Drainage Reports

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Water Study

Wastewater Study

Stormwater Waiver Application

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Chauncey Lane Marketplace
Mixed-Use Development
Scottsdale, Arizona

Basis of Design
Water and Wastewater Needs Report

Prepared for:
JLB Partners
9237 E Via de Ventura
Suite 215
Scottsdale, Arizona 85258

Prepared by:
Kimley-Horn and Associates, Inc.
7740 North 16th Street
Suite 300
Phoenix, Arizona 85020

Expires: 9/30/17

191447017
November 2016

Kimley»Horn

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INTRODUCTION

Kimley-Horn and Associates, Inc. has prepared this water and wastewater report for the proposed Crossroads South Mixed-Use Development at the SEC of Scottsdale Road and Chauncey Lane as required per the City of Scottsdale.

The proposed project encompasses approximately 11.3 acres with 52,219 square feet of mixed commercial use and a multi-story residential apartment building with 301 units.

DOMESTIC WATER SUPPY

A 16" DIP water main exists in Scottsdale Road and a 12" DIP water main exists in Chauncey Lane adjacent to the site. The 16" water main within Scottsdale Road includes an 8" DIP stub to the proposed development. An 8" DIP water main loop will be constructed on-site that will serve new on-site fire hydrants and 8" firelines to the proposed buildings. This on-site water main will be connected to the 12" water main in Chauncey Lane and will be looped to the existing 8" DIP water main stub along Scottsdale Road. Domestic water supplies are proposed to serve the mixed-use commercial and apartment buildings. See Appendix C for the Preliminary Utility Plan.

DOMESTIC WATER DEMANDS

According to the guidelines provided in Figure 6.1-2 of the City of Scottsdale *Standards and Policies, Chapter 6, Water*, the proposed building will add the following demands to the City of Scottsdale's existing system:

		Inside Demand	Outside Demand	Total Demand	ADD (GPM)	Peak Hour (GPM)	Maximum Day (GPM)
High Density Condo	301 Dwelling Units (DU)	155.3 (GPD/DU)	30 (GPD/DU)	185.3 (GPD/DU)	38.7	135.6	77.5
Commercial/ Retail	16,363 S.F.	0.7 (GPD/SF)	0.1 (GPD/SF)	0.8 (GPD/SF)	9.1	31.8	18.2
Restaurant	16,364 S.F.	1.2 (GPD/SF)	0.1 (GPD/SF)	1.3 (GPD/SF)	14.8	51.7	29.5
Office	19,492 S.F.	0.5 (GPD/SF)	0.1 (GPD/SF)	0.6 (GPD/SF)	8.1	28.4	16.2
TOTAL					70.7	247.5	141.4

The Peak Hour demand is 3.5 times the Average Daily Demand (ADD). The Maximum Day Demand is two times the ADD.

According to the 2012 International Fire Code (IFC), fire flow to Group R (residential) buildings may be reduced by 75% if an approved fire sprinkler system is installed. A fire sprinkler system will be installed with all buildings. The largest proposed building is 516,743 S.F. with a III-B Construction Type. Therefore, the required maximum building fire flow rate for the proposed buildings is 2,000 gallons per minute. Refer to Appendix A for the 2012 IFC excerpts.

WASTERWATER COLLECTION SYSTEM

A 15" VCP sewer main exists within Scottsdale Road. This sewer main includes an 8" stub to the site. A new 8" PVC private sewer main and sewer services are proposed on-site that will connect to the 8" PVC stub. See Appendix C for the Preliminary Utility Plan. The following demand calculations are based on Figure 7.1-2 of the City of Scottsdale *Design Standards and Policies Manual.*

		Demand	ADD (GPM)	Peaking Factor	Peak Demand (GPM)	Maximum Day (GPM)
High Density Condo	301 Dwelling Units	140 (GPD/DU)	29.3	4.5	131.7	58.5
Commercial/ Retail	16,363 S.F.	0.5 (GPD/S.F.)	5.7	3	17.0	11.4
Restaurant	16,364 S.F.	1.2 (GDP/S.F.)	13.6	6	81.8	27.3
Office	19,492 S.F.	0.4 (GPD/S.F.)	5.4	3	16.2	10.8
TOTAL			54.0		246.7	108.0

The Maximum Day Demand is two times the Average Day Demand (ADD).

CONCLUSION

Water

This development proposes to connect to City of Scottsdale water mains located adjacent to the site in Scottsdale Road and Chauncey Lane. The water main serving the Chauncey Lane Marketplace Mixed-Use Development will be a looped system.

Wastewater

This development proposes to connect the building sewer services to the 8" PVC sewer main in Scottsdale Road via a new on-site 8" PVC sewer main. The proposed 8" PVC private sewer main has adequate capacity for the flows generated by the proposed buildings and their associated uses. Refer to Appendix B for the Sewer Capacity Calculations.

Appendix A
2012 International Fire Code

SECTION B105 FIRE-FLOW REQUIREMENTS FOR BUILDINGS

B105.1 One- and two-family dwellings.
The minimum fire-flow and flow duration requirements for one- and two-family *dwellings* having a fire-flow calculation area that does not exceed 3,600 square feet (344.5 m^2) shall be 1,000 gallons per minute (3785.4 L/min) for 1 hour. Fire-flow and flow duration for *dwellings* having a fire-flow calculation area in excess of 3,600 square feet (344.5m^2) shall not be less than that specified in Table B105.1.

Exception: A reduction in required fire-flow of 50 percent, as *approved*, is allowed when the building is equipped with an *approved automatic sprinkler system.*

TABLE B105.1 MINIMUM REQUIRED FIRE-FLOW AND FLOW DURATION FOR BUILDINGS

FIRE-FLOW CALCULATION AREA (square feet)					FIRE-FLOW (gallons per minute)[b]	FLOW DURATION (hours)
Type IA and IB[a]	Type IIA and IIIA[a]	Type IV and V-A[a]	Type IIB and IIIB[a]	Type V-B[a]		
0-22,700	0-12,700	0-8,200	0-5,900	0-3,600	1,500	2
22,701-30,200	12,701-17,000	8,201-10,900	5,901-7,900	3,601-4,800	1,750	
30,201-38,700	17,001-21,800	10,901-12,900	7,901-9,800	4,801-6,200	2,000	
38,701-48,300	21,801-24,200	12,901-17,400	9,801-12,600	6,201-7,700	2,250	
48,301-59,000	24,201-33,200	17,401-21,300	12,601-15,400	7,701-9,400	2,500	
59,001-70,900	33,201-39,700	21,301-25,500	15,401-18,400	9,401-11,300	2,750	
70,901-83,700	39,701-47,100	25,501-30,100	18,401-21,800	11,301-13,400	3,000	3
83,701-97,700	47,101-54,900	30,101-35,200	21,801-25,900	13,401-15,600	3,250	
97,701-112,700	54,901-63,400	35,201-40,600	25,901-29,300	15,601-18,000	3,500	
112,701-128,700	63,401-72,400	40,601-46,400	29,301-33,500	18,001-20,600	3,750	
128,701-145,900	72,401-82,100	46,401-52,500	33,501-37,900	20,601-23,300	4,000	4
145,901-164,200	82,101-92,400	52,501-59,100	37,901-42,700	23,301-26,300	4,250	
164,201-	92,401-	59,101-	42,701-	26,301-	4,500	

183,400	103,100	66,000	47,700	29,300		
183,401-203,700	103,101-114,600	66,001-73,300	47,701-53,000	29,301-32,600	4,750	
203,701-225,200	114,601-126,700	73,301-81,100	53,001-58,600	32,601-36,000	5,000	
225,201-247,700	126,701-139,400	81,101-89,200	58,601-65,400	36,001-39,600	5,250	
247,701-271,200	139,401-152,600	89,201-97,700	65,401-70,600	39,601-43,400	5,500	
271,201-295,900	152,601-166,500	97,701-106,500	70,601-77,000	43,401-47,400	5,750	
295,901-Greater	166,501-Greater	106,501-115,800	77,001-83,700	47,401-51,500	6,000	
—	—	115,801-125,500	83,701-90,600	51,501-55,700	6,250	
—	—	125,501-135,500	90,601-97,900	55,701-60,200	6,500	
—	—	135,501-145,800	97,901-106,800	60,201-64,800	6,750	
—	—	145,801-156,700	106,801-113,200	64,801-69,600	7,000	
—	—	156,701-167,900	113,201-121,300	69,601-74,600	7,250	
—	—	167,901-179,400	121,301-129,600	74,601-79,800	7,500	
—	—	179,401-191,400	129,601-138,300	79,801-85,100	7,750	
—	—	191,401-Greater	138,301-Greater	85,101-Greater	8,000	

For SI: 1 square foot = 0.0929 m^2, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. Types of construction are based on the *International Building Code.*

b. Measured at 20 psi residual pressure.

B105.2 Buildings other than one- and two-family dwellings.
The minimum fire-flow and flow duration for buildings other than one- and two-family *dwellings* shall be as specified in Table B105.1.

Exception: A reduction in required fire-flow of up to 75 percent, as *approved,* is allowed when the building is provided with an *approved automatic sprinkler system* installed in accordance with Section 903.3.1.1 or 903.3.1.2. The resulting fire-flow shall not be less than 1,500 gallons per minute (5678 L/min) for the prescribed duration as specified in Table B105.1.

Appendix B
Sewer Capacity Calculations

Worksheet for 6" PVC Max. Slope

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010	
Channel Slope	4.53	%
Normal Depth	0.50	ft
Diameter	6.00	in
Discharge	697	gpm

Results

Discharge	697	gpm
Normal Depth	0.50	ft
Flow Area	0.20	ft^2
Wetted Perimeter	1.57	ft
Hydraulic Radius	0.13	ft
Top Width	0.00	ft
Critical Depth	0.49	ft
Percent Full	100.0	%
Critical Slope	0.04168	ft/ft
Velocity	7.91	ft/s
Velocity Head	0.97	ft
Specific Energy	1.47	ft
Froude Number	0.00	
Maximum Discharge	1.67	ft^3/s
Discharge Full	1.55	ft^3/s
Slope Full	0.04530	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 6" PVC Max. Slope

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.49	ft
Channel Slope	4.53	%
Critical Slope	0.04168	ft/ft

Worksheet for 6" PVC Min. Slope

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010	
Channel Slope	1.10	%
Normal Depth	0.50	ft
Diameter	6.00	in
Discharge	343	gpm

Results

Discharge	343	gpm
Normal Depth	0.50	ft
Flow Area	0.20	ft^2
Wetted Perimeter	1.57	ft
Hydraulic Radius	0.13	ft
Top Width	0.00	ft
Critical Depth	0.44	ft
Percent Full	100.0	%
Critical Slope	0.00998	ft/ft
Velocity	3.90	ft/s
Velocity Head	0.24	ft
Specific Energy	0.74	ft
Froude Number	0.00	
Maximum Discharge	0.82	ft^3/s
Discharge Full	0.76	ft^3/s
Slope Full	0.01100	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 6" PVC Min. Slope

GVF Output Data

Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.50	ft
Critical Depth	0.44	ft
Channel Slope	1.10	%
Critical Slope	0.00998	ft/ft

Worksheet for 8" PVC Max. Slope

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010	
Channel Slope	2.02	%
Normal Depth	0.67	ft
Diameter	8.00	in
Discharge	1002	gpm

Results

Discharge	1002	gpm
Normal Depth	0.67	ft
Flow Area	0.35	ft^2
Wetted Perimeter	2.09	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.64	ft
Percent Full	100.0	%
Critical Slope	0.01759	ft/ft
Velocity	6.40	ft/s
Velocity Head	0.64	ft
Specific Energy	1.30	ft
Froude Number	0.00	
Maximum Discharge	2.40	ft^3/s
Discharge Full	2.23	ft^3/s
Slope Full	0.02020	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 8" PVC Max. Slope

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	0.64	ft
Channel Slope	2.02	%
Critical Slope	0.01759	ft/ft

Worksheet for 8" PVC Min. Slope

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.40	%
Normal Depth	0.67	ft
Diameter	8.00	in
Discharge	446	gpm

Results

Discharge	446	gpm
Normal Depth	0.67	ft
Flow Area	0.35	ft^2
Wetted Perimeter	2.09	ft
Hydraulic Radius	0.17	ft
Top Width	0.00	ft
Critical Depth	0.47	ft
Percent Full	100.0	%
Critical Slope	0.00551	ft/ft
Velocity	2.85	ft/s
Velocity Head	0.13	ft
Specific Energy	0.79	ft
Froude Number	0.00	
Maximum Discharge	1.07	ft^3/s
Discharge Full	0.99	ft^3/s
Slope Full	0.00400	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 8" PVC Min. Slope

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	0.47	ft
Channel Slope	0.40	%
Critical Slope	0.00551	ft/ft

Appendix C
Preliminary Utility Plan