



Troweling floor
Mach. Shop.

Blue Line Note: Moved from Phasing Section.

APPENDIX A: SOURCES AND CREDITS

- ULI Advisory Services Panel, 2008, “Albuquerque Rail Yards,” prepared at the invitation of the City of Albuquerque, the WHEELS Museum, and the University of New Mexico School of Architecture and Planning.
- Wilson, Chris, 1986, “The Historic Railroad Buildings of Albuquerque, an Assessment of Significance,” prepared for the Redevelopment Division, Planning Department, City of Albuquerque.
- Dodge, Bill et al, 2014, “National Register of Historic Place Nomination Form, Atchison, Topeka & Santa Fe Railway Locomotive Shops Historic District,” prepared for the City of Albuquerque for submittal to the New Mexico State Historic Preservation Office.
- City of Santa Fe, 2002, “Santa Fe Railyard, Master Plan and Design Guidelines.” Master Plan prepared for the former Rail Yard site at the terminus of the former ATSF line in Santa Fe.
- City of Albuquerque, 2008, “Barelas Sector Development Plan.” Document prepared as a replacement to the Barelas Sector Development Plan written in 1978 and amended in 1993.
- City of Albuquerque, 1986 (amended 2002) “South Broadway Neighborhoods Sector Development Plan.”
- Historic District Improvement Company, 1999, “Master Plan, Alvarado Transportation Center Project Area.”
- City of Albuquerque, Department of Finance and Administrative Services, 2010, “Request For Proposals, Solicitation Number: RFP 2011-003-JR.”

APPENDIX B: TRAFFIC IMPACT STUDY

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Railyard Re-development
(Second St. S. of Hazeldine Ave.)

Traffic Impact Study

October 1, 2013

Presented to:

City of Albuquerque

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Traffic Impact Study
Railyard Re-development – (Second St. S. of Hazeldine Ave.)

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Traffic Impact Study
Railyard Re-development – (Second St. S. of Hazeldine Ave.)

STUDY PURPOSE

The purpose of this study is to identify the development's impact on the adjacent transportation system. The study is being conducted in conjunction with a request for approval of a proposed plan for a commercial retail, office, and residential development located at Second St. south of Hazeldine Ave. in Albuquerque, New Mexico. This study is presented to satisfy the requirements of the City of Albuquerque.

GENERAL

The proposed development is located along the east side of Second St. between Hazeldine Ave. and Bridge Blvd. (see Appendix Page A-1 - Vicinity Map). It is the old AT&SF Railyard. The existing intersections of Gold Ave. / Second St., Lead Ave. / Second St., Coal Ave. / Second St., and Bridge Blvd. / Third St. are currently signalized intersections and the existing intersections of Hazeldine Ave. / Second St. and Santa Fe Ave. / Second St. are unsignalized intersections and will be analyzed in this study.

Currently, properties in the area are a mix of commercial, office, and residential in nature.

PROPOSED DEVELOPMENT

The proposed plan for this site consists of an approximately 1 million SF mixed use project described in the table below. This study will analyze only the full development of the project.

Use	Scenario 1 – Samitaur Master Plan (1-4-13)
Cultural Facilities	239,229 – 271,767
Housing	77,927 – 110,465
Public/Open Space	<123,466
Comm./Retail/Restaurant	100,000
Light Manufacturing	<430,100
Office	<430,100
Training/Education	<430,100
TOTAL SQFT	1,003,260

The anticipated implementation year for this site is the year 2018.

STUDY PROCEDURES

A Scoping Meeting was with City of Albuquerque staff to discuss scope and methodology to be utilized within the report before the start of the project. Specific items included format, intersections to be studied, intersection analysis procedures, existing traffic counts, trip distribution methodology, and implementation year definition.

The basic procedure followed for this traffic impact study is outlined as follows:

- ◆ Calculate the generated trips for this proposed development as defined on Page A-3 of the Appendix of this report and more specifically defined in the Trip Generation Table on Page A-5 of the Appendix of this report. The trips generated for the implementation year analyses (2018) will assume that 100% of the development has occurred.
- ◆ Calculate trip distribution for the newly generated trips by this development. The new trips will be distributed based on a two-mile radius distribution of population for the commercial portion of the development and based on city-wide socio-economic data from the Mid-Region Council of Governments (2035 data set) for the residential and office portions of the development, Appendix Pages A-15 thru A-20, A-23 thru A-27, and A-30 thru A-35.
- ◆ Determine Trip Assignments for the newly generated trips based on the results of the Trip Distribution Analysis and logical routing to and from the new site, Appendix Pages A-21 thru A-22, A-28 thru A-29, and A-36 thru A-37.
- ◆ Obtain AM Peak Hour and PM Peak Hour Turning Movement Volumes Traffic Counts for the intersections of Gold Ave. / Second St., Lead Ave. / Second St., Coal Ave. / Second St., Bridge Blvd. / Third St., Hazeldine Ave. / Second St., and Santa Fe Ave. / Second St., Appendix Pages A-115 thru A-120.
- ◆ Determine Historic Growth Rates for background traffic volumes based on an analysis of the growth trend of recent AWDT Volumes obtained from 2002 thru 2011 MRCOG Traffic Flow Maps, Appendix Pages A-38 thru A-52.
- ◆ Determine the 2018 NO BUILD Volumes for each intersection to be analyzed by growing the background traffic growth from the year of the counts to 2018, Appendix Pages A-53 thru A-72.
- ◆ Add newly generated trips from the proposed development to the 2018 NO BUILD Volumes to obtain the 2018 BUILD Volumes for this project, Appendix Pages A-53 thru A-72.
- ◆ Provide signalized and / or unsignalized intersection analyses for the following intersections:

INTERSECTION	TYPE CONTROL	NO BUILD ANALYSIS	BUILD ANALYSIS
Gold Ave. / Second St.	Traffic Signal	2018	2018
Lead Ave. / Second St.	Traffic Signal	2018	2018
Coal Ave. / Second St.	Traffic Signal	2018	2018
Bridge Blvd. / Third St.	Traffic Signal	2018	2018
Hazeldine Ave. / Second St.	Stop Sign	2018	2018
Santa Fe Ave. / Second St.	Stop Sign	2018	2018
Driveway 'A' / Second St.	Stop Sign	N/A	2018
Driveway 'B' / Second St.	Stop Sign	N/A	2018

TRIP GENERATION WORKSHEET

Projected trips were calculated based on the ITE trip generation data for library, apartment, city park, shopping center, variety store, high turnover (sit-down) restaurant, manufacturing, general office, and junior / community college. Trips for the development were determined based on land use defined by the developer. See Conceptual Site Development Plan on Page A-3 in the Appendix of this report. The following table summarizes the trip generation rate for the project:

Railyard Re-development (Second St S. of Hazeldine)
Trip Generation Data (ITE Trip Generation Manual - 9th Edition)

	USE (ITE CODE)		24 HR VOL	A. M. PEAK HR.		P. M. PEAK HR.	
COMMENT	DESCRIPTION		GROSS	ENTER	EXIT	ENTER	EXIT
	<u>Summary Sheet</u>			Units			
Cultural Facilities	Library (590)	✓	270.00	7,427	249	102	721
Housing	Apartment (220)	✓	160	1,093	16	66	69
Open Space	City Park (411)	✓	120.00	227	302	238	239
40%	Shopping Center (820)	✓	40.00	3,743	55	34	156
40%	Variety Store (814)	✓	40.00	2,561	76	76	136
20%	High Turnover (Sit-Down) Restaurant (932)	✓	20.00	2,543	119	97	118
Light Mfg	Manufacturing (140)	✓	430.00	1,689	255	72	115
Office	General Office Building (710)	✓	430.00	3,978	541	74	95
Training / Ed.	Junior / Community College (540)	✓	430.00	698	123	23	114
Total				23,959	1,736	782	1,763
							2,119

See Appendix Page A-5 thru A-14 for the Trip Generation Summary Table and Worksheets for this project.

Pass-by trips were not considered for this study in order to maintain a more conservative analysis.

BACKGROUND TRAFFIC GROWTH

Background traffic growth rates were considered for each individual approach to an intersection that was targeted for analysis based on data from the 2002 through 2011 Traffic Flow maps prepared by the Mid-Region Council of Governments. Most of the

Traffic Flow Data for those years taken from the MRCOG Traffic Flow Maps were Standard Data. The data from those years for each approach was plotted on a graph and a linear “regression trend line” calculated using the equation format $y=mx+b$. The growth rate was determined by calculating the average volume increase per year during the time period considered and dividing that volume into the most recent AWDT used in the analysis from which future volumes will be calculated. The rate of growth of that trend line was utilized as the annual growth rate for each approach if that calculated rate appeared feasible. However, there were some instances where the rate indicated a negative growth trend or appeared to be unreasonably high or low. In those cases, an appropriate growth rate from an adjacent segment of the same roadway was used, a shorter time span was used to determine the growth rate, or the growth rate was considered to be 0.5% or a generic 1% if appropriate. Due to the limited potential for growth in the area, it was believed that a 0.5% growth rate was appropriate for this study. Therefore, a growth rate of 0.5% was used if the linear regression analysis showed the growth rate to be negative. Additionally, if the R^2 value of the trend line was low, other means of establishing a probable growth rate from the data accumulated was considered. Historical Growth Rate Graphs with linear regression trendlines are shown in the Appendix on Pages A-38 thru A-52. Additionally, the growth rate utilized for each approach to an intersection is printed at the top of the Turning Movement sheets for each intersection (Appendix Pages A-53 thru A-72).

PROJECTED PEAK HOUR TURNING MOVEMENTS FOR 2018 BUILDOUT

The calculated growth rates were applied to the most recent (2013) peak hour traffic counts to derive the 2018 AM and PM Peak Hour NO BUILD Volumes. To these volumes, the generated trips based on implementation of the proposed Site Development Plan (100% development) were added to obtain BUILD volumes for the intersection analyses. See Appendix Pages A-53 thru A-72 for further information regarding the turning movement counts.

TRIP DISTRIBUTION

Primary and Diverted Linked Trips:

Commercial Land Use

Primary and diverted linked trips for the commercial land use development were distributed proportionally to the 2018 projected population of Data Analysis Subzones within a two-mile radius of the proposed development. Population data for the years 2015 and 2035 were taken from the 2035 Socioeconomic Forecasts by Data Analysis Subzones for the MRCOG Region, supplied by the Mid-Region Council of Governments (MRCOG). Population data from the years 2015 and 2035 was interpolated linearly to obtain 2018 population data to utilize for this analysis. Population Subzones were grouped based on the most likely major street(s) or route(s) to the subject development. The trip distribution worksheets and associated map of subareas and data analysis subzones is shown on Appendix Pages A-30 thru A-37.

Office Land Use

Primary and diverted linked trips for the office land use development were distributed proportionally to the 2018 projected population of Subareas citywide. Population data for the years 2015 and 2035 were taken from the 2035 Socioeconomic Forecasts by Data Analysis Subzones for the MRCOG Region, supplied by the Mid-Region Council of Governments (MRCOG). Population data from the years 2015 and 2035 was interpolated linearly to obtain 2018 population data to utilize for this analysis. Population Subzones were grouped based on the most likely major street(s) or route(s) to the subject development. The trip distribution worksheets and associated map of subareas and data analysis subzones is shown on Appendix Pages A-23 thru A-39.

Residential Land Use

Primary and diverted linked trips for residential development have been distributed proportionally to the 2018 projected employment of Subareas citywide. Employment data for 2015 and 2035 were taken from the 2035 Socioeconomic Forecasts by Data Analysis Subzones for the MRCOG Region, supplied by the Mid-Region Council of Governments (MRCOG). Employment Data was interpolated linearly to obtain 2018 values and adjusted for distance from the proposed new facility. The trip distribution worksheets and associated map of subareas are shown in the Appendix Pages A-15 thru A-22.

The implementation year analysis of the intersection of Gold Ave. / Second St. demonstrates that the level-of-service will be acceptable for both the AM Peak Hour and PM Peak Hour NO BUILD and BUILD conditions. The implementation year analysis shows that the proposed development increases the delay at the intersection by 6.8 seconds. Therefore, this study concludes that the development presents no significant impact to the calculated delays at the intersection of Gold Ave. / Second St.

The following table summarizes the results of the queuing analysis for the auxiliary lanes at the intersection:

RESULTS OF SIGNALIZED INTERSECTION CAPACITY ANALYSES

#1 – Gold Ave. / Second St. - Pages A-73 thru A-76

The results of the implementation year analysis of the signalized intersection of Gold Ave. / Second St. are summarized in the following table:

Intersection: 1 - GOLD AVE. / SECOND ST.

2018 AM Peak Hour BUILD						2018 PM Peak Hour BUILD					
		(EXIST. GEOM.)						(EXIST. GEOM.)			
		NO BUILD		BUILD				NO BUILD		BUILD	
		Lanes	LOS-Delay	Lanes	LOS-Delay			Lanes	LOS-Delay	Lanes	LOS-Delay
EB	L	>	B - 13.8	>	B - 17.4	L	>	B - 13.0	>	C - 25.9	
	T	1	B - 13.8	1	B - 17.4	T	1	B - 13.0	1	C - 25.9	
	R	>	B - 13.8	>	B - 17.4	R	>	B - 13.0	>	C - 25.9	
WB	L	>	B - 12.9	>	B - 15.4	L	>	B - 11.6	>	C - 21.6	
	T	1	B - 12.9	1	B - 15.4	T	1	B - 11.6	1	C - 21.6	
	R	>	B - 12.9	>	B - 15.4	R	>	B - 11.6	>	C - 21.6	
NB	L	1	A - 6.3	1	A - 4.3	L	1	A - 7.8	1	B - 16.0	
	T	1	B - 14.3	1	A - 8.9	T	1	B - 14.6	1	C - 23.3	
	R	>	B - 14.3	>	A - 8.9	R	>	B - 14.6	>	C - 23.3	
SB	L	1	A - 5.9	1	A - 6.1	L	1	A - 6.5	1	A - 9.8	
	T	1	A - 4.0	1	A - 6.3	T	1	A - 5.0	1	A - 6.4	
	R	>	A - 4.0	>	A - 6.3	R	>	A - 5.0	>	A - 6.4	
Intersection:		B - 12.2		A - 9.4				B - 11.4		B - 18.2	

Note: ">" designates a shared right or left turn lane.

Queueing Analysis Summary Sheet

project: Railyard Re-development (Second St S. of Hazeldine)
intersection: Gold Ave SW / Second St

2018											
Approach		Left Turns			Thru Movements			Right Turns			
Eastbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	19	0	1	66	Cont	0	22	0	
M NO BUILD Queue		0	23	75	1	81	150	0	27	75	
M BUILD Queue		0	23	75	1	81	150	0	71	125	
Existing Lane Length		0	50	0	1	99	Cont	0	15	0	
M NO BUILD Queue		0	61	125	1	121	200	0	18	50	
M BUILD Queue		0	61	125	1	121	200	0	75	125	
Westbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	14	0	1	22	Cont	0	21	0	
M NO BUILD Queue		0	14	50	1	23	75	0	22	50	
M BUILD Queue		0	14	50	1	23	75	0	22	50	
Existing Lane Length		0	15	0	1	20	Cont	0	30	0	
M NO BUILD Queue		0	15	50	1	21	50	0	31	75	
M BUILD Queue		0	15	50	1	21	50	0	31	75	
Northbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		1	18	75	1	266	Cont	0	12	0	
M NO BUILD Queue		1	18	50	1	273	375	0	12	50	
M BUILD Queue		1	41	100	1	401	525	0	12	50	
Existing Lane Length		1	13	75	1	204	Cont	0	21	0	
M NO BUILD Queue		1	13	50	1	209	300	0	22	50	
M BUILD Queue		1	72	125	1	583	675	0	22	50	
Southbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		1	25	100	1	58	Cont	0	13	0	
M NO BUILD Queue		1	26	75	1	59	125	0	13	50	
M BUILD Queue		1	26	75	1	382	500	0	13	50	
Existing Lane Length		1	36	100	1	117	Cont	0	11	0	
M NO BUILD Queue		1	37	75	1	120	200	0	11	50	
M BUILD Queue		1	37	75	1	402	500	0	11	50	

AM PM
Cycle Length: 130 120

NOTE: Queue lengths are in feet.

The following table summarizes the recommendations of the queueing analysis for the auxiliary lanes at the intersection:

Lane Description	Existing Length (Ft)	NO BUILD Length (Ft)	BUILD Length (Ft)	Lengthen Existing Auxiliary Lane to:
Eastbound Left Turn:	0	125	125	No Recommendation
Eastbound Right Turn:*	0	40	60	No Recommendation
Westbound Left Turn:	0	50	50	No Recommendation
Westbound Right Turn:*	0	40	40	No Recommendation
Northbound Left Turn:	75	50	125	125' plus transition.
Northbound Right Turn:*	0	30	30	No Recommendation
Southbound Left Turn:	100	75	75	No Recommendation
Southbound Right Turn:*	0	30	30	No Recommendation

* - Calculated right turn queue lengths have been reduced by 50% to account for right-turns-on red and overlap phases.

The queueing analysis recommends that the northbound left turn lane be lengthened from 75 feet to 125 feet. This intersection is completely built out and there is no available right-of-way to construct this improvement. Therefore, no recommendations are made for the auxiliary lanes at the intersection of Gold Ave. / Second St.

#2 – Lead Ave. / Second St. - Pages A-77 thru A-82

The results of the implementation year analysis of the signalized intersection of Lead Ave. / Second St. are summarized in the following table:

Intersection: 2 - LEAD AVE. / SECOND ST.

2018 AM Peak Hour BUILD										2018 PM Peak Hour BUILD									
		(EXIST. GEOM.)				(MIT. GEOM.)				(EXIST. GEOM.)				(MIT. GEOM.)					
		NO BUILD		BUILD		BUILD				NO BUILD		BUILD		BUILD					
		Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay			Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay				
EB	L	1	A - 8.3	1	C - 28.7	1	D - 53.0	L	1	A - 7.4	1	D - 42.7	1	D - 41.5					
	R	1	A - 4.9	1	B - 17.9	1	E - 61.3	R	1	A - 4.3	1	C - 26.1	1	D - 47.1					
WB	L	1	A - 5.2	1	D - 44.2	1	D - 40.1	L	1	A - 4.9	1	F - 93.1	1	E - 69.0					
	T	2	A - 6.8	2	C - 23.3	2	C - 26.4	T	2	A - 5.9	2	C - 34.2	2	C - 29.9					
NB	R	>	A - 6.8	>	C - 23.4	>	C - 26.4	R	>	A - 5.9	>	C - 34.3	>	C - 30.0					
	L	>	A - 10.0	>	D - 38.2	>	C - 20.2	L	>	B - 10.5	>	E - 77.5	>	D - 40.2					
SB	T	1	A - 10.0	1	D - 38.2	1	C - 20.2	T	1	B - 10.5	1	E - 77.5	1	D - 40.2					
	T	1	A - 7.5	1	D - 51.2	1	D - 47.8	T	1	B - 11.2	1	D - 36.3	1	A - 1.9					
	R	1	A - 6.6	1	C - 32.4	1	C - 30.3	R	1	A - 8.5	1	C - 23.0	1	A - 0.1					
	Intersection:		A - 7.4		D - 36.7		C - 34.1				A - 7.0		E - 55.8		C - 34.5				

Note: ">" designates a shared right or left turn lane.

The implementation year analysis of the intersection of Lead Ave. / Second St. demonstrates that the level-of-service will be acceptable for both the AM Peak Hour and PM Peak Hour NO BUILD conditions and for the AM Peak Hour BUILD conditions. The PM Peak Hour BUILD condition will experience excessive delays. The intersection can be mitigated by changing the westbound left turn lane signal type from permitted to permitted plus protected. This mitigation demonstrates an acceptable level-of-service for the PM Peak Hour BUILD condition. Signal modifications will probably be required.

The following table summarizes the results of the queuing analysis for the auxiliary lanes at the intersection:

Queueing Analysis Summary Sheet

Project: Railyard Re-development (Second St S. of Hazeldine)
Intersection: Lead Ave SW / Second St

2018											
Approach		Left Turns			Thru Movements			Right Turns			
Eastbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		1	9	125	1	0	Cont	0	11	0	
AM NO BUILD Queue		1	9	25	1	0	0	0	11	50	
AM BUILD Queue		1	9	25	1	0	0	0	66	125	
Existing Lane Length		1	7	125	1	0	Cont	0	30	0	
PM NO BUILD Queue		1	7	25	1	0	0	0	31	75	
PM BUILD Queue		1	7	25	1	0	0	0	102	175	
Westbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		1	55	590	2	581	Cont	0	73	0	
AM NO BUILD Queue		1	56	125	2	596	450	0	75	150	
AM BUILD Queue		1	452	575	2	596	450	0	75	150	
Existing Lane Length		1	109	590	2	691	Cont	0	74	0	
PM NO BUILD Queue		1	112	175	2	708	475	0	76	125	
PM BUILD Queue		1	420	500	2	708	475	0	76	125	
Northbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	7	0	1	203	Cont	0	0	0	
AM NO BUILD Queue		0	7	25	1	208	300	0	0	0	
AM BUILD Queue		0	36	75	1	359	475	0	0	0	
Existing Lane Length		0	9	0	1	141	Cont	0	0	0	
PM NO BUILD Queue		0	9	25	1	145	225	0	0	0	
PM BUILD Queue		0	82	150	1	578	675	0	0	0	
Southbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	0	0	1	64	Cont	1	15	170	
AM NO BUILD Queue		0	0	0	1	66	125	1	15	50	
AM BUILD Queue		0	0	0	1	433	550	1	15	50	
Existing Lane Length		0	0	0	1	120	Cont	1	28	170	
PM NO BUILD Queue		0	0	0	1	123	200	1	29	75	
PM BUILD Queue		0	0	0	1	462	550	1	29	75	

Cycle Length: AM 130 PM 120

NOTE: Queue lengths are in feet.

The following table summarizes the recommendations of the queuing analysis for the auxiliary lanes at the intersection:

Lane Description	Existing Length (Ft)	NO BUILD Length (Ft)	BUILD Length (Ft)	Lengthen Existing Auxiliary Lane to:
Eastbound Left Turn:	125	25	25	No Recommendation
Eastbound Right Turn:*	0	40	90	No Recommendation
Westbound Left Turn:	590	175	575	No Recommendation
Westbound Right Turn:*	0	80	80	No Recommendation
Northbound Left Turn:	0	25	150	No Recommendation
Northbound Right Turn:*	0	0	0	No Recommendation
Southbound Left Turn:	0	0	0	No Recommendation
Southbound Right Turn:*	170	40	40	No Recommendation

* - Calculated right turn queue lengths have been reduced by 50% to account for right-turns-on red and overlap phases.

There are no recommendations for the auxiliary lanes at the intersection of Lead Ave. / Second St.

#3 – Coal Ave. / Second St. - Pages A-83 thru A-86

The results of the implementation year analysis of the signalized intersection of Coal Ave. / Second St. are summarized in the following table:

Intersection: 3 - COAL AVE. / SECOND ST.

2018 AM Peak Hour BUILD				2018 PM Peak Hour BUILD			
(EXIST. GEOM.)				(EXIST. GEOM.)			
NO BUILD		BUILD		NO BUILD		BUILD	
Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay
EB L	> B - 10.1	> D - 53.4	L	> A - 7.9	> E - 67.1		
EB T	3 A - 9.8	3 D - 48.1	T	3 A - 7.7	3 E - 57.6		
EB R	> A - 9.8	> D - 48.7	R	> A - 7.7	> E - 59.2		
NB L	1 A - 7.2	1 C - 35.0	L	1 A - 8.3	1 A - 6.2		
NB T	1 B - 13.1	1 B - 12.3	T	1 A - 9.6	1 C - 29.7		
NB R	> B - 13.1	> B - 12.3	R	> A - 9.6	> C - 29.7		
SB L	1 A - 6.2	1 B - 19.0	L	1 A - 6.2	1 E - 79.0		
SB T	1 A - 3.0	1 B - 13.5	T	1 A - 5.7	1 A - 1.9		
SB R	> A - 3.0	> B - 13.5	R	> A - 5.7	> A - 1.9		
Intersection:		B - 10.2	C - 24.9	A - 7.6	C - 30.3		

Note: ">" designates a shared right or left turn lane.

The implementation year analysis of the intersection of Coal Ave. / Second St. demonstrates that the level-of-service will be acceptable for both the AM Peak Hour and PM Peak Hour NO BUILD and BUILD conditions. The implementation year analysis shows that the proposed development increases the delay at the intersection by 14.7 to 26.5 seconds. Therefore, this study concludes that the development presents no significant impact to the calculated delays at the intersection of Coal Ave. / Second St.

The following table summarizes the results of the queuing analysis for the auxiliary lanes at the intersection:

Queueing Analysis Summary Sheet

Project: Railyard Re-development (Second St. S. of Hazeldine)
 Intersection: Coal Ave SW / Second St

The following table summarizes the recommendations of the queueing analysis for the auxiliary lanes at the intersection:

2018											
Approach		Left Turns			Thru Movements			Right Turns			
Eastbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	28	0	3	582	Cont	0	8	0	
AM NO BUILD Queue		0	31	75	3	637	350	0	9	25	
AM BUILD Queue		0	31	75	3	637	350	0	70	125	
Existing Lane Length		0	19	0	3	611	Cont	0	10	0	
PM NO BUILD Queue		0	21	50	3	669	350	0	11	50	
PM BUILD Queue		0	21	50	3	669	350	0	92	150	
Westbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	0	0	0	0	Cont	0	0	0	
AM NO BUILD Queue		0	0	0	0	0	0	0	0	0	
AM BUILD Queue		0	0	0	0	0	0	0	0	0	
Existing Lane Length		0	0	0	0	0	Cont	0	0	0	
PM NO BUILD Queue		0	0	0	0	0	0	0	0	0	
PM BUILD Queue		0	0	0	0	0	0	0	0	0	
Northbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		1	7	75	1	246	Cont	0	101	0	
AM NO BUILD Queue		1	7	25	1	252	350	0	104	175	
AM BUILD Queue		1	40	100	1	433	550	0	249	350	
Existing Lane Length		1	18	75	1	119	Cont	0	70	0	
PM NO BUILD Queue		1	18	50	1	122	200	0	72	125	
PM BUILD Queue		1	101	175	1	628	725	0	514	600	
Southbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		1	34	75	1	74	Cont	0	15	0	
AM NO BUILD Queue		1	35	75	1	76	150	0	15	50	
AM BUILD Queue		1	35	75	1	892	>1,000 *	0	15	50	
Existing Lane Length		1	99	75	1	171	Cont	0	29	0	
PM NO BUILD Queue		1	101	175	1	175	250	0	30	75	
PM BUILD Queue		1	101	175	1	893	>1,000 *	0	30	75	

Cycle Length: AM 130 PM 120

NOTE: Queue lengths are in feet.

Lane Description	Existing Length (Ft)	NO BUILD Length (Ft)	BUILD Length (Ft)	Lengthen Existing Auxiliary Lane to:
Eastbound Left Turn:	0	75	75	No Recommendation
Eastbound Right Turn:*	0	30	80	No Recommendation
Westbound Left Turn:	0	0	0	No Recommendation
Westbound Right Turn:*	0	0	0	No Recommendation
Northbound Left Turn:	75	50	175	175' plus transition.
Northbound Right Turn:*	0	90	300	No Recommendation
Southbound Left Turn:	75	175	175	175' plus transition.
Southbound Right Turn:*	0	40	40	No Recommendation

* - Calculated right turn queue lengths have been reduced by 50% to account for right-turns-on red and overlap phases.

The queueing analysis recommends that the northbound and southbound left turn lanes be lengthened from 75 feet to 175 feet. This intersection is completely built out and there is no available right-of-way to construct this improvement. Furthermore, lengthening the northbound left turn lane would adversely impact the southbound left turn at the intersection of Iron Ave. / Second St. Therefore, no recommendations are made for the auxiliary lanes at the intersection of Coal Ave. / Second St.

#4 – Bridge Blvd. / Third St. - Pages A-87 thru A-92

The results of the implementation year analysis of the signalized intersection of Bridge Blvd. / Third St. are summarized in the following table:

Intersection: 4 - BRIDGE BLVD. / THIRD ST.

2018 AM Peak Hour BUILD							2018 PM Peak Hour BUILD								
		(EXIST. GEOM.)				(MIT. GEOM.)				(EXIST. GEOM.)				(MIT. GEOM.)	
		NO BUILD		BUILD		BUILD				NO BUILD		BUILD		BUILD	
		Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay			Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay
EB	L	>	A - 3.5	>	A - 6.8	>	D - 37.3	L	>	A - 8.5	>	B - 15.3	>	C - 24.9	
	T	2	A - 3.6	2	A - 7.0	2	D - 41.7	T	2	A - 8.6	2	B - 15.6	2	C - 25.5	
	R	1	A - 1.5	1	A - 3.4	1	B - 15.0	R	1	A - 5.9	1	B - 12.1	1	B - 19.1	
WB	L	1	B - 11.0	1	F - 40.2	1	F - 105	L	1	B - 13.9	1	F - 102	1	C - 26.2	
	T	1	A - 1.9	1	A - 4.4	1	A - 8.4	T	1	B - 10.7	1	C - 32.1	1	C - 28.9	
	R	2	A - 1.9	2	A - 4.5	2	A - 8.5	R	2	B - 10.7	2	D - 44.1	2	D - 38.9	
NB	L	>	D - 47.3	>	E - 55.8	>	D - 53.5	L	>	D - 44.6	>	D - 35.4	>	D - 48.6	
	T	1	D - 47.3	1	E - 55.8	1	D - 53.5	T	1	D - 44.6	1	D - 35.4	1	D - 48.6	
	R	1	D - 50.0	1	F - 177	1	F - 177	R	1	C - 31.1	1	E - 58.6	1	F - 194	
SB	L	>	D - 50.9	>	F - 390	1	D - 49.0	L	>	D - 38.3	>	F - 471	1	F - 147	
	T	1	D - 50.9	1	F - 390	1	D - 44.9	T	1	D - 38.3	1	F - 471	1	C - 33.1	
	R	>	D - 50.9	>	F - 390	>	D - 44.9	R	>	D - 38.3	>	F - 471	>	C - 33.1	
Intersection:		A - 5.1		E - 56.6		D - 39.8				B - 12.1		E - 76.8		D - 52.0	

Note: ">" designates a shared right or left turn lane.

The implementation year analysis of the intersection of Bridge Blvd. / Third St. demonstrates that the level-of-service will be acceptable for both the AM Peak Hour and PM Peak Hour NO BUILD conditions and will experience excessive delays for the AM Peak Hour and PM Peak Hour BUILD conditions. The intersection can be partially mitigated by adding a 200 foot southbound left turn lane with a permitted plus protected turn signal. This mitigation demonstrates acceptable levels-of-service for both the AM Peak Hour and PM Peak Hour BUILD conditions. No other improvements are physically possible at this intersection.

The following table summarizes the results of the queuing analysis for the auxiliary lanes at the intersection:

Queueing Analysis Summary Sheet

Project: Railyard Re-development (Second St. S. of Hazeldine)
Intersection: Bridge Blvd / Third St

2018											
Approach		Left Turns			Thru Movements			Right Turns			
Eastbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	1	0	2	1,544	Cont	1	123	260	
AM NO BUILD Queue		0	1	0	2	1,583	>1,000 *	1	126	200	
AM BUILD Queue		0	1	0	2	1,583	>1,000 *	1	276	375	
Existing Lane Length		0	0	0	2	1,083	Cont	1	64	260	
PM NO BUILD Queue		0	0	0	2	1,110	700	1	66	125	
PM BUILD Queue		0	0	0	2	1,110	700	1	249	325	
Westbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		1	57	50	2	723	Cont	0	12	0	
AM NO BUILD Queue		1	58	125	2	741	525	0	12	50	
AM BUILD Queue		1	217	325	2	741	525	0	358	475	
Existing Lane Length		1	45	50	2	1,498	Cont	0	31	0	
PM NO BUILD Queue		1	46	100	2	1,535	>1,000 *	0	32	75	
PM BUILD Queue		1	200	275	2	1,535	>1,000 *	0	380	475	
Northbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	14	0	1	2	Cont	1	34	80	
AM NO BUILD Queue		0	14	50	1	2	0	1	35	75	
AM BUILD Queue		0	55	125	1	2	0	1	188	275	
Existing Lane Length		0	59	0	1	2	Cont	1	22	80	
PM NO BUILD Queue		0	60	125	1	2	0	1	23	50	
PM BUILD Queue		0	166	250	1	2	0	1	448	550	
Southbound		# Lanes	Vol.	Length	# Lanes	Vol.	Length	# Lanes	Vol.	Length	
Existing Lane Length		0	9	0	1	20	Cont	0	30	0	
AM NO BUILD Queue		0	9	25	1	21	50	0	31	75	
AM BUILD Queue		0	75	150	1	21	50	0	65	125	
Existing Lane Length		0	12	0	1	52	Cont	0	84	0	
PM NO BUILD Queue		0	12	50	1	53	100	0	86	150	
PM BUILD Queue		0	199	275	1	53	100	0	176	250	

AM PM
Cycle Length: 130 120

NOTE: Queue lengths are in feet.

The following table summarizes the recommendations of the queuing analysis for the auxiliary lanes at the intersection:

Lane Description	Existing Length (Ft)	NO BUILD Length (Ft)	BUILD Length (Ft)	Lengthen Existing Auxiliary Lane to:
Eastbound Left Turn:	0	0	0	No Recommendation
Eastbound Right Turn:*	260	100	190	No Recommendation
Westbound Left Turn:	50	125	325	325' plus transition.
Westbound Right Turn:*	0	40	240	No Recommendation
Northbound Left Turn:	0	125	250	No Recommendation
Northbound Right Turn:*	80	40	280	280' plus transition.
Southbound Left Turn:	0	50	275	No Recommendation
Southbound Right Turn:*	0	80	130	No Recommendation

* - Calculated right turn queue lengths have been reduced by 50% to account for right-turns-on red and overlap phases.

The queuing analysis recommends that the westbound left turn lane be lengthened from 50 feet to 325 feet and the northbound left turn lane be lengthened from 80 feet to 280 feet. Lengthening the westbound left turn lane is not feasible without widening the bridge along Bridge Blvd. Lengthening the northbound left turn lane would adversely impact the eastbound left turn lane at First St. Therefore, no recommendations are made for the auxiliary lanes at the intersection of Bridge Blvd. / Third St.

RESULTS OF UNSIGNALIZED INTERSECTION CAPACITY ANALYSES

#5 – Santa Fe Ave. / Second St. – Pages A-93 thru A-98

The results of the analysis of the unsignalized intersection of Santa Fe Ave. / Second St. are summarized in the following table:

Intersection: 5 - SANTA FE AVE. / SECOND ST.

2018 AM Peak Hour BUILD				2018 PM Peak Hour BUILD			
(EXIST. GEOM.)				(EXIST. GEOM.)			
NO BUILD		BUILD		NO BUILD		BUILD	
Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay
EB L	1 A - 9.8	1 F - 195		EB L	1 A - 9.7	1 F - 999	
EB R	> A - 9.8	> F - 195		EB R	> A - 9.7	> F - 999	
NB L	> A - 7.4	> A - 9.9		NB L	> A - 7.6	> B - 12.2	
NB T	1 A - 7.4	1 A - 9.9		NB T	1 A - 7.6	1 B - 12.2	
Intersection: u - N/A				Intersection: u - N/A			

Note: ">" designates a shared right or left turn lane.

This analysis indicates that the tee intersection will operate at acceptable levels-of-service in the implementation year (2018) for both the AM Peak Hour and PM Peak Hour NO BUILD conditions and will experience excessive delays for both the AM Peak Hour and PM Peak Hour BUILD conditions. The delays for the eastbound shared left/right turn movement are so excessive during the PM Peak Hour that Synchro 8 cannot calculate the actual delay. This intersection can be improved by constructing a single lane roundabout as demonstrated in the following table.

2018 Peak Hour BUILD			
(MIT. GEOM.)			
AM BUILD		PM BUILD	
Lanes	LOS-Delay	Lanes	LOS-Delay
EB L			
EB R	1 B - 11.2	1 C - 22.5	
NB L	1 E - 45.9	1 F - 131	
NB T	1 C - 19.8	1 F - 108	
Intersection: u - N/A			

#6 –Hazeldine Ave. / Second St. – Pages A-99 thru A-104

The results of the analysis of the unsignalized intersection of Hazeldine Ave. / Second St. are summarized in the following table:

Intersection: 6 - HAZELDINE AVE. / SECOND ST.

2018 AM Peak Hour BUILD										2018 PM Peak Hour BUILD									
		(EXIST. GEOM.)				(MIT. GEOM.)						(EXIST. GEOM.)				(MIT. GEOM.)			
		NO BUILD		BUILD		BUILD				NO BUILD		BUILD		BUILD					
		Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay	Lanes	LOS-Delay		
EB	L	>	B - 12.0	>	F - 999	1	D - 41.4	L	>	B - 10.2	>	F - 999	1	D - 45.0					
	T	1	B - 12.0	1	F - 999	1	E - 68.4	T	1	B - 10.2	1	F - 999	1	F - 172					
	R	>	B - 12.0	>	F - 999	>	E - 68.4	R	>	B - 10.2	>	F - 999	>	F - 173					
WB	L	>	B - 12.7	>	F - 999	1	D - 38.9	L	>	B - 10.8	>	F - 999	1	F - 182					
	T	1	B - 12.7	1	F - 999	1	D - 40.2	T	1	B - 10.8	1	F - 999	1	D - 44.8					
	R	>	B - 12.7	>	F - 999	1	D - 41.5	R	>	B - 10.8	>	F - 999	1	F - 88.7					
NB	L	>	A - 7.4	>	A - 8.8	1	B - 14.2	L	>	A - 7.5	>	A - 9.0	>	B - 10.6					
	T	1	A - 7.4	1	A - 8.8	1	C - 24.9	T	1	A - 7.5	1	A - 9.0	1	E - 62.3					
	R	>	A - 7.4	>	A - 8.8	1	B - 12.3	R	>	A - 7.5	>	A - 9.0	>	A - 9.7					
SB	L	>	A - 8.3	>	C - 20.1	1	C - 22.1	L	>	A - 7.6	>	C - 22.0	1	F - 158					
	T	1	A - 8.3	1	C - 20.1	1	B - 10.3	T	1	A - 7.6	1	C - 22.0	1	A - 3.2					
	R	>	A - 8.3	>	C - 20.1	>	B - 10.3	R	>	A - 7.6	>	C - 22.0	>	A - 3.2					
Intersection:		u - N/A		u - N/A		C - 24.9				u - N/A		u - N/A				E - 69.5			

Note: ">" designates a shared right or left turn lane.

This analysis indicates that the full intersection, which will also be the northernmost driveway of the proposed development, will operate at acceptable levels-of-service in the implementation year (2018) for both the AM Peak Hour and PM Peak Hour NO BUILD conditions and will experience excessive delays for the AM Peak Hour and PM Peak Hour BUILD conditions for the eastbound and westbound movements. The delays for the eastbound and westbound shared left/thru/right turn movements are so excessive during the AM Peak Hour and PM Peak Hour that Synchro 8 cannot calculate the actual delay. This intersection can be improved by constructing second northern driveway for the proposed development at the intersection of Atlantic Ave. / Second St. and by constructing a traffic signal as demonstrated in the table above. Coal Ave. / Second St. is the nearest signalized intersection and is approximately 1,000 feet to the north. Stover Ave. / Second St. is the nearest unsignalized intersection to the north and is approximately 360 feet away from the Hazeldine Ave. / Second St. intersection. Atlantic Ave. / Second St. is the nearest unsignalized intersection and is approximately 300 feet to the south. The analysis of the Atlantic Ave. / Second St. intersection is discussed in the #9 - Atlantic Ave. / Second St. section on Page 22.

#7 –Driveway 'A' / Second St. – Pages A-105 thru A-108

The results of the analysis of the unsignalized intersection of Driveway 'A' / Second St. are summarized in the following table:

Intersection: 7 - DRIVEWAY 'A' / SECOND ST.

2018 Peak Hour BUILD					
		(EXIST. GEOM.)		(MIT. GEOM.)	
		AM BUILD		PM BUILD	
		Lanes	LOS-Delay	Lanes	LOS-Delay
WB	L	1	F - 999	1	F - 999
	R	>	F - 999	>	F - 999
SB	L	>	B - 14.7	>	B - 14.5
	T	1	B - 14.7	1	B - 14.5
Intersection:		u - 0.0		u - N/A	

Note: ">" designates a shared right or left turn lane.

This analysis indicates that the driveway will experience excessive delays for both the AM Peak Hour and PM Peak Hour BUILD conditions for the westbound movement. The delays for the westbound shared left/right turn movement are so excessive during the AM Peak Hour and PM Peak Hour that Synchro 8 cannot calculate the actual delay. This intersection can be improved by constructing a single lane roundabout as demonstrated in the following table.

2018 Peak Hour BUILD

(MIT. GEOM.)					
		AM BUILD		PM BUILD	
		Lanes		Lanes	
		LOS-Delay		LOS-Delay	
WB	L	1	C - 17.0	1	F - 131
	R	1	F - 148	1	F - 139
SB	L	1	D - 26.9	1	F - 222
	T	1	D - 26.9	1	F - 222
Intersection:		u - N/A		u - N/A	

#8 –Driveway 'B' / Second St. – Pages A-109 thru A-112

The results of the analysis of the unsignalized intersection of Driveway 'B' / Second St. are summarized in the following table:

Intersection: 8 - DRIVEWAY 'B' / SECOND ST.

		2018 Peak Hour BUILD			
		(EXIST. GEOM.)			
		AM BUILD		PM BUILD	
		Lanes LOS-Delay		Lanes LOS-Delay	
WB	L	1	F - 999	>	F - 999
	R	>	F - 999	>	F - 999
	L	>	B - 14.3	>	B - 11.4
	T	1	B - 14.3	1	B - 11.4
Intersection:		u - 0.0		u - N/A	

Note: ">" designates a shared right or left turn lane.

This analysis indicates that the driveway will experience excessive delays for both the AM Peak Hour and PM Peak Hour BUILD conditions for the westbound movement. The delays for the westbound shared left/right turn movement are so excessive during the AM Peak Hour and PM Peak Hour that Synchro 8 cannot calculate the actual delay. This intersection can be improved by constructing a single lane roundabout as demonstrated in the following table.

		2018 Peak Hour BUILD			
		(MIT. GEOM.)			
		AM BUILD		PM BUILD	
		Lanes LOS-Delay		Lanes LOS-Delay	
WB	L	1	C - 15.4	1	C - 22.0
	R	1	F - 136	1	E - 35.9
	L	1	B - 11.1	1	F - 89.4
	T				
Intersection:		u - N/A		u - N/A	

#9 –Atlantic Ave. / Second St. – Pages A-113 thru A-114

This intersection will be used as a second northern driveway for the proposed development to improve the delays at the intersection (northern most driveway) of Hazeldine Ave. / Second St. The results of the analysis of the unsignalized intersection of Atlantic Ave. / Second St. are summarized in the following table:

Intersection: 9 - ATLANTIC AVE. / SECOND ST.

		2018 Peak Hour BUILD			
		(MIT. GEOM.)			
		AM BUILD		PM BUILD	
		Lanes LOS-Delay		Lanes LOS-Delay	
WB	L	1	C - 28.2	1	E - 57.4
	R	1	B - 16.9	1	F - 391
	L	1	F - 225	1	F - 317
	T	1	E - 64.8	1	F - 297
Intersection:		u - N/A		u - N/A	

This intersection was analyzed as a single lane roundabout. The analysis indicates that the driveway will experience excessive delays for both the AM Peak Hour and PM Peak Hour BUILD conditions. But is necessary to improve the delays at Hazeldine Ave. / Second St.

It should be noted that Levels of Service (LOS) for unsignalized intersections cannot be compared directly with Levels of Service for signalized intersections. LOS for unsignalized intersections is based on reserve capacity, which is converted to generalized levels of delay; LOS for signalized intersections is based on actual delay in seconds.

LEVEL-OF-SERVICE CRITERIA FOR SIGNALIZED INTERSECTIONS

Average Delay (secs)	Level-of-Service
≤ 10	A
> 10 and ≤ 20	B
> 20 and ≤ 35	C
> 35 and ≤ 55	D
> 55 and ≤ 80	E
> 80	F

LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS

<u>Average Delay</u> <u>(secs)</u>	<u>Level-of-Service</u>
≤ 10	A
> 10 and ≤ 15	B
> 15 and ≤ 25	C
> 25 and ≤ 35	D
> 35 and ≤ 50	E
> 50	F

- #6 – Hazeldine Ave. / Second St. - Construct as a signalized intersection with the mitigated geometry described on Page 19.
- #9 – Atlantic Ave. / Second St. – Construct a single lane roundabout with a driveway to the proposed development.

Generally speaking, a Level-of-Service D or better is an acceptable parameter for design purposes.

CONCLUSIONS

This analysis demonstrates that the existing signalized intersections of Gold Ave. / Second St., Lead Ave. / Second St. Coal Ave. / Second St., and Bridge Blvd. / Third St. will operate at acceptable levels-of-service with some mitigation. The existing unsignalized intersections of Hazeldine Ave. / Second St., Santa Fe Ave. / Second St., and Atlantic Ave. / Second St. will require more substantial improvements and will still experience long delays for some of the turning movements upon implementation of the proposed project along with Driveways 'A' and 'B'.

Utilizing projected traffic volumes resulting from the development of this site into a mixed use facility such as the one shown on Page A-3 in the Appendix in conjunction with projected 2018 traffic volumes this report concludes that development of the subject site will have no significant adverse impact on the existing signalized intersections of the adjacent transportation system and will have moderate adverse impacts to the existing unsignalized intersections of the adjacent transportation system, provided that the following recommendations are followed:

RECOMMENDATIONS

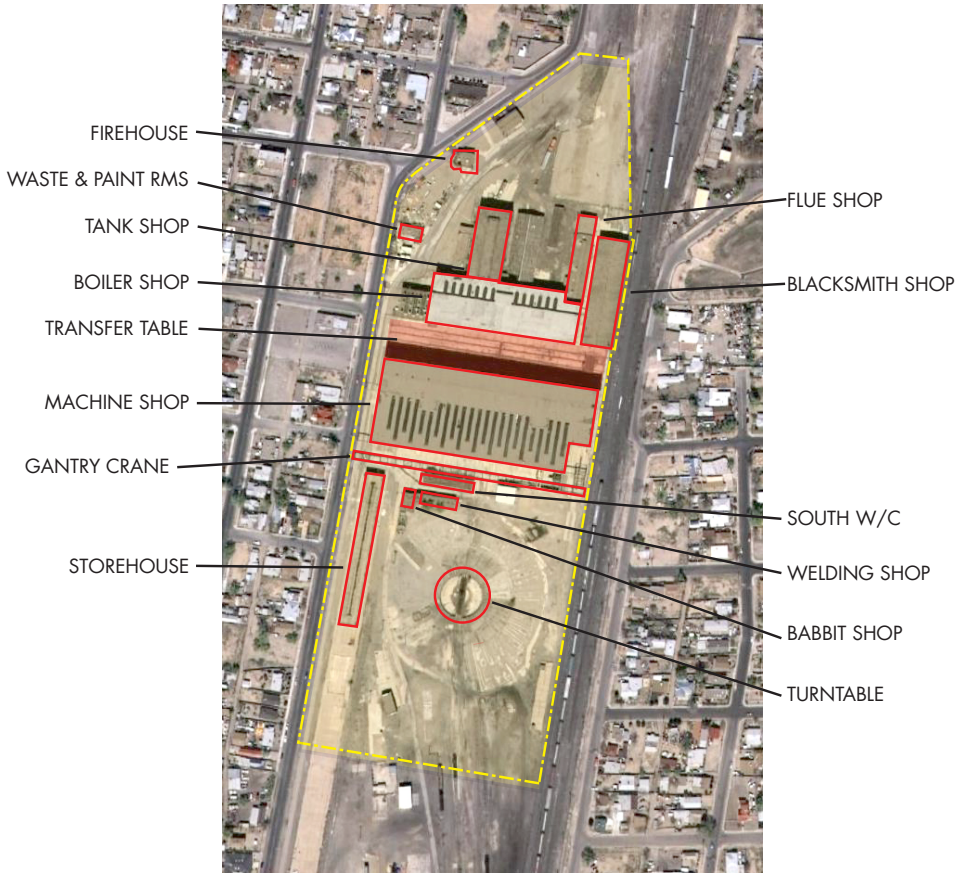
- Design of the site should maintain adequate sight distances for traffic approaching, entering, and exiting the site from the proposed driveways.
- All driveways should be constructed utilizing 30 feet minimum radius curb returns or larger if needed to accommodate delivery trucks. The new development should be implemented utilizing at least four driveways for access - the intersections of Hazeldine Ave. / Second St. and Atlantic Ave. / Second St. and Driveway 'A' and 'B' (from Second St.). The driveway (Hazeldine Ave. / Second St. intersection) should be signalized and the others should be constructed as single lane roundabouts.
- #2 – Lead Ave. / Second St. – Change the westbound left turn signalized movement from permitted to permitted plus protected.
- #4 – Bridge Blvd. / Third St. – Construct a 200 foot long southbound left turn lane along Second St. with a permitted plus protected left turn signal.
- #5 – Santa Fe Ave. / Second St. – Construct as a single lane roundabout.

APPENDIX C: PHOTOGRAPHIC SURVEY OF HISTORIC STRUCTURES

BLUE LINE NOTE: THE FOLLOWING PAGES HAVE BEEN EDITED FOR LAYOUT AND CONSISTENCY

Appendix C provides included is a photographic summary of some of the historic buildings and structures on thoughts/information compiled specific to the Rail Yards site. There are a number of is-much historic documentations that address the site at our disposal. Rather than compiling an exhaustive list, this appendix we've focused on information that would be pertinent in the future adaptive reuse of the site. Some is technical pulled from literature, some is based on site observation. The photographic survey was conducted in 2011 by Giora Solar.

The current configuration of the Rail Yards site locomotive repair facilities were was constructed between 1915 and 19252-and represented the height of in modern industrial design and achievement at their time. The buildings were advanced, the so-called 'Machine Shop' is the largest structure and contains the following advances; The photographic survey covers several of the buildings and structures to be preserved: the Machine Shop (1921), the Boiler Shop (1923), the Blacksmith Shop (1917), the Flue Shop (1920), the Tank Shop (also known as the Tender Repair, 1925), the Firehouse (1920), the Transfer Table (1919), the Storehouse and its platform (1915), the Turntable (1915) and the Bridge Crane (also known as the Crane Runway and the Gantry Crane, 1921).



Aerial photograph showing the historic buildings and structures to be preserved.



MACHINE SHOP

Built in 1921. A footprint of 139,316sf and ~~Contains 165,000sf including~~ includes a partial mezzanine in the ~~Bench Bay Bay #1~~. Divided into 4 bays, with an exterior 5th bay at the South for unloading, also known as the Crane Runway.

Entirely glazed north and south façades. 1/4" thick, single glazed panels, 14"x20", set in steel sashes. Partially glazed East and West façades set into reinforced concrete frames.

The Lower 18' of the north façade contains continuous bi-fold steel frame doors, supported on rollers, that allowed the locomotives to move from Machine Shop to the exterior Transfer ~~Table Platform~~.

Mechanically operated natural ventilation, large crank/pulley devices controlled multiple operable sashes at once. Equipment looks to be in decent shape.

Rooftop skylights allowing no direct sun. Single glazed, ribbed, wire glass. Skylights are also mechanically operable on one side only. Almost all panels are broken, resulting from apparent vandalism (target practice).

2 large mechanical rooms contained two large electrical fans providing 90,000cfm and 68,000cfm respectively, capable of 3 complete air changes per hour. Air was forced across steam heated coils when ~~required req'd~~ for heating load. Ductwork throughout structure followed column lines to the distribution point 7' above floor.

Flooring: 6" concrete slab, finished to a true surface, primed with a 1/8" bituminous coating, upon which 3" creosoted (distillate derived entirely from tars produced from the carbonization of bituminous coal) end-grain wood blocks were laid, with pitch interlaid between for waterproofing. Wood floor is in poor condition and creosote is carcinogenic.

Steel Frame Structure, columns designed to support 16 tons each. Each column is supported on a concrete foundation supported upon creosoted wooded piles, driven on average 26' into the earth. Frame also supports various cranes, still intact, not known if still operable, largest crane supports 250 tons.

Building contained 3 electric Otis elevators serving one Mezzanine Level that was historically used for offices and files. Elevators have been removed, only shafts remain.

Roof is double sheathed with built-up roofing. Roof surface is in poor condition although the Machine Shop roof looks to be in better shape than other buildings on-site.



Machine Shop, Bench Bay #1 - Below board formed, cast in place, concrete mezzanine.



Machine Shop, Light Machinery Bay #2, Pyramidal skylights run between the Heavy and Light Machinery Bays bays 2 and 3.



Machine Shop, View Towards East-West Elevation



Machine Shop, Heavy Machinery Bay #3.



Machine Shop, Erecting Bay Bay #4, 57' clear height to underside of truss structure. Floor troughs can be seen across slab.



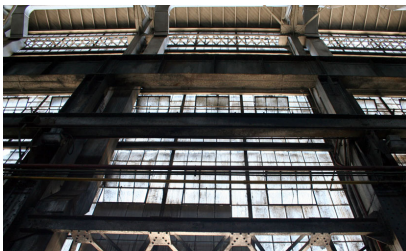
Machine Shop, Erecting Bay Bay #4 - View from within floor trough.



North interior elevation showing large operable doors.



HVAC Duct distribution from Central Plant.



North interior elevation.

Machine Shop, North elevation, View from Transfer Table.



North elevation, Operable doors.



North elevation, Operable doors.



North elevation, Completely glazed façade.





Skylight detail.



Gear/Pulley mechanism for skylight operation.



Crank mechanism for skylight operation.



Machine Shop, Pyramidal skylights over the Heavy and Light Machinery Bays 2 and 3.



Longitudinal view from mezzanine catwalk.



Mezzanine elevator machine room (cab has been removed).



Transverse view from mezzanine.



Wired skylight glazing.



Machine Shop,
View up toward
mezzanine level.



Machine Shop, View from Room looking North.



Pyramidal skylights.



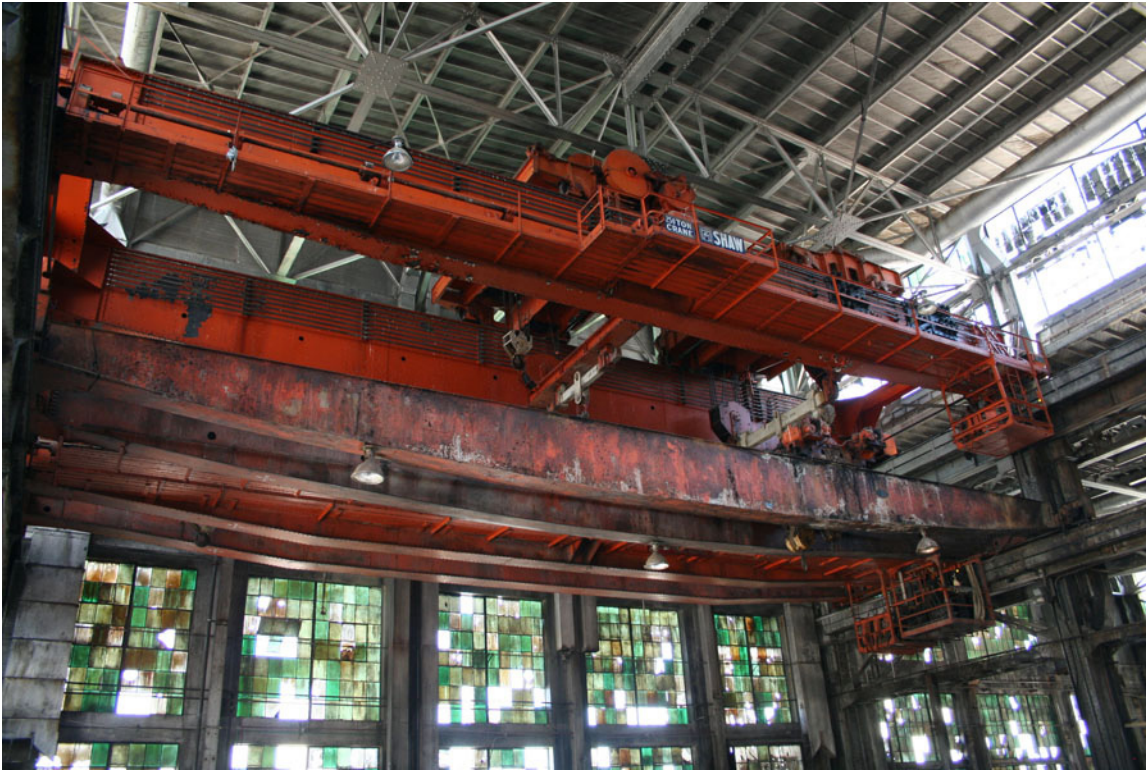
Clerestory skylight at Erecting Bay Bay #4.



View of Erecting Bay Bay #4 from roof clerestory.



Built-up roofing, positive slope to South.



Machine Shop,-Erecting Bay Bay #4, Main 250 ton crane.



Flooring, 3" thick creosoted end-grain wood blocks.



Erecting Bay Bay #4, Floor trough.



Erecting Bay Bay #4 columns supported on deep piles, damped by springs.



Southeast corner, adjacent active BNSF rail lines .



West Elevation, Cast in Place Concrete Frame.



BRIDGE CRANE

The Bridge Crane, also known as the Gantry Crane or the Crane Runway is a 15 ton crane that runs along the South elevation of the Machine Shop.



*15 Ton Bridge Crane Connected to South Elevation of Machine Shop.
Crane structure extends to 2nd Street.*



Bridge Crane, View from Machine Shop Roof, North towards South.



Bridge Crane, View from South West Corner.



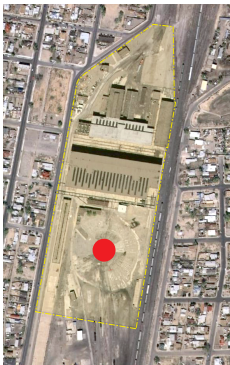
Bridge Crane, View from East Elevation.



*South bay, Crane Runway ,
Exterior loading crane.*



Bridge Crane, View from West Elevation.



TURNTABLE

Plate girder steel turntable with head frame, motorized, set in 120' diameter cylindrical pit c.4 feet deep with poured concrete walls. The structure served a supporting function in a complex proposed for City Landmark designation in the City's Barelas Sector Development Plan. The turntable is an essential part of the complex. Currently used by BNSF Railway Co. The turntable is a key remnant of the shops complex, its historic integrity

is high. It is driven by an internal combustion engine and drive gear.
Head frame:



Turntable, View from South.



Machine Shop, South Elevation, View across turntable.



Turntable, View from South.



Turntable, View from North side.



Turntable, View from Machine Shop Roof.



BOILER SHOP

Built in 1923. Contains 58,100sf. Divided into 2 bays. Entirely glazed south façade and partially glazed north façade. 1/4" thick, single glazed panels, 14"x20", set in steel sashes. Partially glazed East and West façades set into reinforced concrete frames. The Lower 18' of the south façade contains continuous bi-fold steel frame doors, supported on rollers, that allowed the locomotives to move from Boiler Shop to the exterior Transfer Table Platform.

Mechanically operated natural ventilation, large crank/pulley devices controlled multiple operable sashes at once. Equipment looks to be in decent shape.

Rooftop skylights allowing no direct sun over Northern bay only. Single glazed, ribbed, wire glass. Skylights are also mechanically operable on one side only.

Mechanical rooms similar in concept to that of the Machine Shop although much smaller due to the fact that the Boiler Shop is 1/3 the area.

Flooring: 6" concrete slab, finished to a true surface, primed with a 1/8" bituminous coating, upon which 3" creosoted (distillate derived entirely from tars produced from the carbonization of bituminous coal) end-grain wood blocks were laid, with pitch interlaid between for waterproofing. Wood floor is in poor condition and creosote is carcinogenic.

Steel Frame Structure. Frame supports various cranes, still intact, not known if still operable.

Exposed wood plank ceiling is intact, although severe damage can be seen at the southern edge of the South Bay.

Roof is double sheathed with built-up roofing. Roof surface is in poor condition, and in some cases, completely void where the plank ceiling has been damaged.

Various auxiliary buildings are directly connected to the Boiler Shop, e.g. Tank Shop, Flue Shop, and the firing shed Paint Shop. ~~The Paint Shop is not worthy of restoration and should be removed.~~

Electric Transformer, not original to the site, has been located at the Western edge of Bay #2 and looks to be still active.



Northeast corner, Reinforced concrete with @ fully glazed perimeter wall.



North elevation, Exterior courtyard in foreground.



Firing Shed Paint Shop attached to West elevation, Transfer Table in foreground.



West elevation, Glazing inset to concrete frame.



Boiler Shop, South elevation, View from Transfer Table.



Boiler Shop, View from South Operable Doors



Boiler Shop, *Erecting Bay Bay #1*, Fully Glazed southern elevation, Crane at rear. Floor troughs seen across



Boiler Shop, *Erecting Bay Bay #1*, Fully Glazed southern elevation with 18' tall operable doors.



Boiler Shop, *Heavy Equipment Bay Bay #2*, Pyramidal skylights



Boiler Shop, *Heavy Equipment Bay Bay #2*, Pyramidal skylights, entrance to Flue Shop at immediate right.



Crane operator workstation, Heavy Equipment Bay Bay #2.



Boiler Shop, Cranes in Erecting Bay at Bay #1.



Crane Controls.



Damaged flooring, 3" thick creosoted end-grain wood blocks



Stair access to mechanical rooms, at columns lines between the Erecting and Heavy Equipment Bays Bays #1 and #2.



BLACKSMITH SHOP

Built in 1917, with the exception of the Storehouse, the Blacksmith Shop is the oldest remaining building on-site. Contains 24,879sf.

Predominantly glazed east and west façades set between vertical bands of masonry. The Blacksmith Shop is the only brick shop building on the site. This is the only masonry building remaining on the site.

North and South façades are primarily masonry with much smaller openings, except for a large bi-fold central door at both façades. Interior of masonry walls have been painted white.

South elevation abuts Transfer Table, and east West elevation abuts the railroad tracks. Very little provision for mechanically operated natural ventilation, fan units were integrated into the East and West façades in subsequent years.

No Rooftop skylights. No Mechanical rooms.

Flooring: Concrete slab on grade.

Steel Frame Structure. Columns are themselves built up trusses. No cranes evident in space. Truss shape is unique.

Exposed wood plank ceiling is intact, water damage is evident although ceiling is in relatively good condition.

Seismic retrofitting is evident at exterior masonry walls at attachments to steel support structure. Alternatively, steel plates may have resulted from some early form of post-tensioning.

Central rail lines remain through center of bay, recessed into the concrete floor.



Blacksmith Shop, Steel Trusses, Wood Plank Ceiling, Glazed East and West elevations.



Blacksmith Shop, South Elevation.



Exterior walkway between Blacksmith Shop (Left) and Flue Shop (Right), Machine Shop/Transfer Table shown in background.



Blacksmith Shop, Steel Truss at column surrounded by masonry wall.



South Elevation showing proximity to Boiler Shop to the West.



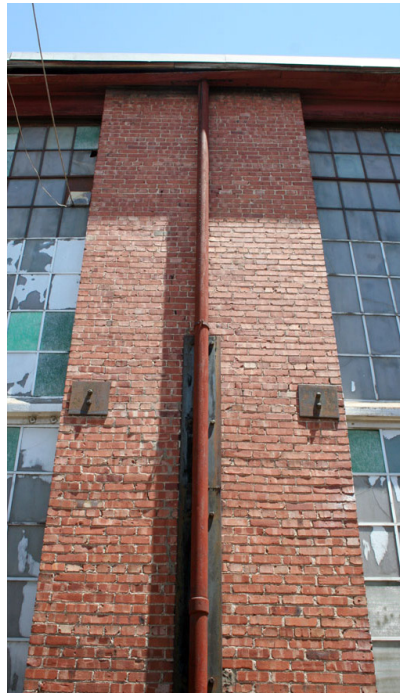
Interior View toward South Elevation Masonry wall.



North Elevation from adjacent parcel.



Fan equipment at Glazed Elevation.



West/East Elevation, Seismic Steel Plate upgrades.



Steel 'trussed' column.



FLUE SHOP

Built in 1920. Contains 9,464sf. 8,878sf.

All concrete cast in place construction makes it unique to the complex with the exception of the Storehouse and some less significant miscellaneous site buildings.

Predominantly glazed east and west façades set between vertical bands of concrete.

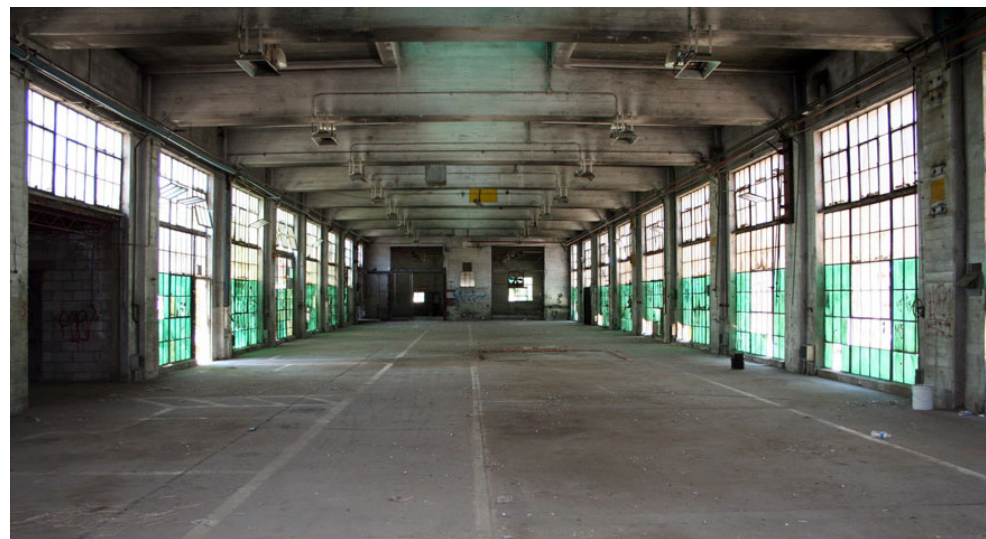
North façade is primarily cast in place concrete with two large openings. South end of building opens directly to adjoining Boiler Shop. East elevation abuts Blacksmith Shop/exterior walkway and West elevation abuts exterior courtyard. Courtyard surface is hardscape but cracked with weeds. A few trees have grown up over the years.

Mechanically operated natural ventilation made possible by operable clerestory skylights.

Unlike other buildings, lighting fixtures can be seen throughout, a small amount of mechanical ductwork is visible, with registers supplying the shop. These are not original to the structure.

Ceiling, walls, beams, and slab are all cast in place concrete.

Seismic retrofitting is evident at exterior concrete walls at attachments to concrete beams. Alternatively, steel plates may have resulted from some early form of post-tensioning.



Flue Shop, View down center of Bay.



Steel plate seismic upgrades.



Operable windows.

Flue Shop, Interior view of entrance, Boiler shop shown beyond.



Flue Shop, View up toward operable clerestory windows.



TANK SHOP

Also known as the Tender Repair Shop. ~~Latest building constructed on site,~~ Built in 1925. Contains 18,564sf.

Building is very similar in structure to the Heavy Equipment Bay ~~Bay #2~~ (northern bay) of the Boiler Shop.

Entirely glazed east and west façades, ~~although the Cab Paint Shop although a very low non-original concrete block with stucco building was added to the site that~~ blocks the lower 15' of the western façade.

~~This stucco building should be removed.~~ 1/4" thick, single glazed panels, 14"x20", set in steel sashes throughout. Partially glazed North façade with large openings to accommodate locomotive transfer set into reinforced concrete frames. South façade opens directly to the Boiler Shop.

Mechanically operated natural ventilation, large crank/pulley devices controlled multiple operable sashes at once. Equipment looks to be in decent shape.

Rooftop clerestory skylights allowing no direct sun run down center of bay. Clerestory shape is distinctive from 'A' frame skylights found in the Boiler and Machine Shops. Single glazed, ribbed, wire glass. Skylights are mechanically operable on both sides.

Mechanical ductwork is visible running through the space is likely to contain asbestos. Mechanical equipment is probably located on rooftop, although this would need to be confirmed. Flooring: Concrete slab on grade.

Steel Frame Structure. Frame supports one central 30 ton crane, manufactured by Shaw, still intact, not known if still operable. Full

height, large braced frames exist in 3 locations on both East and West façades to deal with lateral loading in North/South direction. Exposed wood plank ceiling is intact, although severe damage can be seen at the western edge.



Northwest Corner, Cab Paint Shop in the foreground. Stucco building in foreground to be removed.



Tank Shop, North elevation.



Tank Shop, Interior view, central bay with Shaw 30-ton crane in foreground.



Interior view, West fully glazed elevation with lower 15' blocked by non-original adjacent building.



FIREHOUSE

Built in 1920. Contains 3,936sf on two floors. With the exception of the mezzanine in the Machine Shop, this is the only above grade floor in the complex. The Firehouse is the only building in the complex recognized as a [City Landmark historic structure](#) by the City of Albuquerque. Below find the City's description taken from their website:

"The Atchison, Topeka and Santa Fe Railway Fire Station was built in 1920 to serve the railroad's shop and roundhouse complex, located south of the passenger depot and Alvarado Hotel. It was one of the last buildings constructed by the railroad in Albuquerque, and reflected the company's interest in providing independent services and utilities for its operations.

This is Albuquerque's oldest remaining fire station. Its rustic architecture is rare in the city, conveying the railroad architect's romantic images of the Southwest. E.A. Harrison's design features a rough, sandstone exterior with an asymmetrical tower, crenellated parapet and sleeping porch. The tower itself is decorated with tiled overhangs, protruding beams, a stone insignia and ornamental globes. The building's sandstone, quarried at Laguna Pueblo, was taken from a demolished 1881 roundhouse built by the Atlantic and Pacific Railroad, a forerunner to the AT&SF. The protection of all of these features is included under its Landmark status.

The fire station was used as offices for several years following the demolition of the roundhouse. It is currently vacant but still stands as a reminder of the important role that the AT&SF industrial complex played in Albuquerque's economy through most of the 20th century."



Historic Photos, AT&SF Firehouse, Courtesy of City of Albuquerque.



Firehouse, West Elevation.



Firehouse, South Elevation - Detail.



Southwest Corner showing proximity to Tank Shop in background.



Firehouse, South Elevation.



East Elevation.



STOREHOUSE WITH PLATFORM

Built in 1915. 1-story, poured concrete building of 50 feet by 417 feet plan dimensions. Storehouse sits on a concrete platform with 10- foot wide runways/ loading docks on east and west sides. Platform extends south of building and beyond. Building held stores for AT&SF Railway Company administration and management- forms, tools, toilet paper- for the entire line. Storehouse is ancillary to the shops operation but served other

AT&SF facilities near and far during the 1914-1953 period. Its historic integrity is high. An oil cellar is partly exposed on the platform just south of the building. Storehouse's southern bay is a space unto itself and accessible only via two exterior doors.



Aerial view of Storehouse from roof of Machine Shop.



Storehouse, View from North.



*Storehouse, View from roof of
Machine Shop.*



Storehouse, View from Inside.



TRANSFER TABLE

Concrete-lined pit with east-west tracks and electrically powered gear-driven table with operators' cab and north/south track in a steel-plate deck. Also includes a nonpowered table with north-south track. Transfer Table was an essential part of locomotive shops operation and the complex. Electric motor housing by cab, electrical service frames Transfer Tables are rare, far more so than railway turntables. The Transfer Table made this shops complex work as a cross-axial design.



Transfer Table, West Elevation.



*Transfer Table, View
from West.*



Transfer Table, View from East side.



Transfer Table, View from southeast EastSouth Corner to BlackSmith Shop and Boiler Shop.



Transfer Table, View from the southeast EastSouth Corner to BlackSmith Shop and Boiler Shop.



Transfer Table, View from through the East Side.

APPENDIX C: INFRASTRUCTURE REPORT

The infrastructure ~~report section~~ deals broadly with systems designed to convey utilities ~~and circulation~~ to and from the Rail Yards site. Systems are analyzed to determine existing capacity and against this baseline, the development proforma of the ~~Master Concept~~ Plan is evaluated and recommendations for its accommodation are provided. ~~The following infrastructure documentation was compiled and analyzed from multiple sources; credits are provided at the beginning of each section.~~

Note that the information contained in this section is preliminary in nature and intended to provide a baseline analysis and rough order of magnitude summary of future infrastructure requirements only. Specific infrastructural requirements will be detailed prior to Site Plan for Building Permit approvals.

C.1 Infrastructure - Executive Summary:



The redevelopment of the Albuquerque Rail Yards located at 2nd Street SW and Santa Fe Avenue SW has been investigated. Infrastructure needed to support the ~~proposed~~ redevelopment ~~concepts~~ has been analyzed. The analysis will review the existing adjacent infrastructure and capacities, to meet the full proposed build-out of the redevelopment, estimated at 30 work force residences, and ~~819,766~~ **801,592** square feet of “heavy commercial” land use. This ~~report master plan~~ will show existing capacities available for both wet and dry utilities; as well as demands and concept improvements for future redevelopment.

At this time, analysis of the infrastructure to support phasing of the project in order to minimize working capital and maintenance requirements has not yet been undertaken. Rather the current examination is to show the amount of infrastructure required to support the full build-out of the project only.

C.1.1 Water Distribution System

Significant improvements must be made to the potable water distribution system between Hazeldine Avenue and Cromwell Avenue along 2nd Street SW to satisfy fire flow demands for the future development. The Rail Yard appeared to have had its own private water line, consisting of both 6-inch and 8-inch pipes. The recommendation is to replace the existing old on-site system with the a proposed public distribution system that will consist of 8-inch pipes, with the appropriate placed fire hydrants, valves, service meters, and a large cistern that will be used to augment fire flows. Each building will be sized for its own independent water meter; and will also be analyzed for the number of fire hydrants that are required for its building type to meet fire code requirements. Requests to the Albuquerque Bernalillo County Water Utility Authority (ABCWUA) have been made to prepare a fire flow test for the existing distribution system adjacent to the Rail Yard. The results of this analysis have not been received so for the purposes of the master plan, the assumption is that a maximum fire demand for the existing infrastructure of 1,500 gallons per minute (GPM), is achievable. The existing public line in 2nd Street SW will be connected in several locations to the new proposed line within the development.

All new hydrants will be located by the City Fire Marshal’s office, and subsequent utility plans will need to be prepared and approved, by the ABCWUA. Public easements will be required for the proposed on-site distribution system.

The site will require an on-site cistern with an additional water supply volume of 46,300 cf; with a peak potable demand of 520 gpm and a maximum fire demand of 4000 gpm; for a two hour duration. Wilson & Company has addressed these requirements in the body of this master plan. The 46,300 cubic foot cistern with booster pump will be required to support the existing infrastructure to provide fire flow for

the project. The cistern and the booster pump may need to be installed during the first phase of the project in case the existing system pressure in 2nd Street SW drops below 20 psi, to address an emergency situation.

The project is also planned to have open space areas, which will be irrigated; with low flow or special irrigation to prevent the unnecessary use of potable water.

C.1.2 Wastewater Collection

Wastewater generated from the proposed developed site will be collected by a series of internal private systems. The proposed system will connect to the existing 8-inch line in 2nd Street SW at 2 locations: near the crossing streets of Atlantic Avenue SW; and Santa Fe Avenue SW. The existing 8-inch line has a capacity of 0.85 cfs. The existing 8-inch line is required to be upsized to a 12-inch line as part of this project. A third connection will be made to the proposed 12-inch line in 2nd Street SW south of Pacific Avenue in order to handle the additional flows. The proposed 12-inch line has a capacity of 2.52 cfs. The line at the intersection of Cromwell Avenue SW and 2nd Street SW is a 12-inch line. The existing capacity of the 12-inch line is 2.52 cfs. Each proposed 8-inch sanitary sewer line has capacity of 0.85 cfs. The technical discussion in the body of this [master plan report](#) shows the peak demand at each of the proposed sanitary connections within the development.

The existing on-site sanitary system will be completely replaced for the purpose of this report [master plan](#).

C.1.3 Stormwater Management System

Stormwater management is a critical element for the proposed development. Drainage patterns will remain similar to those of the existing condition; however, no detention is currently provided for the mostly impervious Rail Yard. Through an existing agreement with the

City of Albuquerque, the proposed project will be allowed to release at a rate of 2.75 cfs per acre of development. The existing drainage patterns, with very flat slopes running from east to west, show 3 natural drainage basins, which will be similar for final grading of the proposed site. Each basin (Basin A-1 located at the northern end of the development, Basin A-2 located in the middle of the development and Basin A-3, located in the southern portion of the development) will provide its own detention areas, whether by underground cistern, porous landscape techniques, bio-swales, rain gardens, or other general low impact improvements accepted for high density urban environments. The onsite system for collection and detention will be a private system connecting to the public gravity system located in 2nd Street SW. It is anticipated that each of the basins will require:

- Basin A-1; total volume of storage required 17,978 cf, with max discharge of 20.1 cfs
- Basin A-2; total volume of storage required 20,309 cf, with max discharge of 22.6 cfs
- Basin A-3; total volume of storage required 28,807 cf, with max discharge of 32.2 cfs

For the purposes of this [report master plan](#), Wilson & Company proposes to incorporate an extensive array of best management practices that respect the flat topography; which reflect the stormwater criteria and regulations. We propose a gravity system consisting of swales, ditches, small diameter piping, and shallow ponds, while attenuating peak discharges, which also adhere to a sustainable design practice for open space and landscape areas.

C.1.4 Dry Utilities

- Gas availability; Contact was made with the New Mexico Gas Company. Based on the general concepts of the site plan, it was

determined that there will be no problem servicing the anticipated load.

- Century Link availability; Contact was made with Century Link. Its main copper and fiber optic facilities located at 4th Street SW, between Coal and Bridge can be extended to serve the Rail Yard development.
- Comcast availability; Contact was also made with Comcast; Capacity is available to provide service to the proposed Rail Yard site.
- PNM availability; An existing sub-station is located at the northern end of the project across 2nd Street SW that has been estimated to provide 1.5 megawatts. The assumption for the development is that the electricity demand will exceed 8 megawatts; requiring the existing sub-station to be expanded, along with the construction of primary distribution lines to the proposed development. The project may also require a new 115kV transmission line to be extended to connect to the expanded substation. Additional analysis through PNM will be required to develop a final conceptual plan for this development.

C.2 Water Distribution

This section of the report master plan is intended to address the future water distribution system for the Albuquerque Rail Yard. The proposed public water distribution system within the site is intended to serve a dual function of domestic service, as well as fire protection flows. Based on the proposed Parcel Map, Floor Area Ratios (FAR), and Projected Usages prescribed within the Master Development Plan, the demands on the water service system have been estimated as outlined within this section of the report master plan.

C.2.1 Existing Infrastructure

According to municipal maps, a private water distribution system within the Rail Yard did exist at one time. It has since been abandoned and its size and condition is unknown at this time. Therefore, for the purposes of master planning within this section of the report master plan, it has been deemed infeasible to re-use the existing on-site system. Instead, this section will schematically layout a new system designed to specifically meet the requirements of the proposed development.

The existing public potable water distribution system to the west of the site within 2nd Street SW consists of a 6" main. An 8" main also exists within Commercial Street SE to the east. However, due to the feasibility and potential expense of crossing the existing railroad tracks to reach the main in Commercial Street the recommendation of this document is that water services be obtained from 2nd Street SW.

*Note: If additional resources can be identified through working with the Albuquerque Bernalillo County Water Utility Authority this could be revisited during the initial designs.

C.2.2 Proposed Development

The proposed concept for development will consist of numerous buildings, both existing buildings to be rehabilitated and new construction. The site is proposed to be has-been divided into ten parcels as part of the master planning process. Each of these parcels was assigned a floor area ratio (FAR) and proposed use. The FAR and parcel area then dictated the potential build-out for development within each parcel. It is these fully built-out square footages that were used in the calculations of the domestic and fire demands.

C.2.3 Domestic Demand Calculation

The Volume II – Design Criteria, Chapter 25: Waste System Design Criteria of the Albuquerque Development Process Manual does not dictate a method for estimating design flows. Therefore, the domestic demand has been calculated by use of the sanitary sewer flows based on the potential build-out outlined above. The sanitary sewer flows were modified to approximate domestic demand by assuming a 20% water consumption rate. Domestic demands for the proposed development are as follows:

Parcel ID	Proposed Use (Per Master Plan)	Domestic Demand (MGD)
1	Cultural Facilities: Museum, Performing Arts	0.174
2	Work-Force Housing	0.122
3	Cultural Facilities: Museum, Live Work	0.029
4	Open Space; Accessory Retail	N/A
5	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media. Accessory Cultural Uses.	0.157
6	Open Space	N/A
7	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media	0.040
8	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media	0.104
9	Open Space/Commercial: Retail, Restaurant, Service	0.023
10	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media	0.100

C.2.4 Fire Flow Demand Calculation

Fire flows for the proposed development were approximated using the International Fire Code Table B105.1. Building Type IIB was assumed for both existing structures to be rehabilitated and proposed new structures. Type IIB was selected due to its non-combustible, non-rated classification. The flow rates from the table were then reduced by 50%

due to the assumption that all buildings will be sprinkled as allowed by the Fire Code. The required flow durations were also obtained based on the projected demands. See the table below for a summary:

Parcel ID	Buildable Area (SF)	Construction Type*	Fire Flow** (GPM)	50% Reduction for Sprinklers (GPM)	Flow Duration As Required by Code (Hours)
1	240,567	IIB	8000	4000	4
2	77,264	IIB	6000	3000	3
3	31,791	IIB	4750	2375	2
4	N/A	N/A	N/A	N/A	4
5	214,121	IIB	8000	4000	4
6	N/A	N/A	N/A	N/A	4
7	45,447	IIB	4750	2375	2
8	134,984	IIB	7750	3875	3
9	24,554	IIB	4750	2375	2
10	128,304	IIB	7500	3750	3

C.2.5 Proposed System Layout and Design

The proposed water distribution system on site was laid out with two main objectives. The first was to provide infrastructure to fully service various connection points throughout the parcel as well as place new fire hydrants to meet the spacing requirements. The second objective was to provide an independently looped system within the boundaries of the site. By doing so it allows fire demands for the development to be met by a single cistern and pump system, which will be installed during the initial phasing of the project.

At the time this document was prepared, no existing flow data was available for the municipal water distribution system adjacent to the site. It has been assumed that the 6" water main in 2nd Street SW will not have an ability to sufficiently supply fire flows for the proposed development. Therefore, it is proposed a booster pump and cistern system be centrally located within the site's water distribution

network to meet the demands estimated in the table above. The proposed cistern size of 46,300 cf and pump size of 2,500 GPM is intended to supplement a projected draw of 1,500 GPM from the city infrastructure to meet the maximum flow of 4,000 GPM for a maximum duration of 2 hours.

It is important to note that the Code requires flow durations in excess of that which the pump system can supply. This non-compliance with Code has been disregarded due to the nature of the flows that have been calculated. The flows are calculated using bulk buildable square footages for different parcels of the site that in many cases include multiple structures. During the formal design of the development more accurate, building specific calculations will be performed that will result in lower flow values and durations. The conceptual fire system is, therefore, conservative and appropriate for planning purposed as the project moves forward. Also use of fire rated construction in larger buildings can be used to reduce demand.

- Attachments:
- Domestic Demand Calculations

Fire Demand Calculations

Existing Water Infrastructure Map

Proposed Conceptual Water Infrastructure Map

Albuquerque Rail Yard - Domestic Demand Estimation

Parcel ID	Proposed Use (Per Masterplan)	Parcel Area (SF)	Proposed FAR	Buildable Area (SF)	Proposed Use (For Utility Sizing)*	Design Flow Per Sanitary* (MGD)	Usage Factor	Domestic Demand (MGD)
1	Cultural Facilities: Museum, Performing Arts	370,103	0.65	240,567	Heavy Commercial	0.145	1.2	0.174
2	Work-Force Housing	77,264	1.00	77,264	80 DU (~1,000SF/DU)	0.101	1.2	0.122
3	Cultural Facilities: Museum, Live Work	63,582	0.50	31,791	Heavy Commercial	0.024	1.2	0.029
4	Open Space; Accessory Retail	40,120	N/A	N/A	N/A	N/A	N/A	N/A
5	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media. Accessory Cultural Uses.	142,747	1.50	214,121	Heavy Commercial	0.131	1.2	0.157
6	Open Space	79,893	N/A	N/A	N/A	N/A	N/A	N/A
7	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media.	30,298	1.50	45,447	Heavy Commercial	0.033	1.2	0.040
8	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media.	89,989	1.50	134,984	Heavy Commercial	0.087	1.2	0.104
9	Open Space/Commercial: Retail, Restaurant, Service.	98,216	0.25	24,554	Heavy Commercial	0.019	1.2	0.023
10	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media.	197,390	0.65	128,304	Heavy Commercial	0.083	1.2	0.100

* - Per Albuquerque Development Process Manual - Chapter 24 - Sanitary Sewer Design Criteria

Albuquerque Rail Yard - Fire Demand Estimation

Parcel ID	Proposed Use (Per Masterplan)	Parcel Area (SF)	Proposed FAR	Buildable Area (SF)	Construction Type*	Fire Flow** (GPM)	50% Reduction for Sprinklers (GPM)	Flow Duration (Hours)
1	Cultural Facilities: Museum, Performing Arts	370,103	0.65	240,567	IIB	8000	4000	4
2	Work-Force Housing	77,264	1.00	77,264	IIB	6000	3000	3
3	Cultural Facilities: Museum, Live Work	63,582	0.50	31,791	IIB	4750	2375	2
4	Open Space; Accessory Retail	40,120	N/A	N/A	N/A	N/A	N/A	4
5	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media. Accessory Cultural Uses	142,747	1.50	214,121	IIB	8000	4000	4
6	Open Space	79,893	N/A	N/A	N/A	N/A	N/A	4
7	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media	30,298	1.50	45,447	IIB	4750	2375	2
8	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media	89,989	1.50	134,984	IIB	7750	3875	3
9	Open Space/Commercial: Retail, Restaurant, Service	98,216	0.25	24,554	IIB	4750	2375	2
10	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media.	197,390	0.65	128,304	IIB	7500	3750	3

* - Construction Type IIB assumed for all buildings: non-combustable, non-rated

** - Fire Flows per IFC Table B105.1



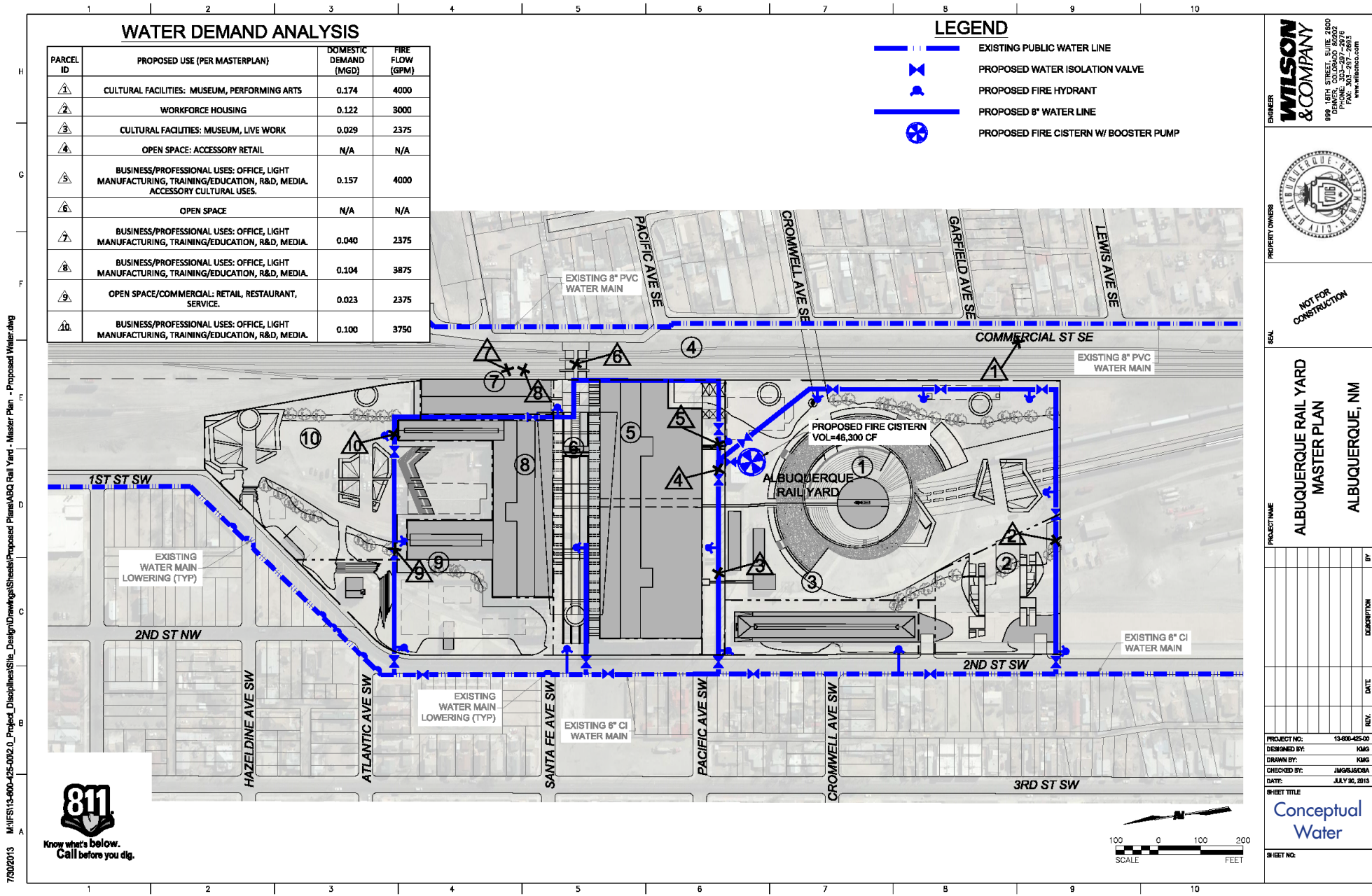


Figure 189b: Master Plan - Proposed Conceptual Water

C.3 Wastewater Collection

This section of the [report master plan](#) is intended to address the proposed sanitary flows that will be contributed from the Albuquerque Rail Yard. The ~~proposed~~ development [concepts with will](#) be comprised of a minimum 30 dwelling units and 5 analysis points of mixed commercial use that has a total parcel area of ~~992,325~~ 1,189,602 square feet, of which ~~819,766~~ 801,592 square feet is the allowable buildable “heavy commercial” land use area. The analysis points are laid out as such:

- Analysis point 1 consist of Parcels 9 and 10
- Analysis point 2 consist of Parcels 5, 7, and 8,
- Analysis point 3 consist of Parcels 1, 2, and 3,
- Analysis point 4 is the combination of analysis points 1 and 2, and
- Analysis point is the combination of analysis point 1 and 4

****Note:** See attached [Master Plan Proposed Sanitary Figure 20b Conceptual Wastewater](#) for analyses point locations and Parcel ID.

The following calculations have been prepared to meet the requirements of Volume II – Design Criteria, Chapter 24: Sanitary Sewer Design Criteria of the Albuquerque Development Process Manual.

- Analysis Point 1 Proposed Flow
Avg Flow = (5,968 GPD/AC)(6.79 AC)(10-6) = 0.040 MGD
Peak Flow = 2.5(0.040)0.8875 = 0.145 MGD
Design Flow = (1.2)(0.145 MGD)(1.547) = 0.270 cfs
Total Design Flow for Analysis Point 1
Total Design Flow = 0.27 cfs
- Analysis Point 2 Proposed Flow
Avg Flow = (5,968 GPD/AC)(6.04 AC)(10-6) = 0.036 MGD

Peak Flow = 2.5(0.036)0.8875 = 0.131 MGD
Design Flow = (1.2)(0.145 MGD)(1.547) = 0.243 cfs
Total Design Flow for Analysis Point 2
Total Design Flow = 0.24 cfs

- Analysis Point 3 Proposed Flow
Commercial Portion
Avg Flow = (5,968 GPD/AC)(9.96 AC)(10-6) = 0.059 MGD
Peak Flow = 2.5(0.059)0.8875 = 0.204 MGD
Design Flow = (1.2)(0.204 MGD)(1.547) = 0.379 cfs

Dwelling Portion
Avg Flow = (80 DU)(2.5 People/DU)(110 GPD/Person)(10-6) = 0.022 MGD
Peak Flow = 2.5(0.022)0.8875 = 0.084 MGD
Design Flow = (1.2)(0.084 MGD)(1.547) = 0.157 cfs
Total Design Flow for Analysis Point 3
Total Design Flow = 0.157 cfs +0.379 cfs = 0.54 cfs

The above mentioned results are the quantities that were obtained using the heavy commercial sanitary average flows provided by Volume II – Design Criteria, Chapter 24: Sanitary Sewer Design Criteria of the Albuquerque Development Process Manual. The heavy commercial sanitary flows were chosen to be conservative when projecting the additional flows and were compared the City and Country of Denver Department of Public Works Sanitary Sewer Design Technical Criteria Manual (See attached CCD Table 2.04.3 – Commercial/Industrial Flow Factors), in order to allow for reasonable assumptions to be made. No data on existing sanitary sewer conditions have been provided prior to this report, such as slope and sanitary flows.

Analyses were performed using FlowMaster software to determine

the allowable capacities of the existing sanitary sewer system. The analysis revealed the existing 8" Vitrified Clay Pipe, VCP, running along the west side of the future development had an allowable capacity of 0.85 cfs, assuming the current system runs at a 0.5% slope. Thus the 0.27 cfs calculated at analysis point 1 (See attached Proposed Sanitary Site Layout for location) could flow into the existing 8" VCP with a remaining capacity of 0.58 cfs (68.2%). Analysis point 4, which is a second proposed connection to the above mentioned existing 8" VCP pipe in 2nd Street SW, will be the combination of the flows from analysis points 1 and 2, which have a total projected flow of 0.51 cfs. The additional 0.51 cfs could be added to the existing 8" VCP sanitary with a remaining 0.34 cfs (40.0%). These analyses were done separate due to the lack of data provided on current conditions.

South of analysis point 5, the ~~report master plan~~ proposes the replacement of the 8" VCP with a 12" PVC sanitary pipe, due to the additional flow that will be contributed from analysis point 5, which is a combination of analysis point 1, 2, and 3. The project flow at this portion of the sanitary sewer system will be 1.05 cfs. An analysis was done using FlowMaster to determine the allowable capacity in the proposed 12" PVC pipe. The results of the FlowMaster analysis it was determined the allowable flow capacity of the proposed 12" PVC pipe was 2.52 cfs, therefore a remaining capacity of 1.47 cfs (58.3%) would be allowable for future developments.

With the above mentioned results, it is assumed that with the additional flows and the proposed change to the portion of the existing 8" VCP to a 12" PVC sanitary pipe, between Pacific Avenue SW and Cromwell Avenue SW, that there will be adequate capacities to handle proposed and existing flows.

Attachments: [Master Plan Existing Wastewater Sanitary](#)
[Master Plan Proposed Sanitary Conceptual Wastewater](#)
 Spread Sheet of Analysis Points with Calculated Flows
 Section 2 of Chapter 24: Sanitary Sewer Design Criteria
 CCD Table 2.04.3 – Commercial/Industrial Flow
 Factors
 FlowMaster Worksheet for Existing 8" VCP @ Assumed
 0.5% (Allowable Capacity)
 FlowMaster Worksheet for Existing 12" PVC @ Assumed
 0.5% (Allowable Capacity)

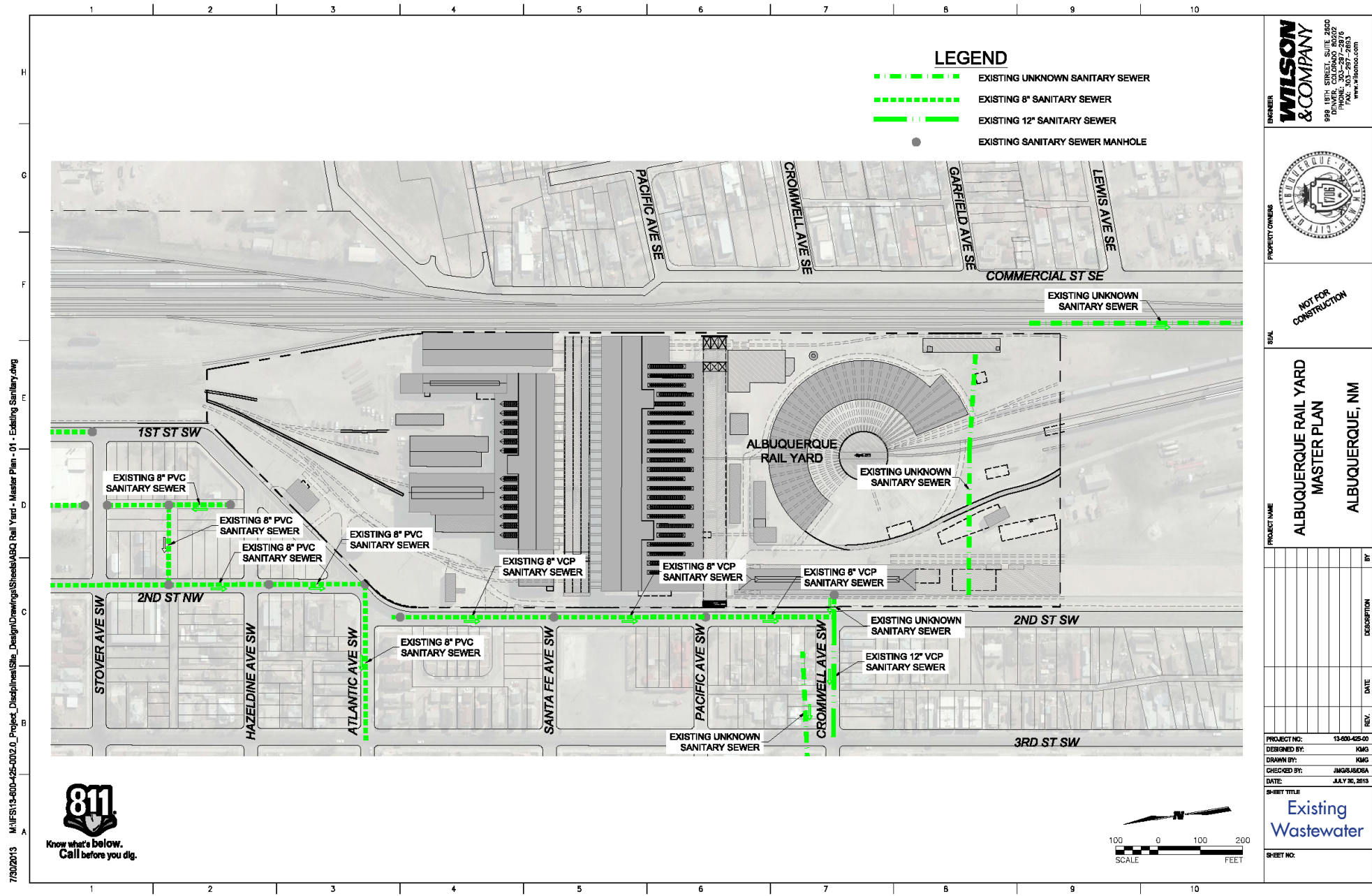


Figure 1920a: Master Plan - Existing Wastewater

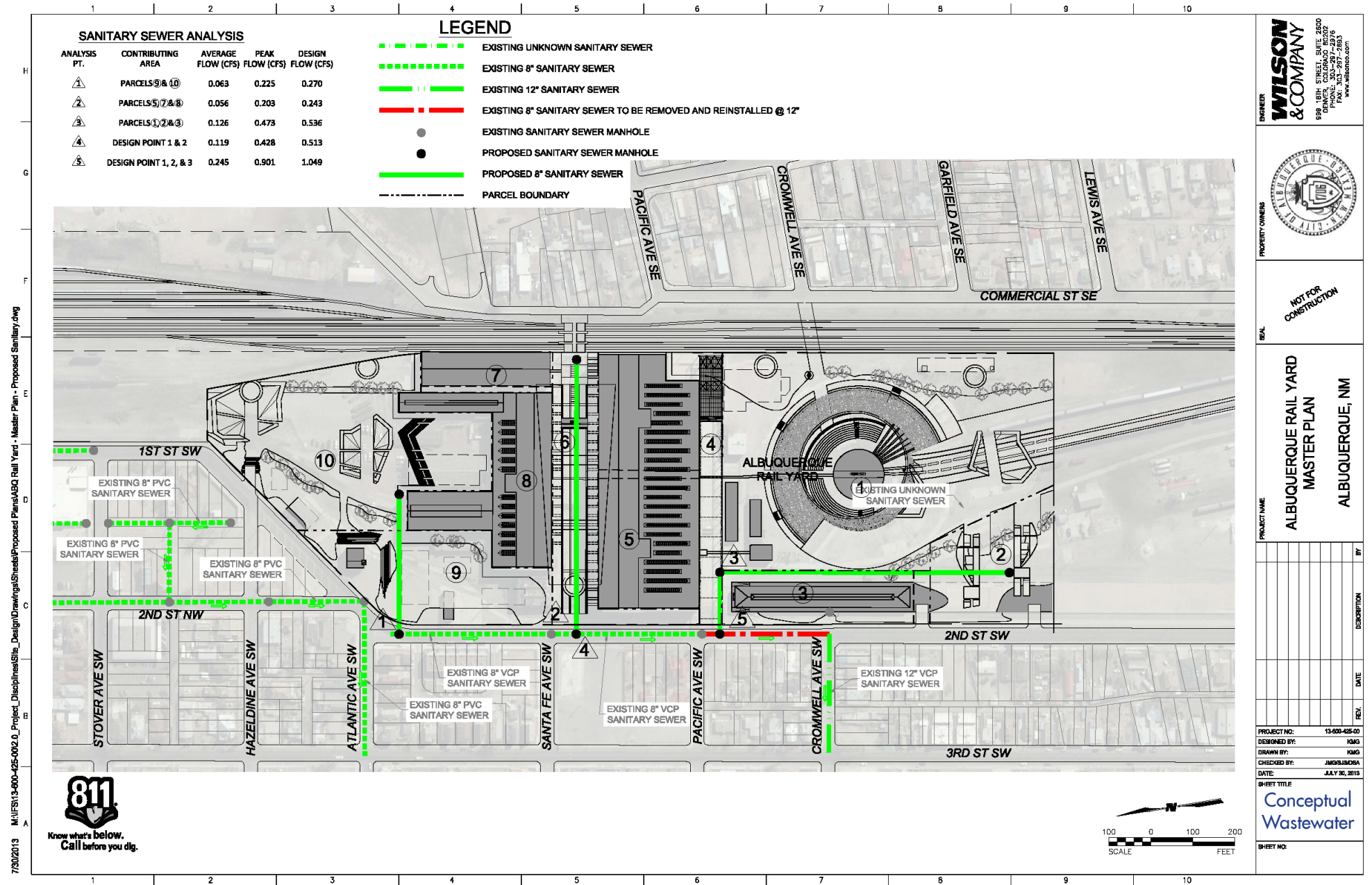


Figure 1920b: Master Plan - Proposed Conceptual Wastewater

Analysis Point 3

Parcel ID	Proposed Use (Per Masterplan)	Parcel Area	Proposed FAR	Buildable Area	Proposed Use (For Utility Sizing)*
1	Cultural Facilities: Museum, Performing Arts	370,103	0.65	240,567	Heavy Commercial
2	Work-Force Housing	77,264	1.00	77,264	80 DU (~1,000SF/DU)
3	Cultural Facilities: Museum, Live Work	63,582	0.50	31,791	Heavy Commercial

Total area (minus WFH Parcel 2 & Open Space Parcel 4) (SF)	433,685	
	MGD	CFS
Ave Flow	0.059	0.092
Peak Flow	0.204	0.316
Design Flow	0.245	0.379
Work-Force Housing	Population	
2.5 persons/DU	200	
	MGD	CFS
Ave Flow	0.022	0.034
Peak Flow	0.084	0.131
Design Flow	0.101	0.157
	MGD	CFS
Total Design Flow for Analysis Point 3	0.346	0.536

Analysis Point 2

Parcel ID	Proposed Use (Per Masterplan)	Parcel Area	Proposed FAR	Buildable Area	Proposed Use (For Utility Sizing)*
5	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media. Accessory Cultural Uses.	142,747	1.50	214,121	Heavy Commercial
7	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media.	30,298	1.50	45,447	Heavy Commercial
8	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media.	89,989	1.50	134,984	Heavy Commercial

Total area (minus open space Parcel 6) (SF)	263,034	
	MGD	CFS
Ave Flow	0.036	0.056
Peak Flow	0.131	0.203
Design Flow	0.157	0.243
	MGD	CFS
Total Design Flow for Analysis Point 2	0.157	0.243

Analysis Point 1

Parcel ID	Proposed Use (Per Masterplan)	Parcel Area	Proposed FAR	Buildable Area	Proposed Use (For Utility Sizing)*
9	Open Space/Commercial: Retail, Restaurant, Service.	98,216	0.25	24,554	Heavy Commercial
10	Business/Professional Uses: Office, Light Manufacturing, Training/Education, R&D, Media.	197,390	0.65	128,304	Heavy Commercial

Total area (minus open space Parcel 6) (SF)	295,606	
	MGD	CFS
Ave Flow	0.040	0.063
Peak Flow	0.145	0.225
Design Flow	0.174	0.270
	MGD	CFS
Total Design Flow for Analysis Point 1	0.174	0.270

	MGD	CFS
Total additional flow	0.678	1.048

No water or sanitary sewer service accounts shall be sold to any development project prior to issuance of a Water and Sanitary Sewer Availability Statement for that specific project. No property may develop or take service in such a manner that leaves adjacent unserved properties without means to obtain service. In accordance with the Water and Sewer Expansion Policies, line extensions are required to cover all frontage of the property requesting service unless all adjacent properties have other means of being served.

Section 2. ENGINEERING DESIGN CRITERIA

Unless modified for a specific project, specifications for pipe and other construction materials and specifications for construction will be as required in the current City of Albuquerque Standard Specifications for Public Works Construction and Standard Details.

A. Design Capacity Criteria Section, Development and Development Service

- Off-site flows will be typically determined by the Planning Department/Utility Development.
- In areas with a mix of residential, commercial, industrial, etc., roughly representative of the city as a whole, the population of the contributing area is determined and the design flows are calculated as follows:

$$\begin{aligned} \text{Average Flow} &= 110 \times \text{Population}/10^6, \text{ in MGD} \\ \text{Peak Flow} &= 2.5 \times (\text{Avg.})^{.8875}, \text{ in MGD} \\ \text{Design Flow} &= 1.2 \times \text{Peak, in MGD} \\ &\text{(for cfs, multiply MGD by 1.547)} \end{aligned}$$

- Population loadings are assumed to be:
 - 2.5 persons per DU for apartments, townhouses and mobile homes
 - 3.0 persons per DU for R-1 single-family homes

Where DU = Dwelling Unit

- In primarily non-residential areas, design flows are determined by other methods as may be appropriate with the approval of the Planning Department/Utility Development, Development & Building Services Center. Following is a summary of non-residential sewer use categories and estimated demand currently used by City staff in the Albuquerque Sewer Analysis Model (ASAM) of the City's major sewer lines:

NOTE: The following land use categories and associated sewer use loading values are established for use with development within the City of Albuquerque Wastewater collection basin. The Land Use Categories relate to standard "Sewer Use Unit Hydrographs" within the City's computer model of the sewer system, Albuquerque Sewer Analysis Model (ASAM). Alternative loadings may be considered or required when justified for a specific development. Impact fees analysis may reflect variations in flows.

LAND USE CATEGORY	AVERAGE FLOW (gpd / Acre)	PEAK FLOW (gpd / Acre)

Light Commercial	1,230	1,621
Heavy Commercial	5,968	7,600
Light Institutional	226	310
Heavy Institutional	1,788	2,448
Light Industrial	447	745
Medium Industrial	1,680	1,982
Heavy Industrial	9,266	10,300

Section 4 of this chapter contains a detailed listing of Land Use Codes and classifications for nearly all possible developed uses, as they are applied in ASAM. Contact Planning Department /Utility Development for assistance in applying rates and determining applicable loadings.

- Design is for full pipe flow at the design flow.
- Manning's Formula is to be used for determination of pipe flow velocities and capacities using a value for Manning's "n" = 0.013.

- Peak velocity = Velocity at peak flow conditions
- Average velocity = Velocity at average flow conditions

B. Manhole Criteria

- Manholes must generally be located on the centerline of street right-of-way or of street width if the street is not concentric with the right-of-way. Manholes for straight lines in curved streets may be located as much as 5' off from centerline of street or right-of-way; however, required clearances from other utilities must be maintained. The offset of such manholes is to be dimensioned from center of manhole barrel to the centerline of the street or right-of-way. In narrow, curving, residential streets, greater than 5' offset may be appropriate to maintain separation from other utilities. Avoid locating manholes in the "wheel path" on arterial and collector roadways, and keep them out of "Parking" lanes and spaces. Manhole locations that conflict with centerline monumentation required for subdivisions, should be shifted, when practical, to eliminate the conflict. Manholes will not be allowed outside of public right-of-way within residential areas except in private streets or within multifamily housing with public easements. All manholes must be accessible by sewer maintenance truck. Manhole locations in residential rear or side yards are not acceptable.

- Standard minimum manhole depth is 6.0', measured from rim to invert. Manhole depths greater than 20 feet shall be avoided.

- The required inside diameter for a manhole is determined as follows:

- Minimum inside diameter is 4.0'.
- A minimum 9" wide shelf must be provided on each side of each main line within the manhole.

CITY AND COUNTY OF DENVER
DEPARTMENT OF PUBLIC WORKS
SECTION 2: SANITARY PLANNING CRITERIA

TABLE 2.04.3 - COMMERCIAL/INDUSTRIAL FLOW FACTORS

Type of Establishment Future Average Flow	(GPD/1000 Gross Building sq. ft.)
Office Buildings	200
Restaurants	500
Bar & Lounges	300
Hotels & Motels	350
Neighborhood Stores	200
Department Stores	200
Laundries & Dry Cleaning	1000
Banks & Financial Buildings	300
Medical Buildings & Clinics	300
Warehouses	100
Meat & Food Processing Plants	2800
Car Washes	1900
Service Stations	20
Auto Dealer, Repair & Service	150
Super Market	200
Trade Businesses - Plumbers, Exterminator, etc.	200
Mobile Home Dealer, Lumber Co., Drive-In Movies, Flea Markets	300
Places of Assembly - Churches, Schools, Libraries, Theaters	600
Factories - Manufacturing raw products into finished products	800
Hospitals	450 gal/bed

Worksheet for 8" Sewer - Capacity

Project Description

Friction Method

Manning Formula

Solve For

Full Flow Capacity

Input Data

Roughness Coefficient

0.013

Channel Slope

0.00500

ft/ft

Normal Depth

0.67

ft

Diameter

0.67

ft

Discharge

0.85

ft³/s

Results

Discharge

0.85

ft³/s

Normal Depth

0.67

ft

Flow Area

0.35

ft²

Wetted Perimeter

2.09

ft

Hydraulic Radius

0.17

ft

Top Width

0.00

ft

Critical Depth

0.44

ft

Percent Full

100.0

%

Critical Slope

0.00848

ft/ft

Velocity

2.45

ft/s

Velocity Head

0.09

ft

Specific Energy

0.76

ft

Froude Number

0.00

Maximum Discharge

0.92

ft³/s

Discharge Full

0.85

ft³/s

Slope Full

0.00500

ft/ft

Flow Type

SubCritical

GVF Input Data

Downstream Depth

0.00

ft

Length

0.00

ft

Number Of Steps

0

GVF Output Data

Upstream Depth

0.00

ft

Profile Description

Profile Headloss

0.00

ft

Average End Depth Over Rise

0.00

%

Worksheet for 12" Sewer - Capacity**Project Description**

Friction Method Manning Formula
Solve For Full Flow Capacity

Input Data

Roughness Coefficient 0.013
Channel Slope 0.00500 ft/ft
Normal Depth 1.00 ft
Diameter 1.00 ft
Discharge 2.52 ft³/s

Results

Discharge 2.52 ft³/s
Normal Depth 1.00 ft
Flow Area 0.79 ft²
Wetted Perimeter 3.14 ft
Hydraulic Radius 0.25 ft
Top Width 0.00 ft
Critical Depth 0.68 ft
Percent Full 100.0 %
Critical Slope 0.00770 ft/ft
Velocity 3.21 ft/s
Velocity Head 0.16 ft
Specific Energy 1.16 ft
Froude Number 0.00
Maximum Discharge 2.71 ft³/s
Discharge Full 2.52 ft³/s
Slope Full 0.00500 ft/ft
Flow Type SubCritical

GVF Input Data

Downstream Depth 0.00 ft
Length 0.00 ft
Number Of Steps 0

GVF Output Data

Upstream Depth 0.00 ft
Profile Description
Profile Headloss 0.00 ft
Average End Depth Over Rise 0.00 %

Worksheet for 12" Sewer - Capacity**GVF Output Data**

Normal Depth Over Rise 100.00 %
Downstream Velocity Infinity ft/s
Upstream Velocity Infinity ft/s
Normal Depth 1.00 ft
Critical Depth 0.68 ft
Channel Slope 0.00500 ft/ft
Critical Slope 0.00770 ft/ft

Worksheet for 8" Sewer - Capacity**GVF Output Data**

Normal Depth Over Rise 100.00 %
Downstream Velocity Infinity ft/s
Upstream Velocity Infinity ft/s
Normal Depth 0.67 ft
Critical Depth 0.44 ft
Channel Slope 0.00500 ft/ft
Critical Slope 0.00848 ft/ft

C.4 Stormwater Management System

This section of the [report master plan](#) is intended to address the drainage analysis for the Rail Yards , and the proposed detention volumes that can be expected with the various basins of the proposed project. The following calculations have been prepared to meet the requirements of Volume II – Design Criteria, Chapter 22: Drainage, Flood Control and Erosion Control of the Albuquerque Development Process Manual (The Manual).

The proposed conditions are obtained from the [concepts Master-Plan](#) for the site. The land treatments for the site have been weighted with 90% Impervious (Treatment D) to comply with a commercial development per The Manual. In the interest of being conservative and because the final ground cover for the site is unknown, the remaining 10% is assumed to be Treatment C. The site is located between the Rio Grande and the San Mateo, and therefore has been determined that the site falls within the Zone ‘2’ precipitation zone. Due to the existing drainage patterns observed on site and the [proposed conceptual](#) layout of the [site Master-Plan](#) we have analyzed the site with three separate drainage basins: A-1, A-2, and A-3. [It should be noted that Conceptual Basin A-2 is the Transfer Table, a historic feature that is proposed to be preserved. Use of the space for stormwater retention may not be compatible with preservation of the Transfer Table.](#)

The 100-year 6-hour event was used as the principal design storm per The Manual. A summary of the hydrology for each basin is as follows:

100-Year 6-Hour Storm Hydrology

- Basin A-1:
Area = 7.37 ac
P360 = 2.35 in
Excess Precipitation = 2.021 in
Peak Intensity = 5.05 in/hr

C100 Coefficient = 0.899
Peak Discharge = 33.2 cfs

- Basin A-2:
Area = 8.23 ac
P360 = 2.35 in
Excess Precipitation = 2.021 in
Peak Intensity = 5.05 in/hr
C100 Coefficient = 0.899
Peak Discharge = 37.4 cfs
- Basin A-3:
Area = 11.71 ac
P360 = 2.35 in
Excess Precipitation = 2.021 in
Peak Intensity = 5.05 in/hr
C100 Coefficient = 0.899
Peak Discharge = 53.2 cfs

The allowable peak discharge for the site post development has been established at 2.75 cfs/acre per the city engineering department. The peak discharge for the developed site is projected to be 4.54 cfs/acre. Therefore, stormwater volume detention will be necessary to reduce the peak discharge to the allowable rate. [Per the Master Plan, Stormwater detention volumes will could be captured and stored within numerous cisterns, or other approved catchment system, on the site. The cistern water captured within the cisterns catchment systems will be released to the municipal storm sewer system at a rate no larger than allowable discharge rate. Stormwater runoff may also be retained in cisterns for use of irrigation at elevations less than the outfall to the municipal system. Should this option be exercised during final design of the storm system, the retained volume cannot exceed 10 acre-ft.](#)

As defined by The Manual, the Hydrograph for Small Watershed method was used to determine the volume of stormwater that must be detained to meet allowable discharge rates for the site. Each of the three (3) basins was analyzed separately. Each basin will contain multiple cisterns so the volumes calculated below represent the total that must be detained. During the formal design process of the campus, it may be determined that it is more feasible to slow discharge for some cisterns and allow other areas of the site to discharge at a rate faster than that allowed or even freely discharge. This design approach would be acceptable as long as two criteria were met: 1) the total site discharge were to be below the allowable rate of 2.75 cfs/acre; and 2) no cistern were to retain water for a period greater than 6 hours. Should drain times exceed the 6 hour limit, design storms in excess of the 100-year 6-hour storm must be analyzed.

Below is a summary of the analysis for the three (3) major basins of the proposed site. Hydrographs representing the 100-year 6-hour design storm were plotted using the parameters defined by The Manual. The allowable discharge was also plotted on the hydrograph. The area between the two is representative of the detention volume necessary. See the attached Hydrographs for more information.

- Basin A-1:
 - Peak Discharge = 33.2 cfs
 - Allowable Discharge = 20.1 cfs
 - Base Time, t_b = 0.713 hours
 - Time to Peak, t_p = 0.198 hours
 - Peak Duration = 0.225 hours
 - Detention Volume = 17,978 cf
 - = 0.413 ac-ft
- Basin A-2:
 - Peak Discharge = 37.4 cfs

Allowable Discharge = 22.6 cfs
 Base Time, t_b = 0.712 hours
 Time to Peak, t_p = 0.198 hours
 Peak Duration = 0.225 hours
 Detention Volume = 20,309 cf
= 0.466 ac-ft

- Basin A-3:
 - Peak Discharge = 11.71 cfs
 - Allowable Discharge = 32.2 cfs
 - Base Time, t_b = 0.712 hours
 - Time to Peak, t_p = 0.198 hours
 - Peak Duration = 0.225 hours
 - Detention Volume = 28,807 cf
 - = 0.661 ac-ft

In summary, the resultant volumes yielded are approximately 2,500 cf of storage required for each acre of the parcel. The consistent unit storage volume is due to use of the uniform Land Treatment of 90% impervious and the uniform allowable discharge of 2.75 cfs/acre. Assumptions made for the non-impervious Land Treatment as well as the time of concentration were conservative. Therefore, the unit storage rate of 2,500 cf/acre is appropriate for future conceptual layout of cisterns as the development of the campus moves forward and drainage basins shift to accommodate desired grading and surface treatments. Use of Low Impact Design techniques such as rain gardens or infiltration swales in the design of the site would result in necessary detention volumes decreasing.

Attachments: [Existing Drainage Map](#)
[Hydrologic Calculations-Conceptual Drainage](#)
[Basin A-1 Hydrograph Existing Dry Utilities](#)
[Basin A-2 Hydrograph](#)
[Basin A-3 Hydrograph](#)
[Section 2 of Chapter 22: Drainage, Flood Control and Erosion Control](#)



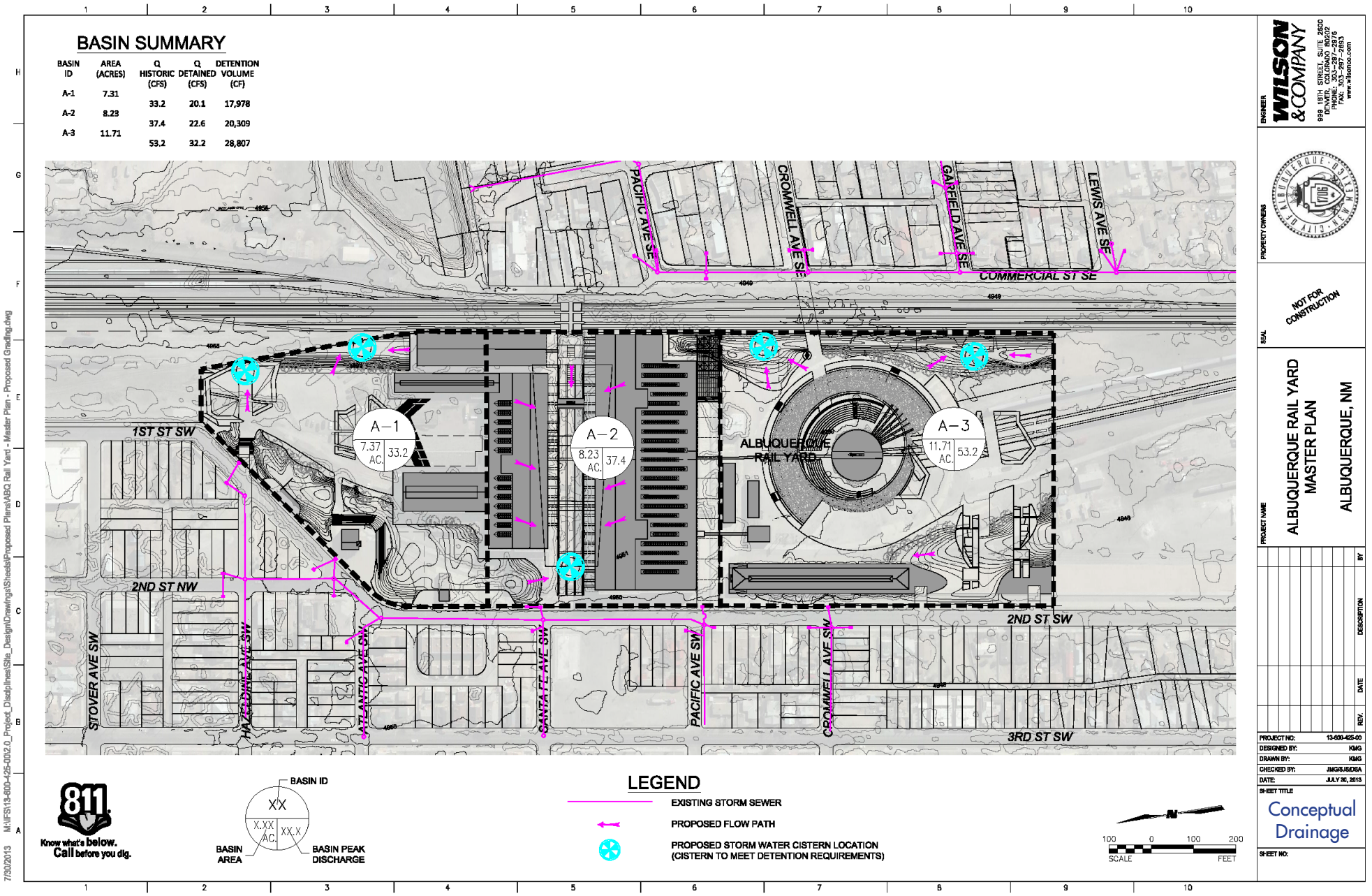


Figure 201b: Master Plan - Proposed Conceptual Drainage Plan

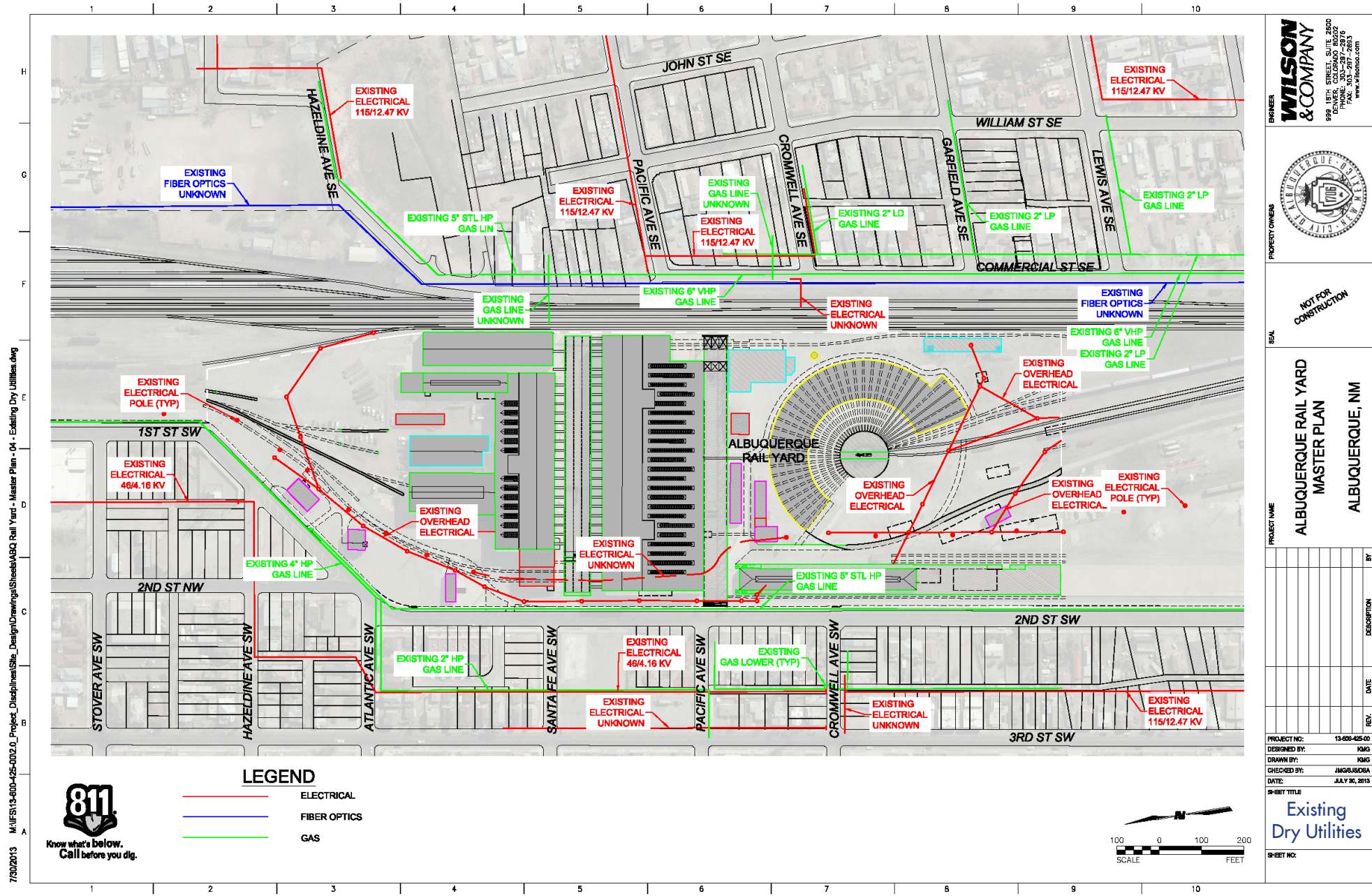



Figure 2+2a: Master Plan - Existing Dry Utilities

Figure 212b: Master Plan—Proposed Dry Utilities (Pending)

Blue Line Note: Delete this section as the historic preservation information is already covered within several components of the plan.

APPENDIX C: Albuquerque Rail Yard Resource List / Treatment Proposals (DRAFT)

The purpose of this proposal is to itemize the resources at the Albuquerque Rail Yards and describe, in general, the proposed treatment for each. The effort is conducted at the Site Development Plan phase of the project. For many of the resources, specific design proposals will not be determined until a use/tenant for the resource is determined during the development process. At that time, specific design proposals will be made for each resource.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
	Albuquerque Rail Yard		District				Contributing (NRHP Criteria A, C, and possibly D)

HPD Comments: Level of Significance: Local, State, and most likely National (comparison with other similar properties is required);
Period of Significance: 1914-1953;

Areas of Significance: Transportation, Architecture, Exploration/Settlement, Industry; Commerce; Social History.

Criterion A: Events related to **Transportation:** The process and technology of conveying passengers or materials.; **Industry:** the technology and process of managing materials, labor, and equipment to produce goods and services.;
Commerce: The business of trading goods, services, and commodities.; **Settlement:** the establishment and earliest development of new settlements or communities [early 20th Century Albuquerque]; and Social History: The history of efforts to promote the welfare of society; the history of society and the lifeways of its social groups [Rail Yard neighborhoods and Labor History];

Criterion C: Architecture, embodies the distinctive characteristics of a type, period, or method of construction [Industrial Architecture of the Early 20th Century].

Criterion D: have yielded, or may be likely to yield, information important in prehistory or history. The Roundhouse foundation site is one archaeological resource within the historic Rail Yard site and should be documented on Laboratory of Archaeology (LA) archaeological site record form. An intensive, pedestrian archaeological survey of the Rail Yard is unlikely to identify additional archaeological features. Instead we recommend testing in the areas

Notes:



1. See HCPI forms for complete descriptions of each Resource.
2. The below


G. Solar Recommendations	Resource Descriptions from HCPI forms and comments
This site should be considered as a group of buildings, man-made elements and open spaces, all being part of a complex, serving one function.	The Albuquerque Rail Yard is a historic site composed of 20 contributing and 4 noncontributing resources that include 15 contributing buildings, 4 contributing structures, 1 contributing site, three non-contributing buildings and 1 non contributing structure (City of Albuquerque, April 2013).



where former buildings and structures once stood and could reveal whether archaeological features remain. In addition, where there is anticipated ground disturbance for future proposed undertakings, it is recommended that testing be conducted. These tests will provide evidence of whether archaeological features or buried cultural deposits have the potential to be likely to yield important information to the history of the Albuquerque Rail Yard regarding the Roundhouse construction and operations, and possibly precontact information of the area. However, at this time, it is undetermined that the Rail Yard site is eligible under Criterion D until testing can be done, prior to extensive ground moving activities on site.


Verbal Boundary Description [Boundary Description and Justification excerpted from the Draft nomination “Atchison, Topeka & Santa Fe Railway Locomotive Shops” AKA Albuquerque Rail Yard, submitted by the City of Albuquerque in January, 2013]: The boundary of this site follows the railroad right-of-way to the east and 2nd Street to the west. It runs north to a point where the site narrows and tracks from the yard begin to meet the railroad right-of-way. The south boundary is below the site of the 1915 roundhouse and just to the south of the motor shop; it runs perpendicularly to the right-of-way and 2nd Street boundaries.



Boundary Justification: The boundaries are both the property line of the former AT&SF rail yard land owned by the City of Albuquerque and the area of that AT&SF land that was used for locomotive maintenance. Although the property extended to the south, that area was primarily used for classification yards and buildings that supported the freight cars. In addition, most of the rails and the buildings in that area have been removed and razed—that area no longer represents the period of significance for the rail yards as a whole.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
1	Fire Station	K-14-1272	Building	1920		Contributing; City of Albuquerque Landmark	Contributing: (Criteria A & C)
2	Machine Shop w/Crane Runway & Lye Vat Shed	K-14-1274	Building	1921		Contributing	Contributing: (Criteria A & C)




G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
High Significance, Preserve	Adaptive Re-Use; Treatment to follow Secretary of the Interior's (SOI) Standards and Guidelines for Rehabilitation and COA Guidelines for Landmark. Use not known at this time.	Not Applicable	2-story sandstone building with tower. The building housed the AT&SF Fire Department and was built using stone salvaged from the demolition of the original locomotive shops. Oldest fire station in the city, local stylistic rarity, built by AT&SF Railway Company. Battered tower with tile roofed, gabled door hood and pyramidal tile roof above. Apparatus doors removed and replaced with concrete block and steel windows. 2 Steel exterior exit stair at sleeping porch with steel door at 2nd story landing
Machine Shop & Crane Runway: High Significance, Preserve Lye Vat Shed: Low Cultural Value/Contribution, Remove	Machine Shop & Crane Runway: Adaptive Re-Use; Treatment to follow Secretary of the Interior's (SOI) Standards and Guidelines for Rehabilitation. Use not known at this time Lye Vat Shed: Suggested to be removed	Not Applicable 	4 bay x 26 stall steel and concrete building of 604ft x 239ft, overall plan dimensions with attached exterior crane runway with inspection pit and lye vat shed. Full length glass curtain wall and clerestory at erecting bay, skylights at others. Machine Shop was the center of engine overhauls by the AT&SF at its only locomotive "back shops" in New Mexico. Photographed in action, 1943, for the Office of War Information. Its monumental scale and corporate architectural imagery make it the Albuquerque building that best represents the AT&SF Railway's dominance in Albuquerque's development. 23 operable, hipped skylights at low roof. Mezzanine over southern bay, tool rooms and other partitioned areas, bridge cranes. Post 1958 modifications: Loading Dock, Machines removed

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
3	Boiler Shop w/ Canopy	K-14-1273	Building	1923		Contributing	Contributing (Criteria A & C)
4	Tender Repair Shop aka Tank Shop	K-14-1378	Building	1925		Contributing	Contributing (Criteria A & C)




G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
<p>Boiler Shop: High Significance, Preserve</p> <p>Canopy: Low Cultural Value/ Contribution, Remove</p>	<p>Boiler Shop: Adaptive Re-Use; Treatment to follow Secretary of the Interior's (SOI) Standards and Guidelines for Rehabilitation. Use not known at this time. Preserve</p> <p>Canopy: the structure should be removed in order to expose the original cast in place concrete façade of the Boiler Shop.</p>	<p>Not Applicable</p> 	<p>2-bay x 7-stall steel and concrete building of 416ft by 140ft overall plan dimensions with full-length glass curtain wall and clerestory at erecting (south side) bay, skylights at heavy equipment (north side) bay. Boiler Shop is built like the Machine Shop but it's much smaller and served fewer function. Building footprint covers (and more) that of original Machine Shop. Its monumental scale, corporate architectural imagery, and relationship to the Machine Shop help present the AT&SF Railways dominance in Albuquerque's development.</p>
<p>High Significance, Preserve</p>	<p>Adaptive Re-Use; Treatment to follow Secretary of the Interior's (SOI) Standards and Guidelines for Rehabilitation. Use not known at this time. Preserve</p>	<p>Not Applicable</p>	<p>1-bay by 8-bay steel and concrete building of 202ft by 90ft plan dimensions and one full story. Adjoining the Boiler Shop's north side and connects internally. North façade's concrete wall akin to Boiler and Machine Shops. Tenders hold water and fuel, both of which are fed into the engine from behind. Its monumental scale, corporate architectural imagery and kinship to the Machine and Boiler Shops help represent the AT&SF's dominance in Albuquerque's development. Internal bridge crane and an office with steel and glass partitions. One through-track and opening into the Boiler Shop. Post 1953 modifications: Concrete block fill in north side door openings.</p>

No.	Resource Name	City ID	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
5	Flue Shop	K-14-1377	Building	1920		Contributing	Contributing (Criteria A & C)
6	Entry Station (CWE Shops)	K-14-1378	Building	post-1957		Non-Contributing	undetermined: need more information




G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
High Significance, Preserve	Adaptive Re-Use; Treatment to follow Secretary of the Interior's (SOI) Standards and Guidelines for Rehabilitation. Use not known at this time. Preserve	Not Applicable	1-story building of reinforced concrete with a concrete block addition at north end and two smaller concrete block additions at west side. Original building has 10 bays of full height windows and connects with Boiler Shop at south end. The reinforced concrete construction is total- foundation, walls and roof. Flues carry hot combustion gases from the locomotive fire, heating water and steam in the boiler and superheater. It retains sufficient historic integrity, represents advanced small shop design character consistent with the site's large shops, and served an essential function in the shops' operations. Original building has a 45ft clear span roof of reinforced concrete. Post 1953 additions: North & West Concrete block additions
Not specifically addressed.	Suggested to be removed	Not Applicable	One-story wood frame hut with textured plywood siding and a flat, projecting roof. The building was part of the AT&SF's Central Work Equipment (CWE) shops, an operation located at the site after the steam locomotive work had ended. Not related to the work of the site — steam locomotives.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
7	Cab Paint Shop aka CWE Shops office	K-14-1379	Building	1921		Non-Contributing	non-contributing
8	Blacksmith Shop	K-14-1286	Building	1917		Contributing	Contributing (Criteria A & C)
9	Storehouse w/Platform	K-14-1281	Building	1915		Contributing	Contributing (Criterion A)



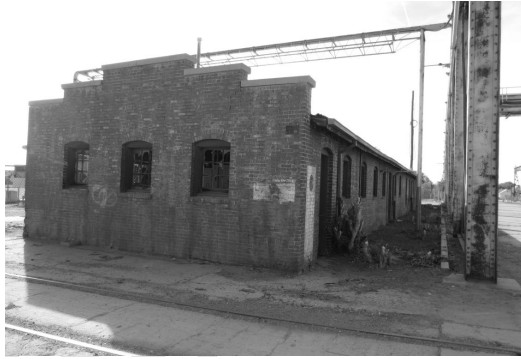
G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
Low Cultural Value/ Contribution, Remove	Suggested to be removed	Not Applicable	1 story building of poured concrete and concrete construction attached to the Boiler Shop and Tender Repair Shop. Originally smaller and open, it is divided into offices and has additions to the north and east Building's use changed from Cab Paint Shop to pipe house to asbestos house to the office for Central Work Equipment (CWE) Shops, AT&SF's post steam use. greatly altered after the locomotive operations ceased, Lacks historic integrity.
High Significance, Preserve	Adaptive Re-Use; Treatment to follow Secretary of the Interior's (SOI) Standards and Guidelines for Rehabilitation. Use not known at this time. Preserve	Not Applicable	1-story brick bearing and steel frame building of 80 feet by 306 feet plan dimensions. Free standing alongside railway tracks. Parapet steps five levels at north and south ends, concrete coping. Large forge in side southeast corner. Warren roof trusses with lower chords. (HCPI form)
High Significance, Preserve	Adaptive Re-Use; Treatment to follow Secretary of the Interior's (SOI) Standards and Guidelines for Rehabilitation. Use not known at this time. Preserve	Not Applicable	1-story, poured concrete building of 50 feet by 417 feet plan dimensions. Storehouse sits on a concrete platform with 10- foot wide runways/ loading docks on east and west sides. Platform extends south of building and beyond. Building held stores for AT&SF Railway Company administration and management- forms, tools, toilet paper- for the entire line. Storehouse is ancillary to the shops operation but served other AT&SF facilities near and far during the 1914-1953 period. Its historic integrity is high. An oil cellar is partly exposed on the platform just south of the building. Storehouse's southern bay is a space unto itself and accessible only via two exterior doors.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
10	Babbitt Shop	K-14-1287	Building	1921		Contributing	Contributing (Criterion A)
11	Welding Shop	K-14-1288	Building	1922		Contributing	Contributing (Criterion A)
12	Transfer Table	K-14-1275	Structure	1919		Contributing	Contributing (Criteria A & C)




G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
Connected to Welding Shop; At least one of these buildings should be PRESERVED, while the other could potentially be PRESENTED. Preserve or Remove.	The building and also a rail line that extends to this shop from the Machine Shop should be preserved	Not Applicable	1-story poured concrete building of 36 feet by 50 feet plan dimensions Connected to the Machine Shop by a track, later blocked by construction of a loading dock.
Connected to Babbitt Shop; At least one of these buildings should be PRESERVED, while the other could potentially be PRESENTED. Preserve or Remove.	As a concern the structure might block the view of the proposed reconstructed Round House but Samitaur will agree with the City's position. Conclusion: Preserve/Rehab	Not Applicable	1-story poured concrete building with wood-frame additions at west end, 110 feet by 27 feet in plan dimensions overall. Adjoins Babbitt Shop on west end. Large window openings with steel sash and door groupings Like the Machine and Boiler Shops, it has bi-fold doors into main work area. Structurally, building resembles the Flue Shop except for lacking a roof monitor. One rooftop metal chimney. Seven metal "passive" rooftop ventilators. Wood addition.
High Significance, Preserve	Adaptive Re-Use; Use not known at this time.	Not Applicable	Concrete-lined pit with east-west tracks and electrically powered gear-driven table with operators' cab and north/south track in a steel-plate deck. Also includes a non-powered table with north-south track. Transfer Table was an essential part of locomotive shops operation and the complex. Electric motor housing by cab, electrical service frames Transfer Tables are rare, far more so than railway turntables. The Transfer Table made this shops complex work as a cross-axial design modifications: removal of additional tables.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
13	Roundhouse Foundation	K-14-1380	Site	1915		Contributing	Contributing (Criterion A); Undetermined Criterion D, archaeological testing may be required to establish potential to yield important information pertaining to the demolished roundhouse, site development, or possible prehistoric resources.
14	Turntable (Roundhouse remnant)	K-14-1381	Structure	1915		Contributing	Contributing: (Criteria A & C)
15	Sheet Metal House aka Sheet Iron Shed	K-14-1284	Building	pre-1919		Contributing	Contributing (Criteria A & C)




G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
The reinstatement of its physical existence on the site is very important; Reconstruct within footprint, shape, volumetric space, not as a replication	See Roundhouse #A	Not Applicable	Roundhouse demolished; Exposed concrete, brick and metal traces of sub-grade foundation of demolished roundhouse, approximately 113,135 square feet footprint. This was surely the largest roundhouse in New Mexico.
It is still functioning, attractive, and a very important element in every main train station and rail yard. In addition, it is still in use by the BNSF Railroad. High Significance, Preserve	Preserve Roundtable and associated tracks for its continued use by BNSF. Area to receive new structure and ground surface treatment following SOI Standards and Guidelines for Rehabilitation involving new addition	Archaeological survey to determine information available; further archaeological excavation may be required.	Plate girder steel turntable with head frame, motorized, set in 120' diameter cylindrical pit c.4 feet deep with poured concrete walls. The structure served a supporting function in a complex proposed for City Landmark designation in the City's Barelal Sector Development Plan. The turntable is an essential part of the complex. Currently used by BNSF Railway Co. The turntable is a key remnant of the shops complex, its historic integrity is high. Internal combustion engine and drive gear. Head frame.
Interesting, important but technically not feasible to PRESERVE. Relatively High Historic Value, Presentation	To be removed but presented	Documentation at level 2 HABS. Interpretative exhibit at location.	One-story timber and lumber frame building of 52 feet by 185 feet plan dimension and gabled roof. Siding is wood board and batten, and there is a two-story room-over-room block within. Building has an overhead monorail system that was used to move large sheets of iron in and out of storage bays with minimum manpower. Roof sheds little water. East bay of the building has a concrete runway where iron sheets were transferred by monorail to or from wheeled delivery vehicles.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
16	Pattern House aka Assembly Bldg.	K-14-1271	Building	1922		Contributing	Contributing: (Criterion A)
17	North Washroom aka Lavatory	K-14-1285	Building	1915		Contributing	Contributing (Criterion A)
18	South Washroom aka Lavatory	K-14-1287	Building	1917		Contributing	Contributing (Criterion A)

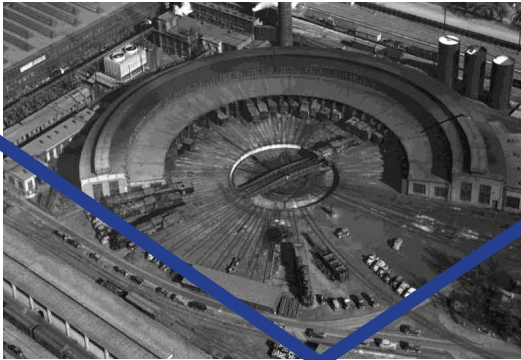
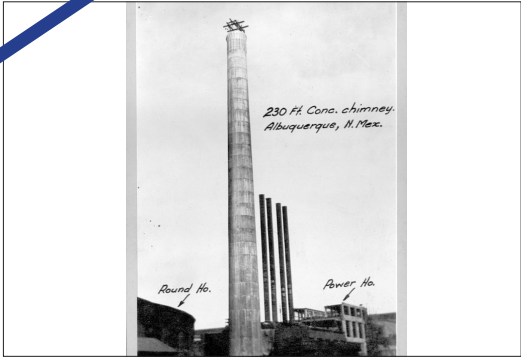
G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
It could be PRESERVED and/or PRESENTED (partially or completely, and even if with significant modifications) within the proposed development, e.g. under the planted mounds	Has been added to the Master Plan scheme with the idea that it would be 1) underneath an Acoustic Mound and 2) could be significantly altered (openings cut, roof removed, etc) in order to transform into a retail use. Conclusion: Preserve/Rehab	To be determined.	One-story poured concrete building of 40 feet by 75 feet plan dimensions. Gabled roof, small openings, doors at ends. The Pattern House was later known as the Assembly Hall (1957 Sanborn map).
They contribute to the story of the site, their location makes them a visual and functional obstacle, and they have no special significance. Remove	Could be removed if the South Washroom were retained; also the building has significant structural damage. Conclusion: Remove	To be determined	1 story red brick building with gabled roof and stepped parapets at ends. 26 feet by 114 feet in plan dimension. Segmental arches at window and door openings. Locker room and toilet inside. This is one of five washrooms built on-site, two of which remain. Also known as the Locker and Washroom.
They contribute to the story of the site, their location makes them a visual and functional obstacle, and they have no special significance. Remove	CABQ suggested that this structure in combination with 2a/2b (see map) created an interesting cluster of small, people scale structures that is unique to the site. Samitaur will agree with the City's position provided other agreements could be reached. Conclusion: Preserve/Rehab	Not Applicable	One-story red brick building of 26 feet by 140 feet plan dimensions Building is divided by transverse walls into several rooms, one with a cluster of toilet stalls. This is one of two remaining brick washrooms. Five were built in locations spread throughout the complex. Windows and doors have segmented arches and brick sills. AT & SF worker stencil painted inside west room.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
19	Waste & Paint Rooms	K-14-1276	Building	1920		Contributing	Contributing (Criterion A)
20	Motor Car Garage aka Battery Shop	K-14-1282	Building	pre-1931		Contributing	Contributing (Criterion A)
21	Fire Runway	K-14-1382	Structure	pre-1922		Contributing	Contributing: (Criterion A)

G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
It could be PRESERVED and/or PRESENTED (partially or completely, and even if with significant modifications) within the proposed development, e.g. under the planted mounds	This building has been added to the Master Plan scheme with the idea that it would be 1) underneath an Acoustic Mound and 2) could be significantly altered (openings cut, roof removed, etc) in order to transform into a retail use. Conclusion: Preserve/Rehab	Not Applicable	One-story poured concrete building of 24 feet by 60 feet in plan dimensions. Its two rooms are connected internally and each has steel windows and doors.
This structure loses its significance if Babbit Shop, Welding Shop and Waste & Paint rooms are preserved. Remove	Preserving the structure significantly impact's Samitaur development of the southern portion of the site. Conclusion: Remove	To be determined	A one-story red brick building of 27 feet by 56 feet plan dimensions on a raised concrete foundation. Large steel windows in groups. Overhead doors on east side. The building was also known as the battery shop. Secondary building used to store utility vehicles for shops operation. Modification: small overhead door
Relatively High Historic Value, Presentation	Conclusion: Present where possible	Photographic documentation; Present a selected portion, perhaps 30' to provide interpretive exhibit with site plan and explanation of its original purpose.	Concrete paved road connecting the Fire Station with all the shops in the complex and the Roundhouse Foundation. It is part of the most significant group of railroad-built facilities in Albuquerque. Historic integrity has been compromised by paving added and removed since the shops complex steam locomotive work ended.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
22	Power House	K-14-1383	Building	pre-1957		Non-Contributing	Non-Contributing
23	Water Reservoir	K-14-1384	Structure	pre-1922		Contributing	Contributing (Criterion A)
24	Welding Gas Lines	K-14-1385	Structure	pre-1922		Non-Contributing	Would like to discuss

G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
This modern structure replaced the Original Power House which was demolished. It has no cultural significance. Remove	Remove	Not Applicable	One story metal building, tall, with a slightly gabled roof, three overhead doors, one personnel door, and three wall vents.
It is suggested for PRESENTATION as a concrete platform, possibly underground	Present	To be determined	Sub-grade, rectangular plan tank 33 feet wide by 103 feet long with upper walls and roof above grade. 2 huts on top. Historic integrity of the water supply system for locomotives has been compromised by removal of the filler tanks. Two huts atop roof- one is a gabled, wood sided box with eaves, exposed rafters, and corner boards.
Portion to be retained if possible to demonstrate operation of original Rail Yards facility.	To be determined	To be determined Photographic documentation; Preserve a selected portion, perhaps in conjunction with Fire Runway; Interpretive exhibit	Steel pipes that run overhead along 2nd Street, supported on poles of light RR track section. Welding gases were piped to certain shops from a gas plant near the north end of the complex, the gas plant has been demolished. It is a remnant of a system whose historic integrity is very low due to the gas plant demolition.

No.	Resource Name	City ID No.	TYPE	BUILT	Photo	City Eligibility	NM SHPO Eligibility
A	Round House	N/A	Building			Demolished	N/A
B	Smoke Stack	N/A	Building			Demolished	N/A

G. Solar Recommendations	Treatment Proposal	Mitigation Proposal if Applicable	SHPO/COA Review
The reinstatement of its physical existence on the site is very important; Reconstruct within footprint, shape, volumetric space, not as a replication.	Reconstruct per Section 6 of the Master Plan.	Not Applicable	
Its reconstruction should mainly represent the idea of a high, vertical element, rather than accurate replication. Reconstruct	Reconstruct per Section 6 of the Master Plan.	Not Applicable	

