Drainage Reports

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Water Study

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Engineering

SOLUTIONS

Advanced Consulting & Engineering Solutions

PRELIMINARY DRAINAGE REPORT

For

Goldwater Development

Plan # ______
Case # 4-ZN-2018
Q-S # ______
☑ Accepted
☐ Corrections
DG 3/5/19
Reviewed By Date

Located in:
70^{TH} & 4^{TH} Street
Scottsdale, Arizona

C.O.S. CASE NO. 4-ZN-2018

This day of: February 2019

Engineer of Record:

Joseph Hassell P.E.

Registered Professional Engineer (Civil)
Certificate No. 3*787
JOSEPH E HASSELL
Date Signed 2-5-19
ARIZONA U.S.A.

2/5/19

Ace Job #: 17-096

Prepared By:
Ace Solutions, LLC
609 N Calgary Ct. Ste. 7
Post Falls, ID 83854
208-777-1854

Prepared For:
Goldwater Boulevard, LLC
Robert Ballard
480-203-8661

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INTRODUCTION

This Storm Water Management report is being developed at the request of the City of Scottsdale to verify that runoff from the Goldwater Development site property under developed conditions will comply with the City's stormwater ordinance and its Design Standards and Policy Manual (DSPM). Site location is the corner of 70^{th} and Goldwater Blvd. Old Town Scottsdale, Arizona. Total lot area is 1.19 Ac. The lot currently has a city owned 24-inch diameter stormwater drain from the end of 4^{th} street to a storm drain manhole in Goldwater Boulevard.

The storm drain will need to be eliminated at 4th street. The stormwater will be designed to flow above ground along the southern property line. Near the east end of the property, the storm flow from the street will be captured in a new catch basin which will pipe the water back to the existing stormwater outlet located in Goldwater Blvd. The new area of pipe will need a drainage easement of 12 feet wide. We have planned to use 18-inch diameter storm drain piping.

In order to retain the stormwater from the developed site condition, an underground stormwater storage tank will be utilized. Per our calculations, 7750 cubic feet of storage is required. The tank will be located on the east end of the property. Catch basins around the property will drain to the tank location, where there will be an outfall pipe that drains to the city system at the maximum allowed rate of 1 cubic foot per second. The tank will be designed as such that a storm larger than the 100 year, 2-hour storm will result in excess water draining to a drywell on site. Drainage easements will be given where required at the storage tank and piping locations.

This submittal is considered preliminary not for construction. A final plan set and certifications will be submitted at a later date. The final submittal will reflect the current city code requirements.

Previous Drainage Studies or Master Plan

The city of Scottsdale has provided as built drawings of the stormwater system for the area and has notified us of a maximum discharge rate into the existing storm system of 1.0 cfs. The existing lot does not have any existing stormwater storage volume.

Location

The proposed development site contains approximately 1.19 acres located between Goldwater Boulevard and 4th street, Scottsdale. Access to the property is from 4th street.

Description of Property

The property is located between Goldwater Boulevard and 4th Street in Old Town Scottsdale, Arizona. Access to the property is from 4th Street. The property is currently undeveloped. All street front improvements are in place. The property owners have requested a 10 foot in width right of way abandonment adjacent to 4th street. This right of way abandonment is not necessary for the drainage plan, it affects the layout of the building.

The property is currently zoned for commercial development.

This project is not near a floodplain area and there are no visible wetlands in the area. See attached FEMA map in appendix C for Scottsdale community number 045012.

Vicinity Map

General Project Description

The purpose of the proposed development is to construct a new 5 story residential condominium with parking in the basement and ground level. The project will also include grading, curb and gutter, paving, stormwater retention areas utilizing underground storage tanks, landscaping and sidewalks, building, parking, and relocation of the existing stormwater drains, pipes and easements.

Construction schedule

Construction is anticipated to begin in late summer of 2019. Construction will not be phased.

Applicant information

Owner: Goldwater Boulevard LLC

Contact: Bob Ballard

480-203-8661

Scottsdale, Arizona

Engineer Information

ACE Solutions LLC

Project Engineer: Joseph Hassell, PE

609 N. Calgary Ct. Ste. 7

Post Falls, Idaho 83854

Telephone: 208-777-1854

Email: joeh@acesolutions.pro

STORMWATER DESIGN CRITERIA

Regulations: Preliminary Report

City of Scottsdale 2018 DSPM was used for this report. A final report will use the current DSPM.

Analysis Methods

Our hydrological analysis is based on the Rational Method. This method utilizes rainfall frequencies and runoff characteristics from a watershed to predict peak discharges during storm events. This method is suitable for storm analysis on site 160 ac. or less. The storm event for 100-year frequency was analyzed. Storm event data was collected for the NOAA Atlas 14, volume 1 Version 5.0 of Western United States.

The analysis uses sheet flow across the surfaces for pre-developed conditions as well as post-developed conditions. Time of concentration was calculated using the existing and proposed surface runoff coefficients and the length of basin was from the further reaches on site to the average distance to the proposed detention area.

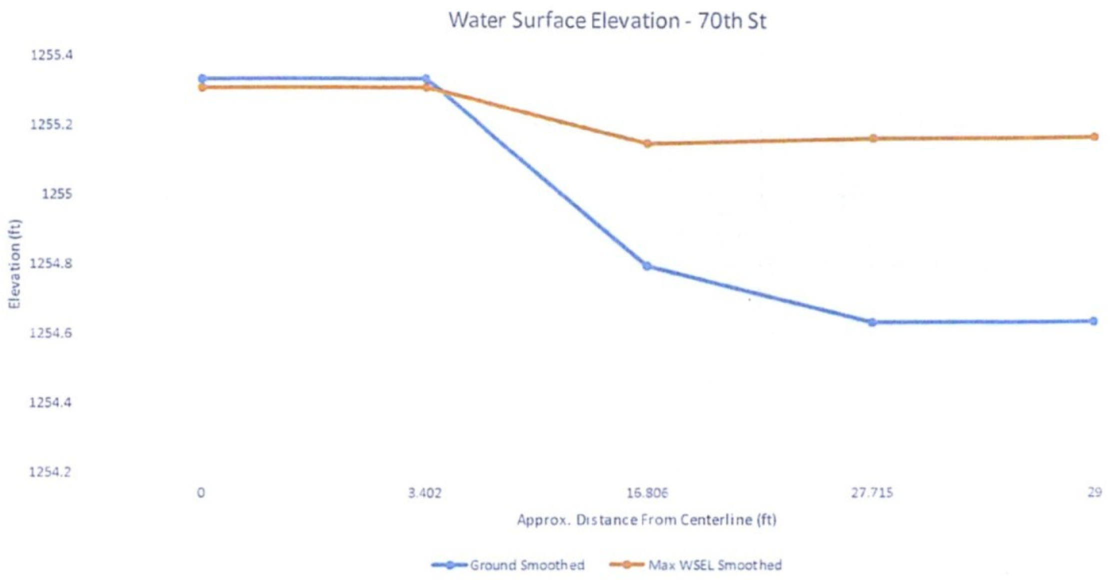
Hydrologic Criteria

At the requirement of the City of Scottsdale DSPM, hydrologic modeling was completed using the 100-year frequency rainfall events as reported in NOAA Atlas 14, Volume 1 Rainfall Frequency Atlas of the Western United States. This data is included in Appendix A. The runoff response from the 6-hour duration storm event was studied to look at historical drainage patterns. These patterns were studied to determine if runoff would enter or leave the property in its pre-development state. The information used was provided by the Lower Indian Bend Wash Area Drainage Master Study (LIBWADMS). Data from the study allows for us to draw a line at certain areas in order to determine the water surface elevation and the flow rates over time after the storm.

Generally, the study confirms the water will flow past the site and not on to the site. Along Goldwater, water will flow away from the property to the North East. Along 70th street, water generally follows the layout of the street. Logically, some water must continue down 4th street. Study shows the water here is lower than the curb height, and with the existing catch basin capturing water at 4th street there should be no water entering the site from the street. A map showing the water flow directions is provided in Appendix C.

Using data from the study, we can determine the water surface elevation at selected points. Our first study location was along 70th street just to the North of the intersection with 4th Street. The following figure shows the results. A full-size version of each of the following figures can be found in Appendix B.

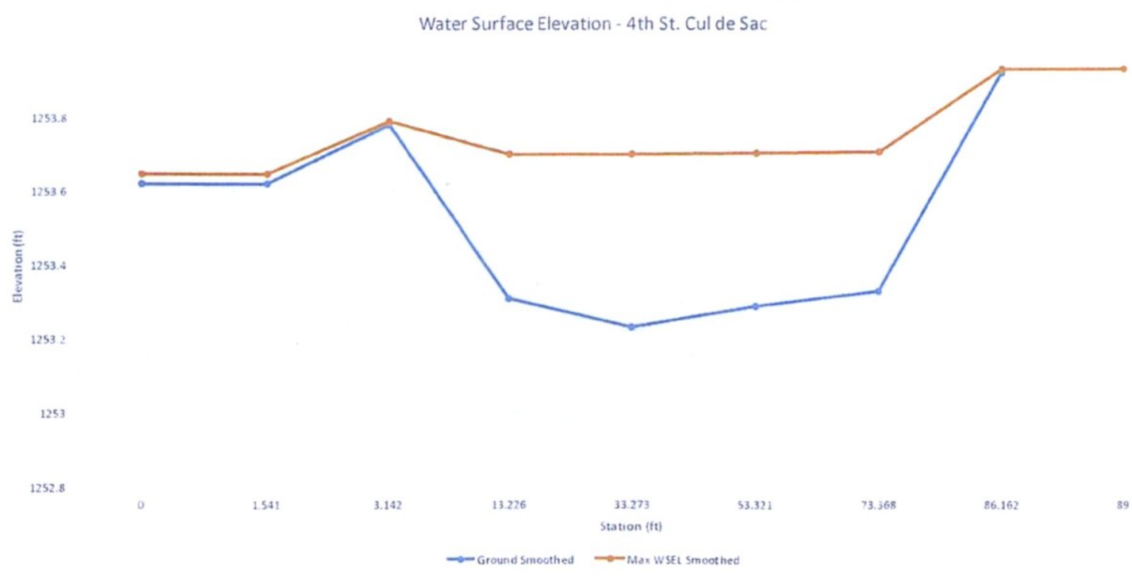
Figure 1: Water Surface Elevation at 70th St.



It was determined that the maximum water surface elevation at this location is 0.53', or just over 6 inches. The curb height at this location is 6 inches, and the water generally runs to the south. Even if the curb were overtopped at this location, the water flow would lead it south along 70th street to the intersection with 4th street, which has more storage capacity for the flows exhibited.

The water surface elevation was also studied at the 4th street Cul-de-Sac. The following figure shows the results.

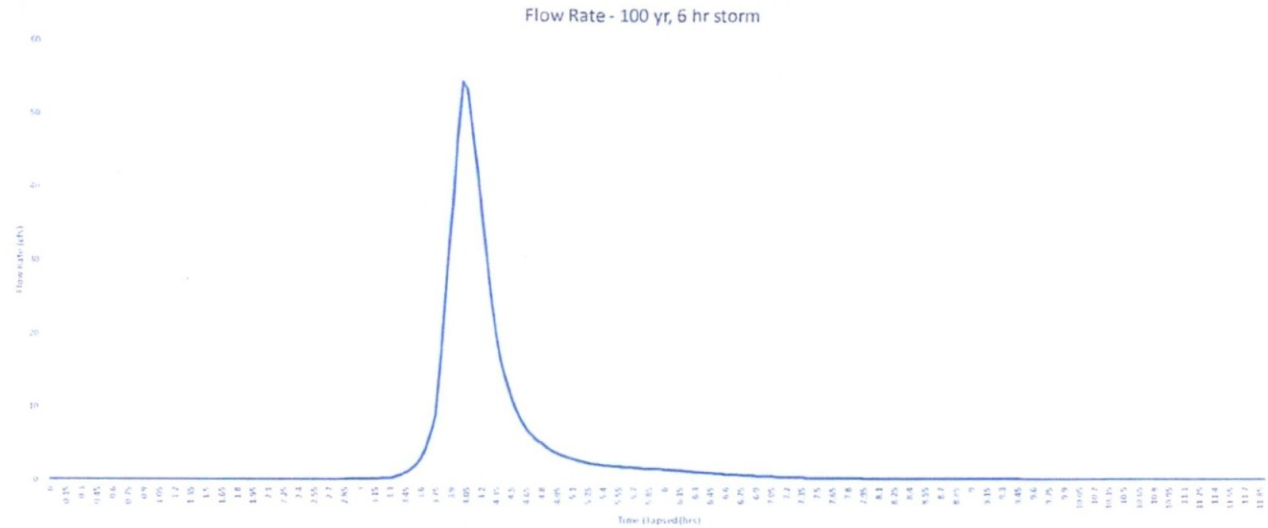
Figure 2: Water Surface Elevation at 4th St.



The maximum water surface elevation at this location is 0.47', just under 6 inches. With a 6-inch tall curb at this location, overtopping should not be a concern, especially with the existing catch basin in the Cul-de-Sac capturing stormwater into the city system.

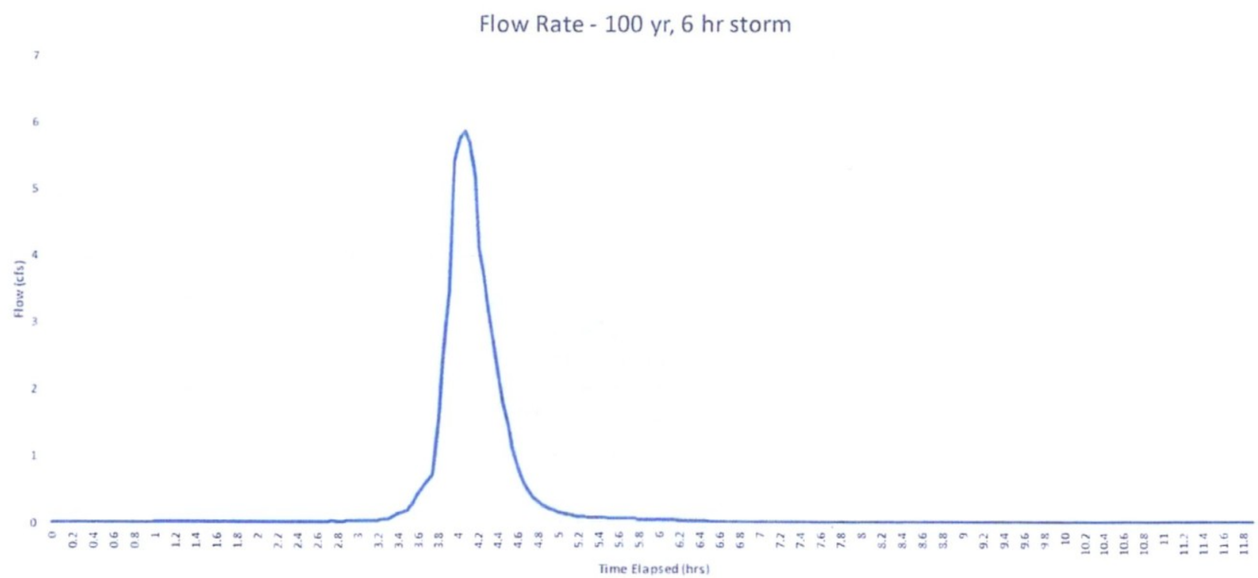
We can also use data from the LIBWADMS to determine the flow rate for the 100-year, 6-hour storm. Figure 3 presents the flow rate over time from the same location studied in figure 1.

Figure 3: Flow rate at 70th St.



Using the information shown above, we determined that the maximum flow at 70th street was 54.31 cfs. This flow occurs 4 hours after the storm. Figure 4 presents information from the same location as figure 2.

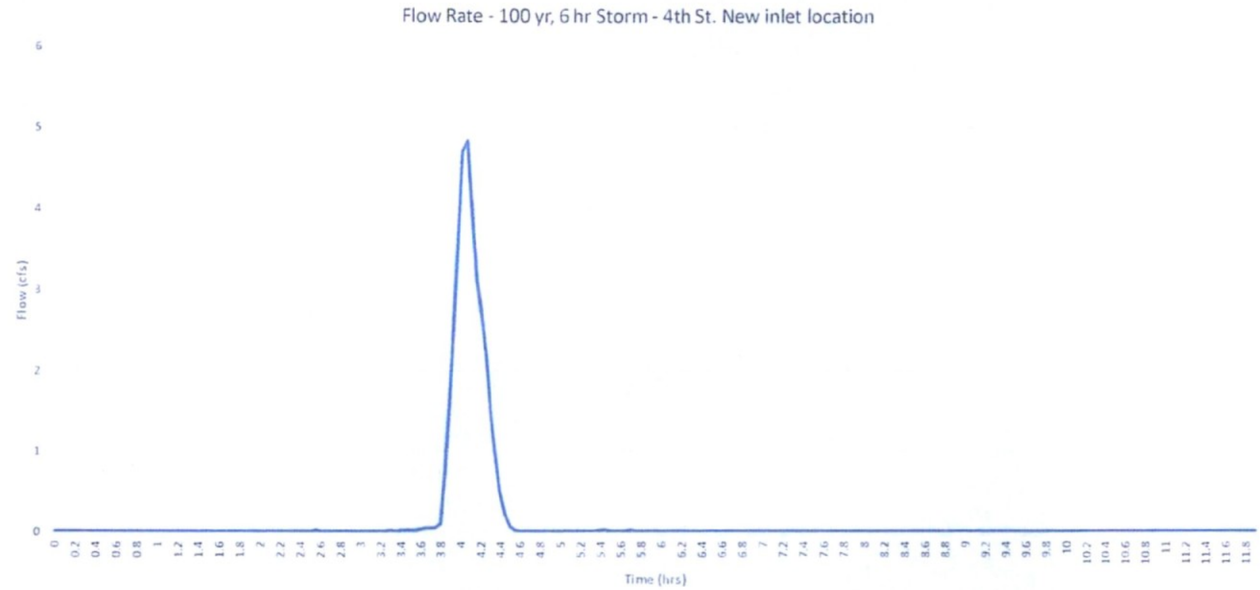
Figure 4: Flow Rate at 4th St.



Using this information, is was determined that the maximum historical flow at the 4th street culvert inlet is 5.88 cfs. Since we are planning on removing this inlet, we must design for the same flow to be conveyed back to the city system. This calculation is presented in Appendix B, with the result shown on plan page C6 in Appendix D.

We also viewed the flow rate at the location where the new inlet will be placed. Had this rate been higher than shown in figure 4, we would use this higher rate.

Figure 5: Flow Rate at new inlet



The maximum flow at this location is 4.83 cfs. We will use the data from figure 4 to as the baseline for stormwater flows contained by the city system.

Datum

All elevations listed in this report refer to the NAVD-88 GEOID 09 datum. Upon final submittal We will provide equation and location for conversion to the City of Scottsdale datum and local bench mark.

STORM WATER MANAGEMENT PLAN

General Description

All stormwater runoff will be collected and piped to a detention vault which will outfall into the city storm system. The city will only allow 1.0 cfs discharge at any one time. A drywell will also be designed to contain flows over the 100-year flood and to speed up outflow from the detention vault.

The proposed detention vault will be constructed to discharge runoff from the site at or below the allowed rate of 1.0 cfs, per the DSPM section 4-1.201. All stormwater will be collected and directed into the underground stormwater storage tank (USST). A Drywell is proposed to capture any overflow above the 100-year event. In the USST, two outflow pipes will be placed at minimum. The first will allow outflow to the city system at the proposed 1.0 cfs. This will be designed to always allow outflow as long as there is water in the USST. A second pipe will be designed above the required storage that allows for outflow to the drywell. The drywell will be sized later, but it is assumed that it will handle all the additional water of storms stronger than the 100-year, 2-hour storm.

The underground detention vault must be constructed to comply with the criteria in the 2018 Design Standards and Policy Manual (DSPM), Chapter 4, Section 4-1.202.

There is also a basement level to the building accessible via a ramp down to the level. This must include drains for the inevitable stormwater that will run down the ramp and water that will run off the cars parked there. Our basement level plan is shown on plan page C2 in Appendix D.

An existing 24-inch diameter storm drain line runs through a section of what will become the ramp down to the lower level. This drain line will be removed, and the easement abandoned to allow for the parking ramp installation. In its' place, a scupper will be installed further south to allow for sheet flow of the street stormwater past the sidewalk. A concrete spillway will be installed beneath the sidewalk and to the south of the parking lot allowing the water to flow past the parking lot. From there it will be conveyed in a v-ditch, lined with rip rap to prevent erosion. It will be directed north directly into a new catch basin, where it will be directed to the city system in a new storm drain. This is shown on plan page C6, included in appendix D. Drainage easements will be provided for the new storm drains. Additional drain pipe will need to be installed to re-route the line towards the existing city drain.

A recreational swimming pool is designed to be on site. The design of this pool is by other firms, but the drains and backwash systems must be connected to the sanitary sewer system.

Hydrological Analysis

For sites that have not been previously developed, the standard formula is shown below:

$Vr = C(R/12)A$

See City of Scottsdale DSPM for more information regarding this formula.

The provided spread sheet calculates a weighted "C" to apply over the entire site. All stormwater from the 100-year, 2-hour precipitation event must be contained on site.

Additional calculations are shown using data from NOAA Atlas 14, Volume 1 to determine historical flows for 2, 10, 25, and 100-year storms.

Table 1 provided below summarizes the rainfall amounts for each of the analyzed storm events.

Table 1: Rainfall Depths

Rainfall Duration	10-Year	25-Year	50-Year	100-Year
2 Hour	1.38"	1.69"	1.92"	2.16"

A weighted C factor has been calculated for each sub-basin based on the existing and developed conditions using coefficients from the DSPM. Table 2 gives runoff coefficients used to calculate the weighted C value for various land usages. We are considering that the current site can be labeled a gravel floodway and shoulder.

Table 2: Runoff Coefficients

Land Cover	Specific/Composite	Storm Freq. (years)		
		2-25	50	100
Lawns, golf courses & parks	Specific Surface Values	0.20	0.25	0.30
Paved Streets, Parking Lots, roofs, driveways, etc.	Specific Surface Value	0.90	0.93	0.95
Apartments & Condominiums	Composite Area Values	0.76	0.83	0.94
Gravel Floodways and Shoulders	Specific Surface Values	0.68	0.78	0.82

Hydraulic Analysis and Design

Retention

Table 3 provided below summarizes the water surface elevations, inflow, outflow, depth and storage required within the proposed USST. The tank will be composed of multiple cells, which when combined hold a minimum of 7750 cf (100 yr.). The outfall weir allows a maximum of 1.0 cfs. Of outfall directly into the city system. Overflow will be directed into an onsite drywell.

Table 3: USST Summary

Event	Max WSEL (ft.) AVG	Freeboard (ft.) At outfall	Max Q_{in} (cfs)	Max Q_{out} (cfs)	Depth(ft.)	Storage Requirement (cft.)
10-Year	TBD	3.62	1.26	1.0	3.88	4544

25-Year	TBD	2.74	1.54	1.0	4.76	5565
100-Year	TBD	0.88	2.12	1.0	6.62	7750

WSEL= Water Surface Elevation from bottom of vault at outfall location for indicated storm event

Retention will be provided to control developed runoff release to rates as allowed by the city (1.0 cfs). The Existing Conditions have a greater discharge then allowed. Freeboard will be provided during all analyzed storm events. However, if overtopping were to occur, overflow from the detention vault will be piped to an area drywell. Drywell to be sized at a later date.

UNDERGROUND STORAGE TANK DESIGN

According to the above calculations, a minimum of 7750 cubic feet of storage is required in the USST. As shown on plan page C6 in appendix D, we have designed a trapezoidal tank totaling 1170 square feet in surface area. The total tank will be 7.5' deep to allow for sediment buildup. If we design for 7 feet of storage, the tank should be able to hold 8190 cubic feet of water.

In our current design, we must outflow to the city approximately 6.5' below grade. This leaves 1 foot of water in the tank that must be removed.

The outfall pipe to the city system will be placed near the bottom of the tank, approximately 6 inches from the bottom to allow for sediment to settle. An outfall pipe will be placed within 12 inches of the top of the tank which will outflow to the drywell. The basic design is shown on plan page D1 in Appendix D.

Table 4: Estimated Tank Drainage Times

Outlet Height (from Base)	Outlet Flow rate (cfs)	Volume Drained by outlet (cu. Ft)	Total Drainage Time (hrs.)
0'-0.5'	0.1 (drywell)	1755	5
1.5'	1.0 (city system)	6435	1.8
6.5-7.0' (TBD)	TBD	TBD	TBD

Table 4 shows the estimated time to drain the tank at full capacity. By adding the results of the last column, we can see that the tank will drain in less than 7 hours.

Comparing the data in Table 4 with the historical flows shown in Figure 4, we see after the 100-7ear, 2-hour storm, the tank will empty before off-site stormwater is conveyed through the site. The 4-hour delay shown in Figure 4 will help us to make sure that the city stormwater system is not overloaded when dealing with our outflow and the historical outflow.

Per the DSPM Chapter 4, Section 4-1.202 the storage tank must meet the following criteria, with comments following showing how we plan to meet the criteria:

C. GENERAL CRITERIA FOR UNDERGROUND STORMWATER STORAGE SYSTEM DESIGN

1. Underground stormwater storage systems must demonstrate protection of public health, safety, and welfare as established by the SRC and related policies.

The final design will incorporate these aspects.

2. Storage systems must not be located under structures, parking garages, or significant landscaping such as trees or sizable cactus that would preclude access to or replacement of the facilities.

Please see attached plan pages in Appendix D for storage location. The location shown meets these criteria. We have removed the fence previously shown on drawings to accommodate the tank location shown.

3.The owner must dedicate a public drainage easement to the city which meets the standards for all drainage easements.

This will be comped prior to construction completion. The easement is shown on plan page C6 in Appendix D.

4. Design must address:

a. Water quality protection measures to protect underground and surface water resources to meet applicable water quality standards.
b. Vector control within storage system.
c. Redundancy in case of storage system failure, with attention to the possibility of structure or street flooding, sediment accumulation, or storm events that are greater than the 100-year, 2-hour event.
d. Initial suspended sediment load removal.
e. At least a 75-year life of entire system, including the lining and coating of the underground storage tank.
f. Drainage by gravity. Pumped systems will only be considered if no other reasonable alternative exists with dry wells as a preferred alternative if drainage by gravity is not feasible.

These points will be addressed as part of the final design. We anticipate that the storage system will be able to drain to the adjacent drywell and to the city system via the outflow piping. If the structure should become overtopped, overflow will be piped to an adjacent drywell. As shown in previous paragraphs, we cannot empty the tank completely using the city system and will drain the remainder to a drywell. This will be done via gravity.

D. SPECIFIC CRITERIA FOR UNDERGROUND STORMWATER STORAGE DESIGN

1. Outfall—underground storage systems must have some sort of outfall, such as gravity drains or pumps.

See above notes. The structure will outflow via outflow piping.

2. Pipes—underground storage system pipes must have a smooth interior floor. The city's Maricopa Association of Governments (MAG) supplemental standard detail 2554 shall be used to meet the smooth interior floor requirement for the use of corrugated metal pipes in underground stormwater storage facilities.

These types of pipes will be used.

3. Installation—excavation, bedding, and backfill procedures and materials must be in accordance with MAG standards.

These standards will be followed.

4. Access—a minimum of two access points must be provided for each underground storage system unless waived in advance by stormwater staff to enable inspections and access for removal of accumulated sediment and debris. Access must be in accordance with MAG standards and be placed to maximize the ability to maintain the underground system.

The final detention vault design will follow these standards.

E. CRITERIA FOR OPERATIONS, MAINTENANCE AND LIABILITY

1. Operations and maintenance generally—owner must provide:

a. Maintenance staff with expertise in operating, inspecting, and maintaining an underground stormwater storage system;

b. An Operations and Maintenance Manual on site for the system that includes:

i. a schedule for inspections and maintenance, and

ii. provisions for emergency operations due to power failure, pump failure, and clogged outlet structures;

iii. A log of the inspections and required maintenance services.

We will insure the owner provides this information.

2. Inspections and maintenance required—In addition to maintenance required by the SRC and other applicable requirements, owner shall:

a. Inspect system after each storm event of 0.6 inch or more, and semiannually, preferably before summer and winter rains.

b. Remove accumulated trash and debris from inlet and outlet structures as needed to ensure free flow of stormwater.

c. Inspect all other elements of the drainage system (pipes, geotextiles, and stone) and repair/replace elements as needed for the storage system to operate at peak efficiency.

The owner will provide this.

3. Signage—before receiving a C of O, the owner must install signs at each end of the underground storage tank that read "Notice—Underground Stormwater Storage Tank." The size, color, and locations of signs are subject to city staff approval.

This will be provided.

4. Ownership Responsibility Statement – The owner shall provide and sign a statement of responsibility for the system stating and acknowledging the owner is responsible for the maintenance, repair, and potential replacement of the system. Prior to final plan approval, the

owner must provide a signed and notarized document to this effect, in a form satisfactory to the City Attorney, for recordation by the city in the Maricopa County Recorder's Office.

This will be provided.

UNDERGROUND LEVEL DESIGNS

The Underground level must be accounted for in the stormwater design. There is one level underground, accessible from a ramp that meets the existing cul-de-sac. An existing storm pipe runs through this area and will have to be moved.

The ramp to the lower level will have a roof over preventing most of the rainwater from running down the ramp. Also, there will be a small rise in elevation from the cul-de-sac trapping water from the street from getting to the ramp. At the top of this rise we will place a grate drain across all lanes of traffic to catch most water that may try to overflow into the basement level.

At the bottom of the ramp a grate drain will be placed across all lanes of traffic. Catch Basins will be placed within the parking area and the parking sloped slightly to drain the water towards the basins. All the water from the drain and from the basins will be conveyed to a sump pump location. From there the water will be pumped up to the surface level where it will drain to the underground storage tank.

Erosion Control

Description

Construction of the project shall include erosion and sediment control. Perimeter erosion controls shall be installed prior to any soil disturbance on site. Interior erosion controls shall be installed after rough grading. The contractor shall install additional erosion control measures as need and shall be responsible for installing and maintaining all erosion control measures. The owner is responsible for erosion control for all contractors working on the site, including minimizing tracking of soil and debris onto adjacent properties and roadways and wind erosion control.

Areas not being developed or planned to be developed for a period of greater than 14 days shall be stabilized to minimize wind and water erosion. This includes periods of winter shut down. Wind erosion protection shall be accomplished by mulching/crimping until 70% vegetation is established. Permanent erosion control shall be achieved by permanent seeding of slopes, disturbed ditch sections and disturbed pond areas. The seed mix shall be a sustainable perennial variety. Further, the contractor is responsible for all clean-up resulting from site erosion and soil tracking. Tracking must be removed by the end of each work day. Erosion control structures shall be in place prior to any land-disturbing activities. Maintaining erosion control structures, site clean-up, and re-evaluation of the erosion plan shall be done on a regular basis, particularly after any storm water event.

See attached development plans for graphical representation of the erosion control plan.

Stormwater Pollution Prevention- General Permit

If the project requires that a General Permit be obtained by the Arizona State Department of Ecology or EPA, an application package with all related and subsequent requirements may be acquired by contacting the Engineer of Record. The forms and requirements outline in the package are also available on the Scottsdale City website.

CONCLUSIONS

Runoff from developed conditions was compared against the runoff rates modeled for existing conditions. The analysis shows that, with the addition of the proposed detention vault, runoff from all analyzed areas under developed conditions, will be retained during the analyzed storm events when compared to existing conditions. The property outfall location will remain the same.

Warning and Disclaimer of Liability

For this preliminary, conceptual, design we have shown that is feasible to control the stormwater runoff on site and meet the city requirements for discharge into their system. We do not recommend the stormwater facilities be built without further engineering and design and full approval from the city.

A signed warning and disclaimer of liability is included in Appendix E

References

The site plan has been analyzed using Atlas 14, volume 1 rainfall rates and soils information provided by onsite inspection. The City of Scottsdale 2018 DSPM has been used for this submittal.

Please feel free to contact Joe Hassell P.E., or Nick Ebner EIT at 208-777-1854 with any questions or comments regarding this SWMP.

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.4897°, Longitude: -111.9299°
Elevation: 1253.07 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.183 (0.154-0.223)	0.240 (0.202-0.291)	0.326 (0.273-0.395)	0.392 (0.326-0.472)	0.481 (0.394-0.577)	0.550 (0.444-0.657)	0.620 (0.492-0.739)	0.692 (0.540-0.824)	0.788 (0.598-0.940)	0.862 (0.641-1.03)
10-min	0.279 (0.234-0.339)	0.364 (0.307-0.443)	0.495 (0.415-0.600)	0.596 (0.496-0.719)	0.732 (0.599-0.878)	0.837 (0.676-1.00)	0.944 (0.748-1.12)	1.05 (0.821-1.25)	1.20 (0.911-1.43)	1.31 (0.976-1.57)
15-min	0.345 (0.290-0.420)	0.452 (0.381-0.549)	0.614 (0.514-0.744)	0.739 (0.614-0.891)	0.907 (0.743-1.09)	1.04 (0.838-1.24)	1.17 (0.928-1.39)	1.31 (1.02-1.55)	1.49 (1.13-1.77)	1.63 (1.21-1.94)
30-min	0.465 (0.390-0.565)	0.608 (0.513-0.740)	0.827 (0.692-1.00)	0.995 (0.827-1.20)	1.22 (1.00-1.47)	1.40 (1.13-1.67)	1.58 (1.25-1.88)	1.76 (1.37-2.09)	2.00 (1.52-2.39)	2.19 (1.63-2.61)
60-min	0.575 (0.483-0.700)	0.753 (0.635-0.915)	1.02 (0.857-1.24)	1.23 (1.02-1.49)	1.51 (1.24-1.82)	1.73 (1.40-2.07)	1.95 (1.55-2.32)	2.18 (1.70-2.59)	2.48 (1.88-2.95)	2.71 (2.02-3.24)
2-hr	0.666 (0.569-0.795)	0.863 (0.736-1.03)	1.16 (0.983-1.37)	1.38 (1.16-1.64)	1.69 (1.40-1.99)	1.92 (1.57-2.26)	2.16 (1.75-2.54)	2.41 (1.91-2.82)	2.74 (2.12-3.21)	2.99 (2.27-3.54)
3-hr	0.724 (0.614-0.870)	0.929 (0.793-1.12)	1.22 (1.04-1.47)	1.45 (1.22-1.74)	1.78 (1.47-2.11)	2.04 (1.66-2.41)	2.31 (1.85-2.73)	2.59 (2.04-3.06)	2.98 (2.28-3.52)	3.29 (2.46-3.91)
6-hr	0.873 (0.756-1.03)	1.11 (0.962-1.30)	1.42 (1.23-1.66)	1.67 (1.43-1.95)	2.01 (1.70-2.33)	2.28 (1.90-2.63)	2.56 (2.10-2.95)	2.84 (2.28-3.28)	3.23 (2.53-3.74)	3.53 (2.71-4.11)
12-hr	0.977 (0.855-1.13)	1.23 (1.08-1.44)	1.57 (1.36-1.81)	1.82 (1.58-2.11)	2.17 (1.86-2.50)	2.44 (2.07-2.81)	2.72 (2.27-3.13)	3.00 (2.47-3.45)	3.37 (2.71-3.91)	3.67 (2.89-4.28)
24-hr	1.17 (1.05-1.32)	1.49 (1.33-1.68)	1.93 (1.72-2.18)	2.28 (2.02-2.56)	2.76 (2.43-3.11)	3.14 (2.75-3.53)	3.54 (3.08-3.97)	3.95 (3.41-4.44)	4.53 (3.86-5.08)	4.98 (4.20-5.60)
2-day	1.26 (1.13-1.43)	1.62 (1.44-1.82)	2.12 (1.89-2.39)	2.53 (2.24-2.84)	3.09 (2.73-3.47)	3.54 (3.11-3.98)	4.02 (3.50-4.52)	4.51 (3.90-5.08)	5.21 (4.45-5.87)	5.76 (4.88-6.51)
3-day	1.34 (1.19-1.51)	1.71 (1.52-1.93)	2.25 (2.00-2.53)	2.69 (2.38-3.02)	3.30 (2.91-3.70)	3.79 (3.32-4.25)	4.32 (3.75-4.84)	4.87 (4.20-5.47)	5.64 (4.80-6.34)	6.26 (5.28-7.06)
4-day	1.41 (1.25-1.59)	1.80 (1.60-2.04)	2.38 (2.11-2.68)	2.85 (2.52-3.20)	3.51 (3.08-3.94)	4.04 (3.53-4.53)	4.61 (4.00-5.17)	5.22 (4.49-5.86)	6.07 (5.16-6.82)	6.77 (5.69-7.61)
7-day	1.57 (1.39-1.77)	2.00 (1.78-2.26)	2.64 (2.34-2.98)	3.16 (2.80-3.56)	3.90 (3.43-4.38)	4.49 (3.92-5.04)	5.12 (4.44-5.75)	5.79 (4.98-6.51)	6.73 (5.72-7.57)	7.49 (6.30-8.45)
10-day	1.70 (1.51-1.92)	2.18 (1.94-2.45)	2.87 (2.55-3.23)	3.44 (3.04-3.86)	4.22 (3.71-4.73)	4.85 (4.24-5.43)	5.52 (4.79-6.18)	6.22 (5.36-6.98)	7.21 (6.14-8.08)	8.00 (6.74-8.99)
20-day	2.09 (1.87-2.34)	2.69 (2.40-3.01)	3.55 (3.17-3.97)	4.20 (3.74-4.69)	5.08 (4.50-5.67)	5.76 (5.08-6.42)	6.44 (5.65-7.19)	7.14 (6.23-7.98)	8.08 (6.99-9.05)	8.81 (7.56-9.88)
30-day	2.44 (2.17-2.74)	3.14 (2.80-3.52)	4.14 (3.68-4.63)	4.90 (4.35-5.47)	5.92 (5.23-6.60)	6.70 (5.89-7.47)	7.51 (6.57-8.36)	8.32 (7.25-9.27)	9.42 (8.14-10.5)	10.3 (8.81-11.5)
45-day	2.83 (2.53-3.16)	3.64 (3.26-4.07)	4.80 (4.29-5.36)	5.66 (5.04-6.32)	6.78 (6.02-7.57)	7.63 (6.76-8.52)	8.49 (7.49-9.49)	9.35 (8.21-10.5)	10.5 (9.13-11.8)	11.3 (9.82-12.7)
60-day	3.13 (2.81-3.49)	4.04 (3.63-4.51)	5.32 (4.76-5.92)	6.24 (5.58-6.95)	7.45 (6.64-8.29)	8.34 (7.41-9.29)	9.24 (8.17-10.3)	10.1 (8.91-11.3)	11.3 (9.87-12.6)	12.1 (10.6-13.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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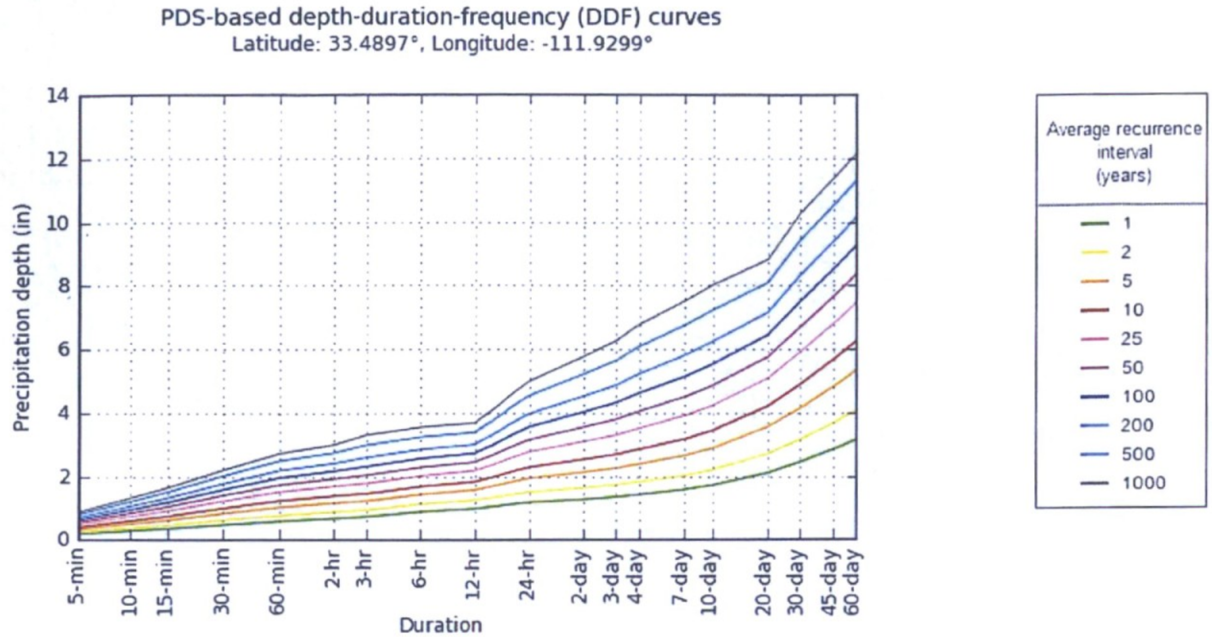
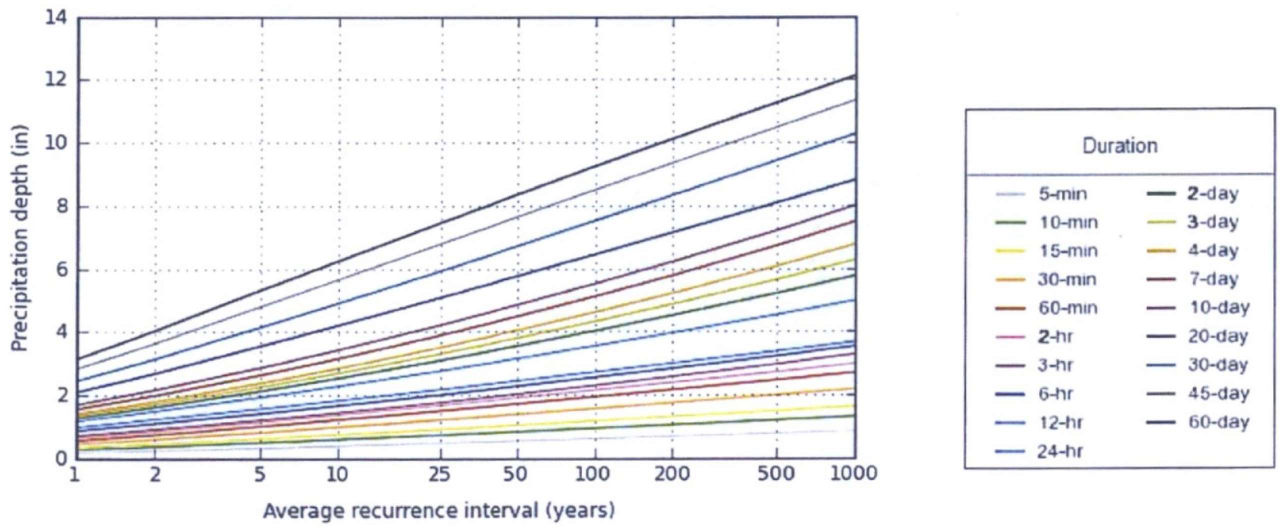
PF graphical





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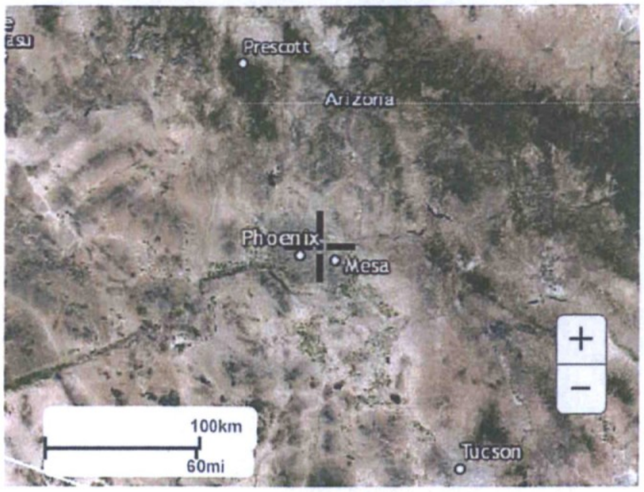
Maps & aerials

Small scale terrain

Large scale terrain

Large scale map

Large scale aerial



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National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX B 1/21

Calculation Description

Objective: Determine the channel design required to convey the 100-year, 6-hour storm flows.

Method of Analysis: Data provided by the Lower Indian Bend Wash Area Drainage Master Study indicated that the maximum flow is 5.88 cfs at the 4th St. Cul-de-sac. We will use hydraulic study and the manning formula to determine flow.

Results:

It was determined that with the constraints given by the site geometry and the City of Scottsdale's requirements, two types of conveyances will work best. The first type will be constrained by the curb of the parking lot and a second curb constructed on the property line. The resulting rectangular shaped ditch will be about 40 inches wide. A shallow V-ditch will be installed after the parking lot to continue conveying water. Both conveyances will be lined with rip-rap to prevent erosion due to the relatively high flows

Conclusion:

The rectangular ditch needs to be 8 inches deep to convey the flow required. We will use a 10-inch-deep ditch in order to better convey flow higher than the maximum required. At the end of the parking lot, a V-ditch will convey the water back to a catch basin where it will flow to the city storm water system. This ditch will be 6 feet wide at the top, and 8 inches deep. It will slope 1% along its length. This will allow for a maximum flow of 6.15 cfs.

Open Channel Flow

Description	Width (ft)	Depth (ft)	Slope (ft/ft)	Entrance Loss coefficient (K_e)	Mannnings n	Area(ft^2)	Wetted Perimeter (ft)	Flow (ft^3/sec)	Velocity (ft/sec)
V-Ditch Sheet Flow	6	0.75	0.01	0	0.03	2.25	6.08	6.154	2.73
Rectangle Shape at curb	3.33	0.67	0.01	0	0.03	2.23	4.67	7.114	3.19

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Calculation Description

Objective: Determine the historical flow rate for the 2 year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank. Also we plan to use the city's equation to determine the storage required for the 2-year storm. See the last calculation for additional details on the city's equation.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 2-year rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 2-year, 2-hour storm, the pre-developed outflow is 0.73 cfs and post-developed outflow is 0.78 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2.

Using the city equation, we find that 2842 cubic feet of storage is required for the 2-year, 2 hour storm.

The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations.

4/21

Entire building area basin 1
Preliminary

2-Year Storm Event

Rational Method

Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.68
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	0.86
Pre-Developed Outflow (c.f.s.)	0.73

Developed Condition

Design Storm Intensity (2hr) (in/hr)	0.86
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	2.00
Area (acres)	1.24
Developed "C" Factor	0.73
Area x "C"	0.91
Soil infiltration rate (in/hr)	0.00

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft^3) (see below)	#6 V_{out} (ft^3)	Required Storage Volume (ft^3)
0						
5	300	2.88	2.61	955	0	955.32
10	600	2.18	1.98	1319	0	1318.77
15	900	1.81	1.64	1584	0	1583.73
20	1200	1.61	1.46	1849	0	1849.17
25	1500	1.41	1.28	2007	0	2007.22
30	1800	1.22	1.10	2058	0	2057.87
35	2100	1.14	1.03	2237	0	2237.18
40	2400	1.06	0.96	2374	0	2374.50
45	2700	0.98	0.89	2470	0	2469.81
50	3000	0.91	0.82	2523	0	2523.13
55	3300	0.83	0.75	2534	0	2534.45
60	3600	0.75	0.68	2504	0	2503.78
120	7200	0.43	0.39	2844	0	2843.83
						2843.83

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.68
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.68

Ace Solutions

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CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.9
Buildings/atrium	38,174.00	0.88	98	0.9
Grass/Lawn	12,792.00	0.29	50	0.2
Gravel	0.00	0.00	76	0.55
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.73

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	0.73
Post-Developed Flow (cfs)	0.00
Required Storage Volume (ft^3)	2842
Storage Volume (ft^3)	7750

} Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

6/21

Calculation Description

Objective: Determine the historical flow rate for the 10-year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank. Also we plan to use the city's equation to determine the storage required for the 10-year storm. See the last calculation for additional details on the city's equation.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 10-year rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 10-year, 2-hour storm, the pre-developed outflow is 1.16 cfs and post-developed outflow is 1.26 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2.

Using the city equation, we find that 4544 cubic feet of storage is required for the 10-year, 2 hour storm.

The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations.

7/21

Entire building area basin 1
Preliminary

10-Year Storm Event

Rational Method

Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.68
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	1.38
Pre-Developed Outflow (c.f.s.)	1.16

Developed Condition

Design Storm Intensity (2hr) (in/hr)	1.38
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	10.00
Area (acres)	1.24
Developed "C" Factor	0.73
Area x "C"	0.91
Soil infiltration rate (in/hr)	0.00

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft^3) (see below)	#6 V_{out} (ft^3)	Required Storage Volume (ft^3)
0						
5	300	4.70	4.27	1560	0	1560.35
10	600	3.58	3.24	2159	0	2159.30
15	900	2.96	2.68	2589	0	2589.32
20	1200	2.63	2.39	3024	0	3024.04
25	1500	2.31	2.10	3284	0	3283.51
30	1800	1.99	1.81	3368	0	3367.73
35	2100	1.86	1.69	3660	0	3660.43
40	2400	1.74	1.58	3884	0	3884.19
45	2700	1.61	1.46	4039	0	4039.01
50	3000	1.48	1.35	4125	0	4124.89
55	3300	1.36	1.23	4142	0	4141.83
60	3600	1.23	1.12	4090	0	4089.84
120	7200	0.69	0.63	4547	0	4547.49
						4547.49

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.68
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.68

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CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.9
Buildings/atrium	38,174.00	0.88	98	0.9
Grass/Lawn	12,792.00	0.29	50	0.2
Gravel	0.00	0.00	76	0.55
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.73

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	1.16	
Post-Developed Flow (cfs)	0.00	
Required Storage Volume (ft^3)	4544	Capacity is Adequate
Storage Volume (ft^3)	7750	

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

9/21

Calculation Description

Objective: Determine the historical flow rate for the 25 year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank. Also we plan to use the city's equation to determine the storage required for the 25-year storm. See the last calculation for additional details on the city's equation.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 25-year rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 25-year, 2 hour storm, the pre-developed outflow is 1.42 cfs and post-developed outflow is 1.54 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2.

Using the city equation, we find that 5565 cubic feet of storage is required for the 25-year, 2 hour storm.

The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations.

10121

Entire building area basin 1
Preliminary

25-Year Storm Event

Rational Method — Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.68
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	1.69
Pre-Developed Outflow (c.f.s.)	1.42

Developed Condition

Design Storm Intensity (2hr) (in/hr)	1.69
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	25.00
Area (acres)	1.24
Developed "C" Factor	0.73
Area x "C"	0.91
Soil infiltration rate (in/hr)	0.04

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft³) (see below)	#6 V_{out} (ft³)	Required Storage Volume (ft³)
0						
5	300	5.77	5.24	1915	0	1914.62
10	600	4.39	3.98	2652	0	2652.03
15	900	3.63	3.29	3178	0	3177.97
20	1200	3.23	2.93	3711	0	3710.59
25	1500	2.84	2.57	4028	0	4027.70
30	1800	2.44	2.21	4129	0	4129.28
35	2100	2.29	2.07	4489	0	4488.77
40	2400	2.13	1.93	4764	0	4763.91
45	2700	1.98	1.79	4955	0	4954.68
50	3000	1.82	1.65	5061	0	5061.10
55	3300	1.67	1.51	5083	0	5083.16
60	3600	1.51	1.37	5021	0	5020.86
120	7200	0.85	0.77	5569	0	5569.02
						5569.02

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:
Tributary Area:

Description:	Area (ft²)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.68
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.68

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CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.9
Buildings/atrium	38,174.00	0.88	98	0.9
Grass/Lawn	12,792.00	0.29	50	0.2
Gravel	0.00	0.00	76	0.55
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.73

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	1.42
Post-Developed Flow (cfs)	0.00
Required Storage Volume (ft^3)	5565
Storage Volume (ft^3)	7750

} Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

12/21

Calculation Description

Objective: Determine the historical flow rate for the 100 year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 100-year, rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 100-year, 2-hour storm, the pre-developed outflow is 2.19 cfs, with post-development outflow at 2.12 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2. This The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations. An interesting conclusion is that using this method, we end up with a similar required storage as the city's equation (see next set of calculations). 7718 cubic feet vs. 7712 cubic feet.

13|21

Entire building area basin 1
Preliminary

One Hundred Year Storm Event

Rational Method   Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.82
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	2.16
Pre-Developed Outflow (c.f.s.)	2.19

Developed Condition

Design Storm Intensity (2hr) (in/hr)	2.16
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	100.00
Area (acres)	1.24
Developed "C" Factor	0.80
Area x "C"	0.98
Soil infiltration rate (in/hr)	0.04

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft^3) (see below)	#6 V_{out} (ft^3)	Required Storage Volume (ft^3)
0						
5	300	7.44	7.32	2676	0	2676.03
10	600	5.66	5.57	3709	0	3708.53
15	900	4.68	4.60	4445	0	4445.19
20	1200	4.17	4.10	5195	0	5195.38
25	1500	3.67	3.61	5647	0	5646.57
30	1800	3.16	3.11	5799	0	5798.75
35	2100	2.96	2.91	6302	0	6301.60
40	2400	2.76	2.71	6685	0	6685.45
45	2700	2.56	2.51	6950	0	6950.28
50	3000	2.35	2.31	7096	0	7096.10
55	3300	2.15	2.12	7123	0	7122.90
60	3600	1.95	1.92	7031	0	7030.69
120	7200	1.08	1.06	7718	0	7718.07
						7718.07

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.82
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.82

14121

CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.95
Buildings/atrium	38,174.00	0.88	98	0.95
Grass/Lawn	12,792.00	0.29	50	0.3
Gravel	0.00	0.00	76	0.82
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.80

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	2.19
Post-Developed Flow (cfs)	0.00
Required Storage Volume (ft^3)	7712
Storage Volume (ft^3)	7750

Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

15/21

Calculation Description

Objective: Determine the required storage volume for the site

Method of Analysis: Equation provided by the City of Scottsdale Design Standards & Policies Manual (DSPM) Chapter 4, Section 1.201.C.

$$Vr = C\left(\frac{R}{12}\right)A$$

See referenced chapter for definition of terms.

Results:

Using data from the NOAA website, the depth in inches of the 100-year, 2-hour rainfall for this site is 2.16 inches. This is the "R" value. The weighted average runoff coefficient, "C" is found to be 0.80 this is shown in the table "Post-Development Tributary Area". This table also shows the "A" value.

Conclusion:

Using the equation above, we find that 7712 cubic feet of storage area is required. We plan to provide a minimum of 7750 cubic feet of storage. The objective is satisfied.

16, 21

Entire building area basin 1
Preliminary

One Hundred Year Storm Event

DSPM Chapter 4, Section -1.201.C. Storage facilities volume

Pre-Developed Condition

Area (square feet)	53,852
Pre-Developed "C" Factor	0.82
Design Storm Intensity (in/hr)	2.16
Pre-Developed Outflow (c.f.s.)	2.19
Time Increment (min)	11.11

Developed Condition

Time Increment (min)	2 hr	
Design Storm Intensity (in/hr)	2.16	R
Post-Developed Outflow (cfs)	0.00	
Design Year Flow (yr)	100.00	
Area (sq. ft)	53,852	A
Developed "C" Factor	0.80	C
Soil infiltration rate (in/hr)	0.00	

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

Storm Attenuation: $Vr = C(R/12)A$

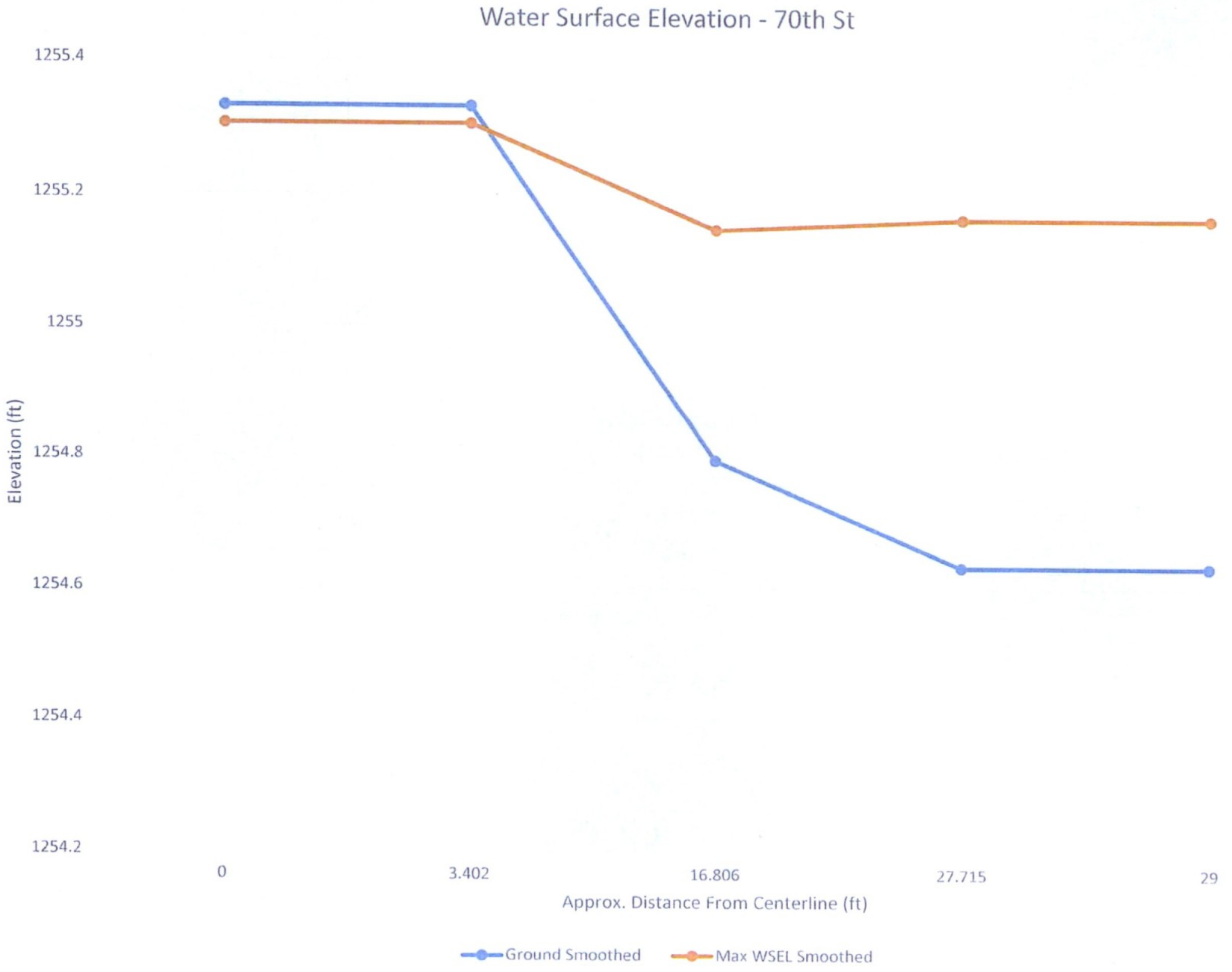
Required Storage Volume (ft^3)	7712	Capacity is Adequate
Storage Volume (ft^3)	7750	

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

Post-Development:
Tributary Area:

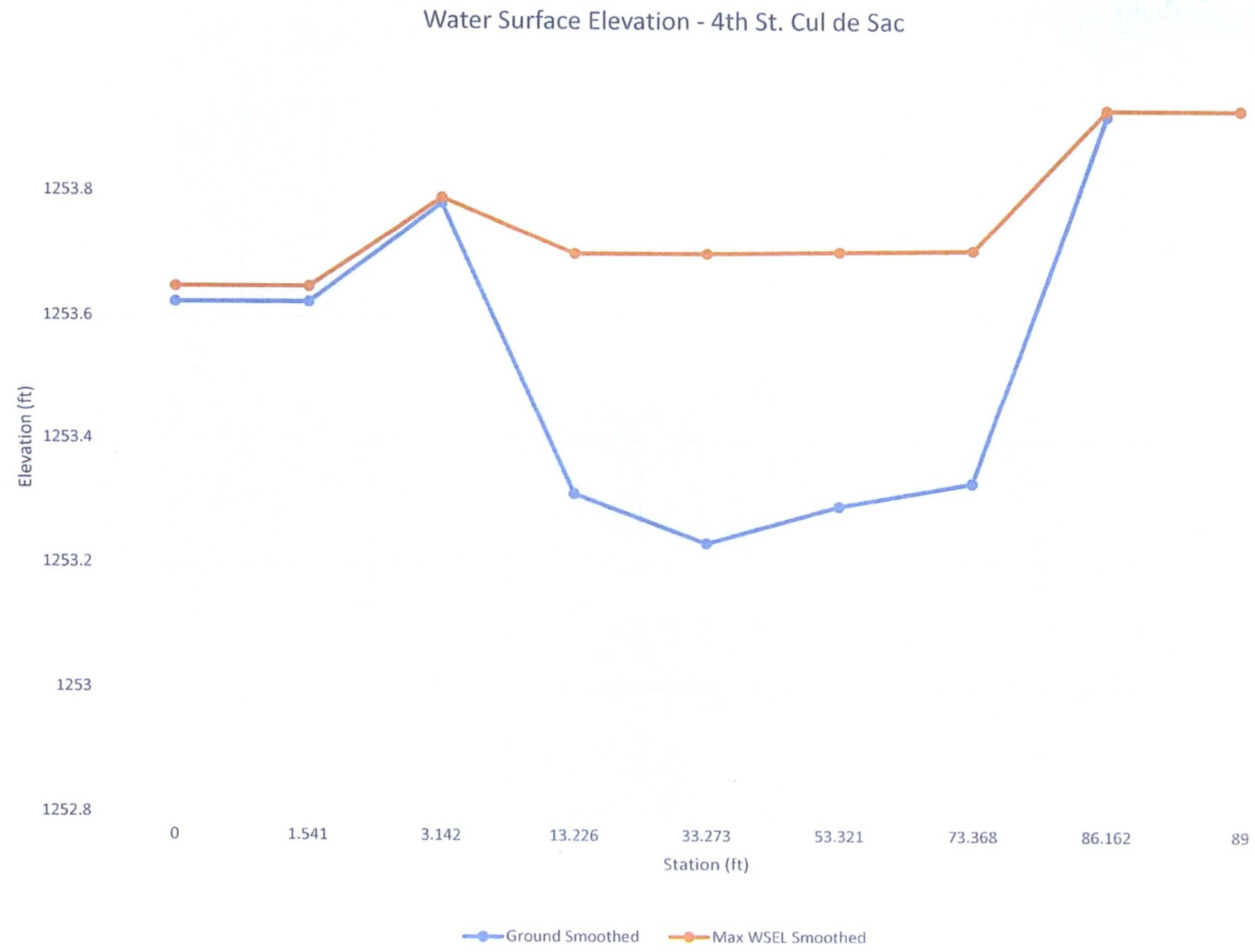
Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2886	0.07	98	0.95
Buildings/atrium	38174	0.88	98	0.95
Grass/Lawn	12792	0.29	50	0.3
Gravel	0	0.00	76	0.82
0	0	0.00	0	0
0	0	0.00	0	0
0	0	0.00	0	0
Totals:	53852	1.24	87	0.80

Figure 1



Water Surface Elevation - 70th St
1255.4
1255.2
1255
1254.8
1254.6
1254.4
1254.2
Elevation (ft)
0
3.402
16.806
27.715
29
Approx. Distance From Centerline (ft)
Ground Smoothed
Max WSEL Smoothed

FIGURE 2



18/21

FIGURE 3

Flow Rate - 100 yr, 6 hr Storm - 70th St. Intersection

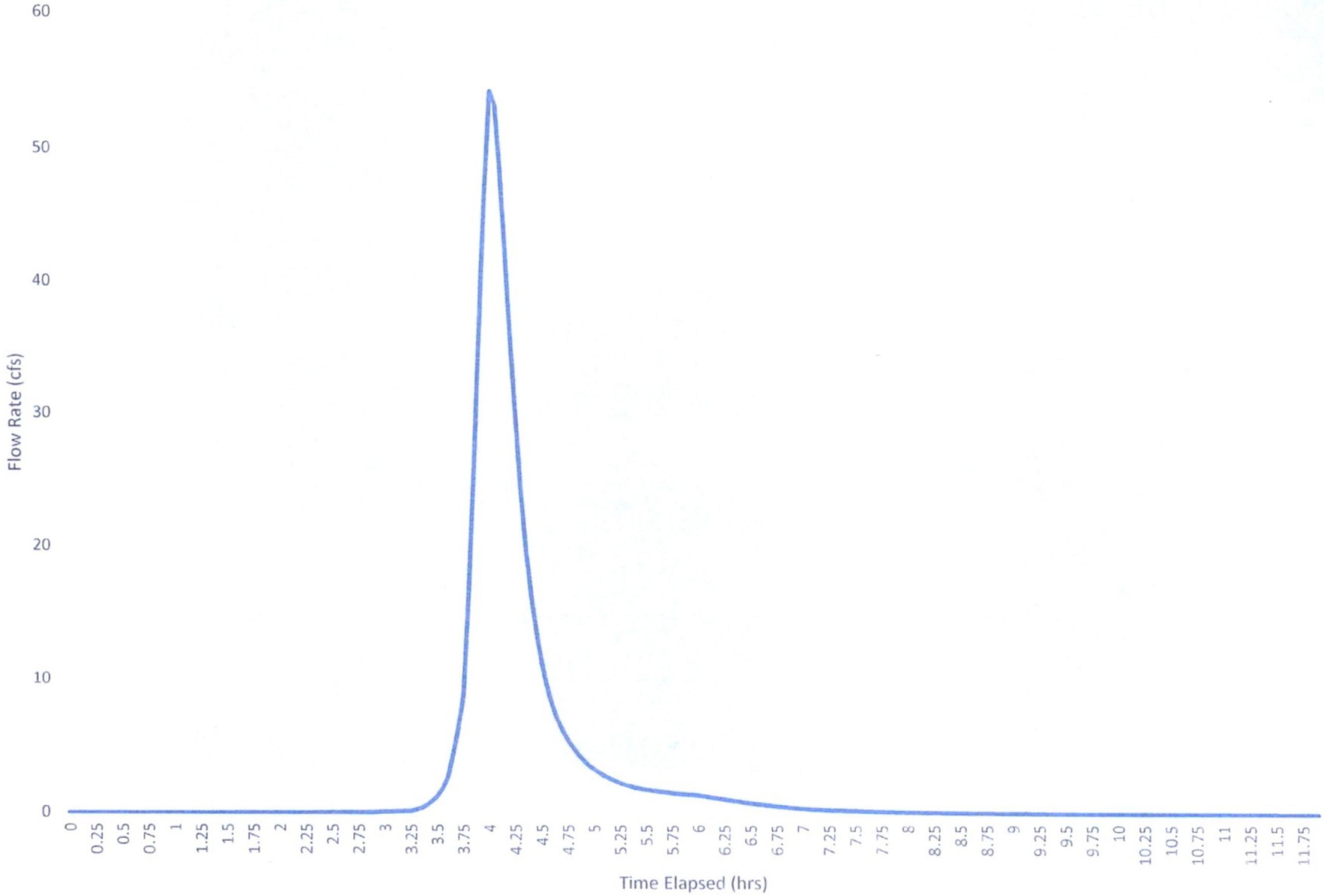
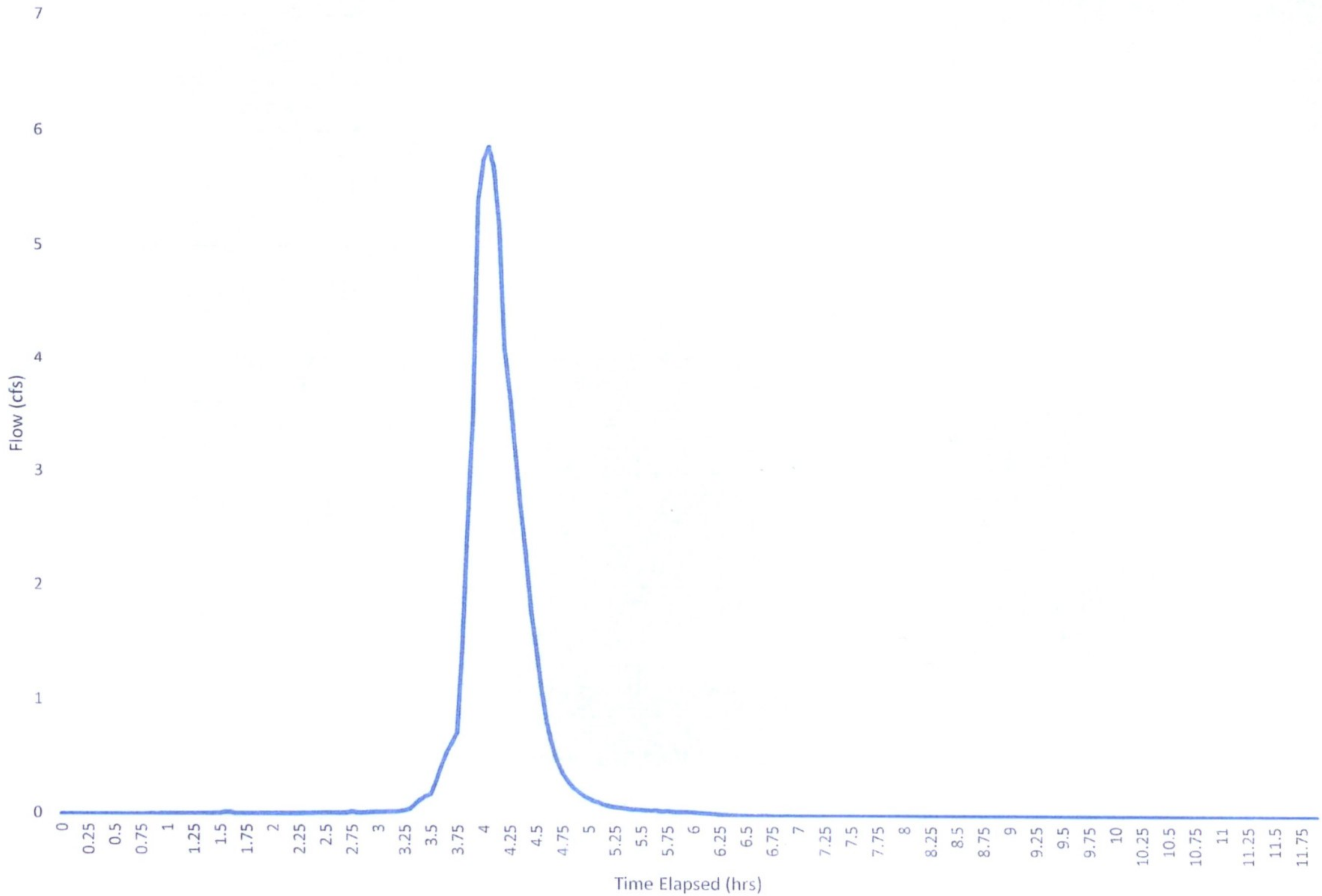


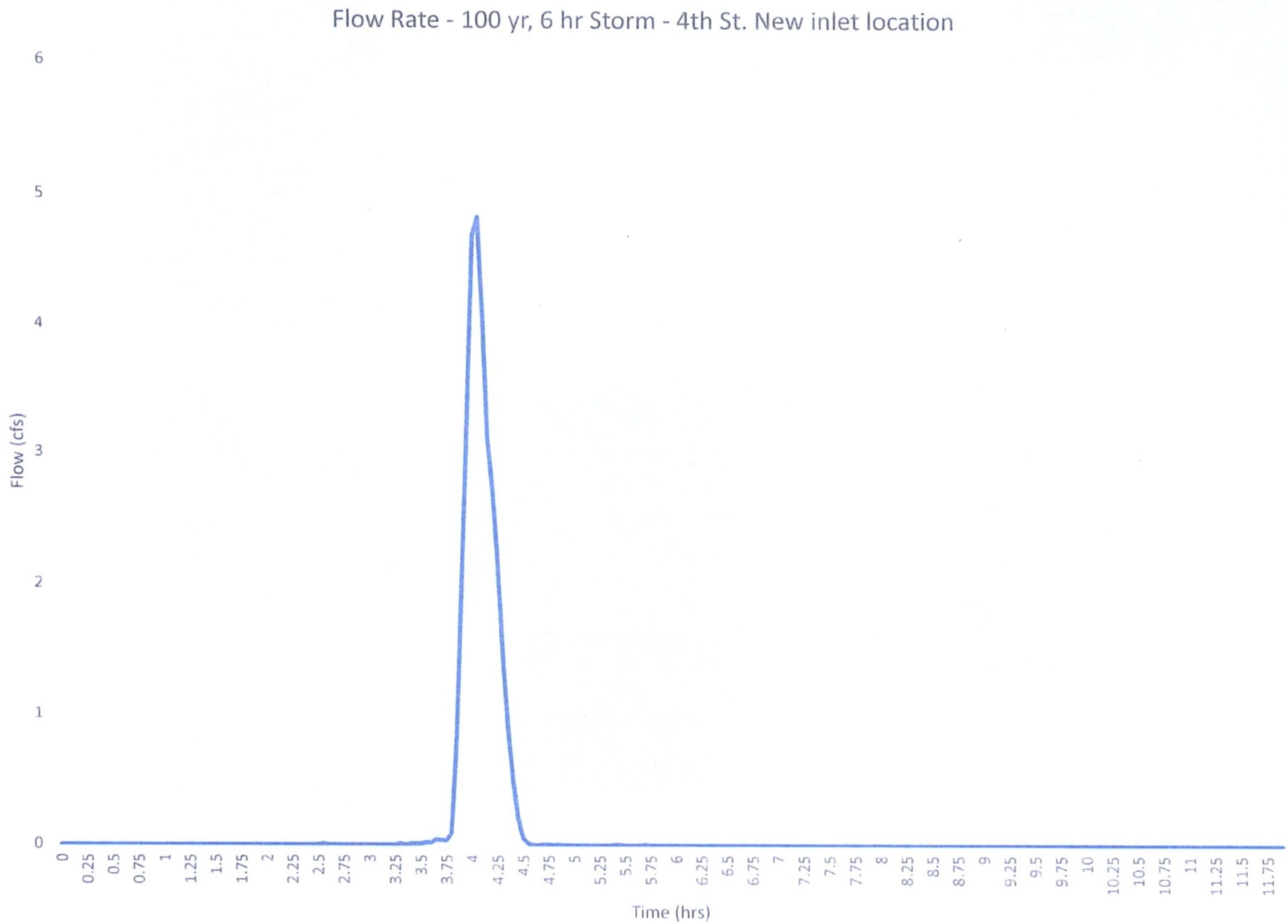
FIGURE 4

Flow Rate - 100 yr, 6 hr Storm - 4th St. Inlet location



20121

FIGURE 5



Flow Rate - 100 yr, 6 hr Storm - 4th St. New inlet location
Flow (cfs)
Time (hrs)
0
1
2
3
4
5
6
0.25
0.5
0.75
1.25
1.5
1.75
2.25
2.5
2.75
3.25
3.5
3.75
4.25
4.5
4.75
5.25
5.5
5.75
6.25
6.5
6.75
7
7.25
7.5
7.75
8
8.25
8.5
8.75
9
9.25
9.5
9.75
10
10.25
10.5
10.75
11
11.25
11.5
11.75

2/12/

Appendix C

National Flood Hazard Layer FIRMette

FEMA

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

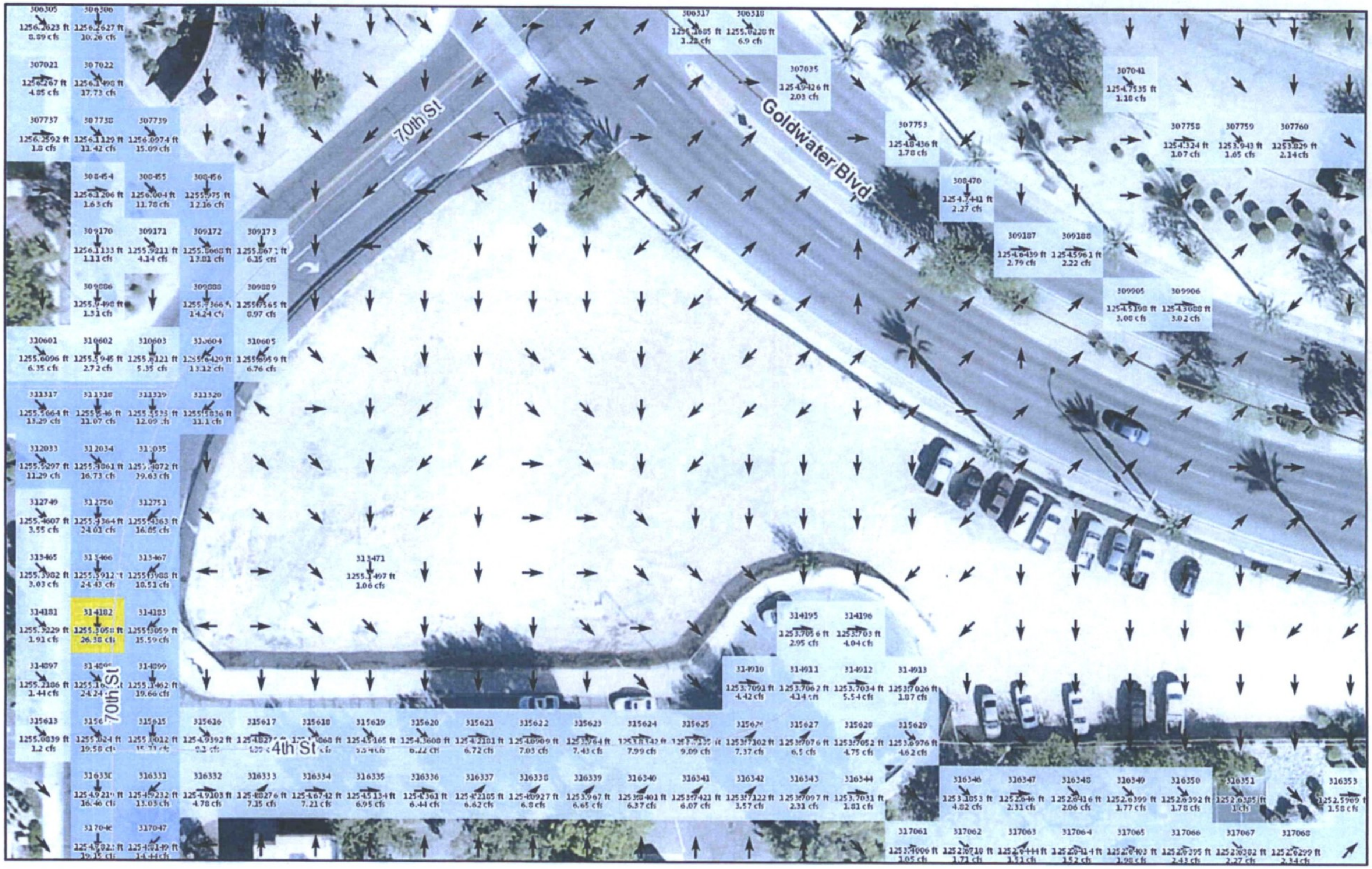
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/7/2018 at 2:11:11 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

679_LIBW - South 100YR6HR



January 23, 2019

1:600

0 25 50 100 ft

0 5 10 20 m

GRADING & DRAINAGE LANGUAGE

WARNING AND DISCLAIMER OF LIABILITY

The City's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding. The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the city is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance 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 constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the city, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect 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.

4-2N-2018 — Plan Check #

Roger Glasman — Owner Representative

11-5-2018 — Date

PRELIMINARY DRAINAGE REPORT

For

Goldwater Development

Plan #
Case # 4-ZN-2018
Q-S #

☑ Accepted
☐ Corrections

DG 3/5/19
Reviewed By Date

Located in:
70TH & 4TH Street
Scottsdale, Arizona

C.O.S. CASE NO. 4-ZN-2018

This day of: February 2019

Engineer of Record:

Joseph Hassell P.E.

Registered Professional Engineer (Civil)
Certificate No. 3*787
JOSEPH E. HASSELL
Date Signed 2-5-19
ARIZONA U.S.A.

2/5/19

Ace Job #: 17-096

Prepared By:
Ace Solutions, LLC
609 N Calgary Ct. Ste. 7
Post Falls, ID 83854
208-777-1854

Prepared For:
Goldwater Boulevard, LLC
Robert Ballard
480-203-8661

4-ZN-2018
2/6/19

Contents

TABLES

FIGURES

LIST OF APPENDICES

INTRODUCTION

This Storm Water Management report is being developed at the request of the City of Scottsdale to verify that runoff from the Goldwater Development site property under developed conditions will comply with the City's stormwater ordinance and its Design Standards and Policy Manual (DSPM). Site location is the corner of 70th and Goldwater Blvd. Old Town Scottsdale, Arizona. Total lot area is 1.19 Ac. The lot currently has a city owned 24-inch diameter stormwater drain from the end of 4th street to a storm drain manhole in Goldwater Boulevard.

The storm drain will need to be eliminated at 4th street. The stormwater will be designed to flow above ground along the southern property line. Near the east end of the property, the storm flow from the street will be captured in a new catch basin which will pipe the water back to the existing stormwater outlet located in Goldwater Blvd. The new area of pipe will need a drainage easement of 12 feet wide. We have planned to use 18-inch diameter storm drain piping.

In order to retain the stormwater from the developed site condition, an underground stormwater storage tank will be utilized. Per our calculations, 7750 cubic feet of storage is required. The tank will be located on the east end of the property. Catch basins around the property will drain to the tank location, where there will be an outfall pipe that drains to the city system at the maximum allowed rate of 1 cubic foot per second. The tank will be designed as such that a storm larger than the 100 year, 2-hour storm will result in excess water draining to a drywell on site. Drainage easements will be given where required at the storage tank and piping locations.

This submittal is considered preliminary not for construction. A final plan set and certifications will be submitted at a later date. The final submittal will reflect the current city code requirements.

Previous Drainage Studies or Master Plan

The city of Scottsdale has provided as built drawings of the stormwater system for the area and has notified us of a maximum discharge rate into the existing storm system of 1.0 cfs. The existing lot does not have any existing stormwater storage volume.

Location

The proposed development site contains approximately 1.19 acres located between Goldwater Boulevard and 4th street, Scottsdale. Access to the property is from 4th street.

Description of Property

The property is located between Goldwater Boulevard and 4th Street in Old Town Scottsdale, Arizona. Access to the property is from 4th Street. The property is currently undeveloped. All street front improvements are in place. The property owners have requested a 10 foot in width right of way abandonment adjacent to 4th street. This right of way abandonment is not necessary for the drainage plan, it affects the layout of the building.

The property is currently zoned for commercial development.

This project is not near a floodplain area and there are no visible wetlands in the area. See attached FEMA map in appendix C for Scottsdale community number 045012.

Vicinity Map

General Project Description

The purpose of the proposed development is to construct a new 5 story residential condominium with parking in the basement and ground level. The project will also include grading, curb and gutter, paving, stormwater retention areas utilizing underground storage tanks, landscaping and sidewalks, building, parking, and relocation of the existing stormwater drains, pipes and easements.

Construction schedule

Construction is anticipated to begin in late summer of 2019. Construction will not be phased.

Applicant information

Owner: Goldwater Boulevard LLC

Contact: Bob Ballard

480-203-8661

Scottsdale, Arizona

Engineer Information

ACE Solutions LLC

Project Engineer: Joseph Hassell, PE

609 N. Calgary Ct. Ste. 7

Post Falls, Idaho 83854

Telephone: 208-777-1854

Email: joeh@acesolutions.pro

STORMWATER DESIGN CRITERIA

Regulations: Preliminary Report

City of Scottsdale 2018 DSPM was used for this report. A final report will use the current DSPM.

Analysis Methods

Our hydrological analysis is based on the Rational Method. This method utilizes rainfall frequencies and runoff characteristics from a watershed to predict peak discharges during storm events. This method is suitable for storm analysis on site 160 ac. or less. The storm event for 100-year frequency was analyzed. Storm event data was collected for the NOAA Atlas 14, volume 1 Version 5.0 of Western United States.

The analysis uses sheet flow across the surfaces for pre-developed conditions as well as post-developed conditions. Time of concentration was calculated using the existing and proposed surface runoff coefficients and the length of basin was from the further reaches on site to the average distance to the proposed detention area.

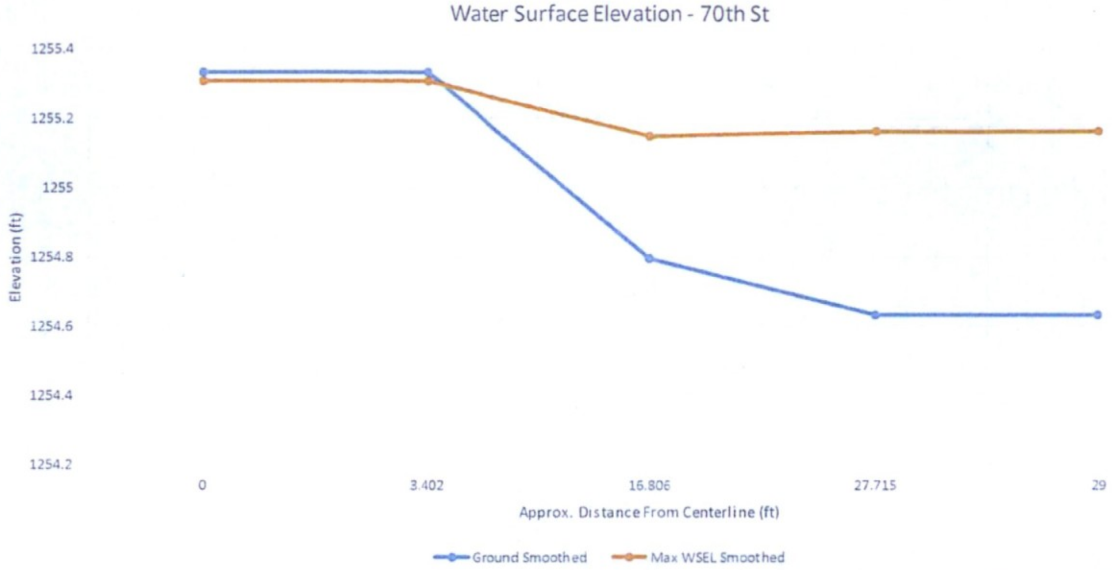
Hydrologic Criteria

At the requirement of the City of Scottsdale DSPM, hydrologic modeling was completed using the 100-year frequency rainfall events as reported in NOAA Atlas 14, Volume 1 Rainfall Frequency Atlas of the Western United States. This data is included in Appendix A. The runoff response from the 6-hour duration storm event was studied to look at historical drainage patterns. These patterns were studied to determine if runoff would enter or leave the property in its pre-development state. The information used was provided by the Lower Indian Bend Wash Area Drainage Master Study (LIBWADMS). Data from the study allows for us to draw a line at certain areas in order to determine the water surface elevation and the flow rates over time after the storm.

Generally, the study confirms the water will flow past the site and not on to the site. Along Goldwater, water will flow away from the property to the North East. Along 70th street, water generally follows the layout of the street. Logically, some water must continue down 4th street. Study shows the water here is lower than the curb height, and with the existing catch basin capturing water at 4th street there should be no water entering the site from the street. A map showing the water flow directions is provided in Appendix C.

Using data from the study, we can determine the water surface elevation at selected points. Our first study location was along 70th street just to the North of the intersection with 4th Street. The following figure shows the results. A full-size version of each of the following figures can be found in Appendix B.

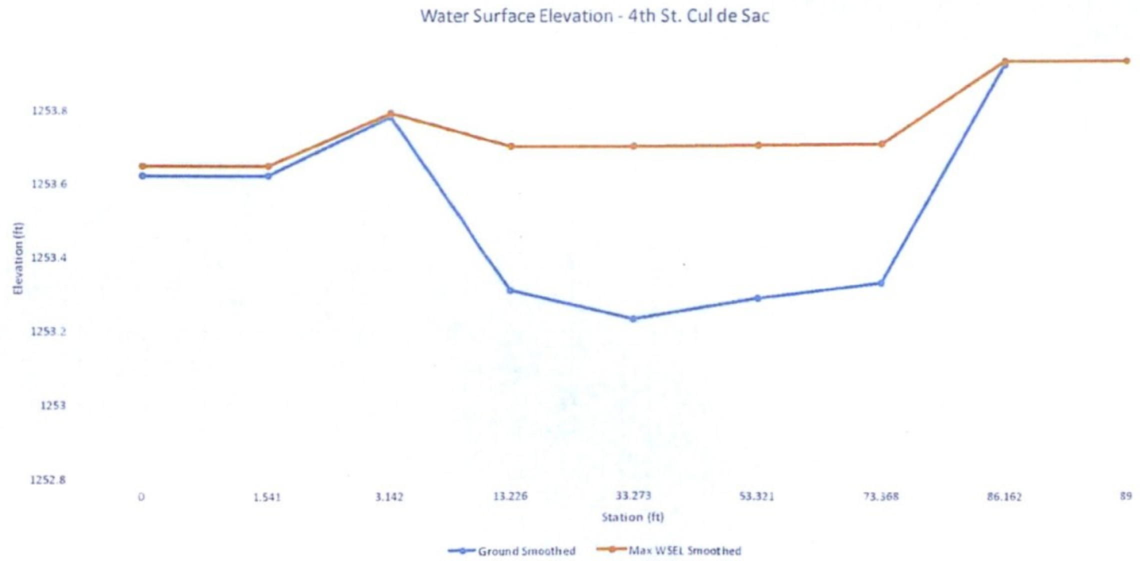
Figure 1: Water Surface Elevation at 70th St.



It was determined that the maximum water surface elevation at this location is 0.53', or just over 6 inches. The curb height at this location is 6 inches, and the water generally runs to the south. Even if the curb were overtopped at this location, the water flow would lead it south along 70th street to the intersection with 4th street, which has more storage capacity for the flows exhibited.

The water surface elevation was also studied at the 4th street Cul-de-Sac. The following figure shows the results.

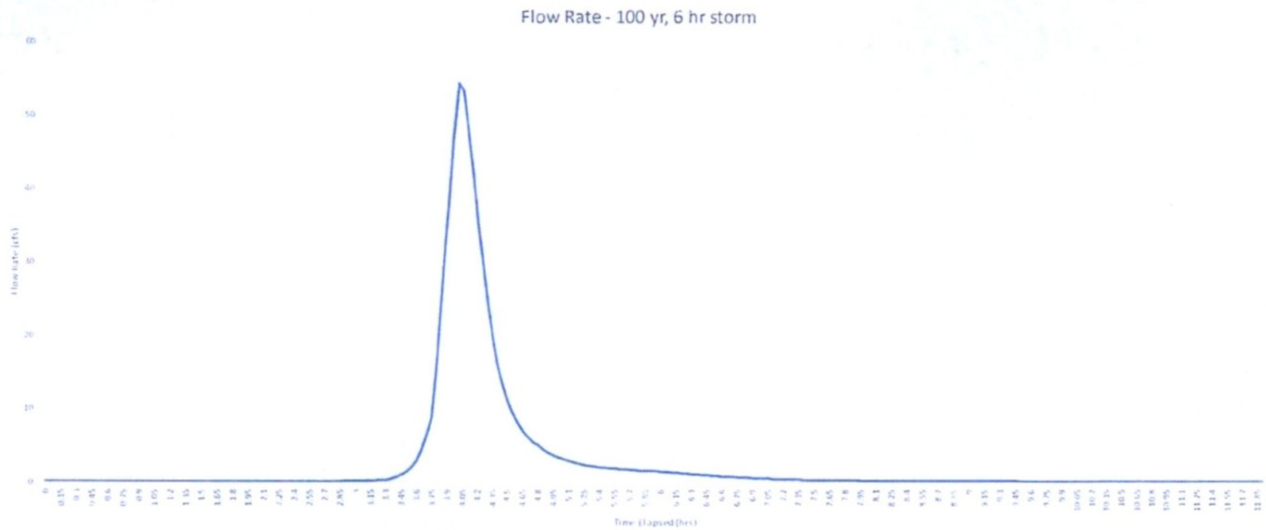
Figure 2: Water Surface Elevation at 4th St.



The maximum water surface elevation at this location is 0.47', just under 6 inches. With a 6-inch tall curb at this location, overtopping should not be a concern, especially with the existing catch basin in the Cul-de-Sac capturing stormwater into the city system.

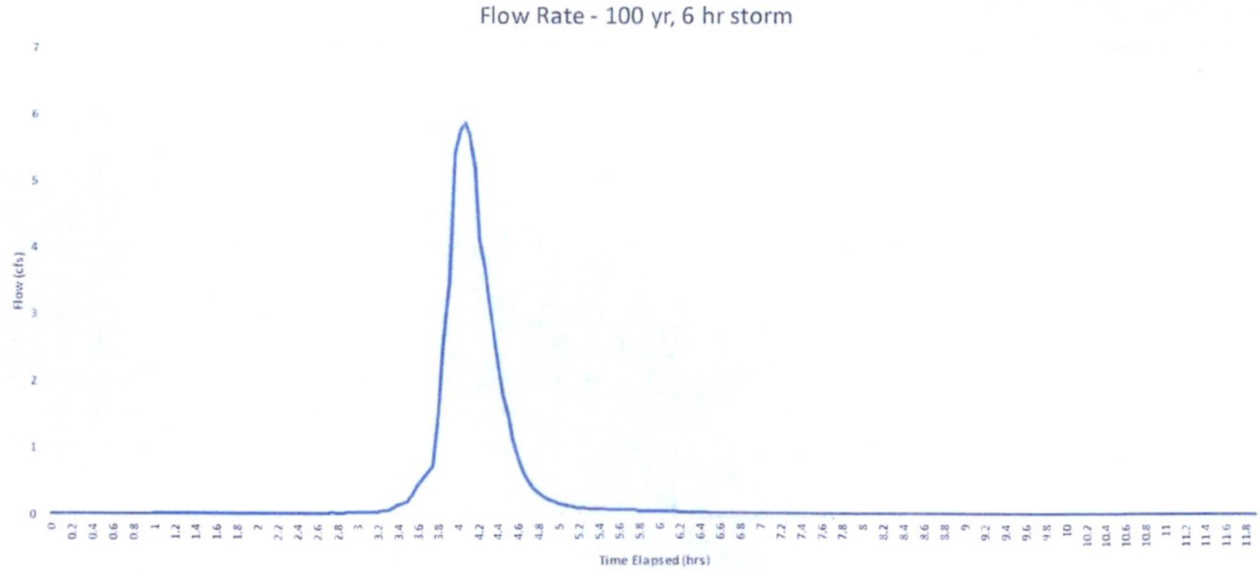
We can also use data from the LIBWADMS to determine the flow rate for the 100-year, 6-hour storm. Figure 3 presents the flow rate over time from the same location studied in figure 1.

Figure 3: Flow rate at 70th St.



Using the information shown above, we determined that the maximum flow at 70th street was 54.31 cfs. This flow occurs 4 hours after the storm. Figure 4 presents information from the same location as figure 2.

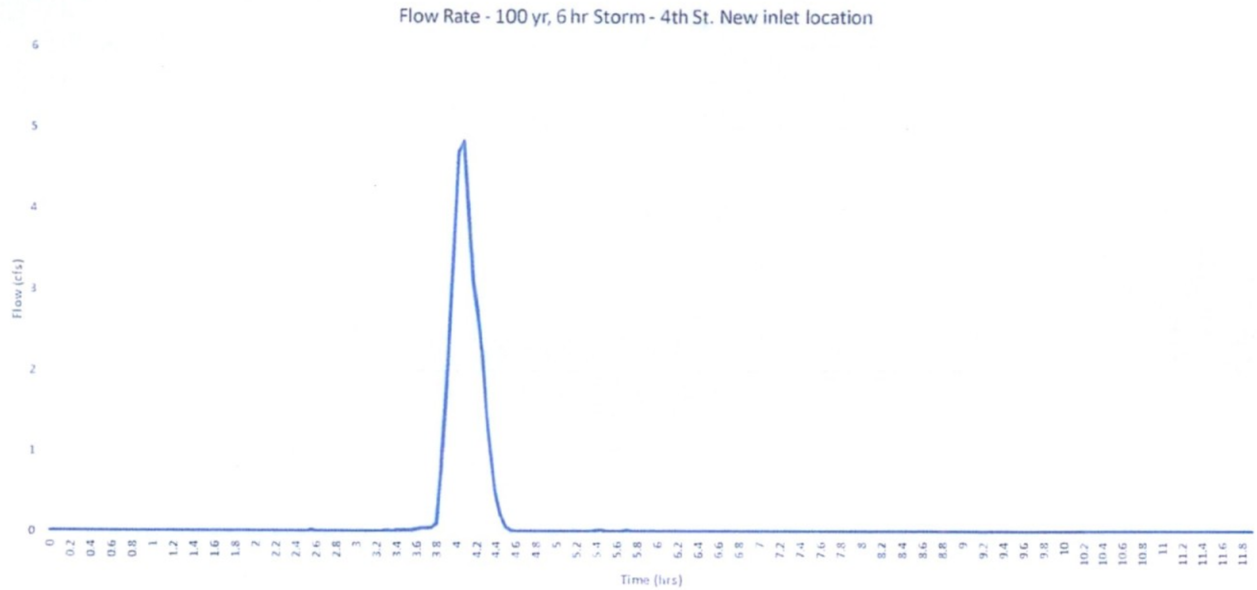
Figure 4: Flow Rate at 4th St.



Using this information, is was determined that the maximum historical flow at the 4th street culvert inlet is 5.88 cfs. Since we are planning on removing this inlet, we must design for the same flow to be conveyed back to the city system. This calculation is presented in Appendix B, with the result shown on plan page C6 in Appendix D.

We also viewed the flow rate at the location where the new inlet will be placed. Had this rate been higher than shown in figure 4, we would use this higher rate.

Figure 5: Flow Rate at new inlet



The maximum flow at this location is 4.83 cfs. We will use the data from figure 4 to as the baseline for stormwater flows contained by the city system.

Datum

All elevations listed in this report refer to the NAVD-88 GEOID 09 datum. Upon final submittal We will provide equation and location for conversion to the City of Scottsdale datum and local bench mark.

STORM WATER MANAGEMENT PLAN

General Description

All stormwater runoff will be collected and piped to a detention vault which will outfall into the city storm system. The city will only allow 1.0 cfs discharge at any one time. A drywell will also be designed to contain flows over the 100-year flood and to speed up outflow from the detention vault.

The proposed detention vault will be constructed to discharge runoff from the site at or below the allowed rate of 1.0 cfs, per the DSPM section 4-1.201. All stormwater will be collected and directed into the underground stormwater storage tank (USST). A Drywell is proposed to capture any overflow above the 100-year event. In the USST, two outflow pipes will be placed at minimum. The first will allow outflow to the city system at the proposed 1.0 cfs. This will be designed to always allow outflow as long as there is water in the USST. A second pipe will be designed above the required storage that allows for outflow to the drywell. The drywell will be sized later, but it is assumed that it will handle all the additional water of storms stronger than the 100-year, 2-hour storm.

The underground detention vault must be constructed to comply with the criteria in the 2018 Design Standards and Policy Manual (DSPM), Chapter 4, Section 4-1.202.

There is also a basement level to the building accessible via a ramp down to the level. This must include drains for the inevitable stormwater that will run down the ramp and water that will run off the cars parked there. Our basement level plan is shown on plan page C2 in Appendix D.

An existing 24-inch diameter storm drain line runs through a section of what will become the ramp down to the lower level. This drain line will be removed, and the easement abandoned to allow for the parking ramp installation. In its' place, a scupper will be installed further south to allow for sheet flow of the street stormwater past the sidewalk. A concrete spillway will be installed beneath the sidewalk and to the south of the parking lot allowing the water to flow past the parking lot. From there it will be conveyed in a v-ditch, lined with rip rap to prevent erosion. It will be directed north directly into a new catch basin, where it will be directed to the city system in a new storm drain. This is shown on plan page C6, included in appendix D. Drainage easements will be provided for the new storm drains. Additional drain pipe will need to be installed to re-route the line towards the existing city drain.

A recreational swimming pool is designed to be on site. The design of this pool is by other firms, but the drains and backwash systems must be connected to the sanitary sewer system.

Hydrological Analysis

For sites that have not been previously developed, the standard formula is shown below:

Vr = C(R/12)A

See City of Scottsdale DSPM for more information regarding this formula.

The provided spread sheet calculates a weighted "C" to apply over the entire site. All stormwater from the 100-year, 2-hour precipitation event must be contained on site.

Additional calculations are shown using data from NOAA Atlas 14, Volume 1 to determine historical flows for 2, 10, 25, and 100-year storms.

Table 1 provided below summarizes the rainfall amounts for each of the analyzed storm events.

Table 1: Rainfall Depths

Rainfall Duration	10-Year	25-Year	50-Year	100-Year
2 Hour	1.38"	1.69"	1.92"	2.16"

A weighted C factor has been calculated for each sub-basin based on the existing and developed conditions using coefficients from the DSPM. Table 2 gives runoff coefficients used to calculate the weighted C value for various land usages. We are considering that the current site can be labeled a gravel floodway and shoulder.

Table 2: Runoff Coefficients

Land Cover	Specific/Composite	Storm Freq. (years)		
		2-25	50	100
Lawns, golf courses & parks	Specific Surface Values	0.20	0.25	0.30
Paved Streets, Parking Lots, roofs, driveways, etc.	Specific Surface Value	0.90	0.93	0.95
Apartments & Condominiums	Composite Area Values	0.76	0.83	0.94
Gravel Floodways and Shoulders	Specific Surface Values	0.68	0.78	0.82

Hydraulic Analysis and Design

Retention

Table 3 provided below summarizes the water surface elevations, inflow, outflow, depth and storage required within the proposed USST. The tank will be composed of multiple cells, which when combined hold a minimum of 7750 cf (100 yr.). The outfall weir allows a maximum of 1.0 cfs. Of outfall directly into the city system. Overflow will be directed into an onsite drywell.

Table 3: USST Summary

Event	Max WSEL (ft.) AVG	Freeboard (ft.) At outfall	Max Q_{in} (cfs)	Max Q_{out} (cfs)	Depth(ft.)	Storage Requirement (cft.)
10-Year	TBD	3.62	1.26	1.0	3.88	4544

25-Year	TBD	2.74	1.54	1.0	4.76	5565
100-Year	TBD	0.88	2.12	1.0	6.62	7750

WSEL= Water Surface Elevation from bottom of vault at outfall location for indicated storm event

Retention will be provided to control developed runoff release to rates as allowed by the city (1.0 cfs). The Existing Conditions have a greater discharge then allowed. Freeboard will be provided during all analyzed storm events. However, if overtopping were to occur, overflow from the detention vault will be piped to an area drywell. Drywell to be sized at a later date.

UNDERGROUND STORAGE TANK DESIGN

According to the above calculations, a minimum of 7750 cubic feet of storage is required in the USST. As shown on plan page C6 in appendix D, we have designed a trapezoidal tank totaling 1170 square feet in surface area. The total tank will be 7.5' deep to allow for sediment buildup. If we design for 7 feet of storage, the tank should be able to hold 8190 cubic feet of water.

In our current design, we must outflow to the city approximately 6.5' below grade. This leaves 1 foot of water in the tank that must be removed.

The outfall pipe to the city system will be placed near the bottom of the tank, approximately 6 inches from the bottom to allow for sediment to settle. An outfall pipe will be placed within 12 inches of the top of the tank which will outflow to the drywell. The basic design is shown on plan page D1 in Appendix D.

Table 4: Estimated Tank Drainage Times

Outlet Height (from Base)	Outlet Flow rate (cfs)	Volume Drained by outlet (cu. Ft)	Total Drainage Time (hrs.)
0'-0.5'	0.1 (drywell)	1755	5
1.5'	1.0 (city system)	6435	1.8
6.5-7.0' (TBD)	TBD	TBD	TBD

Table 4 shows the estimated time to drain the tank at full capacity. By adding the results of the last column, we can see that the tank will drain in less than 7 hours.

Comparing the data in Table 4 with the historical flows shown in Figure 4, we see after the 100-7ear, 2-hour storm, the tank will empty before off-site stormwater is conveyed through the site. The 4-hour delay shown in Figure 4 will help us to make sure that the city stormwater system is not overloaded when dealing with our outflow and the historical outflow.

Per the DSPM Chapter 4, Section 4-1.202 the storage tank must meet the following criteria, with comments following showing how we plan to meet the criteria:

C. GENERAL CRITERIA FOR UNDERGROUND STORMWATER STORAGE SYSTEM DESIGN

1. Underground stormwater storage systems must demonstrate protection of public health, safety, and welfare as established by the SRC and related policies.

The final design will incorporate these aspects.

2. Storage systems must not be located under structures, parking garages, or significant landscaping such as trees or sizable cactus that would preclude access to or replacement of the facilities.

Please see attached plan pages in Appendix D for storage location. The location shown meets these criteria. We have removed the fence previously shown on drawings to accommodate the tank location shown.

3.The owner must dedicate a public drainage easement to the city which meets the standards for all drainage easements.

This will be comped prior to construction completion. The easement is shown on plan page C6 in Appendix D.

4. Design must address:

a. Water quality protection measures to protect underground and surface water resources to meet applicable water quality standards.
b. Vector control within storage system.
c. Redundancy in case of storage system failure, with attention to the possibility of structure or street flooding, sediment accumulation, or storm events that are greater than the 100-year, 2-hour event.
d. Initial suspended sediment load removal.
e. At least a 75-year life of entire system, including the lining and coating of the underground storage tank.
f. Drainage by gravity. Pumped systems will only be considered if no other reasonable alternative exists with dry wells as a preferred alternative if drainage by gravity is not feasible.

These points will be addressed as part of the final design. We anticipate that the storage system will be able to drain to the adjacent drywell and to the city system via the outflow piping. If the structure should become overtopped, overflow will be piped to an adjacent drywell. As shown in previous paragraphs, we cannot empty the tank completely using the city system and will drain the remainder to a drywell. This will be done via gravity.

D. SPECIFIC CRITERIA FOR UNDERGROUND STORMWATER STORAGE DESIGN

1. Outfall—underground storage systems must have some sort of outfall, such as gravity drains or pumps.

See above notes. The structure will outflow via outflow piping.

2. Pipes—underground storage system pipes must have a smooth interior floor. The city's Maricopa Association of Governments (MAG) supplemental standard detail 2554 shall be used to meet the smooth interior floor requirement for the use of corrugated metal pipes in underground stormwater storage facilities.

These types of pipes will be used.

3. Installation—excavation, bedding, and backfill procedures and materials must be in accordance with MAG standards.

These standards will be followed.

4. Access—a minimum of two access points must be provided for each underground storage system unless waived in advance by stormwater staff to enable inspections and access for removal of accumulated sediment and debris. Access must be in accordance with MAG standards and be placed to maximize the ability to maintain the underground system.

The final detention vault design will follow these standards.

E. CRITERIA FOR OPERATIONS, MAINTENANCE AND LIABILITY

1. Operations and maintenance generally—owner must provide:

a. Maintenance staff with expertise in operating, inspecting, and maintaining an underground stormwater storage system;

b. An Operations and Maintenance Manual on site for the system that includes:

i. a schedule for inspections and maintenance, and

ii. provisions for emergency operations due to power failure, pump failure, and clogged outlet structures;

iii. A log of the inspections and required maintenance services.

We will insure the owner provides this information.

2. Inspections and maintenance required—In addition to maintenance required by the SRC and other applicable requirements, owner shall:

a. Inspect system after each storm event of 0.6 inch or more, and semiannually, preferably before summer and winter rains.

b. Remove accumulated trash and debris from inlet and outlet structures as needed to ensure free flow of stormwater.

c. Inspect all other elements of the drainage system (pipes, geotextiles, and stone) and repair/replace elements as needed for the storage system to operate at peak efficiency.

The owner will provide this.

3. Signage—before receiving a C of O, the owner must install signs at each end of the underground storage tank that read "Notice—Underground Stormwater Storage Tank." The size, color, and locations of signs are subject to city staff approval.

This will be provided.

4. Ownership Responsibility Statement – The owner shall provide and sign a statement of responsibility for the system stating and acknowledging the owner is responsible for the maintenance, repair, and potential replacement of the system. Prior to final plan approval, the

owner must provide a signed and notarized document to this effect, in a form satisfactory to the City Attorney, for recordation by the city in the Maricopa County Recorder's Office.

This will be provided.

UNDERGROUND LEVEL DESIGNS

The Underground level must be accounted for in the stormwater design. There is one level underground, accessible from a ramp that meets the existing cul-de-sac. An existing storm pipe runs through this area and will have to be moved.

The ramp to the lower level will have a roof over preventing most of the rainwater from running down the ramp. Also, there will be a small rise in elevation from the cul-de-sac trapping water from the street from getting to the ramp. At the top of this rise we will place a grate drain across all lanes of traffic to catch most water that may try to overflow into the basement level.

At the bottom of the ramp a grate drain will be placed across all lanes of traffic. Catch Basins will be placed within the parking area and the parking sloped slightly to drain the water towards the basins. All the water from the drain and from the basins will be conveyed to a sump pump location. From there the water will be pumped up to the surface level where it will drain to the underground storage tank.

Erosion Control

Description

Construction of the project shall include erosion and sediment control. Perimeter erosion controls shall be installed prior to any soil disturbance on site. Interior erosion controls shall be installed after rough grading. The contractor shall install additional erosion control measures as need and shall be responsible for installing and maintaining all erosion control measures. The owner is responsible for erosion control for all contractors working on the site, including minimizing tracking of soil and debris onto adjacent properties and roadways and wind erosion control.

Areas not being developed or planned to be developed for a period of greater than 14 days shall be stabilized to minimize wind and water erosion. This includes periods of winter shut down. Wind erosion protection shall be accomplished by mulching/crimping until 70% vegetation is established. Permanent erosion control shall be achieved by permanent seeding of slopes, disturbed ditch sections and disturbed pond areas. The seed mix shall be a sustainable perennial variety. Further, the contractor is responsible for all clean-up resulting from site erosion and soil tracking. Tracking must be removed by the end of each work day. Erosion control structures shall be in place prior to any land-disturbing activities. Maintaining erosion control structures, site clean-up, and re-evaluation of the erosion plan shall be done on a regular basis, particularly after any storm water event.

See attached development plans for graphical representation of the erosion control plan.

Stormwater Pollution Prevention- General Permit

If the project requires that a General Permit be obtained by the Arizona State Department of Ecology or EPA, an application package with all related and subsequent requirements may be acquired by contacting the Engineer of Record. The forms and requirements outline in the package are also available on the Scottsdale City website.

CONCLUSIONS

Runoff from developed conditions was compared against the runoff rates modeled for existing conditions. The analysis shows that, with the addition of the proposed detention vault, runoff from all analyzed areas under developed conditions, will be retained during the analyzed storm events when compared to existing conditions. The property outfall location will remain the same.

Warning and Disclaimer of Liability

For this preliminary, conceptual, design we have shown that is feasible to control the stormwater runoff on site and meet the city requirements for discharge into their system. We do not recommend the stormwater facilities be built without further engineering and design and full approval from the city.

A signed warning and disclaimer of liability is included in Appendix E

References

The site plan has been analyzed using Atlas 14, volume 1 rainfall rates and soils information provided by onsite inspection. The City of Scottsdale 2018 DSPM has been used for this submittal.

Please feel free to contact Joe Hassell P.E., or Nick Ebner EIT at 208-777-1854 with any questions or comments regarding this SWMP.

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, USA*
Latitude: 33.4897°, Longitude: -111.9299°
Elevation: 1253.07 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF tabular | PF graphical | Maps & aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.183 (0.154-0.223)	0.240 (0.202-0.291)	0.326 (0.273-0.395)	0.392 (0.326-0.472)	0.481 (0.394-0.577)	0.550 (0.444-0.657)	0.620 (0.492-0.739)	0.692 (0.540-0.824)	0.788 (0.598-0.940)	0.862 (0.641-1.03)
10-min	0.279 (0.234-0.339)	0.364 (0.307-0.443)	0.495 (0.415-0.600)	0.596 (0.496-0.719)	0.732 (0.599-0.878)	0.837 (0.676-1.00)	0.944 (0.748-1.12)	1.05 (0.821-1.25)	1.20 (0.911-1.43)	1.31 (0.976-1.57)
15-min	0.345 (0.290-0.420)	0.452 (0.381-0.549)	0.614 (0.514-0.744)	0.739 (0.614-0.891)	0.907 (0.743-1.09)	1.04 (0.838-1.24)	1.17 (0.928-1.39)	1.31 (1.02-1.55)	1.49 (1.13-1.77)	1.63 (1.21-1.94)
30-min	0.465 (0.390-0.565)	0.608 (0.513-0.740)	0.827 (0.692-1.00)	0.995 (0.827-1.20)	1.22 (1.00-1.47)	1.40 (1.13-1.67)	1.58 (1.25-1.88)	1.76 (1.37-2.09)	2.00 (1.52-2.39)	2.19 (1.63-2.61)
60-min	0.575 (0.483-0.700)	0.753 (0.635-0.915)	1.02 (0.857-1.24)	1.23 (1.02-1.49)	1.51 (1.24-1.82)	1.73 (1.40-2.07)	1.95 (1.55-2.32)	2.18 (1.70-2.59)	2.48 (1.88-2.95)	2.71 (2.02-3.24)
2-hr	0.666 (0.569-0.795)	0.863 (0.736-1.03)	1.16 (0.983-1.37)	1.38 (1.16-1.64)	1.69 (1.40-1.99)	1.92 (1.57-2.26)	2.16 (1.75-2.54)	2.41 (1.91-2.82)	2.74 (2.12-3.21)	2.99 (2.27-3.54)
3-hr	0.724 (0.614-0.870)	0.929 (0.793-1.12)	1.22 (1.04-1.47)	1.45 (1.22-1.74)	1.78 (1.47-2.11)	2.04 (1.66-2.41)	2.31 (1.85-2.73)	2.59 (2.04-3.06)	2.98 (2.28-3.52)	3.29 (2.46-3.91)
6-hr	0.873 (0.756-1.03)	1.11 (0.962-1.30)	1.42 (1.23-1.66)	1.67 (1.43-1.95)	2.01 (1.70-2.33)	2.28 (1.90-2.63)	2.56 (2.10-2.95)	2.84 (2.28-3.28)	3.23 (2.53-3.74)	3.53 (2.71-4.11)
12-hr	0.977 (0.855-1.13)	1.23 (1.08-1.44)	1.57 (1.36-1.81)	1.82 (1.58-2.11)	2.17 (1.86-2.50)	2.44 (2.07-2.81)	2.72 (2.27-3.13)	3.00 (2.47-3.45)	3.37 (2.71-3.91)	3.67 (2.89-4.28)
24-hr	1.17 (1.05-1.32)	1.49 (1.33-1.68)	1.93 (1.72-2.18)	2.28 (2.02-2.56)	2.76 (2.43-3.11)	3.14 (2.75-3.53)	3.54 (3.08-3.97)	3.95 (3.41-4.44)	4.53 (3.86-5.08)	4.98 (4.20-5.60)
2-day	1.26 (1.13-1.43)	1.62 (1.44-1.82)	2.12 (1.89-2.39)	2.53 (2.24-2.84)	3.09 (2.73-3.47)	3.54 (3.11-3.98)	4.02 (3.50-4.52)	4.51 (3.90-5.08)	5.21 (4.45-5.87)	5.76 (4.88-6.51)
3-day	1.34 (1.19-1.51)	1.71 (1.52-1.93)	2.25 (2.00-2.53)	2.69 (2.38-3.02)	3.30 (2.91-3.70)	3.79 (3.32-4.25)	4.32 (3.75-4.84)	4.87 (4.20-5.47)	5.64 (4.80-6.34)	6.26 (5.28-7.06)
4-day	1.41 (1.25-1.59)	1.80 (1.60-2.04)	2.38 (2.11-2.68)	2.85 (2.52-3.20)	3.51 (3.08-3.94)	4.04 (3.53-4.53)	4.61 (4.00-5.17)	5.22 (4.49-5.86)	6.07 (5.16-6.82)	6.77 (5.69-7.61)
7-day	1.57 (1.39-1.77)	2.00 (1.78-2.26)	2.64 (2.34-2.98)	3.16 (2.80-3.56)	3.90 (3.43-4.38)	4.49 (3.92-5.04)	5.12 (4.44-5.75)	5.79 (4.98-6.51)	6.73 (5.72-7.57)	7.49 (6.30-8.45)
10-day	1.70 (1.51-1.92)	2.18 (1.94-2.45)	2.87 (2.55-3.23)	3.44 (3.04-3.86)	4.22 (3.71-4.73)	4.85 (4.24-5.43)	5.52 (4.79-6.18)	6.22 (5.36-6.98)	7.21 (6.14-8.08)	8.00 (6.74-8.99)
20-day	2.09 (1.87-2.34)	2.69 (2.40-3.01)	3.55 (3.17-3.97)	4.20 (3.74-4.69)	5.08 (4.50-5.67)	5.76 (5.08-6.42)	6.44 (5.65-7.19)	7.14 (6.23-7.98)	8.08 (6.99-9.05)	8.81 (7.56-9.88)
30-day	2.44 (2.17-2.74)	3.14 (2.80-3.52)	4.14 (3.68-4.63)	4.90 (4.35-5.47)	5.92 (5.23-6.60)	6.70 (5.89-7.47)	7.51 (6.57-8.36)	8.32 (7.25-9.27)	9.42 (8.14-10.5)	10.3 (8.81-11.5)
45-day	2.83 (2.53-3.16)	3.64 (3.26-4.07)	4.80 (4.29-5.36)	5.66 (5.04-6.32)	6.78 (6.02-7.57)	7.63 (6.76-8.52)	8.49 (7.49-9.49)	9.35 (8.21-10.5)	10.5 (9.13-11.8)	11.3 (9.82-12.7)
60-day	3.13 (2.81-3.49)	4.04 (3.63-4.51)	5.32 (4.76-5.92)	6.24 (5.58-6.95)	7.45 (6.64-8.29)	8.34 (7.41-9.29)	9.24 (8.17-10.3)	10.1 (8.91-11.3)	11.3 (9.87-12.6)	12.1 (10.6-13.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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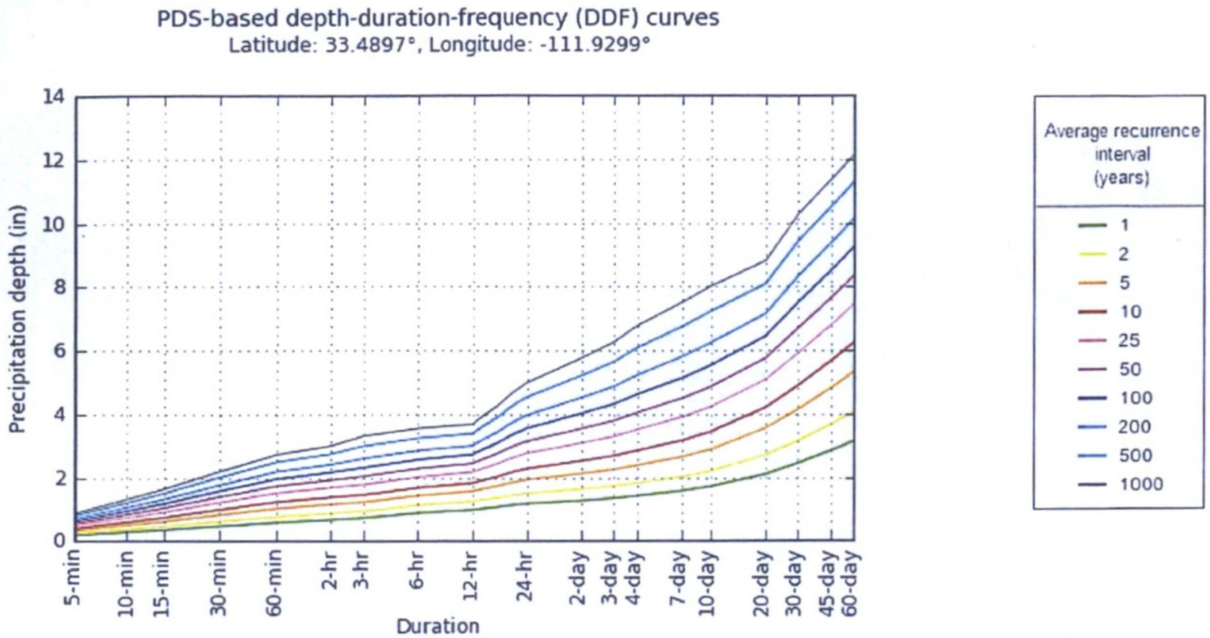
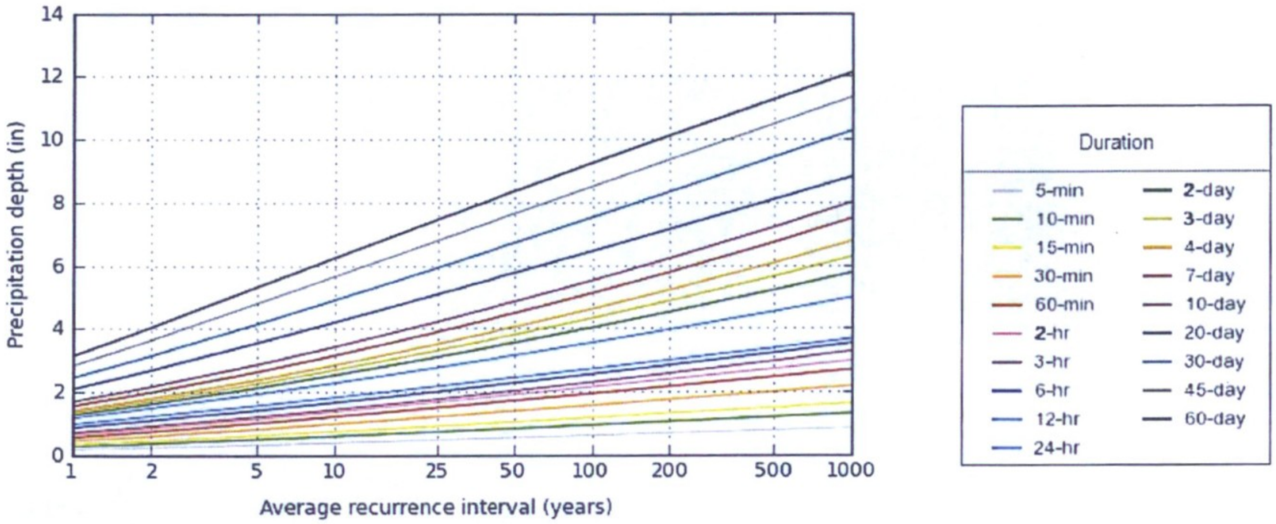
PF graphical





NOAA Atlas 14, Volume 1, Version 5

Created (GMT): Fri Nov 2 16:49:47 2018

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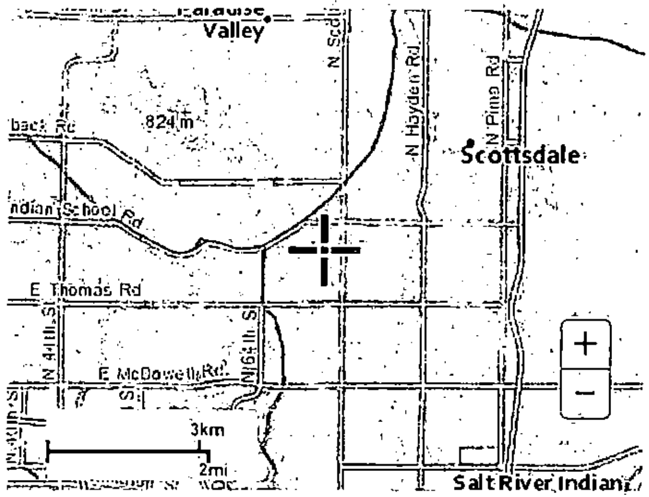
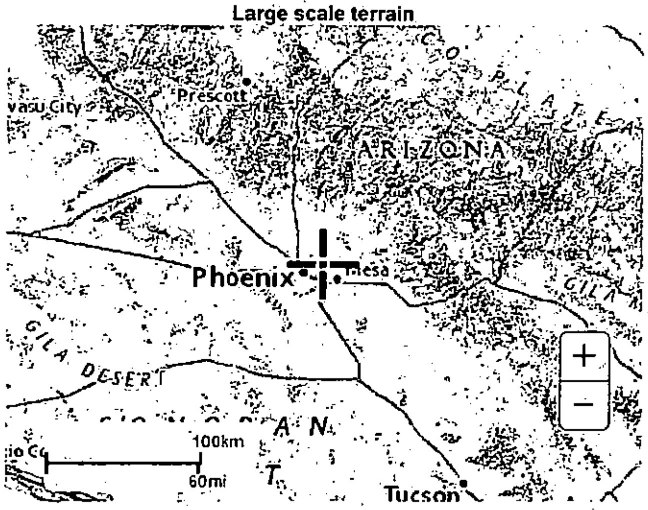
Maps & aerials

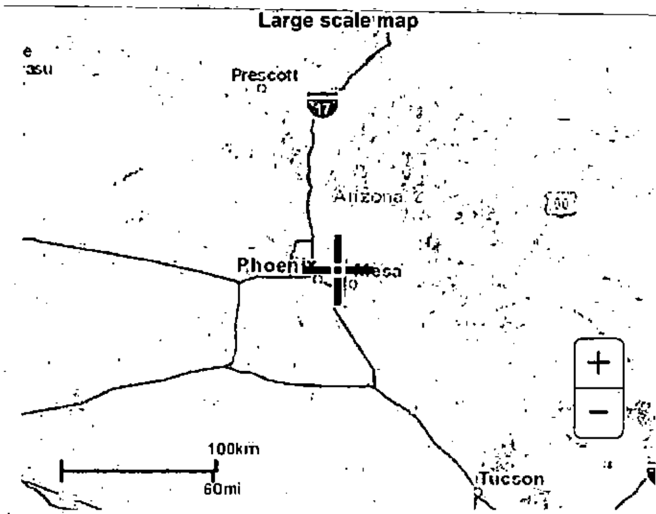
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix B

Calculation Description

Objective: Determine the channel design required to convey the 100-year, 6-hour storm flows.

Method of Analysis: Data provided by the Lower Indian Bend Wash Area Drainage Master Study indicated that the maximum flow is 5.88 cfs at the 4th St. Cul-de-sac. We will use hydraulic study and the manning formula to determine flow.

Results:

It was determined that with the constraints given by the site geometry and the City of Scottsdale's requirements, two types of conveyances will work best. The first type will be constrained by the curb of the parking lot and a second curb constructed on the property line. The resulting rectangular shaped ditch will be about 40 inches wide. A shallow V-ditch will be installed after the parking lot to continue conveying water. Both conveyances will be lined with rip-rap to prevent erosion due to the relatively high flows

Conclusion:

The rectangular ditch needs to be 8 inches deep to convey the flow required. We will use a 10-inch-deep ditch in order to better convey flow higher than the maximum required. At the end of the parking lot, a V-ditch will convey the water back to a catch basin where it will flow to the city storm water system. This ditch will be 6 feet wide at the top, and 8 inches deep. It will slope 1% along its length. This will allow for a maximum flow of 6.15 cfs.

609 N Calgary Court, Suite 7 Post Falls, Idaho 83854 Tel: 208-777-1854 Fax: 208-777-2128

Open Channel Flow

Description	Width (ft)	Depth (ft)	Slope (ft/ft)	Entrance Loss coefficient (K_e)	Mannnings n	Area(ft^2)	Wetted Perimeter (ft)	Flow (ft^3/sec)	Velocity (ft/sec)
V-Ditch Sheet Flow	6	0.75	0.01	0	0.03	2.25	6.08	6.154	2.73
Rectangle Shape at curb	3.33	0.67	0.01	0	0.03	2.23	4.67	7.114	3.19

2/121

3/21

Calculation Description

Objective: Determine the historical flow rate for the 2 year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank. Also we plan to use the city's equation to determine the storage required for the 2-year storm. See the last calculation for additional details on the city's equation.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 2-year rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 2-year, 2-hour storm, the pre-developed outflow is 0.73 cfs and post-developed outflow is 0.78 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2.

Using the city equation, we find that 2842 cubic feet of storage is required for the 2-year, 2 hour storm.

The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations.

4/21

Entire building area basin 1
Preliminary

2-Year Storm Event

Rational Method

Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.68
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	0.86
Pre-Developed Outflow (c.f.s.)	0.73

Developed Condition

Design Storm Intensity (2hr) (in/hr)	0.86
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	2.00
Area (acres)	1.24
Developed "C" Factor	0.73
Area x "C"	0.91
Soil infiltration rate (in/hr)	0.00

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft^3) (see below)	#6 V_{out} (ft^3)	Required Storage Volume (ft^3)
0						
5	300	2.88	2.61	955	0	955.32
10	600	2.18	1.98	1319	0	1318.77
15	900	1.81	1.64	1584	0	1583.73
20	1200	1.61	1.46	1849	0	1849.17
25	1500	1.41	1.28	2007	0	2007.22
30	1800	1.22	1.10	2058	0	2057.87
35	2100	1.14	1.03	2237	0	2237.18
40	2400	1.06	0.96	2374	0	2374.50
45	2700	0.98	0.89	2470	0	2469.81
50	3000	0.91	0.82	2523	0	2523.13
55	3300	0.83	0.75	2534	0	2534.45
60	3600	0.75	0.68	2504	0	2503.78
120	7200	0.43	0.39	2844	0	2843.83
						2843.83

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.68
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.68

5121

CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.9
Buildings/atrium	38,174.00	0.88	98	0.9
Grass/Lawn	12,792.00	0.29	50	0.2
Gravel	0.00	0.00	76	0.55
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.73

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	0.73
Post-Developed Flow (cfs)	0.00
Required Storage Volume (ft^3)	2842
Storage Volume (ft^3)	7750

Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

6/21

Calculation Description

Objective: Determine the historical flow rate for the 10-year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank. Also we plan to use the city's equation to determine the storage required for the 10-year storm. See the last calculation for additional details on the city's equation.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 10-year rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 10-year, 2-hour storm, the pre-developed outflow is 1.16 cfs and post-developed outflow is 1.26 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2.

Using the city equation, we find that 4544 cubic feet of storage is required for the 10-year, 2 hour storm.

The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations.

7/21

Entire building area basin 1
Preliminary

10-Year Storm Event

Rational Method

Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.68
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	1.38
Pre-Developed Outflow (c.f.s.)	1.16

Developed Condition

Design Storm Intensity (2hr) (in/hr)	1.38
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	10.00
Area (acres)	1.24
Developed "C" Factor	0.73
Area x "C"	0.91
Soil infiltration rate (in/hr)	0.00

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft^3) (see below)	#6 V_{out} (ft^3)	Required Storage Volume (ft^3)
0						
5	300	4.70	4.27	1560	0	1560.35
10	600	3.58	3.24	2159	0	2159.30
15	900	2.96	2.68	2589	0	2589.32
20	1200	2.63	2.39	3024	0	3024.04
25	1500	2.31	2.10	3284	0	3283.51
30	1800	1.99	1.81	3368	0	3367.73
35	2100	1.86	1.69	3660	0	3660.43
40	2400	1.74	1.58	3884	0	3884.19
45	2700	1.61	1.46	4039	0	4039.01
50	3000	1.48	1.35	4125	0	4124.89
55	3300	1.36	1.23	4142	0	4141.83
60	3600	1.23	1.12	4090	0	4089.84
120	7200	0.69	0.63	4547	0	4547.49
						4547.49

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.68
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.68

8121

CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.9
Buildings/atrium	38,174.00	0.88	98	0.9
Grass/Lawn	12,792.00	0.29	50	0.2
Gravel	0.00	0.00	76	0.55
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.73

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	1.16
Post-Developed Flow (cfs)	0.00
Required Storage Volume (ft^3)	4544
Storage Volume (ft^3)	7750

} Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

9/21

Calculation Description

Objective: Determine the historical flow rate for the 25 year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank. Also we plan to use the city's equation to determine the storage required for the 25-year storm. See the last calculation for additional details on the city's equation.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 25-year rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 25-year, 2 hour storm, the pre-developed outflow is 1.42 cfs and post-developed outflow is 1.54 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2.

Using the city equation, we find that 5565 cubic feet of storage is required for the 25-year, 2 hour storm.

The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations.

10121

Entire building area basin 1
Preliminary

25-Year Storm Event

Rational Method

Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.68
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	1.69
Pre-Developed Outflow (c.f.s.)	1.42

Developed Condition

Design Storm Intensity (2hr) (in/hr)	1.69
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	25.00
Area (acres)	1.24
Developed "C" Factor	0.73
Area x "C"	0.91
Soil infiltration rate (in/hr)	0.04

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft^3) (see below)	#6 V_{out} (ft^3)	Required Storage Volume (ft^3)
0						
5	300	5.77	5.24	1915	0	1914.62
10	600	4.39	3.98	2652	0	2652.03
15	900	3.63	3.29	3178	0	3177.97
20	1200	3.23	2.93	3711	0	3710.59
25	1500	2.84	2.57	4028	0	4027.70
30	1800	2.44	2.21	4129	0	4129.28
35	2100	2.29	2.07	4489	0	4488.77
40	2400	2.13	1.93	4764	0	4763.91
45	2700	1.98	1.79	4955	0	4954.68
50	3000	1.82	1.65	5061	0	5061.10
55	3300	1.67	1.51	5083	0	5083.16
60	3600	1.51	1.37	5021	0	5020.86
120	7200	0.85	0.77	5569	0	5569.02
						5569.02

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:

Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.68
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.68

11/21

CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.9
Buildings/atrium	38,174.00	0.88	98	0.9
Grass/Lawn	12,792.00	0.29	50	0.2
Gravel	0.00	0.00	76	0.55
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.73

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	1.42
Post-Developed Flow (cfs)	0.00
Required Storage Volume (ft^3)	5565
Storage Volume (ft^3)	7750

Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

12/21

Calculation Description

Objective: Determine the historical flow rate for the 100 year, 2-hour storm event. This information will help determine the flow rate into the stormwater tank.

Method of Analysis: The rational method of calculating stormwater flow.

Results:

Using data from the NOAA website, the depth in inches of the 100-year, rainfall for various timeframes are used to determine the rainfall intensity. These numbers are shown in column #3.

Conclusion:

For the case of the 100-year, 2-hour storm, the pre-developed outflow is 2.19 cfs, with post-development outflow at 2.12 cfs. The post-development number is found by multiplying the result in column #3, 120-minute row by 2. This The following calculation sheet includes other information that is typically of interest but not necessarily needed for these calculations. An interesting conclusion is that using this method, we end up with a similar required storage as the city's equation (see next set of calculations). 7718 cubic feet vs. 7712 cubic feet.

13121

Entire building area basin 1
Preliminary

One Hundred Year Storm Event

Rational Method

Determine historical flows

Pre-Developed Condition

Area (acres)	1.24
Pre-Developed "C" Factor	0.82
Time Increment (min)	5.00
Design Storm Intensity (in/hr)	2.16
Pre-Developed Outflow (c.f.s.)	2.19

Developed Condition

Design Storm Intensity (2hr) (in/hr)	2.16
# of 600 Gallon Dry Wells	0
# of 1000 Gallon Dry Wells	0
Post-Developed Outflow (cfs)	0.00
Design Year Flow (yr)	100.00
Area (acres)	1.24
Developed "C" Factor	0.80
Area x "C"	0.98
Soil infiltration rate (in/hr)	0.04

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

#1 Time Inc. (min.)	#2 t Time Inc. (sec.) (#1*60)	#3 Intensity (in./hr.)	#4 Q_{dev} (cfs)	#5 V_{in} (1) (ft^3) (see below)	#6 V_{out} (ft^3)	Required Storage Volume (ft^3)
0						
5	300	7.44	7.32	2676	0	2676.03
10	600	5.66	5.57	3709	0	3708.53
15	900	4.68	4.60	4445	0	4445.19
20	1200	4.17	4.10	5195	0	5195.38
25	1500	3.67	3.61	5647	0	5646.57
30	1800	3.16	3.11	5799	0	5798.75
35	2100	2.96	2.91	6302	0	6301.60
40	2400	2.76	2.71	6685	0	6685.45
45	2700	2.56	2.51	6950	0	6950.28
50	3000	2.35	2.31	7096	0	7096.10
55	3300	2.15	2.12	7123	0	7122.90
60	3600	1.95	1.92	7031	0	7030.69
120	7200	1.08	1.06	7718	0	7718.07
						7718.07

(1) $V_{in} = 1.34 * Q_{Dev} * t$ for $t < T_c$

$V_{in} = (Q_{Dev} * t) + (.34 * Q_{Dev} * T_c)$ for $t > T_c$

$Q_{dev} = CIA - Q_{DRYWELL} - Q_{INFILTRATION}$

Pre-Development:

Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Grass	0.00	0.00	50	0.2
Gravel	53,852.00	1.24	76	0.82
Pavement	0.00	0.00	98	0.9
Trees/Brush	0.00	0.00	36	0.2
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	76	0.82

14121

CN values not used with the rational method

Post-Development:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2,886.00	0.07	98	0.95
Buildings/atrium	38,174.00	0.88	98	0.95
Grass/Lawn	12,792.00	0.29	50	0.3
Gravel	0.00	0.00	76	0.82
0	0.00	0.00	0	0
0	0.00	0.00	0	0
0	0.00	0.00	0	0
Totals:	53,852.00	1.24	87	0.80

Impervious Area:
Tributary Area:

Description:	Area (ft^2)	Area (Ac.)
Asphalt	2,886.00	0.07
Buildings	38,174.00	0.88
Grass	0.00	0
Totals:	43,946.00	1.01

Storm Attenuation: $Vr = C(R/12)A$

Stormwater Detention Basin Area (ft^2)	775
Detention Basin Depth (ft)	10
Detention Basin Storage Volume (ft^3)	7750

Pre-Developed Flow (cfs)	2.19
Post-Developed Flow (cfs)	0.00
Required Storage Volume (ft^3)	7712
Storage Volume (ft^3)	7750

} Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

15/21

Calculation Description

Objective: Determine the required storage volume for the site

Method of Analysis: Equation provided by the City of Scottsdale Design Standards & Policies Manual (DSPM) Chapter 4, Section 1.201.C.

$$Vr = C\left(\frac{R}{12}\right)A$$

See referenced chapter for definition of terms.

Results:

Using data from the NOAA website, the depth in inches of the 100-year, 2-hour rainfall for this site is 2.16 inches. This is the "R" value. The weighted average runoff coefficient, "C" is found to be 0.80 this is shown in the table "Post-Development Tributary Area". This table also shows the "A" value.

Conclusion:

Using the equation above, we find that 7712 cubic feet of storage area is required. We plan to provide a minimum of 7750 cubic feet of storage. The objective is satisfied.

16,121

Entire building area basin 1
Preliminary

One Hundred Year Storm Event

DSPM Chapter 4, Section -1.201.C. Storage facilities volume

Pre-Developed Condition

Area (square feet)	53,852
Pre-Developed "C" Factor	0.82
Design Storm Intensity (in/hr)	2.16
Pre-Developed Outflow (c.f.s.)	2.19
Time Increment (min)	11.11

Developed Condition

Time Increment (min)	2 hr	
Design Storm Intensity (in/hr)	2.16	R
Post-Developed Outflow (cfs)	0.00	
Design Year Flow (yr)	100.00	
Area (sq. ft)	53,852	A
Developed "C" Factor	0.80	C
Soil infiltration rate (in/hr)	0.00	

Flow Calcs:

Qout	0.00	CFS
$Q_{DRYWELL}$	0.00	CFS

Storm Attenuation: $Vr = C(R/12)A$

Required Storage Volume (ft^3)	7712
Storage Volume (ft^3)	7750

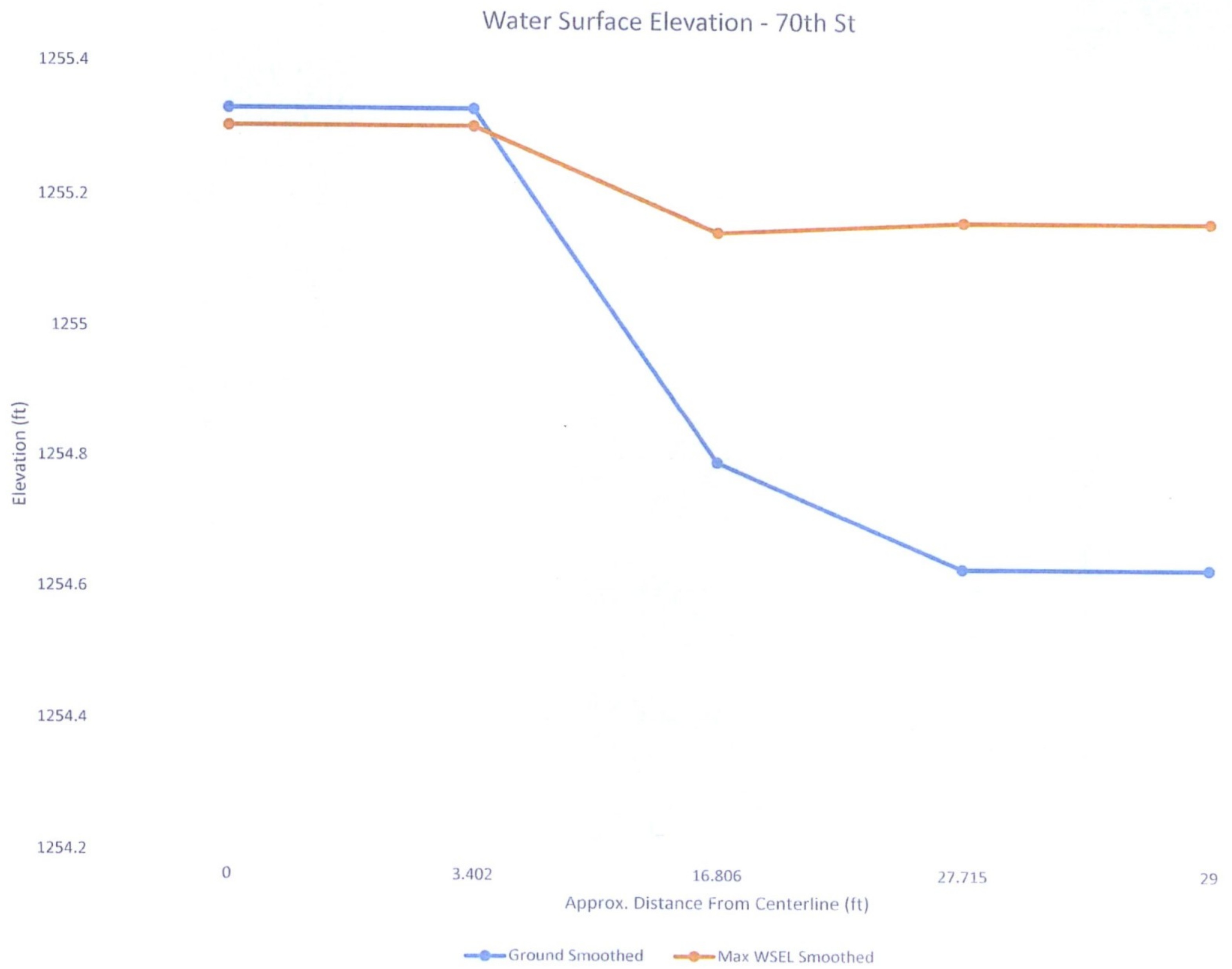
} Capacity is Adequate

provide minimum detention vault size to hold 7750 cf for maximum 100 yr storm event

Post-Development:
Tributary Area:

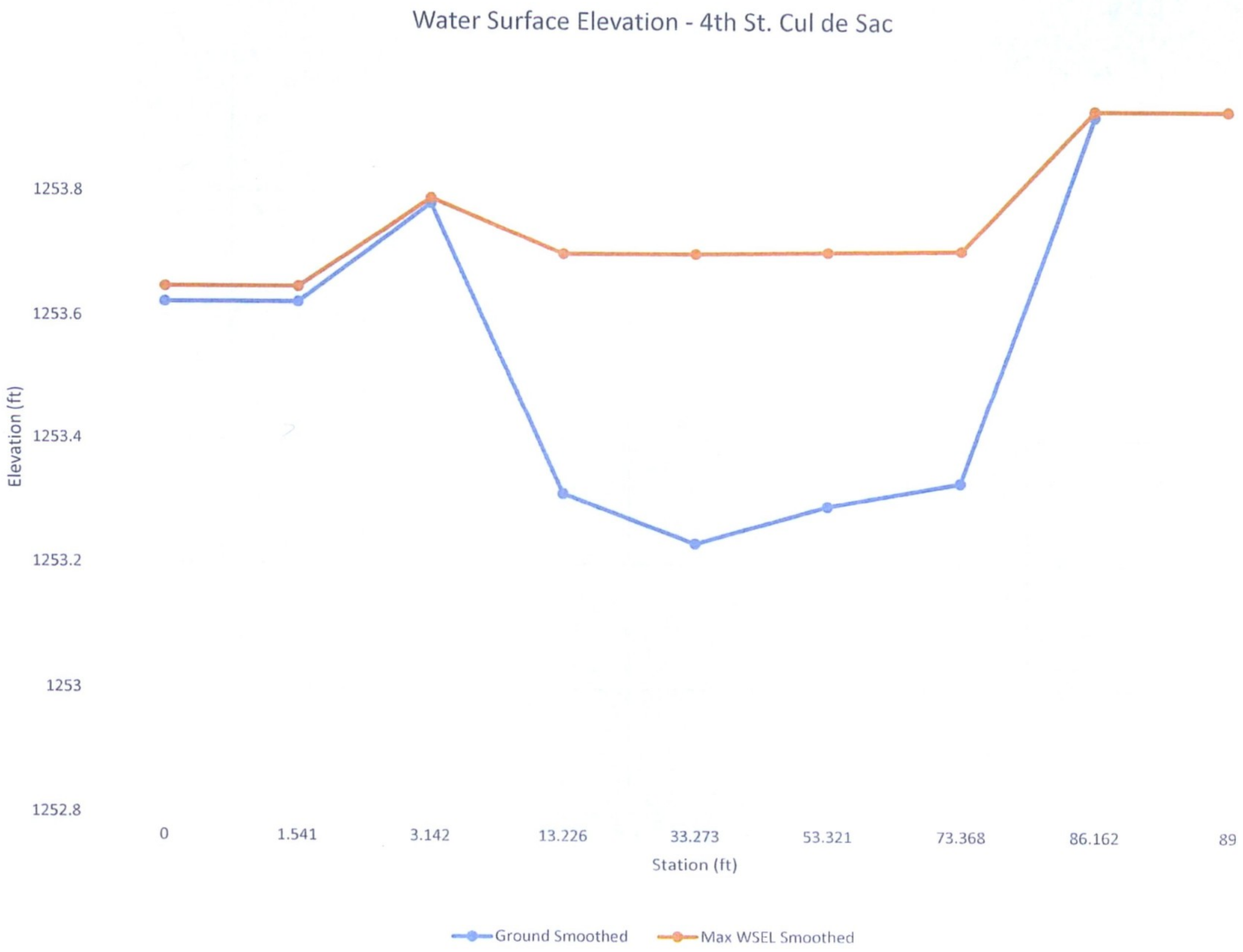
Description:	Area (ft^2)	Area (Ac.)	CN	Runoff Coefficients
Asphalt Pavement	2886	0.07	98	0.95
Buildings/atrium	38174	0.88	98	0.95
Grass/Lawn	12792	0.29	50	0.3
Gravel	0	0.00	76	0.82
0	0	0.00	0	0
0	0	0.00	0	0
0	0	0.00	0	0
Totals:	53852	1.24	87	0.80

FIGURE 1



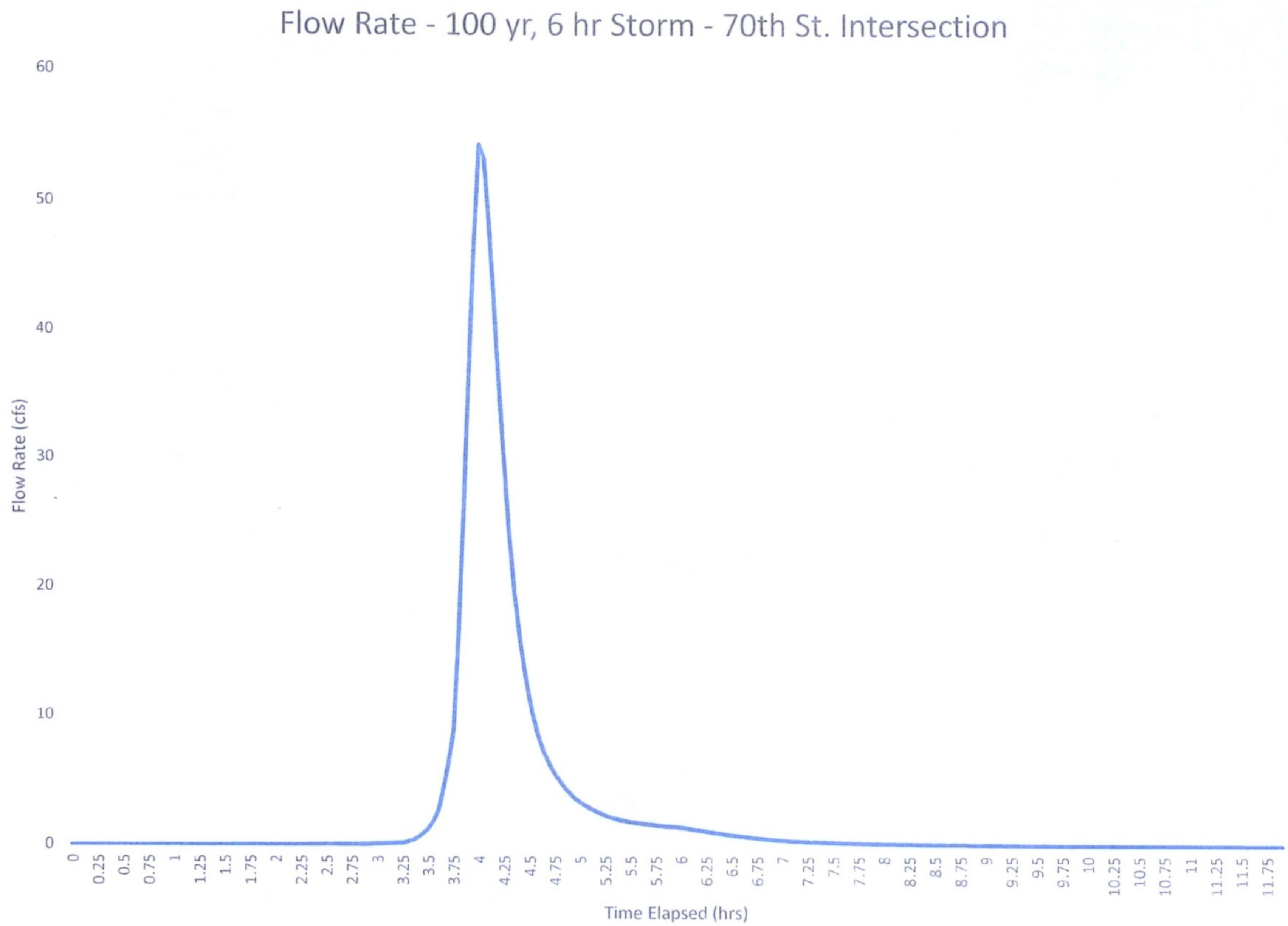
Water Surface Elevation - 70th St
Elevation (ft)
1255.4
1255.2
1255
1254.8
1254.6
1254.4
1254.2
0
3.402
16.806
27.715
29
Approx. Distance From Centerline (ft)
Ground Smoothed
Max WSEL Smoothed

FIGURE 2



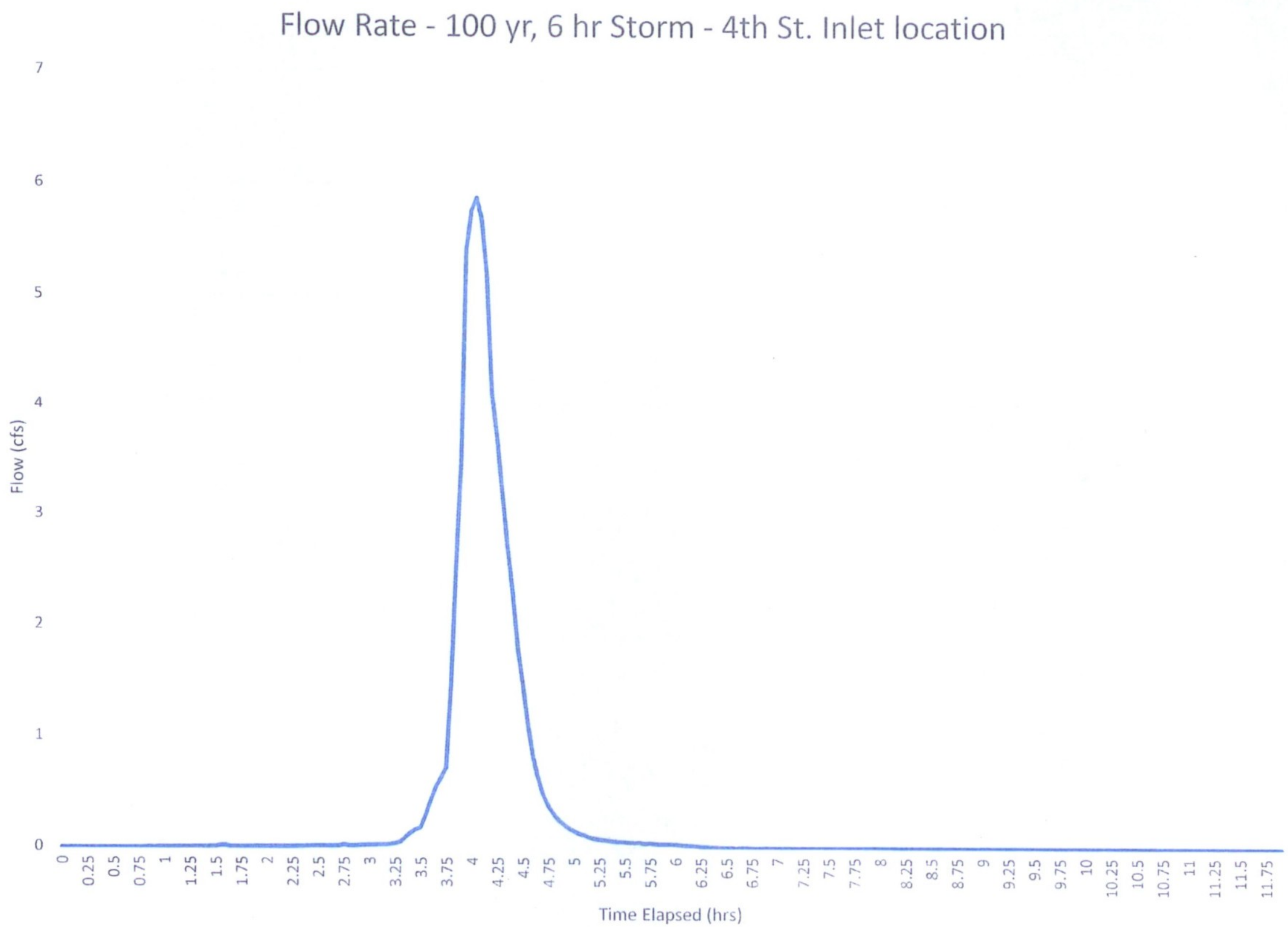
18121

FIGURE 3



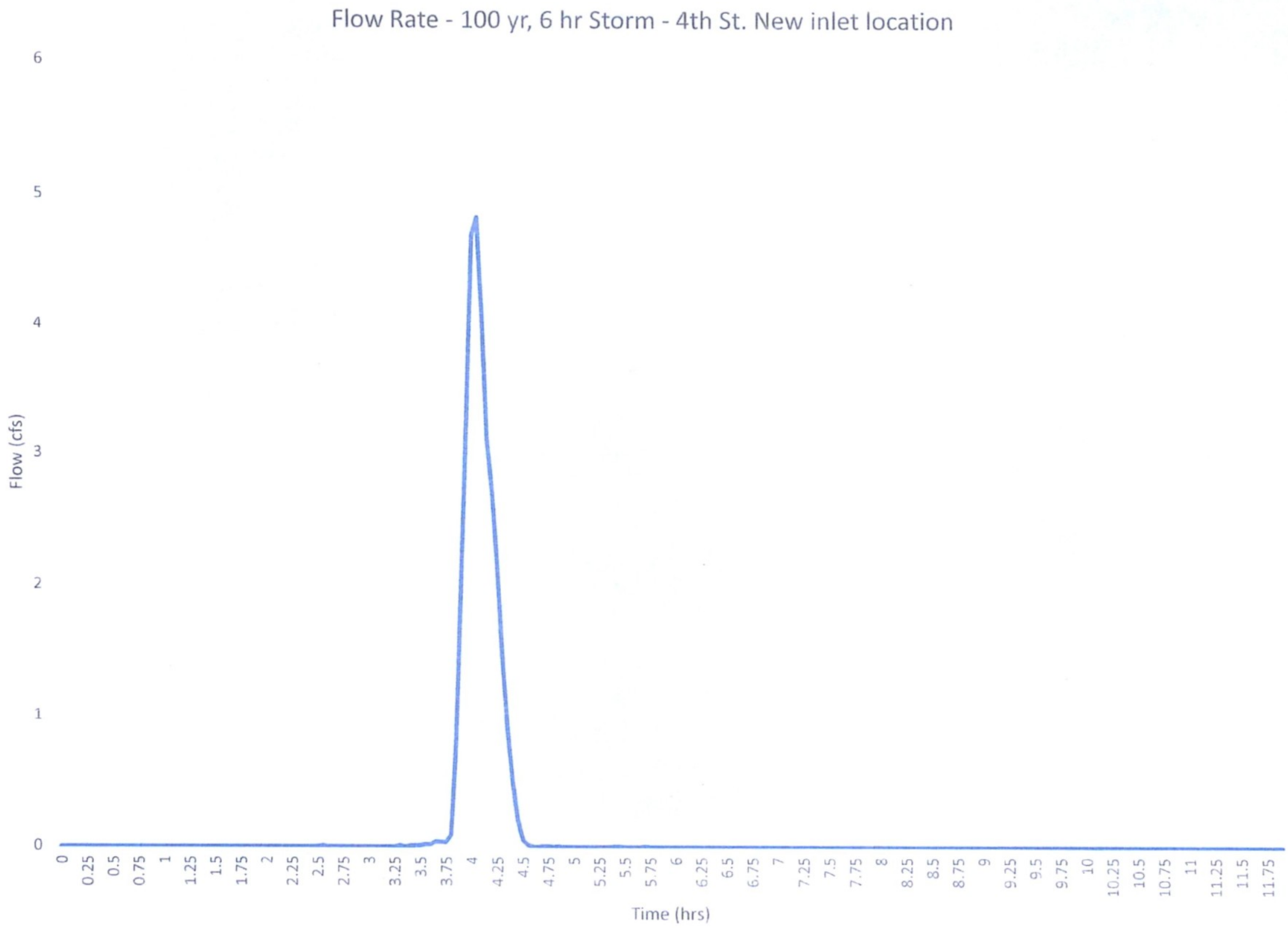
19 | 21

FIGURE 4



20121

Figure 5



2/121

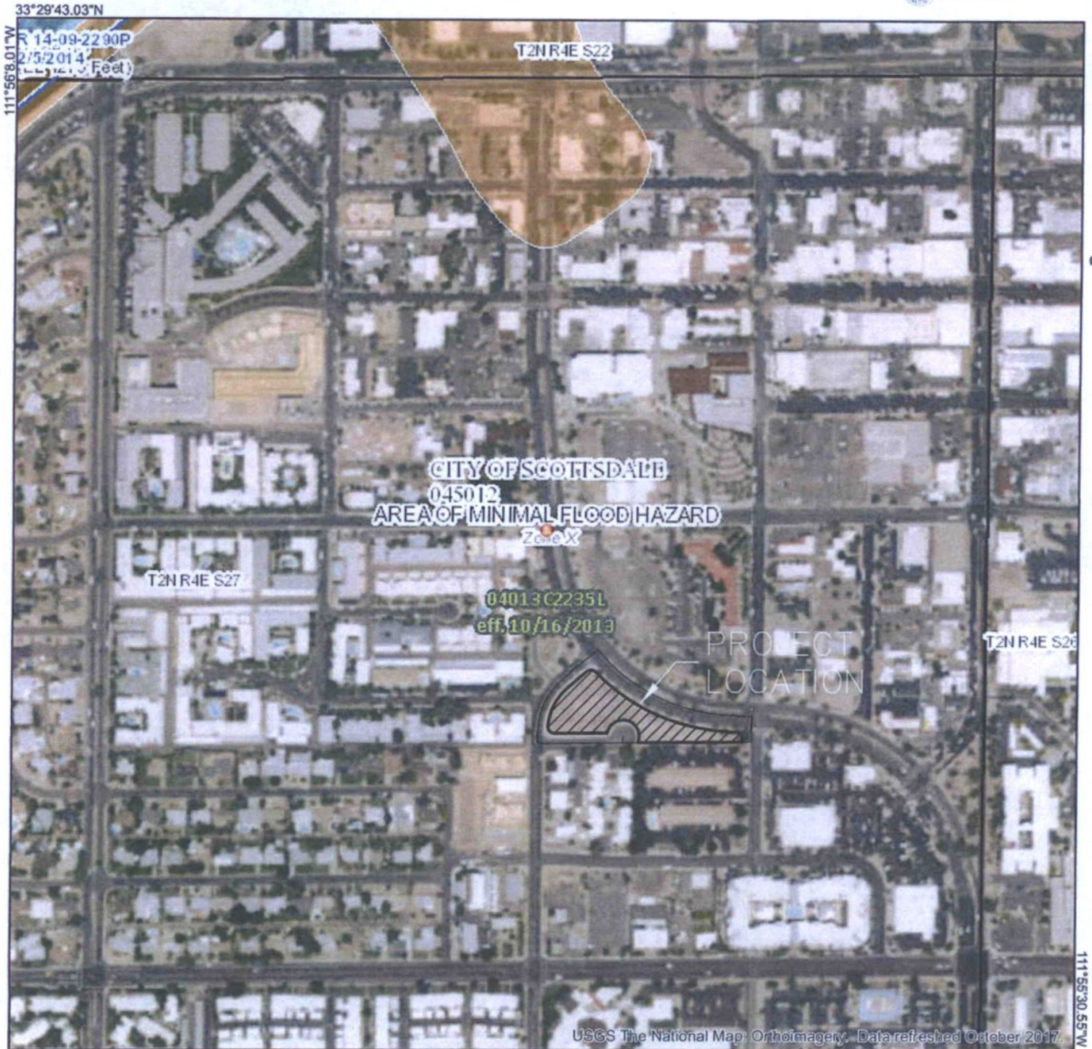
Appendix C

National Flood Hazard Layer FIRMette

FEMA

33°29'43.03"N

111°56'8.01"W



111°55'30.55"W

33°29'13.02"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

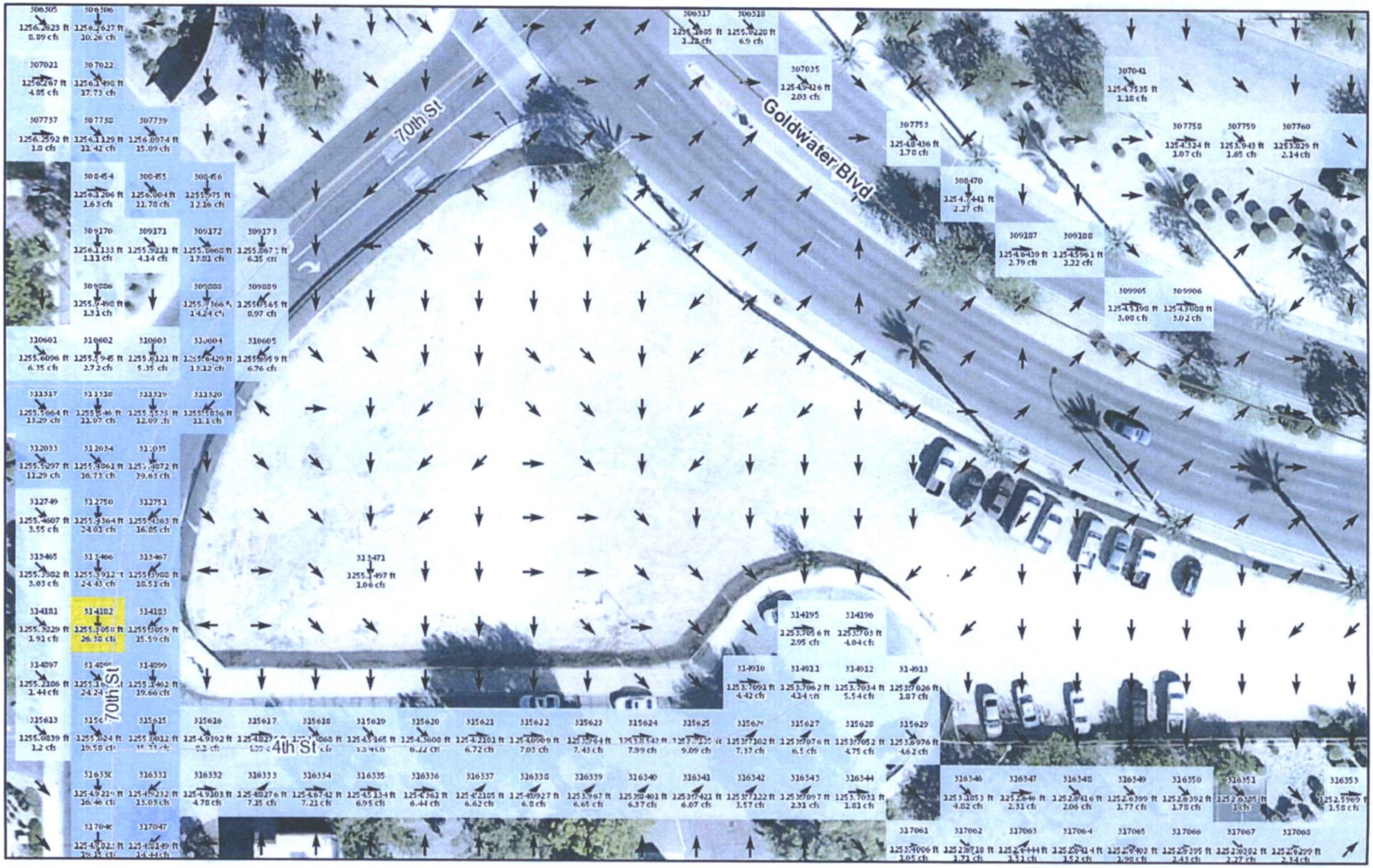
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/7/2018 at 2:11:11 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

679_LIBW - South 100YR6HR



January 23, 2019

1:600

0 25 50 100 ft

0 5 10 20 m

APPENDIX E

GRADING & DRAINAGE LANGUAGE

WARNING AND DISCLAIMER OF LIABILITY

The City's Stormwater and Floodplain Management Ordinance is intended to minimize the occurrence of losses, hazards and conditions adversely affecting the public health, safety and general welfare which might result from flooding. The Stormwater and Floodplain Management Ordinance identifies floodplains, floodways, flood fringes and special flood hazard areas. However, a property outside these areas could be inundated by floods. Also, much of the city is a dynamic flood area; floodways, floodplains, flood fringes and special flood hazard areas may shift from one location to another, over time, due to natural processes.

WARNING AND DISCLAIMER OF LIABILITY

The flood protection provided by the Stormwater and Floodplain Management Ordinance 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 constructed or natural causes. The Stormwater and Floodplain Management Ordinance does not create liability on the part of the city, any officer or employee thereof, or the federal, state or county government for any flood damages that result from reliance on the Ordinance or any administrative decision lawfully made thereunder.

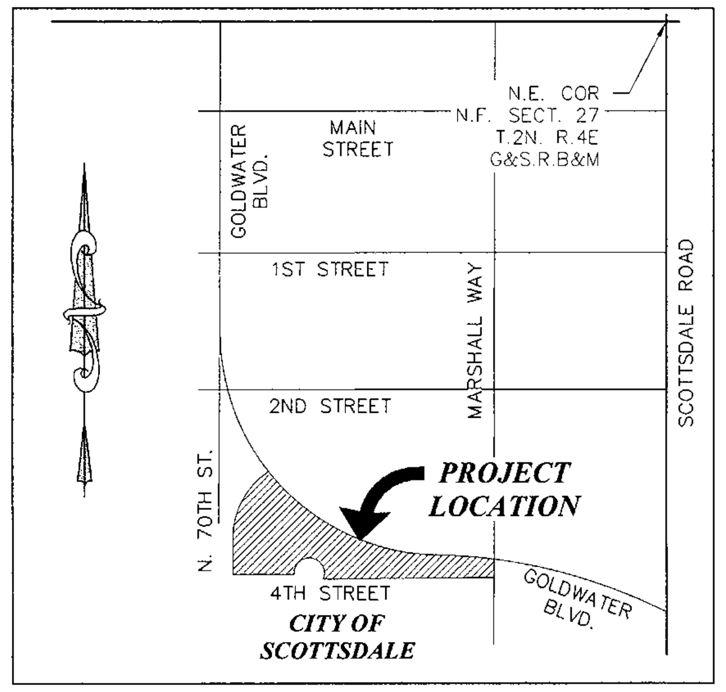
Compliance with the Stormwater and Floodplain Management Ordinance does not ensure complete protection from flooding. Flood-related problems such as natural erosion, streambed meander, or constructed obstructions and diversions may occur and have an adverse effect in the event of a flood. You are advised to consult your own engineer or other expert regarding these considerations.

I have read and understand the above.

4-2N-2018	Roger Gleason	11-5-2018
Plan Check #	Owner Representative	Date

ALTA/NSPS LAND TITLE SURVEY
GOLDWATER BOULEVARD, LLC.

LOT 1 OF LOLOMA II SUBDIVISION, A SINGLE LOT PROPERTY, LOCATED IN N.W. QUARTER OF THE S.E. QUARTER OF THE N.E. QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST, GILA & SALT RIVER B.M., CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

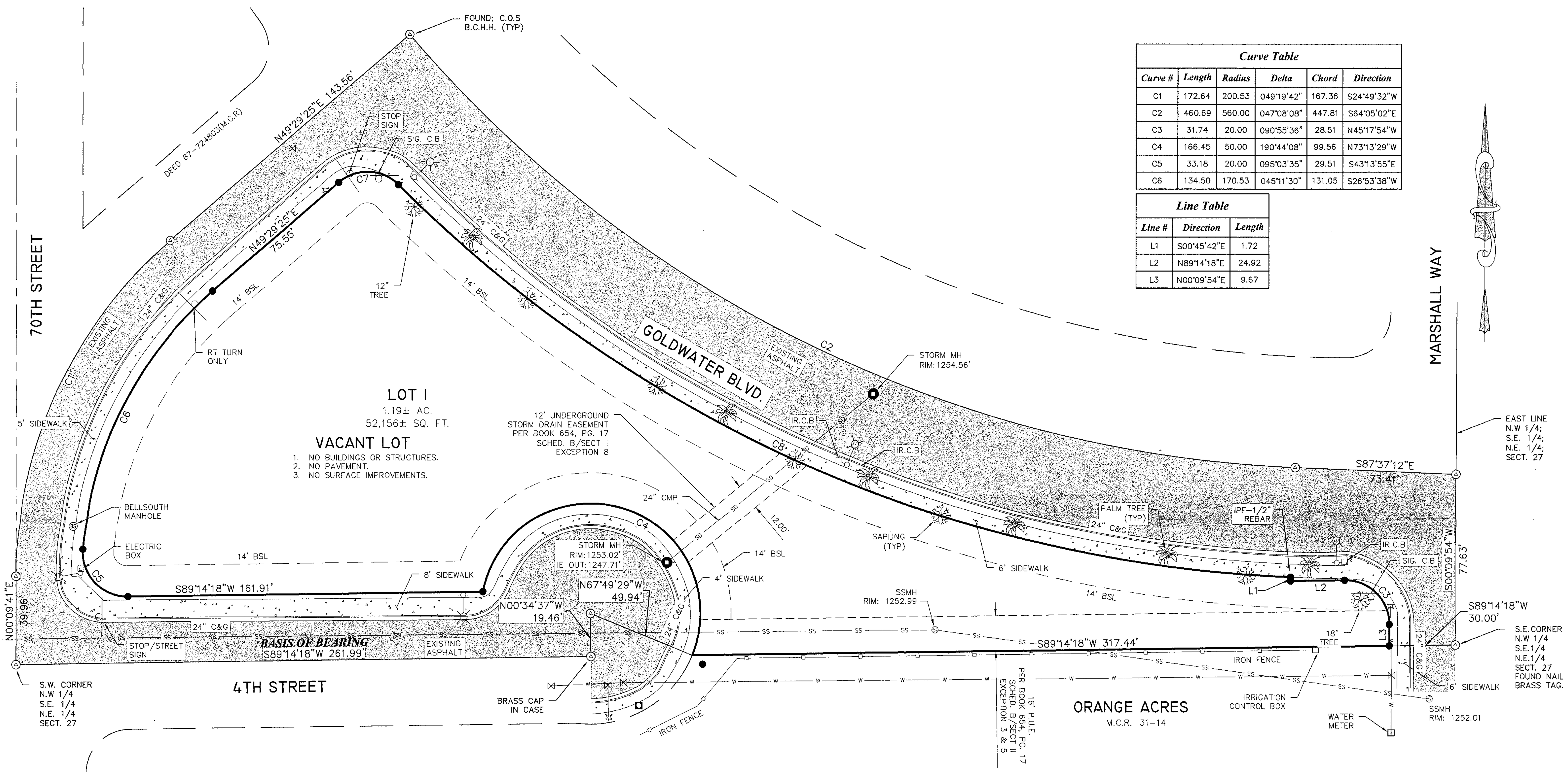


VICINITY MAP

NOT TO SCALE

LEGEND (MAY OR MAY NOT APPLY)

- FOUND; CITY OF SCOTTSDALE BRASS CAP IN HAND HOLE, OR AS NOTED
- ½" IRON BAR FOUND, WITH TAG/LS#22281
- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK
- ASPHALT (1/2 WIDTH LOCATED)
- CONCRETE
- FENCE
- OVERHEAD ELECTRIC LINE
- SANITARY SEWER LINE
- WATER LINE
- UTILITY POLE
- GUY ANCHOR
- ELECTRICAL TRANSFORMER
- ELECTRICAL METER
- GAS METER
- STORM DRAIN MANHOLE
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- STREET LIGHT
- SIGN AS NOTED
- SIG. C.B — TRAFFIC SIGNAL CONTROL BOX
- IR. C.B — IRRIGATION CONTROL BOX.



OWNERSHIP INFORMATION

2008 CONDO PROPERTIES, LLC., A TEXAS LIMITED LIABILITY COMPANY.
5718 WESTHEIMER, #2000
HOUSTON, TEXAS, 77057

SITE ADDRESS

7000 E. 4TH STREET
SCOTTSDALE ARIZONA, 85251

Curve Table

Curve #	Length	Radius	Delta	Chord	Direction
C1	172.64	200.53	049°19'42"	167.36	S24°49'32"W
C2	460.69	560.00	047°08'08"	447.81	S64°05'02"E
C3	31.74	20.00	090°55'36"	28.51	N45°17'54"W
C4	166.45	50.00	190°44'08"	99.56	N73°13'29"W
C5	33.18	20.00	095°03'35"	29.51	S43°13'55"E
C6	134.50	170.53	045°11'30"	131.05	S26°53'38"W

Line Table

Line #	Direction	Length
L1	S00°45'42"E	1.72
L2	N89°14'18"E	24.92
L3	N00°09'54"E	9.67

BASIS OF BEARING

BASIS OF BEARING FOR THIS SURVEY IS S89°14'18"W ALONG THE SOUTH LINE OF THE N.W 1/4 OF THE S.E 1/4 OF THE N.E. 1/4 OF SECTION 27, AS SHOWN PER R-1.

LEGAL DESCRIPTION

LOT 1, LOLOMA II, ACCORDING TO THE PLAT, BOOK 654, PAGES 17, RECORDS OF MARICOPA COUNTY, ARIZONA.

REFERENCES

R-1 A PROPERTY DIVISION OF LOLOMA II, BY JOHN. R. SNODGRASS, PLS 22281, FILED IN BOOK 654 OF RECORDS, AT PAGE 17, RECORDS OF MARICOPA COUNTY.

R-2 A SPECIAL WARRANTY DEED, FILED UNDER INSTR. NO.20160464176, RECORDS OF MARICOPA COUNTY.

SURVEYOR'S CERTIFICATE

TO: GOLDWATER BOULEVARD, LLC., AN ARIZONA LIMITED LIABILITY COMPANY, KEYBANK NATIONAL ASSOCIATION, A NATIONAL BANKING ASSOCIATION AND ITS SUCCESSORS AND/OR ASSIGNS, AND COMMONWEALTH LAND TITLE INSURANCE COMPANY:

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2016 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 6(b), 7(a), 7(b)(1), 8, 9, 10(a), 11, 13, 16, 17, 18 19 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON 07/23/2017.

DATE OF PLAT OR MAP: 3/19/2018

JOSEPH E. HASSELL P.L.S. 65909 DATE

Z:\2017\17096\DWG\SURVEY\ROS\17096-ALTA.DWG

GENERAL NOTES

1. RECORDED AND UNRECORDED DOCUMENTS, MAPS, DEEDS, PRESCRIPTIONS, VERBAL CONTRACTS AND EASEMENTS MAY EXIST THAT EFFECT THIS SURVEY. WE HAVE SHOWN THOSE CERTAIN EXCEPTIONS FOUND IN THE TITLE COMMITMENT NO. C1802110-340-DL4-BB2, DATED MARCH 1, 2018 @ 5:00 P.M.
2. THE STORM DRAIN EASEMENT INFORMATION SHOWN AND DESCRIBED HEREON WAS OBTAINED FROM A PLAT LOLOMA II, JOHN R. SNODGRASS RLS #22281, A LICENSED SURVEYOR IN THE STATE OF ARIZONA.
3. THIS LOT IS ZONED D/RH-2 DO, BY THE CITY OF SCOTTSDALE.
   A. BUILDING SETBACK= 14' FROM RIGHT OF WAY OF PUBLIC STREET.
4. GOLDWATER BLVD., 70TH STREET, MARSHALL WAY & 4TH STREET ARE PUBLIC RIGHT-OF-WAY, MAINTAINED BY THE CITY OF SCOTTSDALE.
5. TOTAL AREA OF LOT 1, IS 1.19 ACRES, MORE OR LESS.
6. PROPERTY DIMENSIONS SHOWN HAVE BEEN FIELD VERIFIED.
7. ALL AVAILABLE EVIDENCE INDICATES THAT ALL UTILITIES SERVING THE PROPERTY ENTER THROUGH ADJOINING PUBLIC STREETS AND/OR EASEMENTS OF RECORD.
8. THE SUBJECT PROPERTY DOES NOT LIE WITHIN FLOOD ZONE X AS PLOTTED ON FEMA FIRM MAP 04013C2235L EFFECTIVE OCTOBER 16, 2013.
9. THERE ARE NO VISIBLE ENCROACHMENTS UPON THIS LOT.
10. NO OBSERVED EVIDENCE OF CURRENT EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS.
11. NO PROPOSED CHANGES TO STREET RIGHT-OF-WAY LINES. NO OBSERVED EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.
12. NO OBSERVED EVIDENCE OF SITE USE AS A SOLID WASTE DUMP, SUMP OR SANITARY LANDFILL.
13 NO WETLAND AREAS AS DELINEATED BY APPROPRIATE AUTHORITIES.
14. GROUND MEASUREMENTS ARE USED AS THE BASIS FOR LOCATION OF ALL FEATURES OF THE SUBJECT PROPERTY.
15. THERE ARE NO BUILDINGS ON THIS SITE.

SCHEDULE B - SECTION II EXCEPTIONS

NOTE: SEE THAT CERTAIN COMMITMENT FOR TITLE INSURANCE ISSUED BY CHICAGO TITLE INSURANCE COMPANY DATED MARCH 1, 2018 AS COMMITMENT NO. C1802110-340-DL4-BB2, WITH EXCEPTIONS AS FOLLOWS:(WITH LIKE NUMBERING)

1. PROPERTY TAXES, WHICH ARE A LIEN NOT YET DUE AND PAYABLE, INCLUDING ANY ASSESSMENTS COLLECTED WITH TAXES TO BE LEVIED FOR THE YEAR 2018.
2. ANY OUTSTANDING LIABILITIES AND OBLIGATIONS, INCLUDING UNPAID ASSESSMENTS, IMPOSED UPON SAID LAND BY REASON OF:(A) INCLUSION THEREOF WITHIN THE BOUNDARIES OF THE SALT RIVER PROJECT AGRICULTURAL IMPROVEMENT AND POWER DISTRICT; (B) MEMBERSHIP OF THE OWNER THEREOF IN THE SALT RIVER VALLEY WATER USERS' ASSOCIATION, AN ARIZONA CORPORATION AND (C) THE TERMS OF ANY WATER RIGHT APPLICATION MADE UNDER THE RECLAMATION LAWS OF THE UNITED STATES FOR THE PURPOSES OF OBTAINING WATER RIGHTS FOR SAID LAND.
3. AN EASEMENT FOR THE PURPOSE SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS SET FORTH IN A DOCUMENT (*AFFECTS SUBJECT PROPERTY*)
   GRANTED TO: CITY OF SCOTTSDALE
   PURPOSE: PUBLIC UTILITIES
   RECORDING DATE: 05/24/1994
   RECORDING NO.: 1994-415957
   RE-RECORDING DATE: 10/18/1994
   RE-RECORDING NO.: 1994-748898
   (THEREAFTER, THE EFFECT OF RELEASE EASEMENT RECORDED SEPTEMBER 24, 2003 IN RECORDING NO. 2003-1341986.)
4. MATTERS CONTAINED IN THAT CERTAIN DOCUMENT. (DOES NOT AFFECT)
   ENTITLED: REDEVELOPMENT AGREEMENT
   DATED: 04/17/2002
   EXECUTED BY: THE CITY OF SCOTTSDALE AND ARTS DISTRICT GROUP, L.L.C., AN ARIZONA LIMITED LIABILITY COMPANY
   RECORDING DATE: 04/26/2002
   RECORDING NO: 2002-426830
   (THE TERMS AND EFFECT OF REDEVELOPMENT AGREEMENT TERMINATION NOTICE RECORDED NOVEMBER 16, 2010 IN RECORDING NO. 2010-1003679.)
5. EASEMENTS, COVENANTS, CONDITIONS AND RESTRICTIONS AS SET FORTH ON THE PLAT.
   RECORDED IN BOOK 654 OF MAPS, PAGE 17 OF M.C.R.
   RECORDING DATE: 10/01/2003. (AFFECTS SUBJECT PROPERTY)

H-Scale 1"= 30'

30 15 30 60

11 X 17 SCALE 1"=60'

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Post Falls, Idaho 83854
PHONE:(208)773-8370
FAX:(208)777-2128
www.acesolutions.pro

REGISTERED LAND SURVEYOR
CERTIFICATE NO. 65909
JOSEPH E. HASSELL
3/21/18
ARIZONA U.S.A.

ALTA/NSPS LAND TITLE SURVEY
GOLDWATER BOULEVARD, LLC.
CITY OF SCOTTSDALE, MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION

ISSUE DATE: 11/9/17
PLOT DATE: 3/21/18
DRAWN BY: AG
CHECKED BY: JEH
DWG FILE: 17096-ALTA
PROJ. # 17-096

SHEET TITLE:
ALTA/NSPS SURVEY

4-ZN-2018 & 5-AB-2018
& 2-II-2018
07/10/18

STORMWATER CONTROL PLANS FOR GOLDWATER

A SINGLE LOT PROPERTY, LOCATED IN N.W. QUARTER OF THE S.E. QUARTER OF THE N.E. QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST, GILA & SALT RIVER B.M., MARICOPA COUNTY, ARIZONA

NOTE:

1 .BASEMENT LEVEL SUMP PUMP, POWER SOURCE AND CONTROLS TO BE SIZED BY CONTRACTOR. CONSULT ENGINEER OF RECORD FOR FLOW AND HEAD PRESSURE INFORMATION.

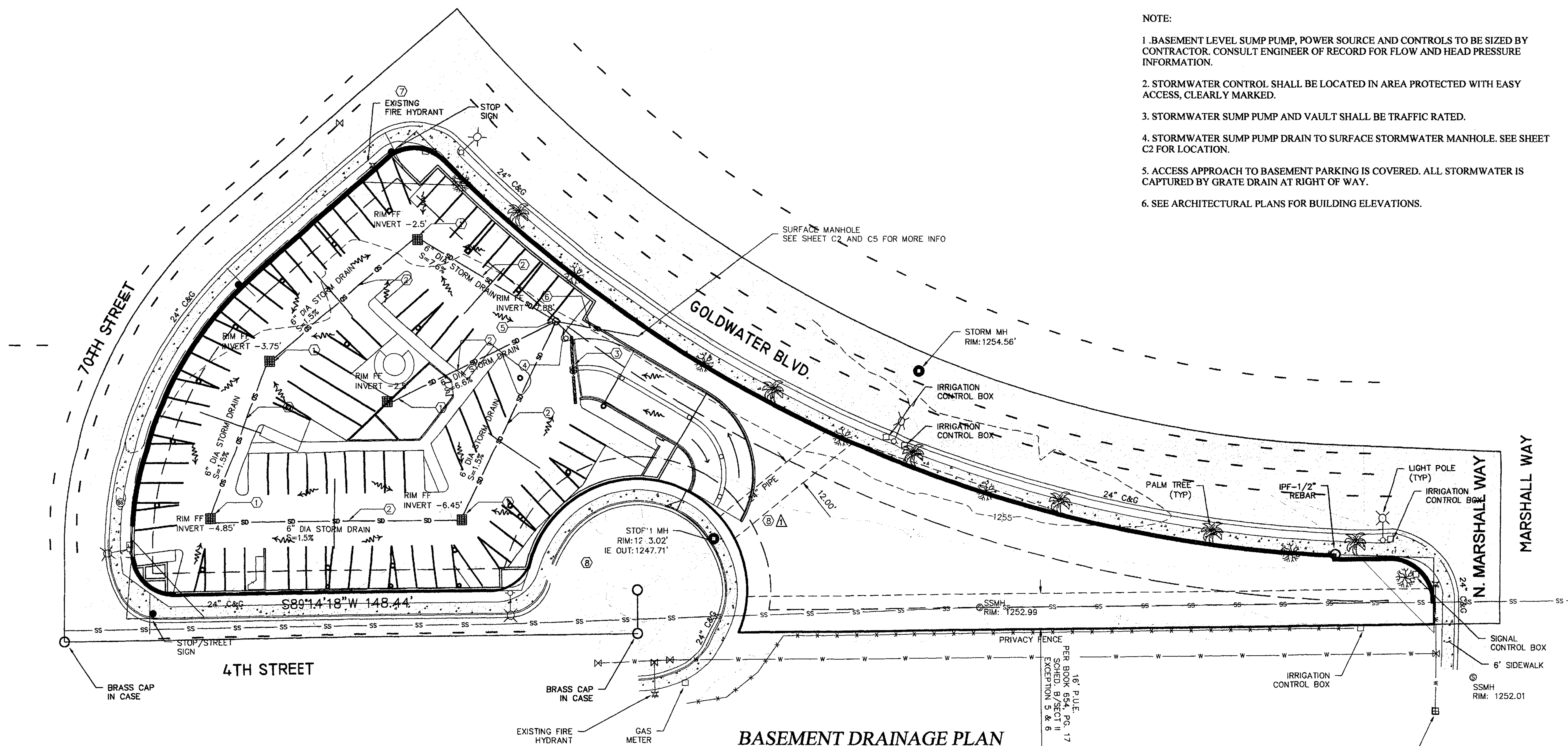
2. STORMWATER CONTROL SHALL BE LOCATED IN AREA PROTECTED WITH EASY ACCESS, CLEARLY MARKED.

3. STORMWATER SUMP PUMP AND VAULT SHALL BE TRAFFIC RATED.

4. STORMWATER SUMP PUMP DRAIN TO SURFACE STORMWATER MANHOLE. SEE SHEET C2 FOR LOCATION.

5. ACCESS APPROACH TO BASEMENT PARKING IS COVERED. ALL STORMWATER IS CAPTURED BY GRATE DRAIN AT RIGHT OF WAY.

6. SEE ARCHITECTURAL PLANS FOR BUILDING ELEVATIONS.



BASEMENT DRAINAGE PLAN

LEGEND

	PROPERTY BOUNDARY
	RIGHT-OF-WAY
	EASEMENT LINE
	BUILDING SETBACK
	ASPHALT
	CONCRETE
	GRAVEL
	MAJOR CONTOUR
	MINOR CONTOUR
—x—x—	FENCE
	CULVERT
—CM—	COMMUNICATIONS LINE
—G—	GAS LINE
—OHE—	OVERHEAD ELECTRIC LINE
—E—	UNDERGROUND ELECTRIC LINE
—SS—	SANITARY SEWER
—SD—	STORM DRAIN
—W—	WATERLINE
	UTILITY POLE
	GUY ANCHOR
	CATCH BASIN
	DRY WELL
	SEWER MANHOLE
	STORM DRAIN MANHOLE
	FIRE HYDRANT
	YARD HYDRANT
	VALVE
	WELL
	CONIFEROUS TREE
	DECIDUOUS TREE
	SIGN (AS NOTED)
	STORMWATER SURFACE FLOW DIRECTION

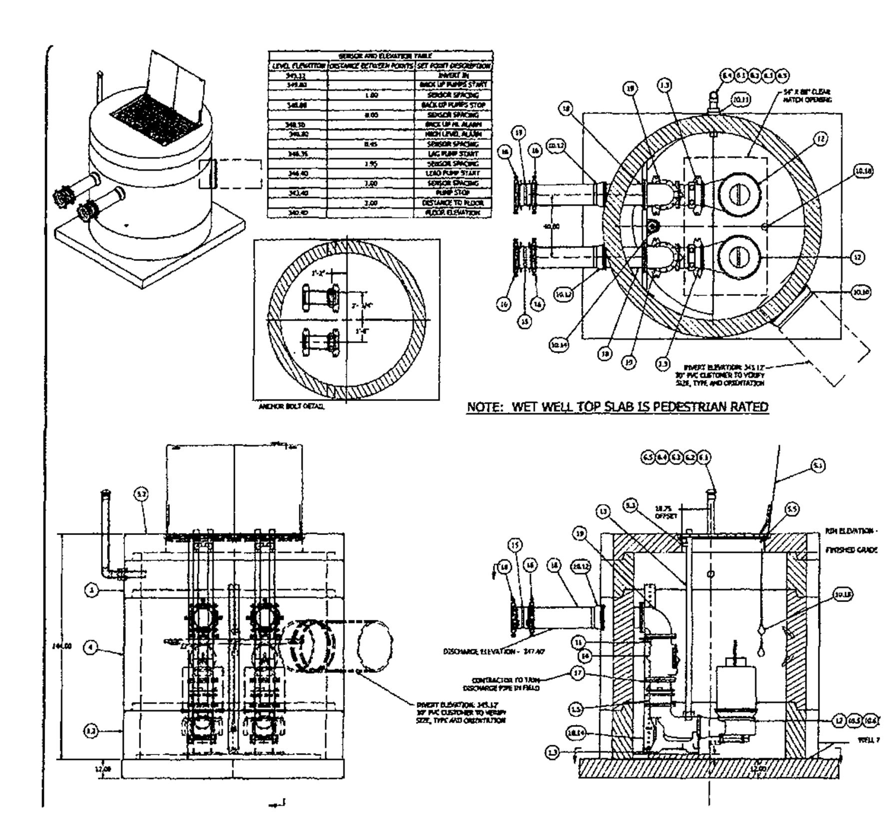
SHEET C1 KEY NOTES

1. INSTALL STANDARD CATCH BASINS, TRAFFIC RATED GRATES.
2. INSTALL 6 INCH SCHEDULE 40 PVC DRAIN PIPE. SEE PLAN FOR SLOPE.
3. INSTALL STANDARD TRAFFIC RATED GRATE DRAIN.
4. INSTALL 4 INCH SCHEDULE 40 PVC DRAIN PIPE.
5. INSTALL 4 FOOT DIAMATER STORM DRAIN MANHOLE WITH TRAFFIC RATED LID FOR SUMP PUMP LOCATION.
6. INSTALL 4 INCH SCHEDULE 80 PVC FOR PRESSURE DRAIN TO GROUND DRAIN SYSTEM. ATTACH TO WALL. SEAL ALL PENETRATIONS.
7. EXISTING FIRE HYDRANT TO BE RELOCATED. CONSULT CITY FOR PREFERRED LOCATION.
8. △ EXISTING CITY STORM DRAIN AND EASEMENT TO BE ABANDONED AND RELOCATED. SEE SHEET C2.
9. REMOVE EXISTING CURB, GUTTER, SIDEWALK AND DRAIN. REINSTALL STANDARD APPROACH AND UNDER DRAIN.

H-Scale 1"= 30'

30 15 30 60

11 X 17 SCALE 1"=60'



STORMWATER DRAINAGE SUMP PUMP VAULT. LOCATION SHOWN ON PLAN. ELEVATIONS SHOWN WILL VERY WITH PLAN ELEVATIONS.

THE SUBMITTAL IS PRELIMINARY AND NOT FOR CONSTRUCTION. REVIEW COPY ONLY.

BOUNDARY INFO PROVIDED IS FOUND IN BOOK 654, PAGE 17 MARICOPA COUNTY, AZ RECORDS.

NO BOUNDARY SURVEY

PROPERTY LINES SHOWN ARE APPROXIMATE. THIS MAP DOES NOT REPRESENT A BOUNDARY SURVEY BY ACE SOLUTIONS, ENGINEERING AND SURVEYING.

DATUM: NAVD 88 GEOID 09
CONTOUR INTERVAL: 1 FOOT

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Registered Professional Engineer (Civil) CERTIFICATE NO. 31787 JOSEPH E. HASSELL 2/5/19 ARIZONA U.S.A.

STORMWATER CONTROL PLANS FOR GOLDWATER

MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION
△	7/2/18	REV STORMWATER NOTE

ISSUE DATE: 3/8/18
PLOT DATE: 2/4/19
DRAWN BY: RJG
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # 17-096

SHEET TITLE:
BASEMENT LEV. SITE PLAN

C1

STORMWATER CONTROL PLANS FOR GOLDWATER

A SINGLE LOT PROPERTY, LOCATED IN N.W. QUARTER OF THE S.E. QUARTER OF THE N.E. QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST, GILA & SALT RIVER B.M., MARICOPA COUNTY, ARIZONA

NOTE:

1. OPEN SPACE SURFACE STORMWATER TO BE GRADED AND COLLECTED IN AREA CATCH BASINS. SEE LANDSCAPE PLAN.

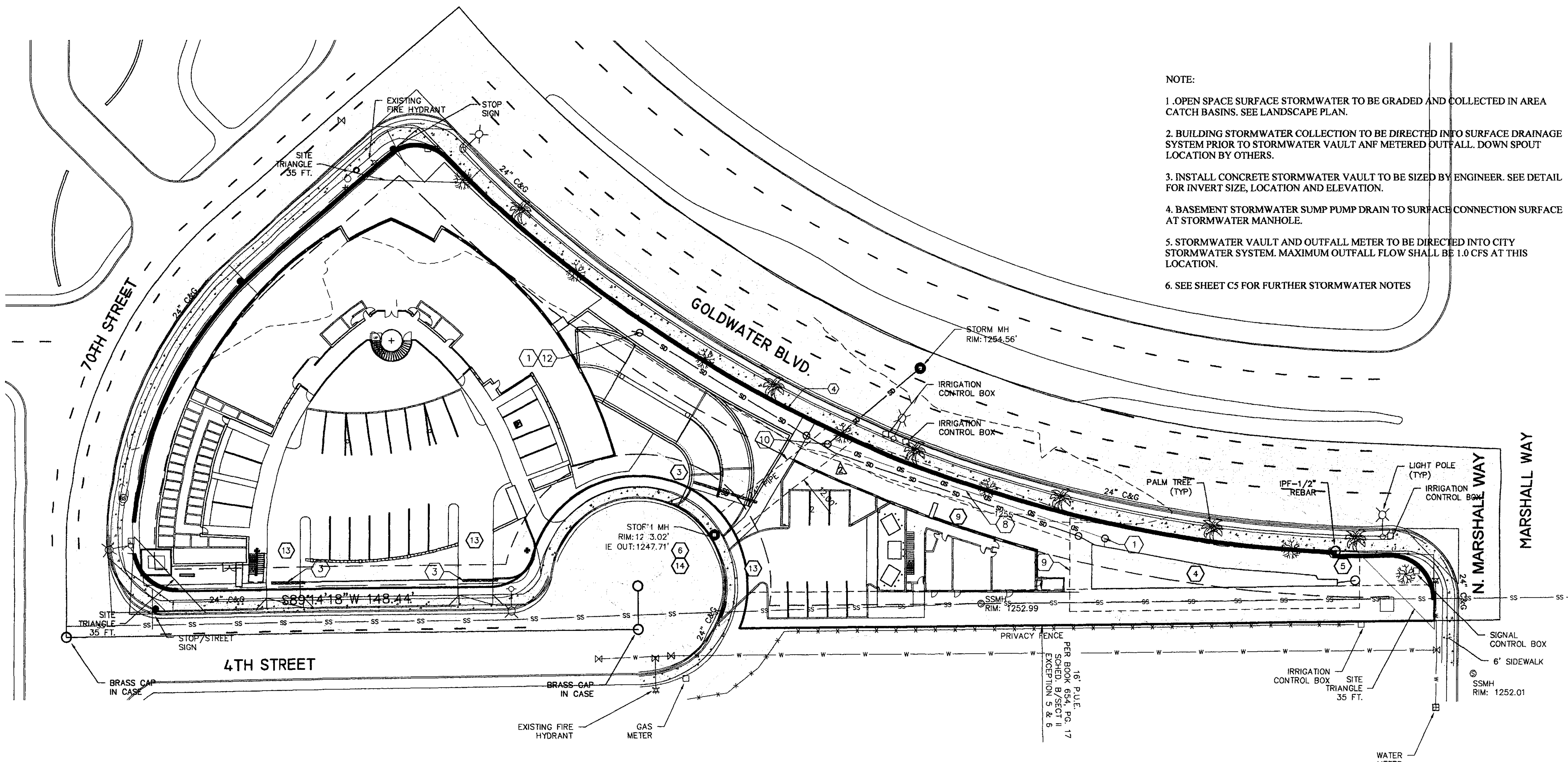
2. BUILDING STORMWATER COLLECTION TO BE DIRECTED INTO SURFACE DRAINAGE SYSTEM PRIOR TO STORMWATER VAULT ANF METERED OUTFALL. DOWN SPOUT LOCATION BY OTHERS.

3. INSTALL CONCRETE STORMWATER VAULT TO BE SIZED BY ENGINEER. SEE DETAIL FOR INVERT SIZE, LOCATION AND ELEVATION.

4. BASEMENT STORMWATER SUMP PUMP DRAIN TO SURFACE CONNECTION SURFACE AT STORMWATER MANHOLE.

5. STORMWATER VAULT AND OUTFALL METER TO BE DIRECTED INTO CITY STORMWATER SYSTEM. MAXIMUM OUTFALL FLOW SHALL BE 1.0 CFS AT THIS LOCATION.

6. SEE SHEET C5 FOR FURTHER STORMWATER NOTES



SURFACE DRAINAGE PLAN

SHEET C2 KEY NOTES

1. INSTALL STANDARD CATCH BASINS, TRAFFIC RATED GRATES.
2. INSTALL 6 INCH SCHEDULE 40 PVC DRAIN PIPE. SEE PLAN FOR SLOPE.
3. INSTALL STANDARD TRAFFIC RATED GRATE DRAIN.
4. INSTALL STORMWATER VAULT WITH OUTFALL METER.
5. INSTALL DRYWELL TO BE SIZED AT A LATER DATE.
6. RELOCATE CITY STORMWATER UNDER CURB DRAIN.
7. RELOCATE CITY STORMWATER DRAIN PIPE AND MANHOLES AS SHOWN.
8. INSTALL 18 INCH SCHEDULE 80 PVC STORM DRAIN.
9. UTILITY EASEMENT TO BE DEDICATED TO CITY.
10. CONNECT INTO CITY 24 INCH DRAIN PIPE.
11. STUB 6 INCH SCHEDULE 40 DRAIN PIPE FOR DOWN SPOUT CONNECTION. ACTUAL LOCATION TO BE COORDINATED WITH BUILDING ARCHITECT.
12. BASEMENT PRESSURE DRAIN PIPE CONNECTION.
13. GROUND LEVEL PARKING ENTRANCE.
14. REMOVE EXISTING CURB, GUTTER, SIDEWALK AND DRAIN. REINSTALL STANDARD APPROACH AND UNDER DRAIN.

H-Scale 1"= 30'

30 15 0 30 60

11 X 17 SCALE 1"=60'

LEGEND

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK
- ASPHALT
- CONCRETE
- GRAVEL
- MAJOR CONTOUR
- MINOR CONTOUR
- FENCE
- CULVERT
- COMMUNICATIONS LINE
- GAS LINE
- OVERHEAD ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- SANITARY SEWER
- STORM DRAIN
- WATERLINE
- UTILITY POLE
- GUY ANCHOR
- CATCH BASIN
- DRY WELL
- SEWER MANHOLE
- STORM DRAIN MANHOLE
- FIRE HYDRANT
- YARD HYDRANT
- VALVE
- WELL
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN (AS NOTED)
- PALM TREE

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BOUNDARY INFO PROVIDED IS FOUND IN BOOK 654, PAGE 17 MARICOPA COUNTY, AZ RECORDS.

NO BOUNDARY SURVEY

PROPERTY LINES SHOWN ARE APPROXIMATE. THIS MAP DOES NOT REPRESENT A BOUNDARY SURVEY BY ACE SOLUTIONS, ENGINEERING AND SURVEYING.

DATUM: NAVD 88 GEOID 09
CONTOUR INTERVAL: 1 FOOT

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Registered Professional Engineer (Civil) — CERTIFICATE NO. 31787 — JOSEPH E HASSELL — 2/5/19 — ARIZONA U.S.A.

STORMWATER CONTROL PLAN FOR GOLDWATER

MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION
1	7/2/18	STORMWATER VAULT

ISSUE DATE: 3/8/18
PLOT DATE: 2/4/19
DRAWN BY: RJG
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # 17-096

SHEET TITLE: GROUND LEVEL SITE PLAN

C2

STORMWATER CONTROL PLANS FOR GOLDWATER

A SINGLE LOT PROPERTY, LOCATED IN N.W. QUARTER OF THE S.E. QUARTER OF THE N.E. QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST, GILA & SALT RIVER B.M., MARICOPA COUNTY, ARIZONA

NOTE:

1 .OPEN SPACE SURFACE STORMWATER TO BE GRADED AND COLLECTED IN AREA CATCH BASINS. SEE LANDSCAPE PLAN.

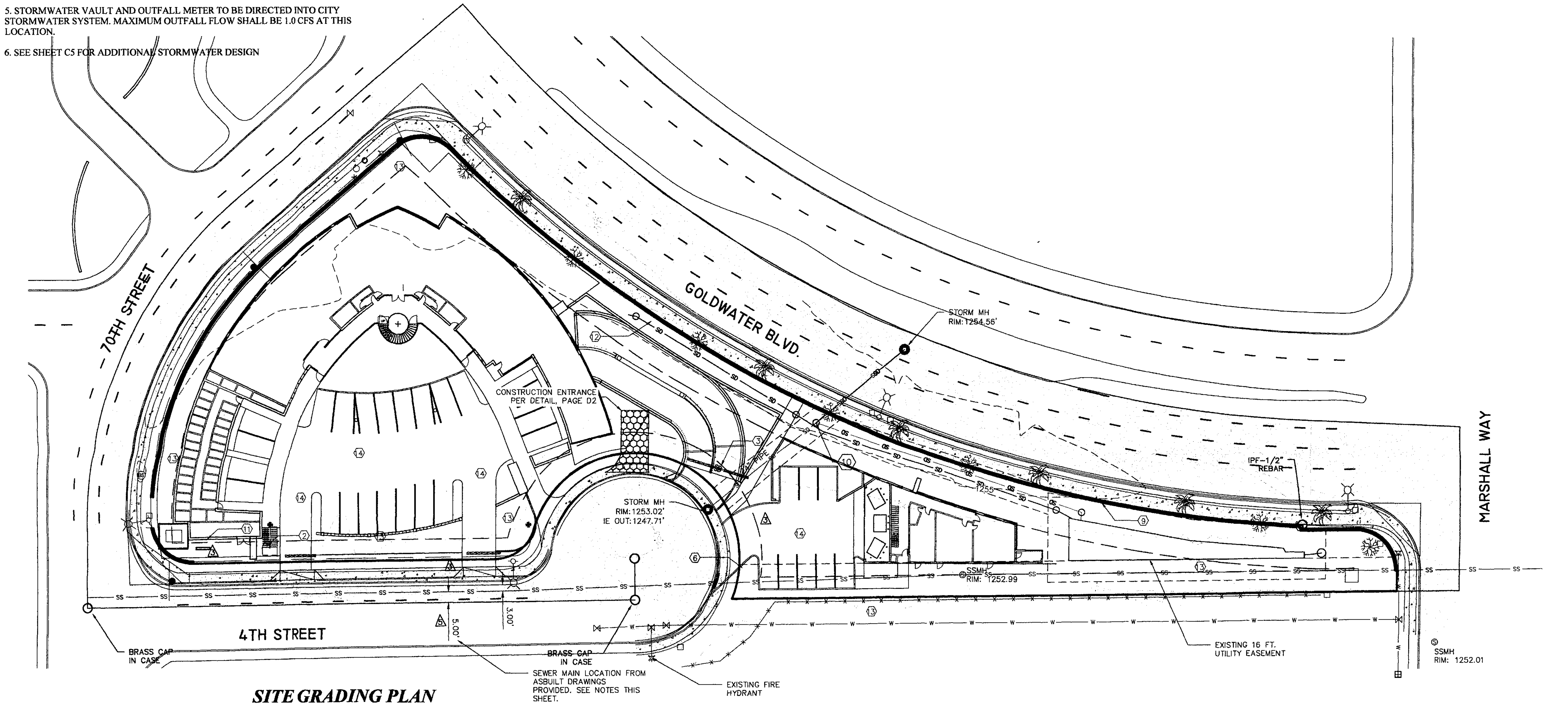
2. BUILDING STORMWATER COLLECTION TO BE DIRECTED INTO SURFACE DRAINAGE SYSTEM PRIOR TO STORMWATER VAULT AND METERED OUTFALL. DOWN SPOUT LOCATION BY OTHERS.

3. INSTALL CONCRETE STORMWATER VAULT TO BE SIZED BY ENGINEER. SEE DETAIL FOR INVERT SIZE, LOCATION AND ELEVATION.

4. BASEMENT STORMWATER SUMP PUMP DRAIN TO SURFACE CONNECTION SURFACE AT STORMWATER MANHOLE.

5. STORMWATER VAULT AND OUTFALL METER TO BE DIRECTED INTO CITY STORMWATER SYSTEM. MAXIMUM OUTFALL FLOW SHALL BE 1.0 CFS AT THIS LOCATION.

6. SEE SHEET C5 FOR ADDITIONAL STORMWATER DESIGN



SITE GRADING PLAN

LEGEND

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK
- ASPHALT
- CONCRETE
- GRAVEL
- MAJOR CONTOUR
- MINOR CONTOUR
- FENCE
- CULVERT
- COMMUNICATIONS LINE
- GAS LINE
- OVERHEAD ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- SANITARY SEWER
- STORM DRAIN
- WATERLINE
- UTILITY POLE
- GUY ANCHOR
- CATCH BASIN
- DRY WELL
- SEWER MANHOLE
- STORM DRAIN MANHOLE
- FIRE HYDRANT
- YARD HYDRANT
- VALVE
- WELL
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN (AS NOTED)
- PALM TREE

EROSION CONTROL NOTES

1. REFER TO THE ADEQ CATALOG OF STORM WATER BEST MANAGEMENT PRACTICES FOR CONSTRUCTION AND PERMANENT BMPS RELATING TO SLOPE PROTECTION, EROSION, & REVEGETATION THE FOLLOWING BMP'S FROM THE ABOVE MENTIONED CATALOG ARE HEREBY MADE A PART OF THIS PLAN:

   BMP #1: TIMING OF CONSTRUCTION
   BMP #2: STAGING AREAS
   BMP #3: PRESERVATION OF EXISTING VEGETATION
   BMP #6: EROSION PREVENTION ON TEMPORARY OR PRIVATE ROADS
   BMP #20: TOP SOILING
   BMP #21: SEEDING
   BMP #23: PLANTING

2. EXISTING VEGETATION TO REMAIN IN PLACE OR BE SALVAGED IF POSSBLE TO BE REPLACED AFTER CONSTRUCTION IS COMPLETED. ANY VEGETATION THAT IS REMOVED AND/OR DESTROYED MUST BE REPLACED IN KIND AT THE OWNER'S EXPENSE. HYDROSEED ALL DISTURBED AREA AS SHOWN WITH A NATIVE DRYLAND SEED MIX AT A RATE OF 120 LBS/ACRE. BEFORE ANY FERTILIZER IS APPLIED, A SOIL STUDY/ANALYSIS SHOULD BE PERFORMED TO DETERMINE THE APPROPRIATE QUANTITIES OF FERTILIZER REQUIRED, IF ANY.

3. EROSION CONTROL MEASURES ARE TO REMAIN IN PLACE UNTIL IT IS APPARENT THAT VEGETATION IS WELL ESTABLISHED.

H-Scale 1"= 30'

30 15 30 60

11 X 17 SCALE 1"=60'

SHEET C3 KEY NOTES

1. INSTALL STANDARD CATCH BASINS, TRAFFIC RATED GRATES.
2. INSTALL 6 INCH SCHEDULE 40 PVC DRAIN PIPE. SEE PLAN FOR SLOPE.
3. INSTALL STANDARD TRAFFIC RATED GRATE DRAIN.
4. INSTALL STORMWATER VAULT WITH OUTFALL METER.
5. INSTALL DRYWELL TO BE SIZED AT A LATER DATE.
6. RELOCATE CITY STORMWATER UNDER CURB DRAIN.
7. RELOCATE CITY STORMWATER DRAIN PIPE AND MANHOLES AS SHOWN.
8. INSTALL 18 INCH SCHEDULE 80 PVC STORM DRAIN.
9. UTILITY EASEMENT TO BE DEDICATED TO CITY.
10. CONNECT INTO CITY 24 INCH DRAIN PIPE.
11. STUB 6 INCH SCHEDULE 40 DRAIN PIPE FOR DOWN SPOUT CONNECTION. ACTUAL LOCATION TO BE COORDINATED WITH BUILDING ARCHITECT.
12. BASEMENT PRESSURE DRAIN PIPE CONNECTION.
13. AREA TO BE GRADED AND PLANTED. SEE LANDSCAPE PLAN.
14. INSTALL ASPHALT PARKING. SEE DETAIL

NOTES:

1. IT IS THE CONTRACTORS RESPONSIBILITY FOR MAINTAINING STABILITY OVER THE ENTIRE AREA AND TO KEEP MUD FROM BEING TRACKED OFF SITE.

2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY SLOPE STABILITY.

3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAINTAIN RIP RAP, STRAW BALES AND STRAW LINED SLOPES UNTIL HYDROSEEDING TAKES ROOT.

4. SWALE AREA SHALL BE SEEDED TO MAINTAIN GOOD GRASS GROWTH.

5. OPERATION AND MAINTENANCE PLAN
   A. INSPECTION FREQUENCY
   INSPECTIONS ARE NOTED IN THE STORMWATER NARRATIVE AND IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY ENGINEER WHEN INSPECTIONS ARE NEEDED.
   B. RESPONSIBLE PERSON OR ENTITY
   THE RESPONSIBILITY OF OPERATION AND MAINTENANCE OF THE BMP'S SHALL BE THAT OF THE OWNER AND/OR HIS CONTRACTOR
   C. ROUTINE MAINTENANCE REQUIREMENTS
   SHALL BE THE RESPONSIBILITY OF THE OWNER.
   D. SYSTEM FAILURE
   IF THE SYSTEM SHOULD EVER FAIL, IT SHALL BE THE OWNERS RESPONSIBILITY TO ENSURE REPLACEMENT OR REPAIR OF THE SYSTEM TO GOOD WORKING ORDER.

5 ASBUILT INFORMATION FOR THE SEWER PLACEMENT IN 4TH STREET:
CITY OF SCOTTSDALE, PUBLIC IMPROVEMENTS, 70TH STREET INTERCEPTOR PROJECT NUMBER V-7501, SHEET 13 OF 19.
CITY OF SCOTTSDALE ENGINEERING DRAWING, DATE 8/8/1980, BY KLJ ENGINEERING, ASBUILT SHEET C-1.

INSPECTION REQUIREMENTS

A DESIGN PROFESSIONAL SHALL MAKE AT LEAST THREE REQUIRED INSPECTIONS DURING THE PROCESS OF THIS PROJECT IN ACCORDANCE WITH CITY CODE. THE MINIMUM REQUIRED INSPECTIONS ARE AS FOLLOWS:

1) PRIOR TO EXCAVATION TO VERIFY THAT EROSION CONTROL MEASURES AND BEST MANAGEMENT PRACTICES ARE IN PLACE AND PROPERLY INSTALLED.

2) DURING CONSTRUCTION TO VERIFY EROSION CONTROL MEASURES AND B.M.P.S ARE UTILIZED PROPERLY.

3) AT PROJECT COMPLETION TO VERIFY PERMANENT EROSION CONTROL MEASURES AND B.M.P.S ARE INSTALLED PROPERLY.

DESIGN PROFESSIONAL SHALL PROVIDE WRITTEN VERIFICATION OF THE INSPECTIONS TO THE CITY BUILDING DEPARTMENT. ADDITIONAL INSPECTIONS MAY BE REQUIRED IF WINTERIZATION OF THE SITE IS REQUIRED. BMP'S SHOWN HEREON ARE MINIMUM ONLY.

THE SUBMITTAL IS PRELIMINARY AND NOT FOR CONSTRUCTION. REVIEW COPY ONLY.

BOUNDARY INFO PROVIDED IS FOUND IN BOOK 654, PAGE 17 MARICOPA COUNTY, AZ RECORDS.

NO BOUNDARY SURVEY

PROPERTY LINES SHOWN ARE APPROXIMATE. THIS MAP DOES NOT REPRESENT A BOUNDARY SURVEY BY ACE SOLUTIONS, ENGINEERING AND SURVEYING.

DATUM: NAVD 88 GEOID 09
CONTOUR INTERVAL: 1 FOOT

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FAX:(208)777-2128
www.acesolutions.pro

Registered Professional Engineer (Civil)
CERTIFICATE NO. 31787
JOSEPH E HASSELL
2/5/19
ARIZONA, U.S.A.

SITE IMPROVEMENT PLAN FOR GOLDWATER
MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION
2	7/2/18	STORMWATER VAULT
3	7/2/18	BLD SETBACKS, PL
4	11/27/18	STORMWATER
5	12/19/18	4TH ST. SEWER LOCATION

ISSUE DATE: 3/8/18
PLOT DATE: 2/5/19
DRAWN BY: AG
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # P17-004

SHEET TITLE:
SITE PLAN
SITE GRADING

C3

E:\2017\17096-GOLDWATER\DWG\CIVIL\SHEETS\17-096-SITE.DWG

STORMWATER CONTROL PLANS FOR GOLDWATER

A SINGLE LOT PROPERTY, LOCATED IN N.W. QUARTER OF THE S.E. QUARTER OF THE N.E. QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST, GILA & SALT RIVER B.M., MARICOPA COUNTY, ARIZONA

NOTE:

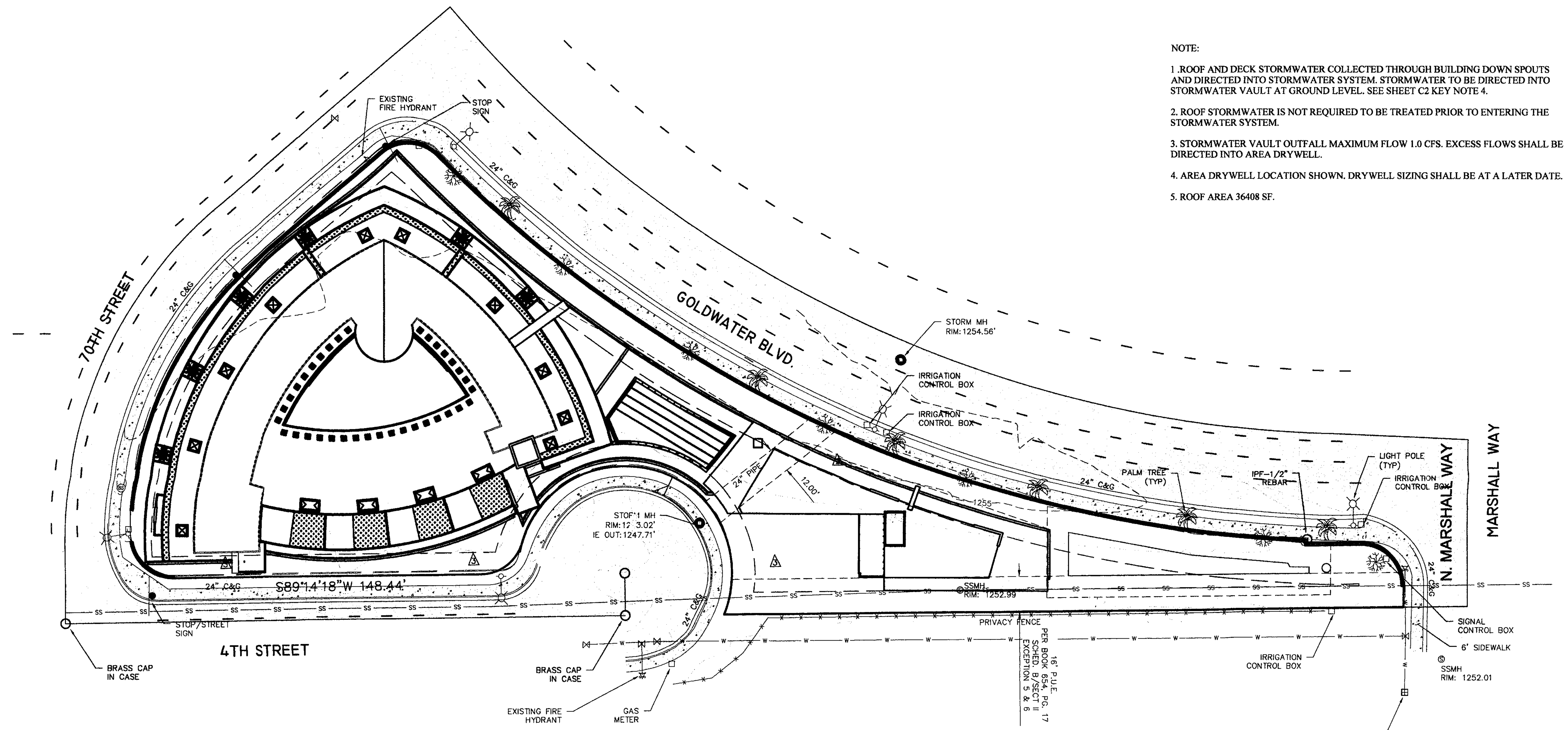
1 .ROOF AND DECK STORMWATER COLLECTED THROUGH BUILDING DOWN SPOUTS AND DIRECTED INTO STORMWATER SYSTEM. STORMWATER TO BE DIRECTED INTO STORMWATER VAULT AT GROUND LEVEL. SEE SHEET C2 KEY NOTE 4.

2. ROOF STORMWATER IS NOT REQUIRED TO BE TREATED PRIOR TO ENTERING THE STORMWATER SYSTEM.

3. STORMWATER VAULT OUTFALL MAXIMUM FLOW 1.0 CFS. EXCESS FLOWS SHALL BE DIRECTED INTO AREA DRYWELL.

4. AREA DRYWELL LOCATION SHOWN. DRYWELL SIZING SHALL BE AT A LATER DATE.

5. ROOF AREA 36408 SF.



ROOF LAYOUT PLAN

LEGEND

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK
- ASPHALT
- CONCRETE
- GRAVEL
- MAJOR CONTOUR
- MINOR CONTOUR
- FENCE
- CULVERT
- COMMUNICATIONS LINE
- GAS LINE
- OVERHEAD ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- SANITARY SEWER
- STORM DRAIN
- WATERLINE
- UTILITY POLE
- GUY ANCHOR
- CATCH BASIN
- DRY WELL
- SEWER MANHOLE
- STORM DRAIN MANHOLE
- FIRE HYDRANT
- YARD HYDRANT
- VALVE
- WELL
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN (AS NOTED)
- PALM TREE

THE SUBMITTAL IS PRELIMINARY AND NOT FOR CONSTRUCTION. REVIEW COPY ONLY.

BOUNDARY INFO PROVIDED IS FOUND IN BOOK 654, PAGE 17 MARICOPA COUNTY, AZ RECORDS.

NO BOUNDARY SURVEY

PROPERTY LINES SHOWN ARE APPROXIMATE. THIS MAP DOES NOT REPRESENT A BOUNDARY SURVEY BY ACE SOLUTIONS, ENGINEERING AND SURVEYING.

DATUM: NAVD 88 GEOID 09
CONTOUR INTERVAL: 1 FOOT

H-Scale 1"= 30'

30 15 30 60

11 X 17 SCALE 1"=60'

Z:\2017\17096-GOLDWATER\DWG\CIVIL\SHEETS\17-096-SITE.DWG

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Registered Professional Engineer (Civil) CERTIFICATE NO. 31787 JOSEPH E HASSELL 2/5/19 ARIZONA, U.S.A.

SITE IMPROVEMENT PLAN FOR GOLDWATER

MARICOPA COUNTY, ARIZONA

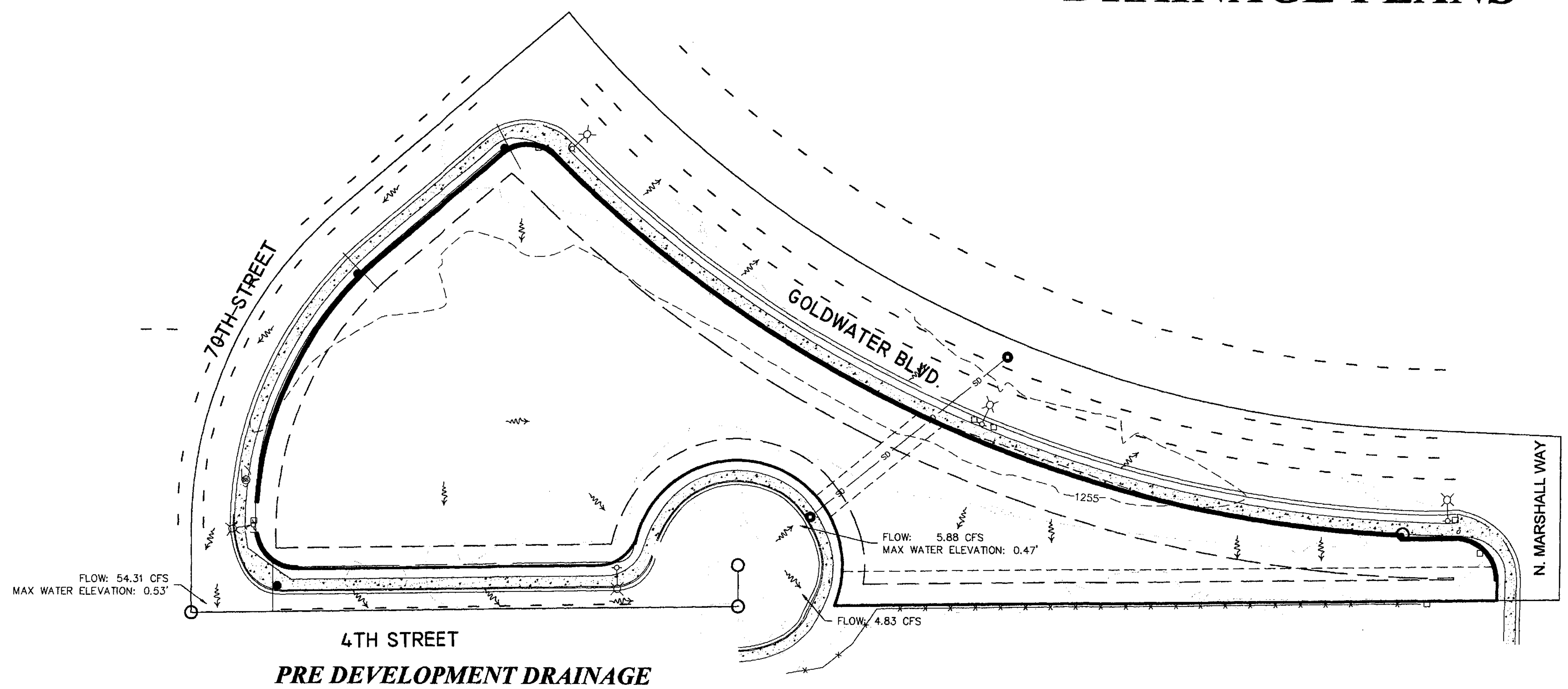
MARK	DATE	DESCRIPTION
	7/2/18	STORMWATER VAULT
	7/2/18	BLD SETBACKS, PL

ISSUE DATE: 3/8/18
PLOT DATE: 2/4/19
DRAWN BY: AG
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # 17-096

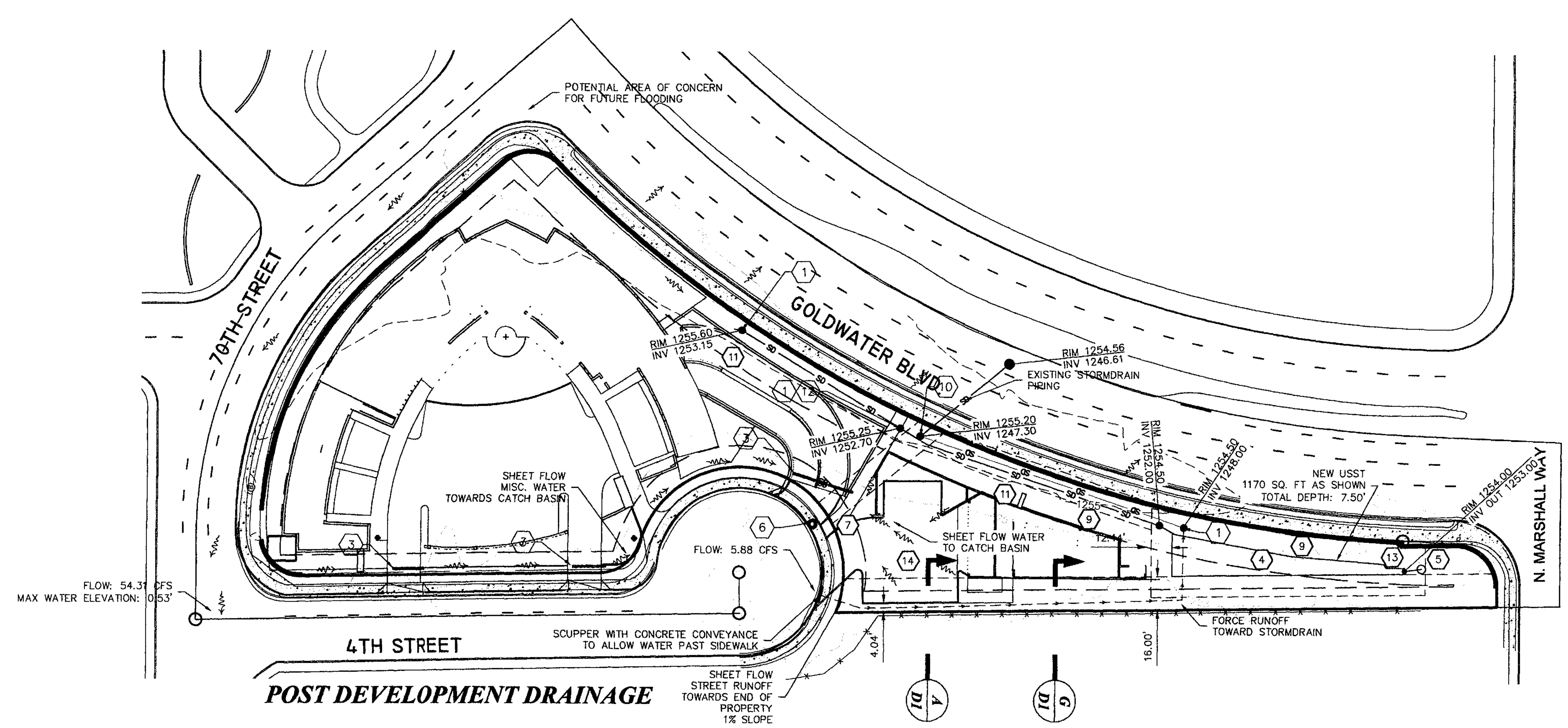
SHEET TITLE:
ROOF PLAN LAYOUT

C4

PRE AND POST DEVELOPMENT DRAINAGE PLANS



PRE DEVELOPMENT DRAINAGE



POST DEVELOPMENT DRAINAGE

PRE DEVELOPMENT AREAS:
GRAVEL = 53852 SF

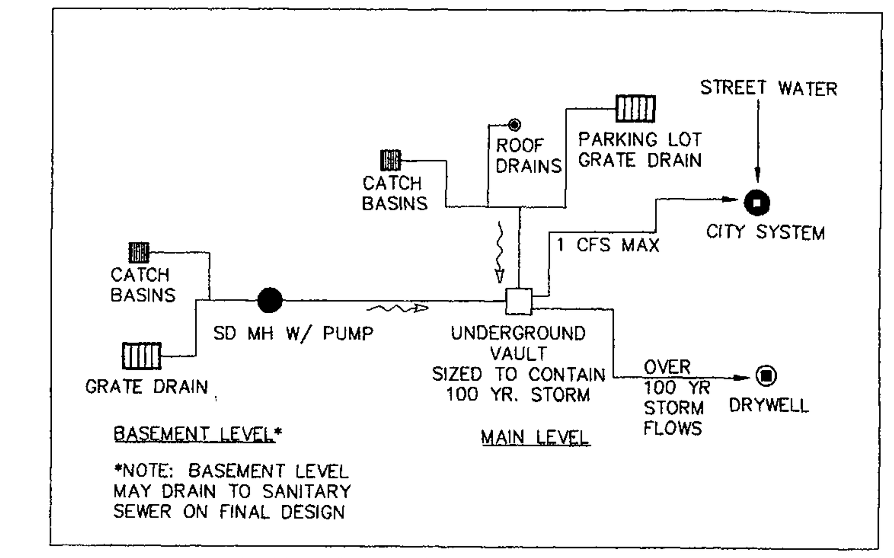
POST DEVELOPMENT IMPERVIOUS AREA:
ROOF = 36408 SF
ATRIUM = 1766 SF
OUTSIDE ASPHALT = 2886 SF
OPEN SPACE = 12792 SF

STORMWATER SYSTEM:
CATCH BASINS, DRAIN PIPE, DETENTION VAULT, DRYWELL, SURFACE CONVEYANCE

DESIGN STORMWATER OUTFLOWS:
Q2: 1.0 CFS (MAX)
Q10: 1.0 CFS
Q100: 1.0 CFS

HISTORICAL STORMWATER FLOWS (CALCULATED):
2 HOUR STORM EVENT
Q2: 0.73 CFS
Q10: 1.16 CFS
Q100: 2.19 CFS
SEE DRAWING FOR 100-YEAR, 6 HOUR EVENT STORMWATER FLOWS AND LOCATIONS

POST DEVELOPMENT STORMWATER FLOWS (INTO USST):
Q2: 0.78 CFS
Q10: 1.26 CFS
Q100: 2.12 CFS



DRAINAGE SCHEMATIC

NOTE: THIS IS A SIMPLIFIED MODEL OF THE SYSTEM SHOWN ON THIS PAGE. SEE PLANS FOR EXACT LOCATIONS, SLOPES, AND OTHER INFORMATION.

NOTE:

1. OPEN SPACE SURFACE STORMWATER TO BE GRADED AND COLLECTED IN AREA CATCH BASINS. SEE LANDSCAPE PLAN.

2. BUILDING STORMWATER COLLECTION TO BE DIRECTED INTO SURFACE DRAINAGE SYSTEM PRIOR TO STORMWATER VAULT AND METERED OUTFALL. DOWN SPOUT LOCATION BY OTHERS.

3. INSTALL CONCRETE STORMWATER VAULT TO BE SIZED BY ENGINEER. SEE DETAIL FOR INVERT SIZE, LOCATION AND ELEVATION.

4. BASEMENT STORMWATER SUMP PUMP DRAIN TO SURFACE CONNECTION SURFACE AT STORMWATER MANHOLE.

5. STORMWATER VAULT AND OUTFALL METER TO BE DIRECTED INTO CITY STORMWATER SYSTEM. MAXIMUM OUTFALL FLOW SHALL BE 1.0 CFS AT THIS LOCATION.

LEGEND

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK
- ASPHALT
- CONCRETE
- GRAVEL
- MAJOR CONTOUR
- MINOR CONTOUR
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- COMMUNICATIONS LINE
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- STORM DRAIN MANHOLE
- FIRE HYDRANT
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- VALVE
- WELL
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN (AS NOTED)
- PALM TREE

SHEET ~~C6~~ 5 KEY NOTES

1. INSTALL STANDARD CATCH BASINS, TRAFFIC RATED GRATES.
2. INSTALL 6 INCH SCHEDULE 40 PVC DRAIN PIPE. SEE PLAN FOR SLOPE.
3. INSTALL STANDARD TRAFFIC RATED GRATE DRAIN.
4. INSTALL STORMWATER VAULT WITH OUTFALL METER.
5. INSTALL DRYWELL TO BE SIZED AT A LATER DATE.
6. RELOCATE CITY STORMWATER UNDER CURB DRAIN.
7. RELOCATE CITY STORMWATER DRAIN PIPE AND MANHOLES AS SHOWN.
8. ~~INSTALL 18 INCH SCHEDULE 80 PVC STORM DRAIN.~~
9. UTILITY EASEMENT TO BE DEDICATED TO CITY.
10. CONNECT INTO CITY 24 INCH DRAIN PIPE.
11. STUB 6 INCH SCHEDULE 40 DRAIN PIPE FOR DOWN SPOUT CONNECTION. ACTUAL LOCATION TO BE COORDINATED WITH BUILDING ARCHITECT.
12. BASEMENT PRESSURE DRAIN PIPE CONNECTION.
13. AREA TO BE GRADED AND PLANTED. SEE LANDSCAPE PLAN.
14. INSTALL ASPHALT PARKING. SEE DETAIL

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BOUNDARY INFO PROVIDED IS FOUND IN BOOK 654, PAGE 17 MARICOPA COUNTY, AZ RECORDS.

NO BOUNDARY SURVEY

PROPERTY LINES SHOWN ARE APPROXIMATE. THIS MAP DOES NOT REPRESENT A BOUNDARY SURVEY BY ACE SOLUTIONS, ENGINEERING AND SURVEYING.

H-Scale 1"= 40'
40 20 0 40 80
11 X 17 SCALE 1"=80'

DATUM: NAVD 88 GEOID 09
CONTOUR INTERVAL: 1 FOOT

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Registered Professional Engineer (Civil)
CERTIFICATE NO
31787
JOSEPH E HASSELL
Date Signed 2/5/19
ARIZONA U.S.A.

SITE IMPROVEMENT PLAN FOR GOLDWATER

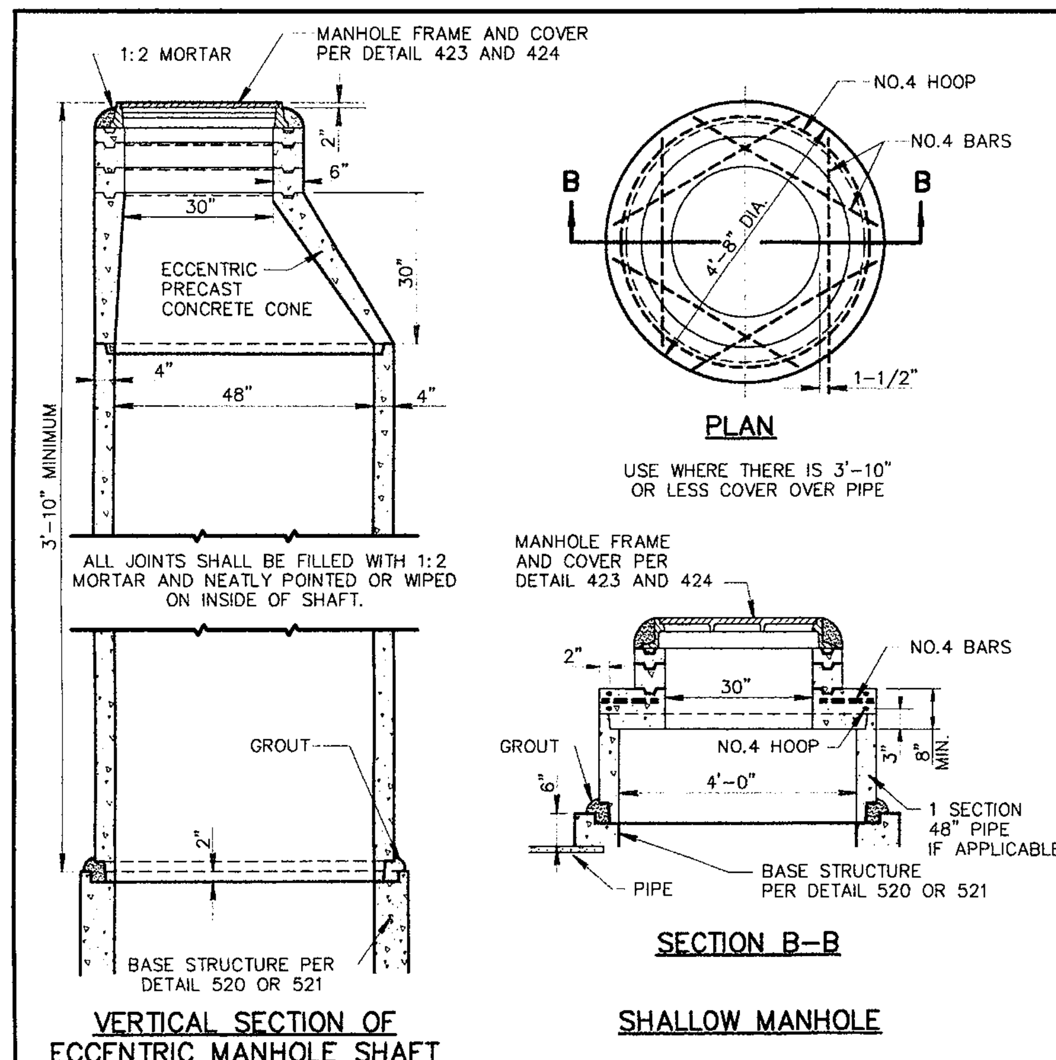
MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION

ISSUE DATE: 3/8/18
PLOT DATE: 2/4/19
DRAWN BY: NWE
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # P17-004

SHEET TITLE:
SITE PLAN STORMWATER

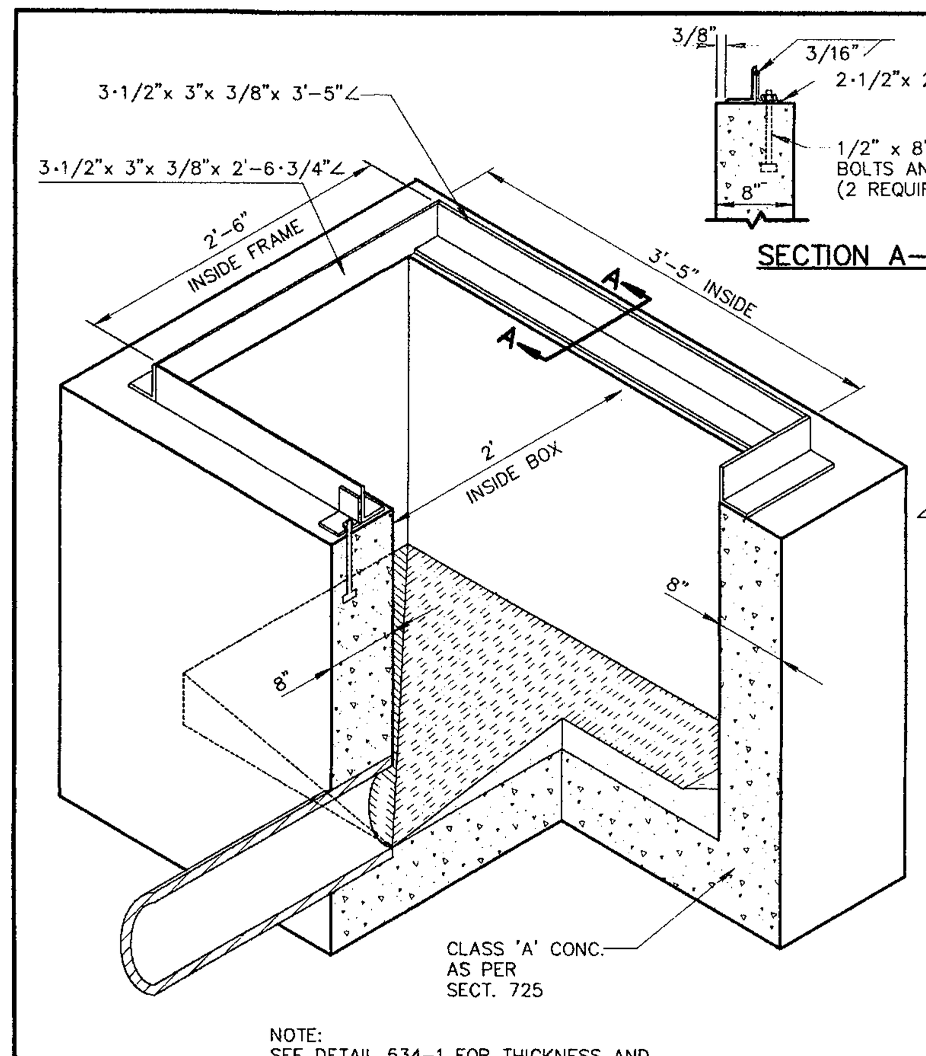
C5

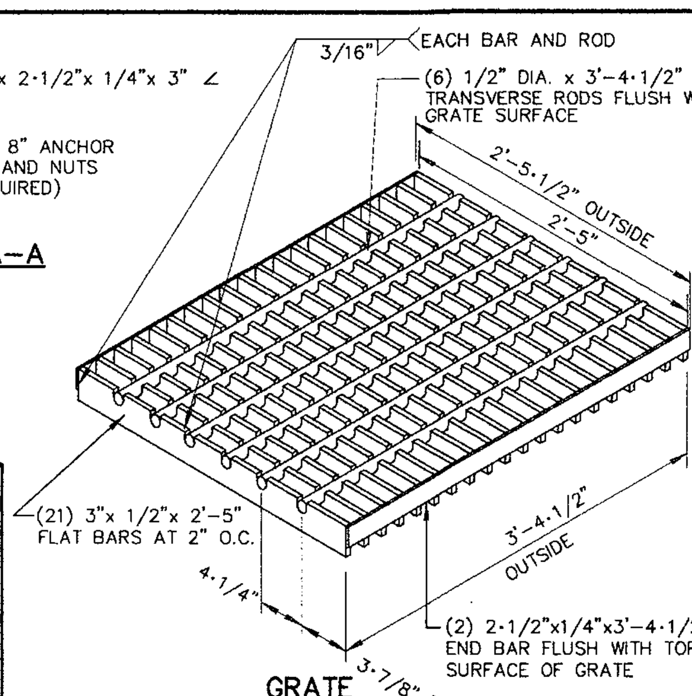


NOTES:

1. PRECAST CONCRETE CONES AND SECTIONS TO BE A.S.T.M. C-478.
2. BRICK MAY BE USED IN LIEU OF OR IN COMBINATION WITH CONCRETE ADJUSTING RINGS.
3. PRECAST CONCRETE SECTIONS 48" DIA PIPE MAY BE FURNISHED IN STANDARD LENGTHS.
4. UNLESS OTHERWISE SHOWN ON PLANS, USE (2) 2-1/2" PRECAST CONCRETE ADJUSTING RINGS ON IMPROVED STREETS AND (4) 2-1/2" RINGS ON UNIMPROVED STREETS.
5. CONCRETE SHALL BE CLASS A PER SECTION 725 AND 505.

DETAIL NO.			REVISED	DETAIL NO.
522	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	STORM DRAIN MANHOLE SHAFT	01-01-2015	522

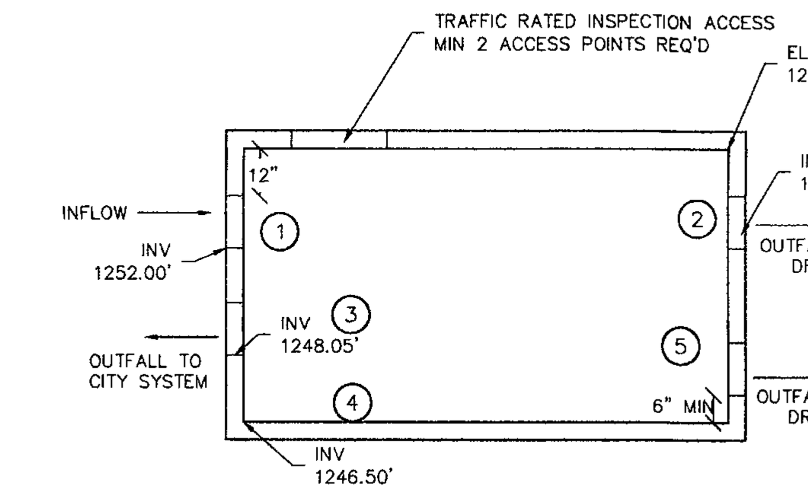




NOTES:

1. PIPES MAY ENTER OR LEAVE ANY WALL. BOTTOM OF BOX TO BE SLOPED TO OUTLET PIPE FROM ALL DIRECTIONS AND TROWELLED TO A HARD SMOOTH SURFACE.
2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
4. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.
5. ALL WELDS ON FRAME AND SIDE BARS ON GRATE SHALL BE FULL LENGTH OF JOINT.
6. TOTAL COMBINED CLEARANCE BETWEEN FRAME AND GRATE IS 1/2".

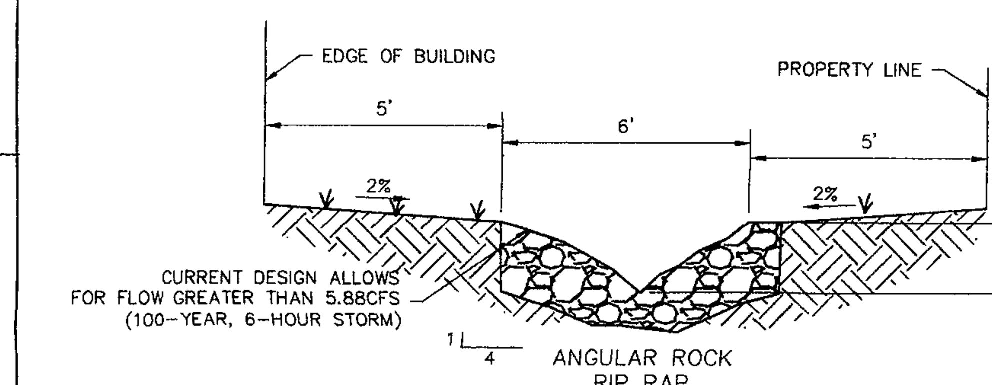
DETAIL NO.			REVISED	DETAIL NO.
535	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	CATCH BASIN TYPE 'F' (FOR USE WITHOUT CURB)	01-01-2009	535



NOTES:
1. INFLOW SIZE FOR 12" PVC SCH80.
2. OUTFALL TO DRYWELL, SIZE FOR 12" PVC SCH80.
3. OUTFALL TO CITY SYSTEM, SIZE FOR 12" PVC SCH80, REDUCE TO 8" ORIFICE TO CONTROL FLOW TO 1.0 CFS.
4. PROVIDE 6 " SEDIMENT TRAP TO BE CLEANED PERIODICALLY.
5. TANK WILL NEED TO DRAIN TO DRYWELL TO ALLOW FOR COMPLETE DRAINAGE. ASSUMING 0.1 CFS DRAINAGE TO DRYWELL ALLOWS FOR TANK TO DRAIN IN APPROX 14 HOURS

STORMWATER DETENTION VAULT TO BE TRAFFIC RATED. VAULT SIZE MAY VARY. PLACE MULTIPLE DETENTION VAULTS INLINE TO PROVIDE 7750 CF CAPACITY.
EXCAVATION, BEDDING AND BACKFILL PROCEDURES AND MATERIALS MUST BE IN ACCORDANCE WITH MAG STANDARDS.
ACCESS MUST BE IN ACCORDANCE WITH MAG STANDARDS AND BE PLACED TO MAXIMIZE THE ABILITY TO MAINTAIN THE UNDERGROUND SYSTEM.

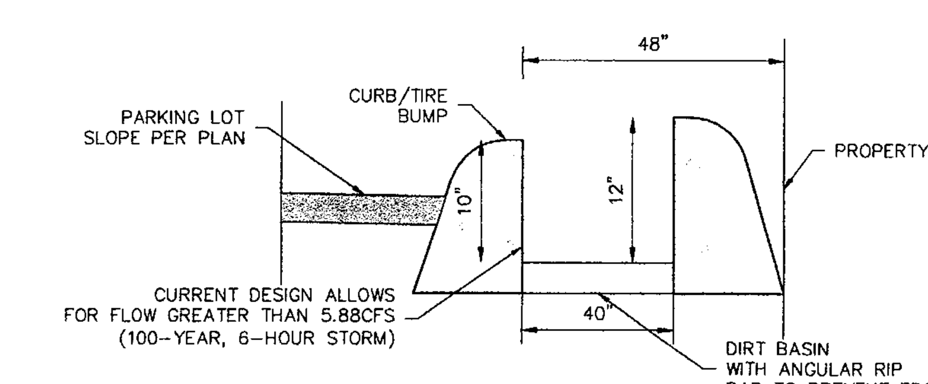
METERING VAULT



G/D1 *ROCK LINED CONVEYANCE DITCH*

SCALE: NTS

NOTE: IN LIEU OF PROVIDING A 10' DISTANCE TO THE PROPERTY LINE, WE HAVE PROVIDED A SHALLOW, V-DITCH CONVEYANCE THAT ALLOWS FOR ACCESS. THE SLOPES ARE SMALL ENOUGH THAT THE BOTTOM OF THE CONVEYANCE CAN BE ACCESSED AT ALL TIMES.



A/D1 *PARKING LOT CONVEYANCE*

SCALE: NTS

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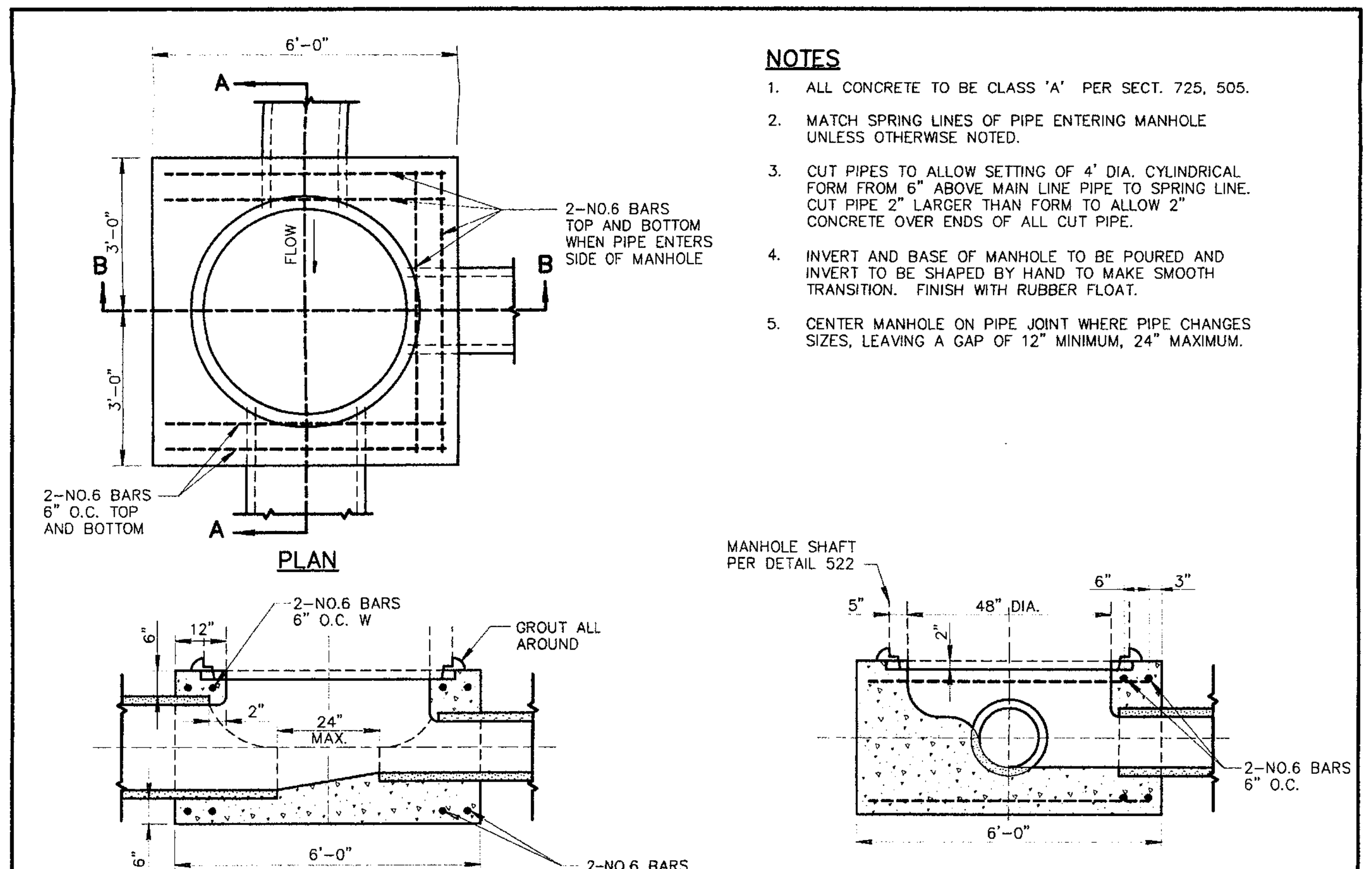
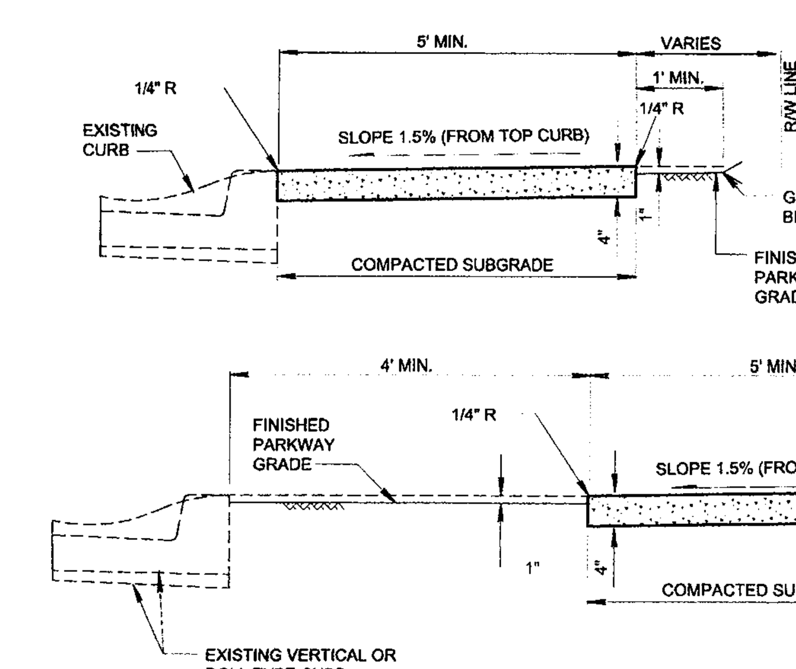


NOTES

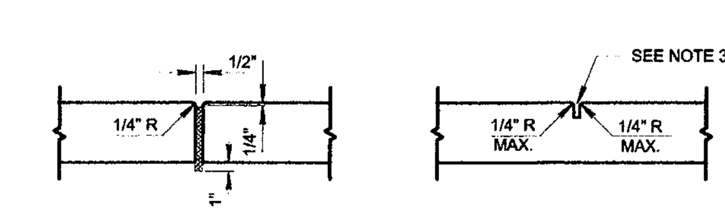
1. ALL CONCRETE TO BE CLASS 'A' PER SECT. 725, 505.
2. MATCH SPRING LINES OF PIPE ENTERING MANHOLE UNLESS OTHERWISE NOTED.
3. CUT PIPES TO ALLOW SETTING OF 4' DIA. CYLINDRICAL FORM FROM 6" ABOVE MAIN LINE PIPE TO SPRING LINE. CUT PIPE 2" LARGER THAN FORM TO ALLOW 2" CONCRETE OVER ENDS OF ALL CUT PIPE.
4. INVERT AND BASE OF MANHOLE TO BE POURED AND INVERT TO BE SHAPED BY HAND TO MAKE SMOOTH TRANSITION. FINISH WITH RUBBER FLOAT.
5. CENTER MANHOLE ON PIPE JOINT WHERE PIPE CHANGES SIZES, LEAVING A GAP OF 12" MINIMUM, 24" MAXIMUM.

DETAIL NO.			REVISED	DETAIL NO.
520	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	STORM DRAIN MANHOLE BASE (48" AND SMALLER)	01-01-1998	520



NOTES:

1. SIDEWALK CONSTRUCTION SHALL CONFORM TO SECTION 340.
2. EXPANSION JOINTS SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, PER SECTION 729.
3. LARGE AGGREGATE, IN CONTRACTION JOINT SHALL BE SEPARATED TO A DEPTH OF 1", FINISH DEPTH SHALL BE A MINIMUM OF 3/4".
4. EXPANSION JOINTS SHALL CONFORM TO SECTION 340, BE INSTALLED PRIOR TO CONCRETE PLACEMENT, AND AT A MAXIMUM SPACING OF 50'.
5. CONCRETE SHALL BE CLASS 'B' PER SECTION 725.
6. WHEN SIDEWALK AND ADJACENT CURB ARE CONSTRUCTED MONOLITHICALLY, ALL EXPANSION AND CONTRACTION JOINTS SHALL EXTEND ACROSS THE CURB.



DETAIL NO.			REVISED	DETAIL NO.
230	MARICOPA ASSOCIATION of GOVERNMENTS — STANDARD DETAIL ENGLISH	SIDEWALKS	01-01-2014	230

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Registered Professional Engineer (Civil) CERTIFICATE NO 31787 JOSEPH E HASSELL 2/5/19 Date Signed ARIZONA U.S.A.

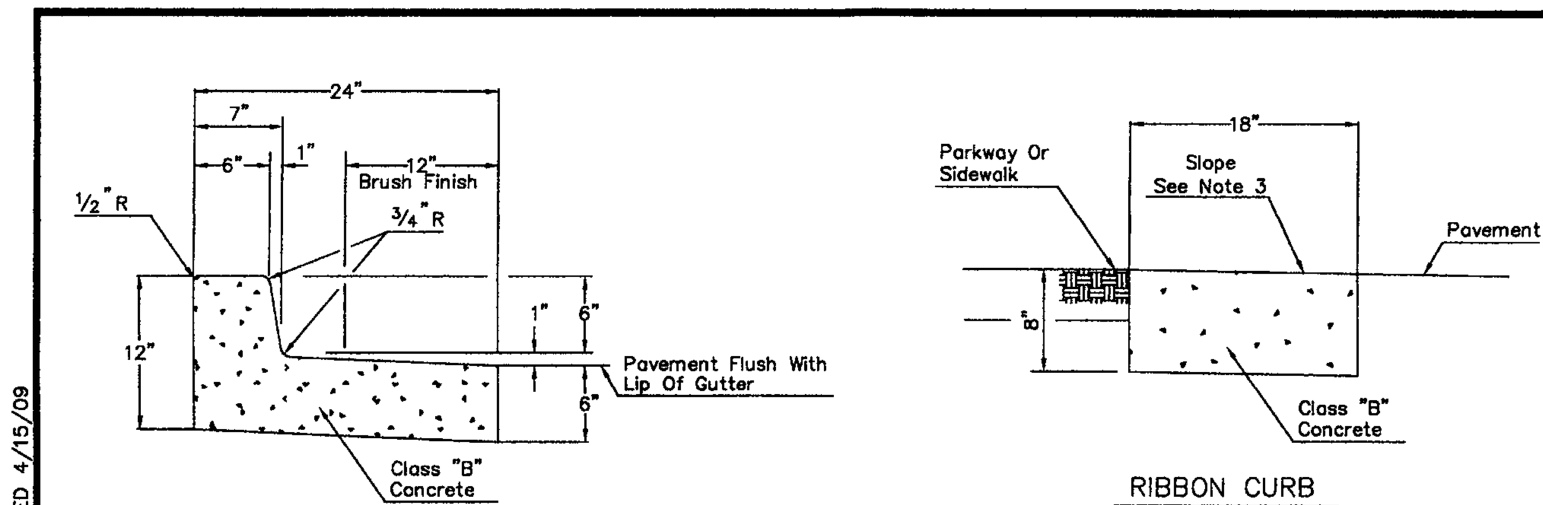
SITE IMPROVEMENT PLAN FOR GOLDWATER

MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION

ISSUE DATE: 3/8/18
PLOT DATE: 2/5/19
DRAWN BY: NWE
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # 17-096
SHEET TITLE:
SITE DETAILS

D1



VERTICAL CURB & GUTTER WITH DEPRESSED LIP
TYPE "A"

RIBBON CURB
TYPE "B"

NOTES

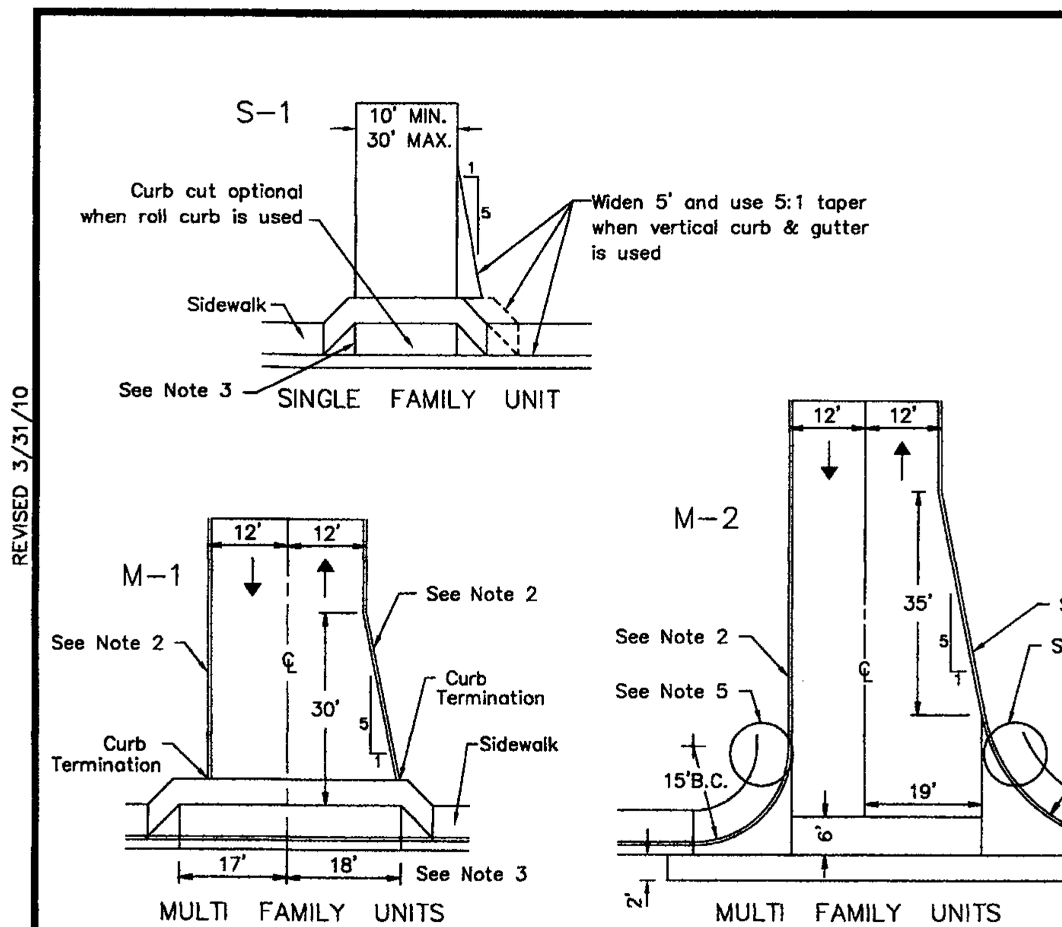
1. All exposed surfaces to be trowel finished except as shown. See M.A.G. Section 340.
2. Contraction joint spacing shall be 10' maximum or as directed by the Inspector.
3. Construct curb and install 1/2" mastic expansion joints, A.S.T.M. D-1751, per M.A.G. Sec. 340 & 729 and COS Sec. 340.
4. Colored concrete shall be colored integrally.

NOTES

1. Construct curb and install 1/2" mastic expansion joints, A.S.T.M. D-1751, per M.A.G. Sec. 340 & 729 and COS Sec 340.
2. Broom finish all surfaces.
3. Ribbon curb may slope towards pavement or parkway. Match cross slope of road unless indicated otherwise on plans.
4. Contraction joint spacing shall be 10' maximum or as directed by the inspector.
5. Colored concrete shall be colored integrally.

REVISED 4/15/09

DETAIL NO.		APPROVED BY:		DETAIL NO.
2220	City of Scottsdale Standard Details	Scottsdale Standards & Specifications Committee	CURB AND GUTTER – TYPES A & B	2220

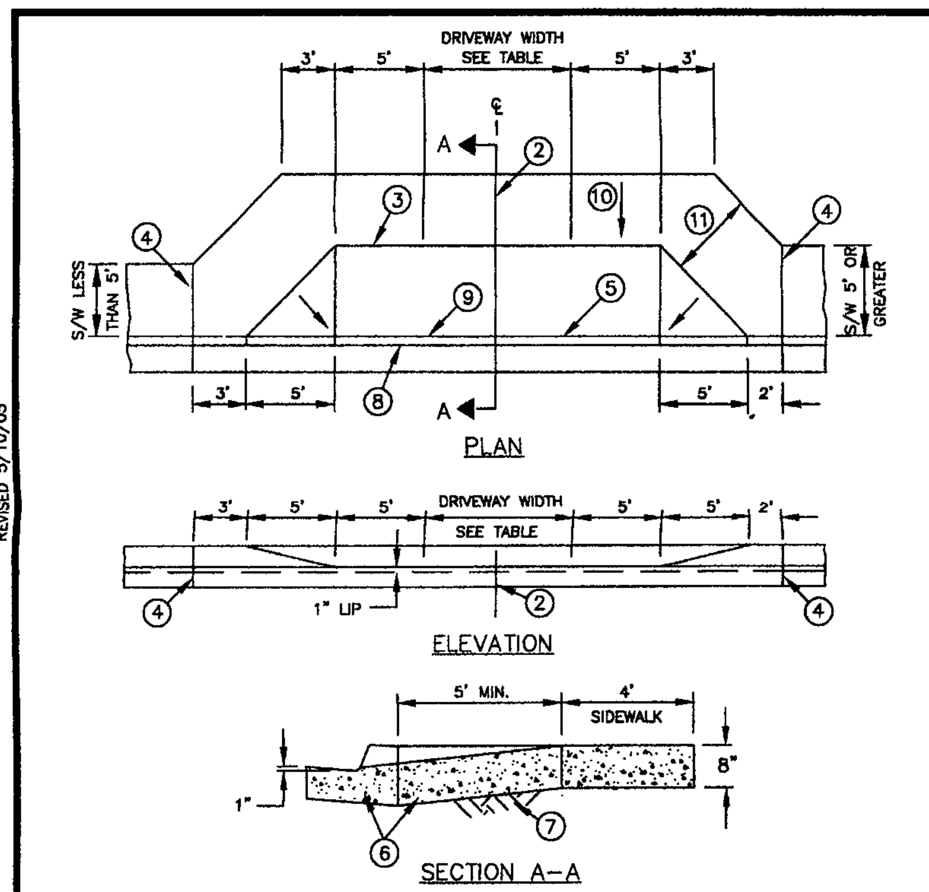


CONSTRUCTION NOTES

1. Sidewalk shall conform to MAG Std. Detail 230 and C.O.S. Sect. 340.
2. Curb as called for on plans.
3. Driveway entrances shall conform to COS Std. Detail 2250. Driveways shall be 3" of R-3/4" asphalt on 6" A.B.C. unless otherwise noted. See plans for driveway limits.
4. Valley gutter shall conform to COS Standard Detail 2240.
5. Sidewalk width, sidewalk ramp configuration and detectable warning surface as called for on plans.
6. Curb termination similar to MAG Std. Det 222.
7. When installing new driveways along an existing street, sawcut, remove & replace a minimum 2' wide strip of A.C. pavement per COS Standard Detail 2200.

REVISED 3/31/10

DETAIL NO.		APPROVED BY:		DETAIL NO.
2255	City of Scottsdale Standard Details	Scottsdale Standards & Specifications Committee	RESIDENTIAL DRIVEWAYS	2255



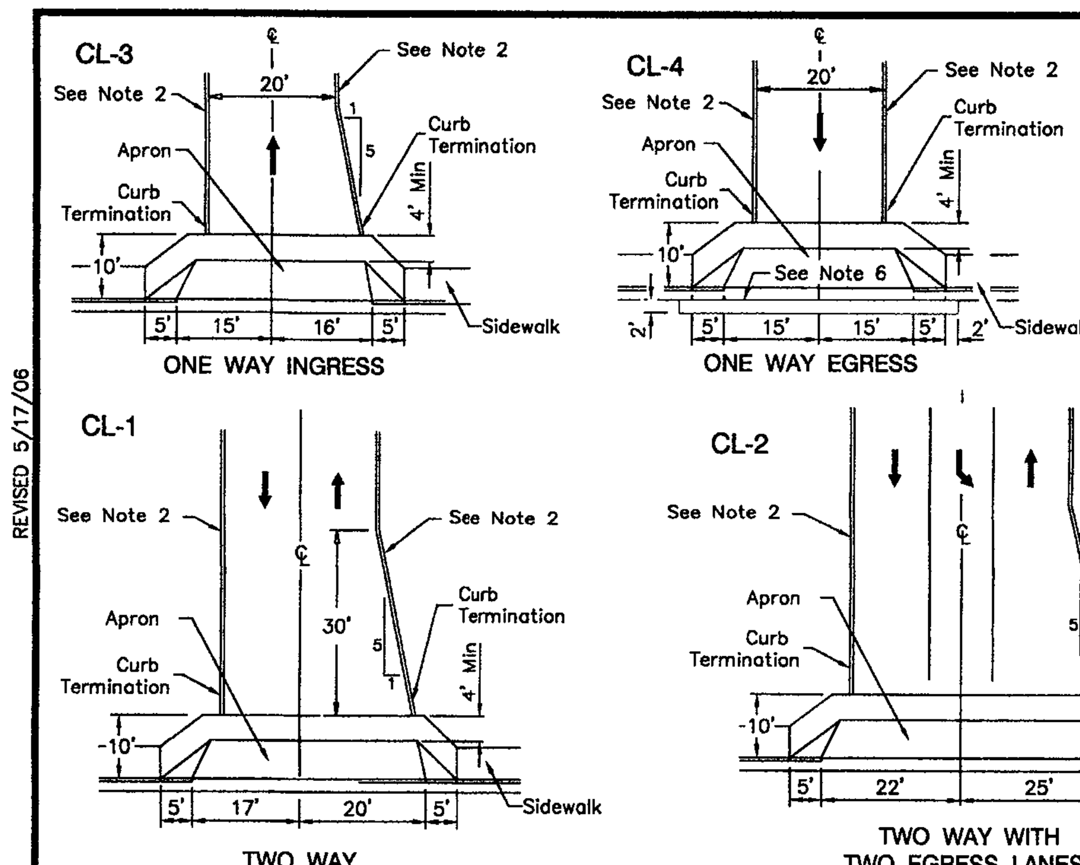
NOTES

1. DEPRESSED CURB SHALL BE PAID FOR AT THE UNIT PRICE BID FOR THE TYPE OF CURB USED AT THAT LOCATION.
2. CONTRACTION JOINT ON DRIVEWAY CENTERLINE.
3. BACK OF DRIVEWAY ENTRANCE – CONSTRUCTION JOINT OR SCORE MARK.
4. MASTIC EXPANSION JOINT THROUGH CURB AND GUTTER. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER A.S.T.M. D-1751.
5. BACK OF CURB – CONSTRUCTION JOINT OR SCORE MARK.
6. CLASS 'B' CONCRETE, MAG SECTION 725.
7. SUBGRADE PREPARATION, MAG SECTION 301.
8. FLOW LINE OF GUTTER.
9. DEPRESSED CURB.
10. 2% MAXIMUM CROSS SLOPE. 1.5% MINIMUM CROSS SLOPE
11. CONCRETE SIDEWALK PER MAG DETAIL 230, MODIFIED. THICKNESS = 8"

COMMERCIAL & INDUSTRIAL			
DRIVEWAY WIDTH	MIN.	MAX.	CLASS
COMMERCIAL ZONING	+ 16'	40'	B
INDUSTRIAL ZONING	+ 16'	40'	B
+ 24' MIN. FOR TWO WAY TRAFFIC			
RESIDENTIAL			
DRIVEWAY WIDTH	MIN.	MAX.	CLASS
MAJOR STREET	16'	30'	B
COLLECTOR STREET	*12'	30'	B
LOCAL STREET	12'	30'	B
* 16' DESIRABLE			

REVISED 5/10/05

DETAIL NO.		APPROVED BY:		DETAIL NO.
2250	City of Scottsdale Standard Details	Scottsdale Standards & Specifications Committee	DRIVEWAY ENTRANCES	2250

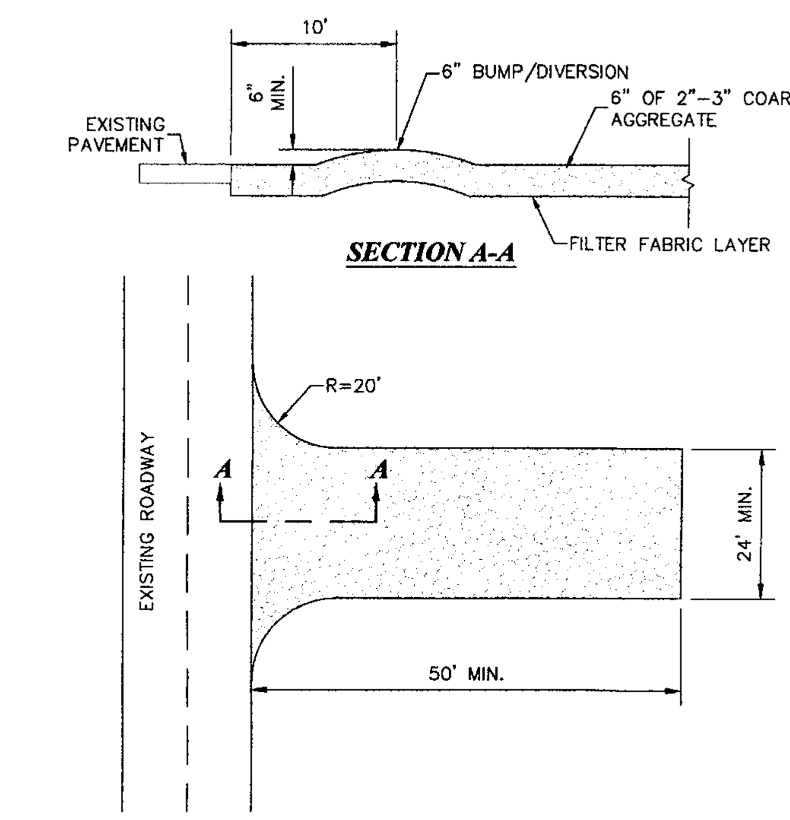


CONSTRUCTION NOTES

1. Sidewalk shall conform to MAG Standard Detail 230 and C.O.S. Sec. 340.
2. Curb as called for on plans.
3. Curb & Gutter shall conform to MAG Standard Detail 220. Single Curb shall conform to MAG Standard Detail 222.
4. Driveway Entrances shall conform to COS Standard Detail 2250 except for modifications as noted. Driveways shall be 2-1/2" A.C. A-19 on 6" A.B.C. unless otherwise noted. See plans for driveway limits.
5. Curb termination similar to MAG Std. Det. 222.
6. When installing new driveways along an existing street, sawcut, remove & replace a minimum 2' wide strip of A.C. pavement per COS Standard Detail 2200.

REVISED 5/17/06

DETAIL NO.		APPROVED BY:		DETAIL NO.
2256	City of Scottsdale Standard Details	Scottsdale Standards & Specifications Committee	COMMERCIAL/INDUSTRIAL DRIVEWAYS-TYPE CL	2256



NOTES:
1. THE ENTRANCE SHALL BE UTILIZED TO PREVENT TRACKING OF SEDIMENT AND DEBRIS ONTO PUBLIC RIGHTS-OF-WAY AND/OR EXISTING PAVED STREETS.
2. IF NECESSARY, WHEELS OF EXISTING TRAFFIC SHALL BE CLEANED PRIOR TO ENTRANCE ONTO EXISTING ASPHALT ROADWAYS.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

E / D2 **CONSTRUCTION ENTRANCE**
SCALE: NTS

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Registered Professional Engineer (Civil)
CERTIFICATE NO. 31787
JOSEPH E HASSELL
3/5/19
ARIZONA, U.S.A.

SITE IMPROVEMENT PLAN FOR GOLDWATER
MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION

ISSUE DATE: 3/8/18
PLOT DATE: 2/5/19
DRAWN BY: NWE
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # 17-096
SHEET TITLE:
SITE DETAILS

D2

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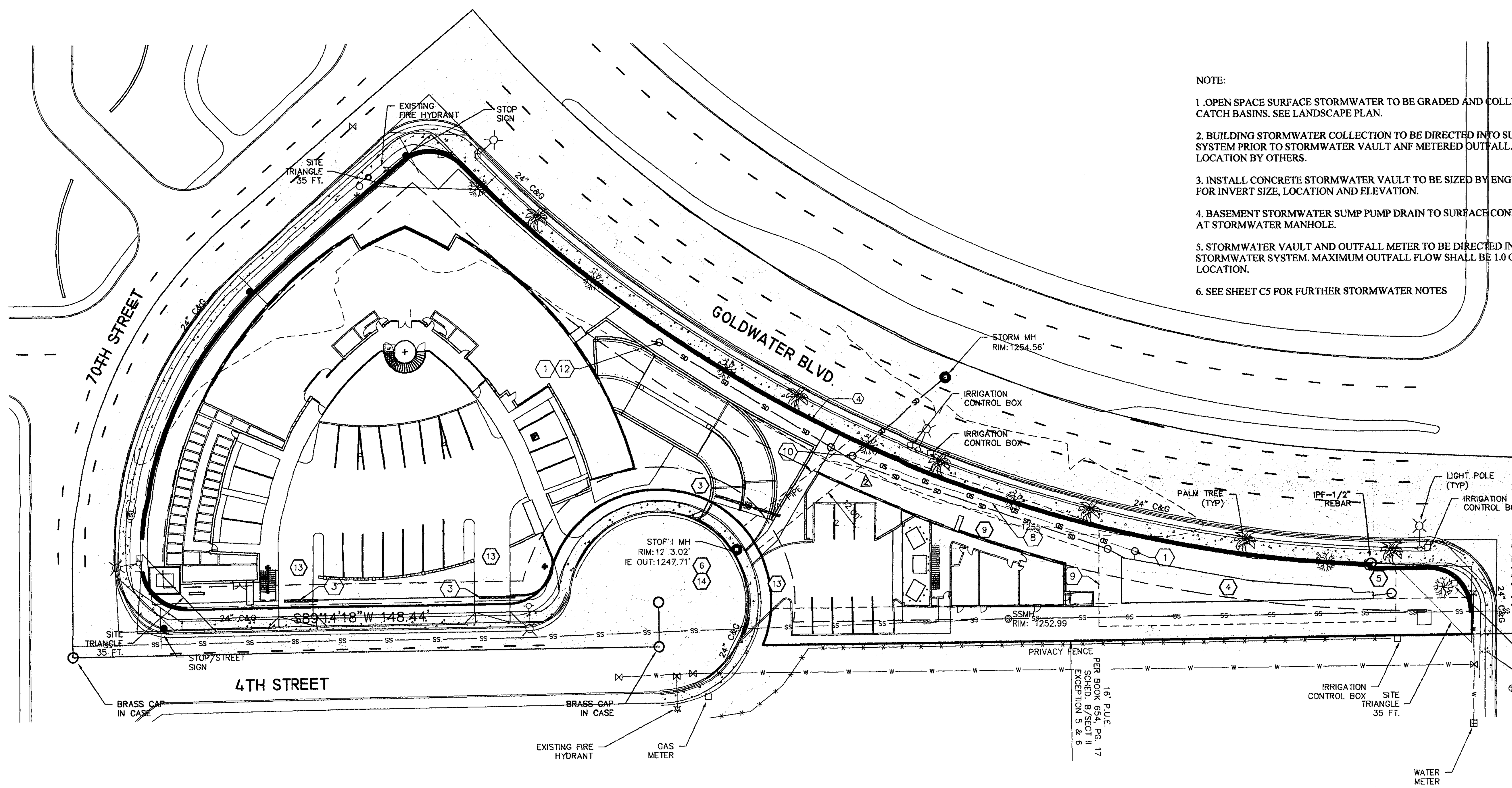
STORMWATER CONTROL PLANS FOR GOLDWATER

A SINGLE LOT PROPERTY, LOCATED IN N.W. QUARTER OF THE S.E. QUARTER OF THE N.E. QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST, GILA & SALT RIVER B.M., MARICOPA COUNTY, ARIZONA



NOTE:

1 .OPEN SPACE SURFACE STORMWATER TO BE GRADED AND COLLECTED IN AREA CATCH BASINS. SEE LANDSCAPE PLAN.

2. BUILDING STORMWATER COLLECTION TO BE DIRECTED INTO SURFACE DRAINAGE SYSTEM PRIOR TO STORMWATER VAULT ANF METERED OUTFALL. DOWN SPOUT LOCATION BY OTHERS.

3. INSTALL CONCRETE STORMWATER VAULT TO BE SIZED BY ENGINEER. SEE DETAIL FOR INVERT SIZE, LOCATION AND ELEVATION.

4. BASEMENT STORMWATER SUMP PUMP DRAIN TO SURFACE CONNECTION SURFACE AT STORMWATER MANHOLE.

5. STORMWATER VAULT AND OUTFALL METER TO BE DIRECTED INTO CITY STORMWATER SYSTEM. MAXIMUM OUTFALL FLOW SHALL BE 1.0 CFS AT THIS LOCATION.

6. SEE SHEET C5 FOR FURTHER STORMWATER NOTES

LEGEND

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK
- ASPHALT
- CONCRETE
- GRAVEL
- MAJOR CONTOUR
- MINOR CONTOUR
- FENCE
- CULVERT
- COMMUNICATIONS LINE
- GAS LINE
- OVERHEAD ELECTRIC LINE
- UNDERGROUND ELECTRIC LINE
- SANITARY SEWER
- STORM DRAIN
- WATERLINE
- UTILITY POLE
- GUY ANCHOR
- CATCH BASIN
- DRY WELL
- SEWER MANHOLE
- STORM DRAIN MANHOLE
- FIRE HYDRANT
- YARD HYDRANT
- VALVE
- WELL
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN (AS NOTED)
- PALM TREE

SURFACE DRAINAGE PLAN

SHEET C2 KEY NOTES

1. INSTALL STANDARD CATCH BASINS, TRAFFIC RATED GRATES.
2. INSTALL 6 INCH SCHEDULE 40 PVC DRAIN PIPE. SEE PLAN FOR SLOPE.
3. INSTALL STANDARD TRAFFIC RATED GRATE DRAIN.
4. INSTALL STORMWATER VAULT WITH OUTFALL METER.
5. INSTALL DRYWELL TO BE SIZED AT A LATER DATE.
6. RELOCATE CITY STORMWATER UNDER CURB DRAIN.
7. RELOCATE CITY STORMWATER DRAIN PIPE AND MANHOLES AS SHOWN.
8. INSTALL 18 INCH SCHEDULE 80 PVC STORM DRAIN.
9. UTILITY EASEMENT TO BE DEDICATED TO CITY.
10. CONNECT INTO CITY 24 INCH DRAIN PIPE.
11. STUB 6 INCH SCHEDULE 40 DRAIN PIPE FOR DOWN SPOUT CONNECTION. ACTUAL LOCATION TO BE COORDINATED WITH BUILDING ARCHITECT.
12. BASEMENT PRESSURE DRAIN PIPE CONNECTION.
13. GROUND LEVEL PARKING ENTRANCE.
14. REMOVE EXISTING CURB, GUTTER,SIDEWALK AND DRAIN. REINSTALL STANDARD APPROACH AND UNDER DRAIN.

H-Scale 1"= 30'

30 15 30 60

11 X 17 SCALE 1"=60'

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BOUNDARY INFO PROVIDED IS FOUND IN BOOK 654, PAGE 17 MARICOPA COUNTY, AZ RECORDS.

NO BOUNDARY SURVEY

PROPERTY LINES SHOWN ARE APPROXIMATE. THIS MAP DOES NOT REPRESENT A BOUNDARY SURVEY BY ACE SOLUTIONS, ENGINEERING AND SURVEYING.

DATUM: NAVD 88 GEOID 09
CONTOUR INTERVAL: 1 FOOT

ACE SOLUTIONS
Advanced Consulting and Engineering Solutions
609 N. Calgary Court, Suite 7,
Post Falls, Idaho 83854
PHONE:(208)773-8370
FAX:(208)777-2128
www.acesolutions.pro

Registered Professional Engineer (Civil) CERTIFICATE NO. 31787 JOSEPH E HASSELL 2/5/19 ARIZONA U.S.A.

STORMWATER CONTROL PLAN FOR GOLDWATER

MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION
1	7/2/18	STORMWATER VAULT

ISSUE DATE: 3/8/18
PLOT DATE: 2/4/19
DRAWN BY: RJG
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # 17-096

SHEET TITLE:
GROUND LEVEL SITE PLAN

C2

PROJECT DESCRIPTION

THIS PROJECT IS TO CONSTRUCT A RESIDENTIAL CONDOMIMUM BUILDING WITH INSIDE PARKING. THE PARKING WILL BE SPLIT FROM A BASEMENT LOCATION AND GROUND LEVEL LOCATION. THE BASEMENT PARKING WILL ENTER FROM THE 4TH STREET CUL DE SAC WHILE THE GROUND LEVEL PARKING WILL ENTER FROM THE NORTH SIDE OF 4TH STREET WEST OF THE CUL DE SAC. BOTH ENTRANCES WILL HAVE STORMWATER GRATE DRAINS NEAR THE PROPERTY LINE TO CONTROL THE FLOW OF STORMWATER AND KEEP IT FROM ENTERING THE RIGHT OF WAY. ALL STORMWATER WILL BE CAPTURED ONSITE AND DIRECTED INTO THE CITY STORMWATER SYSTEM OR ONSITE DRY WELL.

THERE IS AN EXISTING CITY STORMWATER INLET ON THE NORTH SIDE OF THE CUL DE SAC WHICH IS PLANNED TO BE MOVED ALONG WITH THE EXISTING STORMWATER DRAIN PIPE. SEE PLAN.

THE CITY REQUIRES THAT LESS THAN 1.0 CFS OF STORMWATER ENTER THE CITY STORMWATER SYSTEM AT ANY TIME. THE ONSITE STORMWATER WILL BE COLLECTED AND DIRECTED INTO A UNDERGROUND DETENTION VAULT WHICH WILL BE METERED TO NOT ALLOW MORE THAN 1.0 CFS OUTFALL INTO THE CITY SYSTEM AT ANY TIME. THE EXCESS STORMWATER WILL BE DIRECTED THROUGH A WEIR TO AN ONSITE DRYWELL. THE ONSITE DRYWELL WILL BE SIZED AT A LATER DATE.

THERE IS NO PLANNED STOCK PILE OF SOIL ON THE PROPERTY AND ALL CONSTRUCTION TRAFFIC WILL ENTER THE SITE THROUGH A CONSTRUCTION ENTRANCE. THE CONSTRUCTION ENTRANCE SHALL BE MAINTAINED THROUGH THE CONSTRUCTION PROCESS.

THE PROPERTY PERIMETER SHALL HAVE A SILT FENCE INSTALLED PRIOR TO CONSTRUCTION.

CURRENT SITE CONDITIONS

THE SUBJECT AREA IS COMPRISED OF UNDEVELOPED PROPERTY. THERE IS A STORMWATER SYSTEM CROSSING THE SITE THAT WILL NEED TO BE RE-ROUTED FOR THIS PROJECT.

GENERAL NOTES

1. THE PURPOSE OF THIS PLAN IS TO IDENTIFY SITE DISTURBANCE AND BEST MANAGEMENT PRACTICES FOR THE PROPOSED FILL EXTENSION. THIS FILL AREA IS NOT INTENDED TO BE BUILT ON. THIS PLAN IS BASED UPON INFORMATION PROVIDED BY THE PROJECT OWNER AND A TOPOGRAPHIC INFORMATION PROVIDED BY ACE SOLUTIONS LLC. THE OWNER IS RESPONSIBLE FOR VERIFYING SLOPE STABILITY PRIOR TO CONSTRUCTION. OWNER SHALL CONSULT WITH ENGINEER OF RECORD OF ANY DISCREPANCIES OR INCONSISTENCIES FROM THIS PLAN.

2. GROUNDWATER IS NOT ANTICIPATED ON THIS SITE; HOWEVER, SHOULD GROUNDWATER APPEAR CONTACT THE ENGINEER-OF-RECORD IMMEDIATELY. THIS CONSTRUCTION WILL CROSS A AREA DRAINAGE, CONTRACTOR SHALL INSTALL CROSSING DURING LOW OR NO FLOW TIME OF YEAR.

3. WINTERIZATION REQUIREMENTS ARE NOT ANTICIPATED ON THIS SITE. ALL SITE DISTURBANCE ACTIVITIES SHOULD BE COMPLETED DURING THE SPRING AND SUMMER MONTHS; HOWEVER SHOULD WINTERIZATION OF THE SITE BE REQUIRED, PROPER BMP PRACTICES SHALL BE FOLLOWED, CONTRACTOR SHALL NOTIFY THE ENGINEER-OF-RECORD.

4. ANY STOCKPILED DIRT AND/OR OTHER MATERIAL SHALL BE PLACED IN A DESIGNATED STOCKPILE AREA OR BE COMPLETELY REMOVED FROM THE SITE. IT IS ANTICIPATED THAT LESS THAN 120 CY OF TOP SOIL WILL BE MOVED AND/OR STOCKPILED DURING CONSTRUCTION. ANY EXPOSED SOIL SHALL BE RELOCATED ON-SITE TO A LOCATION WHICH MAKES TRANSPORTATION OF SILT AND/OR STORM RUNOFF TO ANY BODY OF WATER IMPOSSIBLE.

5. CONSTRUCTION SCHEDULE: START CONSTRUCTION SUMMER 2019; COMPLETION OF ALL CONSTRUCTION BY OCTOBER 2020 (WEATHER PERMITTING).

6. OPERATION AND MAINTENANCE OF EROSION CONTROL MEASURES SHALL BE BY THE PROJECT OWNER, AND/OR THE CONTRACTOR, WHO SHALL MAKE DAILY INSPECTIONS OF ALL FACILITIES. EROSION CONTROL MEASURES ARE TO REMAIN IN PLACE UNTIL VEGETATION IS WELL ESTABLISHED AND OBSERVED BY THE ENGINEER-OF-RECORD. AT THE END OF EACH WORK DAY, THE SITE SHALL BE INSPECTED TO ENSURE THAT THE NECESSARY EROSION CONTROL MEASURES ARE IN PLACE AND FUNCTIONING PROPERLY.

7. CONSTRUCTION TRAFFIC SHALL ENTER THE PROJECT SITE FROM 4TH STREET. THIS STREET IS TO REMAIN FREE FROM ANY CONSTRUCTION DEBRIS. THIS STREET SHALL BE CLEANED AS NECESSARY TO PREVENT MUD/DEBRIS AND OTHER MATERIALS FROM BECOMING A NUISANCE TO OR OBSTRUCTING DAILY TRAFFIC.

8. PRIOR TO CONSTRUCTION. A START-UP LETTER MUST BE ISSUED TO THE CITY BY THE ENGINEER-OF-RECORD AFTER THE REQUIRED SITE INSPECTION APPROVING THE INSTALLATION OF ANY NOTED BMPS. WORK SHALL NOT COMMENCE UNTIL SAID LETTER HAS BEEN APPROVED BY THE CITY BUILDING AND PLANNING DEPARTMENT.

STORMWATER CONTROL PLANS FOR GOLDWATER

A SINGLE LOT PROPERTY, LOCATED IN N.W. QUARTER OF THE S.E. QUARTER OF THE N.E. QUARTER OF SECTION 27, TOWNSHIP 2 NORTH, RANGE 4 EAST, GILA & SALT RIVER B.M., MARICOPA COUNTY, ARIZONA

VICINITY MAP

SITE INFORMATION

OWNER:
GOLDWATER BOULEVARD LLC
CONTACT: BOB BALLARD
P: 480-203-8661

LEGAL DESCRIPTION:
LOT 1, LOLOMA II, ACCORDING TO THE PLAT, BOOK 654, PAGES 17, RECORDS OF MARICOPA COUNTY, ARIZONA

AVERAGE SITE SLOPE:
FLAT AND LEVEL

PRE DEVELOPMENT AREAS:
GRAVEL = 53852 SF

POST DEVELOPMENT IMPERVIOUS AREA:
ROOF = 36408 SF
ATRIUM = 1766 SF
OUTSIDE ASPHALT = 2886 SF
OPEN SPACE = 12792 SF

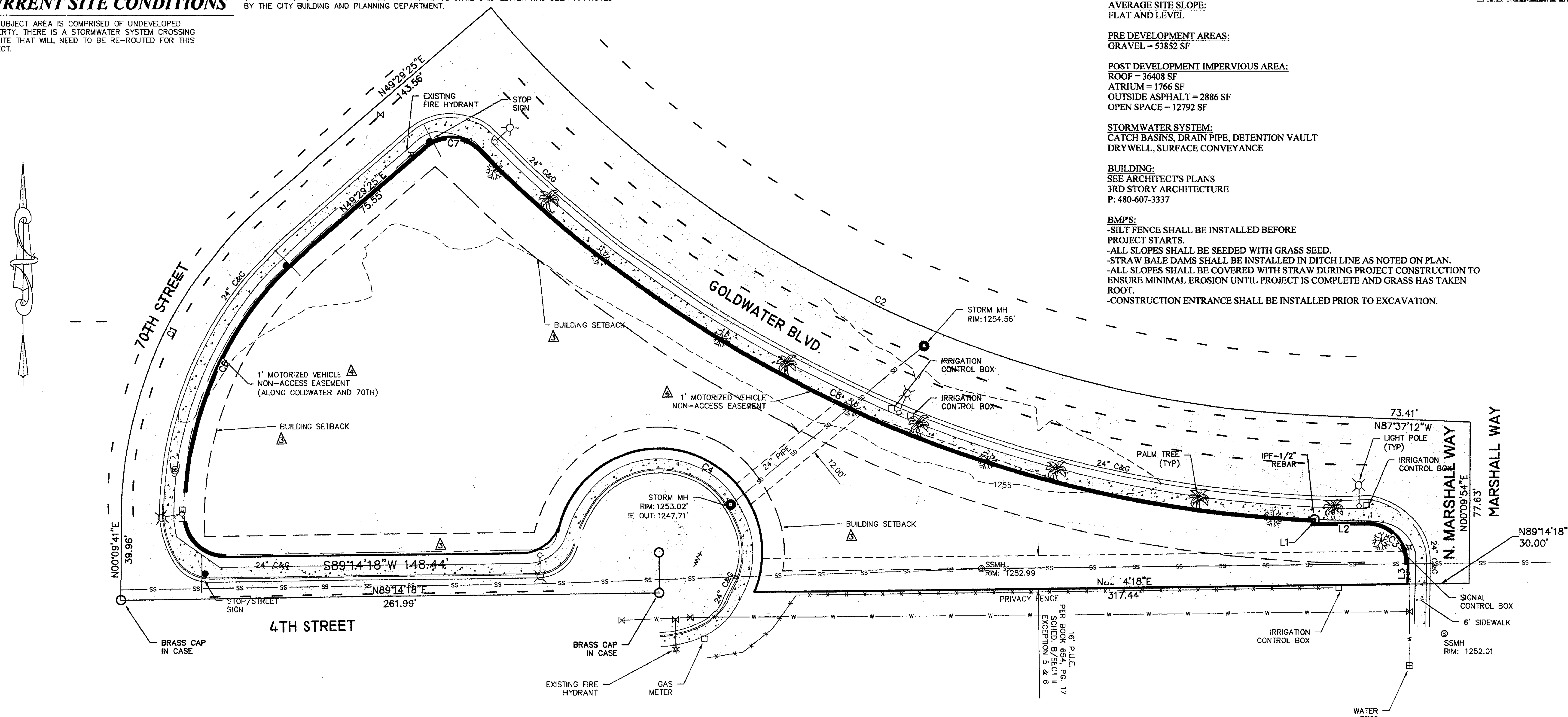
STORMWATER SYSTEM:
CATCH BASINS, DRAIN PIPE, DETENTION VAULT
DRYWELL, SURFACE CONVEYANCE

BUILDING:
SEE ARCHITECT'S PLANS
3RD STORY ARCHITECTURE
P: 480-607-3337

BMP'S:
-SILT FENCE SHALL BE INSTALLED BEFORE PROJECT STARTS.
-ALL SLOPES SHALL BE SEEDED WITH GRASS SEED.
-STRAW BALE DAMS SHALL BE INSTALLED IN DITCH LINE AS NOTED ON PLAN.
-ALL SLOPES SHALL BE COVERED WITH STRAW DURING PROJECT CONSTRUCTION TO ENSURE MINIMAL EROSION UNTIL PROJECT IS COMPLETE AND GRASS HAS TAKEN ROOT.
-CONSTRUCTION ENTRANCE SHALL BE INSTALLED PRIOR TO EXCAVATION.

LEGEND

- PROPERTY BOUNDARY
- RIGHT-OF-WAY
- EASEMENT LINE
- BUILDING SETBACK
- ASPHALT
- CONCRETE
- GRAVEL
- MAJOR CONTOUR
- MINOR CONTOUR
- FENCE
- CULVERT
- CM COMMUNICATIONS LINE
- G GAS LINE
- OHE OVERHEAD ELECTRIC LINE
- E UNDERGROUND ELECTRIC LINE
- SS SANITARY SEWER
- SD STORM DRAIN
- W WATERLINE
- UTILITY POLE
- GUY ANCHOR
- CATCH BASIN
- DRY WELL
- SEWER MANHOLE
- STORM DRAIN MANHOLE
- FIRE HYDRANT
- YARD HYDRANT
- VALVE
- WELL
- CONIFEROUS TREE
- DECIDUOUS TREE
- SIGN (AS NOTED)
- PALM TREE
- STORMWATER FLOW DIRECTION



Curve Table					
Curve #	Length	Radius	Delta	Chord	Direction
C1	172.64	200.53	049°19'42"	167.36	S24°49'32"W
C2	460.69	560.00	047°08'08"	447.81	S64°05'02"E
C3	31.74	20.00	090°55'36"	28.51	N45°17'54"W
C4	166.45	50.00	190°44'08"	99.56	N73°13'29"W
C6	134.50	170.53	045°11'30"	131.05	S26°53'38"W

Line Table		
Line #	Direction	Length
L1	S00°45'42"E	1.72
L2	N89°14'18"E	24.92
L3	N00°09'54"E	9.67

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INDEX OF SHEETS

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Registered Professional Engineer (Civil)
CERTIFICATE NO. 31787
JOSEPH E HASSELL
Date Signed 2/5/19
ARIZONA, U.S.A.

SITE IMPROVEMENT PLAN FOR GOLDWATER

MARICOPA COUNTY, ARIZONA

MARK	DATE	DESCRIPTION
3	7/2/18	BLD SETBACKS, PL
4	11/27/18	STORMWATER

ISSUE DATE: 3/8/18
PLOT DATE: 2/5/19
DRAWN BY: RJG
CHECKED BY: JEH
DWG FILE: 17-096-SITE
PROJ. # 17-096

SHEET TITLE:
TOPOGRAPHIC SURVEY EXISTING COND.

TP1