

Drainage Report

Belle Terre Commercial, To Wichita, Kansas

June, 2016



117 E. Lewis
Wichita, Kansas 67202
(316) 264-0242

Table of Contents

Tab 1
Drainage Report

Drainage Report
Preliminary Plat
Aerial/Location Map

Tab 2:

Proposed Drainage Plan
Hydrological Calculations and Output
Water Quality Volume Calculations

Tab 3:

FIRM Panel

Tab 4:

Federal and Local Permits

Tab 1

Drainage Report
Preliminary Plat
Aerial Photograph/Location Map

Drainage Report

Belle Terre Commercial

Introduction

The Proposed Development is located north of US 54 and about a quarter mile west of North 159th St E. It is in the Southeast Quarter of Section 24, Township 27 South, Range 2 East. The site in existing condition is an undeveloped area between Fourmile Creek and US 54. Runoff from the site flows to the river throughout the site, and is densely populated with cedar tree and shrubbery. The proposed use is for a commercial building and storage site, as well as a wet detention pond in the southeast corner of the lot.

Current Conditions and Background

The hydrological soil survey map indicates that the entire land is composed of soil group C. The existing drainage pattern indicates that the entire property drains to the south and east into the existing Fourmile creek that runs along the north and east property line. The runoff once in the creek continues southerly where it crosses US-54 southeast of the property. The average slope of the ground varies from 1% to 3%.

There is an established floodplain or flood boundary on the site. The FIRM panel is attached for reference, and is undergoing review from DWR.

Proposed Improvements

The proposed improvement is to develop the agricultural land into a commercial development. This will consist of a main building, parking lot and drive entrances, and a detention pond

The detention pond is to control the increased runoff from the added impervious area of the development. The pond has been sized to have a constant water surface level of 1293.0. The shape of the pond and use could be subject to change in design phase.

Site Hydrological Analysis

Existing and proposed site runoff calculations have been modeled using the SCS Curve Number (CN) method for Type II rainfall distribution. The Values for Curve Number (CN) and Rainfall Depth were established using the *City of Wichita/Sedgwick County Stormwater Manual*. Existing times of concentration were calculated from existing ground conditions and can be found in tab 2. Proposed times of concentration have been modeled using the assumed developed site condition.

Flow generated on and passing through the site from offsite sources was modeled using the US Army Corps of Engineers' Hydrologic Engineering Center's Hydrologic Modeling System (HEC-HMS 3.5) software. The loss method selected was the NRCS Curve Number (CN) method and the synthetic hydrograph selected was the NRCS Unit Hydrograph. The curve number used in the model for the site's disturbed pervious surfaces in Group C soils was 69 as stipulated in

Section 4.8, Chapter 4, Volume 2 of the City of Wichita Stormwater Manual. The loss for impervious surfaces was based on the percentage method rather than on a composite CN, as prescribed in Chapter 7 of the HECHMS User's Manual.

The initial abstraction was permitted to be determined by the model based on CN = 85. The transform method used was the NRCS Unit Hydrograph Transform or Lag Time (T_1) based on 60% of the Time of Concentration (T_c) as determined using NRCS methods.

Site Drainage Basins

As can be seen in the drainage map (Tab 2), the site drainage basin as described below:

Drainage Basin (1) is a 13.36 acre (0.020875 square mile) area which contains all of proposed Lots within the plat. Its onsite constituents are 1.26 acres of proposed impervious development. The time of concentration based on flow originating in the pervious, residential land is 33.9 minutes with a corresponding lag time of 20.34 minutes (Tab 2).

Water Quality

Water quality volume and water quality flows will be handled within the proposed detention pond.

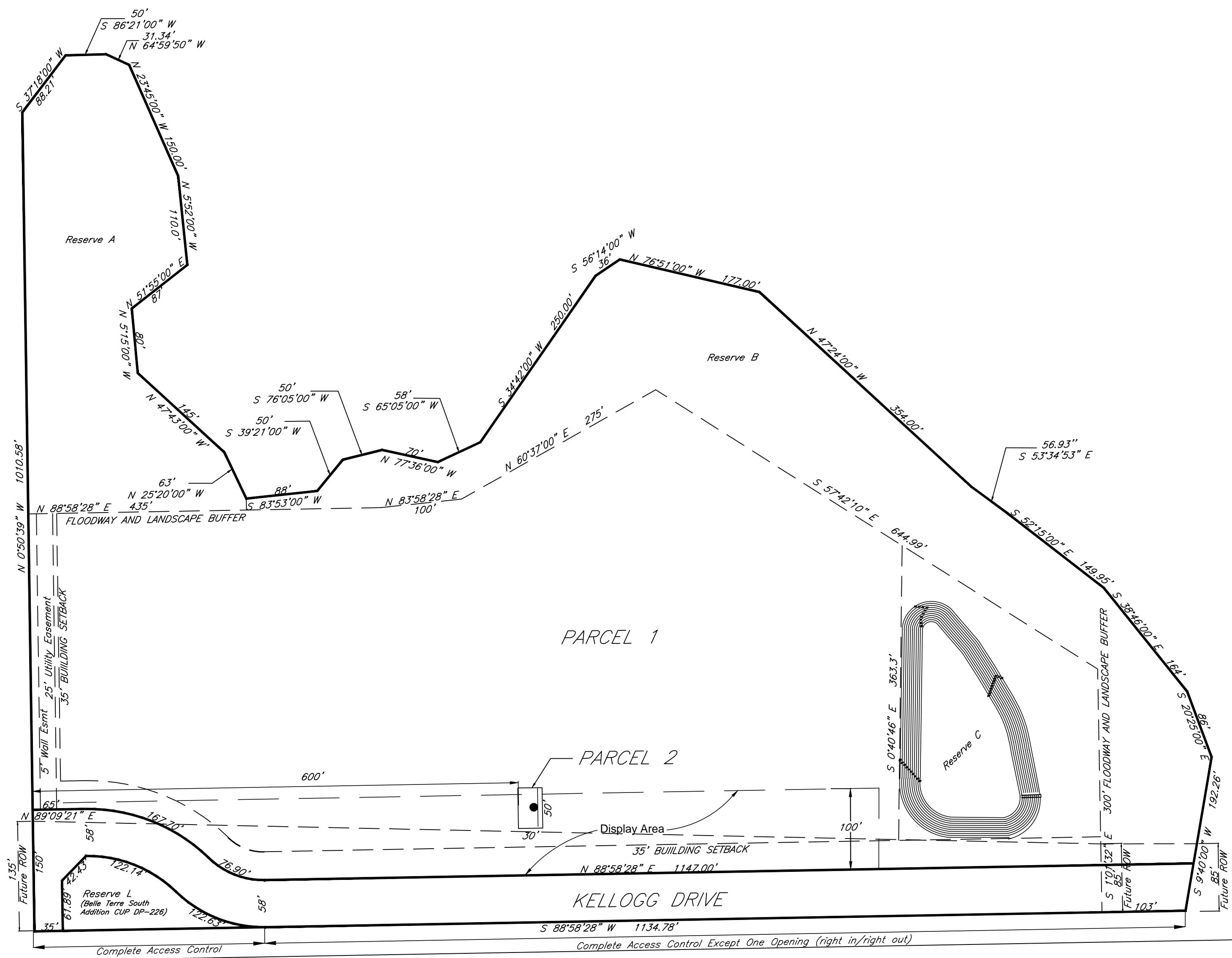
Best Management Practices

Best management practices for erosion control shall be undertaken during the site design. Such BMPs shall include ditch checks in the proposed swales, inlet protection at all inlets, silt fences where applicable, and sediment ponds within the detention basins. The erosion control plan will have to constantly evolve as the site develops.

Federal, State and Local Permits

Refer to Tab 5.

BELLE TERRE COMMERCIAL PLANNED UNIT DEVELOPMENT PUD2016-01



US-54

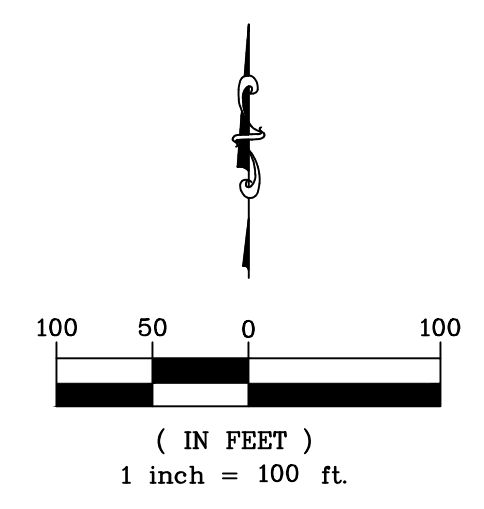
PARCEL 1:	
A. Net Area:	845,573 sq. ft. ± 19.41 acres ±
B. Maximum Building Coverage	296,475 sq. ft.
C. Maximum Gross Floor Area	444,713 sq. ft.
D. Floor Area Ratio	0.35
E. Maximum Number of Buildings	12
F. Maximum Building height	45' Except all buildings in the west 300 feet of the parcel shall be limited to one story and a building height of 35'
G. Setbacks	See Drawing
H. Access Points	1 on U.S. Highway 54
I. Parking	Per Code
Permitted Uses:	See General Provision #15.

PARCEL 2:	
1. Net Area:	1500 sq. ft. ± 0.03 acres ±
2. Permitted Uses:	off-site sign

LEGAL DESCRIPTION:
Lot 1, Block 1 Belle Terre South Addition,
and Lot 1, Block 2 Belle Terre South Addition.

GENERAL PROVISIONS:

- Total Land Area 847,073 sq. ft. or 19.45 acres
- Parking shall be provided in accordance with Article IV of the Unified Zoning Code.
- Setbacks are as indicated on the P.U.D. drawing.
- A drainage plan shall be submitted to City Engineering for approval. Required guarantees for drainage shall be provided at the time of plotting improvements.
- Signs shall be in accordance with the LC zoning district in the Sign Code of the City of Wichita, with the following additional requirements:
 - Parcel 1 is permitted the following freestanding signage: Six signs with a maximum height of 20'. Spacing between signs shall be 150 feet. Maximum area for signs shall not exceed 0.8 times the parcel frontage.
 - Portable signs are not permitted.
 - Ground signs shall be monument type.
 - One off-site sign shall be allowed on Parcel 2 of the PUD.
 - The off-site sign shall be 150' setback from U.S. Highway 54, and a minimum of 600' east of the west property line.
 - The off-site sign shall be permitted for off-site advertising only; on-site advertising is prohibited per the Sign Code on the off-site sign.
 - All regulations for the off-site sign are governed by this PUD; Off-site regulations in Title 24 do not govern except for brightness control and limitations.
 - The off-site sign may be LED.
 - The maximum size for the off-site sign is 14'x48', maximum height is 30'.
 - Off-site signage requires appropriate permits from State authorities.
- Access to U.S. Highway 54 shall be limited to 1 right-in right-out only opening to Parcel 1, and located east of Reserve L, to be determined at the time of platting. When Kellogg mainline improvements have been completed, this access will be to the frontage road. There shall be complete access control on the remaining U.S. 54 Highway Frontage.
 - The height of all light poles, including pole base, is limited to 15 feet.
 - All exterior lighting shall be shielded to direct light disbursement in a downward direction and away from residential areas.
 - Utilities shall be installed underground on all parcels.
 - Landscape buffers and screening shall be in accordance with the City of Wichita Landscape Ordinance.
 - A Landscape Plan shall be prepared by a Kansas Landscape Architect for the above referenced landscaping, indicating the type, location, and specifications of all plant material. The landscape plan shall also state how water is to be provided to the plant materials. This plan shall be submitted to the Planning Department for their review and approval prior to issuance of a building permit.
 - A financial guarantee for the plant material and watering requirements approved on the landscape plan for that portion of the P.U.D. being developed shall be required prior to issuance of any occupancy permit, if the required landscape has not been planted.
 - The applicant shall guarantee the construction of a 6'-8" masonry wall south of the roadway reserve to Kellogg Drive as shown on the P.U.D. along the west property line of Parcel 1. Said wall will be required at such time as development occurs within the west 300' of Parcel 1 and guaranteed at the time of building permit(s) for Parcel 1.
 - The wall requirements along the north and west property line of Parcel 1 that are within the floodway shall be modified to permit a 25' landscape buffer in lieu of the masonry wall due to the existing vegetation and floodway reserve separating Parcel 1 from the adjoining Residential Zoned Property. The existing vegetation may contribute to satisfying the evergreen screening in the 25' landscape buffer requirement.
- Noise from the site shall not be audible from adjacent or surrounding property above the local, ambient noise. No outdoor speaker systems shall be permitted.
- All rooftop mechanical equipment shall be screened from ground-level view from adjacent residential areas and adjacent street right of way.
- Trash receptacles and ground level mechanical equipment shall be screened to reasonably hide them from ground level view, adjacent property and street right of way.
- All building exteriors in the P.U.D. shall share a consistent architectural design, color, and texture. Exterior utility boxes, mechanical equipment, and etc., shall be screened and/or painted according to the acceptable color range. All light fixtures shall share consistent design (i.e., fixtures, poles, lamps, etc.). Variations must be approved by the Director of Planning.
- Fire lanes shall be in accordance with the Fire Code of the City of Wichita. No parking shall be allowed in said fire lanes, although they may be used for passenger loading and unloading. The Fire Chief or his designated representative shall review and approve the location and design of all fire lanes. Fire hydrant installation and paved access to all building sites shall be provided for each phase of construction prior to the issuance of building permits.
- Uses in Parcel 1 shall be limited to the following: All uses permitted in G.C. zoning district except for the following: manufactured/mobile homes, assisted living, group residence, auditorium, cemetery, community assembly, correctional placement residence, golf course, library, entertainment establishment, event center, farmer's market, kennel, hobby and boarding/breeding/training, recreational marine facility, indoor and outdoor recreation and entertainment, rodeo, riding academy or stable, sexually oriented business in the city, tattooing and body piercing facility, teen club, vocational school, hospital, recycling collection stations, reverse vending machine, elementary, middle and high schools, car wash, convenience stores, night club, pawn shop, service stations, tavern and drinking establishments, vehicle repair, adult entertainment establishments, recycling processing center, second hand store, microbrewery, self-service warehouse, RV campground, outdoor vehicle sales, manufacturing limited and general, vehicle storage yard, warehousing, and welding or machine shop as defined in the City of Wichita ordinances. There shall be no hotels or motels in the west 300 feet of the parcel. Outdoor rental and sales of equipment shall be allowed. Any use requiring a conditional use in GC zoning shall require a PUD amendment.
- The PUD is subject to replatting to include: complete access control except for one right-in and right-out only access point to US-54 located east of Reserve L (Belle Terre South Addition, CUP DP-226), guarantee of acceleration and deceleration lane improvements, reconfiguration of Kellogg Drive to a frontage road with emergency access to the vacated portion Kellogg Drive if required, dedications for future Kellogg Expressway will be determined, and a drainage plan and associated guarantees will be required.
- Development of the site will not be permitted without connection to public water and sewer.
- All outdoor storage of equipment and materials shall be visually screened from all surrounding properties and all adjacent right of way, to include US-54. Material shall not be stacked or piled higher than the screening walls or landscaping. Planning Staff site plan approval is required for designated outdoor material and equipment storage, which shall not be within 150' of any adjacent property or right-of-way.
- All internal circulation drives shall be paved with concrete or asphalt to mitigate dust.
- A site circulation plan shall be required for review and approval by the Planning Director prior to the issuance of any building permits. The site circulation plan shall ensure pedestrian linkages between buildings and the sidewalk system and shall ensure internal vehicular circulation among developments within the P.U.D., including joint use of ingress/egress openings and ensuring that drive openings are not impacted/blocked by the layout of parking stalls or landscaping.
- Amendments, adjustments or interpretations to this P.U.D. shall be done in accordance with the Unified Zoning Code.
- The Transfer of title of all or any portion of land included within the Planned Unit Development (or any amendments thereto) does not constitute a termination of the plan or any portion thereof, but said plan shall run with the land and be binding upon present owners, their successors and assigns.
- The development of this property shall proceed in accordance with the development plan as recommended for approval by the Planning Commission and approval by the Governing Body, and any substantial deviation of the plan, as determined by the Zoning Administrator or the Director of Planning, shall constitute a violation of the building permit authorizing construction of the proposed development.
- Any major changes in this development plan shall be submitted to the Planning Commission and to the Governing Body for their consideration.



06-22-2016

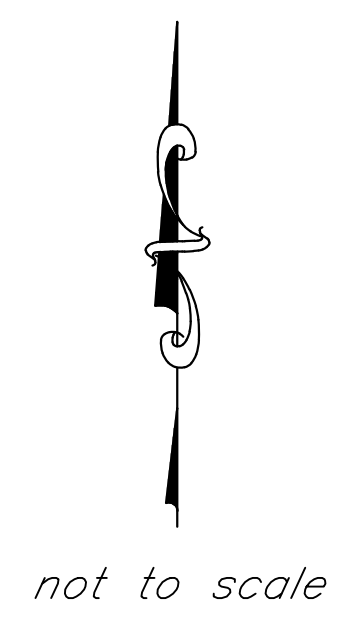
KEMILLER
ENGINEERING PA
117 E. Lewis, Wichita, KS 67202 (316)264-0242



Proposed site

US - 54

N. 159th St E.

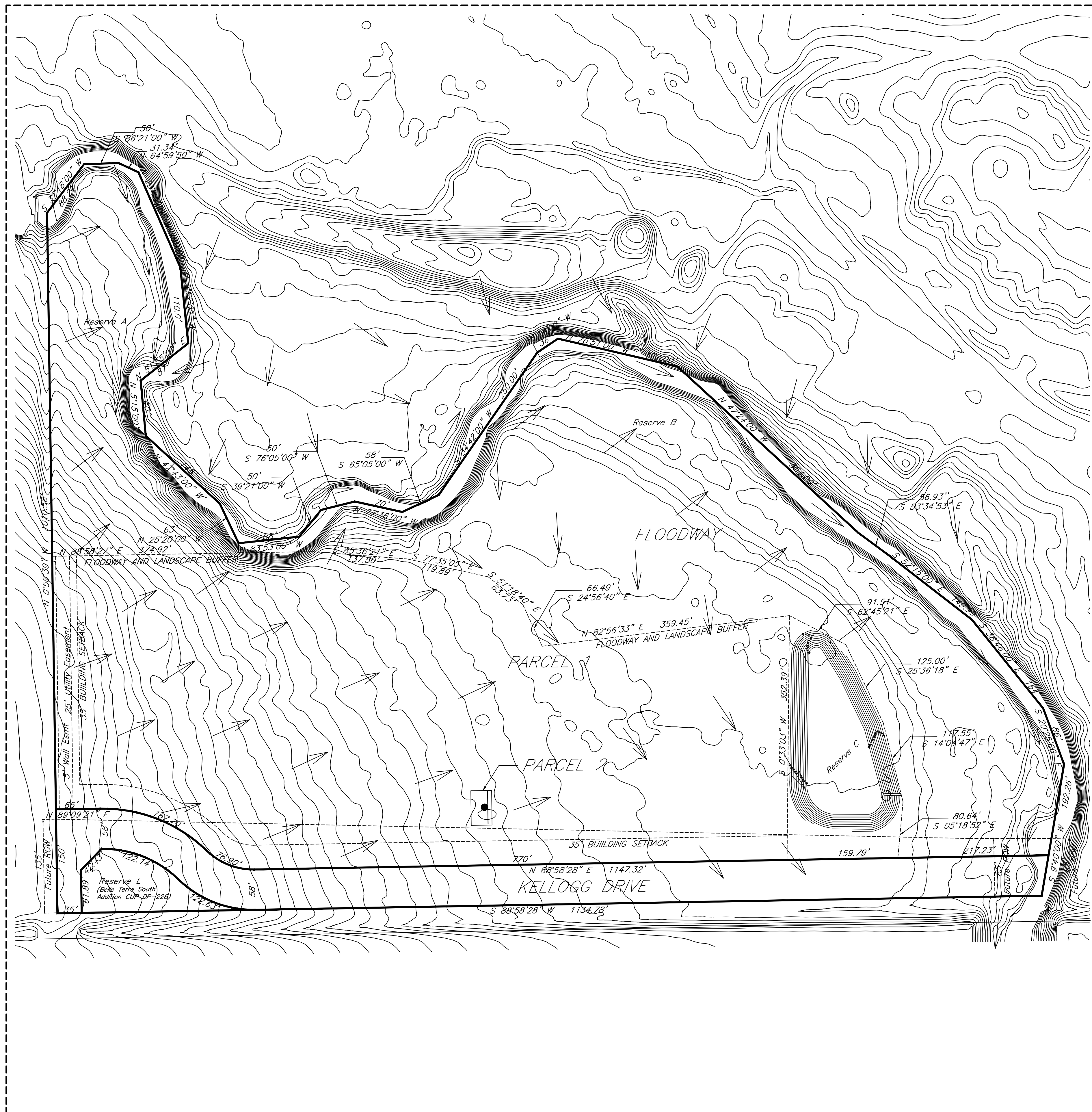


Belle Terre Commercial
Aerial/Location Map
Wichita, Kansas

 KEMILLER ENGINEERING PA <small>117 E. Lewis, Wichita, KS 67202 (316)264-0242</small>	PROJECT NUMBER			
	KEM NO. 15202	FILE	DATE 06/2016	SHEET 1.0
DESIGN KM	DRAWN ME	REVISED		

Tab 2:

Proposed Drainage Plan
Hydrological Calculations and Output
Water Quality Volume Calculations



Project Narrative:
 The Proposed Development is located north of US 54 and about a quarter mile west of North 159th St E. The site in existing condition is an undeveloped area between Fourmile Creek and US 54. Runoff from the site flows to the river throughout the site, and is densely populated with cedar tree and shrubbery. The proposed use is for a commercial building and storage site, as well as a wet detention pond in the southeast corner of the lot.

Water Quality and TSS Removal Calculation:

Water Quality Volume (WQv) Calculation				
Calculation for water quality volume (WQv=P*Rv*A/12)		Soil Group 'C'		
85th percentile storm event (1.2 inches), P =	1.20	inches	Calculation of Rv	
Total area, A =	13.36	acres	Coeff.	Area
Rainfall Coeff, Rv, =	0.313	cf	Coeff for undisturbed area, Rv _U =	0.03 0.00
Required Vol. for Water Quality =	0.418	ac-ft	Coeff for turf cover, disturbed, Rv _T =	0.20 11.36
Corresponding Water Quality Peak Flow =	4.05	cfs	Coeff for impervious area, Rv _I =	0.95 2.00
			Weighted, Rv =	0.313

Total water quality flow needs to be treated for proposed development. The WQV and water quality flow will be treated in the proposed detention pond.

Water Quality Peak Flow Calculation		
Area =	13.36	acres
WQv =	0.375	inches
Pond and Swamp Factor, Fp =	0.700	
Calculated CN =	88.0	
S =	1.365	inches
la =	0.273	inches
la/P =	0.227	
qu	740.0	cfs/sq.mil/yr
Water quality peak flow	4.05	cfs

Runoff Calculations (2-, 5-, 10-, 25-, and 100-yr)

EXISTING CONDITION:
 Total Area A = 13.36 acres, Surface Type = Undeveloped Wooded w/ Underbrush Use:
 Soil Group = C

EXISTING SITE									
DRAINAGE AREA	ACRES	Tc min	CN	Q2	Q5	Q10	Q25	Q100	REMARKS
On-site (1)	13.36	56.3	69	6.21	11.23	15.15	20.49	31.51	Runoff draining east to proposed pond, before entering Fourmile Creek

DEVELOPED CONDITION:
 Total Area, A = 13.36 acres, Total Impervious Area = 2.00 acres (15% impervious)
 Hydrological Soil Group = C

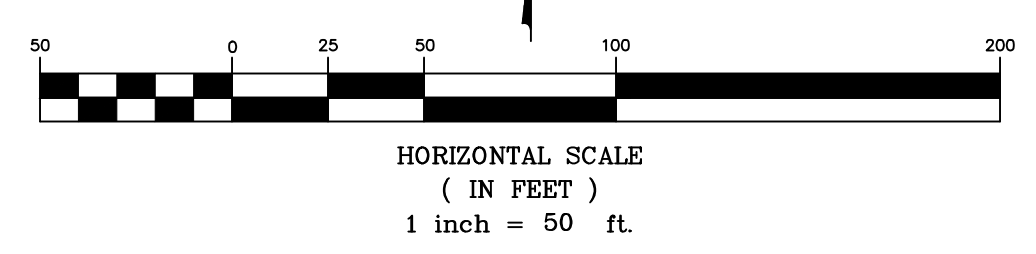
DEVELOPED SITE									
DRAINAGE AREA	ACRES	Tc min	CN	Q2	Q5	Q10	Q25	Q100	REMARKS
On-site (1)	13.36	33.9	85	21.55	31.09	37.86	46.60	63.13	Runoff from site draining east to Fourmile Creek

PROPOSED OUTFALL:
 A 3ft notched concrete weir will be installed at the southeast end of the detention plan set at Elev. 1293.5. This will outlet to the existing creek.

OUTFLOW							
DRAINAGE AREA	ACRES	Q2	Q5	Q10	Q25	Q100	REMARKS
On-Site (1)	13.36	6.10	11.00	14.79	20.51	31.83	Outlet via Notched Weir to Fourmile Creek

Stage-Storage for Detention Pond		
Pond 1		
Storm Event	Runoff Volume, ac-ft	Water Surface Elevation (ft)
2-yr	1.95	1294.66
5-yr	2.94	1295.21
10-yr	3.86	1295.58
25-yr	4.60	1295.99
100-yr	6.40	1296.67

- Notes:**
- Existing and developed flows are calculated using the SCS Hydrograph method. "CN" & "T" values are established from "City of Wichita Stormwater Design Manual."
 - The developed peak flows are routed through the proposed detention pond and into the adjacent creek.
 - The site is not in designated 100-yr floodplain (FIRM 2017C0395E, Revised, February 2, 2007)
 - Shape of the detention pond and use could be subject to change in the site design phase (owners considering wet pond).



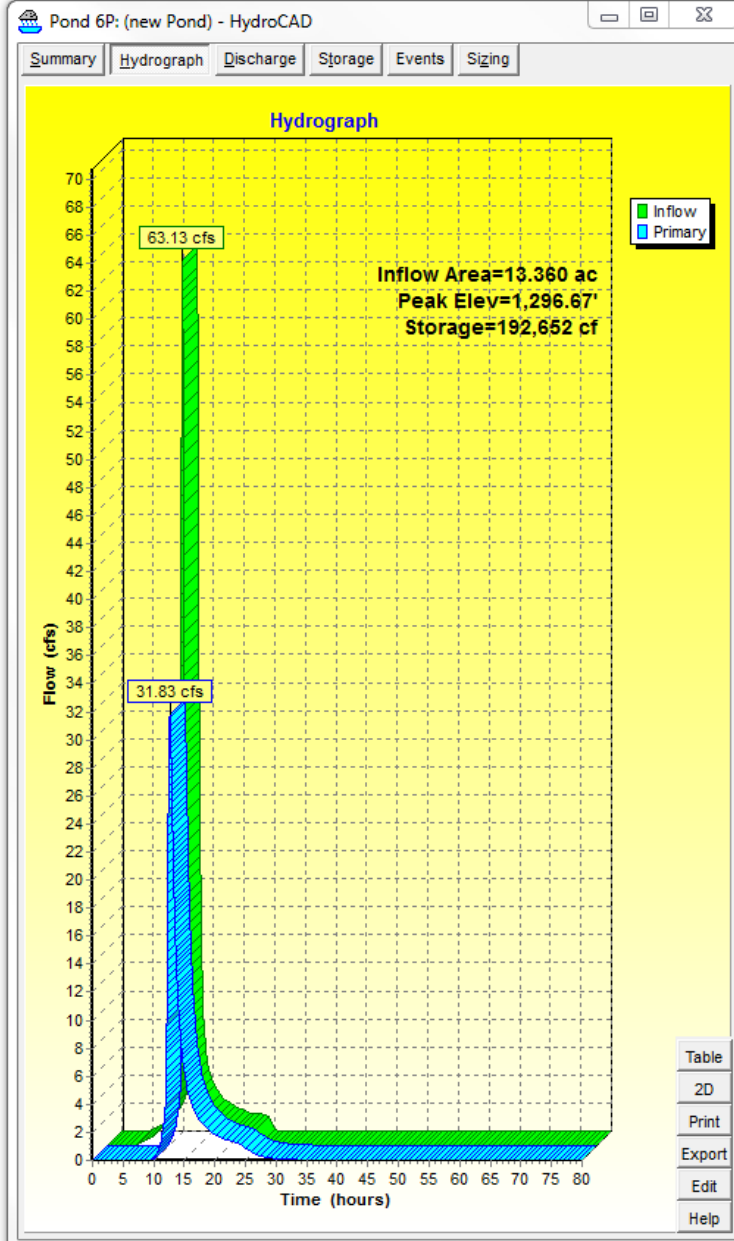
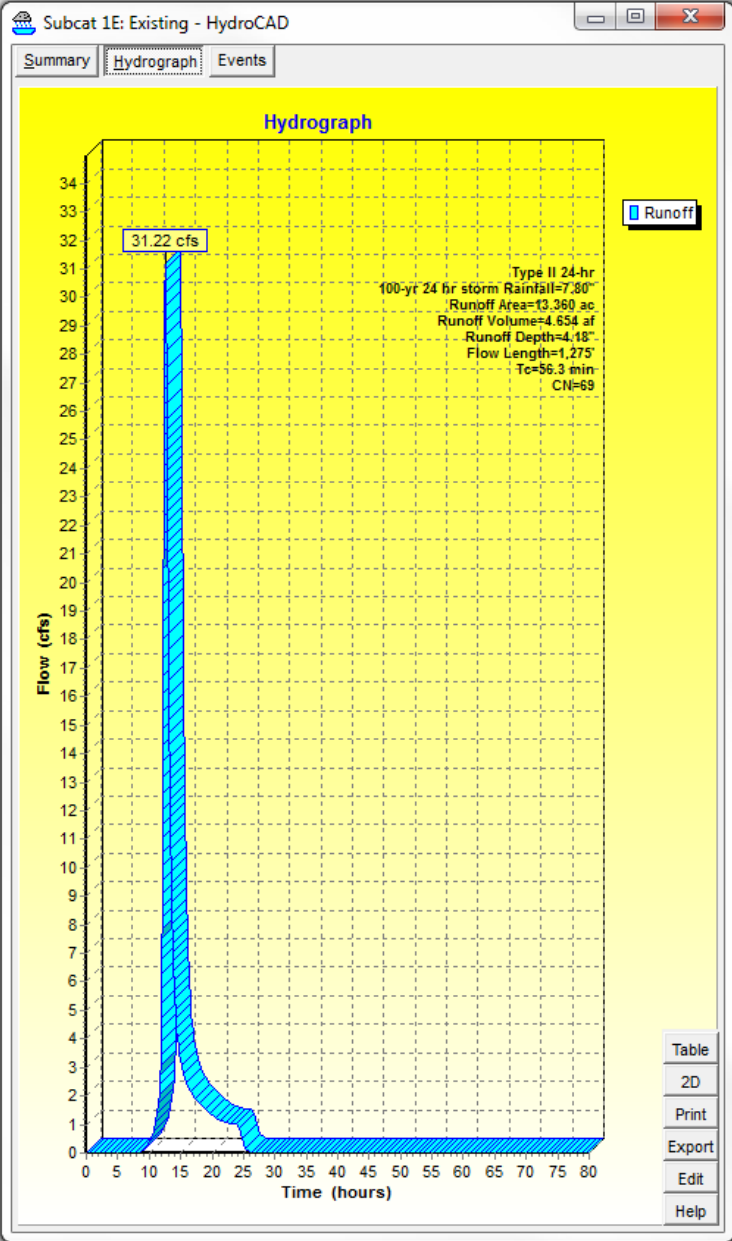
Onsite drainage basin, Area = 13.36 acres --- Drainage Basin Boundary

Absolute Natural Stone
Drainage Plan
 Wichita, Kansas

PROJECT NUMBER

KEMILLER ENGINEERING PA 117 E. Lewis, Wichita, KS 67202 (316)264-0242	KEM NO. 15202	FILE	DATE 06/2016	SHEET
	DESIGN KM	DRAWN ME	REVISED	1.0

- Subcat
- Reach
- Pond
- Link
- Text



DEVELOPED SITE									
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Corresponding Water Quality Peak Flow =	4.05	cfs		Coeff for impervious area, R_{vI} =	0.95	2.00
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Pond and Swamp Factor, Fp=	0.700	
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S=	1.365	inches
la=	0.273	inches
la/P=	0.227	
qu	740.0	cfs/sq.mi/in

Tab 3:

FIRM Panel

Tab 4:

A letter of notice of intent will be submitted to the KDHE during the design phase and a copy will be presented along with PPD during the site design. The proposed improvement will not change previously designated FEMA flood boundary or floodplain.