
P-TR3-04-03	4	7	18	33	113	159	201	290	0.08037
P-TR3-09-01	5	8	18	27	39	57	96	173	0.04451
P-TR3-11-05	2	3	11	40	70	88	106	150	0.04325
P-TR3-11-06	72	104	192	265	387	466	544	727	0.15799
P-TR3-12-01	1	2	30	83	129	154	179	237	0.04052
P-TR3-12-03	0	0	0	8	48	138	304	686	0.13367
P-TR4-06	121	186	315	408	675	759	854	1087	0.17429
P-TR4-07	108	138	215	274	346	399	450	567	0.08348
R-GLF-02	28	123	366	518	711	864	1020	1475	0.52368
R-GLF-02-01	26	35	62	83	110	130	170	305	0.12839
R-GLF-02-02	0	0	3	15	51	93	139	259	0.09700
R-GLF-02-03	34	43	68	87	110	127	144	183	0.03362
R-GLF-02-04	47	66	123	180	257	317	378	523	0.13047
R-GLF-02-05	37	51	86	115	152	179	207	270	0.06143
R-GLF-03	68	97	177	243	330	396	463	669	0.18502
R-GLF-03-01	35	47	80	105	138	162	187	242	0.05046
R-GLF-04	26	40	77	109	151	184	218	359	0.10354
R-J-GLF-05	14	22	45	64	89	109	129	216	0.04930
R-MAG-02	1026	1406	2471	3703	5209	6175	7204	10078	9.81279
R-MAG-02-01	35	43	63	78	96	109	122	151	0.02299
R-MAG-02-02	33	44	71	92	118	137	156	198	0.02752
R-MAG-03	1024	1408	2505	3762	5240	6198	7226	10074	9.76630
R-MAG-04	1020	1422	2646	3856	5235	6186	7210	10044	9.67003
R-MAG-04-02	45	59	95	124	158	184	210	268	0.04916
R-MAG-04-03	124	159	248	317	403	468	531	676	0.12828
R-MAG-04-04	43	55	84	107	135	155	175	221	0.03866
R-MAG-04-05	25	31	47	59	73	84	94	117	0.01511
R-MAG-04-06	47	58	84	103	126	143	160	197	0.02592
R-MAG-05	1023	1448	2714	3873	5247	6192	7215	10055	9.66287
R-MAG-05-03	73	91	134	167	207	236	264	327	0.05036
R-MAG-05-04	42	52	77	95	118	134	150	186	0.02431
R-MAG-05-05	65	92	167	229	309	369	429	568	0.10861
R-MAG-05-06	27	39	73	102	139	168	196	262	0.04430
R-MAG-05-07	13	17	27	34	43	50	57	72	0.00995
R-MAG-06	982	1416	2642	3783	5146	6077	7084	9854	9.10445

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
R-MAG-07	990	1446	2663	3805	5196	6102	7098	9903	9.03705
R-MAG-08	960	1414	2613	3719	5068	5949	6915	9598	8.40692
R-MAG-08-02	282	360	553	701	882	1015	1145	1442	0.24439
R-MAG-08-04	167	211	319	401	501	574	645	807	0.11910
R-MAG-08-05	9	11	17	21	27	30	34	42	0.00526
R-MAG-08-07	34	43	65	81	101	116	130	163	0.02157
R-MAG-08-08	9	11	17	22	27	31	34	43	0.00535
R-MAG-08-09	95	120	180	225	280	321	360	449	0.06716
R-MAG-08-10	74	93	138	172	214	244	273	340	0.05080
R-MAG-08-11	57	72	107	133	165	189	212	263	0.03820
R-MAG-08-12	45	57	85	107	133	152	171	213	0.02957
R-MAG-08-13	28	35	52	65	81	93	104	130	0.01742
R-MAG-08-14	56	73	117	151	193	224	254	323	0.05062
R-MAG-08-15	17	23	39	51	66	77	88	114	0.01811
R-MAG-09	946	1407	2776	3783	5153	5957	6866	9580	8.12013
R-MAG-10	951	1482	2782	3806	5199	6017	6872	9556	8.07176
R-MAG-11	889	1359	2515	3549	4943	5744	6506	9103	7.55049
R-MAG-12	588	874	1678	2361	3307	4155	5110	7535	5.54465
R-MAG-12-01	6	13	39	63	98	126	156	228	0.06621
R-MAG-13	583	866	1663	2330	3252	4100	5045	7442	5.40963
R-MAG-14	590	870	1672	2331	3257	4115	5083	7583	5.36333
R-MAG-14-UP	107	174	394	582	824	1024	1232	1619	1.90256
R-MAG-14-01	17	29	67	100	146	182	219	307	0.07236
R-MAG-14-02	11	16	32	45	62	76	89	120	0.02274
R-MAG-14-03	12	22	55	84	124	157	190	269	0.06871
R-MAG-15	101	161	348	512	733	909	1093	1525	1.83019
R-MAG-15-UP	97	152	317	456	642	789	942	1306	1.75083
R-MAG-15-03	61	93	185	271	388	480	574	800	0.23581
R-MAG-15-04	47	70	136	193	267	325	384	524	0.14716
R-MAG-15-05	37	55	104	145	199	241	282	380	0.09285
R-MAG-16-01	17	26	49	68	93	112	131	176	0.03824
R-MAG-17	37	38	41	43	46	48	49	239	1.37530
R-MAG-18-03	29	41	72	98	132	157	182	239	0.04013
R-MAG-18-05	110	178	375	547	778	958	1141	1575	0.38662
R-MAG-18-07	38	61	126	183	259	318	378	518	0.09789
R-MAG-18-08	27	42	87	125	176	215	255	348	0.06320
R-MAG-18-09	8	12	25	36	51	62	73	99	0.01614
R-MAG-18-10	56	91	195	285	405	499	595	822	0.17440
R-MAG-18-11	3	5	10	14	21	25	30	42	0.00689
R-MAG-18-12-UP	40	65	137	199	283	347	412	566	0.11225

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
R-MAG-18-14-UP	14	22	47	68	97	120	142	195	0.03611
R-MAG-18-17	1	2	9	16	27	36	46	70	0.01883
R-MAG-18-18	16	24	46	65	91	110	129	174	0.02767
R-MAG-19-02	21	33	69	99	139	170	202	277	0.06564
R-MAG-19-03	14	23	49	72	102	126	150	206	0.04393
R-MAG-19-04	41	62	124	176	245	298	352	479	0.10404
R-MAG-19-06	34	50	96	135	185	224	263	352	0.06359
R-MAG-21	17	28	62	91	132	163	195	271	0.06184
R-P-TR3-11-06	72	104	192	265	387	466	544	727	0.15799
R-TRA-02	169	226	387	521	706	846	997	1315	0.33789
R-TRA-03	66	91	164	225	307	363	420	567	0.13923
R-TRA-03-UP	51	68	117	156	205	241	275	368	0.09140
R-TRA-03-01	14	20	35	48	64	76	88	116	0.02251
R-TRB-02	86	112	180	232	299	363	416	528	0.12234
R-TRB-03	85	111	174	217	282	340	383	473	0.10666
R-TRB-04	77	98	151	186	238	277	309	377	0.06916
R-TRC-02	103	143	266	374	550	695	805	1119	0.30259
R-TRC-03	96	134	247	349	517	638	732	1034	0.26427
R-TRC-04	70	98	180	256	372	455	531	745	0.18230
R-TRC-04-01	28	39	70	95	128	152	176	232	0.03326
R-TRC-05	36	49	85	116	160	196	228	301	0.07989
R-TRC-06	32	43	75	105	148	179	207	277	0.04807
R-TR1-02	167	233	326	354	481	568	651	805	0.77022
R-TR1-03	176	235	322	367	497	579	652	800	0.71634
R-TR1-04	198	248	401	525	588	673	713	861	0.67466
R-TR1-04-01	23	31	51	67	87	102	117	149	0.02086
R-TR1-05	216	279	410	525	619	684	720	854	0.61924
R-TR1-05-03	61	79	122	156	197	228	257	325	0.05350
R-TR1-06	208	277	409	519	613	674	711	843	0.55989
R-TR1-07	142	206	365	512	564	653	677	732	0.38880
R-TR1-07-02	4	9	30	51	80	104	129	191	0.05105
R-TR1-08	130	189	354	484	628	634	709	773	0.33646
R-TR1-08-01	25	35	59	79	104	123	141	185	0.03737
R-TR1-08-02	4	7	15	21	30	37	45	61	0.01381
R-TR1-09	85	122	221	304	411	493	574	766	0.17134
R-TR1-10	61	86	152	209	283	340	396	530	0.11597
R-TR1-11	53	72	121	162	215	255	295	387	0.07751
R-TR1-11-01	3	6	12	18	26	33	39	54	0.01024
R-TR1-12	30	39	64	84	109	127	145	185	0.02887
R-TR2-02	438	560	991	1397	1930	2361	2826	3875	1.15159

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
R-TR2-03	290	376	658	931	1314	1599	1917	2599	0.77536
R-TR2-03-01	34	46	77	102	133	157	180	235	0.05592
R-TR2-03-02	26	35	59	78	103	121	139	180	0.03798
R-TR2-04	279	363	627	886	1247	1513	1802	2430	0.69408
R-TR2-04-02	31	39	59	74	92	105	119	149	0.02766
R-TR2-05	275	358	615	873	1224	1488	1778	2369	0.66882
R-TR2-06	171	217	354	449	571	671	779	1008	0.26786
R-TR2-07	160	203	332	419	532	627	727	929	0.23170
R-TR2-08	144	182	293	369	464	545	631	790	0.17436
R-TR2-09	141	180	279	355	443	525	595	745	0.16033
R-TR2-09-01	29	36	54	68	84	97	109	136	0.02317
R-TR2-10	104	134	211	270	340	392	444	562	0.11436
R-TR2-10-01	11	14	21	26	32	37	42	52	0.00873
R-TR2-11	54	69	110	140	178	206	233	295	0.05889
R-TR3-01-UP	501	747	1459	2093	2941	3658	4442	6391	3.21690
R-TR3-01-02	30	42	77	106	144	172	200	266	0.05268
R-TR3-03	500	745	1446	2107	2945	3660	4445	6405	3.09966
R-TR3-04	502	746	1447	2114	2962	3703	4469	6430	3.07570
R-TR3-04-02	23	34	65	93	182	276	350	488	0.11824
R-TR3-04-03	4	7	18	33	113	159	201	290	0.08037
R-TR3-04-04	3	7	23	39	61	80	99	147	0.04376
R-TR3-04-06	10	22	60	95	144	182	222	319	0.07210
R-TR3-04-07	75	123	267	393	561	692	825	1140	0.22970
R-TR3-04-08	22	40	95	144	211	263	317	445	0.09559
R-TR3-04-09	6	11	26	40	58	73	88	124	0.02847
R-TR3-04-10	11	17	34	48	67	82	96	130	0.02218
R-TR3-04-12	34	51	100	140	194	235	276	371	0.05934
R-TR3-05	469	698	1343	1974	2747	3474	4164	6034	2.42865
R-TR3-05-UP	335	493	938	1394	1955	2483	2982	4491	1.67365
R-TR3-05-01	4	8	28	47	74	96	119	175	0.05089
R-TR3-05-02	4	11	34	57	88	113	139	201	0.04174
R-TR3-05-04	128	203	421	608	862	1061	1266	1758	0.57972
R-TR3-05-05	121	190	390	563	795	976	1162	1609	0.49564
R-TR3-05-05-UP	116	178	366	528	745	914	1087	1500	0.43022
R-TR3-05-07-UP	100	149	285	401	554	672	796	1093	0.29330
R-TR3-05-09	96	143	272	381	525	635	747	1014	0.26888
R-TR3-05-10	42	58	100	133	176	208	240	312	0.04330
R-TR3-05-11	68	104	204	289	402	489	576	785	0.18657
R-TR3-05-12	55	81	151	210	287	345	404	541	0.11107

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
R-TR3-05-13	43	62	115	159	217	260	304	405	0.08071
R-TR3-06-02	52	73	130	178	238	284	330	435	0.08198
R-TR3-06-03	32	46	83	113	152	182	211	279	0.04958
R-TR3-07	312	459	872	1298	1830	2319	2779	4234	1.41993
R-TR3-07-UP	308	451	853	1269	1791	2266	2712	4148	1.34260
R-TR3-07-01	28	40	74	102	137	164	191	254	0.04182
R-TR3-07-02	48	67	119	161	215	256	296	389	0.06263
R-TR3-08	289	425	809	1208	1716	2171	2598	4009	1.23815
R-TR3-09	286	419	796	1189	1690	2137	2554	3954	1.20042
R-TR3-09-UP	275	403	766	1147	1637	2069	2473	3852	1.13029
R-TR3-09-01	5	8	18	27	39	57	96	173	0.04451
R-TR3-11	263	385	731	1096	1566	1980	2336	3674	1.04271
R-TR3-11-02	129	188	352	490	749	954	1123	1517	0.37047
R-TR3-11-03	18	24	42	55	73	86	99	128	0.01968
R-TR3-11-04-UP	95	137	250	344	562	690	808	1083	0.25112
R-TR3-11-05	2	3	11	40	70	88	106	150	0.04325
R-TR3-11-06	95	136	247	339	503	607	708	943	0.20788
R-TR3-11-08	55	81	150	208	284	342	400	536	0.11677
R-TR3-11-09	25	35	62	84	112	133	154	202	0.03806
R-TR3-12	118	172	327	525	724	879	1104	2020	0.53481
R-TR3-12-UP	107	153	286	460	630	762	1029	1849	0.46492
R-TR3-12-02	106	152	284	396	542	657	967	1713	0.42439
R-TR3-12-03	0	0	0	8	48	138	304	686	0.13367
R-TR3-12-04	43	60	105	142	189	224	259	340	0.06141
R-TR3-12-05	25	35	60	81	106	125	144	188	0.02899
R-TR3-12-06	6	11	27	42	63	79	97	139	0.04446
R-TR3-14	50	73	137	192	264	320	376	510	0.13466
R-TR3-15	29	44	90	128	180	221	262	359	0.08699
R-TR3-16	20	27	47	62	83	98	113	148	0.02959
R-TR4-02	99	137	259	358	587	669	761	991	0.43905
R-TR4-03	95	135	257	390	595	686	786	1013	0.41810
R-TR4-04	79	157	239	280	422	484	555	723	0.34152
R-TR4-05	72	154	216	272	349	373	376	384	0.24451
R-TR4-06	87	245	299	299	299	299	299	304	0.17429
R-TR4-08	29	39	63	82	105	123	140	179	0.03028
R-WEW-02	222	285	446	577	825	1018	1207	1635	0.48460
R-WEW-03	228	295	454	583	835	1032	1221	1644	0.47675
R-WEW-04	214	273	415	559	797	983	1161	1560	0.42147
R-WEW-05	212	270	403	557	800	986	1159	1552	0.38954
R-WEW-05-01	88	113	176	225	284	327	370	466	0.07507

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
R-WEW-05-02	47	61	95	121	153	177	200	252	0.03737
R-WEW-06	68	115	278	424	627	773	916	1236	0.30283
R-WEW-06-SS2	80	80	80	80	80	80	80	80	0.00000
R-WEW-06-UP	144	189	357	507	678	819	951	1253	0.27844
R-WEW-07	136	179	335	472	625	752	871	1144	0.24839
R-WEW-07-UP	87	128	283	419	564	688	803	1064	0.23235
R-WEW-08	48	48	48	48	48	48	48	48	0.00000
R-WEW-08-MID	124	178	331	432	582	663	758	985	0.19732
R-WEW-08-UP	106	160	290	393	523	620	715	941	0.19732
R-WEW-08-UP_SS	48	48	48	48	48	48	48	48	0.00000
R-WEW-08-02	98	130	215	284	369	434	498	645	0.12586
R-WEW-08-03	57	77	129	172	226	266	307	400	0.07794
R-WEW-08-04	18	28	55	78	109	132	156	211	0.04212
R-WEW-08-05	24	33	57	76	101	119	138	179	0.02718
R-WEW-08-06	26	34	51	65	82	94	106	132	0.01748
R-WEW-10	46	57	86	109	136	156	177	221	0.03637
TRA-01	2	3	6	10	14	18	21	30	0.00708
TRA-02	14	19	35	47	63	76	88	116	0.02278
TRA-03	28	37	60	78	100	117	133	170	0.02532
TRA-03-01	14	20	35	48	64	76	88	116	0.02251
TRA-04	13	18	31	42	56	67	77	101	0.01828
TRA-05	33	43	67	86	110	127	144	182	0.02597
TRA-06	31	41	65	83	107	124	141	181	0.04715
TRB-01	37	51	87	117	154	182	209	272	0.05354
TRB-02	10	13	23	31	42	49	57	75	0.01569
TRB-03	30	42	76	104	140	168	195	258	0.03749
TRB-04	26	32	45	55	66	75	83	103	0.01782
TRB-04-01	17	22	33	42	53	61	69	86	0.01593
TRB-05	50	63	93	116	145	165	185	230	0.03541
TRC-01	18	27	52	72	100	121	142	190	0.02881
TRC-02	45	58	90	115	146	169	191	241	0.03832
TRC-03	30	42	74	100	133	157	182	238	0.03511
TRC-03-01	34	45	74	97	125	146	167	215	0.04112
TRC-03-02	6	7	12	16	20	23	27	34	0.00576
TRC-04	31	45	84	117	161	194	227	304	0.06915
TRC-04-01	28	39	70	95	128	152	176	232	0.03326
TRC-05	9	12	22	29	40	48	56	75	0.03182
TRC-06	46	64	109	145	191	225	258	335	0.04807
TR1-01	31	41	70	92	121	142	163	211	0.03691
TR1-02	22	35	72	104	146	178	211	287	0.05388

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
TR1-03	8	16	38	59	87	109	132	187	0.04168
TR1-04	28	42	81	113	155	187	220	295	0.05542
TR1-04-01	23	31	51	67	87	102	117	149	0.02086
TR1-05	9	15	36	55	81	101	122	171	0.03849
TR1-05-01	30	44	82	113	154	185	216	289	0.06495
TR1-05-02	27	38	69	94	126	150	174	229	0.03634
TR1-05-03	61	79	122	156	197	228	257	325	0.05350
TR1-06	7	11	21	31	43	52	61	83	0.01630
TR1-07	44	61	106	143	191	227	262	343	0.05235
TR1-07-01	19	28	53	74	101	121	142	190	0.03607
TR1-07-02	4	9	30	51	80	104	129	191	0.05105
TR1-08	37	51	89	119	157	186	214	279	0.04062
TR1-08-01	25	33	54	70	91	106	121	155	0.02356
TR1-08-02	4	7	15	21	30	37	45	61	0.01381
TR1-09	31	43	78	106	142	170	198	261	0.05537
TR1-10	8	14	32	48	70	87	105	148	0.03846
TR1-11	36	49	82	109	143	168	193	249	0.03840
TR1-11-01	3	6	12	18	26	33	39	54	0.01024
TR1-12	30	39	64	84	109	127	145	185	0.02887
TR2-01	6	10	21	31	44	54	65	90	0.02662
TR2-02	18	26	49	68	92	110	129	171	0.03125
TR2-03	5	10	23	35	52	65	78	110	0.02537
TR2-03-01	19	26	43	57	74	87	99	128	0.01793
TR2-03-02	26	35	59	78	103	121	139	180	0.03798
TR2-04	7	11	20	29	40	48	57	78	0.02526
TR2-04-01	18	24	37	47	59	68	77	97	0.01915
TR2-04-02	31	39	59	74	92	105	119	149	0.02766
TR2-05	18	25	42	57	74	88	101	132	0.02275
TR2-06	50	64	101	129	164	189	214	270	0.03616
TR2-07	62	83	137	180	234	274	313	402	0.05734
TR2-08	16	21	33	42	54	62	70	89	0.01403
TR2-09	37	46	69	86	108	123	138	172	0.02280
TR2-09-01	29	36	54	68	84	97	109	136	0.02317
TR2-10	45	57	88	112	141	163	184	233	0.04673
TR2-10-01	11	14	21	26	32	37	42	52	0.00873
TR2-11	56	72	113	144	183	212	240	304	0.05889
TR3-01	18	31	72	107	156	194	233	327	0.07743
TR3-01-01	8	18	55	90	139	178	219	320	0.08427
TR3-01-02	30	42	77	106	144	172	200	266	0.05268
TR3-02	15	22	40	56	77	92	108	145	0.03297

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
TR3-03	16	23	42	57	78	93	108	143	0.02395
TR3-04	7	18	63	106	167	216	268	393	0.08474
TR3-04-01	15	27	64	97	142	178	214	303	0.08006
TR3-04-02	22	32	59	81	110	132	153	204	0.03786
TR3-04-03	12	20	46	68	98	121	144	200	0.03662
TR3-04-04	3	7	23	39	61	80	99	147	0.04376
TR3-04-05	16	25	50	71	100	122	145	198	0.04004
TR3-04-06	10	22	60	95	144	182	222	319	0.07210
TR3-04-07	3	8	24	38	59	76	94	136	0.03070
TR3-04-08	20	36	82	123	178	222	267	373	0.06712
TR3-04-09	6	11	26	40	58	73	88	124	0.02847
TR3-04-10	11	17	34	48	67	82	96	130	0.02218
TR3-04-11	21	33	65	93	129	157	186	251	0.04407
TR3-04-12	34	51	100	140	194	235	276	371	0.05934
TR3-05	5	14	44	72	112	145	179	261	0.05642
TR3-05-01	4	8	28	47	74	96	119	175	0.05089
TR3-05-02	8	20	62	102	156	201	247	359	0.07712
TR3-05-03	4	11	34	57	88	113	139	201	0.04174
TR3-05-04	9	20	56	90	137	176	215	312	0.08408
TR3-05-05	12	24	64	99	149	188	228	325	0.06542
TR3-05-06	14	23	53	79	114	141	169	235	0.05096
TR3-05-07	15	29	74	115	172	217	264	376	0.08595
TR3-05-08	5	9	21	33	48	61	74	104	0.02442
TR3-05-09	25	35	64	88	119	143	166	220	0.03900
TR3-05-10	42	58	100	133	176	208	240	312	0.04330
TR3-05-11	14	26	63	96	142	178	215	304	0.07550
TR3-05-12	13	20	39	55	76	92	108	147	0.03036
TR3-05-13	43	62	115	159	217	260	304	405	0.08071
TR3-06	12	23	60	93	139	177	215	308	0.07992
TR3-06-01	9	16	38	58	86	107	129	182	0.04094
TR3-06-02	23	32	57	77	103	123	142	187	0.03240
TR3-06-03	32	46	83	113	152	182	211	279	0.04958
TR3-07	6	14	47	78	122	158	196	288	0.07733
TR3-07-01	28	40	74	102	137	164	191	254	0.04182
TR3-07-02	17	22	37	48	62	73	83	106	0.01674
TR3-07-03	31	45	83	114	153	184	214	283	0.04589
TR3-08	5	10	27	43	66	83	101	146	0.03773
TR3-09	32	49	97	139	193	235	277	376	0.07013
TR3-09-01	11	20	44	65	94	117	140	195	0.04451
TR3-10	41	57	101	137	183	218	252	330	0.04307

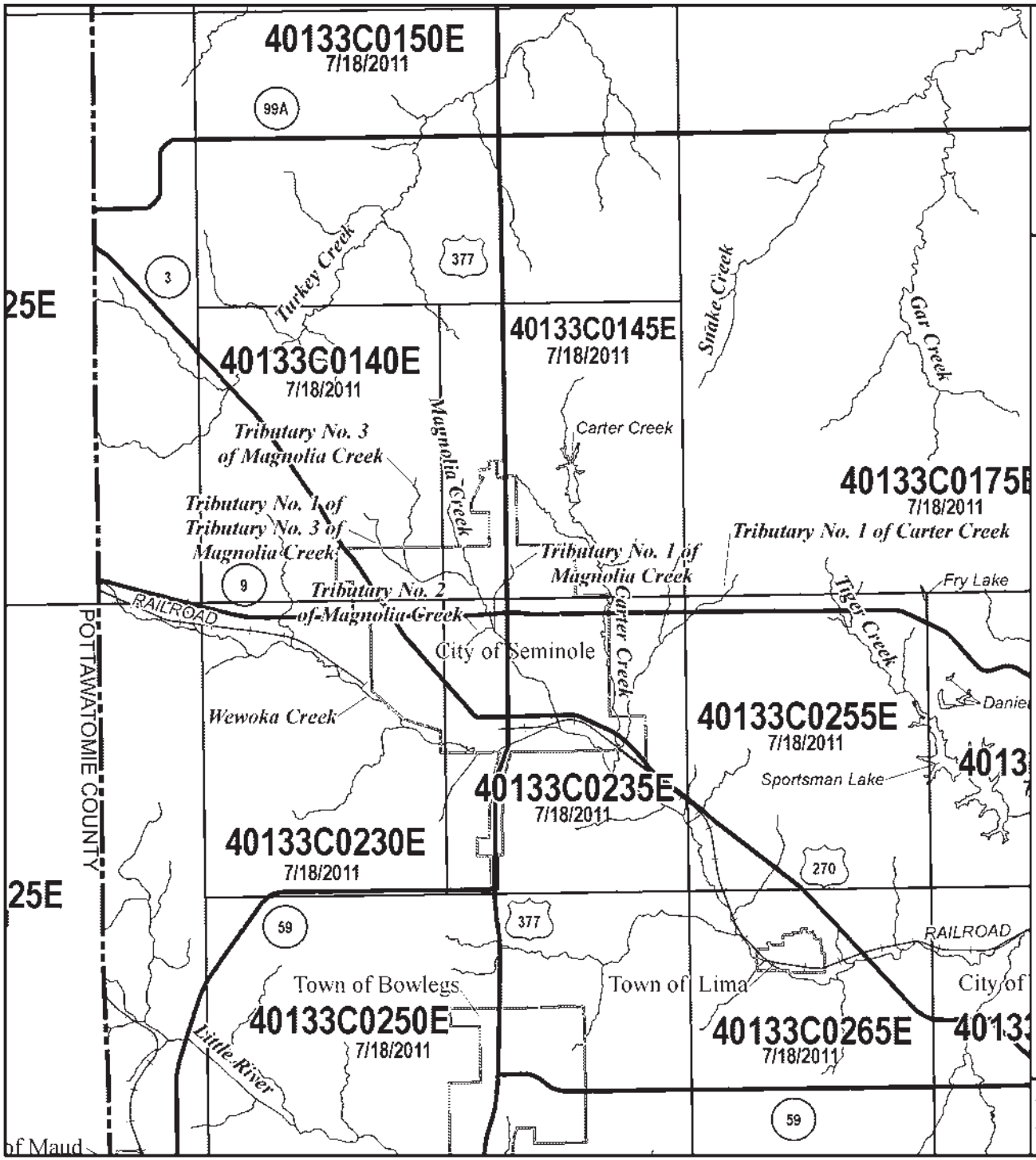
Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
TR3-11	7	13	33	51	76	96	116	164	0.03643
TR3-11-01	4	7	17	26	38	48	58	83	0.01957
TR3-11-02	25	38	75	106	148	180	212	287	0.05098
TR3-11-03	18	24	42	55	73	86	99	128	0.01968
TR3-11-04	12	20	45	67	98	121	145	203	0.04869
TR3-11-05	8	14	32	48	70	88	106	150	0.04325
TR3-11-06	24	34	61	83	112	133	154	204	0.04122
TR3-11-07	38	52	90	120	158	187	216	281	0.04989
TR3-11-08	33	51	99	140	194	235	276	374	0.07871
TR3-11-09	25	35	62	84	112	133	154	202	0.03806
TR3-11-10	28	48	111	166	242	300	360	501	0.08143
TR3-12	16	31	75	114	169	211	255	360	0.06989
TR3-12-01	28	40	71	98	131	156	181	239	0.04052
TR3-12-02	15	27	61	90	131	162	194	269	0.04896
TR3-12-03	30	48	99	143	202	247	293	401	0.07225
TR3-12-04	33	45	79	105	139	164	190	247	0.03243
TR3-12-05	25	35	60	81	106	125	144	188	0.02899
TR3-12-06	6	11	27	42	63	79	97	139	0.04446
TR3-13	56	76	128	170	222	261	300	388	0.06264
TR3-14	42	58	99	132	173	204	234	304	0.04767
TR3-15	10	18	43	66	98	123	149	212	0.05741
TR3-16	20	27	47	62	83	98	113	148	0.02959
TR4-01	19	26	43	57	75	89	102	132	0.02328
TR4-02	15	20	33	43	56	66	76	98	0.01649
TR4-02-01	8	10	14	17	20	23	25	31	0.00447
TR4-03	52	73	128	173	230	273	316	415	0.07658
TR4-04	77	105	179	238	312	367	421	544	0.07170
TR4-04-01	26	34	55	71	91	106	120	153	0.02531
TR4-05	44	65	122	169	231	278	325	434	0.07022
TR4-06	55	75	125	165	215	252	288	372	0.06053
TR4-07	108	139	216	275	347	400	452	569	0.08348
TR4-08	29	39	63	82	105	123	140	179	0.03028
WEW-01	8	16	43	68	103	130	158	227	0.05094
WEW-02	4	6	12	17	24	29	34	46	0.00785
WEW-03	48	63	103	134	173	202	230	295	0.05528
WEW-04	55	68	100	124	153	174	195	241	0.03193
WEW-05	24	30	43	53	65	74	82	102	0.01164
WEW-05-01	42	53	83	106	133	154	174	220	0.03770
WEW-05-02	47	61	95	121	153	177	200	252	0.03737
WEW-06	37	45	67	83	102	116	130	161	0.02439

Seminole MDP
Existing Flow Rates (CFS)

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
WEW-06-01	29	37	59	75	96	111	126	160	0.03005
WEW-07	21	27	40	51	63	72	81	101	0.01302
WEW-07-01	6	7	11	14	17	19	22	27	0.00302
WEW-07-02	25	31	47	59	73	83	94	117	0.01793
WEW-08	29	36	52	64	79	89	99	123	0.01710
WEW-08-01	22	27	41	51	64	73	81	101	0.01315
WEW-08-02	34	43	66	84	105	120	136	170	0.02075
WEW-08-03	22	28	43	54	68	78	88	110	0.01834
WEW-08-04	18	28	55	78	109	132	156	211	0.04212
WEW-08-05	24	33	57	76	101	119	138	179	0.02718
WEW-08-06	26	34	51	65	82	94	106	132	0.01748
WEW-09	33	42	62	78	96	110	124	154	0.02194
WEW-10	53	66	97	121	150	171	192	238	0.03637

Appendix 3-D
FEMA Floodplain and Floodway



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM

FLOOD INSURANCE RATE MAP

SEMINOLE COUNTY,
OKLAHOMA

AND INCORPORATED AREAS

MAP INDEX

PANELS PRINTED: 25, 50, 75, 100, 125, 140, 145, 150, 175, 200, 225, 230, 235, 250, 255, 260, 265, 270, 290, 300, 325, 350, 375, 380, 400, 425, 450, 475, 500, 525, 550

MAP NUMBER
40133CIND0A

MAP REVISED
JULY 18, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

96°41'15"

35°15'00"

39 03 000m N

39 02 000m N

39 01 000m N

JOINS PANEL 0

ance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

0 500 1,000 1,500 2,000 FEET

Magnolia Creek

Tributary No. 2 of Magnolia Creek

ZONE AE

ZONE A

Bridge

PROFILE BASE LINE

LIMIT OF DETAILED STUDY

LIMIT OF STUDY

City of Seminole
400192

BRANDON DR
ELOISE CIR
MILT PHILLIPS ST
EASTGATE DR
TWIN LAKES DR
WILLIAM BLVD
N3570 RD
MOCKING BIRD DR
ROBIN RD
MORNINGSIDE DR
MEADOW LN
CRISSO DR
PHELPS DR
GIBSON DR
GOLF RD
HOFFMAN DR
SIMS PL
BEALS PL
MORGAN DR
DICEY RD
RAY DAVIS RD
RAY DAVIS BLVD
LILLY ST
ADWAN AVE
HARVEY RD
NORTHWOOD DR
JOHN ST
CASON DR
REID ST
REID CIR
COOLIDGE ST
VAN DR
ROOSEVELT ST
GESSEL ST
EUREKA ST
JEFFERSON ST
UNIVERSITY ST
HIGHLAND ST
HARBER ST
HARDING ST
TAFT ST
LEE AVE
WILSON AVE
HOOVER AVE
STROTHER AVE
TIMMONS ST
WILSON AVE
FJ1211
ELM ST
MC KINLEY ST
RUSSELL AVE
WALNUT AVE
COLLEGE AVE
TRUMAN AVE
SIMPSON AVE
SEMINOLE AVE
FJ1210
FJ1214
FJ0107
FJ1215
FJ0106
FJ1213
PARK ST
SECOND ST
MAIN ST
OAK AVE
FJ1212
JACKSON ST
BROADWAY AVE
DOUGLAS AVE
FJ1209
FJ0108
MARKET ST
FOURTH ST
EVANS AVE
FIFTH ST
SIXTH ST
SEVENTH ST
EIGHTH ST
NINTH ST
CLAUSING BLVD
MANOR DR
ROESLER BLVD
MONTGOMERY RD
SHAW LN
SHAW LN
ZONE AE
ZONE A
ZONE AE
ZONE AE
ZONE AE
ZON
Magnolia Creek
877
875
872
869
868
867
876
874
885
881
889
894
866
863
859
856
853
16
15
9
22
21
28
27

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0235E

FIRM

FLOOD INSURANCE RATE MAP

SEMINOLE COUNTY, OKLAHOMA

AND INCORPORATED AREAS

PANEL 235 OF 550

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEMINOLE COUNTY, UNINCORPORATED AREAS	400497	0235	E
SEMINOLE, CITY OF	400192	0235	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
40133C0235E

MAP REVISED
JULY 18, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

ance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

0 500 1,000 1,500 2,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0145E

FIRM

FLOOD INSURANCE RATE MAP

SEMINOLE COUNTY, OKLAHOMA

AND INCORPORATED AREAS

PANEL 145 OF 550

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEMINOLE COUNTY, UNINCORPORATED AREAS	400497	0145	E
SEMINOLE, CITY OF	400192	0145	E

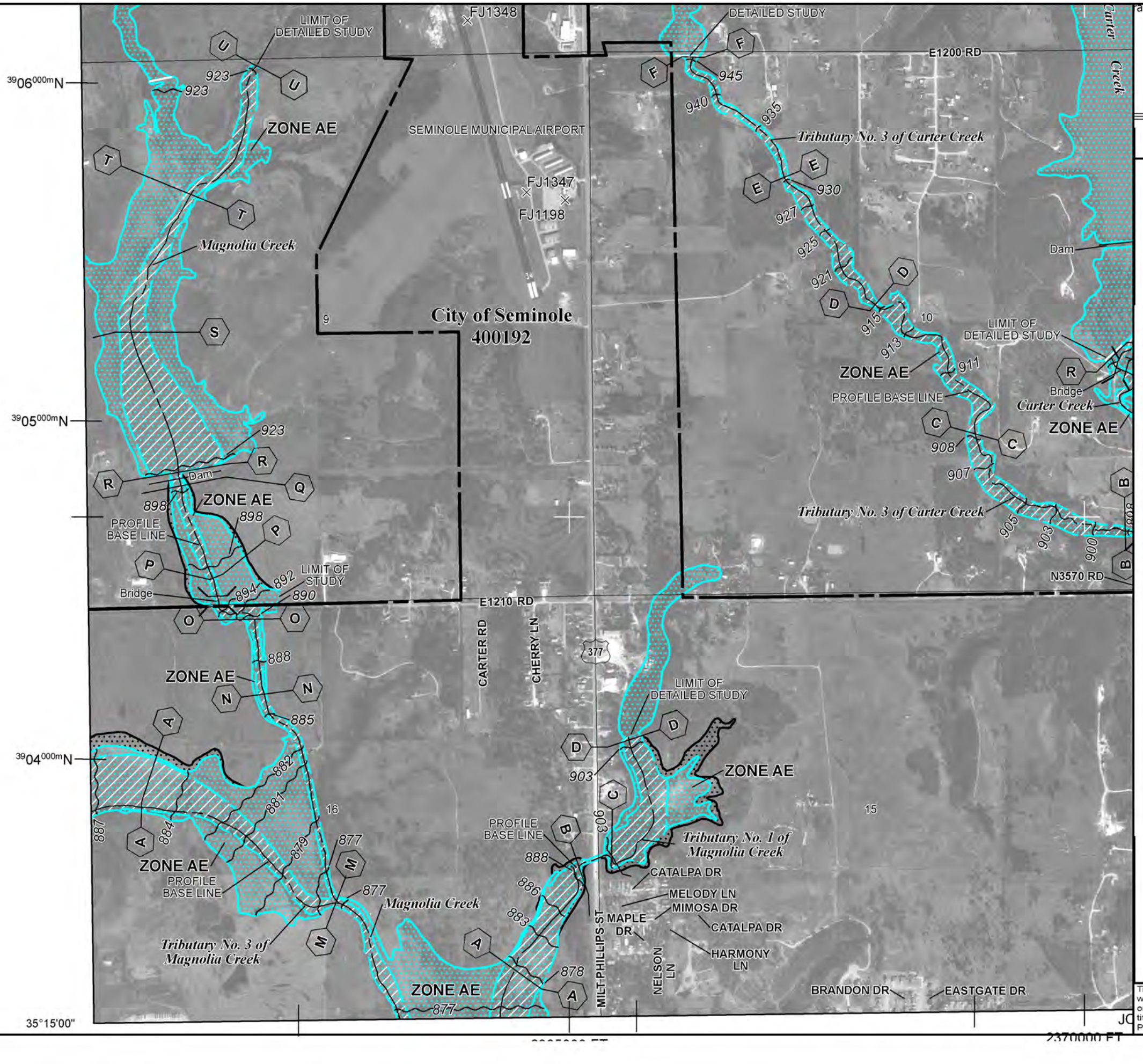
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
40133C0145E

MAP REVISED
JULY 18, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



ance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

0 500 1,000 1,500 2,000 FEET

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0140E

FIRM

FLOOD INSURANCE RATE MAP

SEMINOLE COUNTY, OKLAHOMA

AND INCORPORATED AREAS

PANEL 140 OF 550

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEMINOLE COUNTY, UNINCORPORATED AREAS	400497	0140	E
SEMINOLE, CITY OF	400192	0140	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 40133C0140E

MAP REVISED JULY 18, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

N3530

N3540 RD

E1210 RD

N3530 RD

DAVIS LN

DAVIDSON RD

KENT LN

IDEAL ST

LIMIT OF DETAILED STUDY

LIMIT OF STUDY

PROFILE BASE LINE

Bridge

ZONE AE

ZONE A

FLOODING EFFECTS MAGNOLIA CREE

Tributary No. 3 of Magnolia Creek

Tributary No. 1 of Tributary No. 3 of Magnolia Creek

City of Seminole 400192

967 963 961 957 955 952 948 943 939 934 930 927 922 917 912 909 905 904 901 900 898 897 895 892 923 920 917 913 911 905 904 898 897 895 892 888 887

7 8 9 16 17 18

3E

705000 FT

35°15'00"

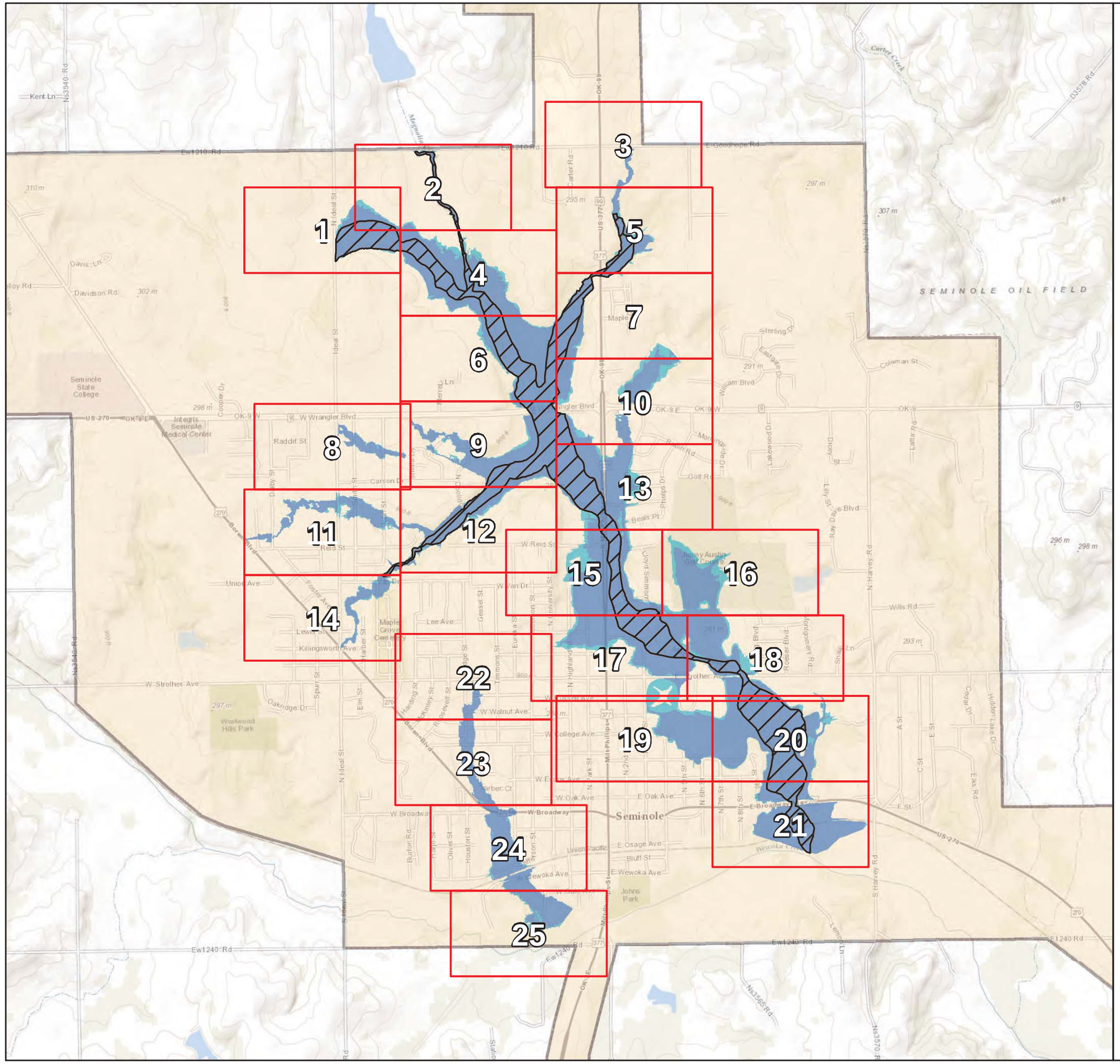
R. 5 E. R. 6 E.

JOINS PANEL 0230

2355000 FT

2360000 FT

Appendix 3-E
Existing Floodplain and Floodway



City of Seminole Master Drainage Plan

Existing Conditions Floodplain Atlas

- Floodplain Atlas Panels
- Seminole City Limits
- Floodway
- 1% Annual Chance
- 0.2% Annual Chance

N

0 0.5 1

Miles

creating a better tomorrow...
MESHEK & ASSOCIATES, PLC
GEOGRAPHIC INFORMATION SYSTEMS
CIVIL AND WATER RESOURCE ENGINEERING
1437 S. Boulder Ave - Suite1550 Tulsa, OK 74119
www.meshekgis.com 918-392-5620

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

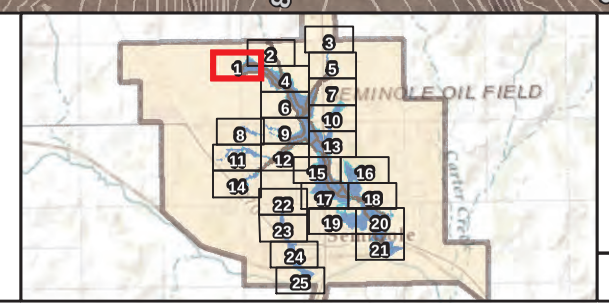
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

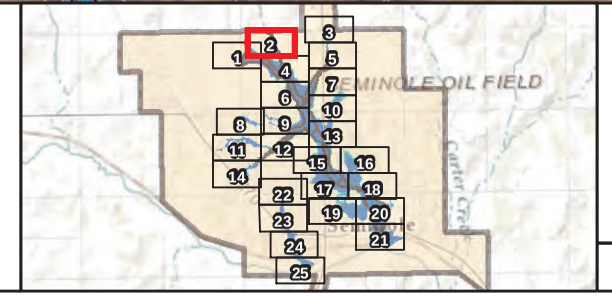
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

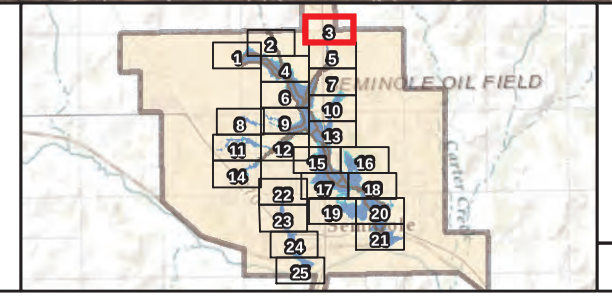
Floodway

1% Annual Chance

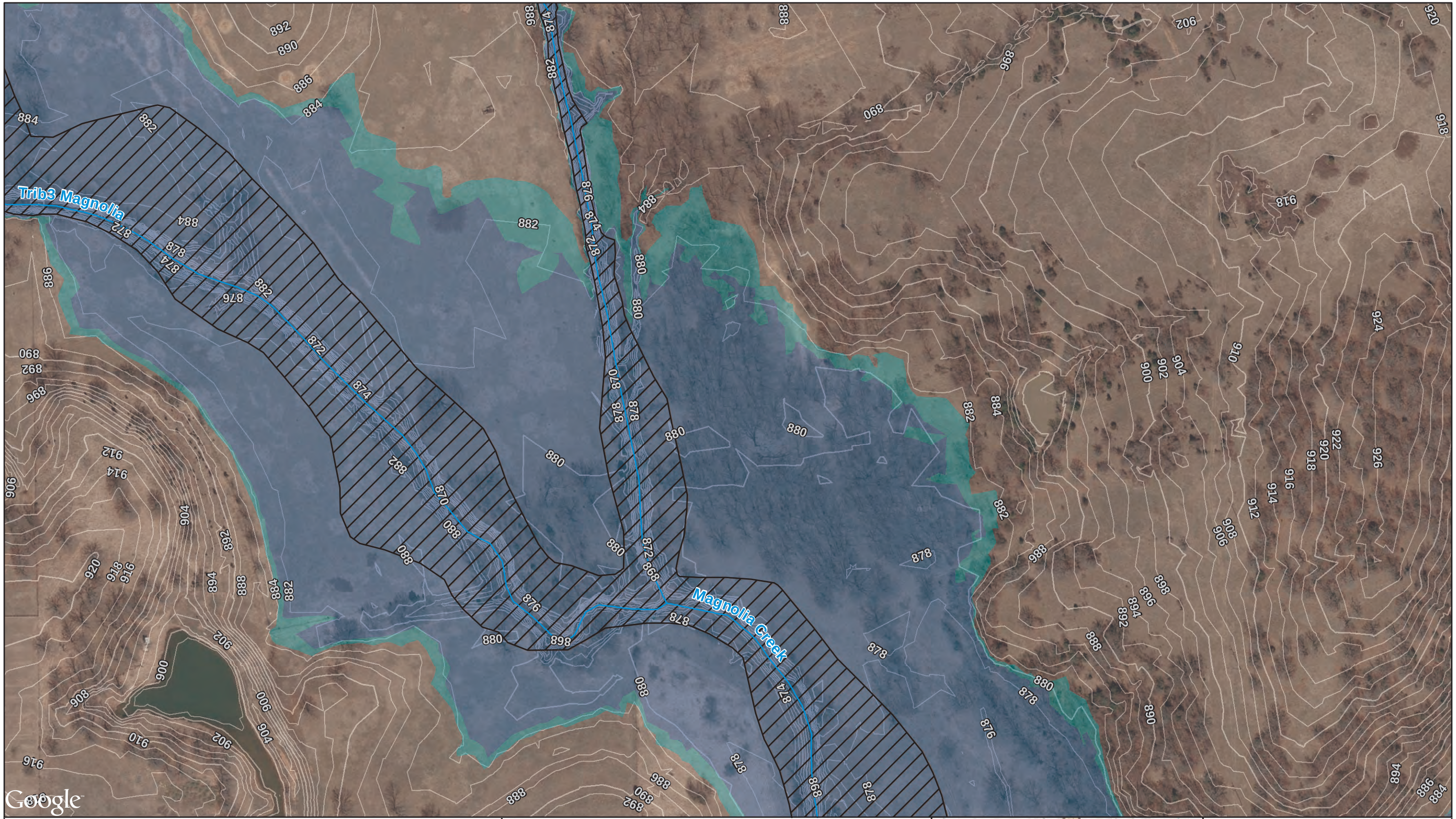
0.2% Annual Chance

Stream Centerline

Seminole City Limits



CITY OF SEMINOLE



City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

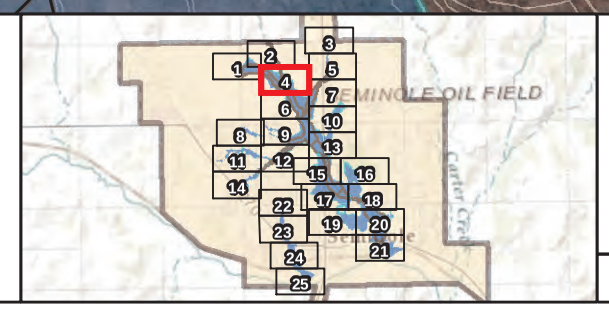
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits

SEMINOLE OIL FIELD

CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits

SEMINOLE OIL FIELD

CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

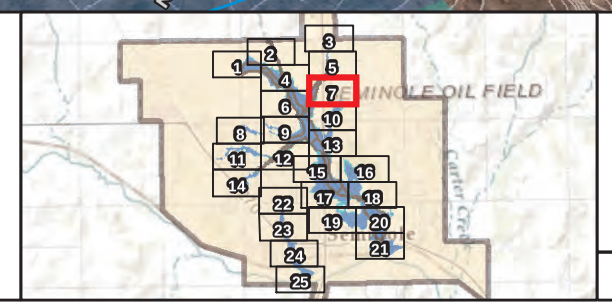
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits

TribB of Trib2 of Magnolia Creek

SEMINOLE OIL FIELD

CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits

SEMINOLE OIL FIELD

CITY OF SEMINOLE

Map Page 9 of 25

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

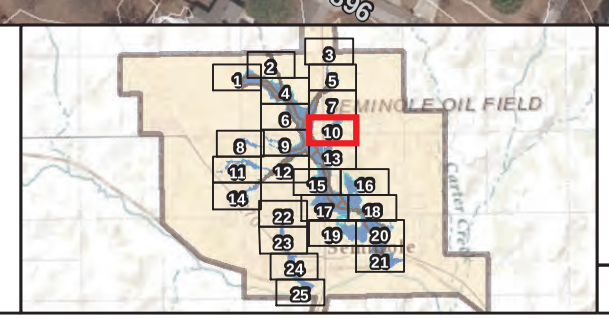
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

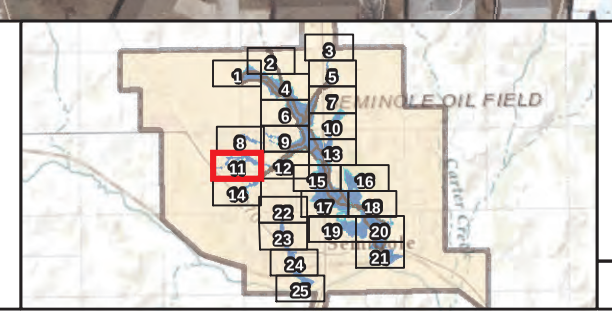
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

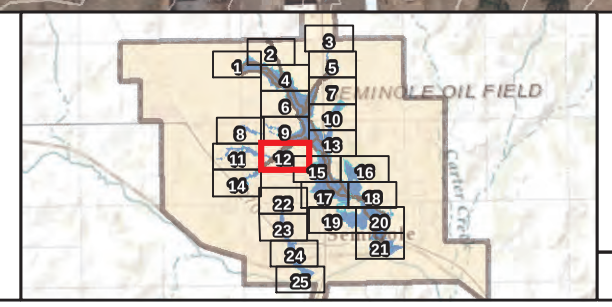
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

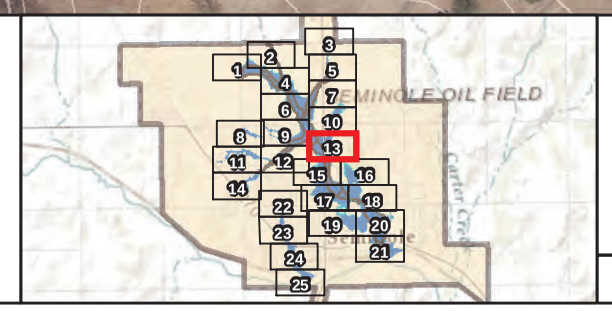
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE



City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits

SEMINOLE OIL FIELD

CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

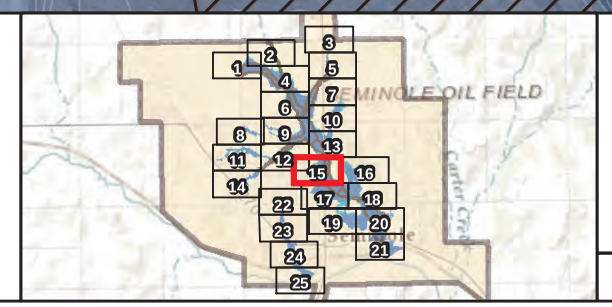
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

Map Page 15 of 25

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

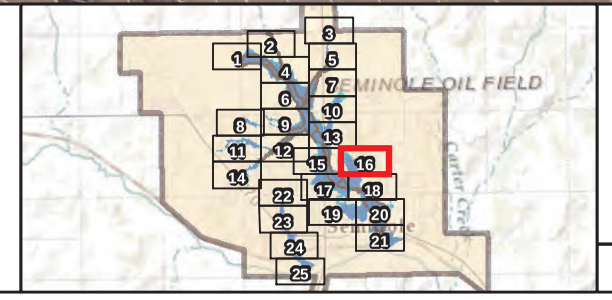
Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

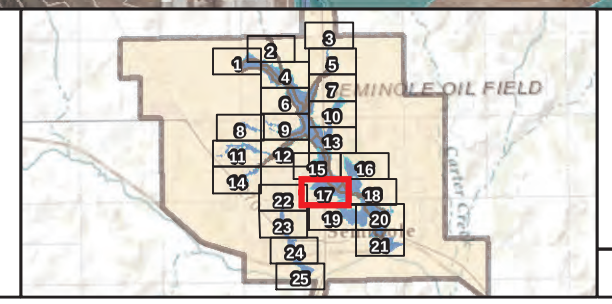
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

Map Page 17 of 25

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits

SEMINOLE OIL FIELD

CITY OF SEMINOLE

Map Page 18 of 25



City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

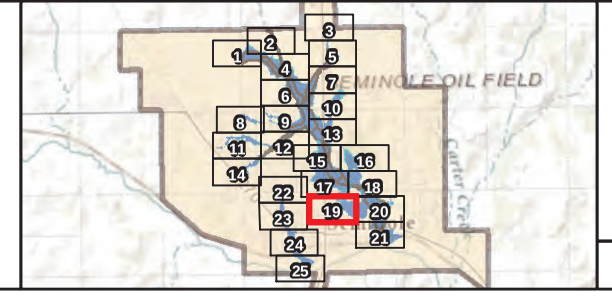
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

- Floodway
- 1% Annual Chance
- 0.2% Annual Chance
- Stream Centerline
- Seminole City Limits



CITY OF SEMINOLE

Magnolia Creek

Seminole Ave

E Evans Ave

N 7th St

N 8th St

N 9th St

N 10th St

Google

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits

SEMINOLE OIL FIELD

CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

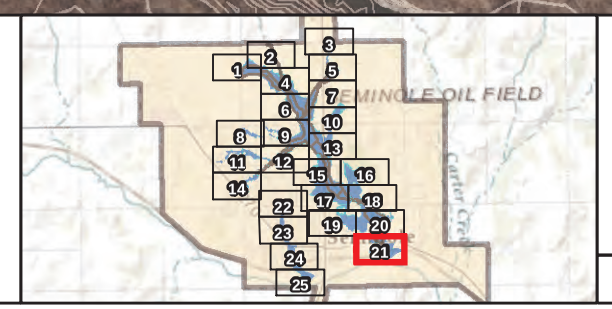
Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

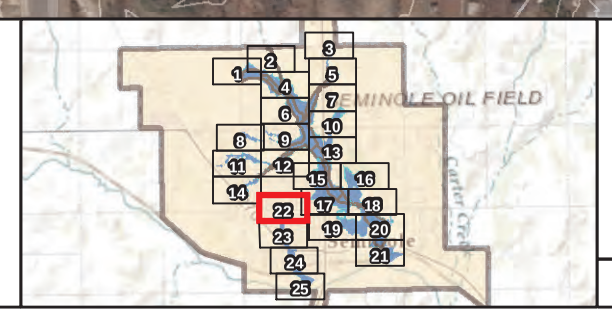
Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

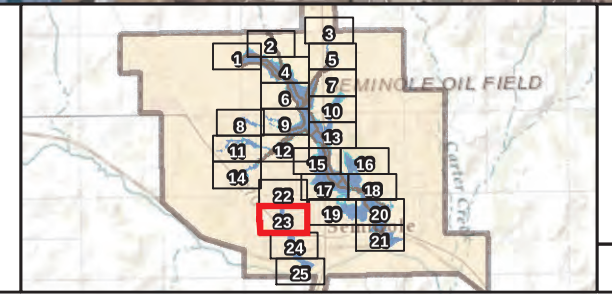
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

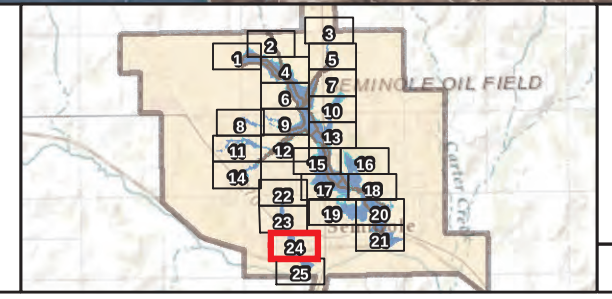
Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits



CITY OF SEMINOLE



City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

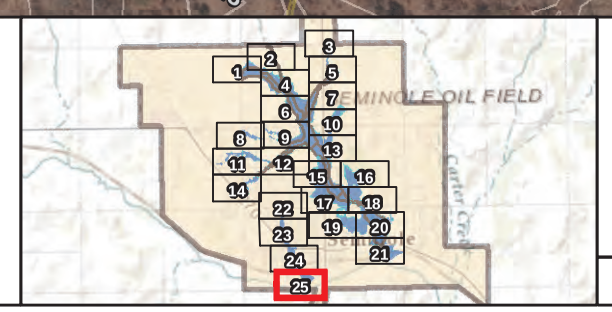
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

Appendix 3-F
Water Surface Profiles

ELEVATION IN FEET (NAVD)

835 840 845 850 855 860 865 870 875 880

STREAM DISTANCE IN IN FEET FROM CONFLUENCE WITH WEWOKA CREEK

55 555 1,055 1,555 2,055 2,555 3,055 3,555 4,055 4,555 5,055 5,555 6,055 6,555

Railroad

E Broadway Ave

Private Structure

Ew Hwy 123/Strothers Ave

Lloyd Simmons Blvd

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 4% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- 20% ANNUAL CHANCE FLOOD
- 50% ANNUAL CHANCE FLOOD
- 100% ANNUAL CHANCE FLOOD
- STREAM BED

FEDERAL EMERGENCY MANAGEMENT AGENCY

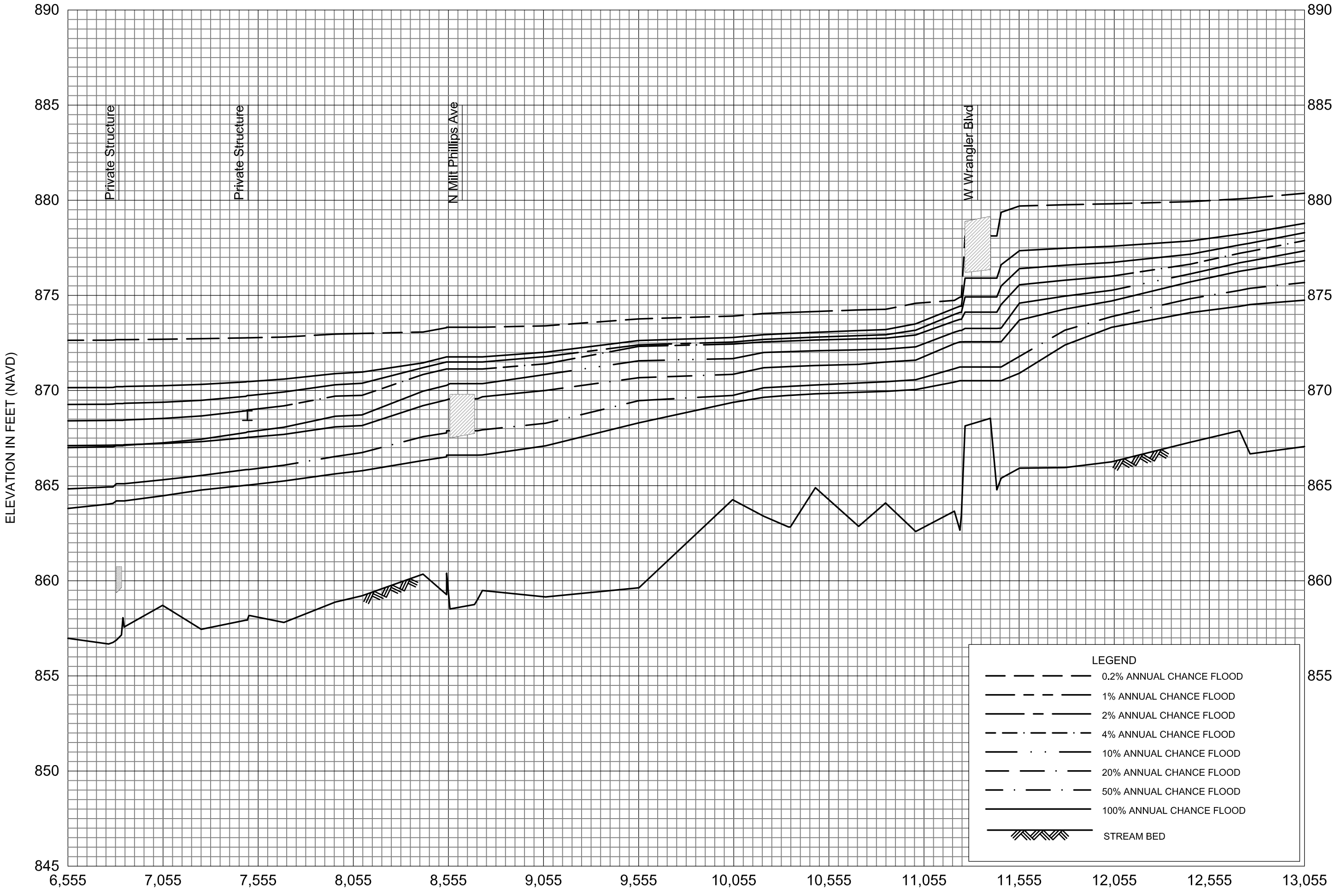
SEMINOLE, OK

CITY OF SEMINOLE

FLOOD PROFILES

MAGNOLIA CREEK

01P



FLOOD PROFILES

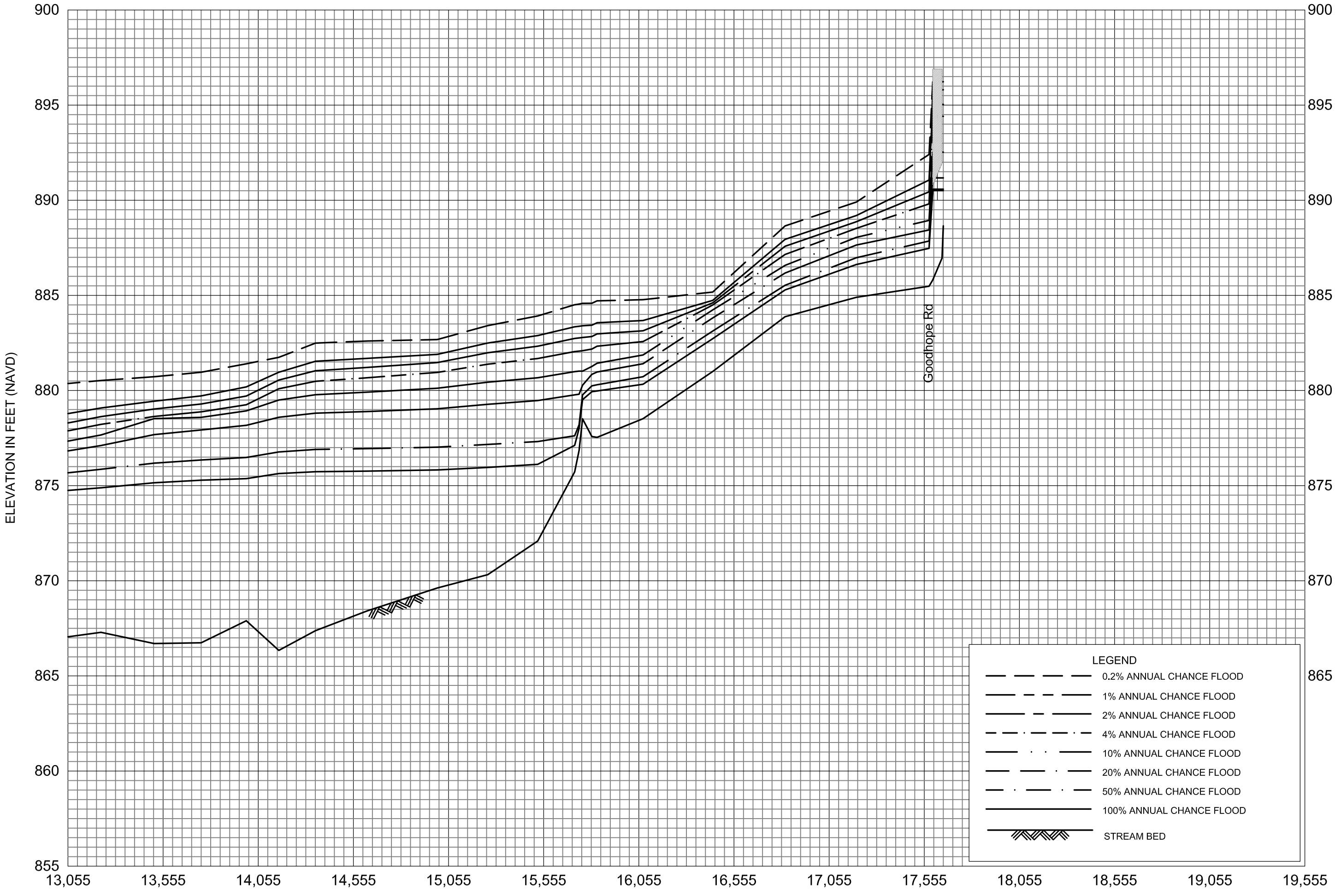
MAGNOLIA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

02P



FLOOD PROFILES

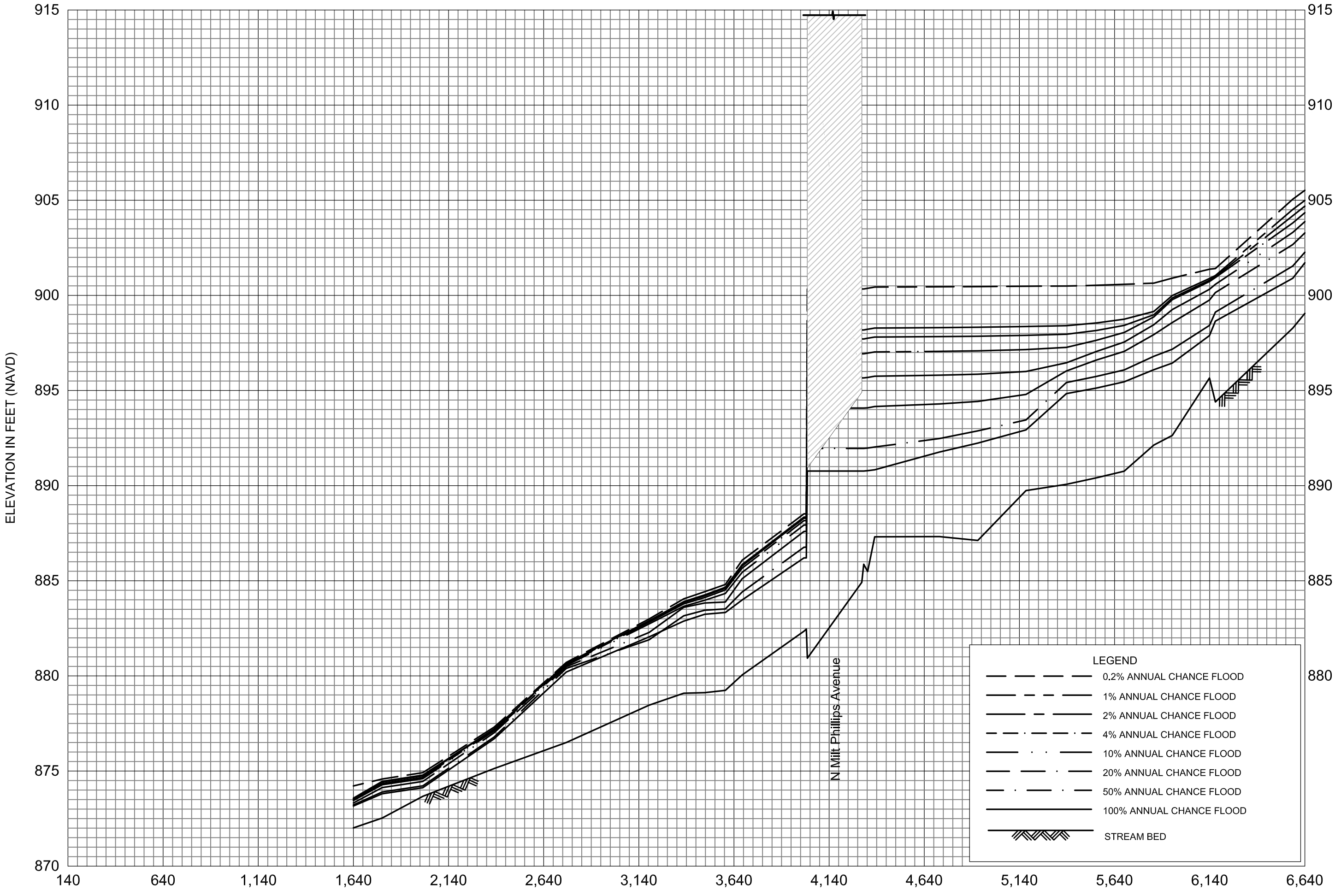
MAGNOLIA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

03P



FLOOD PROFILES

TRIBUTARY 1 TO MAGNOLIA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

01P

ELEVATION IN FEET (NAVD)

885 890 895 900 905 910 915 920 925 930

STREAM DISTANCE IN IN FEET FROM CONFLUENCE WITH MAGNOLIA CREEK

2,140 2,640 3,140 3,640 4,140 4,640 5,140 5,640 6,140 6,640 7,140 7,640 8,140 8,640

N Milt Phillips Avenue

Goodhope Rd

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 4% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- 20% ANNUAL CHANCE FLOOD
- 50% ANNUAL CHANCE FLOOD
- 100% ANNUAL CHANCE FLOOD
- STREAM BED

FEDERAL EMERGENCY MANAGEMENT AGENCY

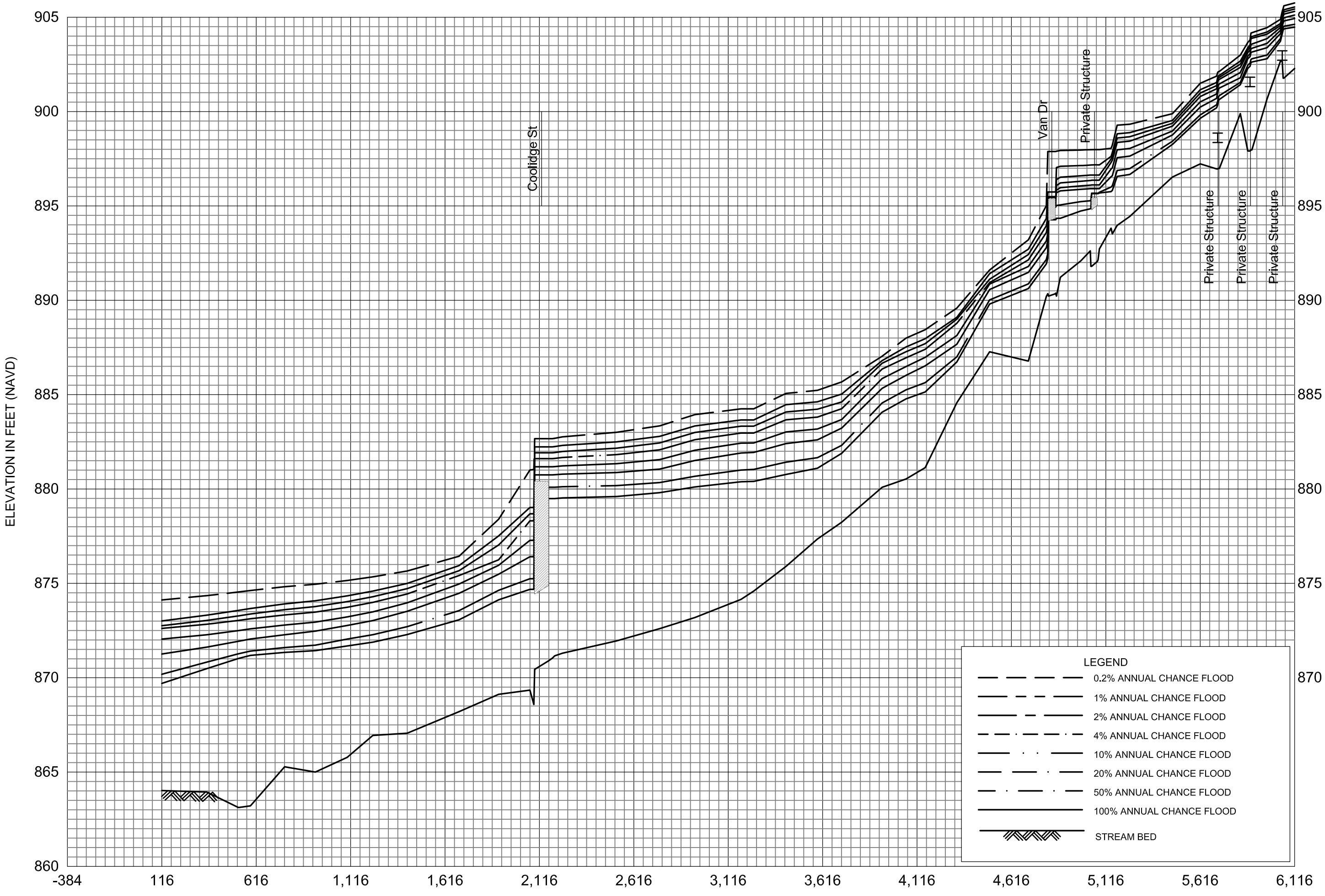
SEMINOLE, OK

CITY OF SEMINOLE

FLOOD PROFILES

TRIBUTARY 1 TO MAGNOLIA CREEK

02P



FLOOD PROFILES

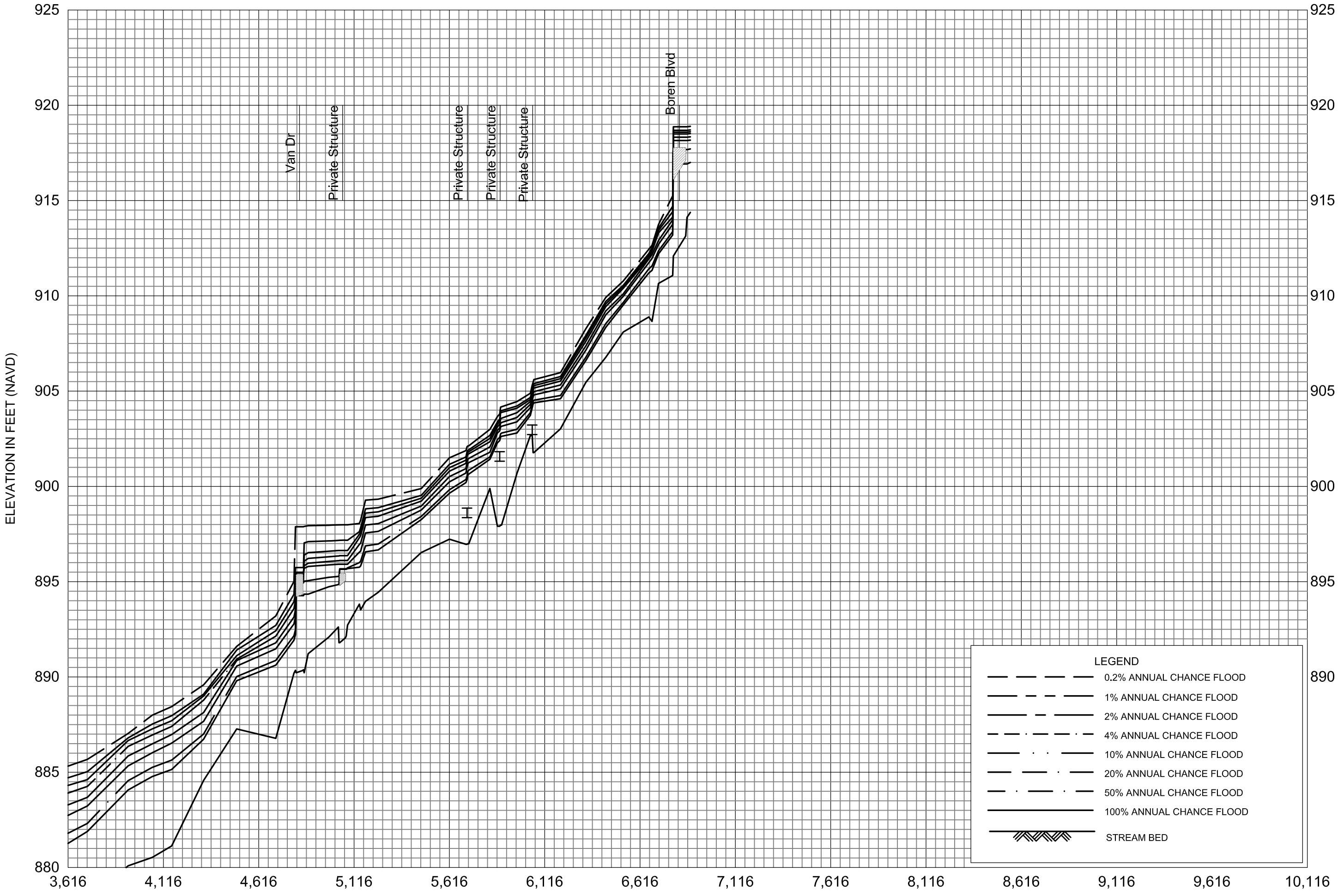
TRIBUTARY 2 TO MAGNOLIA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

01P



FLOOD PROFILES

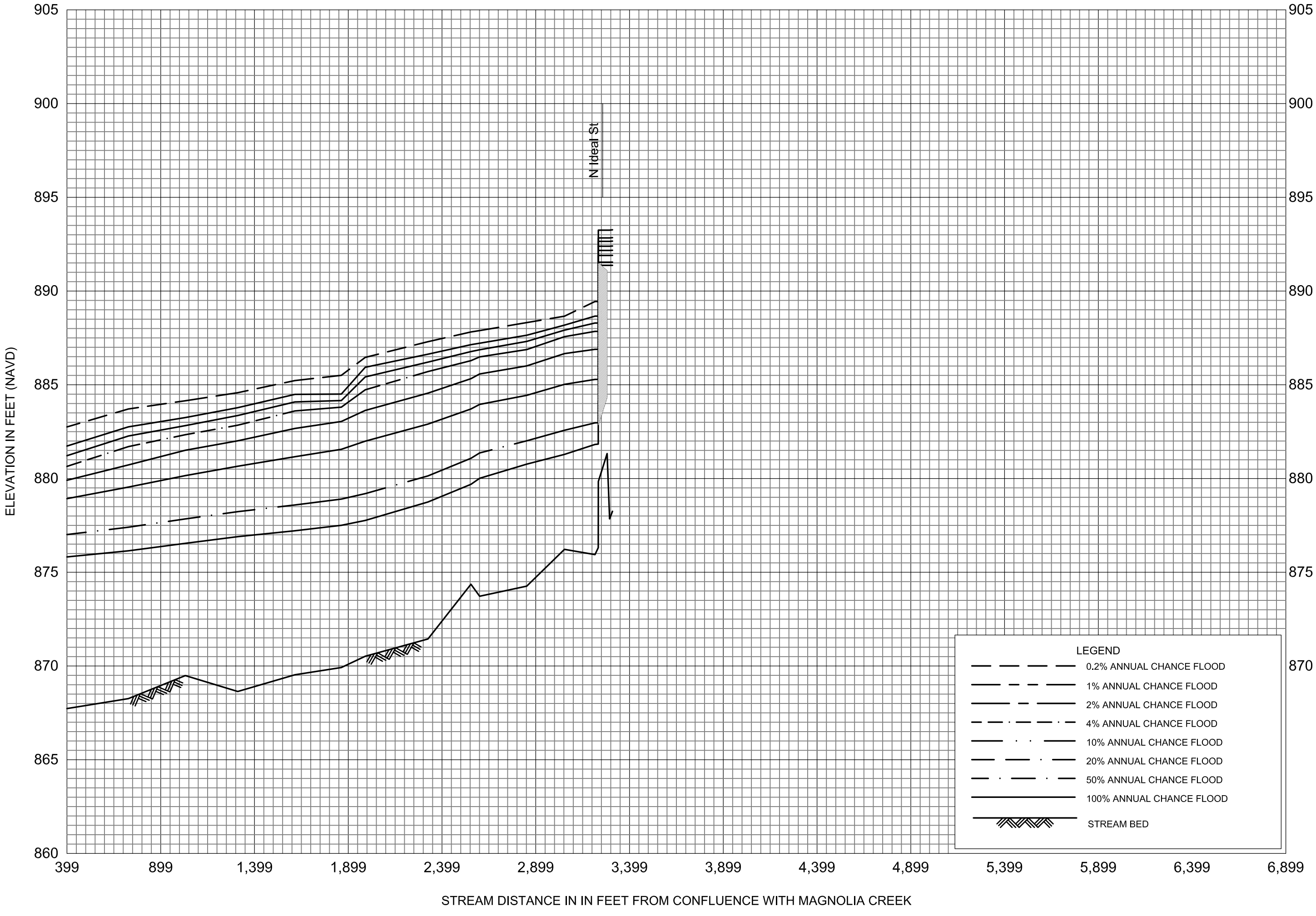
TRIBUTARY 2 TO MAGNOLIA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

02P



FLOOD PROFILES

TRIBUTARY 3 TO MAGNOLIA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

01P

ELEVATION IN FEET (NAVD)

860 865 870 875 880 885 890 895 900 905

-365 135 635 1,135 1,635 2,135 2,635 3,135 3,635 4,135 4,635 5,135 5,635 6,135

STREAM DISTANCE IN IN FEET FROM CONFLUENCE WITH MAGNOLIA CREEK

Private Structure

Private Structure

Private Structure

Private Structure

Private Structure

E Wrangler Blvd

Grisso Dr

LEGEND

0.2% ANNUAL CHANCE FLOOD

1% ANNUAL CHANCE FLOOD

2% ANNUAL CHANCE FLOOD

4% ANNUAL CHANCE FLOOD

10% ANNUAL CHANCE FLOOD

20% ANNUAL CHANCE FLOOD

50% ANNUAL CHANCE FLOOD

100% ANNUAL CHANCE FLOOD

STREAM BED

FEDERAL EMERGENCY MANAGEMENT AGENCY

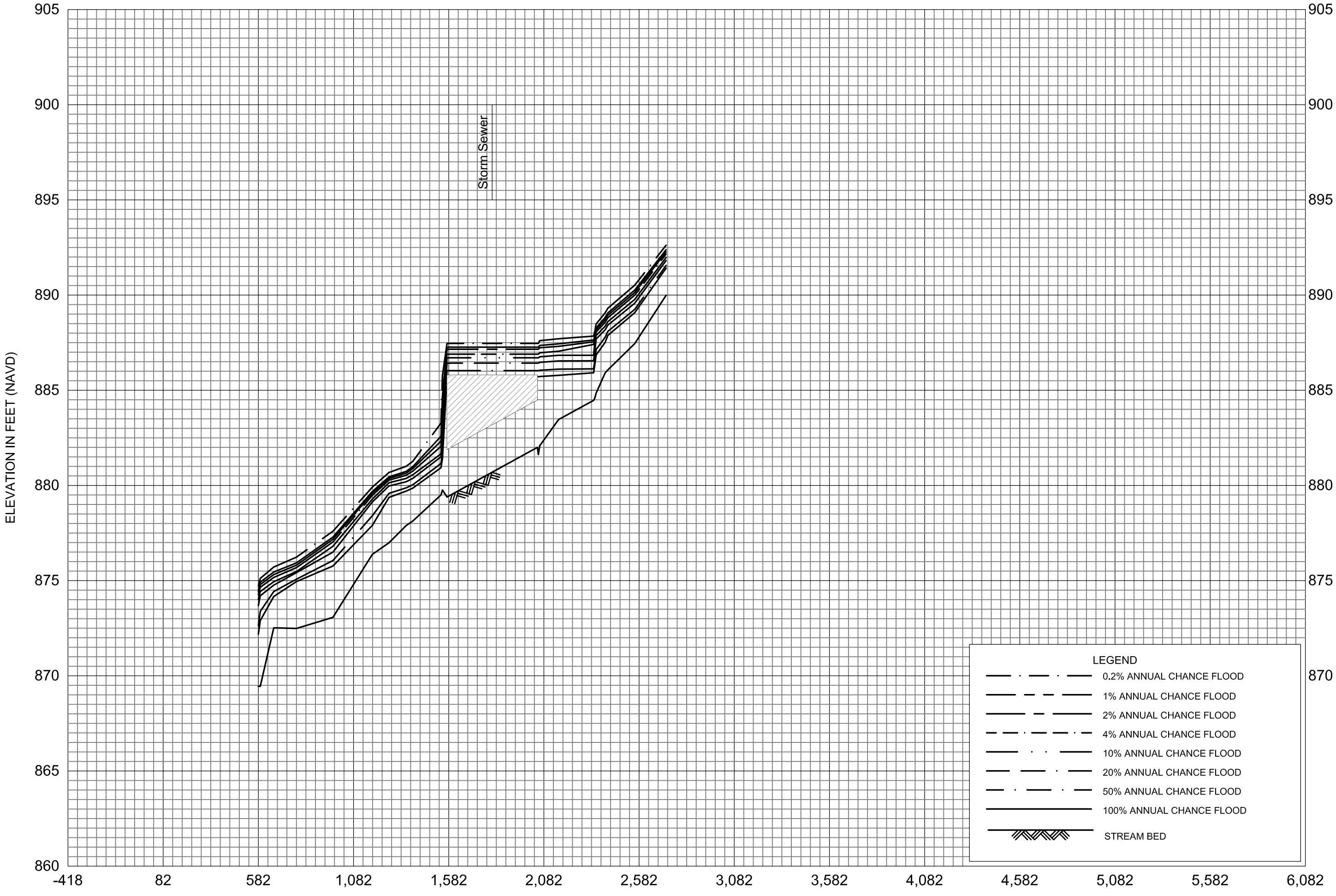
SEMINOLE, OK

CITY OF SEMINOLE

FLOOD PROFILES

TRIBUTARY 4 TO MAGNOLIA CREEK

01P



FLOOD PROFILES

TRIBUTARY A TO TRIBUTARY 2 OF MAGNOLIA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

01P

ELEVATION IN FEET (NAVD)

870 875 880 885 890 895 900 905 910 915

-908 -408 92 592 1,092 1,592 2,092 2,592 3,092 3,592 4,092 4,592 5,092 5,592

STREAM DISTANCE IN IN FEET FROM CONFLUENCE WITH TRIBUTARY A

Pecan Dr

Storm Sewer

Private Structure

John St

Smith St

880 885 890 895 900 905 910 915

LEGEND

- 0.2% ANNUAL CHANCE FLOOD
- 1% ANNUAL CHANCE FLOOD
- 2% ANNUAL CHANCE FLOOD
- 4% ANNUAL CHANCE FLOOD
- 10% ANNUAL CHANCE FLOOD
- 20% ANNUAL CHANCE FLOOD
- 50% ANNUAL CHANCE FLOOD
- 100% ANNUAL CHANCE FLOOD
- STREAM BED

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

FLOOD PROFILES

TRIBUTARY B TO TRIBUTARY 2 OF MAGNOLIA CREEK

01P

Appendix 3-G
Culvert Capacities

Roadway	Existing Strcture	Exsiting Capacity	Proposed Strcuture	Proposed Capacity	Comments
Magnolia Creek					
Goodhope Road	60" CMP	50-year			Meets the capacity requirement for state highways
Wrangler Boulevard/Hwy 9	15-20-15X12 RCB + 2-5X8 RCB	100-year			Meets the capacity requirement for state highways
N Milt Phillips Avenue/Hwy99	15-20-20-15X9 RCB	2-year			
Lloyd Simmons Boulevard	34' Span Bridge	2-year			
Strothers Avenue	4-17x9.5 RCB	50-year			
E Broadway Avenue/Hwy 270	5-25' span bridge	100-year			
Railroad (Abandoned)	60' span bridge	5-year			
Tributary No: 1 to Magnolia Creek					
Goodhope Road	8X8 RCB	50-year			
N Milt Phillips Avenue/Hwy99	6X10 RCB	100-year			
Tributary No: 2 to Magnolia Creek					
Boren Boulevard	3X4 RCB	2-year	2-5X4	100-year	Minimum required capacity is 50-year.
Van Drive	8X4 RCB	2-year	2-8X4 RCB	10-year	
Coolidge Street	2-48" CMP	< 1-year	2-8X8 RCB	10-year	
Tributary A to Tributary No:2					
Storm Sewer	36"+ 30" CMP	< 1-year	2-5X3	2-year	
Tributary B to Tributary No:2					
Smith Street	2-24" CMP	< 1-year	2-6X3 RCB	10-year	Requires raising approximately 332 feet road section to 909 feet (Average 0.8 feet)
John Street	36" CMP	< 1-year	2-5X4 RCB	10-year	Requires raising approximately 275 feet road section to 901.11 (Average 1.0 foot)
Storm Sewer	48" CMP	< 1-year	2-6X4 RCB	10-year	
Pecan Drive	2-36" CMP	< 1-year	2-6X5 RCB	10-year	Approximately 365 feet roadway section needs to be raised to 880.79 feet (Average 2.4 feet)
Tributary C to Tributary No:2					
Boren Boulevard	3X3 RCB	2-year	2-5X4 RCB	100year	
Dalby Street	42" Steel Pipe	1-year	2-4X3 RCB	10-year	
N Ideal Street	4X5 Stone Boxes	2-year	8X6 RCB	10-year	
Smith Street	6X4 RCB	2-year	2-10X5 RCB	10-year	Requires raising approximately 350 feet of roadway section to 899 feet (Average 0.65 feet)
John Street	60" CMP	1-year	2-6X5 RCB	10-year	Requires raising approximately 160 feet of road section to a min elevation of 895 feet.
Tributary No: 4 to Magnolia Creek					
Grisso Drive	24" Steel Pipe	< 1-year			
Wrangler Boulevard	6X6 RCB	100-year			
Wewoka Creek Tributary					
Mike Snyder Avenue	42" RCP	< 1-year			
Railroad	13.5-40-13.5 span bridge	500-year			
W Wewoka Ave	45" CMP	< 1-year			

Appendix 3-H
Cost Estimates

City of Seminole - Magnolia Creek					
Problem Area 1, Alternative 3 - Magnolia Creek Detention Pond					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	SELECT BORROW	CY	54700	$ 25.00	$ 1,367,500.00
2	TEMPORARY SILT FENCE	LF	6500	$ 2.00	$ 13,000.00
3	SOLID SLAB BERMUDA SODDING	SY	24000	$ 2.50	$ 60,000.00
4	18" RCP	LF	100	$ 52.00	$ 5,200.00
5	POND OUTLET CONTROL STRUCTURE	EA	1	$ 5,000.00	$ 5,000.00
6	TRENCH EXCAVATION	CY	53	$ 8.00	$ 424.00
7	STANDARD BEDDING MATERIAL	CY	27	$ 20.00	$ 548.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 1,461,672.00**
				15% Contingency	**$ 219,250.80**
				Subtotal	**$ 1,680,922.80**
				25% Utility Relocation Contingency	**$ 420,230.70**
				Subtotal	***$ 2,101,153.50***

Problem Area 1, Alternative 3 - Channelization upstream of Strother's Ave. and Lloyd Simmons Blvd Bridge					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	27000	$ 12.00	$ 324,000.00
2	BRIDGE REPLACEMENT	SF	3000	$ 125.00	$ 375,000.00
3	PAVEMENT REMOVAL	SY	1400	$ 10.00	$ 14,000.00
4	PAVEMENT REPLACEMENT	SY	1400	$ 75.00	$ 105,000.00
5	TEMPORARY SILT FENCE	LF	8800	$ 2.00	$ 17,600.00
6	SOLID SLAB BERMUDA SODDING	SY	36000	$ 2.50	$ 90,000.00
				Subtotal	**$ 925,600.00**
				15% Contingency	**$ 138,840.00**
				Subtotal	**$ 1,064,440.00**
				25% Utility Relocation Contingency	**$ 266,110.00**
				Subtotal	***$ 1,330,550.00***
				Total	***$ 3,431,703.50***

City of Seminole - Magnolia Creek					
Problem Area 1, Alternative 2 - Magnolia Creek Detention Pond					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	SELECT BORROW	CY	54700	$ 25.00	$ 1,367,500.00
2	TEMPORARY SILT FENCE	LF	6500	$ 2.00	$ 13,000.00
3	SOLID SLAB BERMUDA SODDING	SY	24000	$ 2.50	$ 60,000.00
4	18" RCP	LF	100	$ 52.00	$ 5,200.00
5	POND OUTLET CONTROL STRUCTURE	EA	1	$ 5,000.00	$ 5,000.00
6	TRENCH EXCAVATION	CY	53	$ 8.00	$ 424.00
7	STANDARD BEDDING MATERIAL	CY	27	$ 20.00	$ 548.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 1,461,672.00**
				15% Contingency	**$ 219,250.80**
				Subtotal	**$ 1,680,922.80**
				25% Utility Relocation Contingency	**$ 420,230.70**
				Subtotal	***$ 2,101,153.50***

Problem Area 1, Alternative 3 - Channelization between Strother's and Lloyd Simmons Blvd					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	21500	$ 12.00	$ 258,000.00
2	TEMPORARY SILT FENCE	LF	4400	$ 2.00	$ 8,800.00
3	SOLID SLAB BERMUDA SODDING	SY	24000	$ 2.50	$ 60,000.00
				Subtotal	**$ 326,800.00**
				15% Contingency	**$ 49,020.00**
				Subtotal	**$ 375,820.00**
				25% Utility Relocation Contingency	**$ 93,955.00**
				Subtotal	***$ 469,775.00***
				Total	***$ 2,570,928.50***

City of Seminole - Magnolia Creek					
Problem Area 1 &2, Alternative 4 - Magnolia Creek Detention Pond					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	SELECT BORROW	CY	54700	$ 25.00	$ 1,367,500.00
2	TEMPORARY SILT FENCE	LF	6500	$ 2.00	$ 13,000.00
3	SOLID SLAB BERMUDA SODDING	SY	24000	$ 2.50	$ 60,000.00
4	18" RCP	LF	100	$ 52.00	$ 5,200.00
5	POND OUTLET CONTROL STRUCTURE	EA	1	$ 5,000.00	$ 5,000.00
6	TRENCH EXCAVATION	CY	53	$ 8.00	$ 424.00
7	STANDARD BEDDING MATERIAL	CY	27	$ 20.00	$ 548.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 1,461,672.00**
				15% Contingency	**$ 219,250.80**
				Subtotal	**$ 1,680,922.80**
				25% Utility Relocation Contingency	**$ 420,230.70**
				Subtotal	***$ 2,101,153.50***

Problem Area 1 &2, Alternative 4 - Channelization between Strother's Ave. and Lloyd Simmons Blvd					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	21500	$ 12.00	$ 258,000.00
2	TEMPORARY SILT FENCE	LF	4400	$ 2.00	$ 8,800.00
3	SOLID SLAB BERMUDA SODDING	SY	24000	$ 2.50	$ 60,000.00
				Subtotal	**$ 326,800.00**
				15% Contingency	**$ 49,020.00**
				Subtotal	**$ 375,820.00**
				25% Utility Relocation Contingency	**$ 93,955.00**
				Subtotal	***$ 469,775.00***

Problem Area 1 &2, Alternative 4 - Trib 4 Detention Pond					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	UNCLASSIFIED EXCAVATION	CY	61000	$ 12.00	$ 732,000.00
2	TEMPORARY SILT FENCE	LF	3000	$ 2.00	$ 6,000.00
3	SOLID SLAB BERMUDA SODDING	SY	37000	$ 2.50	$ 92,500.00
4	30" RCP	LF	350	$ 120.00	$ 42,000.00
5	POND OUTLET CONTROL STRUCTURE	EA	1	$ 5,000.00	$ 5,000.00
6	STRUCTURE REPLACEMENT	SF	2260	$ 125.00	$ 282,500.00
7	TRENCH EXCAVATION	CY	330	$ 8.00	$ 2,640.00
8	STANDARD BEDDING MATERIAL	CY	166	$ 20.00	$ 3,318.00
9	PAVEMENT REMOVAL	SY	2690	$ 10.00	$ 26,900.00
10	PAVEMENT REPLACEMENT	SY	2690	$ 75.00	$ 201,750.00
11	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 1,404,608.00**
				15% Contingency	**$ 210,691.20**
				Subtotal	**$ 1,615,299.20**
				25% Utility Relocation Contingency	**$ 403,824.80**
				Subtotal	***$ 2,019,124.00***
				Total	***$ 4,590,052.50***

City of Seminole - Magnolia Creek					
Problem Area 1&2, Alternative 5 - Magnolia Creek Detention Pond					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	SELECT BORROW	CY	54700	$ 25.00	$ 1,367,500.00
2	TEMPORARY SILT FENCE	LF	6500	$ 2.00	$ 13,000.00
3	SOLID SLAB BERMUDA SODDING	SY	24000	$ 2.50	$ 60,000.00
4	18" RCP	LF	100	$ 52.00	$ 5,200.00
5	POND OUTLET CONTROL STRUCTURE	EA	1	$ 5,000.00	$ 5,000.00
6	TRENCH EXCAVATION	CY	53	$ 8.00	$ 424.00
7	STANDARD BEDDING MATERIAL	CY	27	$ 20.00	$ 548.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 1,461,672.00**
				15% Contingency	**$ 219,250.80**
				Subtotal	**$ 1,680,922.80**
				25% Utility Relocation Contingency	**$ 420,230.70**
				Subtotal	***$ 2,101,153.50***

Problem Area 1&2, Alternative 5 - Trib 4 Detention Pond					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	UNCLASSIFIED EXCAVATION	CY	61000	$ 12.00	$ 732,000.00
2	TEMPORARY SILT FENCE	LF	3000	$ 2.00	$ 6,000.00
3	SOLID SLAB BERMUDA SODDING	SY	37000	$ 2.50	$ 92,500.00
4	30" RCP	LF	350	$ 120.00	$ 42,000.00
5	POND OUTLET CONTROL STRUCTURE	EA	1	$ 5,000.00	$ 5,000.00
6	STRUCTURE REPLACEMENT	SF	2260	$ 125.00	$ 282,500.00
7	TRENCH EXCAVATION	CY	330	$ 8.00	$ 2,640.00
7	STANDARD BEDDING MATERIAL	CY	166	$ 20.00	$ 3,318.00
8	PAVEMENT REMOVAL	SY	2690	$ 10.00	$ 26,900.00
8	PAVEMENT REPLACEMENT	SY	2690	$ 75.00	$ 201,750.00
9	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 1,404,608.00**
				15% Contingency	**$ 210,691.20**
				Subtotal	**$ 1,615,299.20**
				25% Utility Relocation Contingency	**$ 403,824.80**
				Subtotal	***$ 2,019,124.00***

Problem Area 1&2, Alternative 5 - Channelization upstream of Strother's Ave. and Lloyd Simmons Blvd Bridge					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	27000	$ 12.00	$ 324,000.00
2	**BRIDGE REPLACEMENT**	**SF**	3000	$ 125.00	$ 375,000.00
3	**PAVEMENT REMOVAL**	**SY**	1400	$ 10.00	$ 14,000.00
4	**PAVEMENT REPLACEMENT**	**SY**	1400	$ 75.00	$ 105,000.00
5	**TEMPORARY SILT FENCE**	**LF**	8800	$ 2.00	$ 17,600.00
6	**SOLID SLAB BERMUDA SODDING**	**SY**	36000	$ 2.50	$ 90,000.00
				Subtotal	**$ 925,600.00**
				15% Contingency	**$ 138,840.00**
				Subtotal	**$ 1,064,440.00**
				25% Utility Relocation Contingency	**$ 266,110.00**
				Subtotal	***$ 1,330,550.00***
				Total	***$ 5,450,827.50***

City of Seminole - Magnolia Creek					
Problem Area 3, Alternative 1 - Magnolia Creek Mainstem and Tributaries Roadway Culvert Improvements					
Tributary 2 - Coolidge Street					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	UNCLASSIFIED EXCAVATION	CY	450	$ 12.00	$ 5,400.00
2	TEMPORARY SILT FENCE	LF	250	$ 2.00	$ 500.00
3	SOLID SLAB BERMUDA SODDING	SY	300	$ 2.50	$ 750.00
4	8'x8' RCB	LF	100	$ 1,020.00	$ 102,000.00
5	PAVEMENT REMOVAL	SY	450	$ 10.00	$ 4,500.00
6	PAVEMENT REPLACEMENT	SY	450	$ 75.00	$ 33,750.00
7	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 156,900.00**
				15% Contingency	**$ 23,535.00**
				Subtotal	**$ 180,435.00**
				25% Utility Relocation Contingency	**$ 45,108.75**
				Total	***$ 225,543.75***

Tributary 2 - Van Drive					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	UNCLASSIFIED EXCAVATION	CY	275	$ 12.00	$ 3,300.00
2	TEMPORARY SILT FENCE	LF	250	$ 2.00	$ 500.00
3	SOLID SLAB BERMUDA SODDING	SY	300	$ 2.50	$ 750.00
4	8'x4' RCB	LF	100	$ 870.00	$ 87,000.00
5	PAVEMENT REMOVAL	SY	450	$ 10.00	$ 4,500.00
6	PAVEMENT REPLACEMENT	SY	450	$ 75.00	$ 33,750.00
7	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 139,800.00**
				15% Contingency	**$ 20,970.00**
				Subtotal	**$ 160,770.00**
				25% Utility Relocation Contingency	**$ 40,192.50**
				Total	***$ 200,962.50***

Tributary 2 - Boren Boulevard					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	650	$ 12.00	$ 7,800.00
2	**TEMPORARY SILT FENCE**	**LF**	440	$ 2.00	$ 880.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	550	$ 2.50	$ 1,375.00
4	**5'x4' RCB**	**LF**	260	$ 470.00	$ 122,200.00
5	**PAVEMENT REMOVAL**	**SY**	1300	$ 10.00	$ 13,000.00
6	**PAVEMENT REPLACEMENT**	**SY**	1300	$ 75.00	$ 97,500.00
7	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 252,755.00**
				15% Contingency	**$ 37,913.25**
				Subtotal	**$ 290,668.25**
				25% Utility Relocation Contingency	**$ 72,667.06**
				Total	***$ 363,335.31***

Tributary A - Storm Sewer					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	2500	$ 12.00	$ 30,000.00
2	**TEMPORARY SILT FENCE**	**LF**	540	$ 2.00	$ 1,080.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	1500	$ 2.50	$ 3,750.00
4	**5'x3' RCB**	**LF**	1100	$ 440.00	$ 484,000.00
5	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 528,830.00**
				15% Contingency	**$ 79,324.50**
				Subtotal	**$ 608,154.50**
				25% Utility Relocation Contingency	**$ 152,038.63**
				Total	***$ 760,193.13***

Tributary B - Pecan Drive					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	300	$ 12.00	$ 3,600.00
2	**SELECT BORROW**	**CY**	6500	$ 25.00	$ 162,500.00
3	**TEMPORARY SILT FENCE**	**LF**	850	$ 2.00	$ 1,700.00
4	**SOLID SLAB BERMUDA SODDING**	**SY**	4500	$ 2.50	$ 11,250.00
5	**6'x5' RCB**	**LF**	100	$ 625.00	$ 62,500.00
6	**PAVEMENT REMOVAL**	**SY**	1650	$ 10.00	$ 16,500.00
7	**PAVEMENT REPLACEMENT**	**SY**	1650	$ 75.00	$ 123,750.00
8	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 25,000.00	$ 25,000.00
				Subtotal	**$ 406,800.00**
				15% Contingency	**$ 61,020.00**
				Subtotal	**$ 467,820.00**
				25% Utility Relocation Contingency	**$ 116,955.00**
				Total	***$ 584,775.00***

Tributary B - Storm Sewer					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	4000	$ 12.00	$ 48,000.00
2	**TEMPORARY SILT FENCE**	**LF**	660	$ 2.00	$ 1,320.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	1900	$ 2.50	$ 4,750.00
4	**6'x4' RCB**	**LF**	1340	$ 580.00	$ 777,200.00
5	**PAVEMENT REMOVAL**	**SY**	900	$ 10.00	$ 9,000.00
6	**PAVEMENT REPLACEMENT**	**SY**	900	$ 75.00	$ 67,500.00
7	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 917,770.00**
				15% Contingency	**$ 137,665.50**
				Subtotal	**$ 1,055,435.50**
				25% Utility Relocation Contingency	**$ 263,858.88**
				Total	***$ 1,319,294.38***

Tributary B - John Street					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	250	$ 12.00	$ 3,000.00
2	**SELECT BORROW**	**CY**	3500	$ 25.00	$ 87,500.00
3	**TEMPORARY SILT FENCE**	**LF**	605	$ 2.00	$ 1,210.00
4	**SOLID SLAB BERMUDA SODDING**	**SY**	2500	$ 2.50	$ 6,250.00
5	**5'x4' RCB**	**LF**	100	$ 470.00	$ 47,000.00
6	**PAVEMENT REMOVAL**	**SY**	1250	$ 10.00	$ 12,500.00
7	**PAVEMENT REPLACEMENT**	**SY**	1250	$ 75.00	$ 93,750.00
8	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 261,210.00**
				15% Contingency	**$ 39,181.50**
				Subtotal	**$ 300,391.50**
				25% Utility Relocation Contingency	**$ 75,097.88**
				Total	***$ 375,489.38***

Tributary B - Smith Street					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	200	$ 12.00	$ 2,400.00
2	**SELECT BORROW**	**CY**	4000	$ 25.00	$ 100,000.00
3	**TEMPORARY SILT FENCE**	**LF**	750	$ 2.00	$ 1,500.00
4	**SOLID SLAB BERMUDA SODDING**	**SY**	2500	$ 2.50	$ 6,250.00
5	**6'x3' RCB**	**LF**	100	$ 550.00	$ 55,000.00
6	**PAVEMENT REMOVAL**	**SY**	1500	$ 10.00	$ 15,000.00
7	**PAVEMENT REPLACEMENT**	**SY**	1500	$ 75.00	$ 112,500.00
8	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 302,650.00**
				15% Contingency	**$ 45,397.50**
				Subtotal	**$ 348,047.50**
				25% Utility Relocation Contingency	**$ 87,011.88**
				Total	***$ 435,059.38***

Tributary C - John Street					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	275	$ 12.00	$ 3,300.00
2	SELECT BORROW	CY	1750	$ 25.00	$ 43,750.00
3	TEMPORARY SILT FENCE	LF	400	$ 2.00	$ 800.00
4	SOLID SLAB BERMUDA SODDING	SY	1500	$ 2.50	$ 3,750.00
5	6'x5' RCB	LF	100	$ 625.00	$ 62,500.00
6	PAVEMENT REMOVAL	SY	725	$ 10.00	$ 7,250.00
7	PAVEMENT REPLACEMENT	SY	725	$ 75.00	$ 54,375.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 185,725.00**
				15% Contingency	**$ 27,858.75**
				Subtotal	**$ 213,583.75**
				25% Utility Relocation Contingency	**$ 53,395.94**
				Total	***$ 266,979.69***

Tributary C - Smith Street					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	400	$ 12.00	$ 4,800.00
2	SELECT BORROW	CY	2900	$ 25.00	$ 72,500.00
3	TEMPORARY SILT FENCE	LF	770	$ 2.00	$ 1,540.00
4	SOLID SLAB BERMUDA SODDING	SY	4200	$ 2.50	$ 10,500.00
5	10'x5' RCB	LF	100	$ 1,220.00	$ 122,000.00
6	PAVEMENT REMOVAL	SY	1600	$ 10.00	$ 16,000.00
7	PAVEMENT REPLACEMENT	SY	1600	$ 75.00	$ 120,000.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 357,340.00**
				15% Contingency	**$ 53,601.00**
				Subtotal	**$ 410,941.00**
				25% Utility Relocation Contingency	**$ 102,735.25**
				Total	***$ 513,676.25***

Tributary C - N. Ideal Street					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	375	$ 12.00	$ 4,500.00
2	**TEMPORARY SILT FENCE**	**LF**	250	$ 2.00	$ 500.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	300	$ 2.50	$ 750.00
4	**8'x6' RCB**	**LF**	60	$ 930.00	$ 55,800.00
5	**PAVEMENT REMOVAL**	**SY**	450	$ 10.00	$ 4,500.00
6	**PAVEMENT REPLACEMENT**	**SY**	450	$ 75.00	$ 33,750.00
7	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 109,800.00**
				15% Contingency	**$ 16,470.00**
				Subtotal	**$ 126,270.00**
				25% Utility Relocation Contingency	**$ 31,567.50**
				Total	***$ 157,837.50***

Tributary C - Dalby Street					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	175	$ 12.00	$ 2,100.00
2	**TEMPORARY SILT FENCE**	**LF**	250	$ 2.00	$ 500.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	300	$ 2.50	$ 750.00
4	**4'x3' RCB**	**LF**	100	$ 360.00	$ 36,000.00
5	**PAVEMENT REMOVAL**	**SY**	450	$ 10.00	$ 4,500.00
6	**PAVEMENT REPLACEMENT**	**SY**	450	$ 75.00	$ 33,750.00
7	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 87,600.00**
				15% Contingency	**$ 13,140.00**
				Subtotal	**$ 100,740.00**
				25% Utility Relocation Contingency	**$ 25,185.00**
				Total	***$ 125,925.00***

Tributary C - Boren Boulevard					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	225	$ 12.00	$ 2,700.00
2	**TEMPORARY SILT FENCE**	**LF**	250	$ 2.00	$ 500.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	300	$ 2.50	$ 750.00
4	**5'x4' RCB**	**LF**	100	$ 470.00	$ 47,000.00
5	**PAVEMENT REMOVAL**	**SY**	450	$ 10.00	$ 4,500.00
6	**PAVEMENT REPLACEMENT**	**SY**	450	$ 75.00	$ 33,750.00
7	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 99,200.00**
				15% Contingency	**$ 14,880.00**
				Subtotal	**$ 114,080.00**
				25% Utility Relocation Contingency	**$ 28,520.00**
				Total	***$ 142,600.00***

City of Seminole - Magnolia Creek					
Problem Area 4, Alternative 3 - 10-Year					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	SOLID SLAB BERMUDA SODDING	SY	1000	$ 3.00	$ 3,000.00
2	PAVEMENT REPLACEMENT	SY	1500	$ 75.00	$ 112,500.00
3	TRENCH GRATE	EA	4	$ 10,000.00	$ 40,000.00
4	SMD INLET	EA	4	$ 3,500.00	$ 14,000.00
5	JUNCTION BOX	EA	1	$ 5,000.00	$ 5,000.00
6	OUTLET STRUCTURE	EA	2	$ 5,000.00	$ 10,000.00
7	24" RCP	LF	900	$ 80.00	$ 72,000.00
8	30" RCP	LF	75	$ 120.00	$ 9,000.00
9	36" RCP	LF	450	$ 140.00	$ 63,000.00
10	42" RCP	LF	75	$ 190.00	$ 14,250.00
11	TRENCH EXCAVATION	CY	1800	$ 8.00	$ 14,400.00
12	STANDARD BEDDING MATERIAL	CY	925	$ 20.00	$ 18,500.00
13	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 25,000.00	$ 25,000.00
14	PAVEMENT REMOVAL	SY	1500	$ 10.00	$ 15,000.00
				Subtotal	**$ 415,650.00**
				15% Contingency	**$ 62,347.50**
				Subtotal	**$ 477,997.50**
				25% Utility Relocation Contingency	**$ 119,499.38**
				Total	***$ 597,496.88***

City of Seminole - Magnolia Creek					
Problem Area 4, Alternative 4 - 50-Year					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	SOLID SLAB BERMUDA SODDING	SY	1000	$ 3.00	$ 3,000.00
2	PAVEMENT REPLACEMENT	SY	1500	$ 75.00	$ 112,500.00
3	TRENCH GRATE	EA	4	$ 10,000.00	$ 40,000.00
4	SMD INLET	EA	4	$ 3,500.00	$ 14,000.00
5	JUNCTION BOX	EA	1	$ 5,000.00	$ 5,000.00
6	OUTLET STRUCTURE	EA	2	$ 5,000.00	$ 10,000.00
7	24" RCP	LF	350	$ 80.00	$ 28,000.00
8	30" RCP	LF	625	$ 120.00	$ 75,000.00
9	42" RCP	LF	525	$ 190.00	$ 99,750.00
10	TRENCH EXCAVATION	CY	1800	$ 8.00	$ 14,400.00
11	STANDARD BEDDING MATERIAL	CY	925	$ 20.00	$ 18,500.00
12	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 25,000.00	$ 25,000.00
13	PAVEMENT REMOVAL	SY	1500	$ 10.00	$ 15,000.00
				Subtotal	**$ 460,150.00**
				15% Contingency	**$ 69,022.50**
				Subtotal	**$ 529,172.50**
				25% Utility Relocation Contingency	**$ 132,293.13**
				Total	***$ 661,465.63***

City of Seminole - Magnolia Creek					
Problem Area 4, Alternative 5 - 100-Year					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	SOLID SLAB BERMUDA SODDING	SY	1000	$ 3.00	$ 3,000.00
2	PAVEMENT REPLACEMENT	SY	1500	$ 75.00	$ 112,500.00
3	TRENCH GRATE	EA	4	$ 10,000.00	$ 40,000.00
4	SMD INLET	EA	4	$ 3,500.00	$ 14,000.00
5	JUNCTION BOX	EA	1	$ 5,000.00	$ 5,000.00
6	OUTLET STRUCTURE	EA	2	$ 5,000.00	$ 10,000.00
7	24" RCP	LF	600	$ 80.00	$ 48,000.00
8	30" RCP	LF	550	$ 120.00	$ 66,000.00
9	36" RCP	LF	75	$ 140.00	$ 10,500.00
10	42" RCP	LF	525	$ 190.00	$ 99,750.00
11	TRENCH EXCAVATION	CY	1800	$ 8.00	$ 14,400.00
12	STANDARD BEDDING MATERIAL	CY	925	$ 20.00	$ 18,500.00
13	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 25,000.00	$ 25,000.00
14	PAVEMENT REMOVAL	SY	1500	$ 10.00	$ 15,000.00
				Subtotal	**$ 481,650.00**
				15% Contingency	**$ 72,247.50**
				Subtotal	**$ 553,897.50**
				25% Utility Relocation Contingency	**$ 138,474.38**
				Total	***$ 692,371.88***

City of Seminole - Magnolia Creek					
Problem Area 5, Alternative 1 - 10 Year					
Gibson Drive					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	UNCLASSIFIED EXCAVATION	CY	2000	$ 12.00	$ 24,000.00
2	TEMPORARY SILT FENCE	LF	400	$ 2.00	$ 800.00
3	SOLID SLAB BERMUDA SODDING	SY	600	$ 2.50	$ 1,500.00
4	6'x4' RCB	LF	220	$ 580.00	$ 127,600.00
5	PAVEMENT REMOVAL	SY	450	$ 10.00	$ 4,500.00
6	PAVEMENT REPLACEMENT	SY	450	$ 75.00	$ 33,750.00
7	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 202,150.00**
				15% Contingency	**$ 30,322.50**
				Subtotal	**$ 232,472.50**
				25% Utility Relocation Contingency	**$ 58,118.13**
				Subtotal	***$ 290,590.63***

Hoffman Drive					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	TEMPORARY SILT FENCE	LF	600	$ 2.00	$ 1,200.00
2	SOLID SLAB BERMUDA SODDING	SY	400	$ 2.50	$ 1,000.00
3	36" RCP	LF	420	$ 140.00	$ 58,800.00
4	TRENCH EXCAVATION	CY	600	$ 8.00	$ 4,800.00
5	STANDARD BEDDING MATERIAL	CY	325	$ 20.00	$ 6,500.00
6	PAVEMENT REMOVAL	SY	450	$ 10.00	$ 4,500.00
7	PAVEMENT REPLACEMENT	SY	450	$ 75.00	$ 33,750.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 120,550.00**
				15% Contingency	**$ 18,082.50**
				Subtotal	**$ 138,632.50**
				25% Utility Relocation Contingency	**$ 34,658.13**
				Subtotal	***$ 173,290.63***

Sims Place					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**TEMPORARY SILT FENCE**	**LF**	600	$ 2.00	$ 1,200.00
2	**SOLID SLAB BERMUDA SODDING**	**SY**	400	$ 2.50	$ 1,000.00
3	**36" RCP**	**LF**	420	$ 140.00	$ 58,800.00
4	**TRENCH EXCAVATION**	**CY**	600	$ 8.00	$ 4,800.00
5	**STANDARD BEDDING MATERIAL**	**CY**	325	$ 20.00	$ 6,500.00
6	**PAVEMENT REMOVAL**	**SY**	450	$ 10.00	$ 4,500.00
7	**PAVEMENT REPLACEMENT**	**SY**	450	$ 75.00	$ 33,750.00
8	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 120,550.00**
				15% Contingency	**$ 18,082.50**
				Subtotal	**$ 138,632.50**
				25% Utility Relocation Contingency	**$ 34,658.13**
				Subtotal	***$ 173,290.63***

City of Seminole - Magnolia Creek					
Problem Area 5, Alternative 2 - 25 Year					
Gibson Drive					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	UNCLASSIFIED EXCAVATION	CY	1800	$ 12.00	$ 21,600.00
2	TEMPORARY SILT FENCE	LF	400	$ 2.00	$ 800.00
3	SOLID SLAB BERMUDA SODDING	SY	600	$ 2.50	$ 1,500.00
4	8'x4' RCB	LF	100	$ 870.00	$ 87,000.00
5	PAVEMENT REMOVAL	SY	450	$ 10.00	$ 4,500.00
6	PAVEMENT REPLACEMENT	SY	450	$ 75.00	$ 33,750.00
7	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 159,150.00**
				15% Contingency	**$ 23,872.50**
				Subtotal	**$ 183,022.50**
				25% Utility Relocation Contingency	**$ 45,755.63**
				Subtotal	***$ 228,778.13***

Hoffman Drive					
ITEM	DESCRIPTION	UNIT	TOTAL	UNIT PRICE	TOTAL COST
1	TEMPORARY SILT FENCE	LF	600	$ 2.00	$ 1,200.00
2	SOLID SLAB BERMUDA SODDING	SY	400	$ 2.50	$ 1,000.00
3	42" RCP	LF	420	$ 190.00	$ 79,800.00
4	TRENCH EXCAVATION	CY	700	$ 8.00	$ 5,600.00
5	STANDARD BEDDING MATERIAL	CY	375	$ 20.00	$ 7,500.00
6	PAVEMENT REMOVAL	SY	450	$ 10.00	$ 4,500.00
7	PAVEMENT REPLACEMENT	SY	450	$ 75.00	$ 33,750.00
8	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 143,350.00**
				15% Contingency	**$ 21,502.50**
				Subtotal	**$ 164,852.50**
				25% Utility Relocation Contingency	**$ 41,213.13**
				Subtotal	***$ 206,065.63***

Sims Place					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**TEMPORARY SILT FENCE**	**LF**	600	$ 2.00	$ 1,200.00
2	**SOLID SLAB BERMUDA SODDING**	**SY**	400	$ 2.50	$ 1,000.00
3	**42" RCP**	**LF**	420	$ 190.00	$ 79,800.00
4	**TRENCH EXCAVATION**	**CY**	700	$ 8.00	$ 5,600.00
5	**STANDARD BEDDING MATERIAL**	**CY**	375	$ 20.00	$ 7,500.00
6	**PAVEMENT REMOVAL**	**SY**	450	$ 10.00	$ 4,500.00
7	**PAVEMENT REPLACEMENT**	**SY**	450	$ 75.00	$ 33,750.00
8	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 10,000.00	$ 10,000.00
				Subtotal	**$ 143,350.00**
				15% Contingency	**$ 21,502.50**
				Subtotal	**$ 164,852.50**
				25% Utility Relocation Contingency	**$ 41,213.13**
				Subtotal	***$ 206,065.63***

Appendix 4-A
Hydrologic Coefficients for Existing Condition

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	877																		
WEW-01	Overland	95		3.35	1.28	1.23			Forest (good cover)	91	25	55	70	77	0.0	66.3	24.5	0.0	61.3	32.6	0.05094
	Channel (ditch)	782		3.94	2.98	4.38			Residential 1/4 acre	9	61	75	83	87	0.0	0.0	9.3	0.0			
	Paved				0.00	0.00															
	Pipe				0.00	0.00															
	Stream	1247			4.00	5.20	6.5	0.11													
		0	970																		
WEW-02	Overland				0.00	0.00			Forest (good cover)	78	25	55	70	77	0.0	24.2	53.8	0.0	69.2	5.0	0.00785
	Channel (ditch)	970		2.30	2.26	7.15			Residential 1/4 acre	22	61	75	83	87	0.0	0.0	22.0	0.0			
	Paved	92		6.49	5.10	0.30															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	4.5	0.07													
		0	1690																		
WEW-03	Overland	84		3.18	1.25	1.12			Forest (good cover)	22	25	55	70	77	0.0	12.3	5.6	3.9	81.0	35.4	0.05528
	Channel (ditch)	1606		2.25	2.24	11.97			Industrial	23	81	88	91	93	0.0	9.7	1.1	12.1			
	Paved				0.00	0.00			Residential 1/4 acre	55	61	75	83	87	0.0	1.8	34.8	18.7			
	Pipe				0.00	0.00															
	Stream	384			4.00	1.60	8.8	0.15													
		0	360																		
WEW-04	Overland				0.00	0.00			Industrial	30	81	88	91	93	0.0	1.4	0.0	28.3	89.0	20.4	0.03193
	Channel (ditch)	360		5.97	3.68	1.63			Residential 1/4 acre	52	61	75	83	87	0.0	1.8	11.6	38.2			
	Paved	107		4.36	4.18	0.43			Residential 1/8 acre	19	77	85	90	92	0.0	0.0	0.0	18.6			
	Pipe	965		1.62	4.00	4.02															
	Stream	174			4.00	0.72	4.1	0.07													
		0	222																		
WEW-05	Overland	83		9.58	2.18	0.63			Commercial	1	89	92	94	95	0.0	0.0	0.0	0.5	89.5	7.4	0.01164
	Channel (ditch)	139		9.89	4.76	0.49			Industrial	10	81	88	91	93	0.0	0.0	0.0	9.8			
	Paved	364		2.24	2.99	2.03			Residential 1/4 acre	53	61	75	83	87	0.0	0.0	0.0	53.2			
	Pipe	42		0.36	4.00	0.18			Residential 1/8 acre	37	77	85	90	92	0.0	0.0	0.0	36.5			
	Stream				0.00	0.00	2.0	0.03													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	852																		
WEW-05-01	Overland				0.00	0.00			Commercial	11	89	92	94	95	0.0	0.0	0.0	11.3	84.3	24.1	0.03770
	Channel (ditch)	852		1.19	1.61	8.79			Residential 1/4 acre	89	61	75	83	87	0.0	19.9	29.5	39.3			
	Paved	698		5.14	4.54	2.56															
	Pipe	319		1.82	4.00	1.33															
	Stream				0.00	0.00	7.6	0.13													
		0	84																		
WEW-05-02	Overland	84		1.58	0.88	1.59			Commercial	6	89	92	94	95	0.0	0.0	0.0	5.7	83.9	23.9	0.03737
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	94	61	75	83	87	0.0	30.0	0.0	64.3			
	Paved	770		1.70	2.60	4.93															
	Pipe				0.00	0.00															
	Stream	503			4.00	2.09	5.2	0.09													
		0	737																		
WEW-06	Overland	91		2.35	1.08	1.41			Commercial	35	89	92	94	95	0.0	0.0	0.0	34.5	88.8	15.6	0.02439
	Channel (ditch)	647		2.30	2.26	4.77			Pasture: Good Condition	16	39	61	74	80	0.0	0.0	0.0	16.4			
	Paved	68		1.29	2.26	0.50			Residential 1/4 acre	46	61	75	83	87	0.0	0.0	0.0	45.9			
	Pipe	89		3.18	4.00	0.37			Residential 1/8 acre	3	77	85	90	92	0.0	0.0	0.0	3.2			
	Stream	709			4.00	2.95	6.0	0.10													
		0	1613																		
WEW-06-01	Overland	93		1.49	0.85	1.82			Commercial	5	89	92	94	95	0.0	1.7	0.0	3.6	83.2	19.2	0.03005
	Channel (ditch)	1519		2.47	2.34	10.80			Industrial	30	81	88	91	93	0.0	12.1	0.0	17.9			
	Paved				0.00	0.00			Pasture: Good Condition	48	39	61	74	80	0.0	15.3	0.0	32.5			
	Pipe				0.00	0.00			Residential 1/8 acre	17	77	85	90	92	0.0	0.0	0.0	16.9			
	Stream	680			4.00	2.83	9.3	0.15													
		0	0																		
WEW-07	Overland				0.00	0.00			Commercial	42	89	92	94	95	0.0	0.0	0.0	42.0	86.5	8.3	0.01302
	Channel (ditch)				0.00	0.00			Pasture: Good Condition	55	39	61	74	80	0.0	0.0	0.0	54.9			
	Paved	749		4.42	4.21	2.97			Residential 1/4 acre	3	61	75	83	87	0.0	0.0	0.0	3.1			
	Pipe				0.00	0.00															
	Stream	623			4.00	2.59	3.3	0.06													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	350																		
WEW-07-01	Overland				0.00	0.00			Commercial	48	89	92	94	95	0.0	0.0	0.0	48.4	87.4	1.9	0.00302
	Channel (ditch)	350		4.55	3.20	1.82			Pasture: Good Condition	50	39	61	74	80	0.0	0.0	0.0	50.1			
	Paved	135		3.00	3.46	0.65			Residential 1/4 acre	1	61	75	83	87	0.0	0.0	0.0	1.4			
	Pipe	59		0.85	4.00	0.25															
	Stream				0.00	0.00	1.6	0.03													
		0	102																		
WEW-07-02	Overland	102		1.10	0.73	2.32			Commercial	0	89	92	94	95	0.0	0.0	0.0	0.1	87.0	11.5	0.01793
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	99.9			
	Paved	999		1.16	2.14	7.77															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.1	0.10													
		0	84																		
WEW-08	Overland	84		1.48	0.85	1.64			Commercial	36	89	92	94	95	0.0	0.0	0.0	36.3	89.9	10.9	0.01710
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	64	61	75	83	87	0.0	0.0	0.0	63.7			
	Paved	775		3.03	3.48	3.71															
	Pipe				0.00	0.00															
	Stream	642			4.00	2.68	4.8	0.08													
		0	97																		
WEW-08-01	Overland	97		3.06	1.23	1.31			Residential 1/4 acre	100	61	75	83	87	0.0	0.0	0.0	100.0	87.0	8.4	0.01315
	Channel (ditch)				0.00	0.00															
	Paved	529		3.45	3.71	2.37															
	Pipe	95		0.38	4.00	0.40															
	Stream	424			4.00	1.77	3.5	0.06													
		0	0																		
WEW-08-02	Overland				0.00	0.00			Residential 1/4 acre	100	61	75	83	87	0.0	15.5	0.0	84.5	85.1	13.3	0.02075
	Channel (ditch)				0.00	0.00															
	Paved	452		5.15	4.55	1.66															
	Pipe	491		1.38	4.00	2.04															
	Stream	141			4.00	0.59	2.6	0.04													

Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	1075																		
WEW-08-03	Overland	95		0.76	0.61	2.60			Industrial	9	81	88	91	93	0.0	0.0	0.0	8.9	85.4	11.7	0.01834
	Channel (ditch)	979		2.03	2.12	7.69			Pasture: Good Condition	21	39	61	74	80	0.0	0.0	0.0	20.6			
	Paved				0.00	0.00			Residential 1/4 acre	71	61	75	83	87	0.0	5.8	0.0	64.7			
	Pipe				0.00	0.00															
	Stream	421			4.00	1.75	7.2	0.12													
		0	121																		
WEW-08-04	Overland				0.00	0.00			Commercial	5	89	92	94	95	0.0	4.7	0.0	0.0	69.7	27.0	0.04212
	Channel (ditch)	121		3.90	2.96	0.68			Forest (good cover)	9	25	55	70	77	0.0	9.0	0.0	0.0			
	Paved	1592		1.39	2.35	11.31			Industrial	11	81	88	91	93	0.0	3.1	0.0	7.7			
	Pipe				0.00	0.00			Pasture: Good Condition	42	39	61	74	80	0.0	35.6	0.0	6.2			
	Stream				0.00	0.00	7.2	0.12	Residential 1/4 acre	25	61	75	83	87	0.0	23.1	0.0	1.5			
									Woods-Grass: Good	9	32	58	72	79	0.0	9.1	0.0	0.0			
		0	958																		
WEW-08-05	Overland	89		1.60	0.89	1.68			Commercial	39	89	92	94	95	0.0	34.1	0.0	4.6	76.3	17.4	0.02718
	Channel (ditch)	869		3.21	2.68	5.40			Pasture: Good Condition	59	39	61	74	80	0.0	44.9	0.0	13.7			
	Paved				0.00	0.00			Residential 1/4 acre	3	61	75	83	87	0.0	1.3	0.0	1.4			
	Pipe				0.00	0.00															
	Stream	34			4.00	0.14	4.3	0.07													
		0	55																		
WEW-08-06	Overland	55		2.01	0.99	0.92			Pasture: Good Condition	27	39	61	74	80	0.0	0.0	0.0	26.9	85.1	11.2	0.01748
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	73	61	75	83	87	0.0	0.0	0.0	73.1			
	Paved	986		2.63	3.24	5.07															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	3.6	0.06													
		0	0																		
WEW-09	Overland				0.00	0.00			Commercial	4	89	92	94	95	0.0	0.0	0.0	4.1	87.3	14.0	0.02194
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	96	61	75	83	87	0.0	0.0	0.0	95.9			
	Paved	1221		2.18	2.95	6.91															
	Pipe				0.00	0.00															
	Stream	335			4.00	1.40	5.0	0.08													

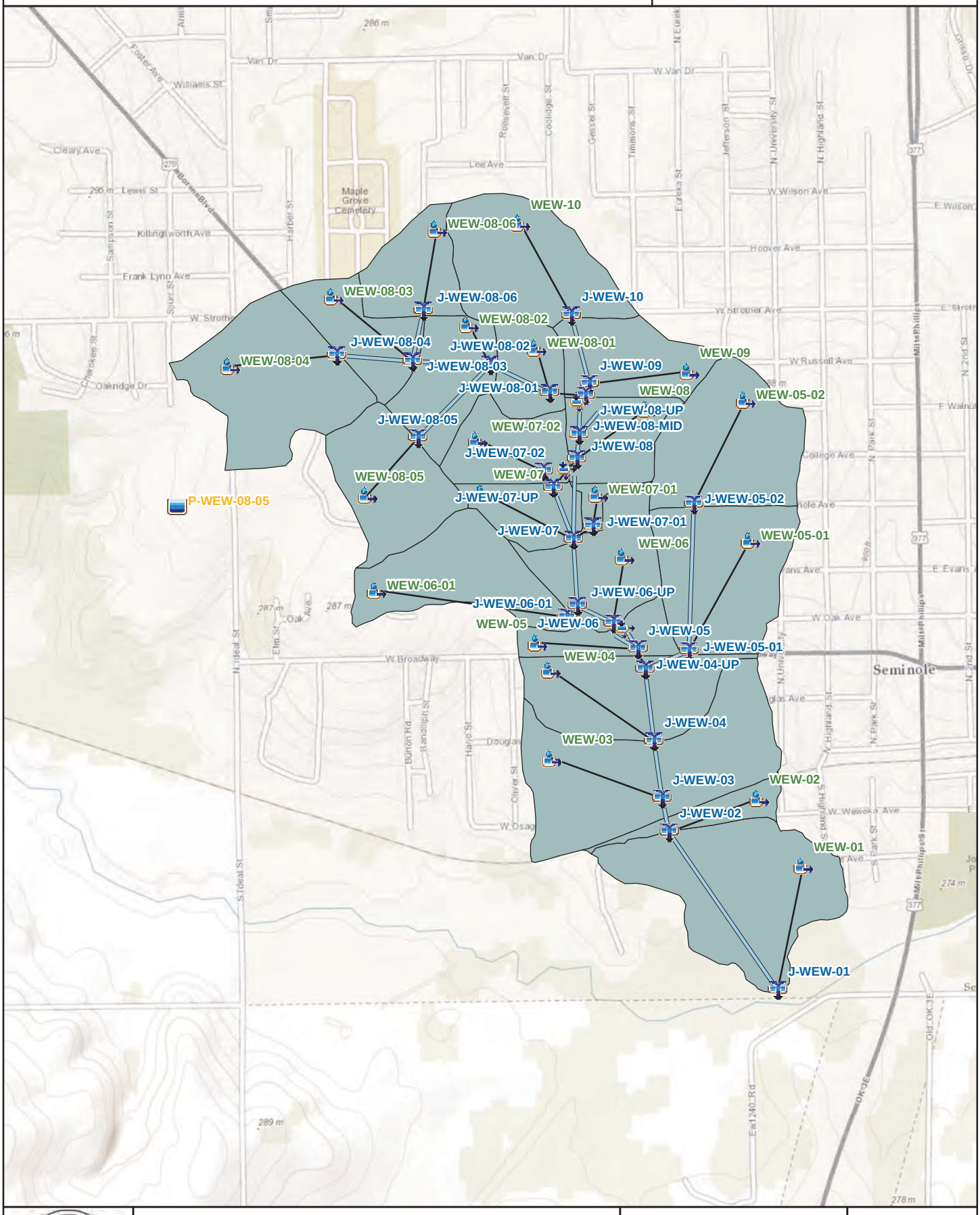
Tributary Subarea	Flow Type	Length (ft)	Percent of Flow Type	Weighted Slope (%)	Velocity (ft./sec.)	Tc (min.)	Lag (min.)	Lag (hr.)	Land Use:	% of Use	CN value for each Hydrologic Soil Group				Hydrologic Soil Groups and %				Composite CN	Drainage Area (acres)	Drainage Area (sq. mi.)
											A	B	C	D	A	B	C	D			
		0	53																		
WEW-10	Overland	53		1.92	0.97	0.91			Commercial	17	89	92	94	95	0.0	0.0	0.0	16.5	88.3	23.3	0.03637
	Channel (ditch)				0.00	0.00			Residential 1/4 acre	83	61	75	83	87	0.0	0.0	0.0	83.5			
	Paved	1646		2.20	2.96	9.27															
	Pipe				0.00	0.00															
	Stream				0.00	0.00	6.1	0.10													

Appendix 4-B
HEC-HMS Schematic

City of Seminole Master Drainage Plan

0 600 1,200
Feet

N



CITY OF SEMINOLE

Wewoka Tributary
HEC-HMS Schematic

MESHEK & ASSOCIATES, PLC
1437 S Boulder Ave, Suite 1550 Tulsa, OK 74119
Ph:(918) 392-5620 www.meshekengr.com

Appendix B

Appendix 4-C
HEC-HMS Output

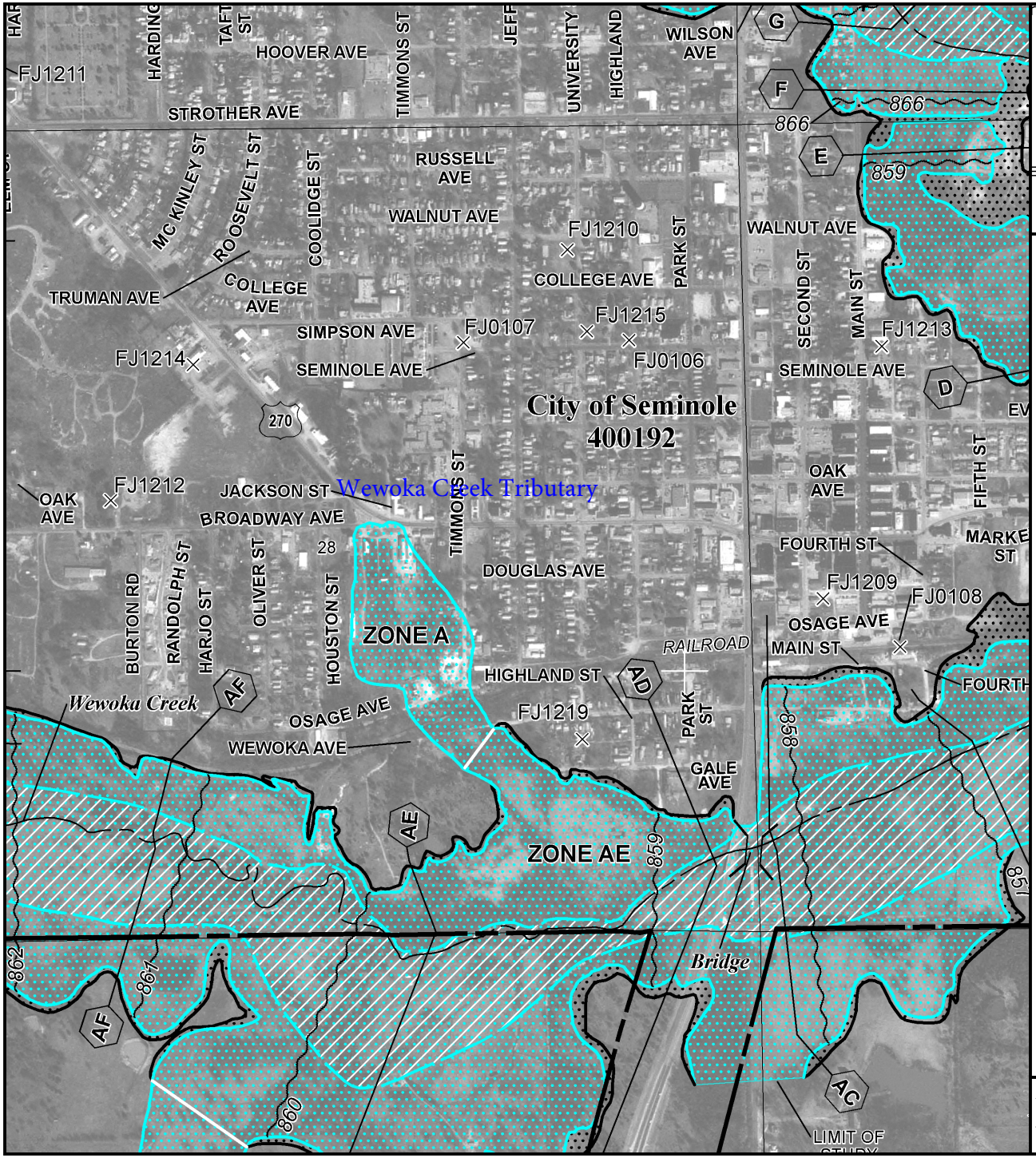
Seminole MDP
Existing Flow Rates (CFS)
Wewoka Creek Tributary

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
D-WEW-06	73	117	293	450	632	783	924	1245	0.30283
D-WEW-08	82	140	308	414	579	677	766	1008	0.21442
D-WEW-08-UP	111	163	292	396	524	621	717	943	0.19732
J-WEW-01	224	290	456	588	841	1040	1234	1676	0.53554
J-WEW-02	229	297	457	585	838	1036	1226	1652	0.48460
J-WEW-03	229	296	455	583	836	1033	1223	1645	0.47675
J-WEW-04	227	291	436	575	828	1021	1201	1608	0.42147
J-WEW-04-UP	221	283	421	574	832	1012	1188	1582	0.38954
J-WEW-05	154	198	363	511	718	867	1011	1336	0.31446
J-WEW-05-01	88	113	176	225	284	327	370	466	0.07507
J-WEW-05-02	47	61	95	121	153	177	200	252	0.03737
J-WEW-06	153	197	373	530	712	863	1004	1325	0.30283
J-WEW-06-UP	145	190	358	508	678	820	952	1254	0.27844
J-WEW-06-01	29	37	59	75	96	111	126	160	0.03005
J-WEW-07	139	181	341	481	632	761	881	1154	0.24839
J-WEW-07-UP	89	152		450	631	751	834	1099	0.23235
J-WEW-07-01	6	7	11	14	17	19	22	27	0.00302
J-WEW-07-02	25	31	47	59	73	83	94	117	0.01793
J-WEW-08	130	188	356	462	627	725	814	1056	0.21442
J-WEW-08-MID	154	208	338	441	571	668	763	989	0.19732
J-WEW-08-UP	159	211	340	444	572	669	765	991	0.19732
J-WEW-08-01	112	149	242	317	411	481	550	710	0.13901
J-WEW-08-02	98	130	215	284	369	434	498	645	0.12586
J-WEW-08-03	57	77	129	172	226	266	307	400	0.07794
J-WEW-08-04	18	28	55	78	109	132	156	211	0.04212
J-WEW-08-05	24	33	57	76	101	119	138	179	0.02718
J-WEW-08-06	26	34	51	65	82	94	106	132	0.01748
J-WEW-09	60	76	115	146	184	212	242	306	0.05831
J-WEW-10	53	66	97	121	150	171	192	238	0.03637
R-WEW-02	222	285	446	577	825	1018	1207	1635	0.48460
R-WEW-03	228	295	454	583	835	1032	1221	1644	0.47675
R-WEW-04	214	273	415	559	797	983	1161	1560	0.42147
R-WEW-05	212	270	403	557	800	986	1159	1552	0.38954
R-WEW-05-01	88	113	176	225	284	327	370	466	0.07507
R-WEW-05-02	47	61	95	121	153	177	200	252	0.03737
R-WEW-06	68	115	278	424	627	773	916	1236	0.30283
R-WEW-06-SS2	80	80	80	80	80	80	80	80	0.00000
R-WEW-06-UP	144	189	357	507	678	819	951	1253	0.27844
R-WEW-07	136	179	335	472	625	752	871	1144	0.24839
R-WEW-07-UP	87	128	283	419	564	688	803	1064	0.23235

Seminole MDP
Existing Flow Rates (CFS)
Wewoka Creek Tributary

HMS Junction	1-Year	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year	Drainage Area, mi^2
R-WEW-08	48	48	48	48	48	48	48	48	0.00000
R-WEW-08-MID	124	178	331	432	582	663	758	985	0.19732
R-WEW-08-UP	106	160	290	393	523	620	715	941	0.19732
R-WEW-08-UP_SS	48	48	48	48	48	48	48	48	0.00000
R-WEW-08-02	98	130	215	284	369	434	498	645	0.12586
R-WEW-08-03	57	77	129	172	226	266	307	400	0.07794
R-WEW-08-04	18	28	55	78	109	132	156	211	0.04212
R-WEW-08-05	24	33	57	76	101	119	138	179	0.02718
R-WEW-08-06	26	34	51	65	82	94	106	132	0.01748
R-WEW-10	46	57	86	109	136	156	177	221	0.03637
WEW-01	8	16	43	68	103	130	158	227	0.05094
WEW-02	4	6	12	17	24	29	34	46	0.00785
WEW-03	48	63	103	134	173	202	230	295	0.05528
WEW-04	55	68	100	124	153	174	195	241	0.03193
WEW-05	24	30	43	53	65	74	82	102	0.01164
WEW-05-01	42	53	83	106	133	154	174	220	0.03770
WEW-05-02	47	61	95	121	153	177	200	252	0.03737
WEW-06	37	45	67	83	102	116	130	161	0.02439
WEW-06-01	29	37	59	75	96	111	126	160	0.03005
WEW-07	21	27	40	51	63	72	81	101	0.01302
WEW-07-01	6	7	11	14	17	19	22	27	0.00302
WEW-07-02	25	31	47	59	73	83	94	117	0.01793
WEW-08	29	36	52	64	79	89	99	123	0.01710
WEW-08-01	22	27	41	51	64	73	81	101	0.01315
WEW-08-02	34	43	66	84	105	120	136	170	0.02075
WEW-08-03	22	28	43	54	68	78	88	110	0.01834
WEW-08-04	18	28	55	78	109	132	156	211	0.04212
WEW-08-05	24	33	57	76	101	119	138	179	0.02718
WEW-08-06	26	34	51	65	82	94	106	132	0.01748
WEW-09	33	42	62	78	96	110	124	154	0.02194
WEW-10	53	66	97	121	150	171	192	238	0.03637

Appendix 4-D
FEMA Floodplain and Floodway



ance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

0 500 1,000 1,500 2,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0235E

FIRM

FLOOD INSURANCE RATE MAP

SEMINOLE COUNTY, OKLAHOMA

AND INCORPORATED AREAS

PANEL 235 OF 550

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SEMINOLE COUNTY, UNINCORPORATED AREAS	400497	0235	E
SEMINOLE, CITY OF	400192	0235	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

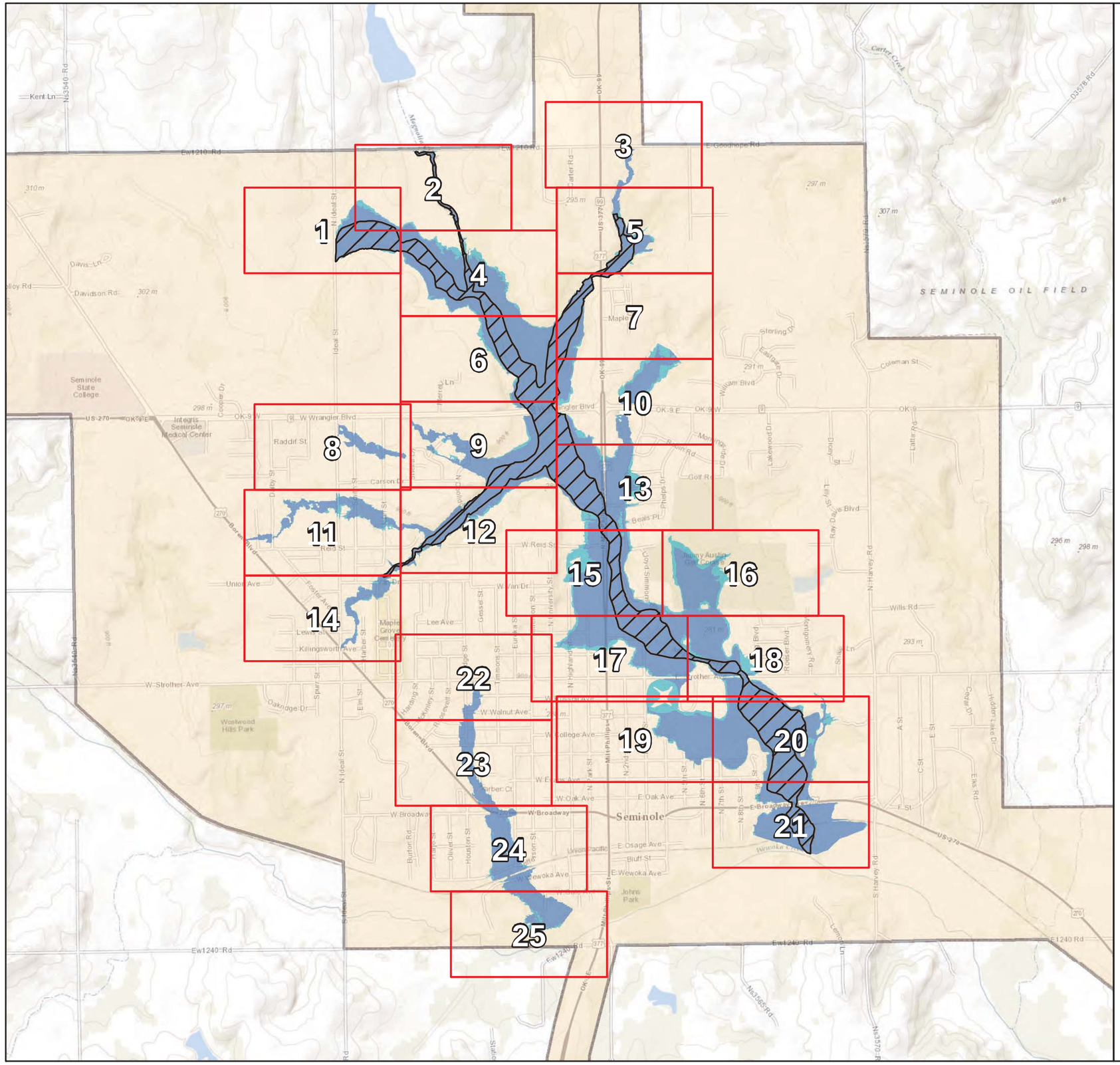
MAP NUMBER
40133C0235E

MAP REVISED
JULY 18, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

Appendix 4-E
Existing Floodplain



City of Seminole Master Drainage Plan

Existing Conditions Floodplain Atlas

- Floodplain Atlas Panels
- Seminole City Limits
- Floodway
- 1% Annual Chance
- 0.2% Annual Chance

N

0 0.5 1

Miles

creating a better tomorrow...
MESHEK & ASSOCIATES, PLC
GEOGRAPHIC INFORMATION SYSTEMS
CIVIL AND WATER RESOURCE ENGINEERING
1437 S. Boulder Ave - Suite1550 Tulsa, OK 74119
www.meshekgis.com 918-392-5620

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

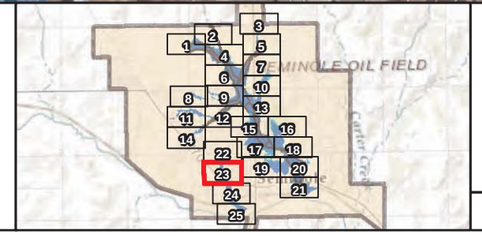
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

Map Page 23 of 25

City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

0 100 200

Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

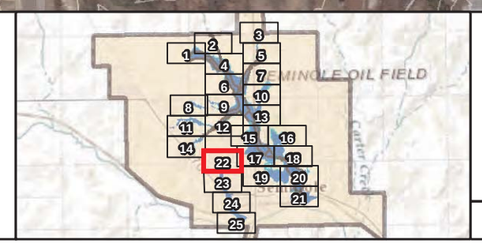
Floodway

1% Annual Chance

0.2% Annual Chance

Stream Centerline

Seminole City Limits



CITY OF SEMINOLE



City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

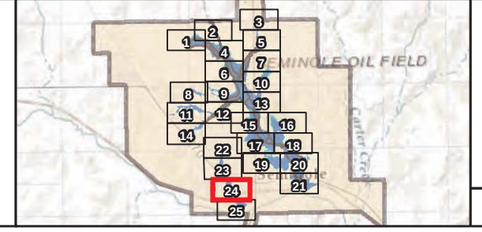
0 100 200
Feet

N

Map Date: 12/14/2015

MESHEK & ASSOCIATES, PLC

- Floodway
- 1% Annual Chance
- 0.2% Annual Chance
- Stream Centerline
- Seminole City Limits



CITY OF SEMINOLE



City of Seminole - Master Drainage Plan

Existing Conditions Floodplain Atlas

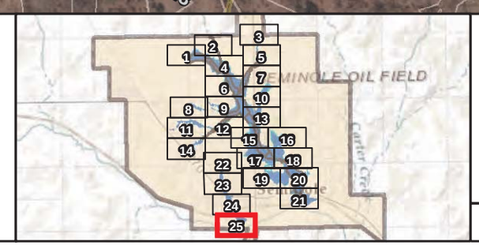
0 100 200
Feet

N

Map Date: 12/14/2015

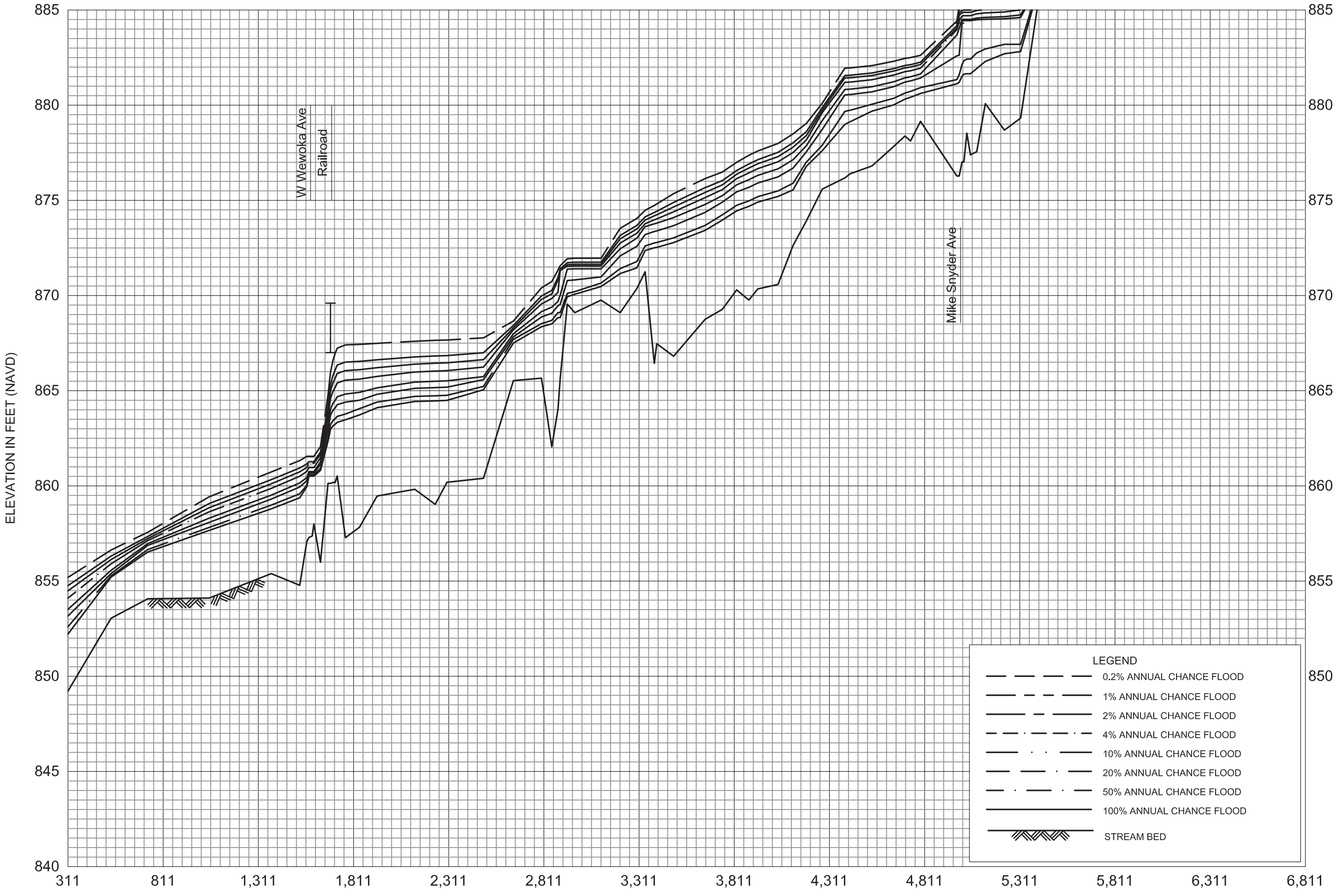
MESHEK & ASSOCIATES, PLC

Floodway
1% Annual Chance
0.2% Annual Chance
Stream Centerline
Seminole City Limits



CITY OF SEMINOLE

Appendix 4-F
Water Surface Profiles



FLOOD PROFILES

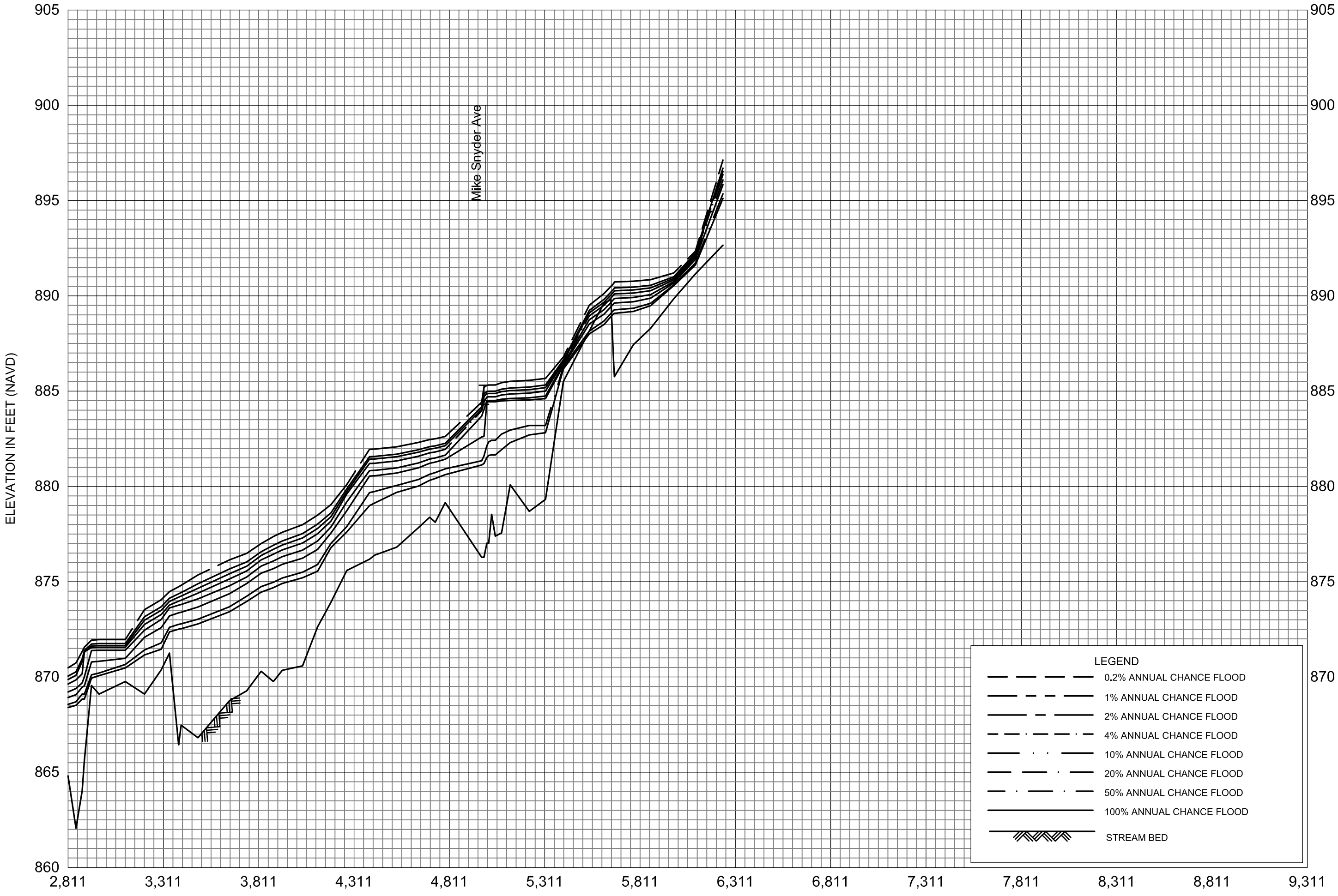
WEWOKA CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

01P



FLOOD PROFILES

WEWOKA CREEK TRIBUTARY

FEDERAL EMERGENCY MANAGEMENT AGENCY

SEMINOLE, OK

CITY OF SEMINOLE

02P

Appendix 4-G
Cost Estimates

City of Seminole - Wewoka Creek Tributary					
Problem Area 1, Alternative 1 - Detention Downstream of Mike Snyder Ave. and Coolidge Street Storm Sewer					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	34700	$ 12.00	$ 416,400.00
2	**TEMPORARY SILT FENCE**	**LF**	1300	$ 2.00	$ 2,600.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	18000	$ 2.50	$ 45,000.00
4	**48" RCP**	**LF**	170	$ 250.00	$ 42,500.00
5	**10'x6' RCB**	**LF**	1070	$ 1,270.00	$ 1,358,900.00
6	**POND OUTLET CONTROL STRUCTURE**	**EA**	1	$ 10,000.00	$ 10,000.00
7	**TRENCH EXCAVATION**	**CY**	475	$ 8.00	$ 3,800.00
8	**PAVEMENT REMOVAL**	**SY**	2400	$ 10.00	$ 24,000.00
9	**PAVEMENT REPLACEMENT**	**SY**	2400	$ 75.00	$ 180,000.00
10	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 50,000.00	$ 50,000.00
				Subtotal	**$ 2,133,200.00**
				15% Contingency	**$ 319,980.00**
				Subtotal	**$ 2,453,180.00**
				25% Utility Relocation Contingency	**$ 613,295.00**
				Total	***$ 3,066,475.00***

City of Seminole - Wewoka Creek Tributary					
Problem Area 1, Alternative 2 - Detention Downstream of Mike Snyder Ave. w/ Storm Sewer under Jackson Street and W. Broadway Ave.					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	40200	$ 12.00	$ 482,400.00
2	**TEMPORARY SILT FENCE**	**LF**	2300	$ 2.00	$ 4,600.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	18950	$ 2.50	$ 47,375.00
4	**48" RCP**	**LF**	170	$ 250.00	$ 42,500.00
5	**8'x8' RCB**	**LF**	970	$ 930.00	$ 902,100.00
6	**10'x6' RCB**	**LF**	1070	$ 1,270.00	$ 1,358,900.00
7	**POND OUTLET CONTROL STRUCTURE**	**EA**	1	$ 10,000.00	$ 10,000.00
8	**TRENCH EXCAVATION**	**CY**	475	$ 8.00	$ 3,800.00
9	**PAVEMENT REMOVAL**	**SY**	4600	$ 10.00	$ 46,000.00
10	**PAVEMENT REPLACEMENT**	**SY**	4600	$ 75.00	$ 345,000.00
11	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 50,000.00	$ 50,000.00
				Subtotal	**$ 3,292,675.00**
				15% Contingency	**$ 493,901.25**
				Subtotal	**$ 3,786,576.25**
				25% Utility Relocation Contingency	**$ 946,644.06**
				Total	***$ 4,733,220.31***

City of Seminole - Wewoka Creek Tributary					
Problem Area 2, Alternative 1 - Detention Downstream of Mike Snyder Ave. w/ Storm Sewer under Jackson Street and W. Broadway Ave. and Additional Detention Upstream of West Basins					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	59000	$ 12.00	$ 708,000.00
2	TEMPORARY SILT FENCE	LF	3550	$ 2.00	$ 7,100.00
3	SOLID SLAB BERMUDA SODDING	SY	114950	$ 2.50	$ 287,375.00
4	18" RCP	LF	150	$ 52.00	$ 7,800.00
5	30" RCP	LF	350	$ 120.00	$ 42,000.00
6	48" RCP	LF	170	$ 250.00	$ 42,500.00
7	8'x8' RCB	LF	970	$ 930.00	$ 902,100.00
8	10'x6' RCB	LF	1070	$ 1,270.00	$ 1,358,900.00
9	POND OUTLET CONTROL STRUCTURE	EA	1	$ 10,000.00	$ 10,000.00
10	TRENCH EXCAVATION	CY	1400	$ 8.00	$ 11,200.00
11	PAVEMENT REMOVAL	SY	5600	$ 10.00	$ 56,000.00
12	PAVEMENT REPLACEMENT	SY	5600	$ 75.00	$ 420,000.00
13	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 50,000.00	$ 50,000.00
				Subtotal	**$ 3,902,975.00**
				15% Contingency	**$ 585,446.25**
				Subtotal	**$ 4,488,421.25**
				25% Utility Relocation Contingency	**$ 1,122,105.31**
				Total	***$ 5,610,526.56***

City of Seminole - Wewoka Creek Tributary					
Problem Area 2, Alternative 2 - Detention Downstream of Mike Snyder Ave. (Including Buyout Areas) w/ Storm Sewer under Jackson Street and W. Broadway Ave. and Additional Detention Upstream of West Basins					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	65300	$ 12.00	$ 783,600.00
2	TEMPORARY SILT FENCE	LF	3550	$ 2.00	$ 7,100.00
3	SOLID SLAB BERMUDA SODDING	SY	114950	$ 2.50	$ 287,375.00
4	18" RCP	LF	150	$ 52.00	$ 7,800.00
5	30" RCP	LF	350	$ 120.00	$ 42,000.00
6	48" RCP	LF	170	$ 250.00	$ 42,500.00
7	8'x8' RCB	LF	970	$ 930.00	$ 902,100.00
8	10'x6' RCB	LF	1070	$ 1,270.00	$ 1,358,900.00
9	POND OUTLET CONTROL STRUCTURE	EA	1	$ 10,000.00	$ 10,000.00
10	TRENCH EXCAVATION	CY	1400	$ 8.00	$ 11,200.00
11	PAVEMENT REMOVAL	SY	5600	$ 10.00	$ 56,000.00
12	PAVEMENT REPLACEMENT	SY	5600	$ 75.00	$ 420,000.00
13	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 50,000.00	$ 50,000.00
				Subtotal	**$ 3,978,575.00**
				15% Contingency	**$ 596,786.25**
				Subtotal	**$ 4,575,361.25**
				25% Utility Relocation Contingency	**$ 1,143,840.31**
				Total	***$ 5,719,201.56***

City of Seminole - Wewoka Creek Tributary					
Problem Area 3, Alternative 1 - Detention Downstream of Mike Snyder Ave. (Including Buyout Areas) w/ Storm Sewer under Jackson Street and W. Broadway Ave. and Additional Detention Upstream of West Basins and Channelization Upstream of College Ave.					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	67000	$ 12.00	$ 804,000.00
2	TEMPORARY SILT FENCE	LF	5550	$ 2.00	$ 11,100.00
3	SOLID SLAB BERMUDA SODDING	SY	116350	$ 2.50	$ 290,875.00
4	CLASS A CONCRETE	CY	700	$ 500.00	$ 350,000.00
5	18" RCP	LF	150	$ 52.00	$ 7,800.00
6	30" RCP	LF	350	$ 120.00	$ 42,000.00
7	48" RCP	LF	170	$ 250.00	$ 42,500.00
8	8'x8' RCB	LF	970	$ 930.00	$ 902,100.00
9	10'x6' RCB	LF	1070	$ 1,270.00	$ 1,358,900.00
10	POND OUTLET CONTROL STRUCTURE	EA	1	$ 10,000.00	$ 10,000.00
11	TRENCH EXCAVATION	CY	1400	$ 8.00	$ 11,200.00
12	PAVEMENT REMOVAL	SY	5600	$ 10.00	$ 56,000.00
13	PAVEMENT REPLACEMENT	SY	5600	$ 75.00	$ 420,000.00
14	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 50,000.00	$ 50,000.00
				Subtotal	**$ 4,356,475.00**
				15% Contingency	**$ 653,471.25**
				Subtotal	**$ 5,009,946.25**
				25% Utility Relocation Contingency	**$ 1,252,486.56**
				Total	***$ 6,262,432.81***

City of Seminole - Wewoka Creek Tributary					
Problem Area 4, Alternative 1 - Storm Sewer System West of Coolidge Street					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	**UNCLASSIFIED EXCAVATION**	**CY**	14000	$ 12.00	$ 168,000.00
2	**TEMPORARY SILT FENCE**	**LF**	3500	$ 2.00	$ 7,000.00
3	**SOLID SLAB BERMUDA SODDING**	**SY**	5700	$ 2.50	$ 14,250.00
4	**5'x3' RCB**	**LF**	350	$ 440.00	$ 154,000.00
5	**10'x8' RCB**	**LF**	650	$ 1,340.00	$ 871,000.00
6	**10'x10' RCB**	**LF**	650	$ 1,560.00	$ 1,014,000.00
7	**CURB INLET**	**EA**	8	$ 5,500.00	$ 44,000.00
8	**PAVEMENT REMOVAL**	**SY**	1800	$ 10.00	$ 18,000.00
9	**PAVEMENT REPLACEMENT**	**SY**	1800	$ 75.00	$ 135,000.00
10	**REMOVAL OF STRUCTURES AND OBSTRUCTIONS**	**LS**	1	$ 75,000.00	$ 75,000.00
				Subtotal	**$ 2,500,250.00**
				15% Contingency	**$ 375,037.50**
				Subtotal	**$ 2,875,287.50**
				25% Utility Relocation Contingency	**$ 718,821.88**
				Total	***$ 3,594,109.38***

City of Seminole - Wewoka Creek Tributary					
Problem Area 4, Alternative 2 - Storm Sewer System West of Coolidge Street along with upstream detention					
ITEM	**DESCRIPTION**	**UNIT**	**TOTAL**	**UNIT PRICE**	**TOTAL COST**
1	UNCLASSIFIED EXCAVATION	CY	12500	$ 12.00	$ 150,000.00
2	TEMPORARY SILT FENCE	LF	3500	$ 2.00	$ 7,000.00
3	SOLID SLAB BERMUDA SODDING	SY	5400	$ 2.50	$ 13,500.00
4	36" RCP	LF	350	$ 140.00	$ 49,000.00
5	TRENCH EXCAVATION	CY	500	$ 8.00	$ 4,000.00
6	STANDARD BEDDING MATERIAL	CY	300	$ 20.00	$ 6,000.00
7	8'x6' RCB	LF	650	$ 930.00	$ 604,500.00
8	8'x8' RCB	LF	650	$ 1,020.00	$ 663,000.00
9	CURB INLET	EA	8	$ 5,500.00	$ 44,000.00
10	PAVEMENT REMOVAL	SY	1800	$ 10.00	$ 18,000.00
11	PAVEMENT REPLACEMENT	SY	1800	$ 75.00	$ 135,000.00
12	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	LS	1	$ 75,000.00	$ 75,000.00
				Subtotal	**$ 1,769,000.00**
				15% Contingency	**$ 265,350.00**
				Subtotal	**$ 2,034,350.00**
				25% Utility Relocation Contingency	**$ 508,587.50**
				Total	***$ 2,542,937.50***