

DRAINAGE PLAN
SAVINA 5TH
ADDITION

TO
WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY



23 MARCH 2007



DRAINAGE PLAN SAVINA 5TH ADDITION

FINAL REPORT

Prepared by Baughman Company, P.A.
23 March 2007

By N. Brent Wooten, P.E.
Trevor R. Kurth, I.E.
Nicholas H. Jefferson, I.E.

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PROJECT NARRATIVE

EXISTING CONDITIONS

The site is located near the intersection of North Arkansas Avenue and 33rd Street North. The site is bounded on the east by the original Chisholm Creek (aka Wichita Drainage Canal) and on the west by residential housing.

The site consists of approximately 6.5 acres of open space and is generally flat. The site appears to drain to the east into the drainage canal.

PROPOSED CONDITIONS

The site is proposed to be developed into multi-family detached homes for Habitat for Humanity. The site will also include streets with roll-type curb as well as utilities and drainage structures. The site will drain via storm sewer into the drainage canal. Flumes will be utilized at the end of cul-de-sacs to carry drainage into the existing canal. The north abutting lots to 33rd Street North will drain via the ROW and then to the east into the channel.

OFFSITE CONDITIONS

The site is generally flat and drains to the east. There appears to be offsite drainage encroaching the property from the west. This flow will be accommodated with storm sewer and into the drainage channel. The flow in the drainage channel appears to be from the upstream basin up to the East Fork Chisholm Creek Levees (37th Street North) and the 2-36 "x48" HECMP s that pass under the levees to the south. This corresponding flow was calculated to be 800 cfs in the 100-year storm event.

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 OFFSITE FLOW

- Areas per existing topography and site visits
- HEC-HMS utilized for upstream offsite flow
- Time of Concentration using City of Wichita minimum 15 min

SITE CHARACTERISTICS

The proposed site is currently open space with grass cover. A rational 'C' factor of 0.63 was used for these conditions. This was for Urban Lawn Area with slopes less than 1%. The site runoff flows to the east and into the adjacent drainage channel. The existing 33rd Street ROW also flows to the west and drains into the channel via a 24" CMP. A time of concentration of 15 minutes was used. The soil type for the area is Type D (Appendix A).

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

It appears that approximately 0.6 acres drains from the west from the Casa De La Familia Addition. This area generates approximately 3 cfs in the 100-year storm event. There is sheet flow from the remaining properties from the west and will be conveyed in the proposed on-site storm sewer system.

For flow in the existing channel, please see below.

DOWNSTREAM DRAINAGE CAPACITY

As stated above, the site drains into the Wichita Drainage Canal (Chisholm Creek) and flows south. The flow from this site is negligible compared to the basin that feeds the channel.

Due to the area being in a FEMA Unstudied Zone A, no flow data was available for the channel. Based on the USGS Quadrangle as well as aerial photographs, it was determined that the upstream basin to 33rd Street North was approximately 180 acres (0.2828 square miles). This area was modeled in HEC-HMS using the SCS Curve Number Method (CN = 90, 0% impervious area) and the lag time of the basin at 76.75 minutes. Baseflow was also used with Recession Equations and a constant of 0.9. This yields a flow of approximately 380 cfs (Appendix B). There are also 2-36"x48" HECMP's that convey water from the original Chisholm Creek from the north under the levee and into the Wichita Drainage Canal. The flow from these pipes was calculated using HydraFlow Express (Appendix C). When calculating the capacity of the existing pipes, the maximum headwater used was the top elevation of the levee before overtopping into the levee. This yielded a maximum

flow capacity of the pipes to be 415 cfs. Therefore, the value used in HEC-RAS modeling was 800 cfs. The modeling can be viewed in Appendix D.

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
 - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events Modeled
- Ø STORM WATER SEWER PIPES
 - Calculated in HydraFlow StormSewers
 - Developed 'C' = 0.82 (Multi-Unit-Detached)
 - Minimum Tc = 15 min

DETENTION FACILITIES

There is no detention provided on this site. The site will drain to the east and directly into the Wichita Drainage Ditch.

The site will utilize storm sewer systems to convey the site's runoff as well as offsite runoff from the west (Appendix E).

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

No potential upstream impacts are expected with this development. The site will convey runoff via storm water sewers into the Wichita Drainage Ditch.

FLOODPLAIN SUBMITTAL

SOURCE OF FLOODPLAIN INFORMATION

The site lies partially within a FEMA Unstudied Zone A. This means, that no Base Flood Elevations (BFE 's) are available for this reach. This is per FEMA FIRM Panel 355 of 700 for Sedgwick County, Kansas effective February 2, 2007.

HEC-RAS was utilized in studying the adjacent channel. As stated above, a flow of 800 cfs was used in the channel for the 100-year conditions. This gives a maximum water surface of a 125.4 COW Datum (1312.8 NGVD). The minimum pads on the proposed site will be set at a 129.4. This will give a 3.8 ' of freeboard to the calculated water surface as well as a 1.0 ' freeboard to the hypothetical 2000 cfs flow rate.

The FEMA FIRM panel for this area is located in Exhibit 6. No data table or profiles are available at the time of this report.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

The USACOE has been contacted at the time of this report. A jurisdictional determination will be obtained prior to construction.

KANSAS DEPT OF AGRICULTURE –DWR PERMITTING

The calculated floodplain stays within the top banks and does not encroach the property. Therefore, a floodplain fill permit may not be required prior to development. However, if any structures are to be placed below the top bank (ie storm sewer end sections) then a structures permit may be required.

FEMA

An Unstudied Zone A exists on this property. The Base Flood Elevations have been established per HEC-RAS and a minimum pad for the site has been determined. All structures shall conform to floodplain development requirements. At this time, no Letters of Map Change are proposed, as it is not required by State or Federal Law.

KANSAS DEPT OF TRANSPORTATION

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

SEDGWICK COUNTY ROW

There does not appear to be any Sedgwick County Permitting on the proposed project.

DRAINAGE PLAN

Scale 1:100

SUPPORTING CALCULATIONS

APPENDIX A:	USGS Soils Survey
APPENDIX B:	HEC-HMS -Offsite Flow Calculations
APPENDIX C:	HydraFlow Express -Capacity of 2-36 "x48 " HECMP
APPENDIX D:	HEC-RAS -Existing Channel Study
APPENDIX E:	HydraFlow Storm Sewers -SWS System

USGS Soils Survey

HEC-HMS

Offsite Flow Conditions

HydraFlow Express

2 –36 "x48 " HECMP

HEC-RAS

Existing Wichita Drainage Canal Study

HydraFlow StormSewers

Main SWS System