DRAINAGE PLAN

NORTH 45th PLACE ADDITION

TO

WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY

Baughman
ENGINEERING | SURVEYING | PLANNING
LANDSCAPE ARCHITECTURE

23 February 2009

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FINAL REPORT

Prepared by Baughman Company, P.A.
23 February 2009

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REPORT CONTENTS

EXISTING CONDITIONS

The site is located at the northeast corner of the intersection of K-96 and Ridge Road. The existing property consists of approximately 58 acres of agricultural farmland and pasture. The site location is depicted on the USGS Quadrangle Sheet as Exhibit 1. The aerial photograph with existing topography can be seen as Exhibit 2. There is no FEMA SFHA located on this property as of this report.

PROPOSED CONDITIONS

The property is to be developed into a commercial site with corresponding streets, utilities, and storm water management systems (storm sewer, channels, ponds, etc.) There are three (3) ponds proposed in this addition that will provide detention for developed runoff. The proposed ponds will serve as a sedimentation basins as well as storage for storm water runoff. For a half-scale copy of the Plat, see Exhibit 3.

OFFSITE CONDITIONS

This site has a high point towards the center of the site. Approximately 40 percent of the site drains to the southeast, 40 percent to the northwest, and 20 percent to the southwest. The southeast portion of the property drains offsite and eventually to the south through a RBC under Highway K-96. The remaining portions of the property drain offsite into the Ridge Road ROW. There does not appear to be any offsite drainage encroaching upon the site.

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
  - 24-hour; 2-yr, 10-yr, 100-yr Storm Events Modeled
  - 2-yr Rainfall Depth = 3.5 in
  - 10-yr Rainfall Depth = 5.3 in
  - 100-yr Rainfall Depth = 7.9 in

- Ø FLOW DATA
  - Existing Conditions runoff utilizing Rational Method
  - Areas per Surveyed Topography, Aerial Photos, and Site Visits
  - C = 0.40 (Type A,B, & C Soils, Row Crops and Open Space)
  - Time of Concentration: FAA Method (15 min minimum)

SITE CHARACTERISTICS

The proposed site is currently agricultural farmland. The predominant soils on this site consist of Type A, with smaller portions of Type B and Type C soils. The site has a high point towards the middle and drains primarily west and southeast; west into the Ridge Road ROW and southeast offsite and under K-96. There is no offsite drainage encroaching the site. The site is bounded to the west by Ridge Road and to the south by Highway K-96. The property to the east is agricultural farmland, and platted as Midland Baptist Church Addition 2nd. There are some existing residential properties bordering the site to the north.
The Aerial Exhibit can be seen as Exhibit 2.

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

The site was analyzed for pre-development conditions using the Rational Method for the 2, 5, 10, 25, and 100-year storm events. The runoff coefficient of 0.40, was based on open space as well agricultural row crops in Type A, B, & C soils. The time of concentration was calculated using the FAA Method with a minimum time of concentration of 15 minutes.

DOWNSTREAM DRAINAGE CAPACITY

Approximately 40 percent of the site drains to the southeast, 40 percent to the northwest, and 20 percent to the southwest. The eastern portion of the site drains under K-96 through a RCB to the south. The western portion of the site currently drains into the Ridge Road ROW.

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
- 24-hour; 5-yr, 10-yr, 100-yr Storm Events Modeled
- 5-yr Rainfall Depth = 4.6 in
- 10-yr Rainfall Depth = 5.3 in
- 100-yr Rainfall Depth = 7.9 in

Ø POND ROUTING / GRADING
- Hydraflow Hydrograph software utilized for modeling (Hydrograph Method)
- Minimum 1' Freeboard from 100-yr Water Surface Elevations to adjacent lot corners (except where noted below)
- Minimum 2' between BFE and lowest opening elevation
- Minimum 5:1 Side Slopes for pond banks

DETENTION FACILITIES

There are three (3) ponds proposed on this commercial site. The ponds will detain developed runoff. These ponds can be seen on the half-scale drainage plan in Exhibit 5. The pond systems are described below in further detail.

Ø NORTH POND SYSTEM

This pond is located in the northwest corner of the property. The pond will be a wet detention pond with a static water surface elevation of 1331 and a 100-yr water surface elevation of 1334.3. The pond will discharge via an 18" RCP offsite.

Ø MIDDLE POND SYSTEM

This pond is located approximately 1100' north of the intersection of K-96 and Ridge Road. The pond will be a wet detention pond with a static water surface elevation of 1332 and a 100-yr water surface elevation of 1334.6. The pond will discharge via an 18" RCP offsite.

Ø SOUTH POND SYSTEM

This pond is located in the southwest corner of the property. The pond will be a wet detention pond with a static water surface elevation of 1334 and a 100-yr water surface elevation of 1336.8. The pond will discharge via a 24" RCP offsite.

DETENTION SUMMARY

Detention will be provided on the proposed site to limit the developed runoff to less than or equal to the existing conditions. The following table represents the pond systems inflow and outflow for the 24-hour, 100-yr storm event. The North Pond system will also detain and convey extra developed runoff to account for no

detention on the adjacent Long-Hayes Commercial Addition. That plat is approximately 1.5 acres and will discharge directly to the SWS of Ridge Road. Additional detention is proposed as part of this plat to compensate for the lack of detention in the Long-Hayes Commercial Addition.

North Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
Pond A	106 cfs	13 cfs	1334.3	18" RCP

Middle Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
Pond B	81 cfs	7.8 cfs	1334.6	18" RCP

South Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
Pond C	95 cfs	20 cfs	1336.8	24" RCP

DISCHARGE POINTS SUMMARY

There are 3 main discharge points that this site utilizes. These are various points along Ridge Road. The site is proposed to drain into the proposed stormwater sewer system along Ridge Road. The peak runoff discharging into the Ridge Road ROW is proposed to be less or equal to existing conditions. The proposed SWS line is currently designed and available through the Sedgwick County Public Works Department. The SWS will drain this addition's detained runoff as well as Ridge Road ROW. The runoff will conveyed to the north and west via a pump station.

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

No potential upstream impacts are expected with this development.
Due to detention on the proposed site, there are no downstream impacts expected. Proposed flows will be limited to at least existing flows to the three (3) discharge points that the site utilizes.

SOURCE OF FLOODPLAIN INFORMATION

FEMA Floodplain and Floodway information were obtained from the Sedgwick County, Kansas FIRM Panel 195 of 700 dated February 2, 2007.
There is no floodway or floodplain boundary on the proposed property.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

There does not appear to be any intermittent and/or ephemeral streams, or wetlands located on the proposed site. It is not anticipated that there will be any USACOE permitting needs.

KANSAS DEPT OF AGRICULTURE – DWR PERMITTING

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

FEMA

There is no mapped floodplain located upon the proposed site.

KANSAS DEPT OF TRANSPORTATION

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

SEDGWICK COUNTY ROW

There will be three (3) points of discharge into Sedgwick County ROW. The site will drain into the proposed storm sewer along Ridge Road. These areas of discharge will need to have county approval.

EXHIBITS

EXHIBIT 1: Site Location Map
EXHIBIT 2: Aerial Photo with Topography
EXHIBIT 3: Plat – Half Scale
EXHIBIT 4: Drainage & Grading Plan – Half Scale
EXHIBIT 5: FEMA Firmette

PLAN SHEETS

DRAINAGE & GRADING PLAN Scale 1:100

APPENDIX A: USGS Soils Survey

APPENDIX B: Hydraflow Hydrograph

USGS Soils Survey

Hydraflow Hydrograph