DRAINAGE PLAN

# WILLOW PLACE 2ND ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

19 JUNE 2007

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# DRAINAGE PLAN
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## FINAL REPORT

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19 June 2007

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# REPORT CONTENTS

EXISTING CONDITIONS

The site is located a half of mile west of the intersection of 45th Street and Webb Road. The property is approximately 2.5 acres. The site primarily consists of undeveloped agricultural land with one residential structure and several outbuildings located on site. The site currently drains to the southwest into an existing offsite inlet and storm sewer in Willow Place Addition. There is a no FEMA Special Flood Hazard Area located on the property as of this report.

PROPOSED CONDITIONS

The property is to be developed as a residential subdivision with corresponding houses, pavement, and lawn areas. The proposed plat is intended for seven lots. Upon development, the site will primarily drain to the southwest into a proposed inlet. A small amount of street runoff will drain north into the 45th Street ROW. The proposed inlet and storm sewer will connect to an existing inlet and storm sewer line that drains southwest into an existing 4 'x5 ' RCBC.

OFFSITE CONDITIONS

The site generally drains to the southwest. There does not appear to be any significant amount of drainage encroaching the property.

# EXISTING CONDITIONS RUNOFF CALCULATIONS

## DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in calculating the existing conditions runoff values.

- Ø STORM SERIES
  - Rational Method utilized for site runoff
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events
- Ø DRAINAGE AREAS
  - Areas per existing topography
  - Hydraflow Hydrograph utilized for flow calculations
  - Minimum Time of Concentration Equals 15 min
  - Existing C= 0.35 (Open Spaces, Fair Condition)

## SITE CHARACTERISTICS

The proposed site is currently used as agricultural farmland and pasture. The site drains southwest into an existing inlet and storm sewer system. A minimum time of concentration of 15 minutes was used for the property. The soil onsite is Type D, and a C factor of 0.35 was used to represent the site's current runoff characteristics. The soil survey can be seen in Appendix A. An aerial photo with existing topography can be viewed in Exhibit 4.

## EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The property currently drains to the southwest to the adjacent Willow Place Addition. The runoff is accumulated into by an existing inlet with a 24" RCP that drains into an existing 4'x5' RCBC.
There is currently no FEMA SFHA found on the property.

## DOWNSTREAM DRAINAGE CAPACITY

There is currently one structure that conveys water downstream from the property. The structure which conveys the runoff is listed in the following table. Ponding areas upstream and downstream of the structure have not been accounted for in the table, if applicable.

| Location | Structure | Qcapacity (cfs)* | Overtopping Elevation | Overtopping Frequency |
|---|---|---|---|---|
| 126'E and 374'S of the Intersection of Ironwood and 45th St. | Area Inlet w/ 24" RCP | 15 | 1394.1 | 25-yr |

*Q capacity equals structure at full flow, per Hydraflow Storm Sewer.

# POST-DEVELOPMENT HYDROLOGIC ANALYSIS

## DRAINAGE METHODS & STANDARDS

The following methods and standards, although not a complete list, were used in developing the drainage and grading plans.

- Ø STORM SERIES
  - Rational Method utilized for site runoff
  - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events
- Ø DRAINAGE AREAS
  - Areas per existing topography
  - Hydraflow Hydrograph utilized for flow calculations
  - Time of Concentration using City of Wichita minimum 15 min
  - Developed C = 73 (Residential, Soil Type "D")

## DETENTION FACILITIES

There is no detention ponds proposed on the property.

## DISCHARGE POINTS SUMMARY

There is one main discharge points that this site utilizes. This point is summarized below. All flows are the 24-hour, 100-yr storm events. The capacity of the structure was calculated using Hydraflow Storm Sewer using existing flowlines and an overtopping elevation equal to the top of the inlet.

| LOCATION | STRUCTURE | EXIST RUNOFF | PROP RUNOFF | CAPACITY |
|---|---|---|---|---|
| 126'E and 374'S of the Intersection of Ironwood and 45th St. | Area Inlet w/ 24" RCP | 15 cfs | 17 cfs | 15 cfs |

## POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

No potential upstream impacts are expected with this development. Due to minimal amount of increased runoff from proposed site, there are no negative downstream impacts expected. Proposed flows will be raised 2 cfs to the site's discharge point for the 100-yr storm event. The system will maintain an overtopping frequency approximately equal to the 25-yr storm event. Any ponding, although minimal, will be contained within the platted easement.

| Location | Structure | Qcapacity (cfs)* | Overtopping Elevation | Overtopping Frequency |
|---|---|---|---|---|
| 126'E and 374'S of the Intersection of Ironwood and 45th St. | Area Inlet w/ 24" RCP | 15 | 1394.1 | 25-yr |

*Q capacity equals structure at full flow, per Hydraflow Storm Sewer.

SOURCE OF FLOODPLAIN INFORMATION

The site lies within a FEMA Zone X. The site is not located within a mapped FEMA SFHA. The location of the property, on FEMA FIRM Panel 240 of 700, map 20173C0240E, is attached as Exhibit 6 (for Sedgwick, effective February 2, 2007).

# FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

There does not appear to be any USACOE permitting needed on the proposed site at this time.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING

There does not appear to be any DWR permitting needed on the proposed site at this time.

FEMA

There is no mapped floodplain located upon the proposed site. Therefore, no FEMA permitting is expected at this time.

KANSAS DEPT OF TRANSPORTATION

There does not appear to be any KDOT permitting needed on the proposed project.

SEDGWICK COUNTY ROW

A Sedgwick County ROW permit will be needed for the proposed discharge into the 45th Street ROW.

DRAINAGE & GRADING PLAN Scale 1:30

APPENDIX A: USGS Soils Survey

APPENDIX B: Hydraflow Hydrograph

APPENDIX C: HydraFlow Stormsewer
- Existing Conditions – 2yr & 100yr
- Proposed Conditions – 2yr & 100yr

# USGS Soils Survey

# HydraFlow Hydrograph

# HydraFlow Stormsewer

- Existing Conditions –2yr & 100yr
- Proposed Conditions –2yr & 100yr