

DRAINAGE REPORT

FOR

THE WATERFRONT SEVENTH ADDITION
Wichita, Kansas

APRIL 2012





City of Wichita/Sedgwick County Subdivision Drainage Plan Checklist



Submit completed forms to:
City of Wichita Public Works & Utilities, 455 N. Main 8th Floor, Wichita KS 67202; or
Sedgwick County Stormwater Management, 1144 S. Seneca, Wichita KS 67213.

Project Name:	Waterfront Seventh Plat		
Total Area of Project:	25.0	acres	
Development Type:	Residential	Other:	
Developer Name:	Waterfront Holding Company	Contact: Johnny Stevens	Phone: (316) 636-2100
Email:	johnny@marchoil.com		
Engineer Name:	MKEC Engineering Consultants	Contact: William Buck, P.E.	Phone: (913) 317-9390
Email:	wbuck@mkec.com		

Directions:

- (1) Fill-out this checklist completely and include it with the Drainage Plan submittal. This checklist should be included in the bound copy, behind the cover sheet for the submittal. Incomplete Drainage Plans and checklists will not be accepted.
- (2) Indicate whether a plan element is included or not included in the submittal by choosing "Yes" or "No" from the dropdown list in the "Element Included?" column. The question must be answered for every plan element for this checklist to be considered complete. An explanation must be provided for all "No" answers.

Drainage Plan Checklist			
#	Plan Element Description	Element Included?	Explanation/Notes
1.0	General		
1.1	Digital copy of drainage plan, including preliminary Master Grading Plan, preliminary plat and proposed plat, in PDF format and one half size, bound, paper copy.	Yes	Attached
1.2	Professional Engineer's seal, signature and date on plan cover.	Yes	Cover
1.3	Site location map, using color ortho-imagery and showing the project boundaries, a north arrow and an accurate scale.	Yes	Appendix 2.1
1.4	Narrative of the development type, existing conditions and proposed impacts on stormwater runoff, wetlands, riparian zones and floodplains/floodways.	Yes	Tab 1 text
1.5	Discussion of off-site conditions surrounding the proposed development.	Yes	Tab 1 text
1.6	Summary table of runoff calculations (pre/post development).	Yes	Table 1.1
1.7	Narrative description of the type and function of the permanent structural stormwater management facilities.	Yes	Tab 1 text
2.0	Existing Conditions Information		
2.1	Existing Conditions Drainage Map		
2.1.1	On-site and off-site topography: NAVD 88 datum, one-foot contours with spot elevations	Yes	Appendix 2.2
2.1.2	On-site and off-site drainage features, including perennial and intermittent streams (with names labeled), conveyance systems such as open channels, ditches, swales and areas of overland flow. Flow direction must be indicated by arrows.	Yes	Appendix 2.2
2.1.3	Storm sewer system components, including storm drains, inlets, catch basins, gutters, manholes, headwalls, pipes and culverts. Material and size must be noted for all pipes and culverts.	Yes	Appendix 2.2
2.1.4	Location and boundaries of natural features such as wetlands, lakes, ponds with the normal water elevation noted, rock outcroppings, wooded areas and tree rows.	Yes	Appendix 2.2
2.1.5	Location, dimensions and elevations of existing bridges and culvert crossings.	Yes	Appendix 2.2
2.1.6	Location of existing utilities (e.g., water, sewer, gas, electric, cable, etc.) with labels and easement boundaries.	Yes	Appendix 2.2 and Tab 2 text
2.1.7	Groundwater elevations, if applicable.	Yes	Tab 2 text
2.1.8	Delineation of predominant soil based on USDA soil surveys and/or on-site soil borings; indicate NRCS soil name and Hydrologic Soil Group for undisturbed surface soils.	Yes	Appendix 2.3
2.1.9	Land use types per NRCS nomenclature.	Yes	Tab 2 text
2.1.10	Footprint of existing impervious areas (labeled, area given in acres).	Yes	Appendix 2.2
2.1.11	Internal drainage subbasin boundaries used for hydrologic calculations (labeled with ID, total area in acres, impervious area in acres and curve number).	Yes	
2.1.12	Time of concentration flow paths. Indicate and label each segment separately (i.e., overland flow, shallow concentrated channel1, channel2, etc.). For each segment, provide the appropriate data to calculate Tc (e.g., length, slope, cover type, paved/unpaved, roughness parameters, geometric properties, etc.).	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
2.2	Existing Conditions Hydrology and Hydraulics Analysis		
2.2.1	Narrative of the hydrologic analysis methodology used (e.g., unit hydrograph or other approved methods).	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
2.2.2	A summary table of drainage subbasin hydrologic parameters (subbasin ID, area in acres, curve number, Tc, etc.).	Yes	
2.2.3	Table of existing condition runoff curve numbers with supporting data and calculations.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
2.2.4	Table of existing condition times of concentration with supporting data and calculations.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
2.2.5	A summary table of rainfall data used in the hydrologic analysis, and a reference for the source of the data.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"

Drainage Plan Checklist			
#	Plan Element Description	Element Included?	Explanation/Notes
2.2.6	Cross-sections and other diagrams of existing open channels, bridge and culvert sections and other hydraulic features as required to illustrate the basis for hydraulic analysis.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
2.2.7	Hydrologic and hydraulic analyses for runoff rates, volumes, velocities and elevations. Provide supporting data not specified above and identify assumptions. Include detailed calculations for the 2, 5, 10, 25 & 100-year, 24-hour storm events. Provide results in a tabular form. Provide digital copies of any computer files and models used.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.0 postdevelopment Conditions Information			
3.1 postdevelopment Conditions Drainage Map			
3.1.1	Proposed project boundary.	Yes	Appendix 3.1
3.1.2	on-site and off-site topography: NAVD 88 datum, one-foot contours with spot elevations.	Yes	Appendix 3.1
3.1.3	Existing on-site and off-site drainage features that are to remain after development, including perennial and intermittent streams (with names labeled), conveyance systems such as open channels, ditches, swales and areas of overland flow. Flow direction must be indicated by arrows.	Yes	Appendix 3.1
3.1.4	Location and description of off-site through-drainage conveyances which are confined to an easement, dedication and/or reserve.	Yes	Appendix 3.1
3.1.5	Footprint of proposed impervious areas, including roads, parking lots, buildings and other structures.	Yes	Appendix 3.1
3.1.6	Location of proposed utilities (e.g., water, sewer, gas, electric, cable, etc.) with labels and easement boundaries.	Yes	Appendix 3.1
3.1.7	Delineation of predominant soils, based on anticipated soil textures and NRCS guidelines if different from predevelopment soil conditions; indicate NRCS soil name and Hydrologic Soil Group for surface soils.	Yes	Appendix 2.3
3.1.8	Land use cover per NRCS nomenclature.	Yes	Tab 3 text
3.1.9	Internal drainage subbasin boundaries used for hydrologic calculations (labeled with ID, total area in acres, impervious area in acres and curve number).	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.1.10	Proposed limits of land disturbing activity (i.e., grading limits).	Yes	Appendix 1.3 (lot grading)
3.1.11	Time of concentration flow paths. Indicate and label each segment separately (i.e., overland flow, shallow concentrated, channel1, channel2, etc.). For each segment, provide the appropriate data to calculate Tc (e.g., length, slope, cover type, paved/unpaved, roughness parameters, geometric properties, etc.).	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.2 Proposed Conveyances Map			
3.2.1	on-site and off-site drainage features, including perennial and intermittent streams (with names labeled), proposed conveyance systems (such as open channels, ditches, swales and areas of overland flow, including backyard drainage). Flow direction must be indicated by arrows.	Yes	Appendix 3.1
3.2.2	Storm sewer system components, including storm drains, inlets, catchbasins, gutters, manholes, headwalls, pipes and culverts. Material and size must be noted for all pipes and culverts.	Yes	Appendix 3.2
3.2.3	For any subbasin or drainage area > 40 acres, show that the stormwater flow is confined to an open channel with required side benches and freeboard, or conformance to applicable policy and design requirements if partially enclosed.	No	No sub-basin or drainage area exceeds 40-acres (total site -s only 25-acres)
3.2.4	Location(s) of stormwater management facilities and any associated drainage easements.	Yes	
3.2.5	Proposed energy dissipaters and other channel protection devices.	Yes	Tab 3 text
3.2.6	Location(s) and dimension(s) of proposed channel, bridge and culvert crossings.	Yes	Appendix 3.1
3.2.7	Normal pool and 100-year pool elevations for ponds and lakes.	Yes	
3.2.8	Permanent concrete outfall control structure(s) for ponds.	Yes	Already constructed
3.2.9	Emergency overflow spillways and top of berm elevations for ponds and other volume/peak discharge control facilities.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.2.10	Floodplains, ponds, and stormwater management facilities located in reserves.	Yes	Appendix 1.2 Plat display and previous Plats
3.3 postdevelopment Conditions Hydrology & Hydraulics			
3.3.1	Narrative of the hydrologic analysis methodology used (e.g., unit hydrograph or other approved methods).	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.2	A summary table of drainage subbasin hydrologic parameters (subbasin ID, area in acres, curve number, Tc, etc.).	Yes	
3.3.3	Table of postdevelopment condition runoff curve numbers with supporting data and calculations.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.4	Table of postdevelopment condition times of concentration with supporting data and calculations.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.5	Cross-sections and other diagrams of existing open channels, bridge and culvert sections and other hydraulic features as	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.6	Hydrologic and hydraulic analyses for runoff rates, volumes, velocities and elevations. Provide supporting data not specified above and identify assumptions. Include detailed calculations for the 2, 5, 10, 25 & 100-year, 24-hour storm events. Provide results in a tabular form. Provide digital copies of any computer files and models used.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.7	Downstream peak discharge assessment (10% Rule) results and supporting data and calculations. Provide digital copies of any computer files and models used.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.8	Stage-storage-discharge or other outlet rating curves and inflow/outflow hydrographs for all ponds.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"

Drainage Plan Checklist			
#	Plan Element Description	Element Included?	Explanation/Notes
3.3.9	Demonstrate that the pond contours on the master grading plan and the stage-storage-discharge data are consistent for all ponds.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.10	Demonstrate that all ponds have one foot of freeboard above the 100-year, 24-hour high water level.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.3.11	Demonstrate that runoff from the proposed project site is discharged in the same manner as prior to development, using level spreaders, energy dissipaters, other devices or grading as required, or identify an appropriate flowage easement.	Yes	See previous report: "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007"
3.4 Stormwater Quantity Control Sizing			
3.4.1	Hydraulic sizing calculations for all stormwater management controls.	Yes	Appendix 3.2
3.4.2	Table(s) listing all stormwater management controls. Present the types, sizes, elevations, flows, velocities and depths for each control, as applicable. Verify that velocities are self-cleaning and non-erosive.	Yes	
3.4.3	Typical details (including cross-sections where applicable) for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc.	Yes	Appendix 3.1
3.5 Stormwater Quality Management Facilities			
3.5.1	Table(s) listing all stormwater management facilities. Present the description, % TSS removal value, water quality volume handled, contributing drainage area in acres and contributing impervious area in acres.	Yes	Tab 3 text
3.5.2	Indicate the responsible party for maintenance, as shown in the plat text (i.e., Home Owners Association, Lot Owners Association, property owner, etc.).	Yes	
3.5.3	Water quality volume (total and by facility), with supporting data and calculations.	Yes	Appendix 3.5
3.5.4	% TSS removal value (total and by facility) with supporting data and calculation. Must be equal to or greater than 80%.	Yes	Tab 3 text
3.5.5	Channel protection volume with supporting data and calculations.	Yes	Tab 3 text and Appendix 3.4
3.5.6	Water quality volume and channel protection volume orifice size calculations.	Yes	Appendix 3.4
3.5.7	Other calculations required for each stormwater management facility as specified in the Wichita/Sedgwick County Stormwater Manual.	Yes	Tab 3 text
3.5.8	Typical details (including cross-sections where applicable) for outlet structures, embankments, internal grading, forebays and other siltation prefilters, filtration/infiltration media, vegetation, check dams, operational controls, etc.	Yes	Already constructed
4.0 Floodplains			
4.1	Reference the source of flood profile, floodplain, floodway and stream discharge information.	Yes	Tab 4 text
4.2	Delineation of nearest base flood elevations.	Yes	
4.3	Delineation of predevelopment regulatory floodplain/floodway limits using FEMA's current GIS database; limits to be per elevation and scaled location.	Yes	Appendix 4.1
4.4	Delineation of postdevelopment regulatory floodplain/floodway limits; limits to be per elevation and scaled location, with project limits shown.	No	not applicable
4.5	Floodway data table and discharges.	No	not applicable
4.6	Hydrologic and hydraulic study information for local floodplain analysis, unnumbered Zone A elevation determinations and floodplain map revisions or required permits.	No	not applicable
4.7	Regulatory floodway and four natural profile models (10, 50, 100 and 500-year) for existing and postdevelopment conditions.	No	not applicable
4.8	Floodplains and floodways located within a reserve, where necessary.	No	not applicable
4.9	Floodplain cut and fill calculations for volume sensitive basins.	No	not applicable
4.10	Demonstrate that floodway elevations and velocities do not increase due to construction in the floodway ("No Rise Certification").	No	not applicable
5.0 Federal, State and Local Permits			
5.1	US Army Corps of Engineers regulatory program permits (Section 404 permit).	Yes	Tab 5 text
5.2	Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Floodplain Fill, Levee, Water Appropriations, Dam Safety permit, etc.).	Yes	
5.3	FEMA letters of map change/revision - LOMA, LOMR, LOMR-F, CLOMR, etc.; shall be included and approved when project modifies the limits of the floodplain/floodway.	Yes	Tab 5 text
6.0 Half Scale Preliminary Master Grading Plan			
6.1	One set of plans and associated PDF of plans.	Yes	Appendix 1.3 (lot grading)
6.2	Professional Engineer's seal, signature and date.	Yes	
6.3	Title block including subdivision name and phase and dated revision documentation.	Yes	Appendix 1.3 (lot grading)
6.4	Future phases shown but cross-hatched as information only.	Yes	Appendix 1.3 (lot grading)
6.5	Scale, not greater than 1-inch = 60 feet.	Yes	Appendix 1.3 (lot grading)
6.6	North arrow.	Yes	Appendix 1.3 (lot grading)
6.7	Index or legend key.	Yes	Appendix 1.3 (lot grading)
6.8	Benchmarks (minimum of 2) used for site control (NAVD 88 vertical datum).	Yes	Appendix 1.3 (lot grading)
6.9	Existing contours of entire site with contour interval of one foot.	Yes	Appendix 1.3 (lot grading)

Drainage Plan Checklist			
#	Plan Element Description	Element Included?	Explanation/Notes
6.10	Proposed contours for channels, ponds, and other permanent stormwater management facilities, with contour interval of one foot.	Yes	Appendix 1.3 (lot grading)
6.11	Spot elevations shown to the nearest tenth of a foot for critical locations, including lot and property boundaries.	Yes	Appendix 1.3 (lot grading)
6.12	Proposed lot and street layout.	Yes	
6.13	Locations of underground storm drains.	Yes	Appendix 1.3 (lot grading)
6.14	Overflow locations for storms exceeding storm drain capacity, with elevations.	Yes	Appendix 1.3 (lot grading)
6.15	Top elevations of storm drains at all inlets, manholes, and flow line elevations for all outfalls.	Yes	Appendix 3.2
6.16	Locations of open ditches and lakes.	Yes	Appendix 1.3 (lot grading)
6.17	Flow direction arrows.	Yes	Appendix 1.3 (lot grading)
6.18	Proposed flow line elevations of all open ditches at maximum 100 foot intervals, and 100-year flood elevations thereon.	Yes	Appendix 1.3 (lot grading)
6.19	Ponds: Location, bottom elevation, normal pool elevation, 100-year flood elevation, emergency overflow elevation.	Yes	Appendix 1.3 (lot grading)
6.20	Proposed top-of-curb elevations at points where drainage will be required to flow over the curb.	Yes	Appendix 1.3 (lot grading)
6.21	Platted minimum building opening elevation for each lot, in table form for all lots (excluding basement floor elevations).	Yes	Appendix 1.2 Plat display
6.22	Standard foundation and elevation detail for slab on grade, full basement, view-out, partial view-out and/or walk-out construction.	Yes	
6.23	Top of foundation elevation for each lot.	Yes	Appendix 1.2 Plat Display
6.24	Notation for builders for each lot as to the type of structure that may be constructed and the view-out, walk-out or pad elevation, as applicable.	Yes	Appendix 1.2 Plat Display
6.25	Indicate that all lots are above the 100-year flood elevation.	Yes	Appendix 1.2 Plat Display
6.26	Indicate that grading around structures conforms to perimeter drainage requirements.	Yes	Appendix 1.3 (lot grading)
6.27	Indicate that backyard drainage grading conforms to backyard drainage requirements.	Yes	Appendix 1.3 (lot grading)
6.28	Adjacent subdivision lot lines, with lot labels and subdivision names.	Yes	Appendix 1.2 Plat Display
6.29	Boundaries and labels for all easements, rights-of-way and reserves.	Yes	Appendix 1.2 Plat Display
6.30	Statement on proposed final plat: "A drainage plan has been developed for the subdivision and all drainage easements, rights-of-way, or reserves shall remain at the established grades and remain unobstructed to allow for the conveyance of stormwater."	Yes	Appendix 1.2 Plat Display
End of Checklist			

Tab 1. Project Narrative

Location

The subject property is in the City of Wichita, Sedgwick County, Kansas. The proposed development is generally northeast of 13th Street and North Webb Road. The site is bordered by Waterfront Parkway to the west, The Waterfront Fourth addition to the northwest, abandoned railroad right-of-way to the north, The Waterfront Residential Addition to the east, and The Waterfront Sixth Addition to the south. The site also lies within the southwest quarter of Section 9, Township 27 West, Range 2 East, 6th Principal Meridian. The plat area is approximately 25.0-acres, and the site is shown on the USGS Map, Appendix 1.1. The platted site is called The Waterfront Seventh Addition.

Discussion of Development

The site will develop as 0.5-acre residential lots. The proposed site is shown on the plat, Appendix 1.2. Preliminary lot grading is shown in Appendix 1.3.

Drainage Summary

Pre-Development

The site drains generally south and southwest into the two level detention basin (Hotel Pond) located along the south property line. Current land use consists of grass or pasture type usage. Pre-development runoff conditions for the site are discussed in the "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007". Within this report, the site was located in sub-area drainage basin TR-20 ID 053.

Post-Development

The entire site under post-developed conditions is included in the area tributary to the detention basin originally constructed for The Waterfront Sixth Addition (Reserve F), and subsequently altered to include post-developed flow from the site and from the west part of The Waterfront Residential Addition to the east. Post-developed runoff from the site is discussed in the "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007". In this report, the site was modeled as a commercial area for post-developed conditions, whereas it will be developed as residential with 0.5-acre lots. Table 1.1 below summarizes pre- and post-developed combined flows for the site, The Waterfront Sixth Addition, and from the west part of The Waterfront Residential Addition to the east.

Table 1.1. Comparison of Pre and Post-Development Flow Rates.

Condition	Design Storm Flows (cfs)			
	2-Yr	5-Yr	10-Yr	100-Yr
Pre-Developed	112.3	168.1	205.5	343.1
Post-Developed	173.4	241.7	286.2	446.9

Post-developed runoff from sub-area TR-20 ID 053 is higher because of the additional impervious area and reduced time of concentration that development typically causes. However, this post-development runoff drains into the Hotel Pond detention facility. This Hotel Pond as modified provides post-developed detention and runoff volume control for The Waterfront Seventh Addition, The Waterfront Sixth Addition, and for the west part of The Waterfront Residential

Addition to the east. Table 1.1 below summarizes the post-developed performance of this detention facility as modified:

Table 1.2 Hotel Pond Summary

Event (Year)	Runoff (cfs)	Pond Elev. (ft)	Pond Outflow (cfs)
2	173.4	1375.3	83.5
5	241.7	1376.0	103.2
10	286.2	1376.4	113.7
100	446.9	1377.9	145.5

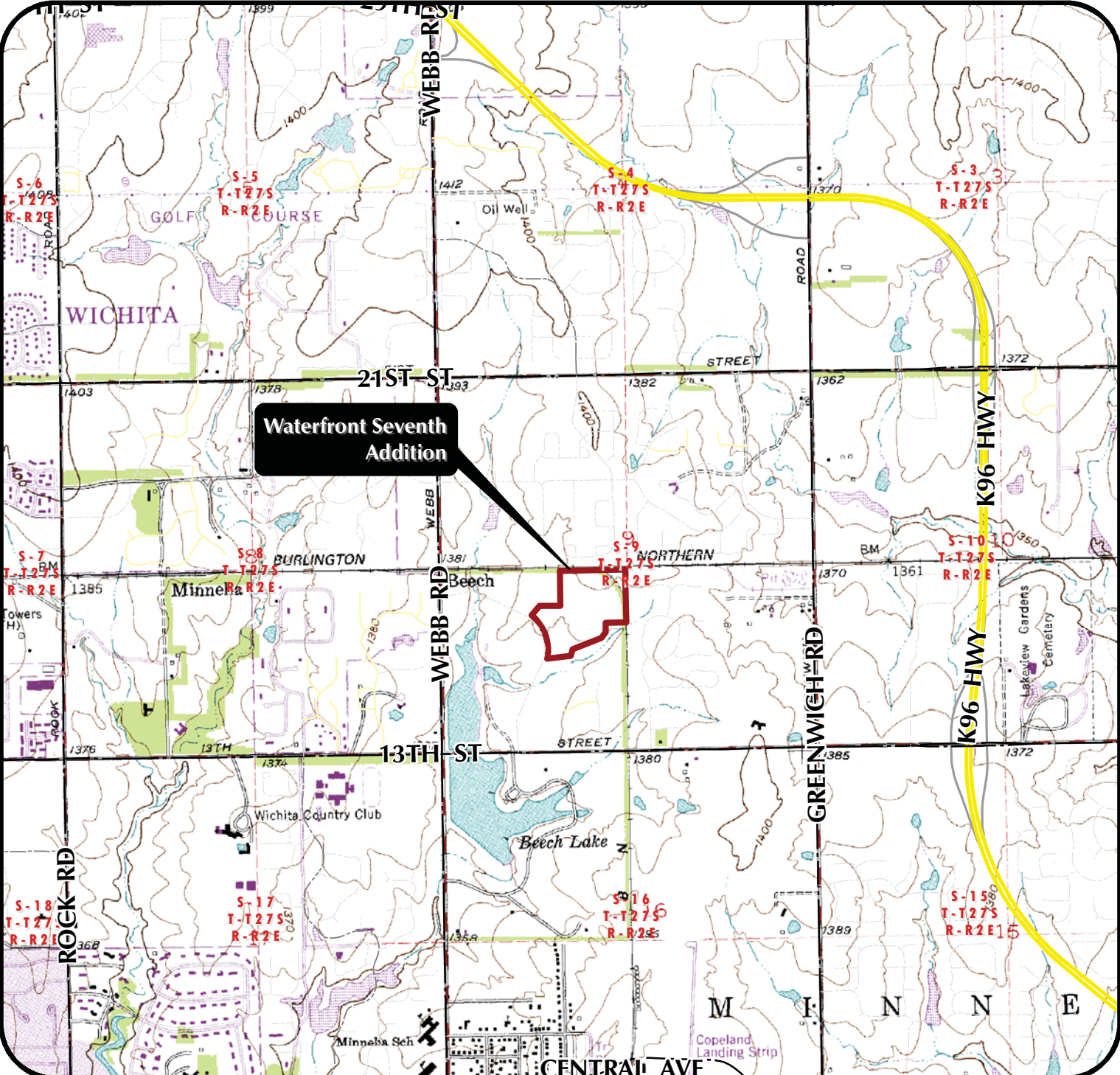
Best Management Practices

The site will be seeded or sodded after completion of the construction of grading and utilities. During construction, curb protection, a construction entrance, and other erosion control devices will be used to prevent soil from leaving the site. A storm water pollution prevention plan will be developed and implemented prior to any soil disturbing activities.

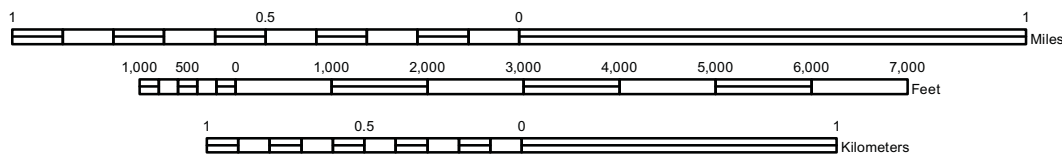
Appendix 1.1

USGS Quadrangle Map

Path: H:\CNVIL\02014\17th Add\GIS\Drmg-USGS-Waterfront7th.mxd - Date: 4/27/2012



Waterfront Seventh Addition



The Waterfront Seventh Addition

Project Name:
USGS Quadrangle - Wichita, Sedgwick County, KS
 Sheet Title:



JGD	April 2012
Drawn By:	Date:
KLA	02014
Design / Review:	Job No.:

Appendix 1.2

Plat

CERTIFICATE OF SURVEY

I, Gregory J. Allison, a registered land surveyor in Kansas, do hereby certify that I have been in responsible charge of surveying and platting of "THE WATERFRONT SEVENTH ADDITION", an addition to Wichita, Sedgwick County, Kansas, into Lots, Blocks, Reserves, and Streets, the same being accurately set forth in the accompanying plat and described herein:

A tract of land lying in the Southwest Quarter, Section 9, Township 27 South, Range 2 East, of the 6th Principal Meridian, Wichita, Sedgwick County, Kansas; said tract being more particularly described as follows:

BEGINNING at the northeast most corner of The Waterfront Fourth Addition, an addition to Wichita, Sedgwick County, Kansas, thence parallel with and 100.00 feet south of the north line of said Southwest Quarter, and being on an extended north line bearing of said Addition, and being on a Kansas coordinate system of 1983 south zone grid bearing of N88°56'04"E, 929.04 feet to the east line of said Southwest Quarter; thence along said east line S01°00'39"E, 748.11 feet to the northeast most corner of The Waterfront Sixth Addition, an addition to Wichita, Sedgwick County, Kansas; thence along the north lines of said The Waterfront Sixth Addition for the next six (6) courses, S88°59'21"W, 292.00 feet; thence S01°00'39"E, 130.00 feet; thence S36°09'06"W, 104.41 feet; thence S69°10'27"W, 435.00 feet; thence S14°46'46"W, 100.00 feet; thence S83°23'02"W, 335.47 feet to an easterly line of The Waterfront Addition, an addition to Wichita, Sedgwick County, Kansas, being on a curve to the left; thence along said curve and said easterly line 681.79 feet to a southeasterly corner of said The Waterfront Fourth Addition, said curve having a central angle of 60°05'53", a radius of 650.00 feet, and a long chord distance of 650.96 feet, bearing N19°57'18"W; thence along the southerly lines of said The Waterfront Fourth Addition for the next two (2) courses N39°59'46"E, 174.32 feet; thence N88°56'04"E, 293.78 feet to the southeast most corner of said The Waterfront Fourth Addition; thence along the east line of said The Waterfront Fourth Addition, N01°03'56"W, 489.35 feet to the POINT OF BEGINNING, TOGETHER WITH, Reserve "F", The Waterfront Sixth Addition, an addition to Wichita, Sedgwick County, Kansas. Said tract CONTAINS: 1,453,982 square feet or 33.379 acres of land, more or less.

All reserves, streets, easements, rights-of-ways, building setbacks, access controls, together with all other public dedications within the above described property, are hereby vacated and replatted by virtue of K.S.A. 12-512(b).

I hereby certify that the details of this plat are correct to the best of my knowledge and belief this ___ day of ___, 2012.

Gregory J. Allison, PE, LS #1257
MKEC Engineering Consultants, Inc.
411 North Webb Road
Wichita, Kansas 67206

OWNER'S CERTIFICATE

Know all men by these presents that the undersigned property owner of the land above set forth in the Registered Land Surveyor's Certificate, has caused the same to be surveyed and platted into Lots, Blocks, Reserves, and Streets the same to be known as "THE WATERFRONT SEVENTH ADDITION", an addition to Wichita, Sedgwick County, Kansas.

Easements for the construction and maintenance of public utilities indicated on the accompanying plat are hereby granted to the public. Streets having a 32 foot street right-of-way have an accompanying and adjoining 15 foot street drainage and utility easement, as indicated, and are hereby granted to the public.

The streets are hereby dedicated to and for the use of the public.

Reserves "A", "B", "C", "D", "E", "F", "G", "H", "I", and "K" are platted for open space, landscaping, irrigation, berming, monuments, sidewalks, and utilities confined by easement(s) or rights-of-way. Reserve "L" is platted for drainage, utilities confined by easement(s) or rights-of-way, open space, landscaping, irrigation, sidewalks, monuments, and for the preservation of existing tree canopy. Reserve "M" is platted for drainage, access to public sewer to Lots 28, 29, and 30, landscaping, irrigation, monuments, private sidewalks, berming, and open space. The Reserves shall be owned and maintained by the owner, and/or their successors, assigns, and/or a Home Owner's Association.

Lots 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 and 36, Block 1, are required to adhere to the minimum pad elevation table (sheet 1 of 2).

A drainage plan has been developed for this plat. All drainage easements, right-of-way, or reserves shall remain at established grades or as modified with the approval of the applicable City or County Engineer, and unobstructed to allow for the conveyance of storm water.

THE WATERFRONT HOLDING CO., L.L.C., a Kansas limited liability company

Johnny Stevens, manager
Stephan L. Clark, manager

STATE OF KANSAS, SEDGWICK COUNTY) ss:

This instrument was acknowledged before me on ___ day of ___, 2012, by Johnny Stevens, and Stephan L. Clark managers of The Waterfront Holding Co., L.L.C., a Kansas limited liability company.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year last above written.

Notary Public:
My Term Expires:

MORTGAGE CERTIFICATE

Commerce Bank, N.A. holder of a mortgage on a portion of the above described property, does hereby consent to the plat of "THE WATERFRONT SEVENTH ADDITION."

COMMERCE Bank, N.A.

Collin Stieben, Senior Vice President

This instrument was acknowledged before me on this ___ day of ___, 2012, by Collin Stieben, Senior Vice President, Commerce Bank, N.A.

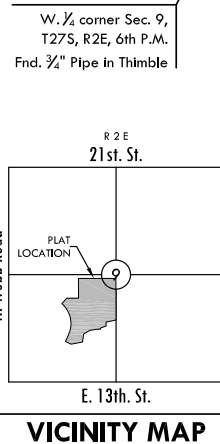
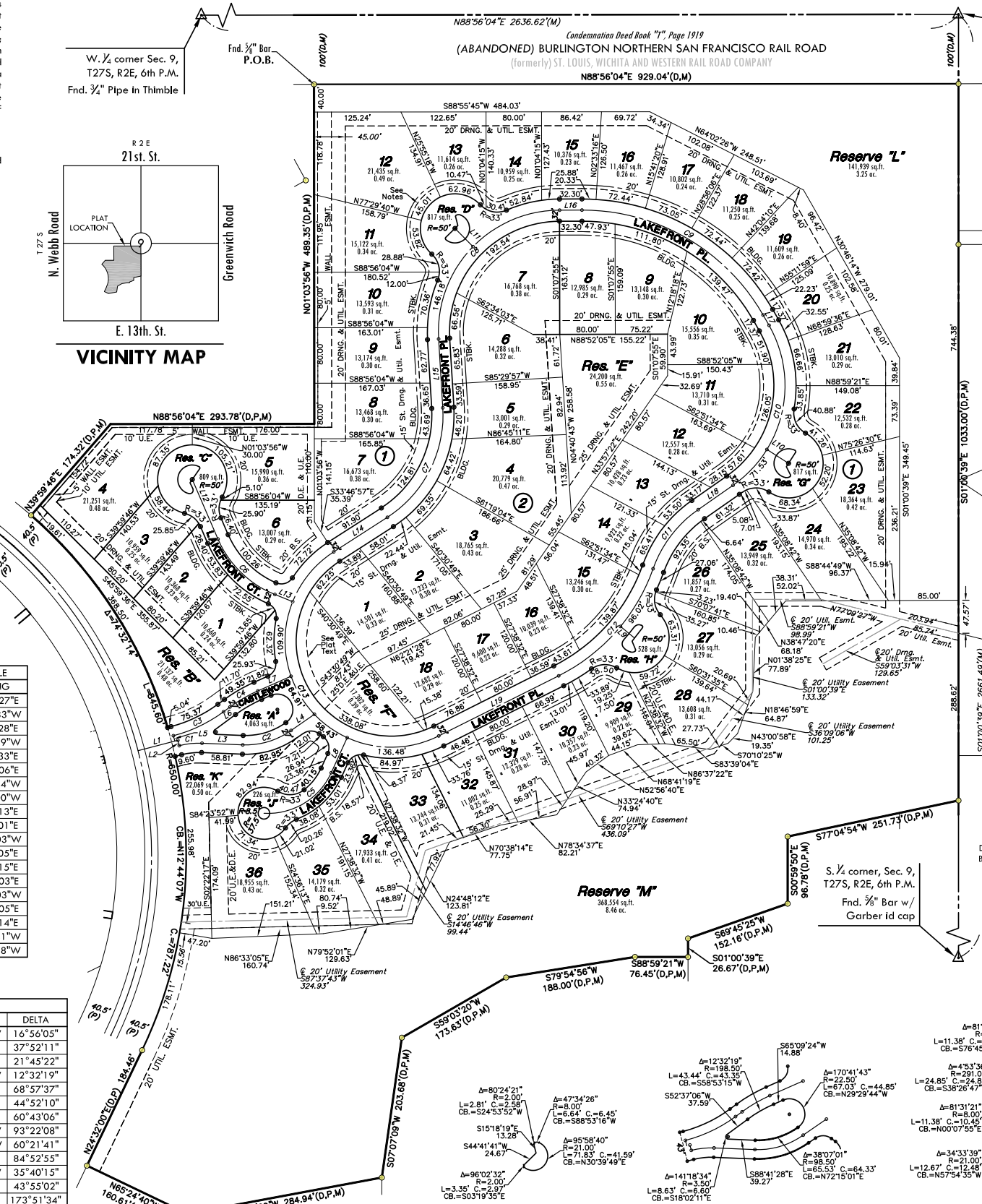
IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal, the day and year last above written.

Notary Public:
My Term Expires:

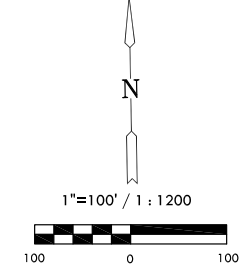
Table with columns: CURVE, LENGTH, RADIUS, CHORD, BEARING, DELTA. Lists curve data for C1 through C13.

Table with columns: LINE, LENGTH, BEARING. Lists street centerline data for L1 through L19.

FINAL PLAT
THE WATERFRONT SEVENTH ADDITION
AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS



Center Sec. 9, T27S, R2E, 6th P.M.
Fnd. 1/2" Pipe w/o id cap



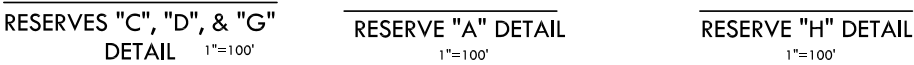
Basis of Bearing: Kansas coordinate system of 1983 south zone grid bearing of N88°56'04"E along the N. line of the SW 1/4, Sec. 9, T27S, R2E, 6th P.M.

This plat is surveyed and platted on NAD83 using Kansas state plane south zone coordinates, modified to the surface, having a combined adjustment scale factor of 1.000120014401728

- LEGEND
- Section corner monument found
- Found 3/8" rebar w/ MKEC
- CLS 3/8" id. cap unless otherwise annotated
- Set 3/8" rebar w/ MKEC
- CLS 3/8" id. cap
(M) = Measured
(CM) = Calculated from measured
(P) = Platted
(D) = Described
U.E. = Utility Easement
D.E. = Drainage Easement

MINIMUM PAD ELEVATION LOWEST OPENING table with columns: LOTS (inclusive), BLOCK, ELEVATION (NAVD88). Shows 24-36, 1, 1381.0.

BENCH MARK
Datum BM #1
Square cut on SW corner of signal light pole base at NE corner of Webb Road and 13th Street. Elev. = 1373.845 (NAVD88)



PLANNING COMMISSION CERTIFICATE

This plat of "THE WATERFRONT SEVENTH ADDITION" has been submitted to and approved by the Wichita-Sedgwick County Metropolitan Area Planning Commission, Wichita, Kansas.

Dated this ___ day of ___, 2012

WICHITA-SEDGWICK COUNTY METROPOLITAN AREA PLANNING COMMISSION

Shawn Farney, Chair

John L. Schlegel, Secretary

Affix MAPC Seal

GOVERNING BODY CERTIFICATE

The dedications shown on this plat are hereby accepted and this plat is hereby approved by the governing body of the City of Wichita, Kansas.

Dated this ___ day of ___, 2012

At the direction of the City Council.

Carl Brewer, Mayor

Karen Sublett, City Clerk

Affix City Seal

TRANSFER RECORD

STATE OF KANSAS, SEDGWICK COUNTY) ss:

Entered on transfer record this ___ day of ___, 2012

Kelly B. Arnold, County Clerk

Affix County Clerk Seal

REGISTER OF DEEDS CERTIFICATE

STATE OF KANSAS, SEDGWICK COUNTY) ss:

This is to certify that this instrument was filed for record in the Register of Deeds office this ___ day of ___, 2012, at ___ o'clock ___ M; and is duly recorded.

Bill Week, Register of Deeds

Tonya E. Buckingham, Deputy

COUNTY SURVEYOR

STATE OF KANSAS, SEDGWICK COUNTY) ss:

Reviewed in accordance with K.S.A. 58-2005 on this ___ day of ___, 2012.

Tricia L. Robello, LS #1246
Deputy County Surveyor
Sedgwick County, Kansas



411 N. WEBB ROAD
WICHITA, KS. 67206
316-684-9600

Appendix 1.3

Lot Grading Plan

PRELIMINARY
NOT FOR
CONSTRUCTION

LOT GRADING PLAN
THE WATERFRONT
SEVENTH ADDITION

LOT GRADING PLAN

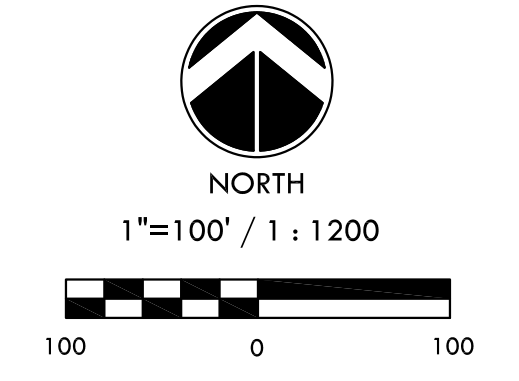
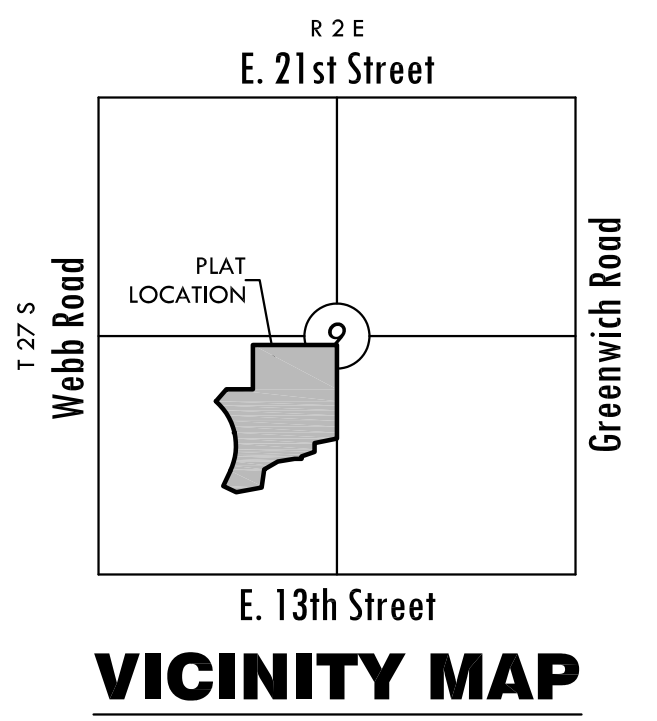
SHEET TITLE
02014

PROJECT NUMBER
DESIGNED **WB** / DRAWN **DM** / CHECKED **GJA**

ISSUED
April 2012

REVISED

SHEET NO.
of



Basis of Bearing: Kansas coordinate system 1983 south zone bearing of S89°00'49"W along the W. Line of SW 1/4, Sec. 9, T27S, R2E, 6th P.M.

BENCH MARK

Datum BM #1 Square cut on SW corner of signal light pole base at NE corner of Webb Road and 13th Street. Elev.=1373.845 (NAVD88)

LEGEND

- ☆ SIN - CONIFEROUS TREE & DIAMETER
- SIN - DECIDUOUS TREE & DIAMETER
- SN - SIGN
- BUSH
- EDGE OF TREES
- FENCE
- SSMH - SANITARY SEWER MANHOLE
- GM - GAS METER
- POLE - POLE
- HLP - HIGH LINE POLE
- GATE
- WALL
- LP - LIGHT POLE
- FH - FIRE HYDRANT
- WV - WATER VALVE
- WM - WATER METER
- PPA - POWER POLE AND GUY ANCHOR
- TR - TELEPHONE RISER
- INLET
- SSP - STORM SEWER PIPE
- W - WATER LINE
- SSS - SANITARY SEWER LINE
- G - GAS LINE
- T - TELEPHONE LINE
- UGE --- UNDERGROUND ELECTRIC LINE
- OHT --- OVERHEAD TELEPHONE
- OHE --- OVERHEAD ELECTRIC
- FOC --- UNDERGROUND FIBER OPTIC CABLE
- SECTION CORNER
- PROPERTY CORNER FOUND
- BENCHMARK
- WO - WALKOUT
- VO - VIEWOUT
- TVO - TERRACED VIEWOUT
- TWO - TERRACED WALKOUT
- WO* - WALKOUT WHICH MAY REQUIRE THICKER FOOTING AND/OR ENGINEERED FILL UNDER FOOTINGS
- SPOT - SPOT ELEV.
- PAD=1362.8 ADD 2 STEPS PROP. HOUSE ELEV.
- TF=1354.8 WO=1357.1
- PAD=1382.8 ADD 2 STEPS EXIST. PLOT PLAN HOUSE ELEV.
- TF=1384.4 VO=1357.1

Tab 2. Existing Conditions

Description

The site is approximately 25.0-acres of undeveloped ground consisting of grass or pasture. The site is shown on the aerial photograph, Appendix 2.1. The site is also shown on the Existing Conditions Map in Appendix 2.2. Existing conditions runoff for the site was included in the previous drainage report "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007".

Soils

The on-site soils are described in the previous drainage report noted above. According to the NRCS Sedgwick County Soil Survey, on-site soils consist mostly of Irwin silty clay loam (1 to 3% slopes) with a small amount of Goessel silty clay (1 to 3% slopes) in the north central part of the site. The Hydrological Soil Group classification for the Irwin and Goessel series soils is D. Drainage calculations in the previous report were based on class D soils. The site is shown on the Soil Survey, Figure 2.3. Groundwater elevations are unknown.

Drainage Calculations

Runoff Method

In the previous drainage report described above, pre-project conditions were modeled using a SCS TR-20 software model using the SCS 24-hour Type II design storms with a peaking factor of 484. In this model, the project site was included in sub-area TR-20 ID 053. This sub-area included the site, the hotel area to the south, and a large part of the residential area to the east.

Rainfall

The rainfall information used in the previous TR-20 modeling efforts was from the Kansas Department of Transportation Rainfall Depths for Kansas Counties June 1997. The rainfall values are shown below in Table 2.1.

Table 2.1. 24-Hour Rainfall Depths.

	2-Yr	5-Yr	10-Yr	100-Yr
Sedgwick	3.50	4.53	5.24	7.80

Time of Concentration

Time of concentration used for pre-development conditions for sub-area TR-20 ID 053 was 0.8340-hr or about 50-minutes.

Curve Numbers

The pre-development curve number used for sub-area TR-20 ID 053 was 84.

Drainage Patterns

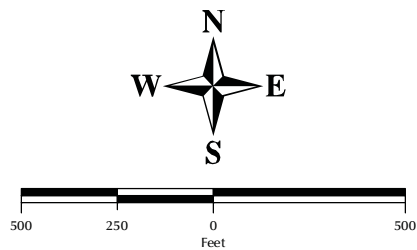
For pre-development conditions, the site generally drains south and southwest into the Hotel Pond located along the south property line. Pre-project runoff from sub-area TR-20 ID 053 is shown below in Table 2.2.

Table 2.3. Pre-Development Flow Rates

Description	Design Storm Flows (cfs)			
	2-Yr	5-Yr	10-Yr	100-Yr
Pre-Developed	112.3	168.1	205.5	343.1
Post-Developed	173.4	241.7	286.2	446.9

Appendix 2.1
Aerial Photograph

Path: H:\CIVIL\020114\7th Add\GIS\Waterfront 7th_Aerial.mxd - Date: 4/27/2012



The Waterfront Seventh Addition

Project Name:

2011 Aerial Photography - Wichita, Sedgwick County, KS

Sheet Title:



JGD

Drawn By:

KLA

Design / Review:

April 2012

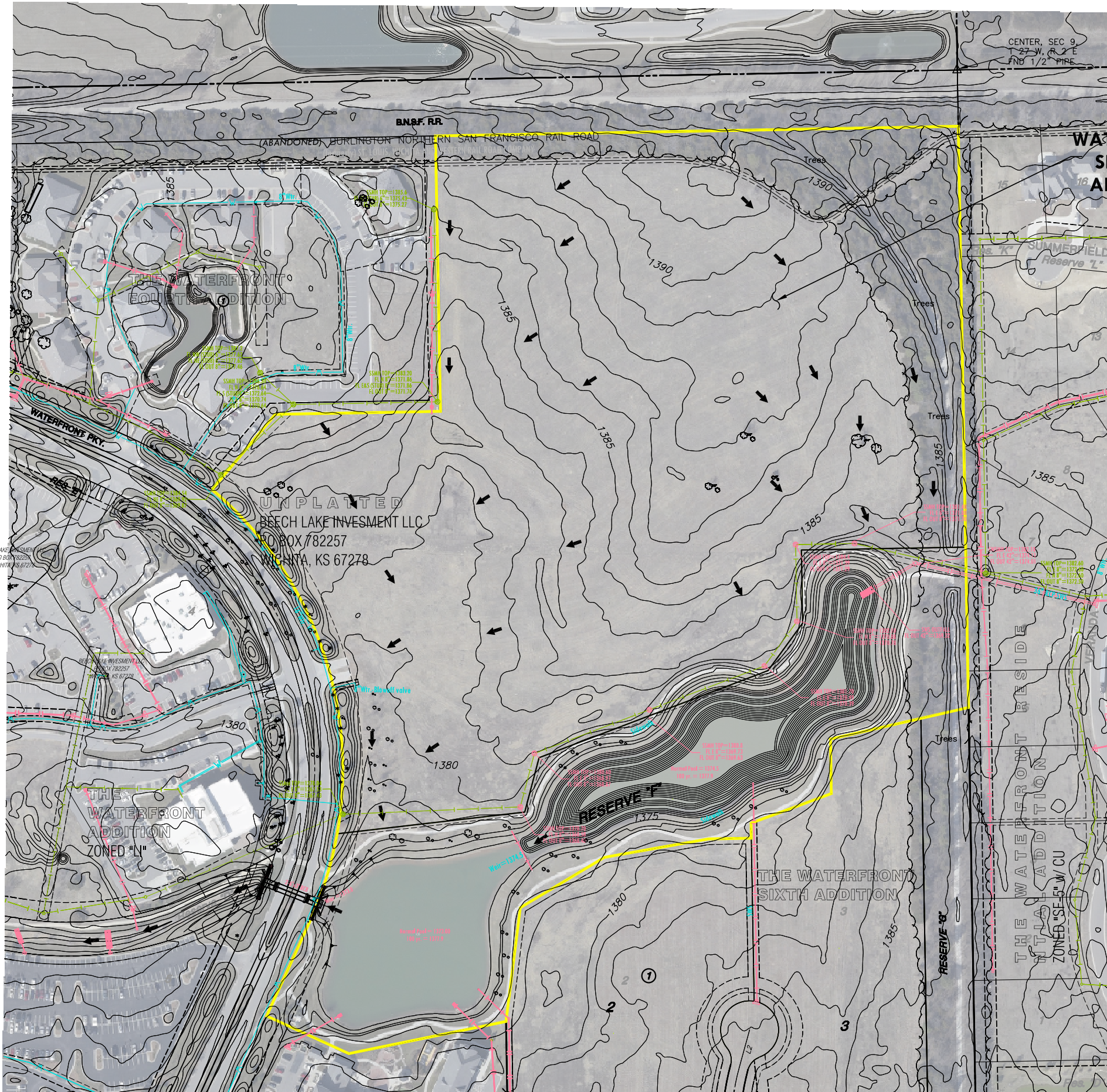
Date:

02014

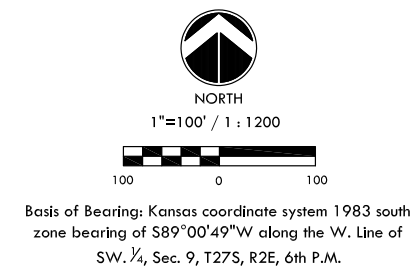
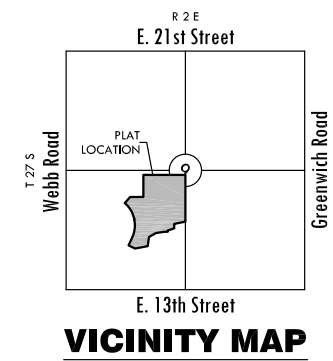
Job No.:

Appendix 2.2

Existing Conditions Map



WATERFRONT SEVENTH ADDITION



LEGEND

- | | |
|---|---|
| <ul style="list-style-type: none"> ① 3IN - TREE AND DIAMETER SN - SN - SIGN AND POSTS ● IP - IRON PIPE 214 x 49 - SPOT ELEVATION AND LOCATION PP - POWER POLE AND DEADMAN ■ KGE - ELECTRIC BOX - - - DRAINAGE ARROW - - - UGE - UNDERGROUND ELECTRIC LINE - - - OHE - OVERHEAD ELECTRIC LINE - x - x - FENCE BM - BENCHMARK ⊙ SWMH - STORM WATER MANHOLE ⊙ SSMH - SANITARY SEWER MANHOLE - - - RETAINING WALL | <ul style="list-style-type: none"> ● LP - LIGHT POLE ⊙ FH - FIRE HYDRANT ⊙ WV - WATER VALVE ⊙ WM - WATER METER ICV - IRRIGATION CONTROL VALVE ⊙ GI - GRATE INLET ⊙ TR - TELEPHONE RISER - - - STORM SEWER PIPE - - - WATER LINE - - - SANITARY SEWER LINE ① - BLOCK NUMBER 5 - LOT NUMBER G - G - GAS LINE - - - T - TELEPHONE LINE ⊙ - STRAW BALE ⊙ - SILT FENCE |
|---|---|

PRELIMINARY
NOT FOR
CONSTRUCTION

EXISTING CONDITIONS
THE WATERFRONT SEVENTH ADDITION

EXISTING CONDITIONS
SHEET TITLE
02014
PROJECT NUMBER

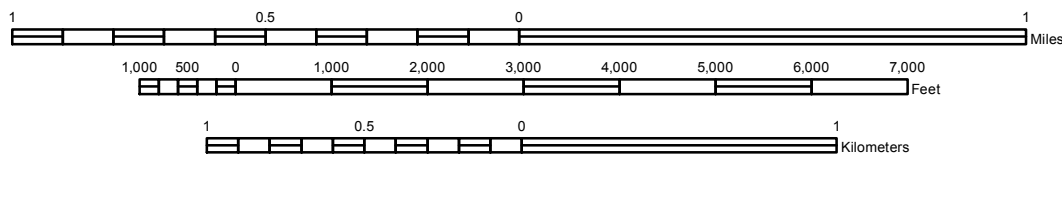
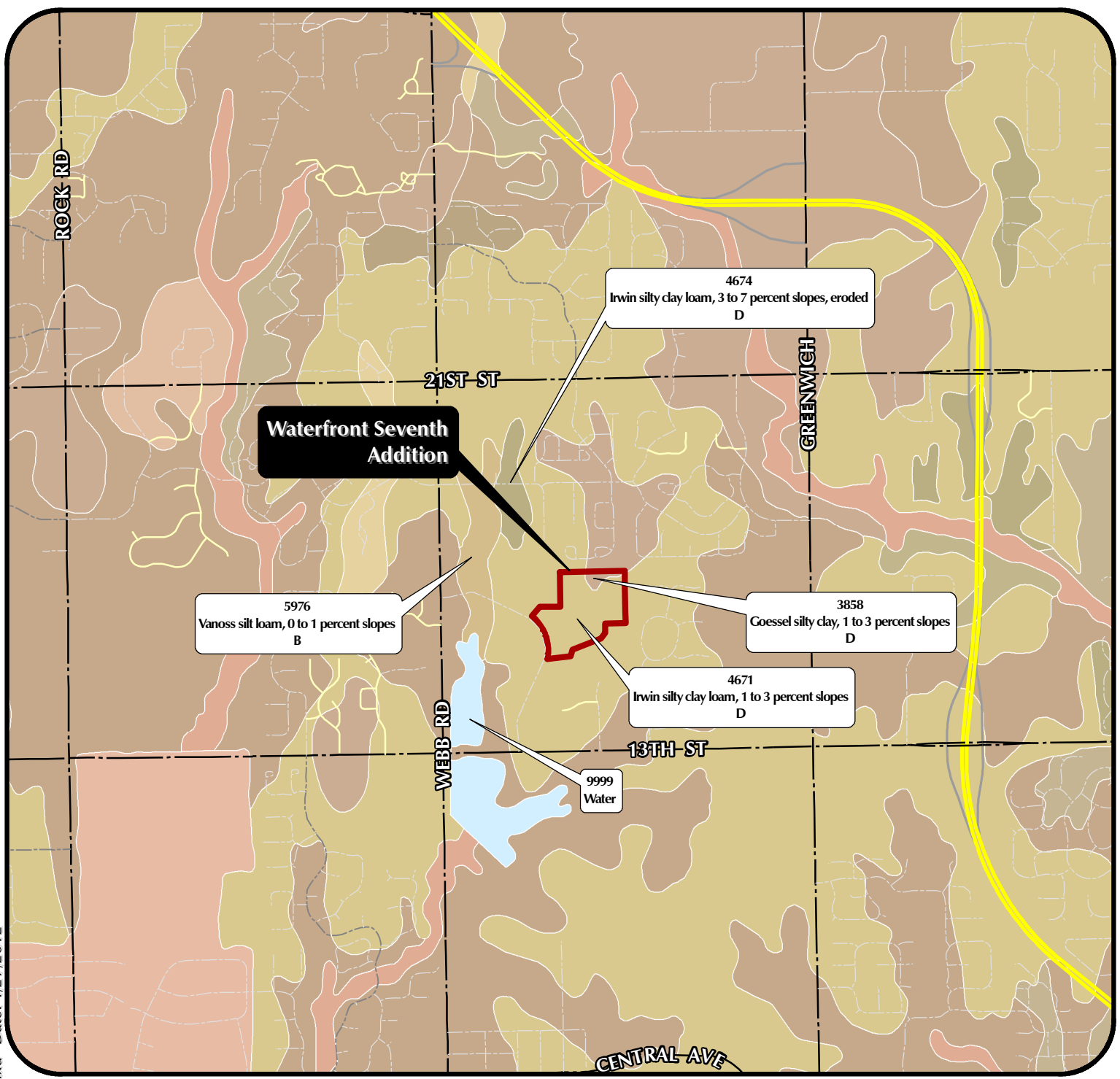
WB / DM / GJA
DESIGNED DRAWN CHECKED

ISSUED
April 2012
REVISED

SHEET NO.
of

Appendix 2.3

Soil Survey Map



The Waterfront Seventh Addition

Project Name:
NRCS Soil Survey - Wichita, Sedgwick County, KS

Sheet Title:

JGD	April 2012
Drawn By:	Date:
KLA	02014
Design / Review:	Job No.:

Tab 3. Post-Development Conditions

Description

The entire site of 25.0-acres will develop into a single family residential sub-division with 54, 0.5-acre lots. The Hotel Pond to the south has been modified to provide storm water detention (volume control) for a drainage area which includes the site. Post-developed conditions for the site and the modifications to the Hotel Pond were included in the previous drainage report "Drainage Report for Waterfront Commercial, Waterfront Residential and Greenwich Office Park, Revised August 2007".

Water quality protection (WQv) and channel protection volumes (CPv) were not explicitly included for any of the previous developments tributary to the Hotel Pond. However, WQv will be provided within the existing Hotel Pond, and the lake complex downstream will supply the CPv. These water quality volumes are provided for the site and for a 12-acre area south of the Hotel Pond that will develop as commercial in the future. This area south of the Hotel Pond is currently undeveloped, and is contained within sub-area TR-20 ID 053 tributary to the Hotel Pond where it receives volumetric runoff control.

Drainage Calculations

Runoff Method

In the previous drainage report noted above, post-project conditions were modeled using a SCS TR-20 software model using the SCS 24-hour Type II design storms with a peaking factor of 484. In this model, the project site was included in sub-area TR-20 ID 053. This sub-area included the site, the hotel area to the south, and a large part of the residential area to the east.

Rainfall

The rainfall information used in the previous TR-20 modeling efforts for post-developed conditions was from the Kansas Department of Transportation Rainfall Depths for Counties June 1997. The rainfall values are shown below in Table 3.1.

Table 3.1. 24-Hour Rainfall Depths.

	2-Yr	5-Yr	10-Yr	100-Yr
Sedgwick	3.50	4.53	5.24	7.80

Time of Concentration

The post-developed time of concentration used for sub-area TR-20 ID 053 was 0.5957-hr or about 36-minutes.

Curve Numbers

The pre-development curve number used for sub-area TR-20 ID 053 was 91. This was a weighted average of ½-acre residential and commercial/business. Since the site will be developed as residential instead of commercial/business, the curve number will decrease from what was previously calculated. Since this is an improvement, the curve number calculations and the hydrologic basin model were not changed.

Drainage Patterns

The site will be graded and storm systems will be constructed to convey runoff from all storm events into the Hotel Pond. The storm sewer layout is shown on the drainage and utility plan, Appendix 3.1. The proposed storm collection systems will convey runoff from the entire

development into the upper portion of the Hotel Pond. The pipe systems will be supplemented with a drainage swale, which will convey runoff from the northeast part of the site to the northeast corner of the Hotel Pond.

Storm Water Sewer Systems

Hydraflow Storm Sewers software was used for the hydraulic calculations for the proposed storm pipe systems, Appendix 3.2. These pipe systems are preliminary sized for a 2-year event, in accordance with the residential area they serve.

Stormwater Quality Management

Appendix 3.3 contains the WQv calculations for the site, and for the remaining undeveloped tributary area to the south. Although some open areas are planned for the site, the calculations proceeded with the assumption that there would not be any post-developed wooded areas. For the area south of the Hotel Pond, this area will develop completely as commercial. Approximately 1.1-acre-ft of treatment volume is required for the site, and 1.0-acre-ft for the undeveloped tributary area to the south. Consequently, a total 2.1-acre-ft of WQv is needed. This treatment volume is obtained below the normal pool of the upper portion of the Hotel Pond. Table 3.2 below contains the volumetric calculations for the upper part of the Hotel Pond.

Table 3.2 – Normal Pool Volume

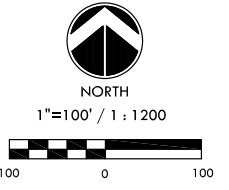
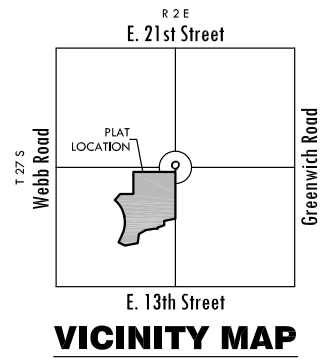
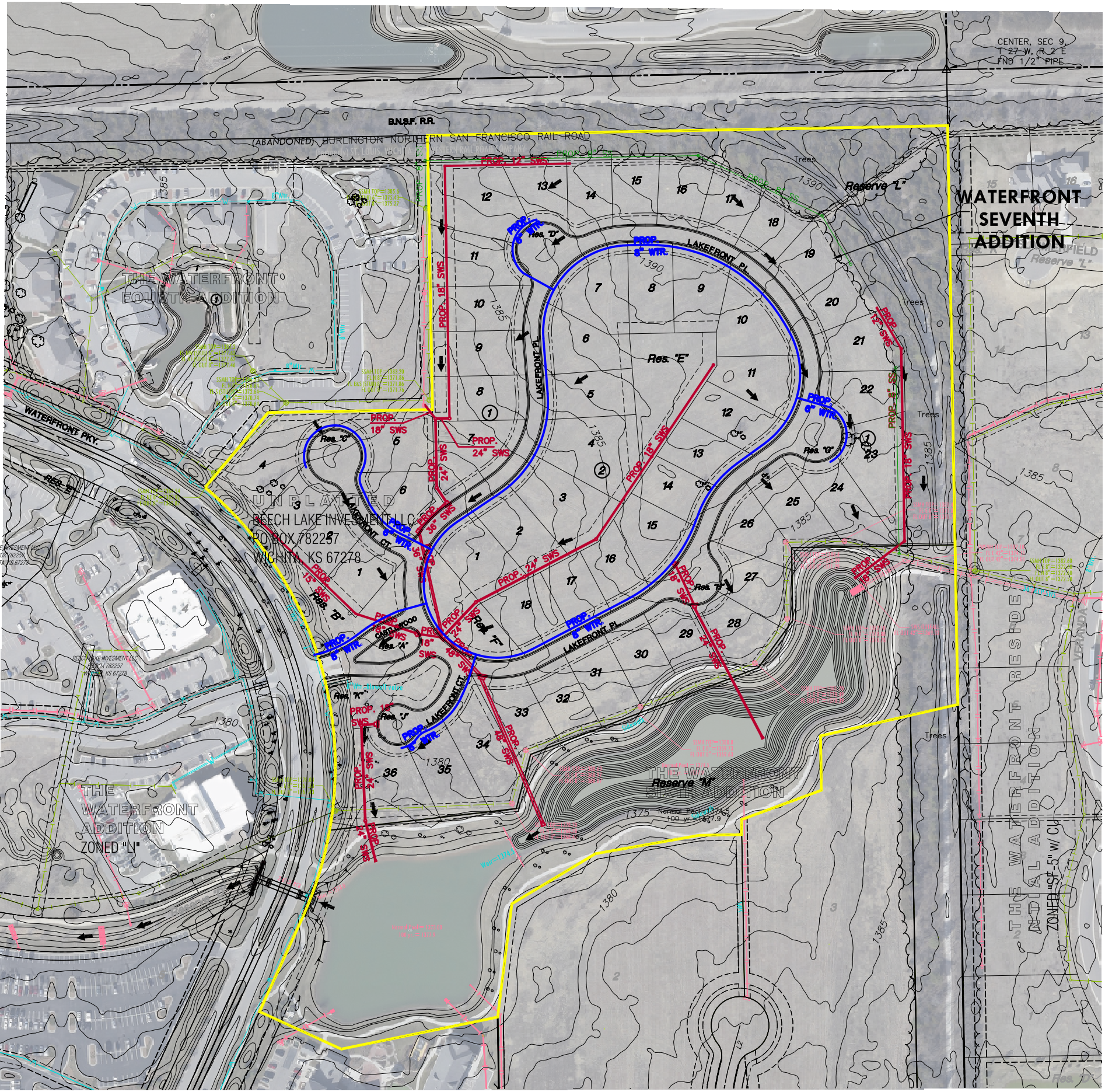
Elev.	Elev. Diff. (ft)	Area (sq.ft)	Inc. Vol. (cu.ft)	Cum. Vol. (cu.ft)	Cum. Vol. (ac.ft)
1361		17,380		0	0.0
	3		65,276		
1364		26,137		65,276	1.5
	1		40,503		
1365		54,868		105,779	2.4
	9.5		763,653		
1374.5		105,901		869,432	20.0

At the normal pool elevation of 1374.5 a permanent water quality pool volume of 20-acre-ft is provided. This pool will remove the required 80% of post-developed total suspended solids (TSS) load from the site and the remaining undeveloped area to the south. The upper pool of the Hotel Pond will act as a standard wet pond, with 100% of the WQv contained within the permanent pool volume.

CPv for the site and for the remaining undeveloped tributary area to the south is provided in the lake complex on site. The Waterfront Lake and the connected Beech Lake are controlled by a downstream weir and dam. The weir includes a notch which has a dimension of 1-ft (deep) x 12-ft.(length). The 1-ft notch controls approximately the 1-year storm for the entire upstream basin. The volume of water that accumulates within the Beech Lake ponds and controlled by 1-ft notch is approximately 40-acre-ft. Appendix 3.4 contains the stage-storage-discharge information for Beech Lake which demonstrates the time for this volume of water to discharge downstream. The time for discharging this entire volume is nearly five days to reach the normal pool elevation of the Beech Lake. A cursory review of the 780-acre basin indicates 65 to 75-acre-ft volume would be required to control the CPv for the entire 780 ac basin. This available volume CPv, coupled with several other ponds within the watershed indicates that the CPv is being provided on a regional basis within existing basin conditions.

Appendix 3.1

Drainage and Utility Plan



Basis of Bearing: Kansas coordinate system 1983 south zone bearing of S89°00'49"W along the W. Line of SW 1/4, Sec. 9, T27S, R2E, 6th P.M.

BENCH MARK

Datum BM #1 Square cut on SW corner of signal light pole base at NE corner of Webb Road and 13th Street. Elev.=1373.845 (NAVD88)

LEGEND

- | | |
|--|--|
| <ul style="list-style-type: none"> 3IN - TREE AND DIAMETER SN - SN - SIGN AND POSTS IP - IRON PIPE 214 x49 - SPOT ELEVATION AND LOCATION PP - POWER POLE AND DEADMAN KGE - ELECTRIC BOX - DRAINAGE ARROW - WAVE - EDGE OF TREES - UGE - UNDERGROUND ELECTRIC LINE - OHE - OVERHEAD ELECTRIC LINE - X - X - FENCE BM - BENCHMARK SWMH - STORM WATER MANHOLE SSMH - SANITARY SEWER MANHOLE - RETAINING WALL | <ul style="list-style-type: none"> LP - LIGHT POLE FH - FIRE HYDRANT WV - WATER VALVE WM - WATER METER ICV - IRRIGATION CONTROL VALVE GI - GRATE INLET TR - TELEPHONE RISER SSWP - STORM SEWER PIPE WL - WATER LINE SSSL - SANITARY SEWER LINE 1 - BLOCK NUMBER 5 - LOT NUMBER G - G - GAS LINE T - T - TELEPHONE LINE SB - STRAW BALE SF - SILT FENCE |
|--|--|

MKEC
ENGINEERING
CONSULTANTS, INC.
411 N. WEBB ROAD
WICHITA, KS. 67206
316 - 684 - 9600

PRELIMINARY
NOT FOR
CONSTRUCTION

DRAINAGE & UTILITY PLAN
THE WATERFRONT
SEVENTH ADDITION

DRNG/UTIL PLAN
SHEET TITLE
02014
PROJECT NUMBER

WB / DM / GJA
DESIGNED DRAWN CHECKED

ISSUED
April 2012

REVISED

SHEET NO.
of

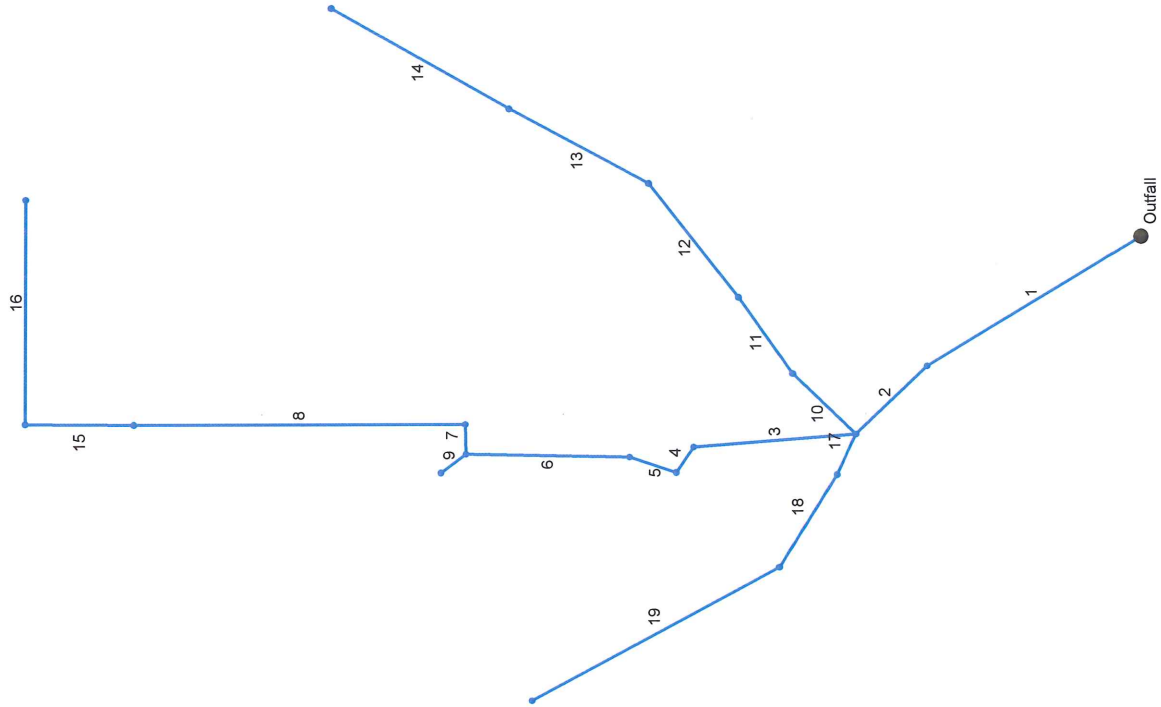
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Appendix 3.2

Storm System Calculations

02014 West SWS



Project File: 02014 West SWS.slm

Number of lines: 19

Date: 04-26-2012

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID	
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line shape	N value (n)	J-loss coeff (K)		Inlet/ Rim El (ft)
1	End	254.00	-120.65	Genr	0.00	1.38	0.42	15.0	1372.00	0.26	1372.65	48	Cir	0.013	0.50	1378.00	1/4 Area C
2	1	100.00	-12.52	Genr	0.00	1.38	0.42	15.0	1372.65	0.25	1372.90	48	Cir	0.013	1.50	1378.00	1/4 Area C
3	2	166.00	38.81	Genr	0.00	2.05	0.42	15.0	1373.90	0.27	1374.35	36	Cir	0.013	1.22	1379.00	1/2 Area D
4	3	31.00	-51.17	Genr	0.00	2.05	0.42	15.0	1374.55	0.32	1374.65	36	Cir	0.013	1.45	1379.00	1/2 Area D
5	4	50.00	73.60	MH	0.00	0.00	0.00	0.0	1374.85	0.30	1375.00	36	Cir	0.013	0.34	1379.50	
6	5	167.00	-16.93	MH	0.00	0.00	0.00	0.0	1376.45	0.66	1377.55	24	Cir	0.013	1.00	1381.00	
7	6	30.00	87.16	MH	0.00	0.00	0.00	0.0	1377.75	0.50	1377.90	24	Cir	0.013	1.00	1381.00	
8	7	340.00	-88.31	Genr	0.00	1.03	0.42	15.0	1378.40	0.47	1380.00	18	Cir	0.013	0.50	1385.00	1/2 Area F
9	6	32.00	-37.23	Genr	0.00	2.79	0.42	15.0	1378.05	0.62	1378.25	18	Cir	0.013	1.00	1381.00	Area E
10	2	89.00	86.42	MH	0.00	0.00	0.00	0.0	1374.00	0.56	1374.50	24	Cir	0.013	0.23	1378.00	
11	10	95.00	10.90	Genr	0.00	0.56	0.42	15.0	1374.70	0.53	1375.20	24	Cir	0.013	0.50	1380.00	1/2 Area B
12	11	147.00	-2.84	Genr	0.00	0.56	0.42	15.0	1375.40	0.51	1376.15	24	Cir	0.013	0.68	1382.00	1/2 Area B
13	12	161.00	-23.29	Genr	0.00	1.09	0.42	15.0	1376.65	0.53	1377.50	18	Cir	0.013	0.50	1384.00	1/2 Area A
14	13	209.00	1.01	Genr	0.00	1.09	0.42	15.0	1377.70	0.62	1379.00	18	Cir	0.013	1.00	1384.00	1/2 Area A
15	8	110.00	0.44	Genr	0.00	0.52	0.42	15.0	1380.20	0.55	1380.80	18	Cir	0.013	1.50	1386.00	1/4 Area F
16	15	226.00	89.57	Genr	0.00	0.52	0.42	15.0	1381.30	0.75	1383.00	12	Cir	0.013	1.00	1388.00	1/4 Area F
17	2	45.00	-21.84	Genr	0.00	1.38	0.42	15.0	1373.90	0.56	1374.15	18	Cir	0.013	0.50	1378.00	1/4 Area C
18	17	110.00	7.27	Genr	0.00	0.69	0.42	15.0	1374.35	0.55	1374.95	18	Cir	0.013	0.83	1379.00	1/8 Area C
19	18	285.00	29.70	Genr	0.00	0.69	0.42	15.0	1375.20	0.51	1376.65	15	Cir	0.013	1.00	1382.00	1/8 Area C

02014 West SWS

Number of lines: 19

Date: 04-26-2012

Storm Sewer Summary Report

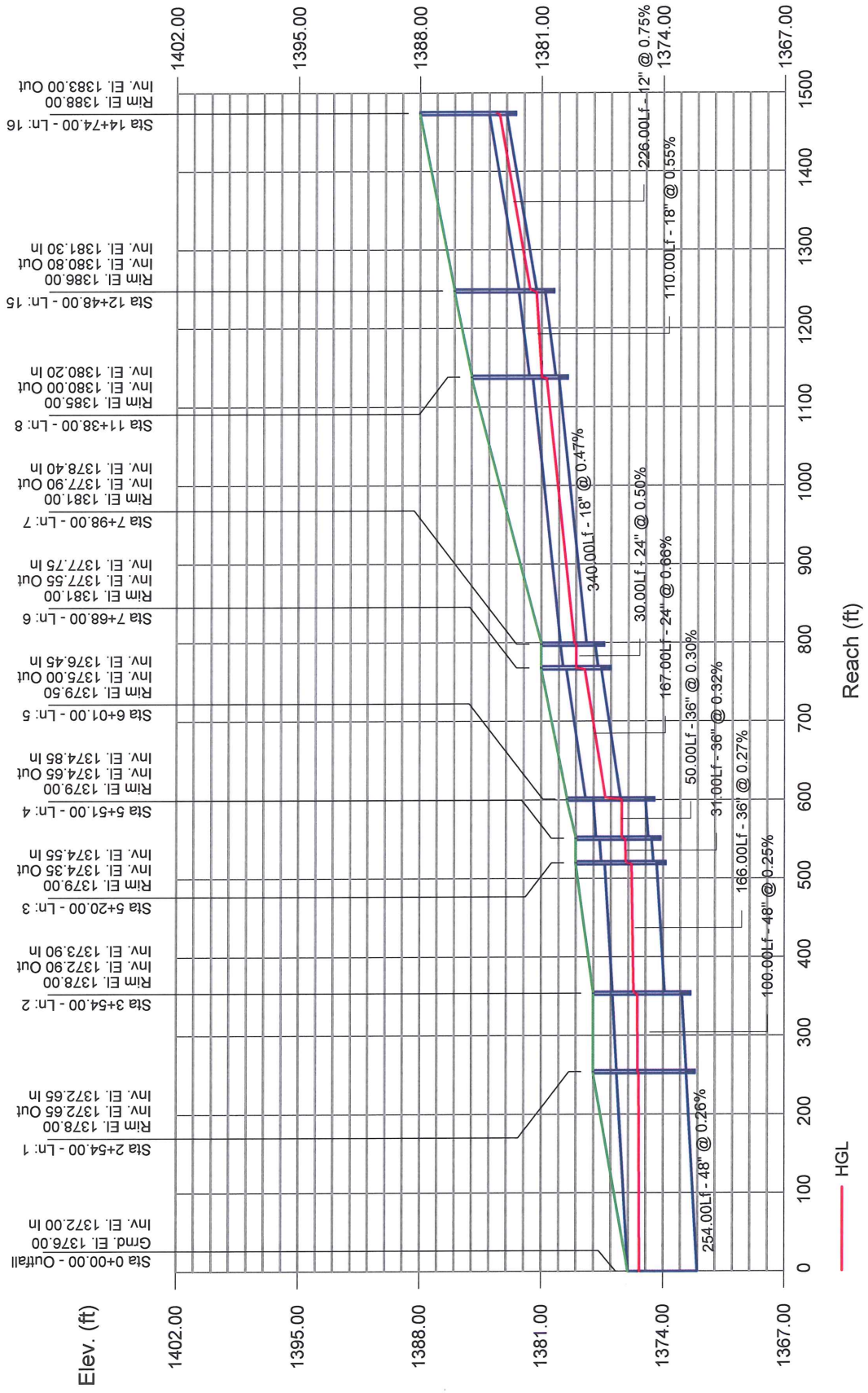
Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	1/4 Area C	24.20	48	Cir	254.00	1372.00	1372.65	0.256	1375.34	1375.39	0.05	1375.44	End	Generic
2	1/4 Area C	22.69	48	Cir	100.00	1372.65	1372.90	0.250	1375.44	1375.46	0.17	1375.63	1	Generic
3	1/2 Area D	12.66	36	Cir	166.00	1373.90	1374.35	0.271	1375.69	1375.80	0.26	1376.07	2	Generic
4	1/2 Area D	9.82	36	Cir	31.00	1374.55	1374.65	0.323	1376.16	1376.16	0.17	1376.33	3	Generic
5		6.98	36	Cir	50.00	1374.85	1375.00	0.300	1376.37	1376.37	0.03	1376.40	4	Manhole
6		7.08	24	Cir	167.00	1376.45	1377.55	0.659	1377.31	1378.49	n/a	1378.98 i	5	Manhole
7		3.04	24	Cir	30.00	1377.75	1377.90	0.500	1378.98	1378.98	0.05	1379.03	6	Manhole
8	1/2 Area F	3.16	18	Cir	340.00	1378.40	1380.00	0.471	1379.10	1380.69	n/a	1380.98 i	7	Generic
9	Area E	4.51	18	Cir	32.00	1378.05	1378.25	0.625	1378.98	1379.06	n/a	1379.51 i	6	Generic
10		4.87	24	Cir	89.00	1374.00	1374.50	0.562	1375.63	1375.65	0.02	1375.67	2	Manhole
11	1/2 Area B	4.93	24	Cir	95.00	1374.70	1375.20	0.526	1375.74	1375.99	n/a	1376.34 i	10	Generic
12	1/2 Area B	4.18	24	Cir	147.00	1375.40	1376.15	0.510	1376.34	1376.87	n/a	1377.18 i	11	Generic
13	1/2 Area A	3.38	18	Cir	161.00	1376.65	1377.50	0.528	1377.35	1378.21	n/a	1378.55 i	12	Generic
14	1/2 Area A	1.76	18	Cir	209.00	1377.70	1379.00	0.622	1378.55	1379.51	n/a	1379.71 i	13	Generic
15	1/4 Area F	1.62	18	Cir	110.00	1380.20	1380.80	0.546	1380.98	1381.29	n/a	1381.48 i	8	Generic
16	1/4 Area F	0.84	12	Cir	226.00	1381.30	1383.00	0.752	1381.66	1383.39	n/a	1383.55 i	15	Generic
17	1/4 Area C	4.07	18	Cir	45.00	1373.90	1374.15	0.556	1375.66*	1375.72*	0.04	1375.77	2	Generic
18	1/8 Area C	2.10	18	Cir	110.00	1374.35	1374.95	0.545	1375.77	1375.81	0.05	1375.86	17	Generic
19	1/8 Area C	1.12	15	Cir	285.00	1375.20	1376.65	0.509	1375.91	1377.07	n/a	1377.24 i	18	Generic

02014 West SWS Number of lines: 19 Run Date: 04-26-2012

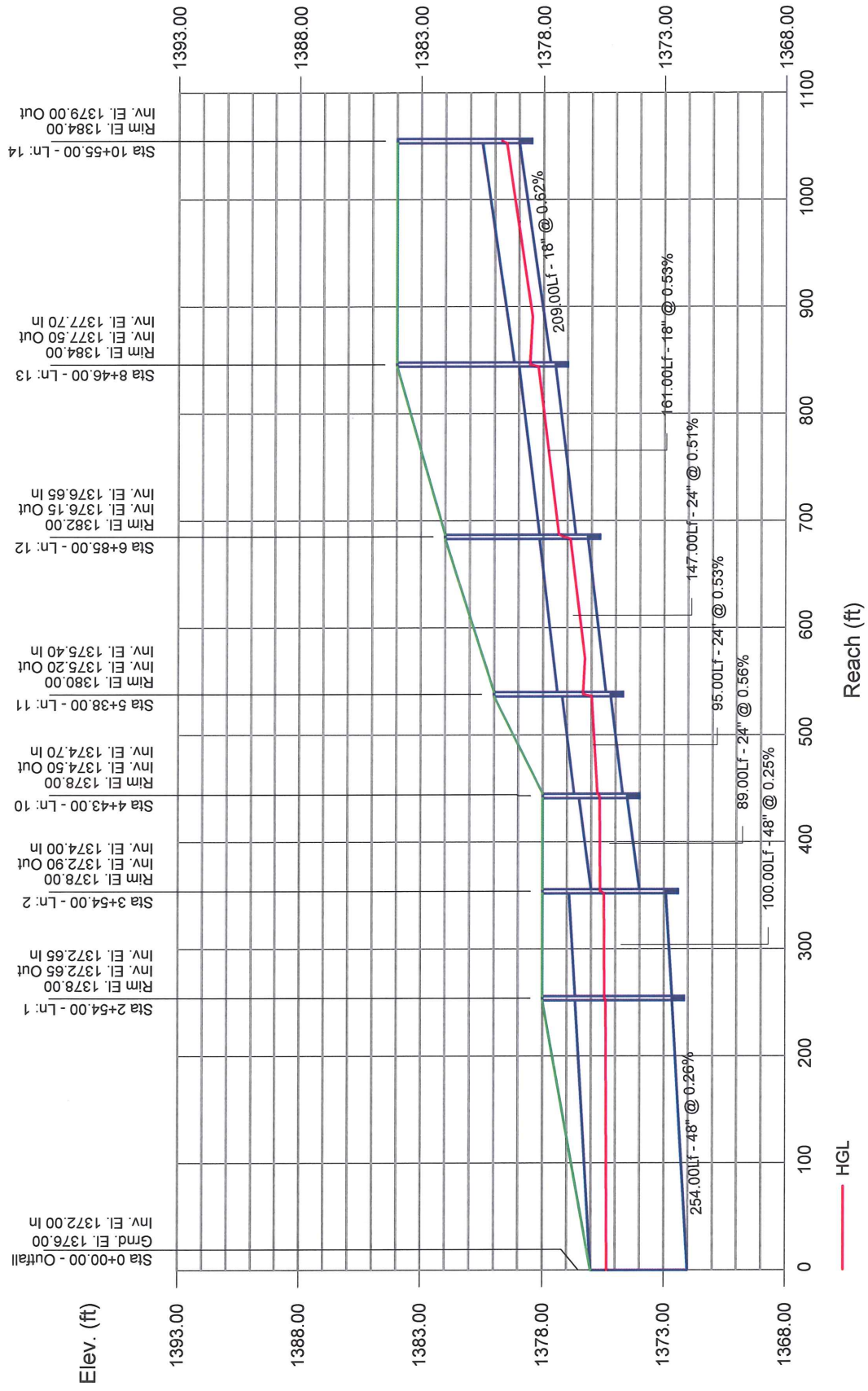
NOTES: Return period = 2 Yrs. ; *Surcharged (HGL above crown). ; i - Inlet control.

Storm Sewer Profile

Proj. file: 02014 West SWS.stm

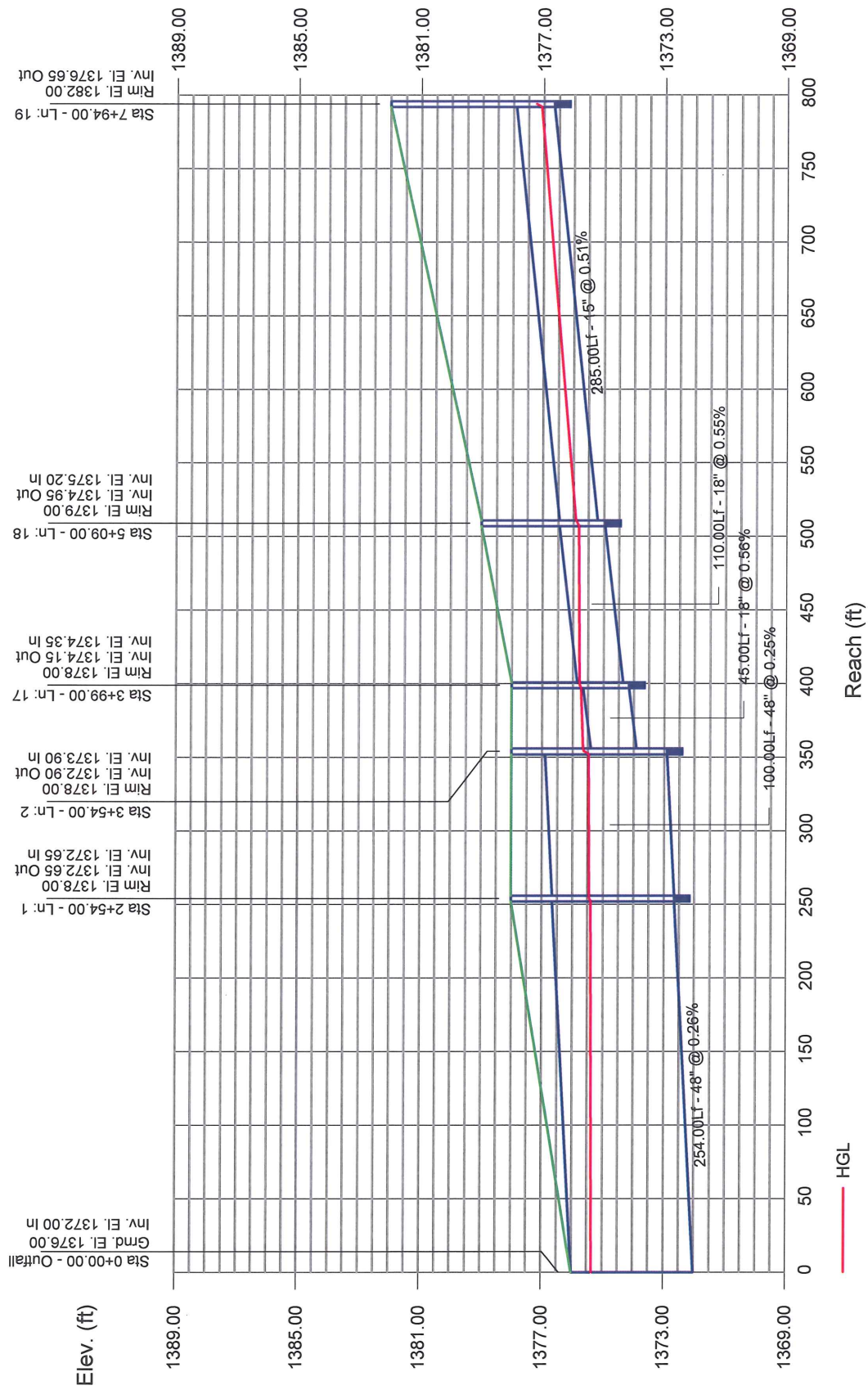


Storm Sewer Profile

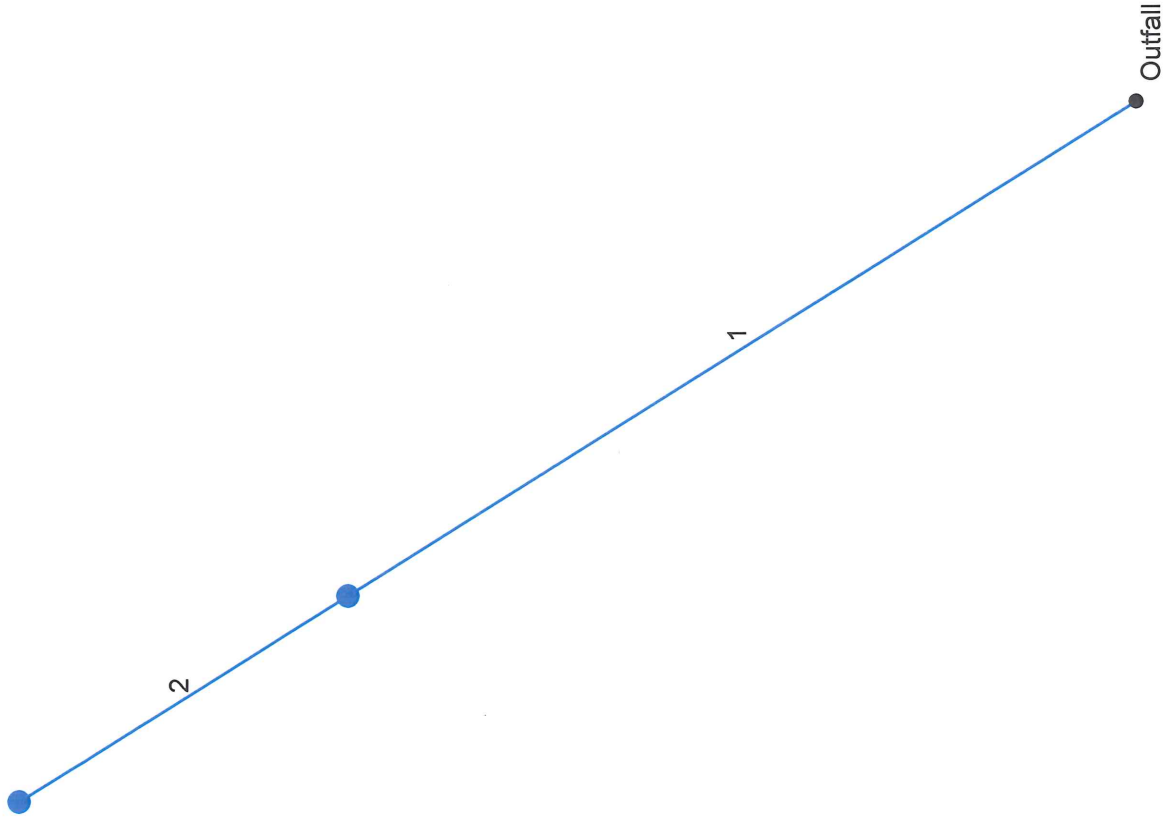


Storm Sewer Profile

Proj. file: 02014 West SWS.stm



02014 East SWS



Project File: 02014 East SWS.stm

Number of lines: 2

Date: 04-26-2012

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID	
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert EI Dn (ft)	Line slope (%)	Invert EI Up (ft)	Line size (in)	Line shape	N value (n)	J-loss coeff (K)		Inlet/ Rim EI (ft)
1	End	180.00	-121.68	Genr	0.00	1.94	0.42	15.0	1372.00	1.94	1375.50	24	Cir	0.013	0.50	1381.00	1/2 Area H
2	1	75.00	-0.03	Genr	0.00	1.94	0.42	15.0	1376.00	2.67	1378.00	18	Cir	0.013	1.00	1383.00	1/2 Area H
02014 East SWS																	
Number of lines: 2																	
Date: 04-26-2012																	

Storm Sewer Summary Report

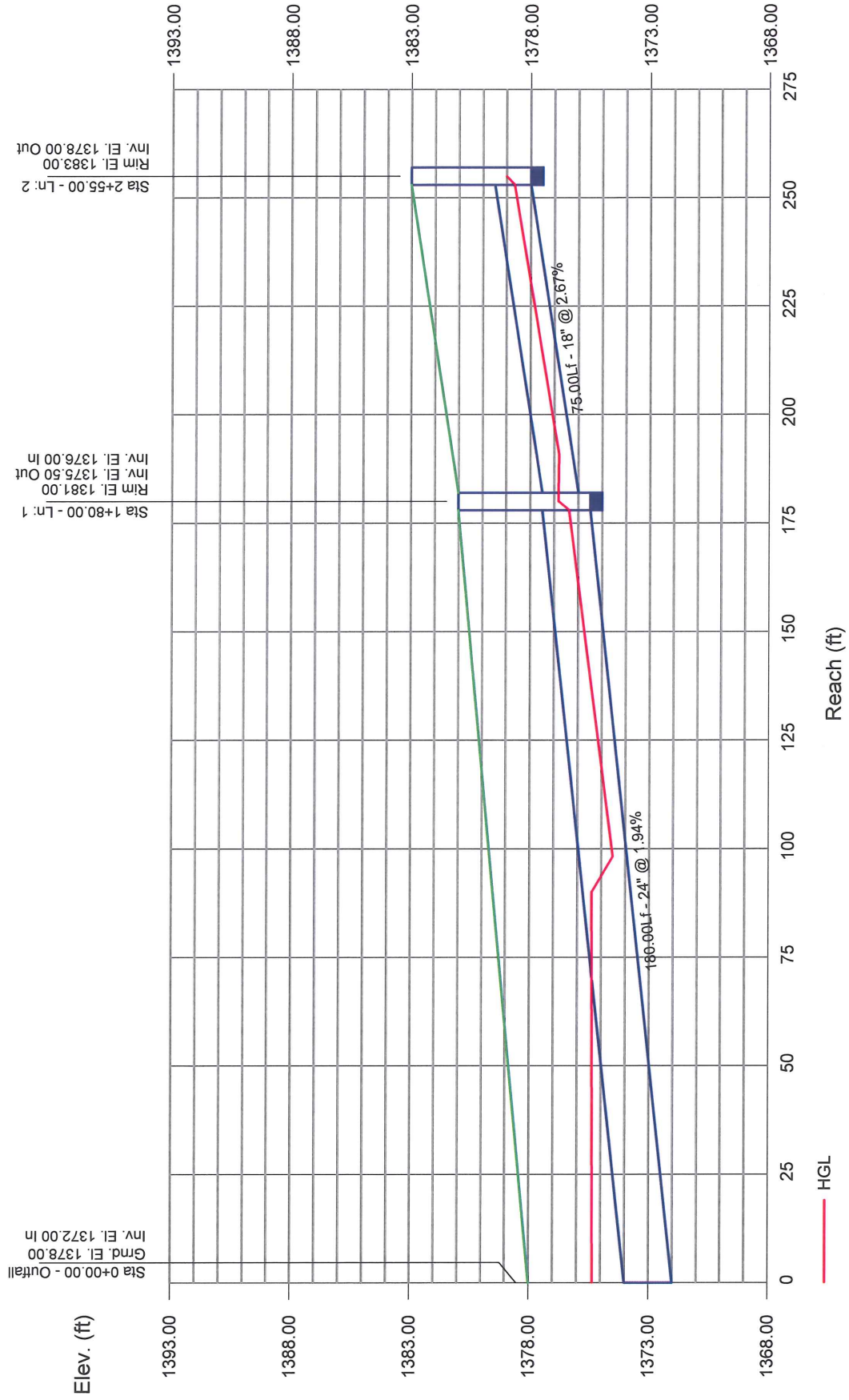
Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	1/2 Area H	6.21	24	Cir	180.00	1372.00	1375.50	1.944	1375.34	1376.38	n/a	1376.81 i	End	Generic
2	1/2 Area H	3.14	18	Cir	75.00	1376.00	1378.00	2.667	1376.81	1378.68	n/a	1379.00 i	1	Generic

02014 East SWS Number of lines: 2 Run Date: 04-26-2012

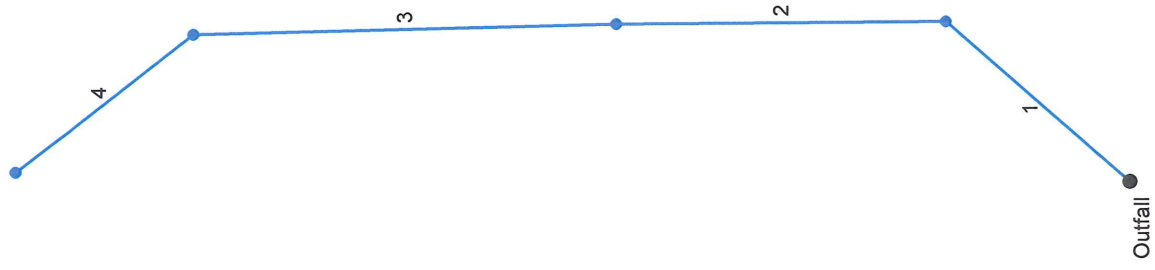
NOTES: Return period = 2 Yrs. ; i - Inlet control.

Storm Sewer Profile

Proj. file: 02014 East SWS.stm



02014 NE SWS



Project File: 02014 NE SWS.stm

Number of lines: 4

Date: 04-26-2012

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID	
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Drng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert El Dn (ft)	Line slope (%)	Invert El Up (ft)	Line size (in)	Line shape	N value (n)	J-loss coeff (K)		Inlet/Rim El (ft)
1	End	110.00	-49.40	Genr	0.00	1.31	0.42	15.0	1370.00	6.82	1377.50	18	Cir	0.013	1.05	1383.00	1/3 Area G
2	1	149.00	-40.94	Genr	0.00	1.31	0.42	15.0	1378.00	0.54	1378.80	18	Cir	0.013	0.50	1384.00	1/3 Area G
3	2	191.00	-0.93	MH	0.00	0.00	0.00	0.0	1379.00	0.52	1380.00	18	Cir	0.013	0.64	1386.00	
4	3	101.00	-36.11	Genr	0.00	1.31	0.42	15.0	1380.50	0.50	1381.00	12	Cir	0.013	1.00	1386.00	1/3 Area G
02014 NE SWS																	
Number of lines: 4															Date: 04-26-2012		

Storm Sewer Summary Report

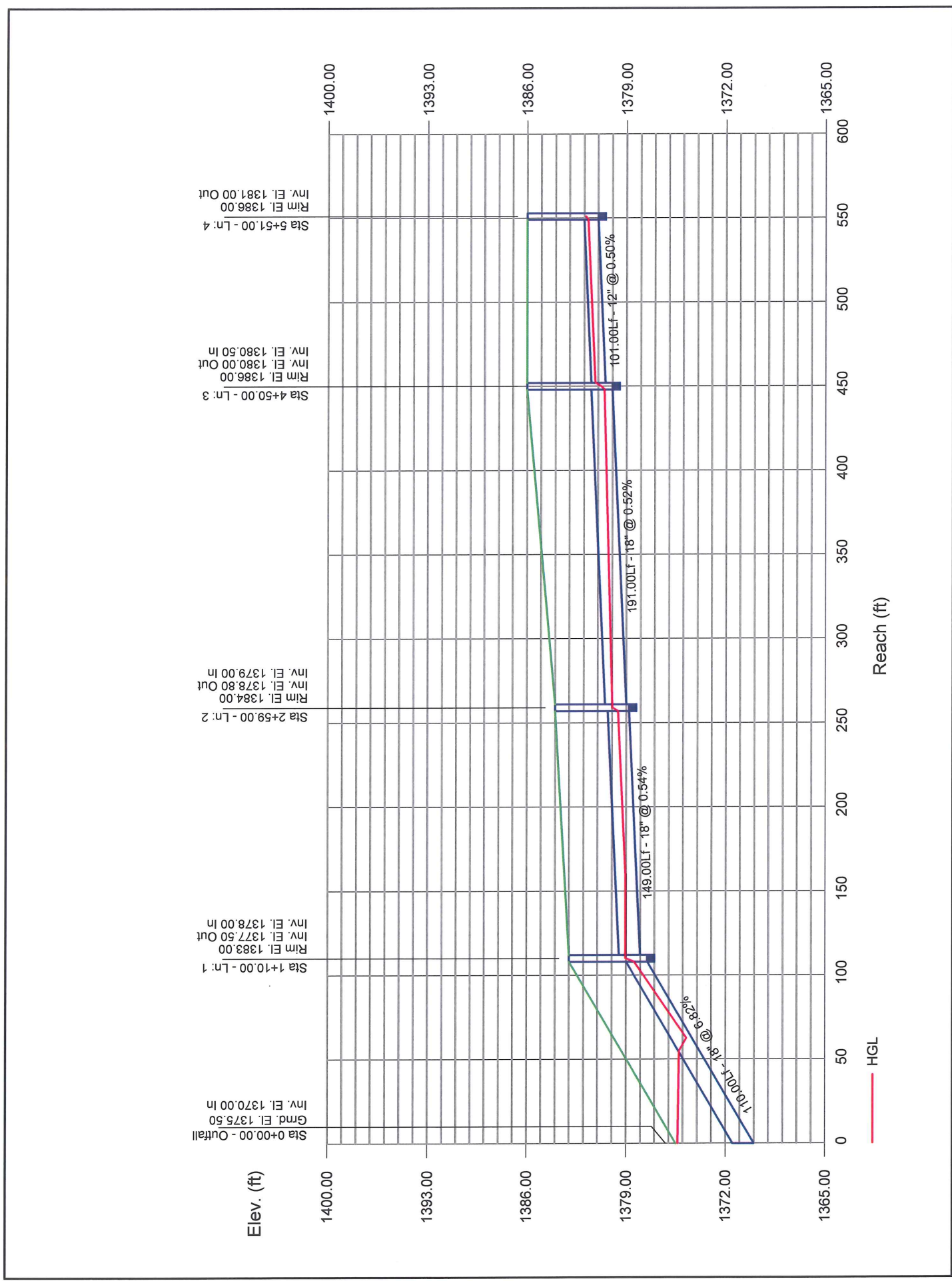
Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1	1/3 Area G	5.93	18	Cir	110.00	1370.00	1377.50	6.818	1375.34	1378.43	n/a	1379.04 i	End	Generic
2	1/3 Area G	4.03	18	Cir	149.00	1378.00	1378.80	0.537	1379.04	1379.57	n/a	1379.98 i	1	Generic
3		2.09	18	Cir	191.00	1379.00	1380.00	0.524	1379.98	1380.55	n/a	1380.78 i	2	Manhole
4	1/3 Area G	2.12	12	Cir	101.00	1380.50	1381.00	0.495	1381.21	1381.71	n/a	1381.87 i	3	Generic

02014 NE SWS Number of lines: 4 Run Date: 04-26-2012

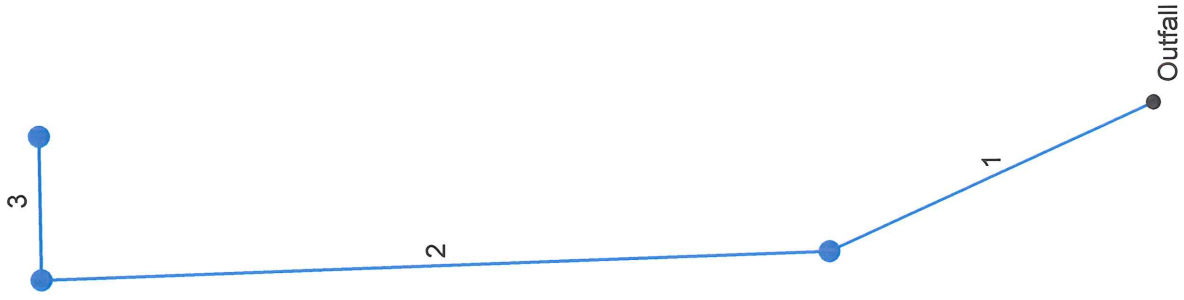
NOTES: Return period = 2 Yrs. ; i - Inlet control.

Storm Sewer Profile

Proj. file: 02014 NE SWS.stm



02014 SW SWS



Project File: 02014 SW SWS.stm

Number of lines: 3

Date: 04-26-2012

Storm Sewer Inventory Report

Line No.	Alignment				Flow Data				Physical Data							Line ID		
	Dnstr line No.	Line length (ft)	Defl angle (deg)	Junc type	Known Q (cfs)	Dmng area (ac)	Runoff coeff (C)	Inlet time (min)	Invert EI Dn (ft)	Line slope (%)	Invert EI Up (ft)	Line size (in)	Line shape	N value (n)	J-loss coeff (K)		Inlet/ Rim EI (ft)	
1	End	75.00	-114.18	MH	0.00	0.00	0.00	0.0	1370.00	0.53	1370.40	24	Cir	0.013	0.43	1376.00	1/4 Area C	
2	1	167.00	22.32	MH	0.00	0.00	0.0	1370.60	1.14	1372.50	24	Cir	0.013	1.00	1377.00			
3	2	30.00	90.62	Genr	0.00	1.38	0.42	15.0	1373.00	0.67	1373.20	18	Cir	0.013	1.00	1377.00		
02014 SW SWS																	Number of lines: 3	Date: 04-26-2012

Storm Sewer Summary Report

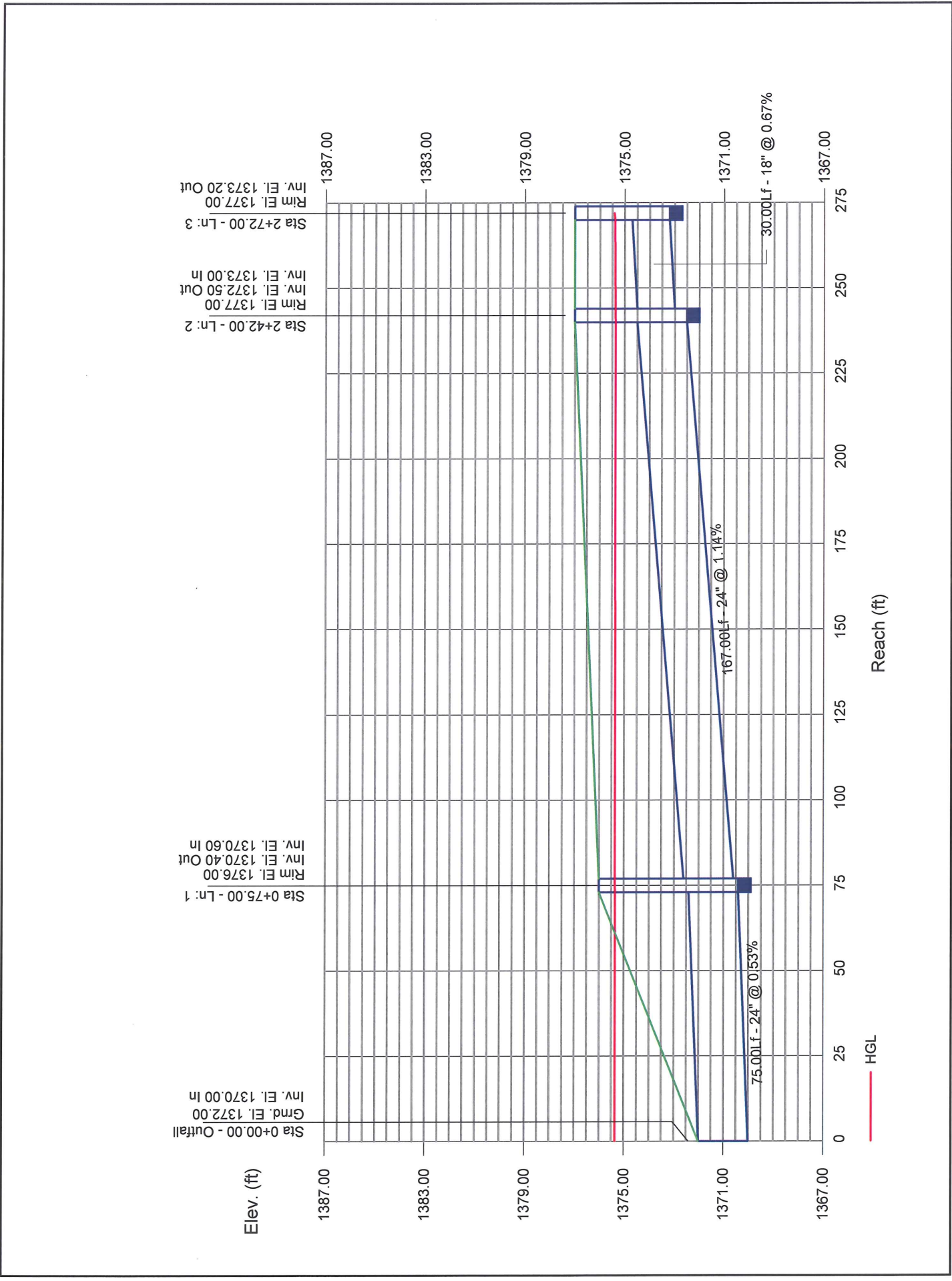
Line No.	Line ID	Flow rate (cfs)	Line size (in)	Line shape	Line length (ft)	Invert EL Dn (ft)	Invert EL Up (ft)	Line slope (%)	HGL down (ft)	HGL up (ft)	Minor loss (ft)	HGL Junct (ft)	Dns line No.	Junction Type
1		1.97	24	Cir	75.00	1370.00	1370.40	0.533	1375.34*	1375.35*	0.00	1375.35	End	Manhole
2		2.20	24	Cir	167.00	1370.60	1372.50	1.138	1375.35*	1375.36*	0.01	1375.37	1	Manhole
3	1/4 Area C	2.23	18	Cir	30.00	1373.00	1373.20	0.667	1375.37*	1375.39*	0.02	1375.41	2	Generic

02014 SW SWS Number of lines: 3 Run Date: 04-26-2012

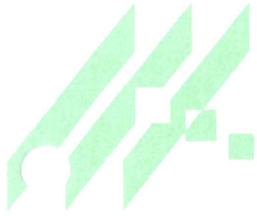
NOTES: Return period = 2 Yrs. ; *Surcharged (HGL above crown).

Storm Sewer Profile

Proj. file: 02014 SW SWS.stm



Appendix 3.3
WQv Calculations



WATERFRONT 7A

WQ_v - SITE

$$R_v = R_{vU} U + R_{vD} D + R_{vI} I$$

↘
0

FOR CONSERVATIVE
ESTIMATE, ASSUME NO
POST-DEVELOPED
WOODS

FROM TABLE 4-13 (p. 4-42)

$R_{vD} = 0.25$ FOR CLASS D SOILS

$R_{vI} = 0.95$

$$R_v = (0.25)(0.74) + (0.95)(0.26)$$

$$R_v = 0.432$$

$$WQ_v = \frac{P R_v A}{12}$$

$$WQ_v = \frac{(1.2)(0.432)(25.01)}{12}$$

$$WQ_v = 1.08 \text{ AC-ft}$$

TOTAL AREA: 0.0391 mi²

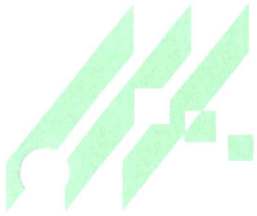
TOTAL AREA: 25.01 AC

CLASS D SOILS

26% IMPERVIOUS

74% PERVIOUS

CN = 91



$$R_v = R_{vU}U + R_{vD}D + R_{vI}I$$

NO POST-DEVELOPED WOODS.
ENTIRE 12.04-AC TO BE
COMMERCIAL: 85% IMPERVIOUS
15% PERVIOUS

FROM TABLE 4-13 (p. 4-42)

$$R_{vD} = 0.25$$

$$R_{vI} = 0.95 \quad (\text{FOR CLASS D SOILS})$$

$$R_v = 0 + 0.25(0.15) + 0.95(0.85)$$

$$R_v = 0.845$$

$$WQV = \frac{P R_v A}{12}$$

$$WQV = \frac{(1.2)(0.845)(12.04)}{12}$$

$$WQV = 1.02 \text{ AC} \cdot \text{ft}$$

TOTAL AREA: 12.04 AC

TOTAL AREA: 0.0188 mi²

CLASS D SOILS

85% IMPERVIOUS

15% PERVIOUS

CN = 97

Beech Lakes Existing Stage/Storage/Discharge Table.

	Elevation (ft)	Contour Area (sf)	Inc. Volume (cf)	Total Storage (cf)	Total Storage (ac-ft)	Weir flowrate (cfs)	Inc. Time (hr)	Drain Time (hr)	Drain Time (Days)
Normal Pool	1369.2	2087988	0	0	0.00	0.00	57.30	114.69	4.78
	1369.3	2092189	209009	209009	4.80	1.01	20.30	57.38	2.39
	1369.4	2096391	209429	418438	9.61	2.87	11.07	37.08	1.55
	1369.5	2100592	209849	628287	14.42	5.26	7.21	26.01	1.08
	1369.6	2104794	210269	838556	19.25	8.11	5.17	18.81	0.78
	1369.7	2108995	210689	1049246	24.09	11.33	3.94	13.64	0.57
	1369.8	2113196	211110	1260355	28.93	14.89	3.13	9.70	0.40
	1369.9	2117398	211530	1471885	33.79	18.76	2.57	6.57	0.27
	1370	2121599	211950	1683835	38.66	22.93	2.16	4.00	0.17
	1370.1	2125921	212376	1896211	43.53	27.36	1.84	1.84	0.08
Top of notch	1370.2	2130243	212808	2109019	48.42	32.04	0	0	0.00

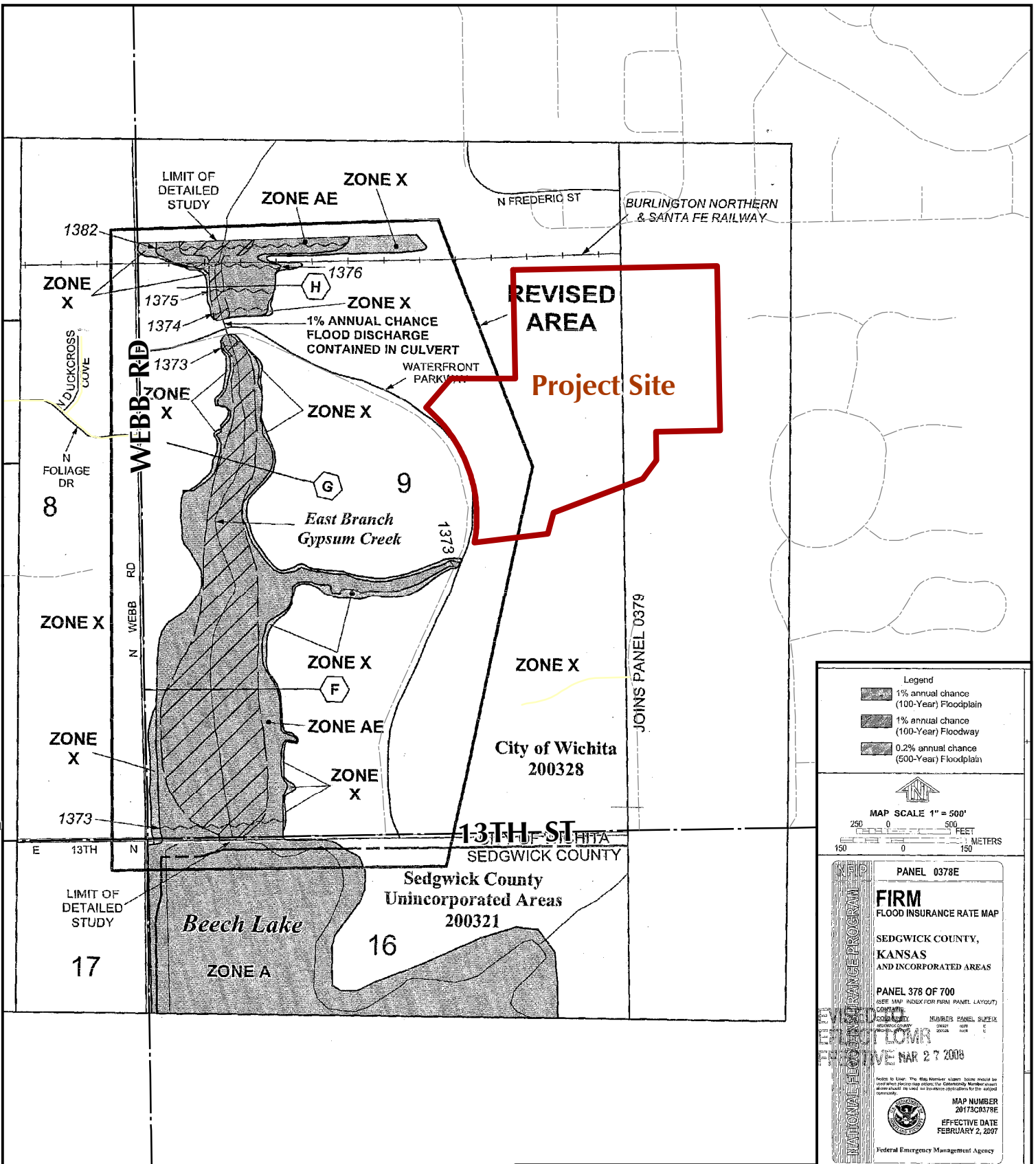
*Weir 12' long by 12" high notch. Table shows rating curve of notch in weir. Assumes a weir coefficient of 2.67.

Tab 4. Floodplain Submittal

There are no FEMA floodplains on the site. According to FIRM Map 20173C0378E with an effective date of February 2, 2007 and as revised with LOMR effective March 27, 2008, Panel 378 of 700, the nearest floodplain is about 112-ft downstream of the Hotel Pond on the west side of Waterfront Parkway. Appendix 4.1 contains the location of the site in relation to the nearest floodplain

Appendix 4.1
Floodplain Map

Path: H:\CIVIL\02014\7th Add\GIS\Waterfront 7th FEMA.mxd - Date: 4/27/2012



Legend

- 1% annual chance (100-Year) Floodplain
- 1% annual chance (100-Year) Floodway
- 0.2% annual chance (500-Year) Floodplain

MAP SCALE 1" = 500'

250 0 500 FEET
150 0 150 METERS

PANEL 0378E

FIRM
FLOOD INSURANCE RATE MAP

SEDGWICK COUNTY,
KANSAS
AND INCORPORATED AREAS

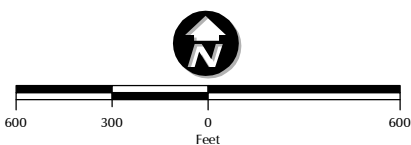
PANEL 378 OF 700
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COUNTY	NUMBER	PANEL	SUBSEX
SEDGWICK COUNTY	378	0378E	

FIRM
EFFECTIVE DATE
FEBRUARY 2, 2007

MAP NUMBER
20173CR378E
EFFECTIVE DATE
FEBRUARY 2, 2007

Federal Emergency Management Agency



The Waterfront Seventh Addition

Project Name:

FEMA FIRM - Wichita, Sedgwick County, KS

Sheet Title:



JGD

Drawn By:

KLA

Design / Review:

April 2012

Date:

02014

Job No.:

Tab 5. Permits

US Army Corps of Engineers

There are no jurisdictional waters on the site, and no stream crossing or channel changes are proposed; therefore no Corps permit will be required

Kansas Department of Agriculture

The proposed site development does not change any waterways or provide any new detention areas; therefore a DWR permit will not be required.

Federal Emergency Agency (FEMA)

There are no FEMA floodplains on site; therefore no LOMC applications are required.

Kansas Department of Transportation

There are no state highways on site, nor is access to one needed.

Sedgwick County Right-of-way Permit

The site is within City limits, and access to a County is not required..