UPDATED PRELIMINARY DRAINAGE REPORT AND FINAL DRAINAGE REPORT WITH STORMWATER STORAGE WAIVER FOR BUILDING 6895

OPTIMA SONORAN VILLAGE

6801 E. CAMELBACK ROAD

SCOTTSDALE, AZ 85251

Project # 134.003

April 19, 2011

Expires: 09/30/2012

Prepared by:

Intelligent Engineering
Environmental *Solutions*

Entellus™

2255 N 44th Street Suite 125
Phoenix, AZ 85008-3279
Phone (602) 244-2566
Fax (602) 244-8947
Web: www.entellus.com

UPDATED PRELIMINARY DRAINAGE REPORT AND FINAL DRAINAGE REPORT WITH STORMWATER STORAGE WAIVER FOR BUILDING 6895

OPTIMA SONORAN VILLAGE

TABLE OF CONTENTS

SECTION 1 INTRODUCTION

1.1 Project Background

This report has been prepared as an update to the approved preliminary drainage report prepared by Kimley-Horn and Associates, Inc., dated March 22, 2010, Plan Check # 478-10, for the proposed Optima Sonoran Village redevelopment project (the project).

Following the approval of the KHA report, the location of the proposed project was included into the City of Scottsdale's "Designated Area for Downtown Stormwater Storage Waivers". This report has been prepared to address the revised development criteria, and stormwater policies now applicable to the project.

1.2 Project Location

The project entails the redevelopment of the Orchid Tree Apartment complex into a mixed use, commercial development. The project is located on the southeast corner of 68th Street and Camelback Road, in Scottsdale, AZ, and is 9.8 acres (gross), and 8.58 acres (net) in size.

The project is bounded by Camelback Road to the north, 68th Street to the west, the Camelback Executive Park to the east, and to the south by the Whitwood 2 Residential Subdivision.

The site is located in a portion of the Southeast Quarter of Section 22, Township 2 North, Range 4 East, of the Gila and Salt River Base & Meridian, Maricopa County, Arizona.

1.3 Project Size and Type

The proposed redevelopment consists of the demolition of an existing apartment complex and construction of a multi level, mixed use project, containing approximately 500 condominium units and 40,000 square feet of commercial space which will be associated with the residential uses. The project will also contain underground parking garages, accommodating approximately 950 vehicles. The project is anticipated to utilize sustainable design practices within the development.

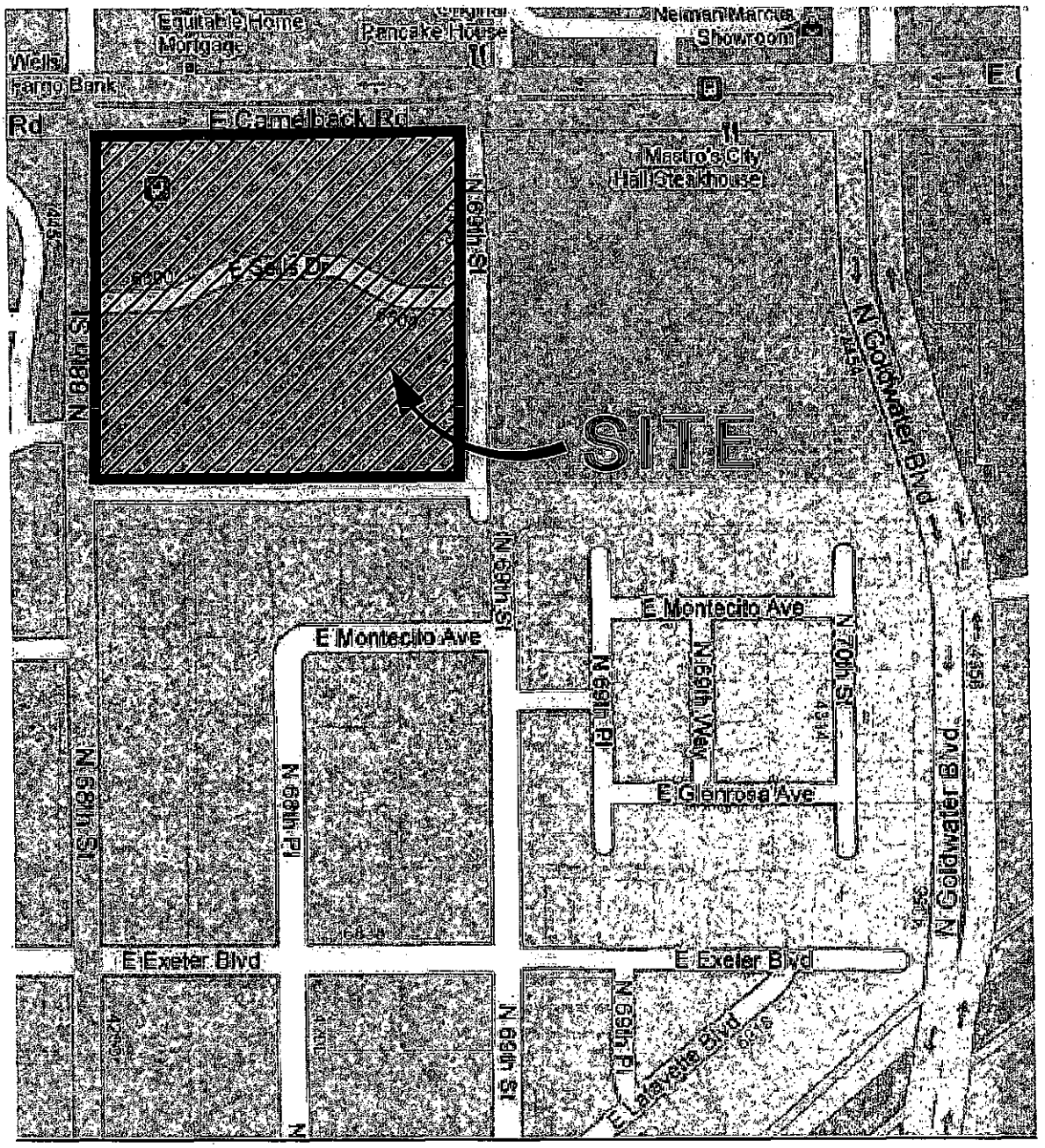
The project will be developed as 5 stand alone buildings. The first building is currently envisioned to be Building 6895, located on the eastern portion of the site, and contains approximately 200 condominium units.

1.4 Purpose and Objective of this report

- To demonstrate compliance with the City of Scottsdale and Maricopa County stormwater, drainage, and grading policies.
- To demonstrate compliance with Downtown District development criteria, and associated stormwater policies applicable to the project.

- To obtain approval of the Updated Preliminary Drainage Report and receive conceptual approval for a Stormwater Storage Waiver to serve the overall Optima Sonoran Village Project.
- To obtain approval for Stormwater Storage Waiver specific to Building 6895, which will be the first building developed.

Exhibit 1: Vicinity Map



VICINITY MAP

NO SCALE

N

SECTION 2 EXISTING CONDITIONS

2.1 Existing On-Site Drainage

The existing apartment complex is situated on a site that is approximately 9.8 acres in size. The general topography of the site is relatively flat with slopes falling from the northwest corner of the site (elev. 1290) to the southeast corner of the site (elev. 1282) at an average slope of 1%.

The existing apartment units are protected from offsite flows that are conveyed easterly along Camelback Road and southerly along 68th Street by existing street drainage facilities, and curb & gutter improvements.

There are no existing dedicated or maintained retention/detention facilities. Historically, the drainage runoff for the project that is not captured within landscaped areas is eventually conveyed toward the southeast corner of the project where it is discharged into 69th Street as surface drainage.

2.2 Existing Drainage Network, Patterns, Watershed and Offsite Watershed

There is an existing 84" RGRCP storm drain located within Camelback Road and an existing curb inlet located near the existing driveway entrance at the northeast corner of the site.

Upon review of the topographic survey prepared by Clouse Engineering on January 25, 2010, and a field observation conducted by Entellus, the results indicate that negligible offsite drainage can enter the site for storm frequencies less than or equal to the maximum conveyance capacity of Camelback Road and 68th Street.

2.3 Existing Conditions and the Drainage Network Entering and Leaving the Site

Historically, the drainage runoff for the project that is not captured within landscaped areas is eventually conveyed toward the southeast corner of the project where it is discharged into 69th Street as surface drainage. This surface runoff is eventually collected into a City of Scottsdale storm drain system located approximately 1000' to the south along 69th Street.

2.4 Context Relative to Existing Adjacent Properties and Improvements

The adjacent properties generally slope to the south and to the east.

The drainage runoff generated within the Whitwood 2 Subdivision, located immediately south of the project is conveyed via an existing street network, southerly into existing storm drain facilities, and do not impact the site.

The drainage runoff generated within the Camelback Executive Park property, located immediately east of the project is conveyed to the southeast where it eventually discharges into 70th Street as surface drainage.

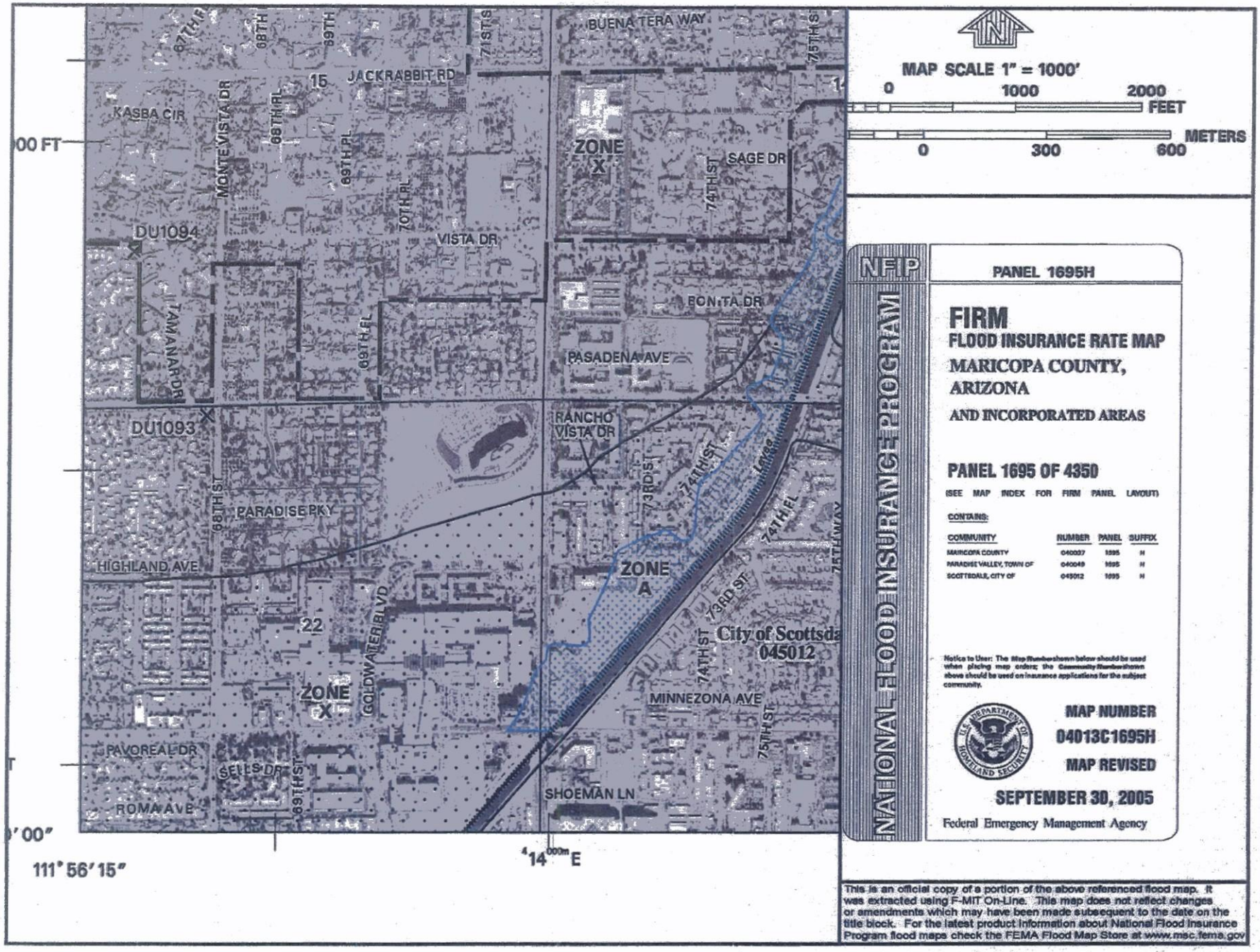
The existing offsite flows that are conveyed easterly along Camelback Road, located immediately north of the project, via existing street drainage facilities, and roadway curb & gutter improvements. There is also an existing 84" RGRCP storm drain located within Camelback Road and an existing curb inlet located near the existing driveway entrance at the northeast corner of the site.

The existing offsite flows that are conveyed southerly along 68th Street, located immediately west of the project, via the existing roadway curb & gutter improvements.

2.5 Flood Hazard Zones on Property, FIRM Maps

FEMA Flood insurance Rate Map (FIRM) 04013C1695H, dated September 30, 2005 indicates that this site is located entirely within Zone X. Per FEMA, Zone X is defined as areas of a 500-year flood; areas of a 100-year flood with depths of less than 1-foot or with drainage areas of less than one-square mile; and areas protected by levees from a 100 year flood. Refer to Exhibit 2.

Exhibit 2: FEMA MAP



This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

SECTION 3 PROPOSED DRAINAGE PLAN

Following the zoning and development board approvals for the Optima Sonoran Village project in early 2010, the project location had been included into the "Designated Area for Downtown Stormwater Storage Waivers" through a revision to the overlay boundary delineation.

The proposed overall development will be designed and constructed as (5) stand alone buildings beginning with the eastern most building. Final design efforts for future buildings may vary slightly from the approved site plan. All site variations will remain in conformance to approved project entitlements and will be closely coordinated with the City of Scottsdale.

The Stormwater Storage Waiver concept for the overall site is based upon the approved site plan for the project and will be supported and approved by this report.

Additional specific Stormwater Storage Waivers will be processed by Building as development progresses, and this report shall be amended as needed. Refer to Appendix B for the specific Building 6895 Stormwater Storage Waiver supporting documentation and calculations.

3.1 Future Conditions (Overall Site Concept)

The proposed overall development of the site is planned to consist of approximately 500 condominium units and 40,000 square feet of commercial space associated with the residential uses. The project is also planned to consist of underground parking garages that will accommodate approximately 950 vehicles. The project is also anticipated to utilize sustainable design practices when applicable within the development.

The proposed residential towers will vary in height from 5 to 7 stories and will be constructed above the underground parking structure. The lowest finished floor will be at elevation 1288.1. The western portion of the structure along the frontage of Camelback Road will be constructed on pedestals with landscaped gardens at ground level displayed under the structure. The eastern portion of the structure along the frontage of Camelback Road will provide commercial/retail amenities.

The project will be served by two driveway entrances for ingress/egress: The main driveway entrance is planned to be located along Camelback Road approximately 610 feet to the east of 68th Street; A secondary driveway entrance is planned to be located along 68th Street approximately 550 feet south of Camelback road.

3.2 General Description of Proposed Drainage System (Overall Site Concept)

This drainage report has been prepared to support the design of the proposed development with regard to drainage, flood control, and an onsite Stormwater Storage Waiver.

As a result of an approved waiver, onsite retention/detention will not be required. This report shall demonstrate that the effect of the waiver will not increase the potential for flooding on adjacent properties.

Generally, the runoff originating from the site will primarily be collected by a series of roof/area drains and will be piped to the existing 84' RGRCP storm drain system located

within Camelback Road. It is anticipated that maximum conveyance of the onsite storm drain system shall not exceed the 10yr-2hr storm frequency. The proposed lateral connections into the existing storm drain system shall have an open grate allowing secondary surface discharge into the adjacent streets when the system is hydraulically surcharged. Lastly, in the event that the storm event exceeds the area drain/storm drain capacity, the onsite grading design will provide for adequate surface drainage to ensure the finished floor elevations and adjacent properties are protected, and that the drainage exits the site in a historic manner.

An overall Stormwater Pollution Protection Plan (SWPPP) shall be prepared per City of Scottsdale, ADEQ, and AZPDES requirements, and shall be approved prior to the commencement of any construction activities. The (SWPPP) shall be updated and maintained accordingly to provide adequate protection for all phases of construction activities until final completion of the project.

In addition, a stormwater discharge permit shall be submitted and approved for each individual building development requiring storm water discharge into a public facility and shall meet all applicable City of Scottsdale, EPA, and ADEQ requirements.

The methodologies, calculations, and results as defined in this report shall further illustrate compliance to the City of Scottsdale applicable design standards and guidelines.

3.3 Stormwater Storage Requirements (Overall Site Concept)

As a result of an approved waiver, onsite stormwater retention/detention will not be required. However, an "In Lieu Fee" will be required based on a unit cost multiplied by the volume (in cubic feet) calculated for the 100yr-2 hour onsite retention. The City of Scottsdale may update the unit cost annually and reserves the right to change the unit cost at any time.

The amount of storage volume shall be determined by using City of Scottsdale and the Flood Control District of Maricopa County stormwater storage requirements and design standards.

Vr = (P/12) * A * Cw where:

Vr = Required storage volume in ac-ft

P = Precipitation amount = 2.17 inches. (COS – DS&PM, Appendix 41-D)

A = Area in acres; the developed portion of the entire site in acres, on which any man made change is planned, including but not limited to; construction, excavation, filling, grading, paving, or mining.

Cw= Weighted runoff coefficient; refer to Appendix A for drainage calculations (Cw= 0.66)

Conceptual overall site retention requirement (based upon the approved site plan):

Vr = (2.17"/12) * (373,740 / 43,560) * (0.66) = 1.02 ac-ft * 43,560 = **44,605 cf**

3.4 Pre and Post Development Runoff Characteristics (Overall Site Concept)

The hydrologic analysis for the development site was performed using the Rational Method as defined in the current City of Scottsdale (DS&PM) and the Flood Control District of Maricopa County Drainage Design Manual.

Pre and Post development flows were evaluated for the peak discharge of the 100 yr –6 hour storm frequency, and historic drainage discharge location.

As a result of the increased landscape, open-space, and pervious areas that are provided within the proposed Optima Sonoran Village Development (Overall), the existing historic peak flows exiting the site were reduced by approximately 20%. (Refer to Appendix A – Drainage Calculations).

Therefore, through a decrease in calculated runoff factors, it is estimated that the proposed development reduces the flooding potential of adjacent properties when compared to the calculated runoff factors for the existing Orchid Tree Apartments.

SECTION 4 SPECIAL CONDITIONS

There are no jurisdictional washes present on the site and the project is not subject to a US Army Corps Section 404 permit.

SECTION 5 DATA ANALYSIS METHODS

5.1 Hydrologic Procedures, Parameter Selection, and Assumptions

The hydrologic analysis for this report was performed using the Rational Method as defined in the current City of Scottsdale (DS&PM) and the Flood Control District of Maricopa County Drainage Design Manual.

The 100 yr –6 hour storm frequency was used as a basis for the pre and post development peak flow estimates provided in this report.

The Stormwater Storage Calculations were based upon requirements set forth in the City of Scottsdale (DS&PM) and the Flood Control District of Maricopa County Drainage Design Manual. The volume calculations are based on the 100yr-2hr storm frequency and weighted C-Values were derived from factors provided in Figure 4-5 from the City of Scottsdale (DS&PM). Also refer to (Appendix A – Hydrologic Data and Calculations), for specific land use areas and associated C-Values used in the weighted average calculation.

The hydraulic analysis for this report was performed utilizing Bentley Flowmaster V8, Haestad Methods Software, and methods described in the City of Scottsdale (DS&PM) and the Flood Control District of Maricopa County Drainage Design Manual.

SECTION 6 CONCLUSIONS

6.1 Overall Project

Based upon the results of this drainage report the following can be concluded:

a. Project development is anticipated to start on the east and progress toward the west.

b. No offsite flows impact the site as a result of the proposed development.

c. As a result of the proposed development, the peak flows exiting the site are reduced.

d. The reduction of peak flows reduces the flooding potential for adjacent properties.

e. The proposed project qualifies for an overall "Stormwater Storage Waiver", per current City of Scottsdale Floodplain Management and Stormwater Ordinance, April 2011.

f. Building 6895, the first building to be constructed is in conformance with this report and the Stormwater Storage Waiver Application is attached.

g. Future buildings within the project in general conformance with this report shall be qualified for a "Stormwater Storage Waiver". Waiver applications shall be processed and specific for each building development.

SECTION 7 WAIVER OF LIABILITY

Appendix 4-1C

WARNING & DISCLAIMER OF LIABILITY

The Drainage and Floodplain Regulations and Ordinances of the City of Scottsdale are intended to "minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding caused by the surface runoff of rainfall" (Scottsdale Revised Code §37-16).

As defined in S.R.C. §37-17, a flood plain or "*Special flood hazard* area means an area having flood and/or flood related erosion hazards as shown on a FHBM or FIRM as zone A, AO, A1-30, AE, A99, AH, or E, and those areas identified as such by the floodplain administrator, delineated in accordance with subsection 37-18(b) and adopted by the floodplain board." It is possible that a property could be inundated by greater frequency flood events or by a flood greater in magnitude than a 100-year flood. Additionally, much of the Scottsdale area is a dynamic flood area; that is, the floodplains may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY PURSUANT TO S.R.C §37-22
"The degree of flood protection provided by the requirements in this article is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Floods larger than the base flood can and will occur on rare occasions. Floodwater heights may be increased by man-made or natural causes. This article (Chapter 37, Article II) shall not create liability on the part of the city, any officer or employee thereof, or the federal government for any flood damages that result from reliance on this article or any administrative decision lawfully made thereunder."

Compliance with Drainage and Floodplain Regulations and Ordinances does not insure complete protection from flooding. The Floodplain Regulations and Ordinances meet established local and federal standards for floodplain management, but neither this review nor the Regulations and Ordinances take into account such flood related problems as natural erosion, streambed meander or man-made obstructions and diversions, all of which may have an adverse affect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above. If I am an agent for an owner I have made the owner aware of and explained this disclaimer.

Plan Check No.	Owner or Agent	Date
		04/19/11

SECTION 8 REFERENCES

1. City of Scottsdale, Arizona. Design Standards & Policies Manual (DS&PM), 2009.
2. City of Scottsdale, Arizona. Floodplain Management and Stormwater Ordinance, April 2011.
3. Flood Control District of Maricopa County. Drainage Design Manual for Maricopa County, Arizona, November 2009.
4. Federal Emergency Management Agency, Flood rate Map of Maricopa County, Arizona and incorporated areas. Panel 0820G of 4350, Map number 04013C0820G. September 2005.
5. Preliminary Drainage Report prepared for Optima Sonoran Village, approved March 22, 2010, and prepared by Kimley-Horn and Associates.

APPENDIX A –

HYDROLOGIC DATA AND CALCULATIONS (OVERALL SITE CONCEPT)

Entellus™

OPTIMA SONORAN VILLAGE

Pre and Post Development
Runoff and Retention Calculations

By **RSL**
Date: **4/18/2011**
Client: **OPTIMA**

Drainage Area No.	AREAS						Geometry				$C_{-factor}$	Rain Intensity			Q_{Peak}			Retention Basin 100-Yr, 2-hr Event			
	Building (sf)	Hardscape (sf)	Roof Gardens (sf)	Landscape (sf)	A_T [sf]	A_T [ac]	High El.	Low El.	Longest Path [ft]	Slope Longit. [ft/ft]	weighted	10-Yr [in/hr]	50-Yr [in/hr]	100-Yr [in/hr]	10-Yr [cfs]	50-Yr [cfs]	100-Yr [cfs]	V_R [cu.ft]	V_R [ac.ft]	V_P [cu.ft]	V_P [ac.ft]
EXIST.	112818	179729	0	81193	373740	8.580	1288.68	1281.69	840	0.0083	**0.82**	5.30	7.12	7.91	**37.28**	**50.09**	**55.66**	0	0.000	0	0.000
PROP. OVERALL	115437	38597	57994	161712	373740	8.580	1288.68	1281.69	840	0.0083	**0.66**	5.30	7.12	7.91	**29.99**	**40.29**	**44.77**	**44605**	**1.024**	**0**	**0.000**
C-Factor	**0.95**	**0.95**	**0.75**	**0.35**																	

100 yr - 2 hr (Precipitation Amount) **2.17"**

Notes:

1). **RUNOFF REDUCTION:** **19.6%** Reduction of offsite flow as a result of developing the property

2). **VOLUME WAIVED (cf):** **44605** Vw = (100yr-2hr retention volume)

3). **IN LIEU FEE (overall):** **$143,628.10** Estimated Fee = (Vw x $3.22)

Entellus™

PEAK DISCHARGE CALCULATIONS
10, 50 100 Year Events
OPTIMA SONORAN VILLAGE

By **RSL**
Date: **4/18/2011**
Client: **OPTIMA**

Drainage Area: **EXIST**
Hydrologic Zone:

A=	8.580	ac
L=	*0.159*	mi
upper elev=	*1288.68*	
lower elev=	*1281.69*	
S=	43.937	ft/mi
S=	0.00832	ft/ft
K_b=	0.034	

$Q = C_w * i * A$

where, Q: Peak Discharge [cfs]
C_w: Weighted Runoff Coefficient
i: Aveage rainfall intensity [in/hr], lasting for a T_c
A: Drainage area [ac]
Tc: Time of Concentration [hrs]

$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$

L: Length of longest flow path [mi]
K_b: Watershed resistance coefficient
S: Slope [fi/mi]

Thus, for **10-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*5.30*	7.7	✓
10	*4.03*	8.6	
15	*3.39*	9.2	

Therefore, Q_{10}= **37.3** cfs

C_{W10}

Building =	*112818*	sf	Cb=	0.95
Hardscape =	*179729*	sf	Ch=	0.95
Roof garden =	*0*	sf	Crg=	0.75
Landscape =	*81193*	sf	Cls=	0.35
A_{Total}=	373740	sf	C_w=	0.82 ✓
A_{Total}=	8.580	ac ✓		

For **50-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*7.12*	6.9	✓
10	*5.45*	7.7	
15	*4.64*	8.1	

Therefore, Q_{50}= **50.1** cfs

C_{W50}

Building =	112818	sf	Cb=	0.95
Hardscape =	179729	sf	Ch=	0.95
Roof garden =	0	sf	Crg=	0.75
Landscape =	81193	sf	Cls=	0.35
A_{Total}=	373740	sf	C_w=	0.82 ✓
A_{Total}=	8.580	ac ✓		

For **100-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*7.91*	6.6	✓
10	*6.07*	7.4	
15	*5.19*	7.8	

Therefore, Q_{100}= **55.7** cfs

CW_{100}

Building =	112818	sf	Cb=	0.95
Hardscape =	179729	sf	Ch=	0.95
Roof garden =	0	sf	Crg=	0.75
Landscape =	81193	sf	Cls=	0.35
A_{Total}=	373740	sf	C_w=	0.82 ✓
A_{Total}=	8.580	ac ✓		

Entellus™

PEAK DISCHARGE CALCULATIONS
10, 50 100 Year Events
OPTIMA SONORAN VILLAGE

By **RSL**
Date: **4/18/2011**
Client: **OPTIMA**

Drainage Area: **PROP**
Hydrologic Zone:

A=	8.580	ac
L=	0.159	mi
upper elev=	1288.680	
lower elev=	1281.690	
S=	43.937	ft/mi
S=	0.008	ft/ft
K_b=	0.034	

$Q = C_w * i * A$

where, Q: Peak Discharge [cfs]
C_w: Weighted Runoff Coefficient
i: Aveage rainfall intensity [in/hr], lasting for a T_c
A: Drainage area [ac]
Tc: Time of Concentration [hrs]

$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$

L: Length of longest flow path [mi]
K_b: Watershed resistance coefficient
S: Slope [fi/mi]

Thus, for **10-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*5.30*	7.7	✓
10	*4.03*	8.6	

Therefore, Q_{10}= **30.0** cfs

CW_{10}

Building =	*115437* sf	Cb=	0.95
Hardscape =	*38597* sf	Ch=	0.95
Roof garden =	*57994* sf	Crg=	0.75
Landscape =	*161712* sf	Cls=	0.35
A_{Total}=	373,740 sf	C_w=	0.66 ✓
A_{Total}=	8.580 ac ✓		

For **50-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*7.12*	6.9	✓
10	*5.45*	7.7	

Therefore, Q_{50}= **40.3** cfs

CW_{50}

Building =	115437 sf	Cb=	0.95
Hardscape =	38597 sf	Ch=	0.95
Roof garden =	57994 sf	Crg=	0.75
Landscape =	161712 sf	Cls=	0.35
A_{Total}=	373,740 sf	C_w=	0.66 ✓
A_{Total}=	8.580 ac ✓		

For **100-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*7.91*	6.6	✓
10	*6.07*	7.4	

Therefore, Q_{100}= **44.8** cfs

CW_{100}

Building =	115437 sf	Cb=	0.95
Hardscape =	38597 sf	Ch=	0.95
Roof garden =	57994 sf	Crg=	0.75
Landscape =	161712 sf	Cls=	0.35
A_{Total}=	373,740 sf	C_w=	0.66 ✓
A_{Total}=	8.580 ac ✓		

Cross Section for Rectangular Channel - OUTFALL (MAX CAPACITY)

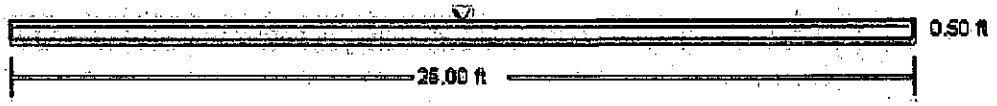
Project Description

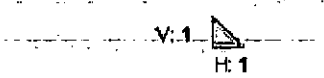
Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.016	
Channel Slope	0.00500	ft/ft
Normal Depth	0.50	ft
Bottom Width	25.00	ft
Discharge	50.38	ft³/s

Cross Section Image





APPENDIX B –

HYDROLOGIC DATA AND CALCULATIONS (FINAL DESIGN - BUILDING 6895)

B. 1.1 Proposed Development – Building 6895

The proposed Building 6895 development is planned to consist of approximately 204 condominium units and an underground parking garage that will accommodate approximately 340 vehicles. The project is also anticipated to utilize sustainable design practices when applicable within the development.

The proposed Phase 1 residential tower will vary in height from 3 to 7 stories and will be constructed above the underground parking structure. The lowest finished floor will be at elevation 1288.1. The northern portion of the structure along the frontage of Camelback Road will provide commercial and retail amenities.

B 1.2 Proposed Drainage System – Building 6895

Generally, the runoff originating from the Building 6895 development will primarily be collected by a series of roof/area drains and will be piped to the existing 84' RGRCP storm drain system located within Camelback Road. The maximum conveyance of the onsite storm drain system shall not exceed the 10yr-2hr storm frequency. The proposed lateral connections into the existing storm drain system shall have an open grate allowing secondary surface discharge into the adjacent street when the storm drain system is hydraulically surcharged. Lastly, should a storm event exceed the area drain/storm drain capacity, the onsite grading design will provide for adequate surface drainage to ensure the finished floor elevations and adjacent properties are protected, and that the drainage exits the site in a historic manner.

A Stormwater Pollution Protection Plan (SWPPP) shall be prepared per City of Scottsdale, ADEQ, and AZPDES requirements, and shall be approved prior to the commencement of any construction activities. The (SWPPP) shall be updated and maintained accordingly to provide adequate protection for all phases of construction activities until final completion of the project.

In addition, a stormwater discharge permit shall be submitted and approved for each individual building development requiring stormwater discharge into a public facility and shall meet all applicable City of Scottsdale, EPA, and ADEQ requirements.

B 1.3 Proposed Stormwater Storage Calculations

The amount of storage volume shall be determined by the City of Scottsdale and the Flood Control District of Maricopa County stormwater storage requirements and design standards.

Vr = (P/12) * A * Cw where:

Vr = Required storage volume in ac-ft

P = Precipitation amount = 2.17 inches. (COS – DS&PM, Appendix 41-D)

A = Area in acres; the developed portion of the entire site in acres, on which any man made change is planned, including but not limited to; construction, excavation, filling, grading, paving, or mining.

Cw= Weighted runoff coefficient; refer to Appendix B for drainage calculations (Cw= 0.67)

Vr = (2.17"/12) * (124,686 / 43,560) * (0.67) = 0.347 ac-ft * 43,560 = **15,115 cf**

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ 85 - DR - 2010 ___ - PP - ___ PC# 478-10-3

The applicant/developer must complete and submit this form to the city for processing and obtain approval of waiver request ***before submitting improvement plans***. Denial of the waiver may require the developer to submit a revised site plan to the Development Review Board.

Date 04/19/2011 **Project Name** Optima Sonoran Village (Building 6895)

Project Location 6801 E. Camelback Road

Applicant Contact David Hovey, Jr., A.I.A. **Company Name** Optima Sonoran Village, L.L.C.

Phone 480-874-9900 Fax 480-285-7320 E-mail hoveydjr@optimaweb.com

Address 7147 E. Rancho Vista Dr, Suite 104
Scottsdale, AZ 85251

Waiver Criteria

A project must meet at least one of four criteria listed below for the city to consider waiving some or all required stormwater storage. **However, regardless of the criteria, a waiver will only be granted if the applicant can demonstrate that the effect of a waiver will not increase the potential for flooding on any property.** Check the applicable box and provide a signed engineering report and supporting engineering analysis that demonstrate the project meets the criteria and that the effect of a waiver will not increase the potential for flooding on any property.

If the runoff for the project has been included in a storage facility at another location, the applicant must demonstrate that the stormwater storage facility was specifically designed to accommodate runoff from the subject property and that the runoff will be conveyed to this location through an adequately designed conveyance facility.

☐ 1. The development is adjacent to a watercourse or channel that an engineering analysis shows is designed and constructed to handle the additional runoff.

☐ 2. The development is on a parcel less than one-half acre in size.

☐ 3. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO). A conflict with ESLO is limited to:

- Property located in the hillside landform as defined in the city Zoning Ordinance.
- Property where more than thirty-five (35) percent is covered by required natural area open space as defined in the city Zoning Ordinance.

☑ 4. The project is located within the Downtown Area as delineated by the Figure 1 below.

By signing below, I certify that the stated project meets the waiver criteria selected above as demonstrated by the attached documentation.

Engineer Richard S. Lopez, P.E. Date 04/19/11

Planning, Neighborhood & Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Exhibit 5

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ 88 - DR - 2010 ___ - PP - ___ PC# 476 10-3

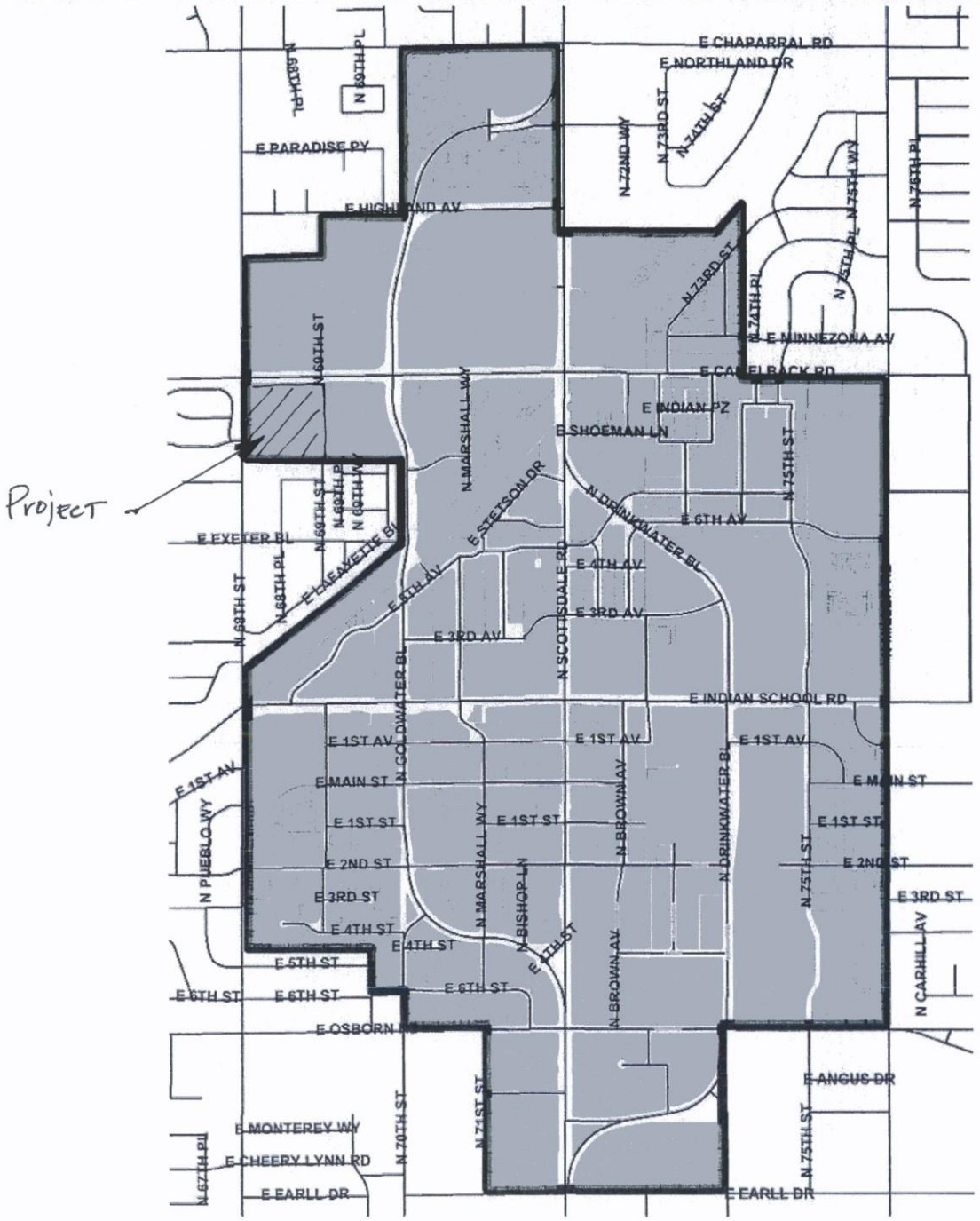


Figure 1. Designated Area for Downtown Stormwater Storage Waivers

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ 88 - DR - 2010 ____ - PP - ____ PC# 478-10-3

CITY STAFF TO COMPLETE THIS PAGE

Project Name Optima Sonoran Village - Bldg 6895 Phase 1 (Phase 1 Only)

Check Appropriate Boxes:

☑ Meets waiver criteria (specify): ☐ 1 ☐ 2 ☐ 3 ☑ 4

☑ Recommend approve waiver.

☐ Recommend deny waiver:
- ☐ None of waiver criteria met.
- ☐ Downstream conditions prohibit waiver of any storage.
- ☐ Other:

Explain: _____

_____

☐ Return waiver request:
- ☐ Insufficient data provided.
- ☐ Other: _____

Explain: _____

_____

Recommended Conditions of Waiver:

☐ All storage requirements waived.

☑ Pre development conditions must be maintained.

☐ Other:

Explain: _____

_____

☑ **Waiver approved per above conditions.**

☐ **Waiver denied.**

Richard McCune — 4/26/11

Floodplain Administrator or Designee — Date

Planning, Neighborhood & Transportation Division

7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:
___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ 88 - DR - 2010 ____ - PP - ____ PC# 478-10-3

In-Lieu Fee and In-Kind Contributions

If the city grants a waiver, the developer is required to calculate and contribute an in-lieu fee based on what it would cost the city to provide the waived storage volume, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. The fee for this cost is $3.22 per cubic foot of stormwater storage waived. This unit cost will be updated annually, but the city reserves the right to revise the unit cost at any time.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. In-kind contributions must be stormwater related and must constitute a public benefit. In-lieu fees and in-kind contributions are subject to the approval of the Floodplain Administrator or designee.

Project Name Optima Sonoran Village (Building 6895)

The waived stormwater storage volume is calculated as follows: (Phase 1 Only)

V = CRA; where
V = stormwater storage volume required, in cubic feet,
C = weighted average runoff coefficient over disturbed area,
R = 100-year/2-hour precipitation depth, in feet (DSPM, Appendix 4-1D, page 11), and
A = area of disturbed ground, in square feet

Furthermore,

$V_w = V - V_p$; where
V_w = volume waived,
V = volume required, and
V_p = volume provided

C = 0.67
A = 124,626 SF
V = 15,115 CF
V_p = 0
V_w = 15,115 CF

☑ An in-lieu fee will be paid, based on the following calculations and supporting documentation:
in-lieu fee ($) = V_w (cu. ft.) x $3.22 per cubic foot = # 48,670.30

☐ An in-kind contribution will be made, as follows:

Approved by:
Richard McCune
Floodplain Administrator or Designee

4/26/11
Date

Planning, Neighborhood and Transportation Division
7447 E Indian School Road, Suite 105, Scottsdale, AZ 85251 • Phone: 480-312-7000 • Fax: 480-312-7088

Entellus™

OPTIMA SONORAN VILLAGE
BUILDING 6895
Runoff and Retention Calculations

By **RSL**
Date: **4/18/2011**
Client: **OPTIMA**

Drainage Area No.	AREAS						Geometry				C_{factor}	Rain Intensity			Q_{Peak}			Retention Basin 100-Yr, 2-hr Event			
	Building (sf)	Hardscape (sf)	Roof Gardens (sf)	Landscape (sf)	A_T [sf]	A_T [ac]	High El.	Low El.	Longest Path [ft]	Slope Longit. [ft/ft]	weighted	10-Yr [in/hr]	50-Yr [in/hr]	100-Yr [in/hr]	10-Yr [cfs]	50-Yr [cfs]	100-Yr [cfs]	V_R [cu.ft]	V_R [ac.ft]	V_P [cu.ft]	V_P [ac.ft]
PH1	39660	14831	16850	53345	124686	2.862	1286.70	1281.69	630	0.008	**0.67**	5.30	7.12	7.91	**10.11**	**13.58**	**15.09**	**15115**	**0.347**	**0**	**0.000**
C-Factor	**0.95**	**0.95**	**0.75**	**0.35**																	

100 yr - 2 hr (Precipitation Amount) **2.17"**

Notes:

1). **VOLUME WAIVED (cf):** **15115** Vw = (100yr-2hr retention volume)

2). **IN LIEU FEE (PH1):** **$48,670.30** Fee = (Vw x $3.22)

Entellus™

PEAK DISCHARGE CALCULATIONS
10, 50 100 Year Events
OPTIMA SONORAN VILLAGE
BUILDING 6895

By **RSL**
Date: **4/18/2011**
Client: **OPTIMA**

Drainage Area: **PH1**
Hydrologic Zone:

A=	2.862	ac
L=	*0.119*	mi
upper elev=	*1286.70*	
lower elev=	*1281.69*	
S=	41.989	ft/mi
S=	0.00795	ft/ft
K_b=	0.037	

$Q = C_w * i * A$

where, Q: Peak Discharge [cfs]
C_w: Weighted Runoff Coefficient
i: Aveage rainfall intensity [in/hr], lasting for a T_c
A: Drainage area [ac]
Tc: Time of Concentration [hrs]

$T_c = 11.4L^{0.5}K_b^{0.52}S^{-0.31}i^{-0.38}$

L: Length of longest flow path [mi]
K_b: Watershed resistance coefficient
S: Slope [fi/mi]

Thus, for **10-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*5.30*	7.1	✓
10	*4.03*	7.9	
15	*3.39*	8.4	

Therefore, Q_{10}= **10.1** cfs

C_{W10}

Building =	*39660*	sf	C_{RC}=	0.95
Hardscape =	*14831*	sf	C_A=	0.95
Roof garden =	*16850*	sf	C_D=	0.45
Landscape =	*53345*	sf	C_G=	0.45
A_{Total}=	124686	sf	C_w=	0.67 ✓
A_{Total}=	2.862	ac ✓		

For **50-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*7.12*	6.3	✓
10	*5.45*	7.0	
15	*4.64*	7.5	

Therefore, Q_{50}= **13.6** cfs

C_{W50}

Building =	39660	sf	C_{RC}=	0.95
Hardscape =	14831	sf	C_A=	0.95
Roof garden =	16850	sf	C_D=	0.45
Landscape =	53345	sf	C_G=	0.45
A_{Total}=	124686	sf	C_w=	0.67 ✓
A_{Total}=	2.862	ac ✓		

For **100-year** Event:

T_c [min]	i [in/hr]	Calculated T_c [min]	
5	*7.91*	6.1	✓
10	*6.07*	6.7	
15	*5.19*	7.2	

Therefore, Q_{100}= **15.1** cfs

CW_{100}

Building =	39660	sf	C_{RC}=	0.95
Hardscape =	14831	sf	C_A=	0.95
Roof garden =	16850	sf	C_D=	0.45
Landscape =	53345	sf	C_G=	0.45
A_{Total}=	124686	sf	C_w=	0.67 ✓
A_{Total}=	2.862	ac ✓		

Worksheet for Circular Pipe - 15" SD (CAPACITY @ MIN. SLOPE)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Normal Depth	1.25	ft
Diameter	1.25	ft

Results

Discharge	8.40	ft^3/s
Flow Area	1.23	ft^2
Wetted Perimeter	3.93	ft
Hydraulic Radius	0.31	ft
Top Width	0.00	ft
Critical Depth	1.13	ft
Percent Full	100.0	%
Critical Slope	0.00876	ft/ft
Velocity	6.84	ft/s
Velocity Head	0.73	ft
Specific Energy	1.98	ft
Froude Number	0.00	
Maximum Discharge	9.03	ft^3/s
Discharge Full	8.40	ft^3/s
Slope Full	0.01000	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	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Circular Pipe - 15" SD

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.25	ft
Critical Depth	1.13	ft
Channel Slope	0.01000	ft/ft
Critical Slope	0.00876	ft/ft

Cross Section for Circular Pipe - 15 in SD

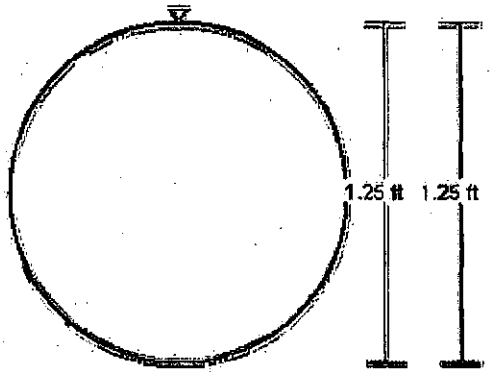
Project Description

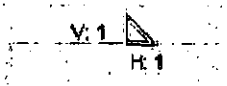
Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.01000	ft/ft
Normal Depth	1.25	ft
Diameter	1.25	ft
Discharge	8.40	ft³/s

Cross Section Image





Worksheet for Circular Pipe - 18" SD (Capacity @ Min. Slope)

Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00330	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft

Results

Discharge	7.84	ft³/s
Flow Area	1.77	ft²
Wetted Perimeter	4.71	ft
Hydraulic Radius	0.38	ft
Top Width	0.00	ft
Critical Depth	1.09	ft
Percent Full	100.0	%
Critical Slope	0.00433	ft/ft
Velocity	4.44	ft/s
Velocity Head	0.31	ft
Specific Energy	1.81	ft
Froude Number	0.00	
Maximum Discharge	8.44	ft³/s
Discharge Full	7.84	ft³/s
Slope Full	0.00330	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	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s

Worksheet for Circular Pipe - 18" SD

GVF Output Data

Upstream Velocity	Infinity	ft/s
Normal Depth	1.50	ft
Critical Depth	1.09	ft
Channel Slope	0.00330	ft/ft
Critical Slope	0.00433	ft/ft

Cross Section for Circular Pipe - 18 in SD

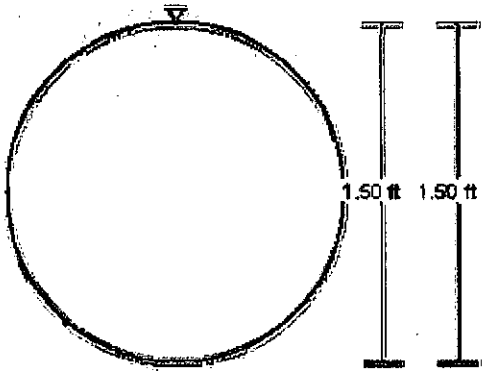
Project Description

Friction Method	Manning Formula
Solve For	Discharge

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00330	ft/ft
Normal Depth	1.50	ft
Diameter	1.50	ft
Discharge	7.84	ft³/s

Cross Section Image



V: 1
H: 1