

**DRAINAGE REPORT**  
**North Elementary School Addition**  
**WICHITA, SEDGWICK COUNTY,**  
**KANSAS**

**March 24, 2010**



**Ruggles & Bohm P.A.**

**Engineering, Surveying, Land Planning**



# Ruggles & Bohm, P.A

Engineering, Surveying, Land Planning  
924 N. Main  
Wichita, Kansas 67203

**Date:** Wednesday, March 24, 2010

## MEMO

MAR 25 2010

**To:** Scott Lindebak, P.E.  
City Hall  
455 N. Main Street  
Wichita, KS 67213

**Description:**

- Confirmation
- Transmittal
- Transmittal under separate cover by

**From:** Alex M. Lane, P.E.

**Purpose:**

- Approval
- Review & comment
- Use
- Other : \_\_\_\_\_
- Distribution
- Information
- Record

**Project:** North Elementary School Addition

**Enclosures/Attachments:**

- Prints
- Originals
- Diskettes containing: \_\_\_\_\_
- Other: \_\_\_\_\_
- Change Order
- Shop Drawings

**RB Project No.:** 3547E

**Other Project Reference No.:** \_\_\_\_\_

Copies	Description
1	Final Drainage Plan
1	cd w/ pdf

**Remarks:** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Copies to:** \_\_\_\_\_

**If checked below, please:**

- Acknowledge receipt of enclosures
- Return enclosures to us.

Signed \_\_\_\_\_



## Public Works, Engineering Division Final Drainage Plan Submittal Checklist

Reviewer: _____	Date: _____
Subdivision Name: _____	Location: _____
Total Land Area Of Ownership: _____ Acres	
Type: _____ Residential _____ Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other	
Applicant: _____	Contact: _____ Phone #: _____
Engineer: _____	Contact: _____ Phone #: _____

Please check the appropriate box:

I = Included; NA = Non-Applicable; R= Required prior to development  
(If "NA" is checked, an explanation must be entered)

Tab 1. Project Narrative	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Site Location Map, using USGS Map			Report	X	
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain			Report	X	
C. Discussion of offsite conditions			Report	X	
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series			Report	X	
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design					
F. Copy of the plat			Report	X	
G. Preliminary grading plan (The final grading plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans. One plan sheet and PDF shall be submitted to the Subdivision Engineer.)					
H. Professional Engineer seal, signature and date on cover of report					
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover					

Tab 2. Existing Conditions Runoff Calculations	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)			Report	X	
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)			Report	X	
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)			Drainage Map	X	
D. Total Site Area and Total Impervious Area (acres)			Drainage Map	X	
E. Benchmarks used for site control			Drainage Map	X	
F. Streams, creeks, and waterway labeled			N/A	X	
G. Predominant soils from USDA soil surveys, and/or on site soil borings			Drainage Report	X	
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted			N/A	X	
I. Location of existing roads, buildings, parking lots and other impervious areas.			Drainage Map	X	



**Final Drainage Plan Submittal Checklist**  
Adopted: February 23, 2007

J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements			Drainage Map	X	
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow			Drainage Map	X	
L. Flow paths			Drainage Map	X	
M. Location and dimensions of existing channels, bridges or culvert crossings			N/A		X
N. Existing conditions hydrologic analysis for runoff rates, volumes and velocities showing methodologies used and supporting calculations (2, 5, 10, 25 & 100 year, 24-hour storm events) or Critical Duration			Rational Equation 5 & 100 yr.	X	
O. Assumed pre-developed runoff curve numbers			Drainage Map	X	
P. Existing time of concentrations used in calculations			Drainage Map	X	
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site			Drainage Report	X	
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)			N/A		X
S. Cross-section data for open channels			N/A		X
T. Ground water elevations, if applicable			N/A		X

Tab 3. Post-Development Hydrologic Analysis	Applicant		Explanation / Location in Plan	Engr	
	I	NA		I	NA
A. Proposed (post-development) conditions hydrologic and hydraulic analysis for runoff rates, volumes, HGL, and velocities showing the methodologies used and supporting calculations for all applicable design storms (2, 5, 10, 25 & 100 year, 24-hour storm events)			Rational Equation 5 & 100 year	X	
B. Proposed time of concentrations used in calculations			Drainage Map & Report	X	
C. Assumed post-developed runoff curve numbers			Drainage Map & Report	X	
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)			N/A		X
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration			Proposed Stormwater shown on Drainage Map	X	
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities			N/A		X
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary			Drainage Report	X	
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)			Drainage Map	X	
I. Design water surface elevations and normal pool elevation for ponds.			N/A		X
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.			N/A		X
K. Proposed limits of clearing and grading			Drainage Map	X	
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.			Drainage Map	X	
M. Location of existing and proposed utilities (e.g., water, sewer) and easements			Drainage Map	X	
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow			Drainage Map	X	
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings			N/A		X



**Final Drainage Plan Submittal Checklist**  
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P. Preliminary selection and location of stormwater controls			N/A		X
Q. Emergency overflow structure's flow path			N/A		X
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)			N/A		X
S. The 100-year 24-hour HWL delineated on the plan for detention pond			N/A		X
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds			N/A		X
U. Stormwater Management Facilities located within a Reserve			N/A		X
V. Maintenance responsibility of stormwater management facility shall be specified in the plat text. (e.g. HOA, Lot Owners Association, or lot)			N/A		X
W. Off-site drainage easements or agreements required, where necessary			Drainage Report	X	

Tab 4. Floodplain Submittal	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Provide source of flood profile			N/A		X
B. Nearest base flood elevations			N/A		X
C. Delineation of pre-developed regulatory floodplain/floodway limits			N/A		X
D. Delineation of post-developed regulatory floodplain and floodway limits			N/A		X
E. Floodplain boundary determination per elevation (project limits shown)			N/A		X
F. Provide source of floodway data table and discharges			N/A		X
G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies, unnumbered Zone A area elevation determinations and flood plain map revisions or required permits			N/A		X
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions			N/A		X
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)			N/A		X
J. Flood plains and floodways located within a Reserve, where necessary			N/A		X

Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	Applicant			Engr	
	I/R	NA	Explanation / Location in Plan	I/R	NA
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)			N/A		X
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)			N/A		X
C. Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.) Shall be included and approved when project modifies the limits of the floodway.			N/A		X
D. Kansas Department of Transportation			N/A		X
E. Sedgwick County Right-of-way Permit			N/A		X

**DRAINAGE REPORT**  
**North Elementary School Addition**  
**WICHITA, SEDGWICK COUNTY,**  
**KANSAS**

**March 24, 2010**

**North Elementary School Addition  
DRAINAGE ANALYSIS  
March 24, 2010**

**INTRODUCTION**

This report contains supporting documentation and calculations for the proposed North Elementary School Addition development. The site is located on the southwest corner of 33<sup>rd</sup> Street North and Arkansas. The 5.56 acre site is in a developed condition with a school and parking lot already constructed. The soil type of the site is Urban land; Canadian part, designated to be in hydrologic group B. The site is located on FEMA FIRM 20173C0355E in unshaded Zone X, defined as areas outside of the 0.2% chance floodplain. No offsite areas drain through the site, and the site currently drains to basins. The west 3.78 acres of the site drain southwesterly to Mascot while the east 1.78 acres drains to Arkansas.

**PROPOSED CONDITIONS**

The existing school shall be removed and a new structure built in its place. The adjacent streets, Mascot to the west and 33<sup>rd</sup> Street North will also be paved as part of the platting requirements. A storm sewer system will be constructed to serve Mascot and will also serve to drain the site. The storm sewer system will begin at the south end of Mascot and be routed along 32<sup>nd</sup> Street North and outlet to Chisholm Creek. The rational equation was used to model the existing and proposed conditions. Attachments A, D and E of the Interim Drainage Policy for the City of Wichita were used to determine the rainfall intensities, c-coefficients and times of concentration, respectively. The model parameters and results for the pre and proposed conditions are shown in the tables below.

EXISTING	AREA	TC (min.)	C5	C100	I5	I100	Q5	Q100
West	3.78	26	0.31	0.48	3.50	5.79	4.1	10.5
East	1.78	15	0.51	0.64	4.56	7.37	4.2	8.3
Offsite	0.42	15	0.25	0.43	4.56	7.37	0.5	1.3

PROPOSED	AREA	TC (min.)	C5	C100	I5	I100	Q5	Q100
A	1.73	19	0.28	0.45	4.10	6.68	2.0	5.2
B	0.42	15	0.45	0.59	4.56	7.37	0.9	1.8
C	0.88	15	0.65	0.74	4.56	7.37	2.6	4.8
D	0.41	15	0.78	0.84	4.56	7.37	1.5	2.5
E	1.00	15	0.72	0.79	4.56	7.37	3.3	5.8
F	0.91	15	0.60	0.70	4.56	7.37	2.5	4.7
G	0.23	15	0.53	0.64	4.56	7.37	0.6	1.1
H	0.42	15	0.60	0.70	4.56	7.37	1.2	2.2

The site will not provide stormwater detention for several reasons. Other recent developments in the area did not provide detention. Additionally, Chisholm creek has additional capacity to contain the additional runoff generated from the site. Also the west basin currently drains to an area with no discernable outlet, the rerouting of the runoff will serve to improve the drainage situation west of Mascot. Finally, the areas available for detention are also to be used as playgrounds, and there is concern over storing runoff where students are intended to play, for both maintenance and safety considerations. In conclusion the site will drain as demonstrated in this report and supporting documentation. Chisholm Creek will accept a large portion of the runoff from the western portion of the site by a proposed offsite storm sewer. Detention will not be provided for the reasons stated above.

**FEMA FIRM**



# **DRAINAGE MAP**



30 0 30'

BENCH MARK: CHISELED SQUARE ON THE TOP OF CURB AT THE SOUTH CURB RETURN AT THE SOUTHEAST CORNER OF 33RD ST. N. AND ARKANSAS AVE. ELEVATION = 1317.54 (NAVD83)

Soil Type: Urban Land, Canadian Part  
Hydrologic Group: B

**Existing**  
West  
Impervious 0.53 ac.  
Grassed Area 3.25 ac.

Offsite  
Impervious 0.02 ac.  
Grassed Area 0.40 ac.

Total Impervious Area = 1.37 ac.

**PROPOSED**  
Area A  
Impervious 0.15 ac.  
Grassed Area 1.58 ac.

Area E  
Impervious 0.78 ac.  
Grassed Area 0.22 ac.

Area B  
Impervious 0.15 ac.  
Grassed Area 0.27 ac.

Area F  
Impervious 0.54 ac.  
Grassed Area 0.37 ac.

Area C  
Impervious 0.59 ac.  
Grassed Area 0.29 ac.

Area G  
Impervious 0.11 ac.  
Grassed Area 0.12 ac.

Area D  
Impervious 0.36 ac.  
Grassed Area 0.05 ac.

Area H  
Impervious 0.11 ac.  
Grassed Area 0.12 ac.

Total Impervious Area = 2.79 ac.

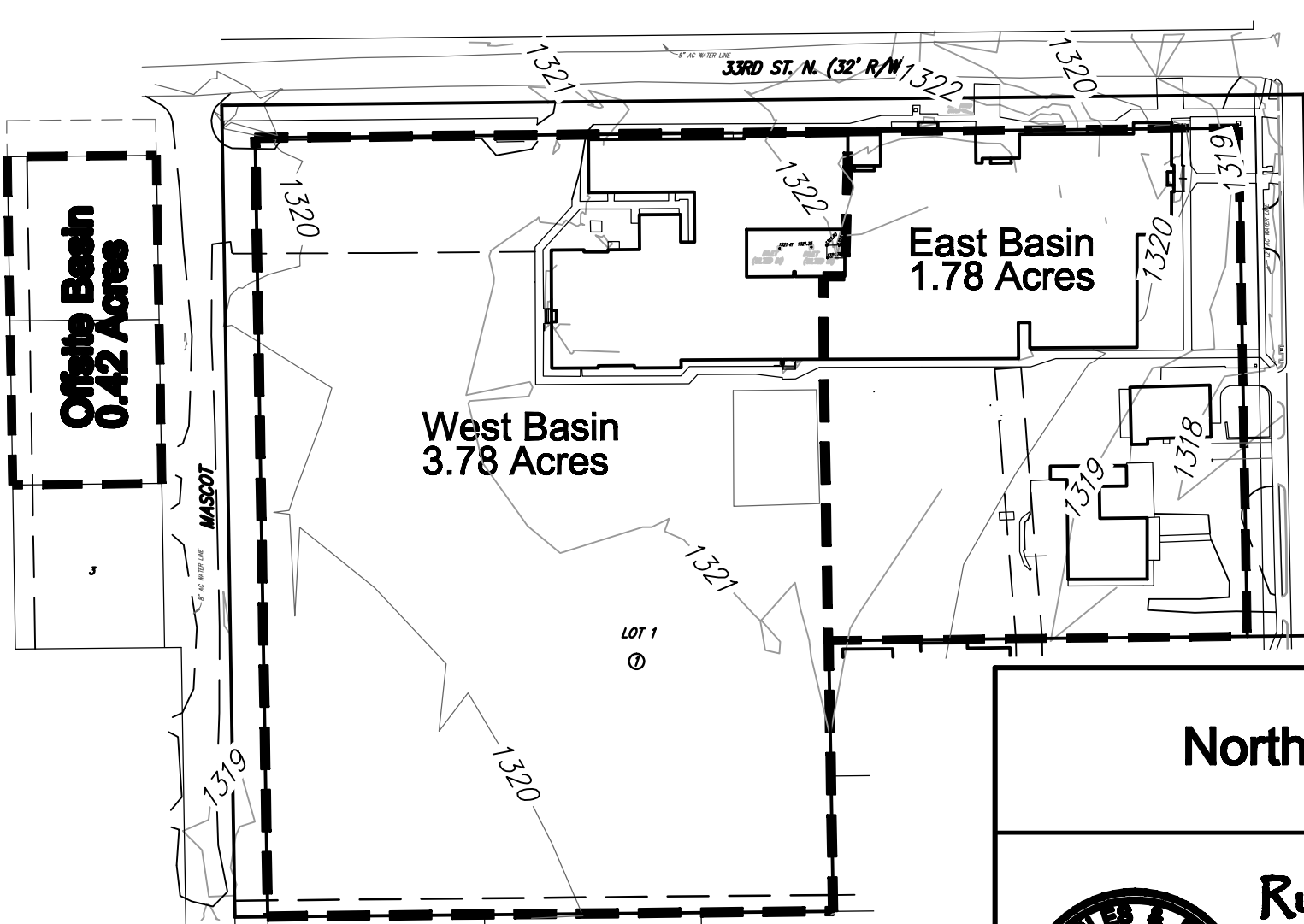
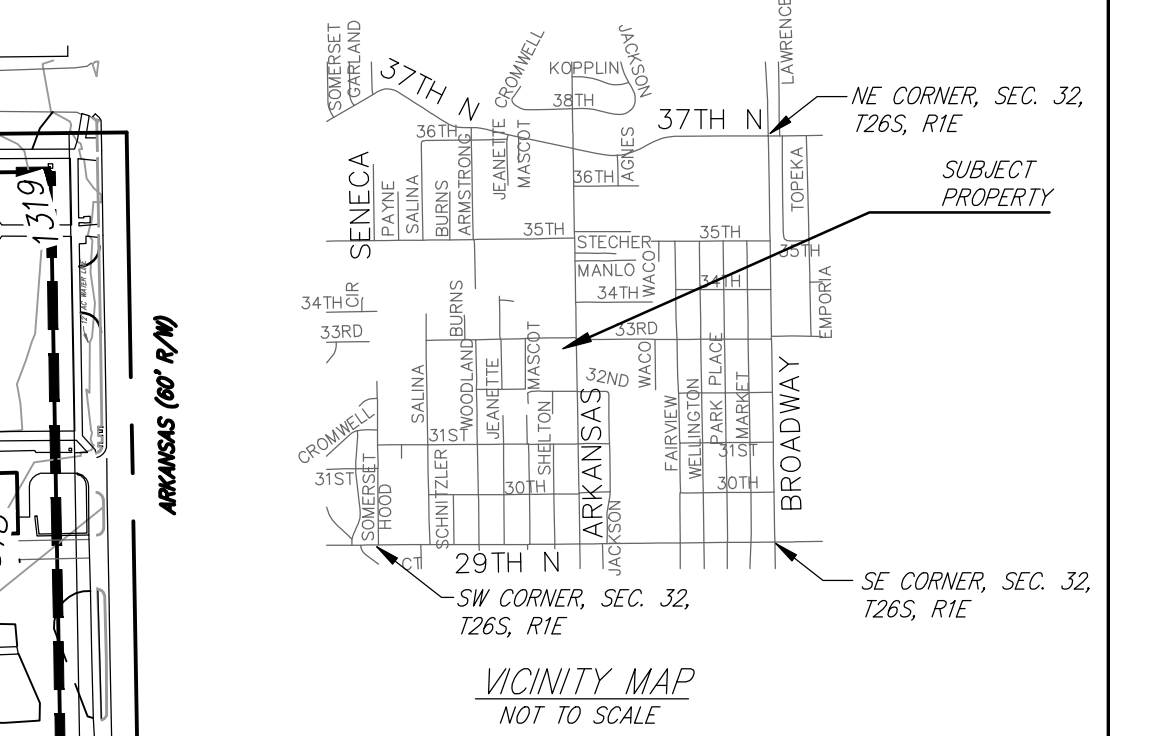
**Existing Condition**

	AREA	TC (min.)	C5	C100	I5	I100	Q5	Q100
West	3.78	26	0.31	0.48	3.50	5.79	4.1	10.5
East	1.78	15	0.51	0.64	4.56	7.37	4.2	8.3
Offsite	0.42	15	0.25	0.43	4.56	7.37	0.5	1.3

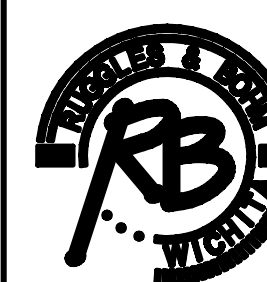
**Proposed Condition**

	AREA	TC (min.)	C5	C100	I5	I100	Q5	Q100
A	1.73	19	0.28	0.45	4.10	6.68	2.0	5.2
B	0.42	15	0.45	0.59	4.56	7.37	0.9	1.8
C	0.88	15	0.65	0.74	4.56	7.37	2.6	4.8
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G	0.23	15	0.53	0.64	4.56	7.37	0.6	1.1
H	0.42	15	0.60	0.70	4.56	7.37	1.2	2.2

ARKANSAS (60' R/W)



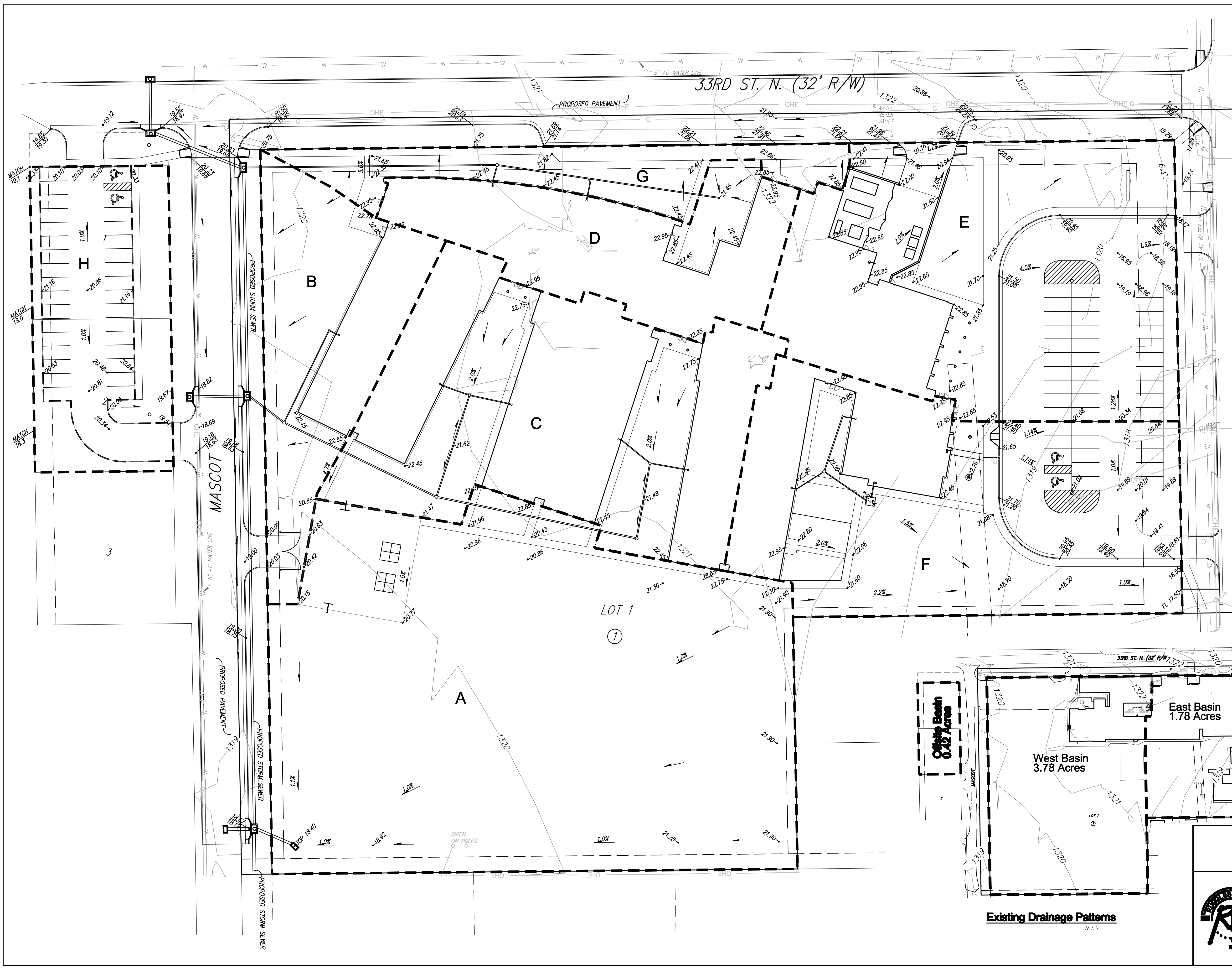
**DRAINAGE PLAN**  
North Elementary School Addition  
WICHITA, KANSAS



**Ruggles & Bohm, P.A.**  
Engineering, Surveying, Land Planning  
824 North Main  
Wichita, Kansas 67203  
www.rbkansas.com

(316) 264-6000  
(316) 264-4821 fax  
E-mail: info@rbkansas.com

ISSUED FOR	PROJECT NUMBER	DATE	SCALE
Drainage Plan {Plan 1}		Dec. 22, 2009	1 OF 1



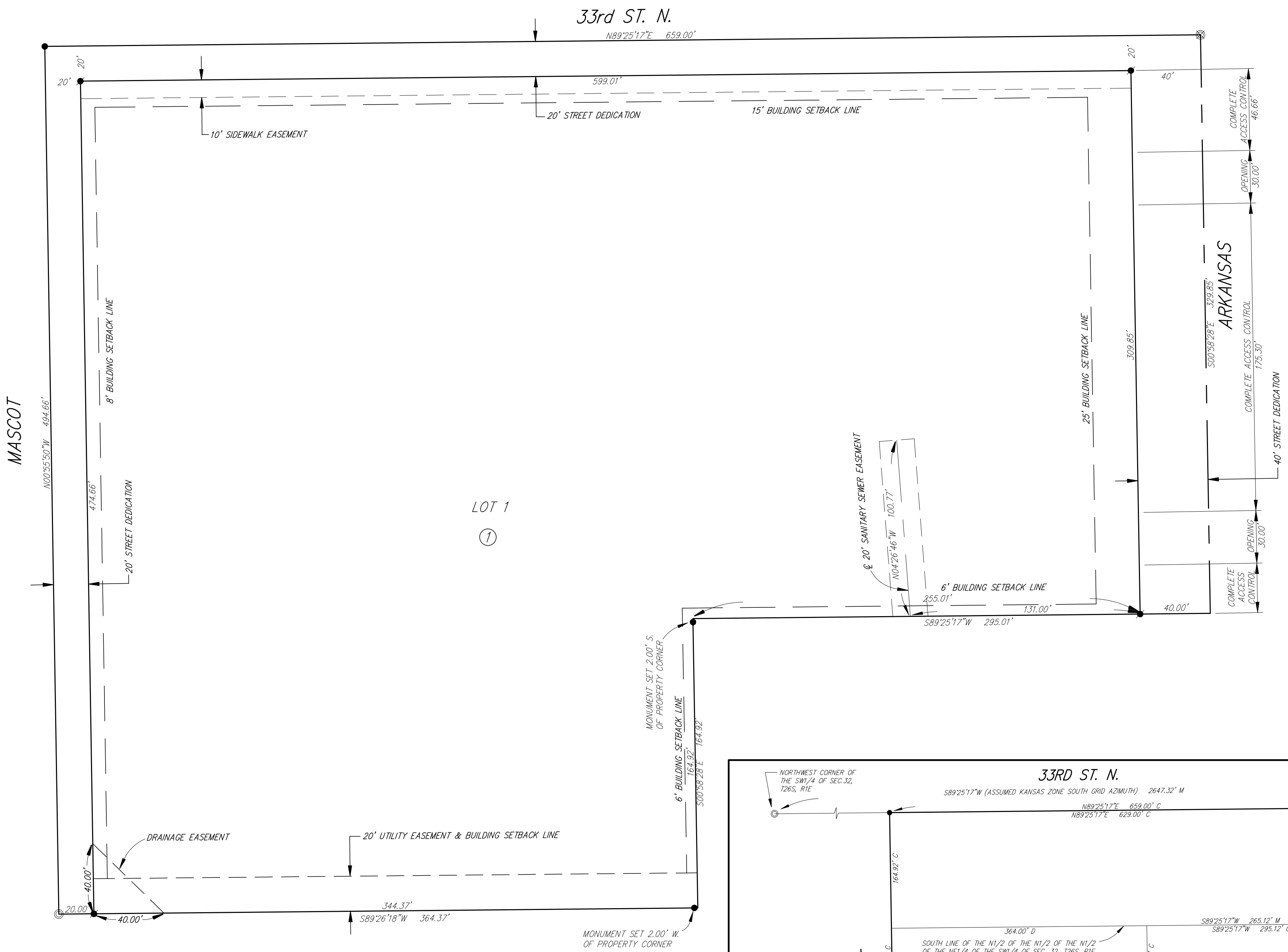
# **SITE AERIAL**



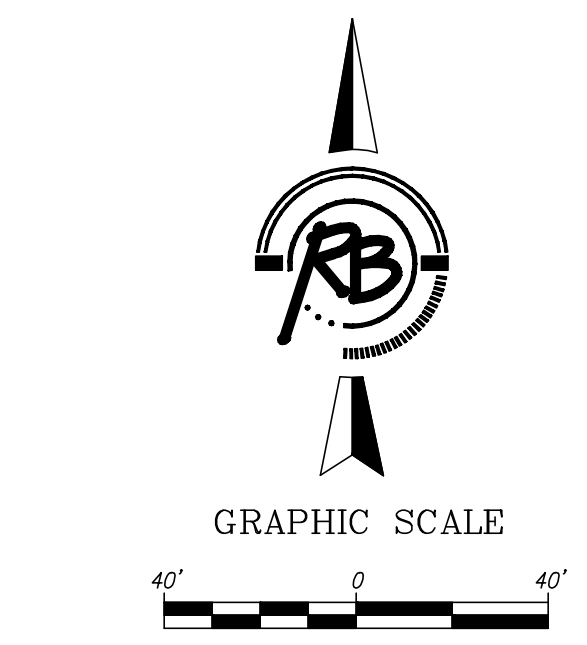
**PLAT**

# NORTH ELEMENTARY SCHOOL ADDITION

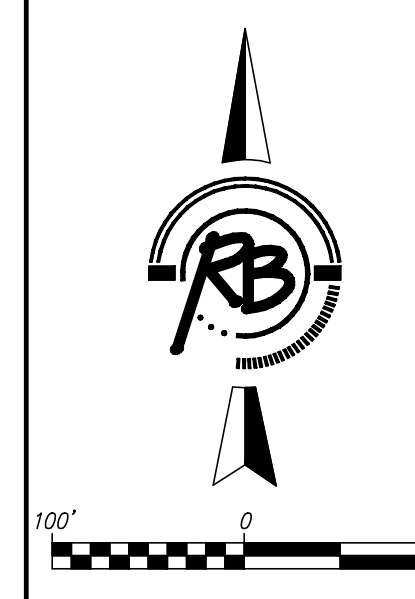
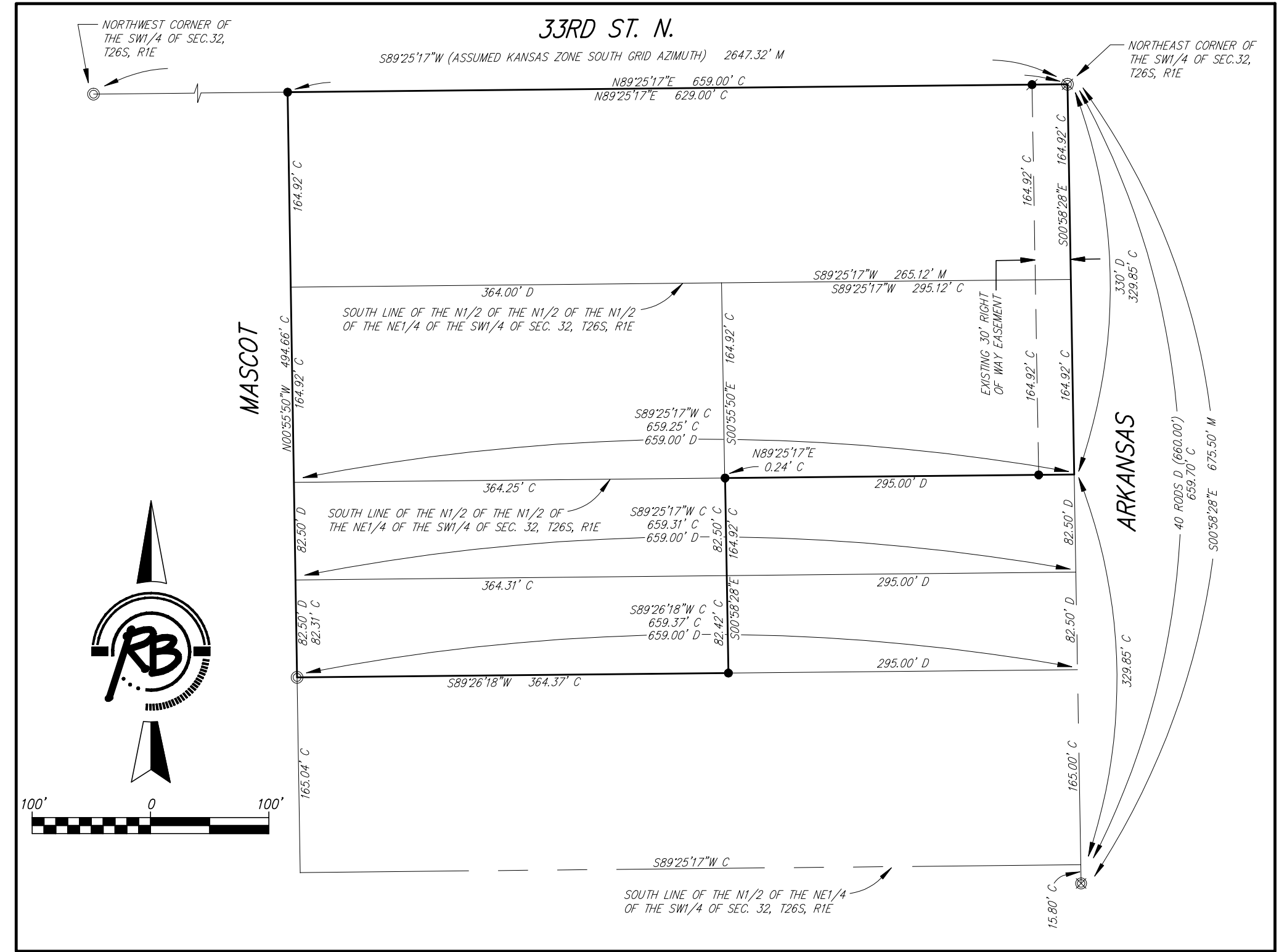
## Wichita, Sedgwick County, Kansas



MASCOT



- M = Measured  
C = Calculated  
D = Described
- SURVEY MARKER LEGEND**
- 3/4" IRON PIPE (FOUND - ORIGIN UNKNOWN)
  - ⊗ 3/4" IRON PIPE IN THIMBLE (FOUND - ORIGIN UNKNOWN)
  - 1/2" REBAR W/RUGGLES & BOHM CAP (SET)
  - 5/8" REBAR W/RUGGLES & BOHM CAP (SET)



BENCH MARK: CHISELED SQUARE ON THE TOP OF CURB AT THE SOUTH CURB RETURN AT THE SOUTHEAST CORNER OF 33RD ST. N. AND ARKANSAS AVE. ELEVATION = 1317.54 (NAVD88)

State of Kansas)  
Sedgwick County) SS

We, Ruggles & Bohm, P.A., Land Surveyors in aforesaid county and state, do hereby certify that, under the supervision of the undersigned, we have surveyed and platted "NORTH ELEMENTARY SCHOOL ADDITION", Wichita, Sedgwick County, Kansas, and that the accompanying plat is a true and correct exhibit of the property surveyed, described as follows:

The N<sup>1</sup>/<sub>2</sub> of the N<sup>1</sup>/<sub>2</sub> of the E<sup>1</sup>/<sub>2</sub> of a tract of ground described as follows: Commencing at the Northeast Corner of the SW<sup>1</sup>/<sub>4</sub> of Sec. 32, T26S, R1E of the 6th P.M., Sedgwick County, Kansas; thence south 40 rods; thence west to the West line of the E<sup>1</sup>/<sub>2</sub> of said SW<sup>1</sup>/<sub>4</sub>; thence north to the North line of said SW<sup>1</sup>/<sub>4</sub>; thence east to the place of beginning.

The West 364 feet of the S<sup>1</sup>/<sub>2</sub> of the N<sup>1</sup>/<sub>2</sub> of the NE<sup>1</sup>/<sub>4</sub> of the NE<sup>1</sup>/<sub>4</sub> of the SW<sup>1</sup>/<sub>4</sub> of Sec. 32, T26S, R1E of the 6th P.M., in Sedgwick County, Kansas.

Beginning 330 feet South of the Northeast Corner of the SW<sup>1</sup>/<sub>4</sub> of Sec. 32, T26S, R1E of the 6th P.M., in Sedgwick County, Kansas; thence west 659 feet; thence south 82.5 feet; thence east 659 feet; thence north 82.5 feet to the point of beginning, EXCEPT the East 295 feet thereof.

Beginning at a point on the East Line of the SW<sup>1</sup>/<sub>4</sub> of Sec. 32, T26S, R1E of the 6th P.M., in Sedgwick County, Kansas, and 412.5 feet South of the Northeast Corner of the SW<sup>1</sup>/<sub>4</sub> of said Sec. 32, thence west parallel with the North line of said SW<sup>1</sup>/<sub>4</sub> a distance of 659 feet; thence south 82.5 feet; thence east 659 feet to a point on the East line of said SW<sup>1</sup>/<sub>4</sub> of said Sec. 32; thence north 82.5 feet to the point of beginning, EXCEPT the East 295 feet thereof.

The north 58 feet of the S<sup>1</sup>/<sub>2</sub> of the N<sup>1</sup>/<sub>2</sub> of the NE<sup>1</sup>/<sub>4</sub> of the SW<sup>1</sup>/<sub>4</sub> of Sec. 32, T26S, R1E of the 6th P.M., Sedgwick County, Kansas, EXCEPT the west 364 feet thereof.

The south 107 feet of the S<sup>1</sup>/<sub>2</sub> of the N<sup>1</sup>/<sub>2</sub> of the NE<sup>1</sup>/<sub>4</sub> of the SW<sup>1</sup>/<sub>4</sub> of Sec. 32, T26S, R1E of the 6th P.M., Sedgwick County, Kansas, EXCEPT the west 364 feet thereof.

All public easements and dedications are hereby vacated by virtue of K.S.A. 12-512(b).

Ruggles & Bohm, P.A.

\_\_\_\_\_  
Thomas C. Ruggles  
Land Surveyor

Know all men by these presents that we, the undersigned, have caused the land described in the surveyor's certificate to be platted into a Lot, a Block and a Street, to be known as "NORTH ELEMENTARY SCHOOL ADDITION", Wichita, Sedgwick County, Kansas. The utility easements are hereby granted for the construction and maintenance of all public utilities. The sidewalk easement is hereby granted for the use of the public. Access Controls as indicated are hereby granted to the appropriate governing body. The street is hereby dedicated to and for the use of the public. A drainage plan has been developed for this plat and all drainage easements shall remain at established grades, or as modified with the approval of the City Engineer, and unobstructed to allow for the conveyance of storm water.

Unified School District 259

\_\_\_\_\_  
Barbara Fuller, President

State of Kansas)  
Sedgwick County) SS

The foregoing instrument acknowledged before me, this \_\_\_\_\_ day of \_\_\_\_\_, 2010, by Barbara Fuller, President, on behalf of the Board of Unified School District 259.

\_\_\_\_\_  
Notary Public

My appointment expires \_\_\_\_\_

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

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 2010.

Wichita-Sedgwick County Metropolitan Area Planning Commission

\_\_\_\_\_  
Chair

G. Nelson Van Fleet

\_\_\_\_\_  
Secretary

John L. Schlegel

This plat approved and all dedications shown hereon accepted by the City Council of the City of Wichita, Kansas, this \_\_\_\_ day of \_\_\_\_\_, 2010.

At the Direction of the City Council

\_\_\_\_\_  
Mayor

Carl Brewer

\_\_\_\_\_  
City Clerk

Karen Sublett

Reviewed in accordance with K.S.A. 58-2005 on this \_\_\_\_\_ day of \_\_\_\_\_, 2010.

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

Entered on transfer record this \_\_\_\_\_ day of \_\_\_\_\_, 2010.

\_\_\_\_\_  
County Clerk  
Kelly B. Arnold

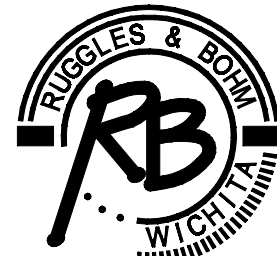
State of Kansas)  
Sedgwick County) SS

This is to certify that this plat has been filed for record in the office of the Register of Deeds, this \_\_\_\_\_ day of \_\_\_\_\_, 2010, at \_\_\_\_\_ o'clock \_\_\_\_ M., and is duly recorded.

\_\_\_\_\_  
Register of Deeds  
Bill Meek

\_\_\_\_\_  
Deputy  
Tonya Buckingham

DWG FILE: SURVEY BASE  
PROJECT NO. 3547P  
MARCH 16, 2010



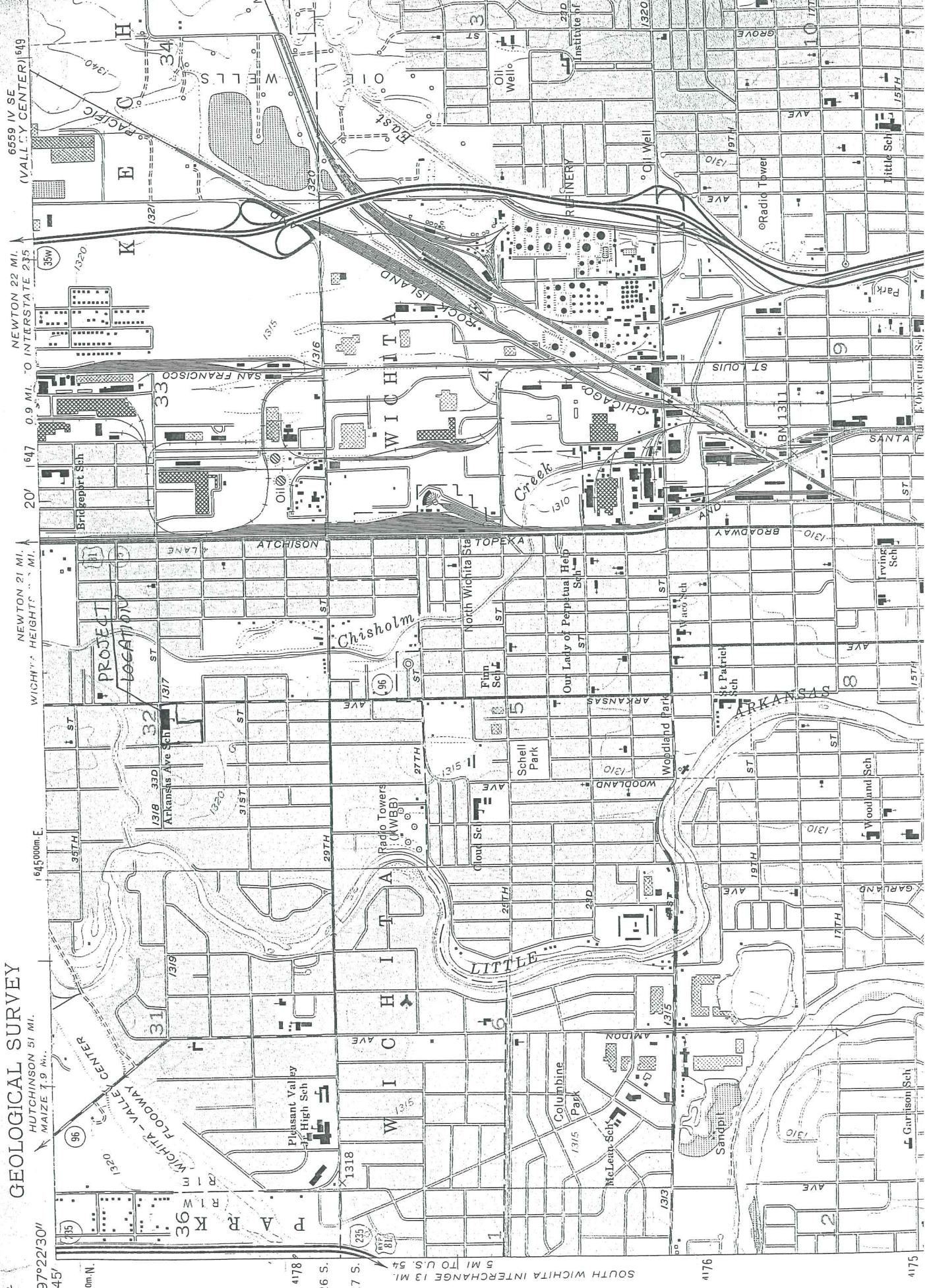
**Ruggles & Bohm, P.A.**  
Engineering, Surveying, Land Planning

924 North Main (316) 264-8008  
Wichita, Kansas 67203 (316) 264-4621 fax  
www.rbkansas.com E-mail: info@rbkansas.com

**USGS**

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

STATE OF KANSAS



6559 IV SW  
(MAIZE)

97°22'30"  
-37°45'

4179000m. N.

4178

T. 26 S.

T. 27 S.

SOUTH WICHITA INTERCHANGE 13 MI.  
5 MI. TO U.S. 54

4176

4175

6559 IV SE  
(VALLEY CENTER)

NEWTON 22 MI.

0.9 MI. TO INTERSTATE 235

NEWTON 21 MI.

WICHITA HEIGHTS 10 MI.

1645000m. E.

HUTCHINSON 51 MI.

MAIZE 7.9 MI.

97°22'30"

37°45'

4179000m. N.

4178

T. 26 S.

T. 27 S.

SOUTH WICHITA INTERCHANGE 13 MI.  
5 MI. TO U.S. 54

4176

4175