

DRAINAGE PLAN

KOCH COMMUNITY PARK ADDITION

TO
WICHITA, SEDGWICK COUNTY, KANSAS

PREPARED BY



09 APRIL 2007



DRAINAGE PLAN KOCH COMMUNITY PARK ADDITION

FINAL REPORT

Prepared by Baughman Company, P.A.
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By N. Brent Wooten, P.E.
Trevor R. Kurth, I.E.
Nicholas H. Jefferson, I.E.

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PROJECT NARRATIVE

EXISTING CONDITIONS

This site is located just south of K-96 on Oliver Avenue. The site is bounded on the south by Norwood Lane as well as Lost Acres Addition. The west line of the property abuts Tributary 3 of the East Fork Chisholm Creek.

The site consists of approximately 30 acres. The site is considered open space in fair condition and is of Soil Type B (Appendix A). Slightly more than half of the site flows to the west and into the adjacent Tributary 3 of the East Fork of Chisholm Creek. The remainder of the site flows to the southeast corner and, after draining through a 12" RCP SWS System, drains into the East Fork of the Chisholm Creek. This area has a history of overtopping Norwood Lane and is accustomed to poor drainage.

A FEMA Zone AE encroaches the property at southeast corner as well as the west line. A portion of the FEMA Floodway encroaches the property at the northwest corner. By elevation the floodplain would not lie on the property near the southeast corner.

PROPOSED CONDITIONS

The site is proposed to be developed into 3 commercial lots with an associated entrance drive, utilities, and drainage structures. Lot 3 will drain into a proposed pond located in mapped FEMA Floodplain. All of Lot 2 as well as a portion of Lot 1 will drain back to the west into a second proposed pond. Both ponds will drain via weir sections at existing grades and into the Tributary of the East Fork Chisholm Creek. The remainder of the site, approximately 3.5 acres, will continue to drain to the southeast and into the existing SWS system under Oliver. This area is also under mapped floodplain by scaled location, but out by elevation.

The FEMA Floodplain that encroaches the property will mainly be included in Reserves (locations of proposed ponds). The BFE established by the FIRM Panels will be the basis for minimum pads established on the proposed lots. Little to no fill is expected in the area of the mapped floodplain. These areas will include the proposed ponds and will require excavation. There is not expected to be any fill or excavation in the area of the FEMA Floodway.

OFFSITE CONDITIONS

The site generally drains to the west and directly into Tributary 3 of the East Fork of the Chisholm Creek. This reach is studied, according to FEMA, and has Base Flood Elevations established. The southeastern portion of the site drains to the southeast corner and into an existing 12" RCP. This area, historically, has overtopped Norwood Lane. This area is also located in the FEMA Floodplain of the East Fork Chisholm Creek. The existing pipe under Oliver will still be utilized, although the basin for this pipe will be greatly reduced upon development.

There does not appear to be any offsite flow encroaching the property from the adjacent properties.

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

- SCS Curve Number Method utilized for site runoff
- 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events

Ø SITE FLOW

- HydraFlow Hydrographs utilized for site runoff (Appendix B)
- Time of Concentration using City of Wichita minimum 15 min
- Existing CN = 88 (Open Space –fair condition)

SITE CHARACTERISTICS

The current site is considered open space (fair condition) and includes a high point or break in the middle. The site is located just upstream of the confluence of Tributary 3 and the East Fork of the Chisholm Creek. The main portion of the site drains to the west and into Tributary 3. The remainder of the site currently drains to southeast near the intersection of Norwood Lane and Oliver Avenue. The site has tree rows encompassing the perimeter. These tree rows will be left as existing, where applicable.

EXISTING CONDITIONS HYDROLOGIC ANALYSIS

This site produces approximately 160 cfs of runoff. The majority of this runoff flows to the west with the remainder flowing to the southeast. The drainage appears to sheet flow into the respective Creeks. The surrounding properties appear to flow directly west and into Tributary 3. The existing 12" RCP appears to be vastly undersized for the existing runoff. Historically, the area near the southeast corner floods and overtops Norwood Lane.

DOWNSTREAM DRAINAGE CAPACITY

As stated earlier, the western portion of the site drains directly into Tributary 3 of the Chisholm Creek with the eastern portion drainage to the southeast corner into an existing 12" SWS. The western portion of the site will detain its runoff before entering the Tributary via broadcrested weir sections. The existing channel has a determined BFE. The existing 12" RCP storm sewer system appears to be undersized for the amount of runoff it serves. Currently, it appears that 9 or more acres drain to this area near Norwood Lane and Oliver Avenue. The existing pipe will convey approximately 5 cfs with 1' of head (Appendix C). This area has had flooding problems in the past, therefore, upon development, the site will reduce this basin size to reduce flooding problems. This area also lies within the 100-year FEMA Floodplain. The FEMA Floodway is located near the southeast property corner.

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
 - SCS Curve Number Method utilized
 - 24-hour; 2-yr, 5-yr, 10-yr, 25-yr, 50-yr, 100-yr Storm Events Modeled
- Ø Developed Site Runoff
 - Calculated in HydraFlow Hydrographs (Appendix B)
 - Developed CN = 88 (Industrial/Commercial)
 - Minimum Tc = 15 min

DETENTION FACILITIES

There will be two (2) detention facilities that this site utilizes for storm water detention. The first, located at the northwest corner of the site, will detain the eastern 15 acres of the developed site. The second, located at the southwest corner, will detain the remaining 12.3 acres. These ponds will be referred to as the North pond and the South pond.

- Ø North Pond (Reserve A)

The North Pond, located in Reserve A, will detain the runoff from approximately 15 acres of developed land. This pond will have a static water surface of a 1349.0 NGVD. The pond will drain via a broadcrested overflow weir, at the static elevation, to the west and into Tributary 3 of the East Fork Chisholm Creek. The upper banks of the pond will be at/near existing elevations in order to not place fill in the 100-year Floodplain. The west bank of the pond will remain as existing where it adjoins the FEMA Floodway. The pond will accept approximately 114 cfs of peak runoff (100-year storm event) and discharge approximately 73 cfs. The 100-year water surface will be at elevation 1350.3 in the 100-year storm event. These numbers are with no tailwater elevation of the adjacent Creek. Under the 100-year flooding event of the adjacent tributary, the pond will be fully inundated and have an elevation equal to the base flood elevation of the creek, which is a 1350.5 NGVD. A one (1) foot freeboard will be provided along the east side of the pond adjacent to any structures. The lowest opening for minimum pads for the adjacent Lot 3 will be at least 3 foot above the FEMA Base Flood Elevation.
- Ø South Pond (Reserve B)

The South Pond, located in Reserve B, will detain runoff from the west portion of the site as well re-direct runoff that currently flows to the east. This will be accomplished at site development by storm sewer or other approved methods. This pond will have a static water surface of 1346.0 and will drain via a five (5') foot broadcrested overflow weir at the same elevation. The weir will discharge directly into Tributary 3 of East Fork Chisholm Creek. As stated above with the North Pond, the banks of the proposed South Pond will be at/near existing

proposed South Pond will be at/near existing elevations. The pond will be located in a mapped FEMA Floodplain. The pond was routed with no tailwater, although the 100-year water surface is expected to be at least the FEMA Base Flood Elevations. The pond will accept the 100-year runoff from approximately 12.3 acres of developed land which will produce 94 cfs. The pond will release approximately 61 cfs of developed runoff via the weir section. This runoff produces a 100-year water surface elevation of 1348.8. The Base Flood elevation for this area, per FEMA BFE, is expected to be a 1348.0. The minimum pad elevation will be set at least 3 feet above the ponds 100-year water surface elevation.

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 tables represent each pond systems inflow and outflow for the 24-hour, 100-yr storm event.

East Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
North Pond	114 cfs	73 cfs	1350.3	20 ' Weir

West Pond System

POND	INFLOW	OUTFLOW	100-yr WSE	OUTLET
South Pond	94 cfs	61 cfs	1348.8	5 ' Weir

POTENTIAL UPSTREAM/DOWNSTREAM IMPACTS

No potential upstream impacts are expected with this development.

The site will detain its runoff in two separate ponds and utilize existing grades to convey the runoff to the west and into Tributary 3 of the East Fork of the Chisholm Creek. No rise in the FEMA Base Flood Elevations are expected from this development as little to no fill will be placed in the FEMA SFHA.

The site will dramatically decrease the runoff to the east, and into the existing 12" RCP storm sewer system, by re-directing some of the runoff to the ponds at the west of the site. We expect to decrease the current runoff to the pipes by at least half upon development. The south subdivision as well as Norwood Lane, has experienced flooding problems from this sites' runoff as well the flooding from the East Fork Chisholm Creek. By reducing this sites' flow, we can reduce the overtopping frequency of Norwood Lane.

FLOODPLAIN SUBMITTAL

SOURCE OF FLOODPLAIN INFORMATION

Portions of the site lie within FEMA Zone AE SFHA. This means, that a base flood elevation has been determined by detailed study on this reach of the creek. This is per FEMA FIRM Panels 356 & 357 of 700 for Sedgwick County, Kansas, effective February 2, 2007.

The site lies near the confluence of Tributary 3 of the East Fork of Chisholm Creek and the East Fork of the Chisholm Creek. The Base Flood Elevation varies across the site. The BFE on the Tributary varies from a 1351 NAVD to a 1347 NAVD from North to South along the west line of the property. The BFE of the East Fork of the Chisholm Creek is approximately a 1346 NAVD at the southeast corner of the property.

The FEMA FIRM panels for this area are located in Exhibit 6. The data table and flood profiles for the Tributary as well as the East Fork of Chisholm Creek are located in the following pages as Exhibits 7 & 8, respectively.

FEDERAL, STATE, & LOCAL PERMITTING

US ARMY CORPS OF ENGINEERS

There does not appear to any USACOE permitting needed on the site at this time. There does not appear to be any stream threads or wetlands on the subject property and no work is expected on the high bank of the creeks.

KANSAS DEPT OF AGRICULTURE –DWR PERMITTING

Little to no fill is expected to be placed in the 100-year Floodplain; therefore, no DWR permitting is expected. According to the DWR rules and regulations, an exemption is allowed on floodplain fills where the amount of fill placed is less than 1600 cu yds and is less than 2 feet in height.

FEMA

A FEMA Zone AE exists on this property as of April 9, 2007. These areas will be located mainly in reserves, where the proposed ponds will be located. No change in the floodplain or floodway is expected, therefore, no permitting will be needed from FEMA on this development.

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.

SUPPORTING CALCULATIONS

APPENDIX A: USGS Soils Survey

APPENDIX B: HydraFlow Hydrographs
-North Pond
-South Pond

APPENDIX C: HydraFlow Express
-12 " RCP SWS

USGS Soils Survey

HydraFlow Hydrographs

North Pond
South Pond

HydraFlow Express

12 " RCP SWS

DRAINAGE PLAN

Scale 1:100