WOOD PATEL

PRELIMINARY DRAINAGE REPORT
FOR
FAIRMONT SCOTTSDALE PRINCESS
PRIVADO WELCOME BUILDING AND PARKING MODIFICATIONS

July 29, 2022
WP# 215319

EXPIRES 06-30-25

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1.0 INTRODUCTION

1.1 General Background

The Fairmont Scottsdale Princess Privado Welcome Building and Parking Modifications (Site) is a proposed Welcome Center and parking lot development on an approximately 6.0-acre parcel in the City of Scottsdale (APN#215-08-003C). The proposed development will consist of one (1) building and a new parking lot expansion. The project will include parking, hardscape, landscape, and utility improvements to support the development. The Site is located approximately 1,300 feet southeast of Scottsdale Road and Princess Boulevard, at the end of Cottage Terrace within Section 35, Township 4 North, Range 4 East of the Gila and Salt River Base and Meridian, Maricopa County, Arizona. Refer to Exhibit 1 – *Vicinity Map* for project location. The existing property, currently zoned C-2, is primarily developed with buildings, parking lots, pools, sidewalks, and a variety of landscaping (desert and grass).

This Drainage Report has been prepared in accordance with Wood, Patel & Associates, Inc.'s (WOODPATEL's) understanding of the City of Scottsdale technical drainage requirements (Ref. 1) and the *Drainage Design Manuals for Maricopa County Hydrology and Hydraulics (2018),* as applicable to the Site.

1.2 FEMA Regulated Flood Zones

The Federal Emergency Management Agency (FEMA) publishes Flood Insurance Rate Map (FIRM) information for communities that adhere to FEMA regulations. The FEMA FIRM panel for this Site is 04013C1320L, effective date October 16, 2013, and indicates the Site falls within "Zone AO" shaded (Refer to Exhibit 2 – *FEMA FIRM*).

"Zone AO" shaded is defined by FEMA as follows:

> *"Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined".*

It is the understanding of WOODPATEL, based on past experience and interpretations of the City of Scottsdale floodplain ordinance that development of land within FEMA Zone "AO" is acceptable as long as, in general, the lowest floor elevation is above or properly protected from the anticipated 100-year water surface elevations. No problems are anticipated with developing the parcel in accordance with the City's floodplain ordinance. No underground structures or parking are proposed.

2.0 HYDROLOGY ANALYSIS

2.1 Offsite Hydrology

The proposed Site does not receive any offsite flows, only modifications to pre-existing flows from the Fairmont Scottsdale community. However, the community does receive offsite flows from a watershed north of the Site. See Appendix A - *Drainage Report for Fairmont Scottsdale Hotel Expansion by Wood, Patel & Associates, Inc., dated May 1, 2015,* which provides a history of the current offsite drainage and retention.

2.2 Onsite Hydrology

As a part of the proposed expansion, the existing storm drain and TPC Golf Course basin is planned to handle the increase in onsite flows from proposed improvement. All runoff from the proposed building and south of the building will sheet flow directly into the TPC Golf Course. Runoff from the proposed parking lot is designed to direct stormwater away from the proposed building and drain overland to existing catch basins and storm drain which ultimately outflows to the TPC Golf Course to the south. The flow into the existing storm drain system has increased by 0.3 cfs with the total increase in flow to the TPC Golf Course calculated to be 1.7 cfs for the 100-year condition. See Appendix F - *Hydrologic and Hydraulic Calculations* for the existing versus proposed drainage calculations.

Onsite peak flow estimates for the proposed development were generated using the Rational Method, as outlined in the *Drainage Design Manual for Maricopa County, Arizona: Volume I – Hydrology (*Ref 2). NOAA Atlas 14 precipitation data was obtained and utilized to develop Intensity-Duration-Frequency (I-D-F) curves for the Site. Rational Method peak flows were computed at concentration points within the Site at key design locations. Runoff coefficients were estimated to reflect post-development land use conditions for the 2-year, 10-year, and 100-year events (Refer to Appendix F – *Hydrologic and Hydraulic Calculations*).

Appendix A - *Drainage Report Fairmont Scottsdale Hotel Expansion by Wood, Patel & Associates, Inc., dated May 1, 2015*, provides a history of the current onsite drainage and retention. Based on the information above, the proposed site improvements mimic current drainage patterns and areas of retention for onsite with very minimal alteration.

2.3 Establishing Lowest Floor (LF88 Elevations)

The Grading and Drainage Plan has been designed to comply with the City of Scottsdale's floodplain ordinance for a Zone "AO" floodplain. It is our understanding, unless other flood proof measures are presented and approved, the proposed lowest habitable finished floor (LFF) elevation must be designed a minimum of 1 foot above the anticipated 100-year flood elevation. The proposed finish floor for the new welcome center will be at elevation 1541.0, or 3.2 feet above the 100-year high water elevation in the TPC Golf Course. In addition, the lowest finish floor elevation is designed to be a minimum of 1 foot above the adjacent finish grade. Refer to Exhibit 4 for graphical representation.

The Site is located within a Zone “AO” floodplain, defined as having a flood depth of 1 foot. Therefore, the anticipated 100-year flood elevation is 1 foot above natural grade, and proposed LFF elevation must have 1-foot additional freeboard or be a minimum of 2 feet above natural grade. Due to the disturbed condition of the Site from previous development, the natural grade has been modified. According to Curry’s Corner 7.5-minute Topographic Survey Map by USGS from 1964 with a contour interval of 10-feet, the approximate highest natural grade of this Site prior to development is 1536.80, which is 4.2 feet lower than the proposed lowest finish floor of 1541.0. It is our understanding this is in compliance with the City’s floodplain ordinance. Refer to the Regional Contour Map within Appendix E, which shows the highest natural grade elevation relative to the proposed building location.

3.0 HYDRAULIC ANALYSIS

The Site was designed to utilize the existing storm drain system in Cottage Terrace Drive and to maintain the existing site outfall locations at the southwest corner of the property. The existing storm drain system was designed to capture runoff through catch basins at low points throughout the project Site and convey it to the TPC Golf Course. With the minimal increase in runoff from the proposed improvements, the storm drain system will capture the 10-year storm event. As previously designed, runoff from the 100-year storm event was expected to exceed capacity of the storm drain system and the excess will be conveyed overland (south on Cottage Terrace Drive) to the outfall at the southwest corner of the Site and to the TPC golf course. The additional flow for the 100-year event will continue to exceed capacity and overland flow south to the Site outfall. See Appendix A – *Drainage Report for Fairmont Scottsdale Hotel Expansion by Wood, Patel & Associates, Inc., dated May 1, 2015*, for the previously designed system. The increase in runoff is not significant enough to affect the existing drainage conditions and therefore no additional stormwater infrastructure is required.

4.0 MAINTENANCE

Ongoing maintenance of the designed or recommended drainage systems is required to preserve the design integrity and purpose of the drainage system. Failure to provide maintenance can prevent the drainage system from performing to its intended design purpose and can result in reduced performance. Maintenance within the public right-of-way is the responsibility of the governing municipality. However, it is the responsibility of landowners (such as private developers or property owners' associations) for facilities on private property. Prior to ultimate condition build-out upstream of drainage structures, additional maintenance may be required due to an increase in sedimentation build-up. A regular maintenance program is required to have drainage systems perform to the level of protection or service, as presented in this report and the projects' plans and specifications.

5.0 CONCLUSIONS

Based on our analysis of the Site, the following conclusions can be made:

1. This Drainage Report has been prepared in accordance with WOODPATEL's understanding of the City of Scottsdale technical drainage requirements and the *Drainage Design Manuals for Maricopa County Hydrology and Hydraulics (2018)*, as applicable to the Site.

2. The Site is within a FEMA designated "Zone AO" shaded.

3. The Site is protected from offsite flows from the north by improvements, as outlined in the approved stormwater storage waiver.

4. No stormwater retention has been provided for this project, per the approved stormwater storage waiver.

5. The onsite 100-year storm event is to be conveyed south, by existing storm drain and overland flow, to the existing TPC Golf Course.

6. The 100-year high water elevation is 1537.80 in the adjacent TPC golf course, which is 3.2 feet below the proposed welcome center lowest finish floor elevation of 1541.00

7. The lowest finish floor elevation of 1541.0 is approximately 4.2 feet higher than the highest natural ground elevation of 1536.8. It is our understanding this is in compliance with the City's floodplain ordinance, which requires the lowest finished floor to be a minimum of 2 feet above (1 foot for AO and 1 foot of freeboard) the natural highest grade.

8. Ongoing maintenance is required for the existing drainage systems to assure design performance. Maintenance is the responsibility of the private parties involved.

6.0 REFERENCES

1. *Design Standards & Policies Manual*, City of Scottsdale, 2018

2. *Drainage Report for Fairmont Scottsdale Hotel Expansion* by Wood, Patel & Associates, Inc., dated May 1, 2015

3. *Drainage Report for Fairmont Scottsdale Western Theme Town* by Wood, Patel & Associates, Inc., dated May 15, 2015

4. *Drainage Memo for Fairmont Scottsdale Sunset Beach Pool* by Wood, Patel & Associated, Inc., dated September 11, 2015

5. *Curry's Corner Quadrangle,* 7.5 Minute Series Topographic Map, USGS, 1964.

APPENDIX A – DRAINAGE REPORT FOR FAIRMONT SCOTTSDALE HOTEL EXPANSION BY WOOD, PATEL & ASSOCIATES, INC., DATED MAY 1, 2015

APPENDIX A - FOR REFERENCE ONLY

DRAINAGE REPORT
FOR
FAIRMONT SCOTTSDALE
HOTEL EXPANSION

May 1, 2015
WP# 154302
C.O.S. No.: 1217-PA-2014

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WOOD/PATEL
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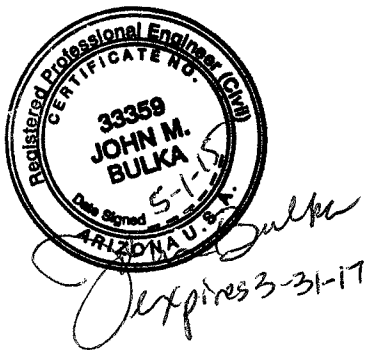

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1.0 INTRODUCTION

The proposed Fairmont Scottsdale Hotel Expansion (Fairmont) is a new 102-room (144-bed) hotel building with associated parking. The proposed development is located at the existing Fairmont Scottsdale Hotel, located east of Scottsdale Road and south of Princess Drive. The project includes one (1) new building and a new parking lot expansion (refer to Exhibit 1 – *Vicinity Map*). The parking lot expansion is located along Cottage Terrace, on approximately 1.22 acres (ac), and is west of the existing parking lot for the Ballroom. The building addition is located on approximately 2.19 ac, and is north of the tennis cottages on the east side of Cottage Terrace. More specifically, the sites are located in the southwest quarter of Section 35, Township 4 North, Range 4 East of the Gila and Salt River Meridian (refer to Exhibit 1). The existing property, currently zoned C-2, is primarily developed with buildings, parking lots, tennis courts, sidewalks, and a variety of landscaping (desert and grass). There is some undeveloped area at the northeast corner of the property that is currently dirt and decomposed granite. Current zoning is expected to stay the same for the proposed improvements.

The purpose of this report is to obtain City of Scottsdale Approval for the proposed Fairmont Scottsdale Hotel Expansion, with respect to the City of Scottsdale's drainage criteria.

Analysis and modeling for this study was performed in accordance with the requirements of the *Design Standards and Policies Manual, Chapter 4: Grading and Drainage* (DS&PM), City of Scottsdale, 2010 (Ref. 1). The methods of analysis, sources of data and assumptions, and the results of the analysis are discussed in detail in the following sections of this report.

APPENDIX A - FOR REFERENCE ONLY

2.0 EXISTING DRAINAGE CONDITIONS AND CHARACTERISTICS

2.1 FEMA Floodplain

The Federal Emergency Management Agency (FEMA) has published a 100-year floodplain, per Flood Insurance Rate Map (FIRM) Panel 1320 of 4425, Map Number 04013C1320L, dated October 16, 2013. The site is within a flood zone labeled "AO-Depth 1 Foot, Velocity 3 FPS".

Zone "AO" is defined by FEMA as follows:

> *"Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined."*

As displayed on the FEMA FIRM panel, the floodplain delineation includes a large portion of land, which includes this project site (refer to Exhibit 2 – *FEMA Map*).

It is the understanding of Wood, Patel & Associates, Inc. (Wood/Patel), based on past experience and interpretations of the City of Scottsdale's floodplain ordinance that development of land within a FEMA Zone "AO" is acceptable as long as, in general, the lowest floor elevation is above or properly protected from the anticipated 100-year water surface elevations. No problems are anticipated with developing the parcel in accordance with the City's floodplain ordinance. No underground structures or parking structures are proposed.

2.2 Offsite Drainage Conditions

A large watershed occurs north of the Fairmont Scottsdale Resort. The watershed has been previously studied and peak flows estimated for existing and proposed conditions, and results were published in the Core North/Core South Drainage Study (Ref. 5). Refer to Appendix D – *Offsite Watershed Exhibits* for the Regional Contour Map, Aerial Map, and Plate 1 and Table 1 from the Core North/Core South study and report (Ref. 5). The Fairmont Scottsdale Resort property is protected from this offsite flow by several past improvements. Originally, when Princess Boulevard was constructed, offsite flows were diverted to the west by a channel on the north site of Princess Boulevard. The flood waters are routed to an existing drainage culvert under Princess Boulevard, just east of

Scottsdale Road. These flood waters are routed south along the east side of Scottsdale Road to the Tournament Players Club (TPC) Golf Course. As the Fairmont Scottsdale Resort continued to develop over the years, the City of Scottsdale requested additional improvements to protect the property from offsite flows from the north. Additional improvements were contingent with the Request for Stormwater Storage Waiver for the Fairmont Scottsdale Resort property in 2008 as development continued (refer to Exhibit B – *Stormwater Storage Waiver / Proposed Drainage Improvements Exhibit*). The additional improvements included adding a flood/screen wall along the south side of Princess Boulevard, providing a high point on Cottage Terrace just south of Princess Drive, providing a high point just south of the traffic circle on Princess Drive, providing a channel and floodwall along the west side of the Maravilla site, and removing and replacing the existing culverts on Princess Drive with a new bridge structure. Currently, all of these improvements have been constructed with past projects (Fairmont Ballroom Addition and the Maravilla Senior Living Community) with the exception of replacing the culverts on Princess Drive with a bridge structure. It is our understanding the Fairmont ownership is working with the City of Scottsdale on an agreement to replace these culverts.

The Hayden/Rhodes (Granite Reef) Aqueduct was constructed as part of the (CAP) by the U.S. Bureau of Reclamation. This existing aqueduct is located along the south edge of the TPC golf course and extends east-west the length of CAP canal. The aqueduct is at a significantly higher elevation than the golf course and acts as a dike which creates stormwater ponding in the existing golf course. The 100-year high water level is at an elevation of 1536.00 NGVD 29 Datum (Ref. 6). The conversion to the NAVD 88 Datum is 1.8 feet, so the 100-year high water level elevation is approximately 1537.80. The proposed finish floor for the new hotel building will be at elevation 1550.41, or 12.61 feet above the 100-year high water elevation.

When the Maravilla Senior Living Community was constructed, Cottage Terrace Drive (a private drive) was relocated to the west side of the Fairmont Scottsdale Resort property to accommodate vehicle access to the Resort. A storm drain system was installed with the driveway improvements to benefit both properties and assumed developed conditions for both sites. Based on new topography obtained for the Fairmont Scottsdale Hotel addition, we have re-analyzed this storm drain system due to an increase in tributary area

from the Fairmont site. Existing drainage areas E2 and E3 have been adjusted accordingly from their original boundaries, and the "B" drainage areas added from the Ballroom. The "M" drainage areas on Maravilla have been revised to more accurately represent the contributing areas to the existing storm drain system in Cottage Terrace. Refer to Exhibit 3 – *Maravilla East Property Line Road Drainage Map*, and Exhibit 4 for a comparison. In addition, existing drainage area E2 has an existing 1-foot deep sediment basin which acts as a retention basin. Therefore, we have not included this in the flows for the existing storm drain system since the volume provided exceeds the volume required for the 100-year, 2-hour storm (refer to Appendix A – *Hydrologic and Hydraulic Calculations*).

Runoff from the existing Princess MXD Mercer Institute (MXD) site drains to the west to the existing flood control channel located between Scottsdale Road and the Maravilla project (Exhibit 4).

2.3 Onsite Drainage Conditions (Pre-Development)

The existing sites slope generally from the northeast to the southwest with an average slope of approximately two percent (2%). Stormwater is captured into an existing storm drain system via existing catch basins and curb inlets located within Cottage Terrace Drive (private drive), which ultimately drains into the existing TPC Golf Course at the Fairmont Scottsdale Princess Resort, located immediately north of the Hayden-Rhodes Aqueduct. Currently, the site consists of parking lots, tennis courts, sidewalks, and a variety of desert landscaping (desert and grass). There is some undeveloped area at the northeast corner of the property that is currently dirt and decomposed granite (refer to Exhibit 4).

When the existing storm drain system was first analyzed as part of the Maravilla East Property Line Road, all the contributing areas were assigned a weighted C-value of 0.90 for the 100-year storm event to account for future buildout in those areas, which accounted for approximately 20.5 ac. Since that time, Maravilla, the Ballroom, and the Maravilla East Property Line Road have all been constructed, and a detailed topographic survey of the area for this project has been completed. In re-analyzing the data from those completed projects and the current survey information, the existing tributary drainage area boundaries were adjusted (refer to Section 2.2 of this report) and weighted C-values were calculated. An adjusted C-value of 0.77 was calculated for the combined existing storm

tributary area, which accounts for approximately 22.0 ac. Even though the overall tributary area went up 1.5 ac, the overall runoff coefficient went down. The result is the existing storm drain system still has adequate capacity for the 10-year storm event, with the 100-year storm flowing overland within Cottage Terrace, as originally designed. Refer to the *Drainage Report for Maravilla East Property Line Road*, dated May 12, 2008, revised October 15, 2008 (Ref. 4), and Appendix A for specific tributary area and C-value information.

3.0 PROPOSED DRAINAGE PLAN

3.1 Onsite Drainage Conditions (Post-Development)

This site was designed to utilize the existing storm drain system in Cottage Terrace Drive and to maintain the existing site outfall locations at the southwest corner of the property. During a 10-year storm event, the proposed storm drain system is designed to capture the runoff through a series of roof drains and catch basins at low points throughout the project site and convey it to the existing storm drain system located within Cottage Terrace. During a 100-year storm event, the runoff is expected to exceed the capacity of the proposed storm drain system and the excess will be conveyed overland (south on Cottage Terrace Drive) to the outfall at the southwest corner of the site and to the TPC golf course. The proposed grading is designed to allow for no more than 1.8 feet of ponding before the runoff overtops the local high points and continue towards the outfall location. The existing onsite private storm drain has also been extended to the outfall location of the new parking lot expansion where a new catch basin has been added. A catch basin has also been added to the existing sediment basin adjacent to the ultimate outfall along Hacienda Way. This portion of new storm drain has also been designed to accept runoff from a future Western Theme Town that will be located in this area (refer to Exhibits 5A and 5B – *Proposed Drainage Maps 1 &* 2 for location). Cottage Terrace Drive has been designed to handle the 100-year flow, per the approved *Drainage Report for Maravilla East Property Line Road*, dated May 12, 2008, revised October 15, 2008 (Ref. 4).

The tributary areas contributing to the existing storm drain system within Cottage Terrace is approximately 22.0 ac. The combined weighted C-value has been calculated for all the tributary areas contributing to the existing storm drain system, including the proposed improvements. The combined weighted C-value has been calculated to be 0.78. Refer to Appendix A for specific tributary area and C-value information, and Exhibits 5A and 5B for tributary area delineation. For a summary of the pre- versus post-weighted C-Values, see the table below:

Drainage Condition	Tributary Area (ac)	Weighted C-Value
Maravilla	20.5	0.90
Pre-Development (including Maravilla)	22.0	0.77
Post-Development (including Maravilla)	22.0	0.78
Pre-Fairmont	8.3	0.59
Post-Fairmont	8.3	0.61

Tributary areas, flow directions, catch basins, storm drains, 100-year overland flow paths, and the ultimate site outfall location are labeled on Exhibit 5A and 5B. The downstream location of the existing storm drain system that the proposed system is to tie into can be seen on Exhibit 4. Storm drain sizing calculations are provided in Appendix A.

3.2 Lowest Habitable Finished Floor Elevations

The Grading and Drainage Plan has been designed to comply with the City of Scottsdale's floodplain ordinance for a Zone "AO" floodplain. It is our understanding, unless other flood proof measures are presented and approved, the proposed lowest habitable finished floor (LFF) elevation must be designed a minimum of 1 foot above the anticipated 100-year flood elevation. As previously mentioned, the proposed finish floor for the new hotel building will be at elevation 1550.41, or 12.61 feet above the 100-year high water elevation in the TPC Golf Course. In addition, the lowest finish floor elevation is designed to be a minimum of 1 foot above the adjacent finish grade. Refer to Exhibits 5A and 5B for graphical representation.

The Site is located within a Zone "AO" floodplain, defined as having a flood depth of 1 foot. Therefore, the anticipated 100-year flood elevation is 1 foot above "natural" grade, and proposed LFF elevation must have 1 foot additional freeboard or be a minimum of 2 feet above natural grade. Due to the disturbed condition of the Site from previous development, the natural grade has been modified. According to Curry's Corner 7.5 minute Topographic Survey Map by USGS from 1964 with a contour interval of 10-feet, the approximate highest natural grade of this site prior to development is 1545.00, which is 5.41 feet lower than the proposed lowest finish floor of 1550.41. It is our understanding this is in compliance with the City's floodplain ordinance. Refer to the *Regional Contour Map* within Appendix D, which shows the highest natural grade elevation relative to the proposed building location.

3.3 Stormwater Retention

A Request for Stormwater Storage Waiver was submitted and approved by the City of Scottsdale on October 23, 2008 (refer to Appendix B). Therefore, onsite stormwater retention is not required.

3.4 Operation and Maintenance

The property owner shall be solely responsible for the operation and maintenance of the stormwater drainage system.

4.0 SPECIAL CONDITIONS

4.1 Special Conditions

Currently, there are no washes with 100-year flows greater than 50 cfs that traverse the project site. Also, there are no designated Section 404 washes within the site; therefore, no Section 404 permit is required.

5.0 DATA ANALYSIS

5.1 Hydrologic Analysis

The drainage improvements are to be developed consistent with Chapter 4 of the City of Scottsdale *Design Standards and Policies Manual*, 2010. The Rational Method has been used to quantify peak discharge values for onsite concentration points for the proposed build out scenario during the 10-year and 100-year storm events. Weighted "C" runoff coefficients were referenced from Chapter 4 of the City of Scottsdale *Design Standards and Policies Manual*, 2010. Refer to Appendix A – *Hydrologic and Hydraulic Calculations* for rational calculation printouts, and Exhibit 5 – *Proposed Drainage Map 1* for drainage basin tributary areas and concentration point locations.

5.2 Hydraulic Analysis

The onsite storm drain system has been designed to accommodate the 10-year storm event. Bentley StormCAD Version 8i was utilized to analyze the existing and proposed storm sewer system. StormCAD printouts and storm drain profiles can be located in Appendix A.

6.0 CONCLUSIONS

The project site is believed to be capable of development as presented with regard to the City of Scottsdale's onsite and offsite drainage requirements. The project's drainage highlights are as follows:

- The site is protected from offsite flows from the north by improvements, as outlined in the approved stormwater storage waiver.

- The proposed drainage infrastructure has been designed in accordance with the City of Scottsdale *Design Standards & Policies Manual*, 2010. The Rational Method was used to estimate peak discharges for all drainage areas. The flow capacities of the proposed storm system have been designed to accept the 10-year storm event.

- No stormwater retention has been provided for this project, per the approved stormwater storage waiver from the City of Scottsdale.

- The onsite 100-year storm event is to be conveyed south, by storm drain and overland flow, to the existing TPC Golf Course.

- The 100-year high water elevation is 1537.80 in the adjacent TPC golf course, which is 12.61 feet below the proposed new building lowest finish floor elevation of 1550.41.

- The project site is in a FEMA designated 100-year floodplain (Zone "AO-Depth 1 foot") in both pre- and post-development conditions.

- The lowest finish floor elevation of 1550.41 is approximately 5.41 feet higher than the highest natural ground elevation of 1545.00. It is our understanding this is in compliance with the City's floodplain ordinance, which requires the lowest finished floor to be a minimum of 2 feet above (1 foot for AO and 1 foot of freeboard) the natural highest grade.

APPENDIX A - FOR REFERENCE ONLY

7.0 REFERENCES

1. *Design Standards and Policies Manual, Chapter 4: Grading and Drainage*, City of Scottsdale, January 2010.
2. *Onsite Drainage Report for Fairmont Scottsdale Ballroom Addition*, Wood, Patel & Associates, Inc., July 14, 2011.
3. *Offsite Drainage Report for Fairmont Scottsdale Ballroom Addition*, Wood, Patel & Associates, Inc., July 14, 2011.
4. *Drainage Report for Maravilla East Property Line Road*, Wood, Patel & Associates, Inc., dated May 12, 2008, revised October 15, 2008.
5. *Drainage Study Core North/Core South Scottsdale, AZ,* Robert Ward, P.E., Consulting Engineering, September 25, 2001. Prepared for Arizona State Land Department.
6. *Sedimentation Report Reach 11 Dikes Hayden/Rhodes (Granite Reef) Aqueduct*, Earth Science Division, Surface Water Branch, Sedimentation Office of Denver, Colorado, July 1990.
7. *Maravilla Scottsdale Senior Living Community*, Wood, Patel & Associates, Inc., December 18, 2008, Revised February 13, 2009.
8. *Curry's Corner Quadrangle*, 7.5 Minute Series Topographic Map, USGS, 1964.

APPENDIX A - FOR REFERENCE ONLY

APPENDIX A

HYDROLOGIC AND HYDRAULIC CALCULATIONS

APPENDIX A - FOR REFERENCE ONLY

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Site I-D-F Curve

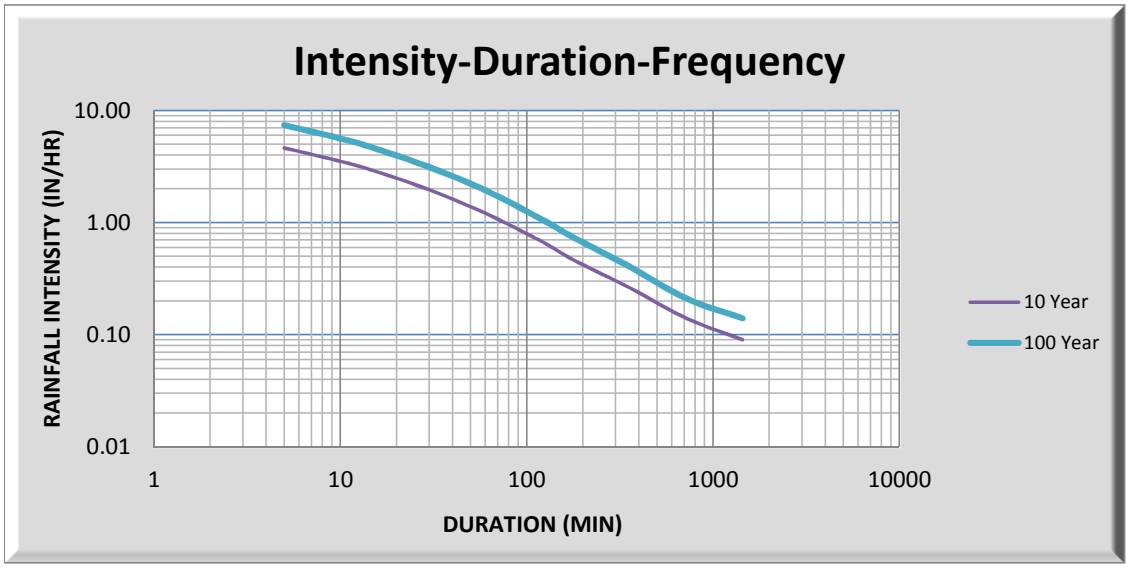
Description: Rational Method IDF Curve
Location: Fairmont Scottsdale Hotel Expansion
City of Scottsdale, Arizona

NOAA ATLAS 14 RAINFALL DEPTHS, INCHES

Duration	Average Recurrence Interval (years)					
	2	5	10	25	50	100
5-min	0.257	0.346	0.415	0.507	0.578	0.651
10-min	0.391	0.526	0.631	0.772	0.880	0.990
15-min	0.484	0.652	0.782	0.957	1.090	1.230
30-min	0.651	0.879	1.050	1.290	1.470	1.650
60-min	0.806	1.090	1.300	1.600	1.820	2.050
2-hr	0.931	1.240	1.480	1.800	2.040	2.290
3-hr	1.020	1.330	1.580	1.920	2.200	2.480
6-hr	1.210	1.540	1.810	2.170	2.450	2.750
12-hr	1.360	1.720	2.000	2.380	2.670	2.970
24-hr	1.610	2.070	2.450	2.970	3.380	3.810

RAINFALL INTENSITY, INCHES/HOUR

Duration minutes	Frequency, years					
	2	5	10	25	50	100
5	3.08	4.15	4.98	6.08	6.94	7.81
10	2.35	3.16	3.79	4.63	5.28	5.94
15	1.94	2.61	3.13	3.83	4.36	4.92
30	1.30	1.76	2.10	2.58	2.94	3.30
60	0.81	1.09	1.30	1.60	1.82	2.05
120	0.47	0.62	0.74	0.90	1.02	1.15
180	0.34	0.44	0.53	0.64	0.73	0.83
360	0.20	0.26	0.30	0.36	0.41	0.46
720	0.11	0.14	0.17	0.20	0.22	0.25
1440	0.07	0.09	0.10	0.12	0.14	0.16



APPENDIX A - FOR REFERENCE ONLY

NOAA Atlas 14, Volume 1, Version 5
Location name: Scottsdale, Arizona, US*
Latitude: 33.6488°, Longitude: -111.9060°
Elevation: 1583 ft*
* source: Google Maps

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	0.196 (0.163–0.241)	0.257 (0.215–0.315)	0.346 (0.287–0.422)	0.415 (0.342–0.505)	0.507 (0.412–0.615)	0.578 (0.463–0.696)	0.651 (0.512–0.782)	0.723 (0.560–0.867)	0.821 (0.620–0.987)	0.896 (0.663–1.08)
10-min	0.299 (0.248–0.366)	0.391 (0.326–0.479)	0.526 (0.436–0.643)	0.631 (0.520–0.768)	0.772 (0.626–0.936)	0.880 (0.705–1.06)	0.990 (0.780–1.19)	1.10 (0.852–1.32)	1.25 (0.943–1.50)	1.36 (1.01–1.64)
15-min	0.371 (0.308–0.454)	0.484 (0.405–0.593)	0.652 (0.540–0.797)	0.782 (0.645–0.953)	0.957 (0.777–1.16)	1.09 (0.874–1.31)	1.23 (0.966–1.48)	1.36 (1.06–1.64)	1.55 (1.17–1.86)	1.69 (1.25–2.03)
30-min	0.499 (0.414–0.611)	0.651 (0.545–0.799)	0.879 (0.728–1.07)	1.05 (0.868–1.28)	1.29 (1.05–1.56)	1.47 (1.18–1.77)	1.65 (1.30–1.99)	1.84 (1.42–2.20)	2.09 (1.57–2.51)	2.28 (1.68–2.74)
60-min	0.617 (0.513–0.756)	0.806 (0.674–0.989)	1.09 (0.901–1.33)	1.30 (1.08–1.59)	1.60 (1.29–1.93)	1.82 (1.46–2.19)	2.05 (1.61–2.46)	2.27 (1.76–2.73)	2.58 (1.95–3.10)	2.82 (2.08–3.39)
2-hr	0.720 (0.606–0.862)	0.931 (0.786–1.12)	1.24 (1.04–1.48)	1.48 (1.22–1.76)	1.80 (1.48–2.13)	2.04 (1.65–2.41)	2.29 (1.83–2.70)	2.55 (1.99–3.00)	2.89 (2.21–3.40)	3.15 (2.36–3.73)
3-hr	0.795 (0.670–0.973)	1.02 (0.861–1.25)	1.33 (1.12–1.63)	1.58 (1.31–1.92)	1.92 (1.58–2.32)	2.20 (1.78–2.64)	2.48 (1.97–2.98)	2.78 (2.17–3.33)	3.19 (2.42–3.82)	3.52 (2.61–4.22)
6-hr	0.958 (0.823–1.14)	1.21 (1.04–1.44)	1.54 (1.32–1.82)	1.81 (1.53–2.13)	2.17 (1.81–2.54)	2.45 (2.02–2.86)	2.75 (2.23–3.20)	3.05 (2.43–3.56)	3.45 (2.68–4.03)	3.77 (2.86–4.41)
12-hr	1.08 (0.933–1.27)	1.36 (1.17–1.60)	1.72 (1.48–2.01)	2.00 (1.71–2.33)	2.38 (2.01–2.77)	2.67 (2.22–3.10)	2.97 (2.44–3.44)	3.27 (2.65–3.79)	3.67 (2.90–4.28)	3.98 (3.09–4.67)
24-hr	1.27 (1.11–1.47)	1.61 (1.41–1.86)	2.07 (1.81–2.41)	2.45 (2.13–2.83)	2.97 (2.56–3.43)	3.38 (2.89–3.89)	3.81 (3.22–4.40)	4.26 (3.56–4.92)	4.89 (4.01–5.65)	5.39 (4.36–6.26)
2-day	1.37 (1.19–1.59)	1.75 (1.52–2.02)	2.29 (1.98–2.64)	2.72 (2.35–3.13)	3.32 (2.84–3.82)	3.80 (3.22–4.37)	4.30 (3.62–4.96)	4.83 (4.02–5.59)	5.56 (4.55–6.46)	6.15 (4.95–7.17)
3-day	1.47 (1.29–1.69)	1.88 (1.65–2.16)	2.48 (2.17–2.84)	2.96 (2.58–3.39)	3.65 (3.15–4.17)	4.19 (3.60–4.79)	4.78 (4.06–5.48)	5.40 (4.54–6.21)	6.27 (5.19–7.23)	6.97 (5.70–8.08)
4-day	1.58 (1.39–1.80)	2.02 (1.78–2.30)	2.67 (2.35–3.04)	3.21 (2.81–3.65)	3.97 (3.46–4.51)	4.59 (3.97–5.22)	5.26 (4.51–5.99)	5.96 (5.06–6.82)	6.97 (5.83–8.00)	7.80 (6.44–8.99)
7-day	1.78 (1.56–2.05)	2.28 (2.00–2.61)	3.03 (2.65–3.46)	3.64 (3.17–4.15)	4.51 (3.91–5.14)	5.22 (4.49–5.95)	5.97 (5.10–6.83)	6.79 (5.73–7.80)	7.94 (6.61–9.15)	8.89 (7.30–10.3)
10-day	1.94 (1.70–2.22)	2.48 (2.18–2.84)	3.29 (2.89–3.75)	3.94 (3.45–4.49)	4.87 (4.23–5.53)	5.62 (4.85–6.39)	6.42 (5.49–7.32)	7.27 (6.16–8.31)	8.48 (7.08–9.73)	9.46 (7.79–10.9)
20-day	2.40 (2.12–2.74)	3.10 (2.73–3.52)	4.10 (3.61–4.65)	4.86 (4.26–5.51)	5.90 (5.15–6.69)	6.71 (5.83–7.61)	7.54 (6.51–8.58)	8.39 (7.19–9.58)	9.55 (8.10–11.0)	10.5 (8.78–12.1)
30-day	2.82 (2.48–3.21)	3.64 (3.21–4.13)	4.81 (4.23–5.45)	5.70 (5.00–6.45)	6.91 (6.03–7.82)	7.85 (6.82–8.88)	8.82 (7.62–9.98)	9.80 (8.41–11.1)	11.1 (9.47–12.7)	12.2 (10.3–14.0)
45-day	3.30 (2.92–3.74)	4.26 (3.77–4.82)	5.63 (4.97–6.36)	6.65 (5.86–7.52)	8.02 (7.03–9.06)	9.06 (7.90–10.2)	10.1 (8.78–11.5)	11.2 (9.65–12.7)	12.6 (10.8–14.5)	13.8 (11.6–15.8)
60-day	3.67 (3.26–4.14)	4.75 (4.21–5.35)	6.26 (5.54–7.05)	7.37 (6.50–8.30)	8.82 (7.76–9.94)	9.92 (8.68–11.2)	11.0 (9.59–12.5)	12.1 (10.5–13.7)	13.6 (11.7–15.5)	14.7 (12.5–16.8)

[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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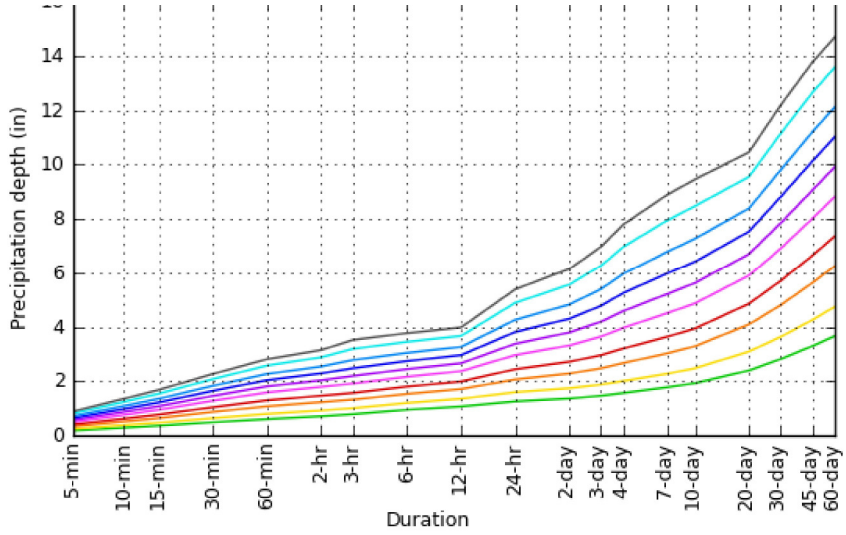

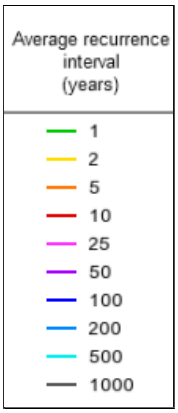

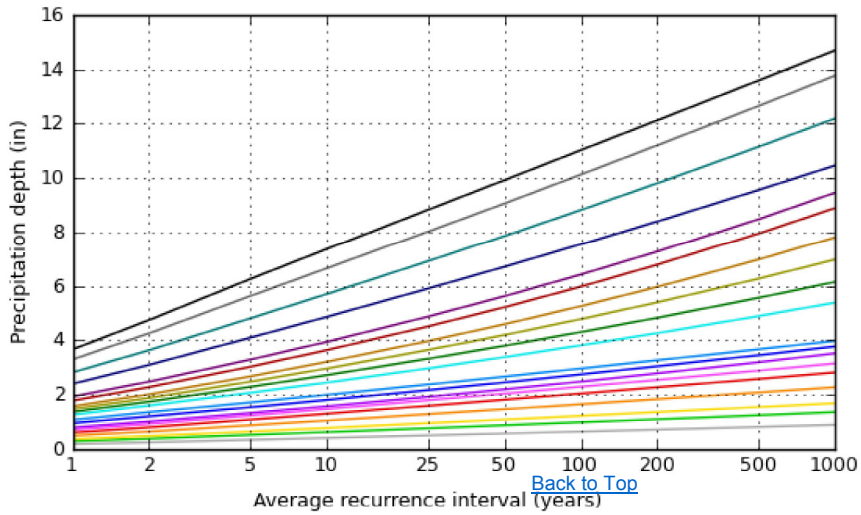

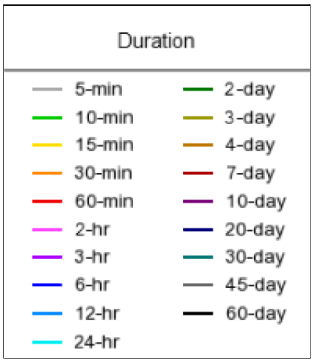

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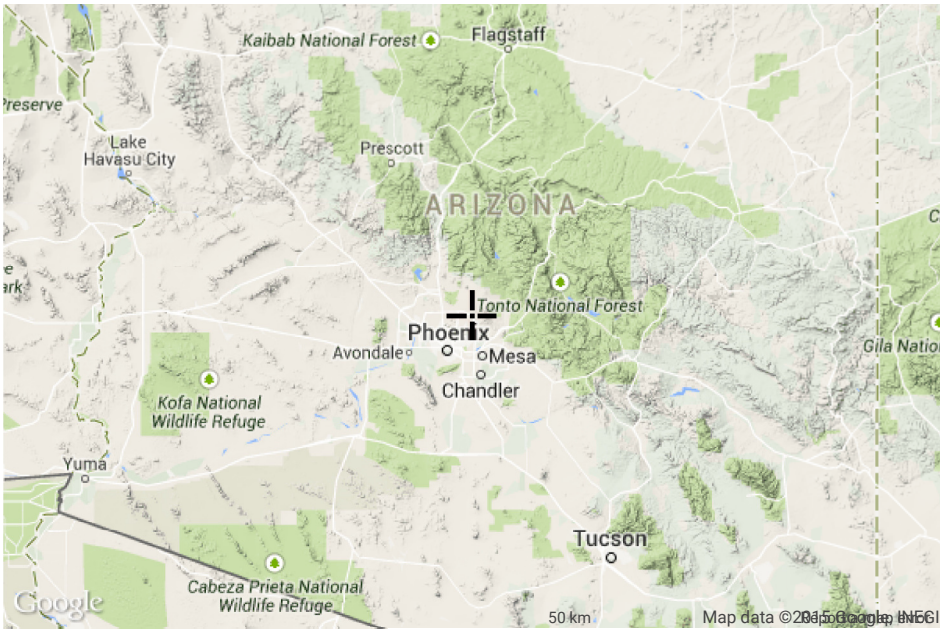
Maps & aerials

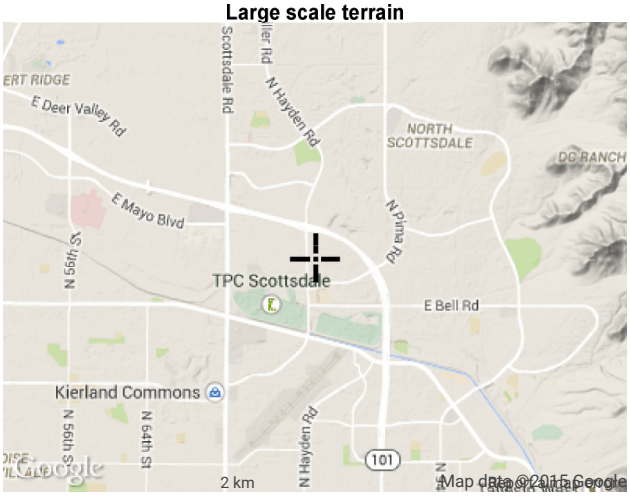
NOAA Atlas 14, Volume 1, Version 5 Created (GMT): Thu Feb 12 15:40:16 2015

Small scale terrain

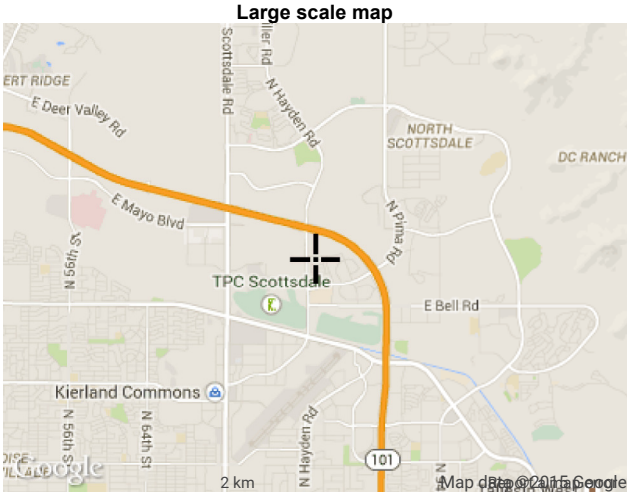


APPENDIX A - FOR REFERENCE ONLY

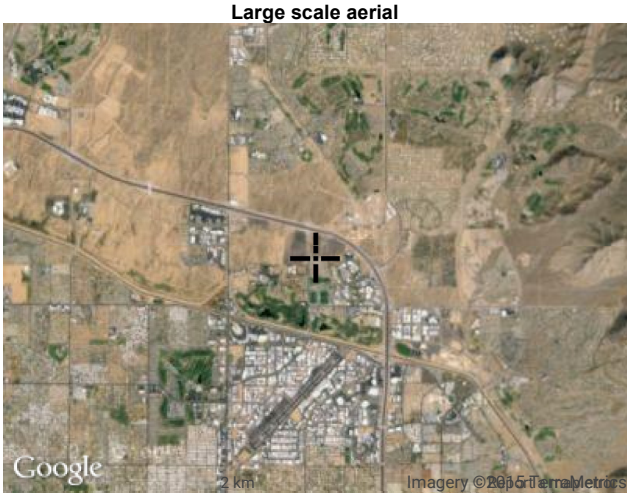
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
Office of Hydrologic Development
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WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Retention Volume Required

Description: Calculation of Required Retention Volume Using the Rational Method
Location: Fairmont Scottsdale Hotel Expansion
City of Scottsdale, Arizona
Reference: City of Scottsdale Design Standards and Policies Manual, 2010

Known Values: Design storm: 100-yr, 2-hr
Rainfall, D: 2.29

Calc. Values:

$$Vrequired = C \times \frac{D}{12} \times A$$

Where: V = Retention Volume Required
C = Runoff Coefficient
D = Depth of Rainfall
A = Area of Watershed Contributing

Retention Basin	Contributing Sub-Basins	Area (ac)	Land Use	100-Year Runoff Coefficient	100-Year, 2-Hour Volume (cu.ft)	100-Year, 2-Hour Volume (ac.ft)
Pre-Condition						
E2	E2	0.44	100% Desert	0.45	1,646	0.04
Post-Condition						
E2	E2	0.40	100% Desert	0.45	1,496	0.03

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Retention Volume Provided

Description: Calculation of Proposed Retention Volume Provided
Location: Fairmont Scottsdale Hotel Expansion
Reference: City of Scottsdale Design Standards and Policies Manual, 2010

Basin ID	Bottom Contour Area (sq.ft.)	Top Contour Area (sq.ft.)	Bottom Elevation (ft)	Top Elevation (ft)	Volume Provided (cu. ft.)	Total Volume Provided (acre-ft.)
E2	2,320	5,240	1556.0	1557.0	3,780	0.09

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Rational Method Summary

Description: Rational Method Inputs and Results
Location: Fairmont Scottsdale Hotel Expansion
City of Scottsdale, Arizona

Existing Runoff

Drainage ID	Longest Watercourse (ft)	Longest Watercourse "L" (mi)	Drainage Area (s.f.)	Drainage Area "A" (acres)	Watershed Resistance Coefficient "K_b"	Top Elev. (ft)	Bottom Elev. (ft)	Basin Slope "S" (ft/mi)	Land Use (1)	Post Q100 "Tc" (min)	100 YR Intensity "i" (in/hr)	100YR Runoff Coefficient "C"	**Post Q100 (cfs)**	Post Q10 "Tc" (min)	10 YR Intensity "i" (in/hr)	10YR Runoff Coefficient "C"	**Post Q10 (cfs)**
B1	544.0	0.103	138121	3.17	0.0731	60.0	54.0	58	100% Desert Landscaping	7.7	6.80	0.45	**9.7**	9.5	3.91	0.37	**4.6**
B2	209.0	0.040	38479	0.88	0.0403	59.5	56.3	81	100% Paved	2.9	8.60	0.95	**7.2**	3.5	5.34	0.90	**4.2**
B3	209.0	0.040	40583	0.93	0.0402	60.0	57.2	71	100% Paved	3.0	8.56	0.95	**7.6**	3.6	5.31	0.90	**4.4**
B4	218.0	0.041	41039	0.94	0.0402	58.0	54.7	80	100% Paved	3.0	8.56	0.95	**7.6**	3.5	5.34	0.90	**4.5**
B5	204.0	0.039	39679	0.91	0.0403	59.0	55.5	91	100% Paved	2.8	8.63	0.95	**7.5**	3.3	5.38	0.90	**4.4**
B6	397.0	0.075	86513	1.99	0.0381	57.4	53.0	59	71% Paved 29% Desert	4.4	8.03	0.80	**12.8**	5.3	4.91	0.74	**7.2**
B7	227.0	0.043	34517	0.79	0.0406	59.0	54.9	95	100% Commercial	2.9	8.60	0.86	**5.8**	3.5	5.34	0.80	**3.4**
B8	777.0	0.147	111872	2.57	0.0374	58.5	54.9	24	75% Paved 16% Grass 9% Desert	8.8	6.39	0.80	**13.1**	10.9	3.58	0.74	**6.8**
B9	120.0	0.023	9010	0.21	0.0442	75.5	75.2	13	100% Roof	4.2	8.11	0.95	**1.6**	5.0	4.98	0.90	**0.9**
B10	213.0	0.040	25528	0.59	0.0414	75.5	74.9	15	100% Roof	5.2	7.74	0.95	**4.3**	6.3	4.67	0.90	**2.5**
B11	207.0	0.039	15190	0.35	0.0428	75.5	74.9	15	100% Roof	5.2	7.74	0.95	**2.6**	6.3	4.67	0.90	**1.5**
B12	110.0	0.021	11907	0.27	0.0436	75.5	75.2	14	100% Roof	3.9	8.22	0.95	**2.1**	4.6	5.08	0.90	**1.2**
E3	186.4	0.035	6320	0.15	0.0913	60.2	53.5	190	100% Desert Landscaping	3.2	8.48	0.45	**0.6**	3.9	5.24	0.37	**0.3**
E4	572.6	0.108	115992	2.66	0.0373	53.0	47.1	54	59% Paved 41% Desert	5.5	7.62	0.74	**15.0**	6.6	4.60	0.68	**8.3**
E5	815.3	0.154	110212	2.53	0.0375	52.3	44.6	50	57% Paved 24% Desert 19% Grass	6.9	7.10	0.71	**12.8**	8.4	4.17	0.64	**6.8**
E6	881.3	0.167	114537	2.63	0.0374	51.9	41.0	65	100% Commercial	6.6	7.21	0.86	**16.3**	8.0	4.27	0.80	**9.0**
M1	533.3	0.101	133357	3.06	0.0370	43.1	41.1	20	100% Commercial	7.4	6.91	0.86	**18.2**	9.1	4.00	0.80	**9.8**
M2	212.3	0.040	17531	0.40	0.0855	34.4	31.2	80	100% Desert Landscaping	4.4	8.03	0.45	**1.4**	5.4	4.88	0.37	**0.7**

C_{Pre} (Overall) = 0.77
C_{Pre} (Fairmont) = 0.59

Notes:
1. The "B" areas represent the areas contributing to the storm drain line in Cottage Terrace from the Ballroom Addition project.
2. The "E" areas represent the areas contributing to the storm drain line in Cottage Terrace from the Maravilla East Property Line Road project.
3. The "M" areas represent the areas contributing to the storm drain line in Cottage Terrace from the Maravilla Senior Living project.

APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Existing

Catch Basin FlexTable: CatchBasin Table

Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Additional) (cfs)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (Out) (ft/s)	Headloss (ft)
EX CB-B1	56.00	44.73	4.60	4.60	50.03	50.00	1.46	0.03
EX CB-B2	56.30	52.80	4.20	4.20	53.90	53.59	4.48	0.31
EX CB-B3	57.20	53.70	4.40	4.40	54.83	54.50	4.56	0.32
EX CB-B4	54.70	51.20	4.50	4.50	52.70	52.59	2.63	0.11
EX CB-B5	55.50	52.00	4.40	4.40	53.90	53.80	2.49	0.10
EX CB-B6A	53.00	49.50	4.32	4.32	51.47	51.38	2.44	0.09
EX CB-B6B	60.95	51.00	1.44	1.44	55.04	54.78	4.13	0.26
EX CB-B6C	60.84	50.70	1.44	2.88	54.38	53.32	8.25	1.06
EX CB-B7	54.90	51.40	3.40	3.40	53.42	53.42	1.92	0.00
EX CB-B8	54.90	51.40	6.80	6.80	53.51	53.43	2.16	0.07
EX CB-B9	57.00	51.38	0.90	0.90	53.15	52.82	4.58	0.33
EX CB-B10	59.70	52.30	2.50	2.50	62.22	59.70	12.73	2.52
EX CB-B11	60.20	51.68	1.50	1.50	59.47	58.56	7.64	0.91
EX CB-B12A	60.80	51.00	0.60	0.60	51.51	51.36	3.07	0.15
EX CB-B12B	60.81	51.00	0.60	0.60	51.51	51.39	2.86	0.13
EX CB-E3	53.52	49.52	0.30	0.30	49.82	49.75	2.26	0.08
EX CB-E4	47.03	38.21	8.30	8.30	45.97	45.63	4.70	0.34
EX CB-E6A	42.78	37.06	0.90	0.90	41.79	41.79	0.51	0.00
EX CB-E6B	41.10	36.37	3.60	3.60	41.00	40.93	2.04	0.06
EX CB-E6C	38.00	35.95	0.90	0.90	38.00	38.00	0.51	0.00
EX CB-E6D	37.00	32.97	3.60	3.60	35.37	35.36	0.60	0.01
EX CB-M1	39.20	35.83	9.80	9.80	39.68	39.20	5.55	0.48
EX CB-M2	39.70	32.70	0.70	80.50	35.36	34.48	7.56	0.89

APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Existing

FlexTable: Conduit Table

Label	Start Node	Stop Node	Manning's n	Diameter (in)	Flow (cfs)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)
EX CO-15	EX MH-1	EX MH-6	0.012	18.0	8.70	77.7	0.021	16.32	52.28	51.82	4.92
EX CO-25	EX MH-2	EX MH-4	0.012	18.0	8.80	76.6	0.016	14.42	53.49	53.03	4.98
EX CO-35	EX MH-3	EX MH-4	0.012	24.0	10.20	135.2	0.007	19.77	53.26	53.03	3.25
EX CO-45	EX MH-4	EX MH-5	0.012	30.0	20.50	154.0	0.007	35.99	52.81	52.49	4.18
EX CO-55	EX MH-5	EX MH-6	0.012	30.0	23.00	158.0	0.007	36.05	52.25	51.82	4.69
EX CO-65	EX MH-6	EX MH-7	0.012	36.0	31.70	125.3	0.007	58.46	51.57	51.33	4.48
EX CO-75	EX MH-7	EX MH-8	0.012	36.0	32.60	67.0	0.007	58.56	51.33	51.20	4.61
EX CO-85	EX MH-8	EX MH-9	0.012	36.0	36.92	97.3	0.007	58.61	50.90	50.65	5.22
EX CO-95	EX MH-9	EX MH-10	0.012	36.0	41.00	73.7	0.014	84.14	50.23	49.99	5.80
EX CO-105	EX MH-10	EX MH-11	0.012	36.0	45.60	89.4	0.014	84.41	49.47	49.12	6.45
EX CO-115	EX MH-11	EX MH-12	0.012	36.0	45.90	101.8	0.014	85.63	48.59	48.18	6.49
EX CO-125	EX MH-12	EX MH-13	0.012	36.0	45.90	142.3	0.019	100.07	47.59	47.02	6.49
EX CO-135	EX MH-13	EX MH-14	0.012	36.0	45.90	16.4	0.002	35.67	46.82	46.75	6.49
EX CO-145	EX MH-14	EX MH-15	0.012	36.0	45.90	239.4	0.003	39.63	46.56	45.59	6.49
EX CO-155	EX MH-15	EX MH-16	0.012	36.0	54.20	208.3	0.003	39.73	44.95	43.78	7.67
EX CO-165	EX MH-16	EX MH-17	0.012	36.0	61.00	271.6	0.003	39.46	43.72	41.79	8.63
EX CO-175	EX MH-17	EX MH-18	0.012	42.0	61.90	127.7	0.003	59.45	41.34	40.92	6.43
EX CO-185	EX MH-18	EX MH-19	0.012	42.0	65.50	155.0	0.003	59.37	40.20	39.64	6.81
EX CO-195	EX MH-19	EX CB-M2	0.012	42.0	76.20	97.9	0.032	193.90	38.53	34.42	18.94
EX CO-205	EX CB-M2	O-1	0.013		80.50	162.0	0.009	195.32	34.48	32.56	10.22
EX CO-215	EX MH-20	EX MH-21	0.012	8.0	1.20	38.8	0.035	2.45	51.28	50.95	3.44
EX CO-225	EX MH-21	EX MH-9	0.012	18.0	4.08	187.4	0.016	14.28	50.89	50.65	2.31
EX CO-235	EX CB-E3	EX MH-11	0.013	12.0	0.30	219.9	0.028	5.99	49.75	49.12	3.97
EX CO-B1	EX CB-B1	EX MH-10	0.012	24.0	4.60	21.7	0.005	16.62	50.00	49.99	1.46
EX CO-B2	EX CB-B2	EX MH-1	0.012	18.0	4.20	176.9	0.020	15.94	53.59	52.54	7.61
EX CO-B3	EX CB-B3	EX MH-2	0.012	18.0	4.40	164.0	0.016	14.30	54.50	53.76	7.12
EX CO-B4	EX CB-B4	EX MH-1	0.012	18.0	4.50	37.1	0.050	25.54	52.59	52.54	10.89
EX CO-B5	EX CB-B5	EX MH-2	0.012	18.0	4.40	29.0	0.031	19.92	53.80	53.76	2.49
EX CO-B6A	EX CB-B6A	EX MH-8	0.012	18.0	4.32	124.1	0.019	15.76	51.38	51.20	2.44

APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Existing

FlexTable: Conduit Table

Label	Start Node	Stop Node	Manning's n	Diameter (in)	Flow (cfs)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)
EX CO-B6B	EX CB-B6B	EX CB-B6C	0.012	8.0	1.44	31.3	0.010	1.25	54.78	54.38	4.13
EX CO-B6C	EX CB-B6C	EX MH-21	0.012	8.0	2.88	49.0	0.041	2.66	53.32	50.95	8.25
EX CO-B7	EX CB-B7	EX MH-3	0.012	18.0	3.40	22.4	0.020	15.94	53.42	53.40	1.92
EX CO-B8	EX CB-B8	EX MH-3	0.012	24.0	6.80	48.6	0.009	23.32	53.43	53.40	2.16
EX CO-B9	EX CB-B9	EX MH-7	0.012	6.0	0.90	68.0	0.047	1.32	52.82	51.33	4.58
EX CO-B10	EX CB-B10	EX MH-5	0.012	6.0	2.50	101.4	0.024	0.94	69.64	52.49	12.73
EX CO-B11	EX CB-B11	EX MH-4	0.012	6.0	1.50	90.8	0.019	0.83	58.56	53.03	7.64
EX CO-B12A	EX CB-B12A	EX MH-20	0.012	8.0	0.60	5.5	0.175	5.48	51.36	51.41	10.31
EX CO-B12B	EX CB-B12B	EX MH-20	0.012	8.0	0.60	27.7	0.035	2.44	51.39	51.41	5.79
EX CO-E4	EX CB-E4	EX MH-15	0.012	18.0	8.30	6.3	0.021	16.36	45.63	45.59	4.70
EX CO-E6A	EX CB-E6A	EX MH-17	0.012	18.0	0.90	22.9	0.018	15.40	41.79	41.79	0.51
EX CO-E6B	EX CB-E6B	EX MH-18	0.012	18.0	3.60	10.6	0.010	11.57	40.93	40.92	2.04
EX CO-E6C	EX CB-E6C	EX MH-19	0.012	18.0	0.90	16.3	0.009	10.90	39.64	39.64	0.51
EX CO-E6D	EX CB-E6D	EX CB-M2	0.012	36.0	3.60	32.3	0.008	66.08	35.36	35.36	5.00
EX CO-M1	EX CB-M1	EX MH-19	0.012	18.0	9.80	15.4	0.002	5.01	39.76	39.64	5.55

Active Scenario: 10 yr - Existing

FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Diameter (in)	Flow (Total Out) (cfs)	Headloss Coefficient (Standard)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Local Fixed Flow (cfs)
EX MH-1	55.40	55.40	49.33	48.0	8.70	0.700	52.54	52.28	0.00
EX MH-2	55.70	55.70	51.11	48.0	8.80	0.700	53.76	53.49	0.00
EX MH-3	56.00	56.00	50.86	48.0	10.20	0.800	53.40	53.26	0.00
EX MH-4	56.15	56.15	49.88	48.0	20.50	0.800	53.03	52.81	0.00
EX MH-5	56.00	56.00	48.87	48.0	23.00	0.700	52.49	52.25	0.00
EX MH-6	54.82	54.82	47.73	48.0	31.70	0.800	51.82	51.57	0.00
EX MH-7	54.78	54.78	46.81	48.0	32.60		51.33	51.33	0.00
EX MH-8	54.72	54.72	46.37	48.0	36.92	0.700	51.20	50.90	0.00
EX MH-9	52.60	52.60	45.63	48.0	41.00	0.800	50.65	50.23	0.00
EX MH-10	53.30	53.30	44.53	48.0	45.60	0.800	49.99	49.47	0.00
EX MH-11	52.60	52.60	43.21	48.0	45.90	0.800	49.12	48.59	0.00
EX MH-12	53.00	53.00	41.68	48.0	45.90	0.900	48.18	47.59	0.00
EX MH-13	50.50	50.50	38.84	48.0	45.90	0.300	47.02	46.82	0.00
EX MH-14	50.00	50.00	38.80	48.0	45.90	0.300	46.75	46.56	0.00
EX MH-15	47.70	47.70	38.08	48.0	54.20	0.700	45.59	44.95	0.00
EX MH-16	45.20	45.20	37.45	48.0	61.00	0.050	43.78	43.72	6.80
EX MH-17	42.80	42.80	36.64	48.0	61.90	0.700	41.79	41.34	0.00
EX MH-18	42.20	42.20	36.26	48.0	65.50	1.000	40.92	40.20	0.00
EX MH-19	41.50	41.50	35.80	48.0	76.20	0.800	39.64	38.53	0.00
EX MH-20	60.00	60.00	50.04	48.0	1.20	0.700	51.41	51.28	0.00
EX MH-21	52.30	52.30	48.68	48.0	4.08	0.800	50.95	50.89	0.00

APPENDIX A - FOR REFERENCE ONLY

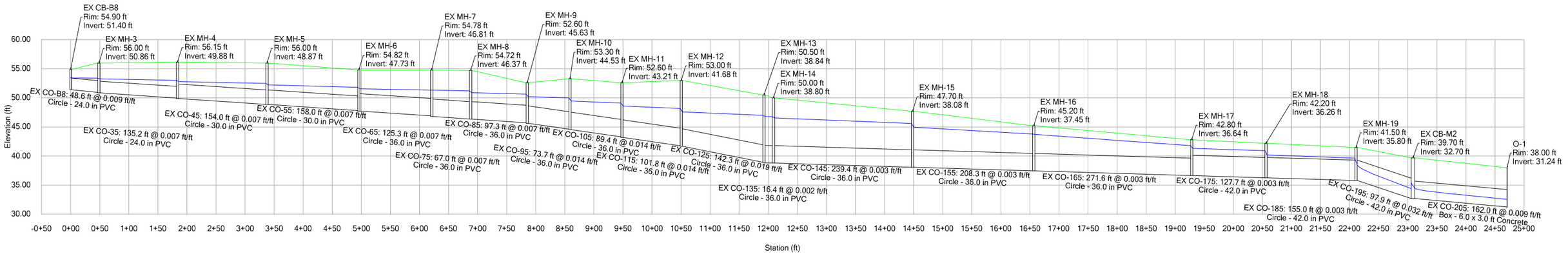
Active Scenario: 10 yr - Existing

FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Set Rim to Ground Elevation	Elevation (Invert) (ft)	Flow (Total Out) (cfs)	Boundary Condition Type
O-1	38.00	True	31.24	80.50	Free Outfall

APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Existing
Profile Report
Engineering Profile - EX CB-B8 TO O-1 (4302 StormCAD - Existing.stsw)



WOOD/PATEL

Rational Method Summary

Description: Rational Method Inputs and Results
Location: Fairmont Scottsdale Hotel Expansion
City of Scottsdale, Arizona

Proposed Runoff

Drainage ID	Longest Watercourse (ft)	Longest Watercourse "L" (mi)	Drainage Area (s.f.)	Drainage Area "A" (acres)	Watershed Resistance Coefficient "K_b"	Top Elev. (ft)	Bottom Elev. (ft)	Basin Slope "S" (ft/mi)	Land Use (1)	Post Q100 "Tc" (min)	100 YR Intensity "i" (in/hr)	100YR Runoff Coefficient "C"	**Post Q100 (cfs)**	Post Q10 "Tc" (min)	10 YR Intensity "i" (in/hr)	10YR Runoff Coefficient	**Post Q10 (cfs)**
Existing																	
B1	570.8	0.108	98439	2.26	0.0378	58.5	54.0	42	93% Desert 7% Paved	6.0	7.44	0.49	**8.2**	7.3	4.43	0.41	**4.1**
B2	209.0	0.040	38479	0.88	0.0403	59.5	56.3	81	100% Paved	2.9	8.60	0.95	**7.2**	3.5	5.34	0.90	**4.2**
B3	209.0	0.040	40583	0.93	0.0402	60.0	57.2	71	100% Paved	3.0	8.56	0.95	**7.6**	3.6	5.31	0.90	**4.4**
B4	218.0	0.041	41039	0.94	0.0402	58.0	54.7	80	100% Paved	3.0	8.56	0.95	**7.6**	3.5	5.34	0.90	**4.5**
B5	204.0	0.039	39679	0.91	0.0403	59.0	55.5	91	100% Paved	2.8	8.63	0.95	**7.5**	3.3	5.38	0.90	**4.4**
B6	397.0	0.075	86513	1.99	0.0381	57.4	53.0	59	71% Paved 29% Desert	4.4	8.03	0.80	**12.8**	5.3	4.91	0.74	**7.2**
B7	227.0	0.043	34517	0.79	0.0406	59.0	54.9	95	100% Commercial	2.9	8.60	0.86	**5.8**	3.5	5.34	0.80	**3.4**
B8	777.0	0.147	111872	2.57	0.0374	58.5	54.9	24	75% Paved 16% Grass 9% Desert	8.8	6.39	0.80	**13.1**	10.9	3.58	0.74	**6.8**
B9	120.0	0.023	9010	0.21	0.0442	75.5	75.2	13	100% Roof	4.2	8.11	0.95	**1.6**	5.0	4.98	0.90	**0.9**
B10	213.0	0.040	25528	0.59	0.0414	75.5	74.9	15	100% Roof	5.2	7.74	0.95	**4.3**	6.3	4.67	0.90	**2.5**
B11	207.0	0.039	15190	0.35	0.0428	75.5	74.9	15	100% Roof	5.2	7.74	0.95	**2.6**	6.3	4.67	0.90	**1.5**
B12	110.0	0.021	11907	0.27	0.0436	75.5	75.2	14	100% Roof	3.9	8.22	0.95	**2.1**	4.6	5.08	0.90	**1.2**
E3	186.4	0.035	6320	0.15	0.0913	60.2	53.5	190	100% Desert	3.2	8.48	0.45	**0.6**	3.9	5.24	0.37	**0.3**
E4	572.6	0.108	115992	2.66	0.0373	53.0	47.1	54	59% Paved 41% Desert	5.5	7.62	0.74	**15.0**	6.6	4.60	0.68	**8.3**
E5A	362.1	0.069	23934	0.55	0.0416	52.3	51.5	12	25% Grass 37% Desert 38% Paved	7.7	6.80	0.60	**2.2**	9.5	3.91	0.53	**1.1**
E5B	461.3	0.087	18390	0.42	0.0424	47.8	43.6	48	63% Paved 37% Desert	5.4	7.62	0.76	**2.4**	6.6	4.60	0.70	**1.4**
E6	362.1	0.069	96144	2.21	0.0378	49.2	41.0	120	100% Commercial	3.3	8.45	0.86	**16.1**	4.0	5.22	0.80	**9.2**
M1	533.3	0.101	133357	3.06	0.0370	43.1	41.1	20	100% Commercial	7.4	6.91	0.86	**18.2**	9.1	4.00	0.80	**9.8**
M2	212.3	0.040	17531	0.40	0.0855	34.4	31.2	80	100% Desert	4.4	8.03	0.45	**1.4**	5.3	4.91	0.37	**0.7**

WOOD/PATEL

Rational Method Summary

Description: Rational Method Inputs and Results
Location: Fairmont Scottsdale Hotel Expansion
City of Scottsdale, Arizona

Proposed Runoff

Drainage ID	Longest Watercourse (ft)	Longest Watercourse "L" (mi)	Drainage Area (s.f.)	Drainage Area "A" (acres)	Watershed Resistance Coefficient "K_b"	Top Elev. (ft)	Bottom Elev. (ft)	Basin Slope "S" (ft/mi)	Land Use (1)	Post Q100 "Tc" (min)	100 YR Intensity "i" (in/hr)	100YR Runoff Coefficient "C"	**Post Q100 (cfs)**	Post Q10 "Tc" (min)	10 YR Intensity "i" (in/hr)	10YR Runoff Coefficient	**Post Q10 (cfs)**
Proposed																	
N1	214.3	0.041	23664	0.54	0.0417	59.0	55.0	99	100% Paved	2.8	8.63	0.95	**4.4**	3.4	5.36	0.90	**2.6**
N2	177.1	0.034	17431	0.40	0.0425	56.9	54.0	86	100% Paved	2.7	8.67	0.95	**3.3**	3.2	5.41	0.90	**1.9**
S1	213.4	0.040	10161	0.23	0.0440	51.3	47.1	104	100% Desert	2.8	8.63	0.45	**0.9**	3.4	5.36	0.37	**0.5**
S2	142.7	0.027	14219	0.33	0.0430	50.3	47.5	104	90% Grass 6% Desert 4% Paved	2.3	8.82	0.34	**1.0**	2.7	5.53	0.24	**0.4**
S3	223.3	0.042	9702	0.22	0.0441	61.3	49.0	291	53% Paved 47% Grass	2.1	8.89	0.64	**1.3**	2.5	5.58	0.57	**0.7**
S4	95.2	0.018	4391	0.10	0.0463	75.0	74.1	50	100% Roof	2.4	8.78	0.95	**0.8**	2.9	5.48	0.90	**0.5**
S5	94.2	0.018	4494	0.10	0.0463	75.0	74.1	50	100% Roof	2.4	8.78	0.95	**0.8**	2.9	5.48	0.90	**0.5**
S6	98.0	0.019	4535	0.10	0.0463	75.0	74.0	54	100% Roof	2.4	8.78	0.95	**0.8**	2.9	5.48	0.90	**0.5**
S7	98.1	0.019	4481	0.10	0.0463	75.0	74.0	54	100% Roof	2.4	8.78	0.95	**0.8**	2.9	5.48	0.90	**0.5**
S8	95.4	0.018	4336	0.10	0.0463	75.0	74.1	50	100% Roof	2.4	8.78	0.95	**0.8**	2.9	5.48	0.90	**0.5**
S9	70.1	0.013	4212	0.10	0.0463	49.9	44.0	444	90% Desert 10% Paved	1.0	9.31	0.50	**0.5**	1.2	5.88	0.42	**0.2**
S10	63.7	0.012	2915	0.07	0.0472	75.0	74.4	50	100% Roof	2.0	8.93	0.95	**0.6**	2.4	5.60	0.90	**0.4**
S11	73.0	0.014	3903	0.09	0.0465	75.0	74.3	51	100% Roof	2.1	8.89	0.95	**0.8**	2.5	5.58	0.90	**0.5**
S12	151.2	0.029	19168	0.44	0.0422	51.6	47.5	143	49% Grass 35% Desert 16% Paved	2.1	8.89	0.45	**1.8**	2.5	5.58	0.37	**0.9**

C_{post} (Overall) = 0.78
C_{post} (Fairmont) = 0.61

Notes:
1. The "B" areas represent the areas contributing to the storm drain line in Cottage Terrace from the Ballroom Addition project.
2. The "E" areas represent the areas contributing to the storm drain line in Cottage Terrace from the Maravilla East Property Line Road project.
3. The "M" areas represent the areas contributing to the storm drain line in Cottage Terrace from the Maravilla Senior Living project.

WOOD/PATEL

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Curb Opening Summary

Description: Design Calculations for Curb Openings
Reference: FCDMC Drainage Design Manual for Maricopa County, Arizona, *Hydraulics (2013)*
Location: Fairmont Scottsdale Hotel Expansion

Known Values and Equations:

$$Q^{(1)} = CLH^{3/2}$$

Where:
Q = Capacity (cfs)
C = Coefficient = 3.0 for Curb Opening, Use: 3.0
L = Length of Opening (ft)
H = Max Headwater Depth of Flow (ft)

Curb Opening Summary

Drainage Area	Opening Type	Length, L (ft)	Coefficient	Depth, H (ft)	Capacity Q (cfs)	Q_{10} (cfs)	Q_{100} (cfs)
N1	Curb Opening	4	3.0	0.5	4.2	2.6	4.4
N2	Curb Opening	4	3.0	0.5	4.2	1.9	3.3

Notes
1) Per FCDMC Drainage Design Manual, Volume II, Hydraulics, (2013) equation 8.19
2) When the curb opening for drainage area N1 is exceeded, the excess will flow to the curb opening in drainage area N2.

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Inlet Capacity Summary

Description: Summary of Inlet Sizing Calculations
Location: Fairmont Scottsdale Hotel Expansion

Inlet ID	Contributing Drainage Area ID	Q10 (cfs)	Available Head (ft)	Inlet Type	Inlet Capacity (cfs)	10-Year Actual Ponding Depth (ft)
CB-S1	S1 & E5A	1.6	0.5	MAG 535	9.02	0.17
CB-S2	S2	0.4	0.5	MAG 535	9.02	0.07
CB-S3	S3	0.7	0.5	MAG 535	9.02	0.06
CB-S9	S9	0.2	0.5	MAG 535	9.02	0.05
CB-S12	S12	0.9	0.5	MAG 535	9.02	0.09
CB-N12	N1 & N2	4.5	1.0	MAG 535	25.50	0.31
CB-B1	1/3 B1	1.4	1.5	MAG 535	35.69	0.15

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Inlet Capacity - Sump Locations

Description: Calculation of Inlet Capacity for Single MAG 535 Catch Basin (w/o Curb)
Location: Fairmont Scottsdale Hotel Expansion
Reference: Drainage Design Manual for Maricopa County, Vol. II, Hydraulics, pg. 3-27

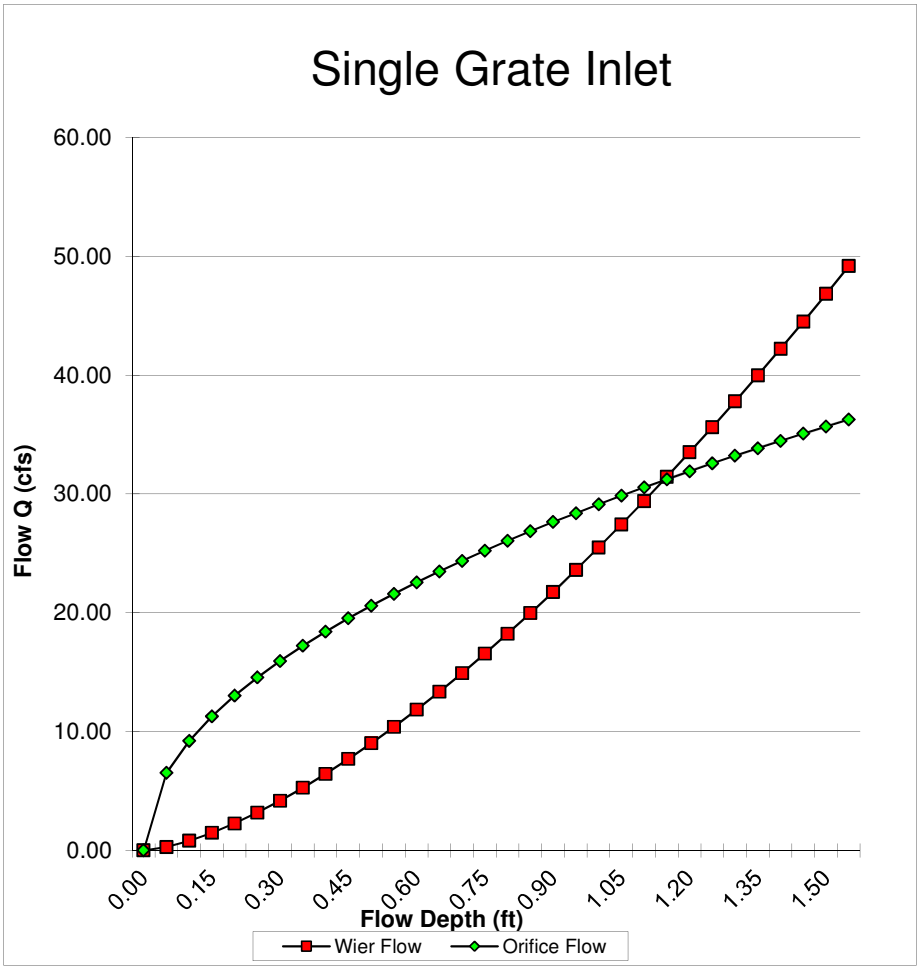
Weir EQ. $Q_i = C_w P d^{1.5}$ **Orifice EQ.** $Q_i = C_o A (2gd)^{0.5}$

Where: $C_w = 3.0$, $C_o = 0.67$

P =	**8.50**	**ft**
A =	**5.42**	**sq.ft.**

where,
P = Perimeter of Catchbasin minus
area of longitudinal & lateral bars (2 Short Sides, 1 Long Side)
A = Total area of grate minus
area of longitudinal & lateral bars

Depth (ft)	Weir Qi (cfs)	Orifice Qi (cfs)
0.00	**0.00**	**0.00**
0.05	**0.29**	**6.52**
0.10	**0.81**	**9.22**
0.15	**1.48**	**11.29**
0.20	**2.28**	**13.03**
0.25	**3.19**	**14.57**
0.30	**4.19**	**15.96**
0.35	**5.28**	**17.24**
0.40	**6.45**	**18.43**
0.45	**7.70**	**19.55**
0.50	**9.02**	**20.61**
0.55	**10.40**	**21.61**
0.60	**11.85**	**22.57**
0.65	**13.36**	**23.49**
0.70	**14.93**	**24.38**
0.75	**16.56**	**25.24**
0.80	**18.25**	**26.07**
0.85	**19.98**	**26.87**
0.90	**21.77**	**27.65**
0.95	**23.61**	**28.40**
1.00	**25.50**	**29.14**
1.05	**27.44**	**29.86**
1.10	**29.42**	**30.56**
1.15	31.45	**31.25**
1.20	33.52	**31.92**
1.25	35.64	**32.58**
1.30	37.80	**33.23**
1.35	40.00	**33.86**
1.40	42.24	**34.48**
1.45	44.52	**35.09**
1.50	46.85	**35.69**
1.55	49.21	**36.28**



APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed

Catch Basin FlexTable: CatchBasin Table

Label	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Flow (Additional) (cfs)	Flow (Total Out) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (Out) (ft/s)	Headloss (ft)
CB-B1	51.00	44.93	1.36	8.60	51.12	51.00	2.74	0.12
CB-N12	52.50	48.04	4.50	4.50	51.32	51.29	1.43	0.03
CB-S1	46.00	38.60	1.60	6.10	46.06	46.00	1.94	0.06
CB-S2	47.50	42.66	0.40	4.00	46.13	46.11	1.27	0.03
CB-S3	49.00	44.00	0.70	0.70	46.14	46.13	0.40	0.00
CB-S4	50.41	46.40	0.50	0.50	46.93	46.76	3.30	0.17
CB-S5	50.41	46.40	0.50	0.50	48.48	47.97	5.73	0.51
CB-S6	50.41	46.40	0.50	0.50	46.93	46.76	3.30	0.17
CB-S7	50.41	44.56	0.50	0.50	46.71	46.61	2.55	0.10
CB-S8	50.41	46.40	0.50	0.50	49.68	49.17	5.73	0.51
CB-S9	44.00	39.00	0.20	1.10	44.01	44.00	0.62	0.01
CB-S10A	48.90	43.64	0.20	0.20	44.17	44.09	2.29	0.08
CB-S10B	50.41	43.60	0.20	0.20	44.31	44.23	2.29	0.08
CB-S11A	50.41	45.00	0.25	0.25	45.44	45.28	3.20	0.16
CB-S11B	50.41	44.54	0.25	0.25	44.98	44.82	3.20	0.16
CB-S12	47.50	44.00	0.90	1.90	46.24	46.22	1.08	0.02
EX CB-B1	56.00	44.73	0.00	8.60	53.44	53.32	2.74	0.12
EX CB-E4	47.30	38.21	8.30	8.30	47.64	47.30	4.70	0.34
EX CB-E6A	42.78	37.06	0.92	0.92	42.14	42.13	0.52	0.00
EX CB-E6B	41.10	36.37	3.68	3.68	41.17	41.10	2.08	0.07
EX CB-E6C	38.00	35.95	0.92	0.92	38.00	38.00	0.52	0.00
EX CB-E6D	37.00	32.97	3.68	3.68	35.50	35.49	0.58	0.01
EX CB-M1	39.20	35.83	9.80	9.80	39.68	39.20	5.55	0.48
EX CB-M2	39.70	32.70	0.70	86.50	35.49	34.56	7.74	0.93

APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed

FlexTable: Conduit Table

Label	Start Node	Stop Node	Manning's n	Diameter (in)	Flow (cfs)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)
CO-15	CB-S1	MH-1	0.012	24.0	6.10	9.4	0.011	25.26	47.55	47.54	1.94
CO-25	MH-2	CB-S1	0.012	24.0	4.50	223.4	0.016	30.81	46.08	46.00	1.43
CO-35	CB-S4	MH-2	0.012	6.0	0.50	21.9	0.157	2.41	46.76	46.10	9.67
CO-45	CB-S2	MH-2	0.012	24.0	4.00	33.8	0.016	30.68	46.11	46.10	1.27
CO-55	CB-S5	MH-10	0.012	4.0	0.50	30.7	0.119	0.71	47.97	46.16	5.73
CO-65	CB-S3	CB-S2	0.012	18.0	0.70	75.3	0.018	15.18	46.13	46.13	0.40
CO-75	MH-10	CB-S2	0.012	18.0	2.90	5.7	0.016	14.26	46.14	46.13	1.64
CO-77	MH-3	MH-10	0.012	18.0	2.40	63.6	0.015	14.06	46.19	46.16	1.36
CO-85	CB-S6	MH-3	0.012	6.0	0.50	28.2	0.074	1.66	46.76	46.21	7.39
CO-95	CB-S12	MH-3	0.012	18.0	1.90	17.7	0.016	14.30	46.22	46.21	1.08
CO-105	MH-4	CB-S12	0.012	8.0	1.00	23.8	0.034	2.42	46.37	46.24	2.86
CO-115	CB-S7	MH-4	0.012	6.0	0.50	20.2	-0.021	0.88	46.61	46.48	2.55
CO-125	CB-S8	MH-4	0.012	4.0	0.50	45.9	0.035	0.38	49.17	46.48	5.73
CO-135	CB-S11A	MH-5	0.012	4.0	0.25	2.5	0.020	0.29	45.28	45.20	3.74
CO-145	MH-5	MH-6	0.010	12.0	0.25	16.5	0.028	7.73	44.83	44.53	4.51
CO-155	CB-S11B	MH-6	0.012	4.0	0.25	2.5	0.020	0.29	44.82	44.74	3.74
CO-165	MH-6	MH-7	0.012	12.0	0.50	32.0	0.028	6.48	44.45	44.06	4.88
CO-175	CB-S10A	MH-7	0.012	4.0	0.20	2.5	0.020	0.29	44.09	44.06	2.29
CO-185	MH-7	MH-8	0.012	12.0	0.70	44.6	0.028	6.49	44.05	44.04	5.40
CO-195	CB-S10B	MH-8	0.012	4.0	0.20	19.8	0.064	0.52	44.23	44.04	2.29
CO-205	MH-8	CB-S9	0.012	12.0	0.90	47.1	0.064	9.74	44.03	44.00	1.15
CO-215	CB-S9	MH-9	0.012	18.0	1.10	14.9	0.080	32.18	44.32	44.32	0.62
CO-220	MH-10	EX CB-B1	0.010	24.0	8.60	7.2	0.006	21.96	53.45	53.44	2.74
CO-225	CB-B1	MH-10	0.012	24.0	8.60	31.9	0.005	17.36	53.52	53.48	2.74
CO-230	MH-11	CB-B1	0.012	24.0	7.24	163.4	0.007	20.47	51.14	51.00	2.30
CO-235	MH-12	MH-11	0.010	24.0	5.87	90.0	0.007	24.40	51.24	51.20	1.87
CO-240	CB-N12	MH-12	0.012	24.0	4.50	22.7	0.015	30.41	51.29	51.29	1.43
EX CO-105	EX MH-10	EX MH-11	0.012	36.0	49.60	89.4	0.014	84.41	52.99	52.56	7.02
EX CO-115	EX MH-11	EX MH-12	0.012	36.0	49.90	101.8	0.014	85.63	51.95	51.46	7.06

Active Scenario: 10 yr - Proposed

FlexTable: Conduit Table

Label	Start Node	Stop Node	Manning's n	Diameter (in)	Flow (cfs)	Length (Unified) (ft)	Slope (Calculated) (ft/ft)	Capacity (Full Flow) (cfs)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Velocity (ft/s)
EX CO-125	EX MH-12	EX MH-13	0.012	36.0	49.90	142.3	0.019	100.08	50.76	50.08	7.06
EX CO-135	EX MH-13	EX MH-14	0.012	36.0	49.90	16.2	0.002	35.87	49.85	49.77	7.06
EX CO-145	EX MH-14	EX MH-15	0.012	36.0	49.90	239.4	0.003	39.63	49.54	48.40	7.06
EX CO-155A	EX MH-15	MH-1	0.012	36.0	58.20	25.0	0.003	40.84	47.70	47.54	8.23
EX CO-155B	MH-1	EX MH-16	0.012	36.0	64.30	183.3	0.003	39.58	46.65	45.20	9.10
EX CO-165A	EX MH-16	MH-9	0.012	36.0	65.70	129.0	0.003	39.72	45.39	44.32	9.29
EX CO-165B	MH-9	EX MH-17	0.012	36.0	66.80	142.6	0.003	39.22	43.35	42.13	9.45
EX CO-175	EX MH-17	EX MH-18	0.012	42.0	67.72	127.3	0.003	59.55	41.59	41.10	7.04
EX CO-185	EX MH-18	EX MH-19	0.012	42.0	71.40	155.2	0.003	59.33	40.50	39.84	7.42
EX CO-195	EX MH-19	EX CB-M2	0.012	42.0	82.12	96.5	0.032	195.30	38.63	34.50	19.42
EX CO-205	EX CB-M2	O-1	0.013		86.50	163.2	0.009	194.59	34.56	32.64	10.42
EX CO-B1	EX CB-B1	EX MH-10	0.012	24.0	8.60	19.6	0.005	17.49	53.32	53.30	2.74
EX CO-E4	EX CB-E4	EX MH-15	0.012	18.0	8.30	5.8	0.023	17.10	48.43	48.40	4.70
EX CO-E6A	EX CB-E6A	EX MH-17	0.012	18.0	0.92	22.6	0.019	15.52	42.13	42.13	0.52
EX CO-E6B	EX CB-E6B	EX MH-18	0.012	18.0	3.68	10.7	0.010	11.55	41.11	41.10	2.08
EX CO-E6C	EX CB-E6C	EX MH-19	0.012	18.0	0.92	16.7	0.009	10.77	39.84	39.84	0.52
EX CO-E6D	EX CB-E6D	EX CB-M2	0.012	36.0	3.68	30.1	0.009	68.42	35.49	35.49	5.15
EX CO-M1	EX CB-M1	EX MH-19	0.012	18.0	9.80	16.0	0.002	4.93	39.96	39.84	5.55

APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed

FlexTable: Manhole Table

Label	Elevation (Ground) (ft)	Elevation (Rim) (ft)	Elevation (Invert) (ft)	Diameter (in)	Flow (Total Out) (cfs)	Headloss Coefficient (Standard)	Hydraulic Grade Line (In) (ft)	Hydraulic Grade Line (Out) (ft)	Local Fixed Flow (cfs)
EX MH-10	53.30	53.30	44.53	48.0	49.60	0.800	53.60	52.99	41.00
EX MH-11	52.60	52.60	43.21	48.0	49.90	0.800	52.56	51.95	0.30
EX MH-12	53.00	53.00	41.68	48.0	49.90	0.900	51.46	50.76	0.00
EX MH-13	50.50	50.50	38.84	36.0	49.90	0.300	50.08	49.85	0.00
EX MH-14	50.00	50.00	38.80	48.0	49.90	0.300	49.77	49.54	0.00
EX MH-15	48.40	48.40	38.08	36.0	58.20	0.800	48.55	47.70	0.00
EX MH-16	45.20	45.20	37.45	48.0	65.70	0.050	45.27	45.20	1.40
EX MH-17	42.80	42.80	36.64	48.0	67.72	0.700	42.13	41.59	0.00
EX MH-18	42.20	42.20	36.26	48.0	71.40	0.700	41.10	40.50	0.00
EX MH-19	41.50	41.50	35.80	48.0	82.12	0.800	39.84	38.63	0.00
MH-1	47.54	47.54	38.00	48.0	64.30	0.700	47.55	46.65	0.00
MH-2	48.50	48.50	42.13	36.0	4.50	0.700	46.10	46.08	0.00
MH-3	47.75	47.75	43.72	36.0	2.40	0.700	46.21	46.19	0.00
MH-4	47.75	47.75	44.81	48.0	1.00	0.800	46.48	46.37	0.00
MH-5	49.91	49.91	44.62	36.0	0.25	0.900	44.89	44.83	0.00
MH-6	49.91	49.91	44.16	36.0	0.50	0.700	44.53	44.45	0.00
MH-7	48.38	48.38	43.26	36.0	0.70	0.700	44.06	44.05	0.00
MH-8	47.80	47.80	42.00	36.0	0.90	0.700	44.04	44.03	0.00
MH-9	45.00	45.00	37.06	48.0	66.80	0.700	44.32	43.35	0.00
MH-10	47.52	47.52	42.75	36.0	2.90	0.700	46.16	46.14	0.00
MH-10	53.65	53.65	44.77	36.0	8.60	0.300	53.48	53.45	0.00
MH-11	53.50	53.50	46.07	48.0	7.24	0.700	51.20	51.14	1.37
MH-12	55.60	55.60	46.69	48.0	5.87	0.900	51.29	51.24	1.37

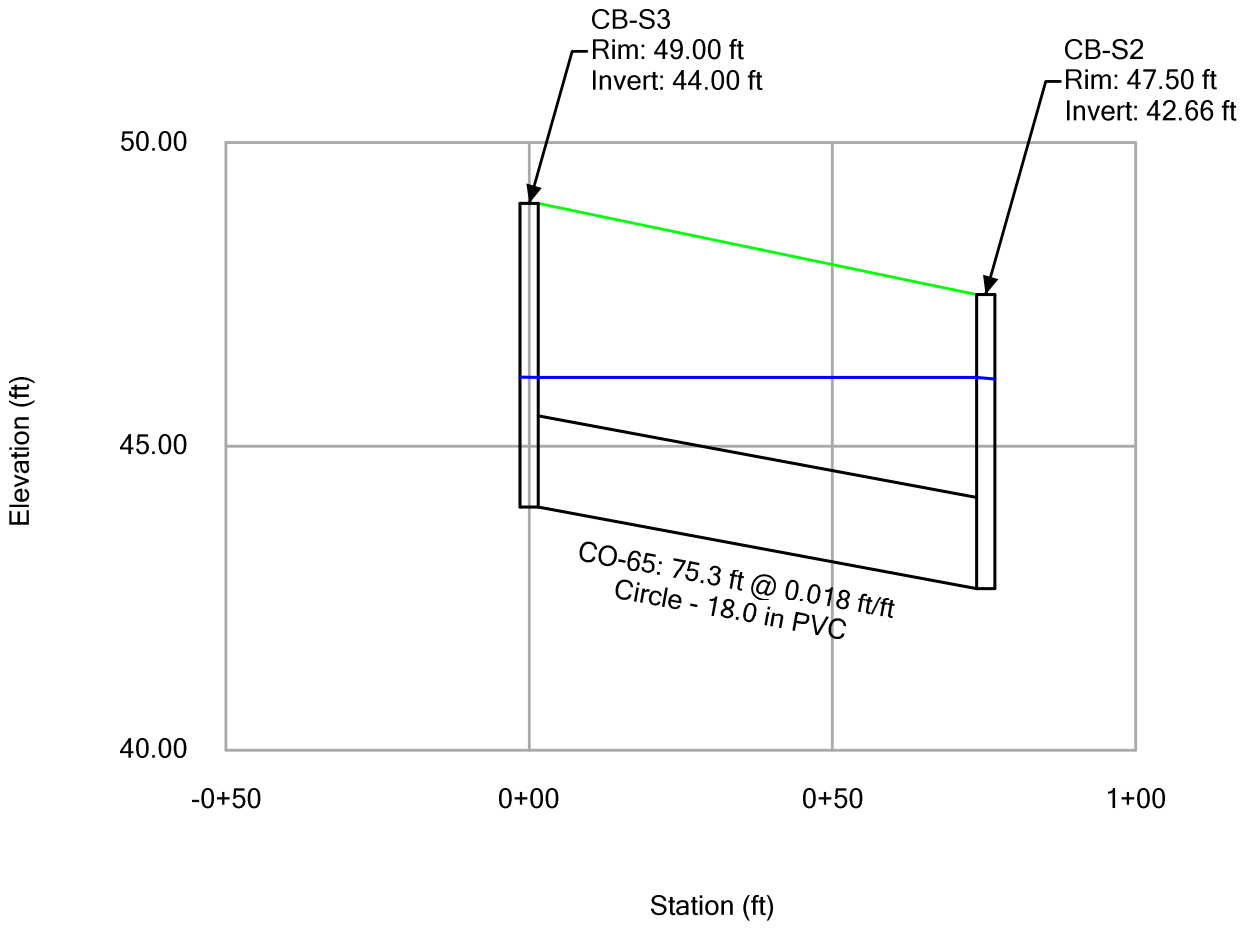
APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
FlexTable: Outfall Table

Label	Elevation (Ground) (ft)	Set Rim to Ground Elevation	Elevation (Invert) (ft)	Flow (Total Out) (cfs)	Boundary Condition Type
O-1	38.00	True	31.24	86.50	Free Outfall

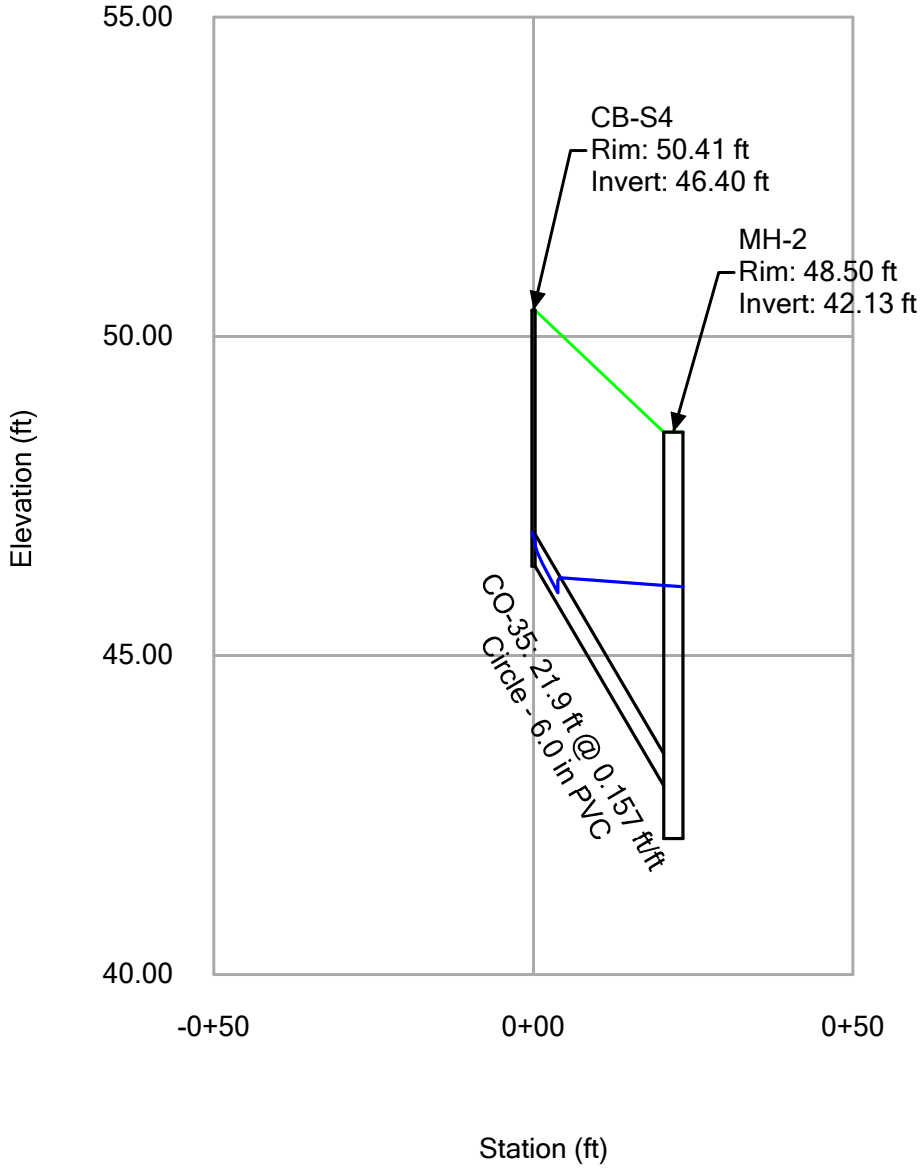
APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - CB-S3 TO CB-S2 (4302 StormCAD - Proposed.stsw)



APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - CB-S4 TO MH-2 (4302 StormCAD - Proposed.stsw)

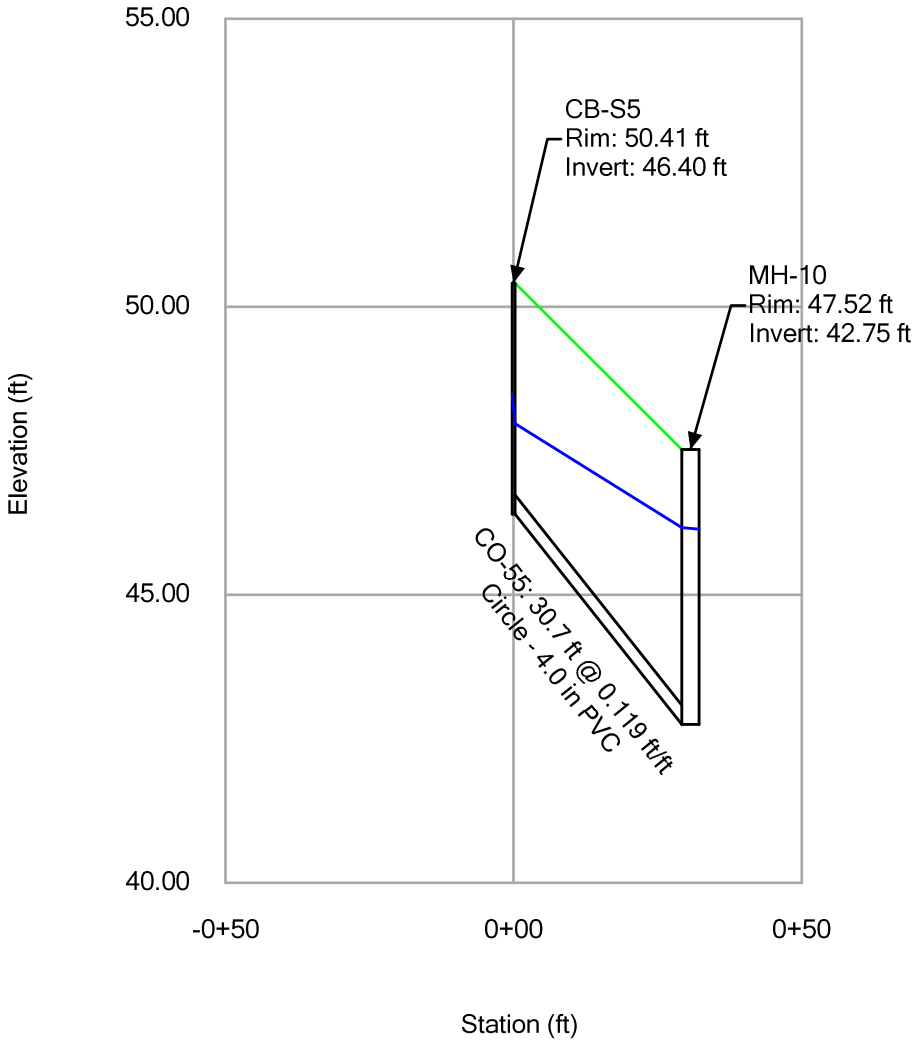


APPENDIX A - FOR REFERENCE ONLY

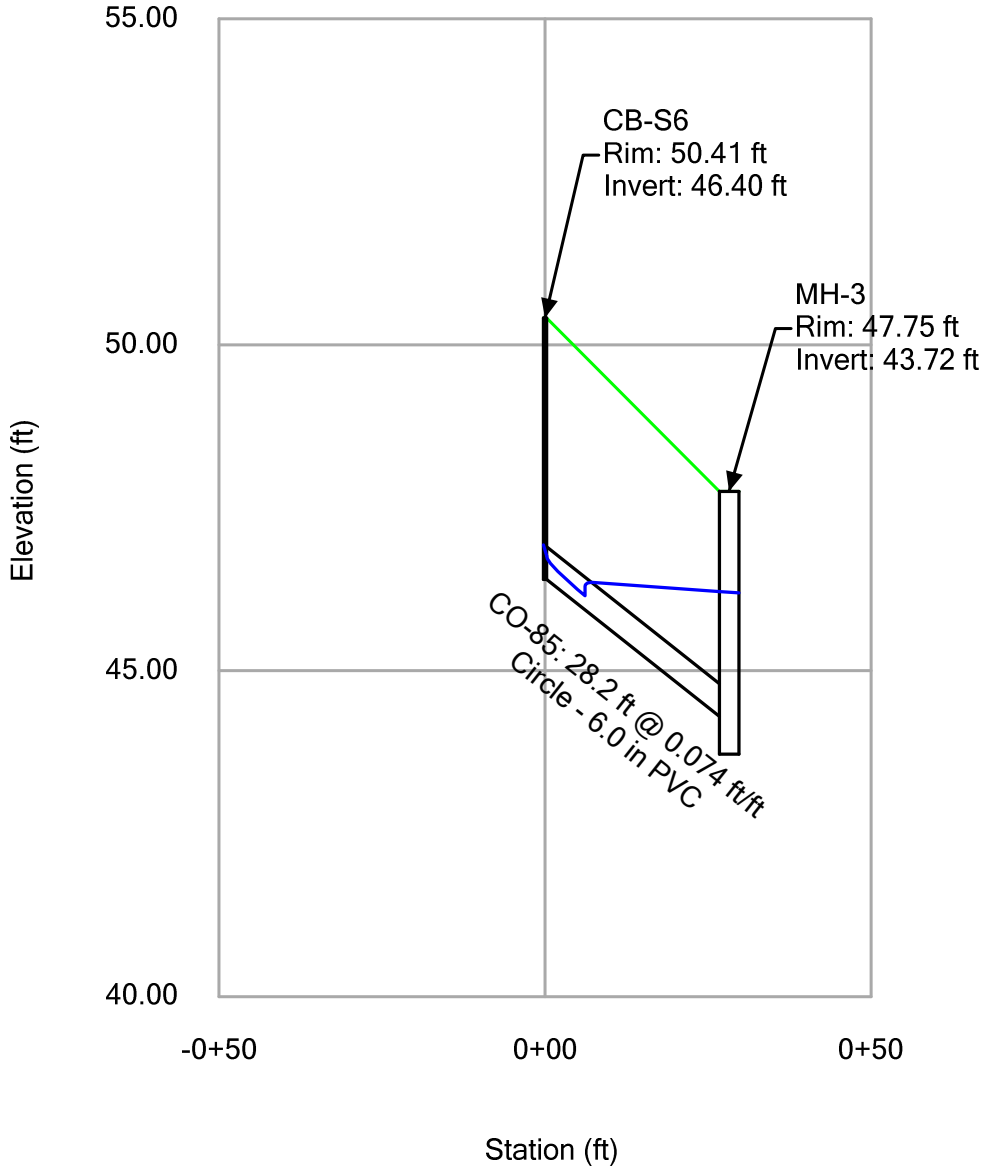
Active Scenario: 10 yr - Proposed

Profile Report

Engineering Profile - CB-S5 TO MH-10 (4302 StormCAD - Proposed.stsw)

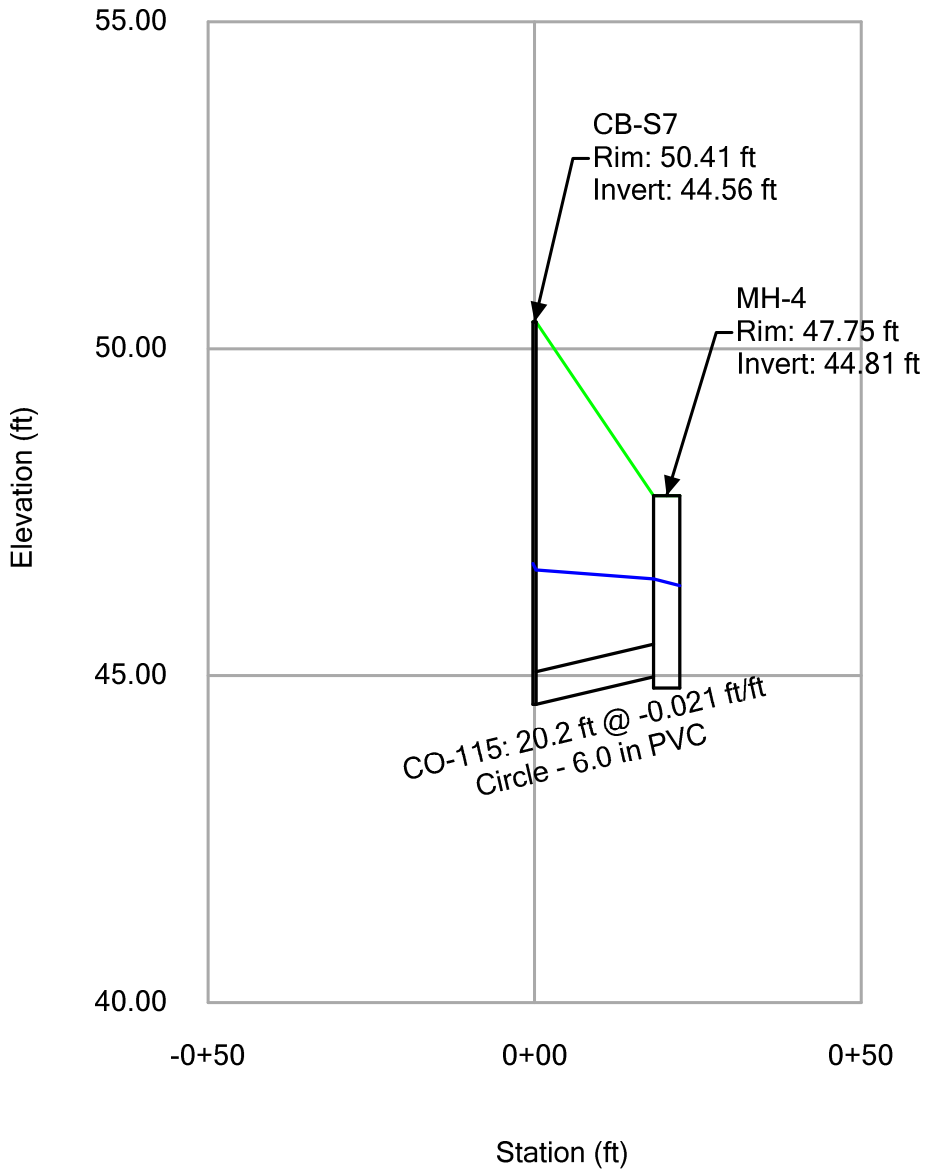


Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - CB-S6 TO MH-3 (4302 StormCAD - Proposed.stsw)



APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - CB-S7 TO MH-4 (4302 StormCAD - Proposed.stsw)

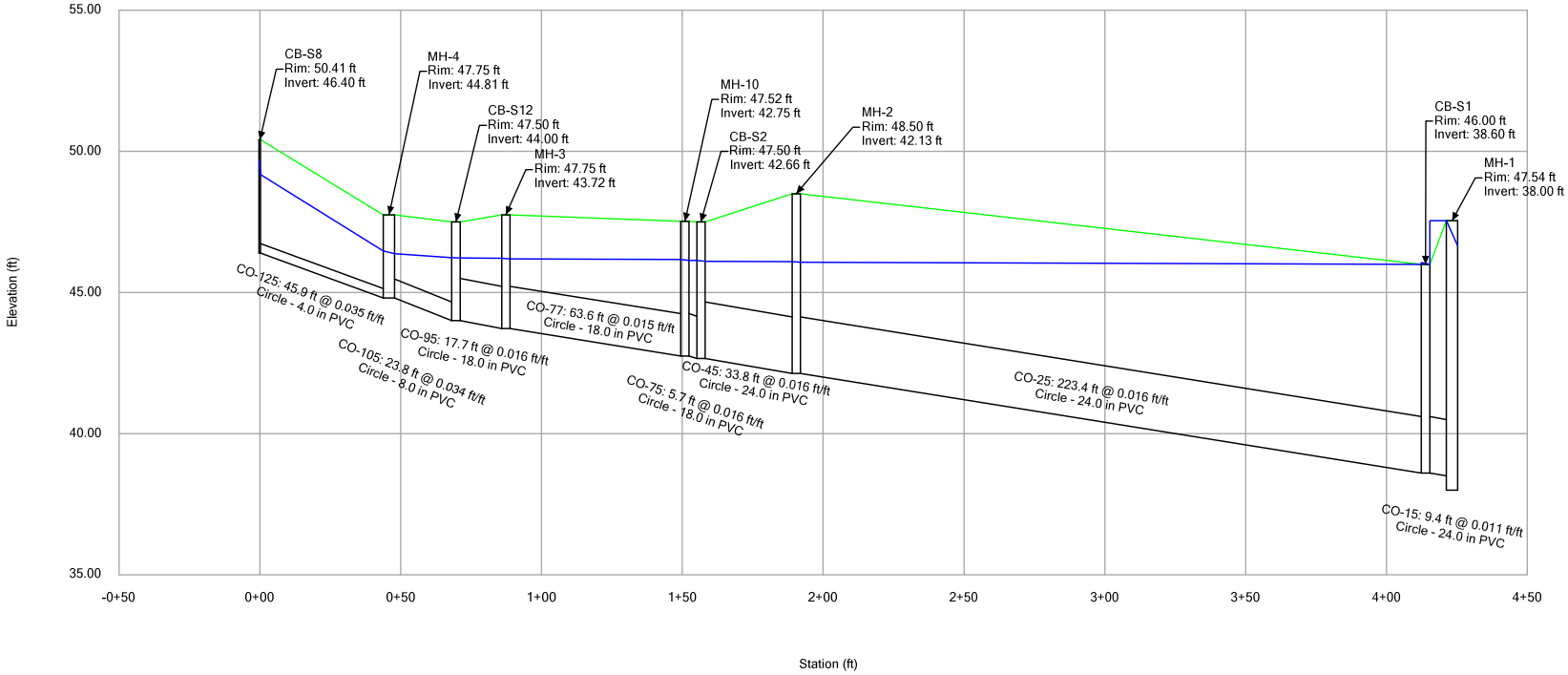


APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed

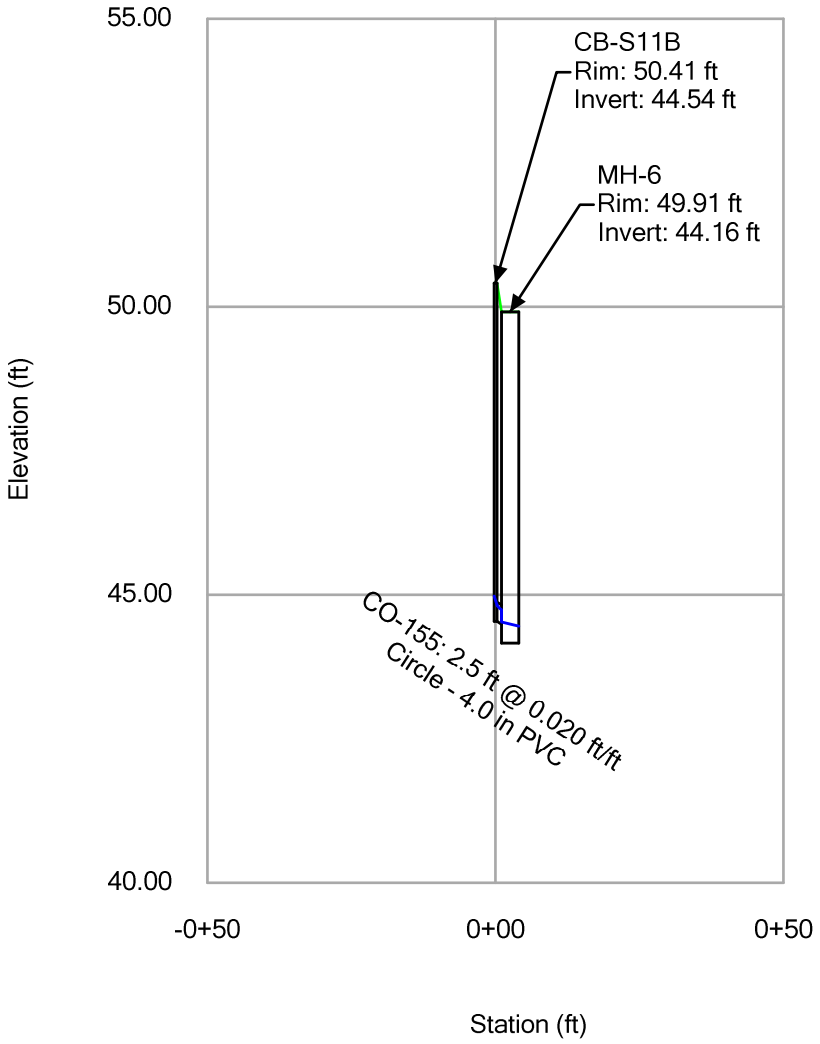
Profile Report

Engineering Profile - CB-S8 TO MH-1 (4302 StormCAD - Proposed.stsw)



APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - CB-S11B TO MH-6 (4302 StormCAD - Proposed.stsw)

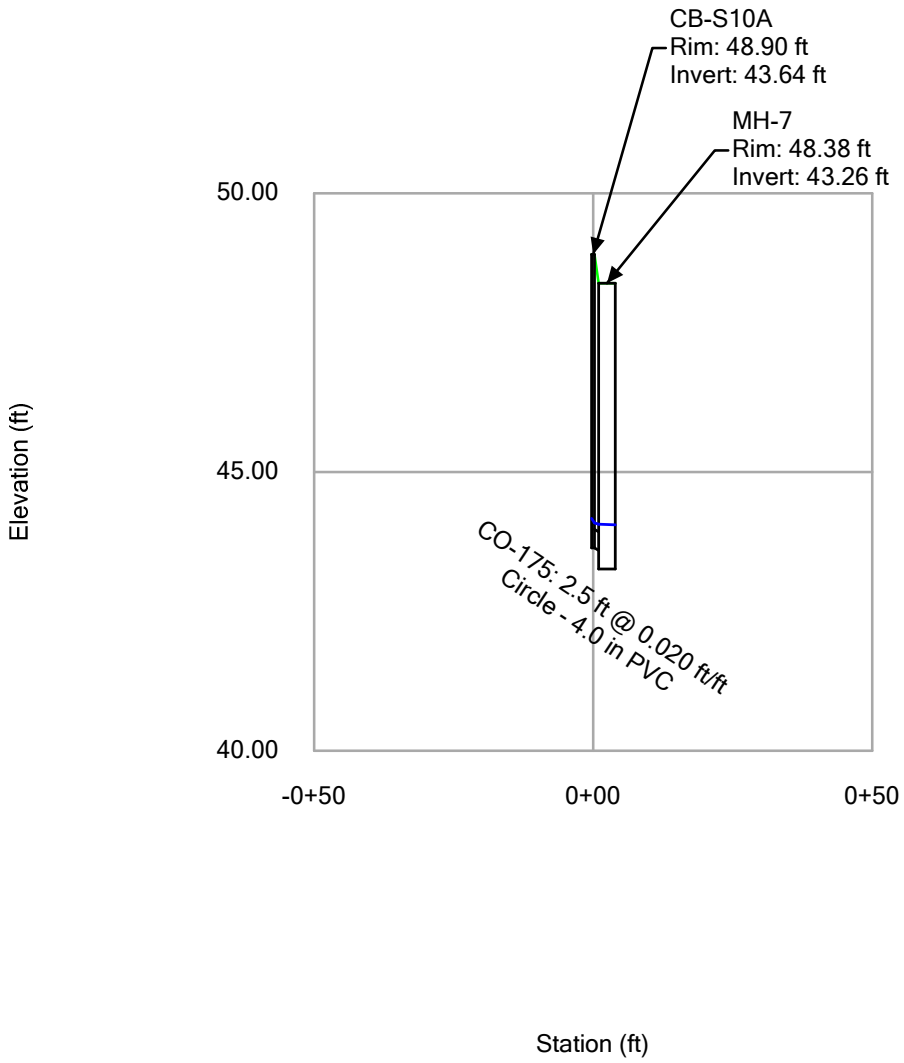


APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed

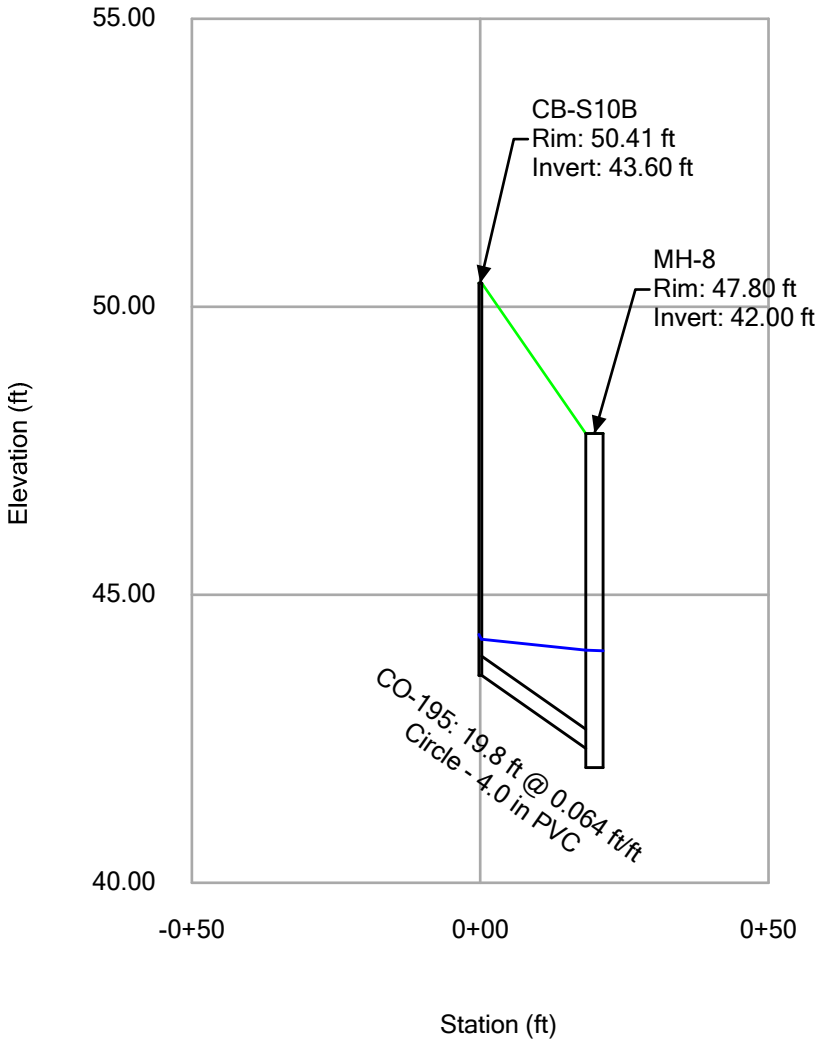
Profile Report

Engineering Profile - CB-S10A TO MH-7 (4302 StormCAD - Proposed.stsw)



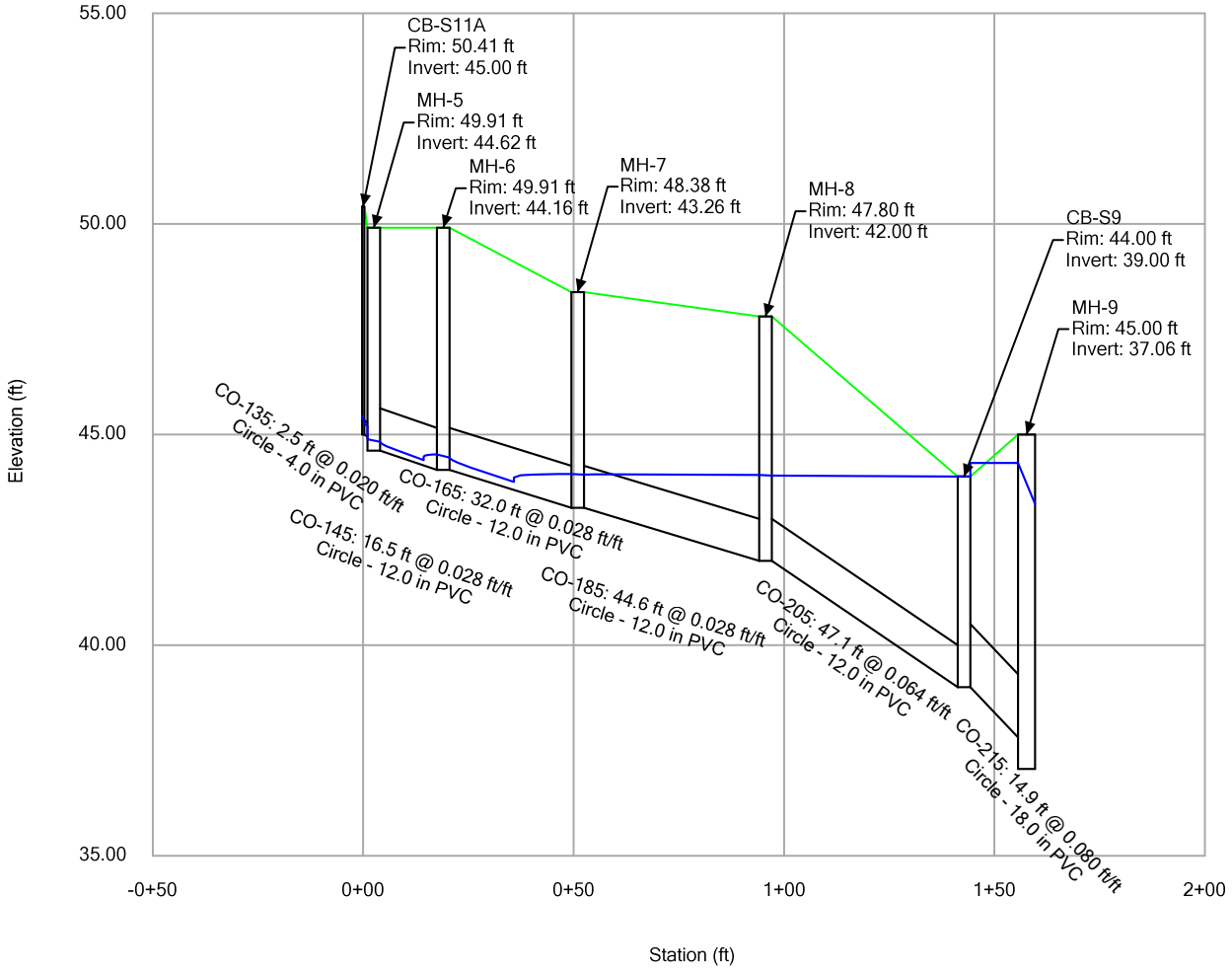
APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - CB-S10B TO MH-8 (4302 StormCAD - Proposed.stsw)



APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - CB-S11A TO MH-9 (4302 StormCAD - Proposed.stsw)

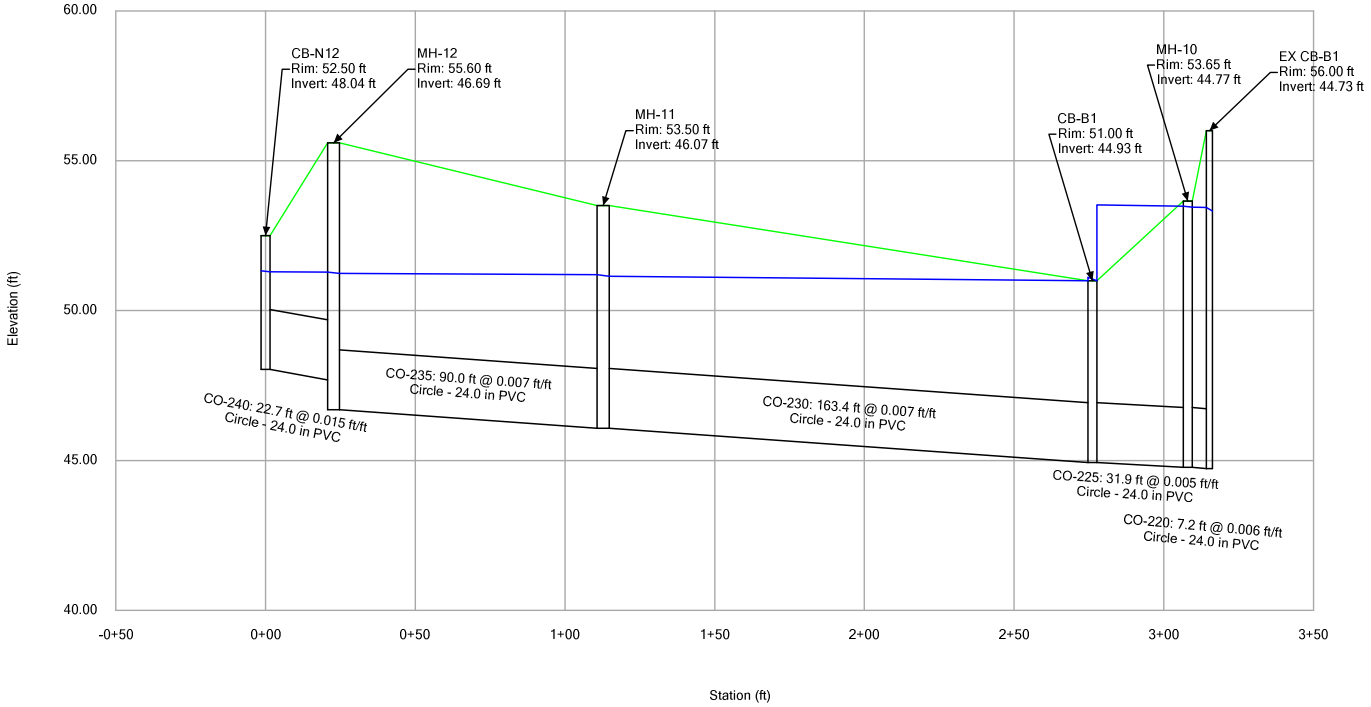


APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed

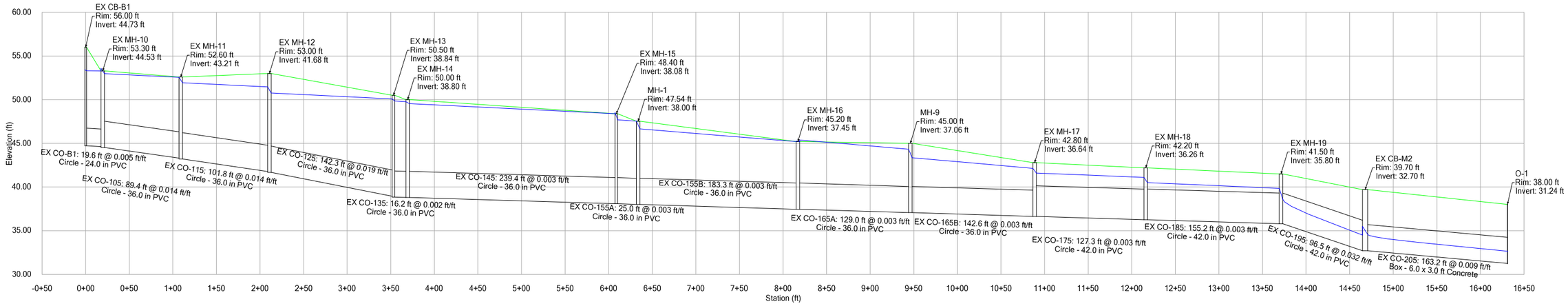
Profile Report

Engineering Profile - CB-N12 TO EX CB-B1 (4302 StormCAD - Proposed.stsw)



APPENDIX A - FOR REFERENCE ONLY

Active Scenario: 10 yr - Proposed
Profile Report
Engineering Profile - EX CB-B1 TO O-1 (4302 StormCAD - Proposed.stsw)



APPENDIX A - FOR REFERENCE ONLY

APPENDIX B

STORMWATER STORAGE WAIVER /
PROPOSED DRAINAGE IMPROVEMENTS EXHIBIT

PRINCESS

APPENDIX A - FOR REFERENCE ONLY

10/22

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC# 6332-07-7

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

Date 7/14/08 Project Name Fairmont Scottsdale Princess Resort

Project Location 7575 East Princess Drive Scottsdale, AZ 85255

Applicant Contact John Bulka Company Name Wood Patel & Associates

Phone 480-834-3300 Fax 480-834-3320 E-mail jbulka@woodpatel.com

Address 1855 N. Stapley Mesa, AZ 85203

Waiver Criteria

A waiver is an intentional relinquishment of a claim or right. A project must meet at least one of six criteria listed below for the city to consider waiving some or all required stormwater storage. Check the applicable box and provide a signed engineering report and supporting engineering analyses that demonstrate the project meets the criteria *and* that the effect of a waiver will not increase the potential for flooding on any property.

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

☒ 2. The development is adjacent to a watercourse or channel that an engineering analysis shows is designed and constructed to handle the additional runoff without increasing the potential for flood damage to the subject property or to any other property.

☐ 3. The development is on a parcel less than one-half acre in size in an area where the engineering analysis demonstrates there is no significant increase in potential for flood damage due to its development.

☐ 4. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO). The applicant must demonstrate there is no increased potential for flood damage to the subject property or to any other property. Such conflicts with ESLO may include:

- Total land requirements for storage basin, easements, setbacks, and NAOS prevent building allowable footprint per zoning.
- Topography prevents building storage basin.
- Creating a storage facility requires wash modification.
- Instances where the Zoning Administrator cannot allow a modification to ESL requirements.

☐ 5. The project is located within the Downtown Fee Reduction Area as described and approved by City Council Resolution #6238 (see map). The applicant must demonstrate there is no increased potential for flood damage to any property. Even if the project is located in the Downtown area, if the project creates additional potential for increased flood damage, the developer must provide alternative mitigation methods to prevent the damage.

☐ 6. The project is located within a watershed that drains directly to the Salt River Pima-Maricopa Indian Community (SRPMIC) (see map). The project must provide the pre-development peak discharge flow to the SRPMIC, and attenuate flows over and above pre-development.

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

John Bulka

Developer or Engineer (circle one)

7-16-08

Date

Planning & Development Services Department

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

SWW

6332-07-7

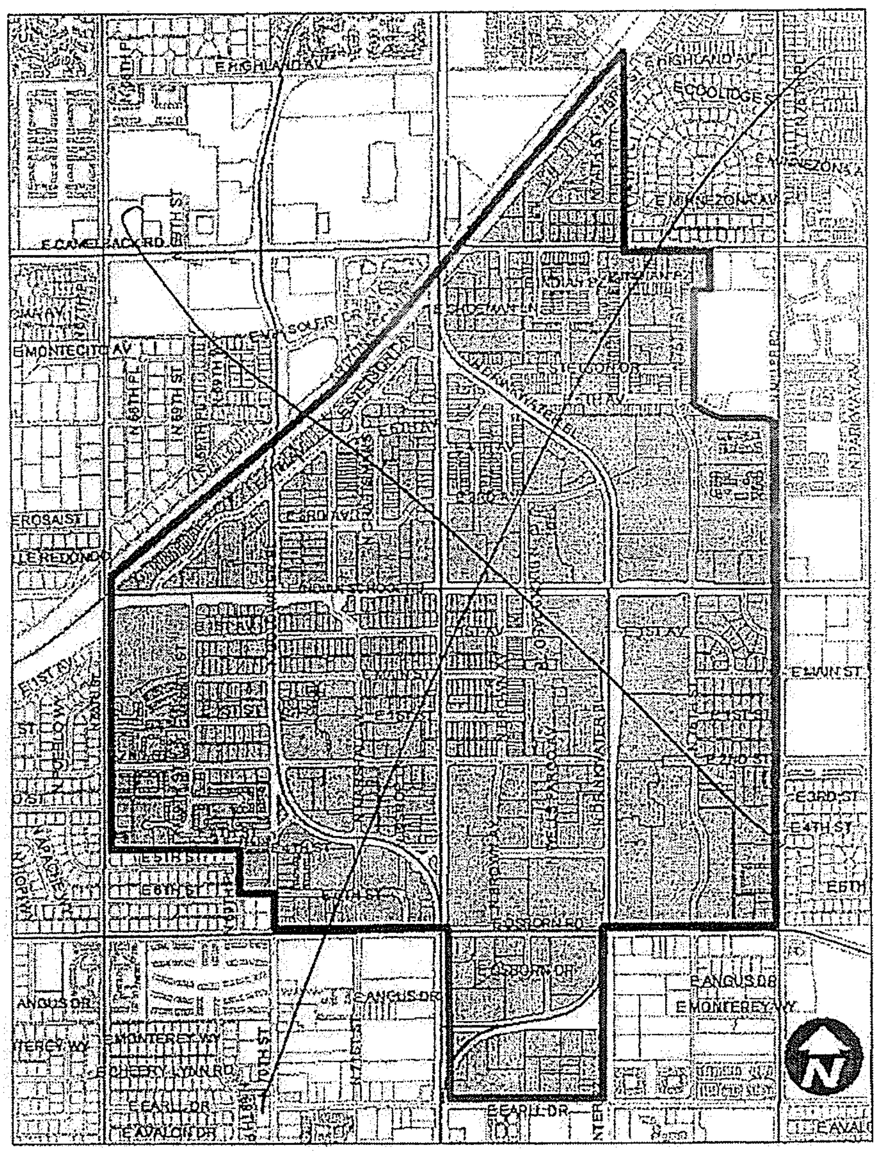
APPENDIX A - FOR REFERENCE ONLY

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#___



NOT APPLICABLE

Figure 1. Designated Area for Downtown Stormwater Storage Waivers

Planning & Development Services Department

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

APPENDIX A - FOR REFERENCE ONLY

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ____ ____ - PP - ____ PC#_____

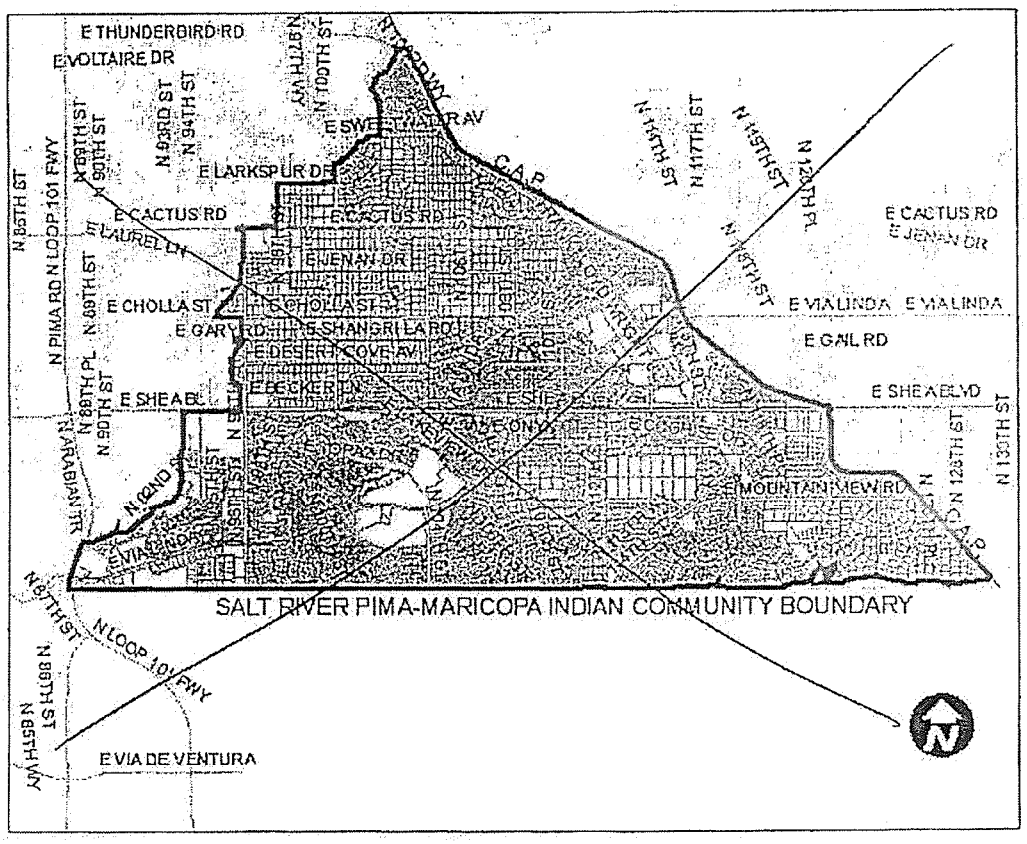


Figure 2. Watersheds Draining to Salt River Pima-Maricopa Indian Community

NOT APPLICABLE

Planning & Development Services Department

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

APPENDIX A - FOR REFERENCE ONLY

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC# ___

CITY STAFF TO COMPLETE THIS PAGE

Project Name FAIRMONT SCOTTSDALE PRINCESS RESORT

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

☑ Recommend approve waiver.

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

Explain: _____

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

Explain: _____

Recommended Conditions of Waiver:
- ☒ All storage requirements waived.
- ☐ Pre development conditions must be maintained.
- ☑ Other:

Explain: In land improvements exceed cost of in-lieu fee.

☒ **Waiver approved per above conditions.**

☐ **Waiver denied.**

C. Ashley Couch — Floodplain Administrator or Designee

10/23/08 — Date

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

APPENDIX A - FOR REFERENCE ONLY

Request for Stormwater Storage Waiver

292-SA-2007 City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

In-Lieu Fee and In-Kind Contributions

If the city grants a waiver, the developer is required to calculate and contribute an In-Lieu Fee based on what it would cost the city to provide the waived storage volume, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. For FY 2007/2008, this cost is $3.22 per cubic foot of stormwater stored. This unit cost will be updated annually, but the city reserves the right to revise the unit cost at any time at its sole discretion.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. The Floodplain Administrator or designee must approve in-lieu fees and in-kind contributions.

Project Name Fairmont Scottsdale Princess Resort

The waived stormwater storage volume is calculated as follows:

V = CRA; where
V = stormwater storage volume required, in cubic feet,
C = weighted average runoff coefficient over disturbed area,
R = 100-year/2-hour precipitation depth, in feet (2.82 inches, or 0.235 feet, for all regions of Scottsdale), and
A = area of disturbed ground, in square feet

Furthermore,

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

C = 0.9
A = 424,753
V = 89,826
V_p = 0
V_w = 89,826

☐ An In-Lieu Fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $3.22 per cubic foot = 289,240

☒ An In-Kind Contribution will be made, as follows:
See attachment. Princess Drive Bridge Reconstruction, in accordance with approved plans.

☐ No In-Lieu Fee is required. Reason:

Approved by: C. Ashley Conklin 10/23/08

Floodplain Administrator or Designee — Date

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

APPENDIX A - FOR REFERENCE ONLY

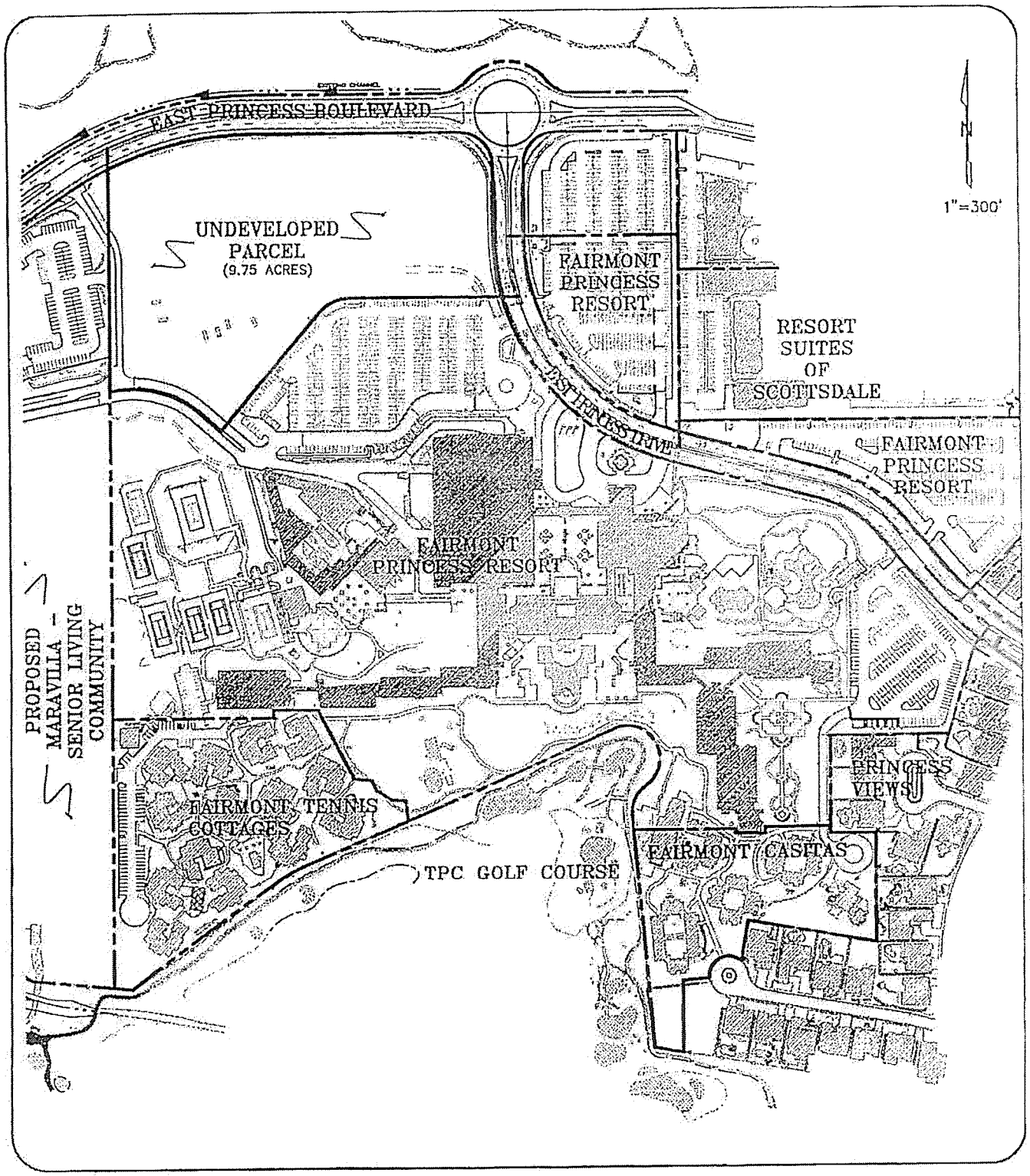


EXHIBIT 1

FAIRMONT SCOTTSDALE PRINCESS RESORT

ENGINEER	J. Bulka
DESIGNER	J. Haywood
CAD TECHNICIAN	J. Sanchez
SCALE	1"=300'
DATE	07/14/08
JOB NUMBER	07910
REF. SHEET	1 OF 1

WOOD/PATEL & ASSOCIATES INC.
Civil Engineers, Hydrologists and Land Surveyors
1855 North Stapley Drive
Mesa, Arizona 85203
(480) 834-3300
(480) 834-3320 FAX

APPENDIX A - FOR REFERENCE ONLY

October 23, 2008

WP# 072910

Attachment to Stormwater Storage Waiver Request

for Fairmont Scottsdale Princess Resort & Regional Flood Control

The Fairmont Scottsdale Princess Resort (Site) is a 60 acre resort located near the southwest corner of Princess Boulevard and Princess Drive. The Site is bounded by the Princess Blvd. to the north, the Maravilla Scottsdale Senior Living Community to the east, the TPC Golf Course to the south and existing residential developments to the west (see Exhibit 1, attached). The existing Fairmont Scottsdale Princess Resort consists of multiple hotel buildings, a ballroom, spa, tennis cottages, tennis courts, and parking. A majority of the site is developed and portions are being updated and renovated. At the north end of the site there is a 9.75 acre portion of the property that has yet to be developed, and other portions are scheduled for upgrades.

It is Wood/Patel's understanding that the ownership of the Fairmont Scottsdale Princess Resort, Strategic Hotels and Resorts, has agreed to fund regional flood control improvements to the public road/channel crossing at Princess Blvd and Scottsdale Road, in return for the City approving this waiver and it being applicable to the entire site. The improvements consist of removing the existing concrete box culvert crossing and replacing it with a bridge structure. The cost of a new bridge structure is estimated at $1,053,000.

City of Scottsdale In-Lieu Fees:

V(req) Volume required = CRA = (0.90) x (0.235 feet) x (9.75 acres) = 89,826 cu-ft.

C (Runoff Coefficient) = 0.90

R (100-year/2-hour precipitation depth) = 0.235 feet

Site area = 9.75 acres

City of Scottsdale In-Lieu Fees = V(req) x $3.22 = (89,826 cu-ft) x $3.22 = $289,240

Summary:

Public Drainage Improvements = $1,053,000 (*)

City of Scottsdale in Lieu Fee = $289,240

(*) See Sheet 2 of 2 Engineering Preliminary Opinion of Probable Cost

APPENDIX A - FOR REFERENCE ONLY

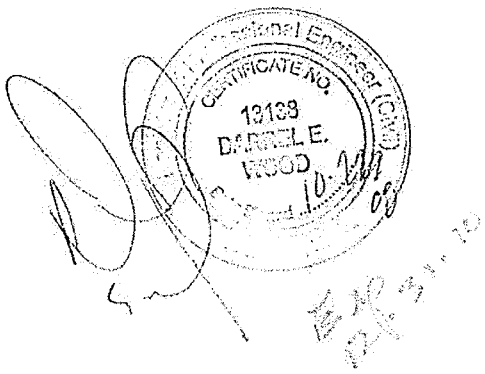
Attachment to Stormwater Storage Waiver Request
for Fairmont Scottsdale Princess Resort & Regional Flood Control

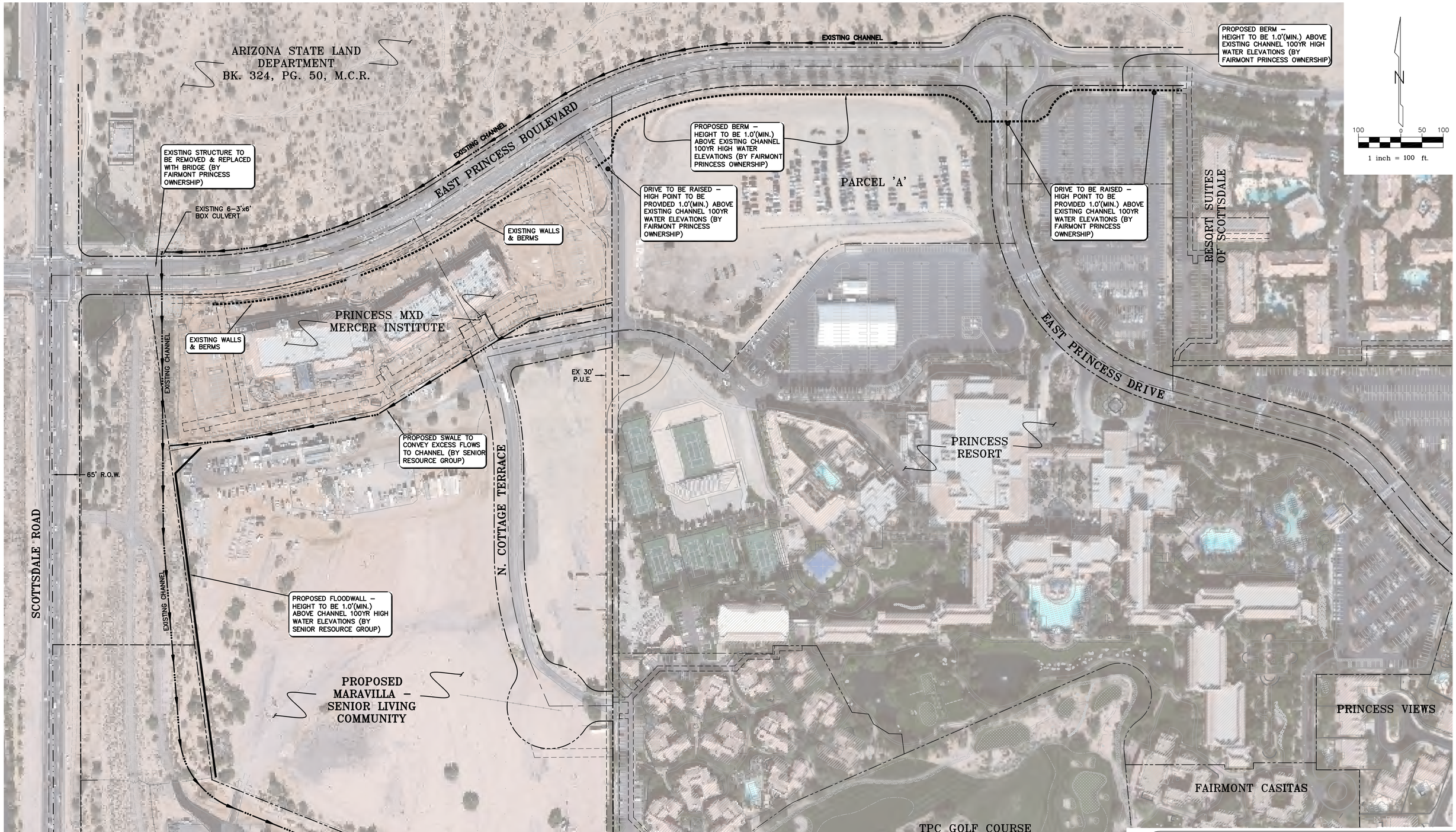
Engineering Preliminary Opinion of Probable Cost (*)

Prepared Bridge Structure at Princess Drive, just east of Scottsdale Road serving unnamed wash.

Estimated Bridge Surface = 8,100 square feet x $130/s.f. $1,053,000

(*) Offered without the benefit of construction documents and specifications.





MARAVILLA SCOTTSDALE/
FAIRMONT SCOTTSDALE PRINCESS RESORT

PROPOSED DRAINAGE IMPROVEMENTS EXHIBIT

DATE: 12/20/07

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STRUCTURES • TRANSPORTATION / TRAFFIC
WATER / WASTEWATER • SURVEYING
CONSTRUCTION MANAGEMENT
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APPENDIX A - FOR REFERENCE ONLY

APPENDIX C

CITY OF SCOTTSDALE FORMS

Appendix 4-1C

WARNING & DISCLAIMER OF LIABILITY

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

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

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

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

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

Plan Check No.	Owner or Agent	Date
		2/6/2015

APPENDIX A - FOR REFERENCE ONLY

Section 404 Certification

Before the City issues development permits for a project, the developer's Engineer or the property owner must certify that it complies with, or is exempt from, Section 404 of the Clean Water Act of the United States. Section 404, administered by the U.S. Army Corps of Engineers (COE), regulates the discharge of dredged or fill material into a wetland, lake, (including dry lakes), river, stream (including intermittent streams, ephemeral washes, and arroyos), or other waters of the United States.

Prior to submittal of improvement plans to Project Review the form below must be completed (and submitted with the improvement plans) as evidence of compliance

Certification of Section 404 Permit Status

Owner's Name: Strategic Hotels and Resorts Phone No. 312-658-6016

Project Name/Description: Fairmont Scottsdale Hotel Exp. Case No. _____

Project Location/Address: 7575 E. Princess Blvd., Scottsdale, Az. 85255

A registered Engineer or the property Owner must check the applicable condition and certify by signing below that:

1. **Section 404 <u>does</u> apply to the project because there will be a discharge of dredged or fill material to waters of the U.S., and:**

   ☐ A Section 404 Permit has already been obtained for this project.

   -or-

   ☐ This project qualifies for a "Nationwide Permit," and this project will meet all terms and conditions of the applicable nationwide permit.

2. **Section 404 <u>does not</u> apply to the project because:**

   ☒ No watercourses or other waters of the U.S. exist on the property.

   ☐ No jurisdictional waters of the U.S. exist on the property. Attached is a copy of the COE's Jurisdictional Determination.

   ☐ Watercourses or other waters of the U.S. do exist on the property, but the project will not involve the discharge of dredged or fill material into any of these waters.

I certify that the above statement is true.

John Bulka
Engineer's Signature and Seal, or Owner's Signature

Registered Professional Engineer (Civil) CERTIFICATE NO. 33359 JOHN M. BULKA Date Signed 2-6-15 ARIZONA U.S.A.

2-6-15
Date

Project Manager
Title

Company Wood, Patel

John Bulka expires: 3-31-17

Planning & Development Services Department
7447 E Indian School Road, Suite 100, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500 ◆ Fax: 480-312-7088

APPENDIX A - FOR REFERENCE ONLY

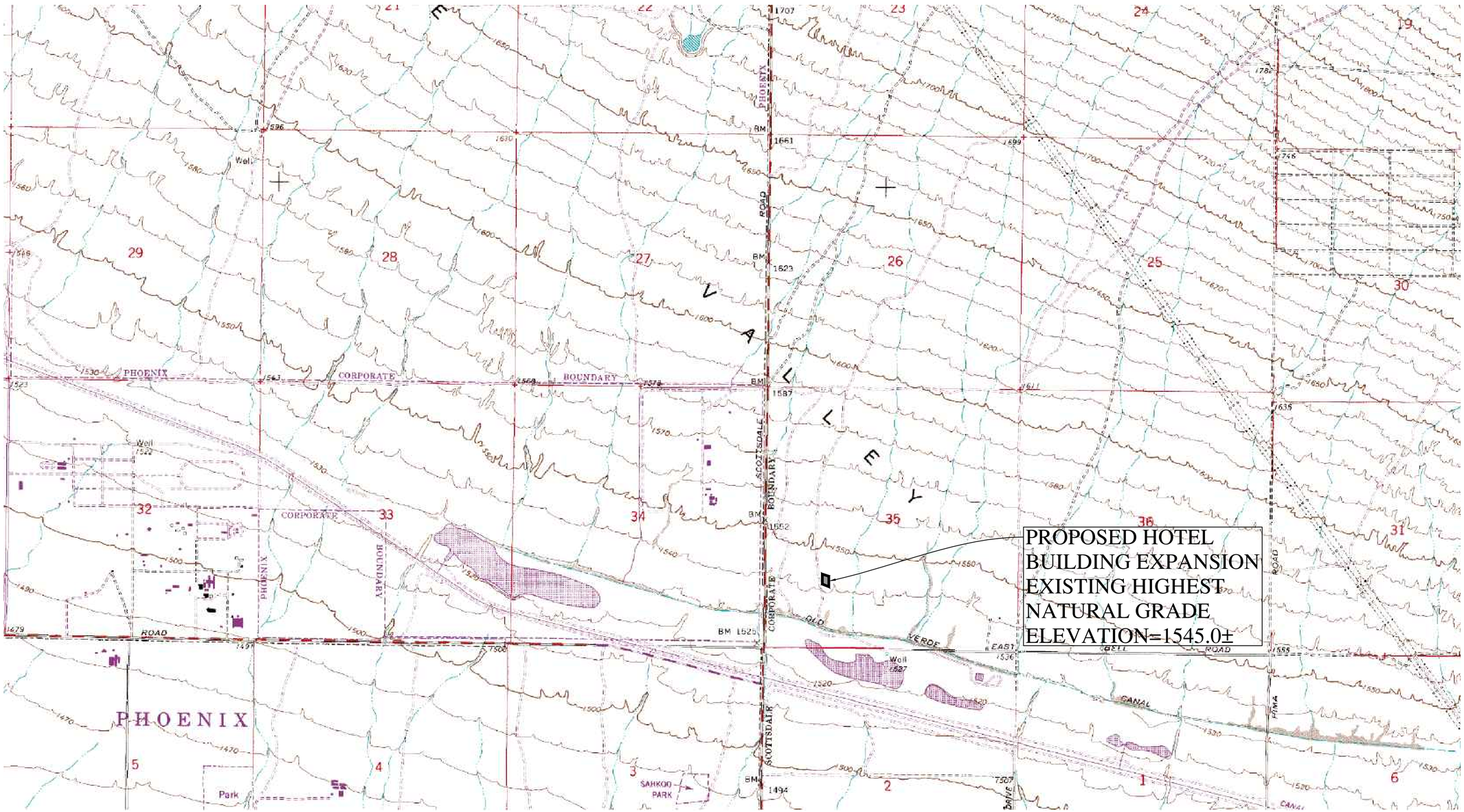
APPENDIX D

OFFSITE WATERSHED EXHIBITS

APPENDIX A - FOR REFERENCE ONLY

Regional Contour Map /
Opinion of Existing Highest Natural Grade Elevation

APPENDIX A - FOR REFERENCE ONLY



PROPOSED HOTEL BUILDING EXPANSION EXISTING HIGHEST NATURAL GRADE ELEVATION=1545.0±

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MISSION: CLIENT SERVICE ™
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WWW.WOODPATEL.COM
PHOENIX - MESA - TUCSON

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Arizona Blue Stake, Inc.
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In Maricopa County: (602) 263-1100

Fairmont
SCOTTSDALE PRINCESS

HOTEL EXPANSION
REGIONAL CONTOUR MAP/OPINION OF EXISTING
HIGHEST NATURAL GRADE ELEVATION

REV	DESCRIPTION	DATE

NOT
FOR
CONSTRUCTION

SCALE (HORIZONTAL) N/A
SCALE (VERTICAL) N/A
DATE 03/16/2015
JOB NUMBER 154302
SHEET 1 OF 1

N:\2015\154302\Project Support\Reports\Drainage\Exhibits\4302 Exhibit - - Regional Contour Map.dwg

(CHECKED BY: JB DESIGNED BY: JB DRAFTED BY: JrS)

APPENDIX A - FOR REFERENCE ONLY

Aerial Map

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FAIRMONT SCOTTSDALE HOTEL EXPANSION

2015 AERIAL PHOTOGRAPH

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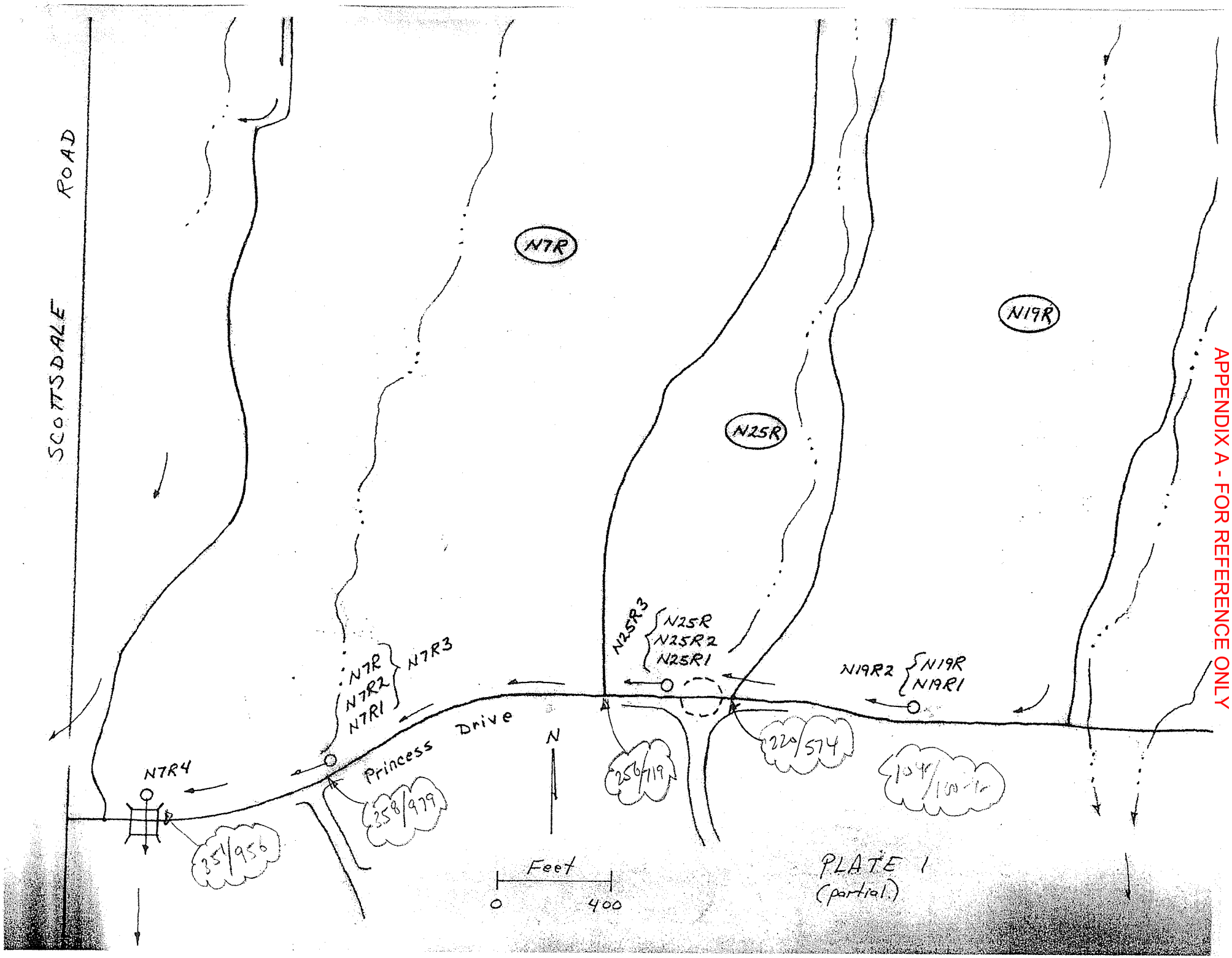
JOB# 154302

APPENDIX A - FOR REFERENCE ONLY

Plate 1 Exhibit

(from Core North/Core South Drainage Study)



APPENDIX A - FOR REFERENCE ONLY

Table 1 Spreadsheet

(from Core North/Core South Drainage Study)

Table 1
Peak Discharge Summary

Princess Drive Channel
Fairmont Scottsdale Princess Resort
Scottsdale, Arizona

Location	HEC-1 CP	Peak Discharge (cfs) By Storm Return Interval (6-Hour Duration)					
		2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
750-Ft East of Roundabout	N19R2	60	146	220	342	444	574
At Roundabout	N25R3	62	167	256	417	549	719
700-Ft Upstream of Culvert	N7R3	90	228	358	583	787	979
At Princess Drive Culvert	N7R4	89	227	351	580	779	956
HEC-1 File:		PRN2	PRN5	PRN10	PRN25	PRN50	PRN100

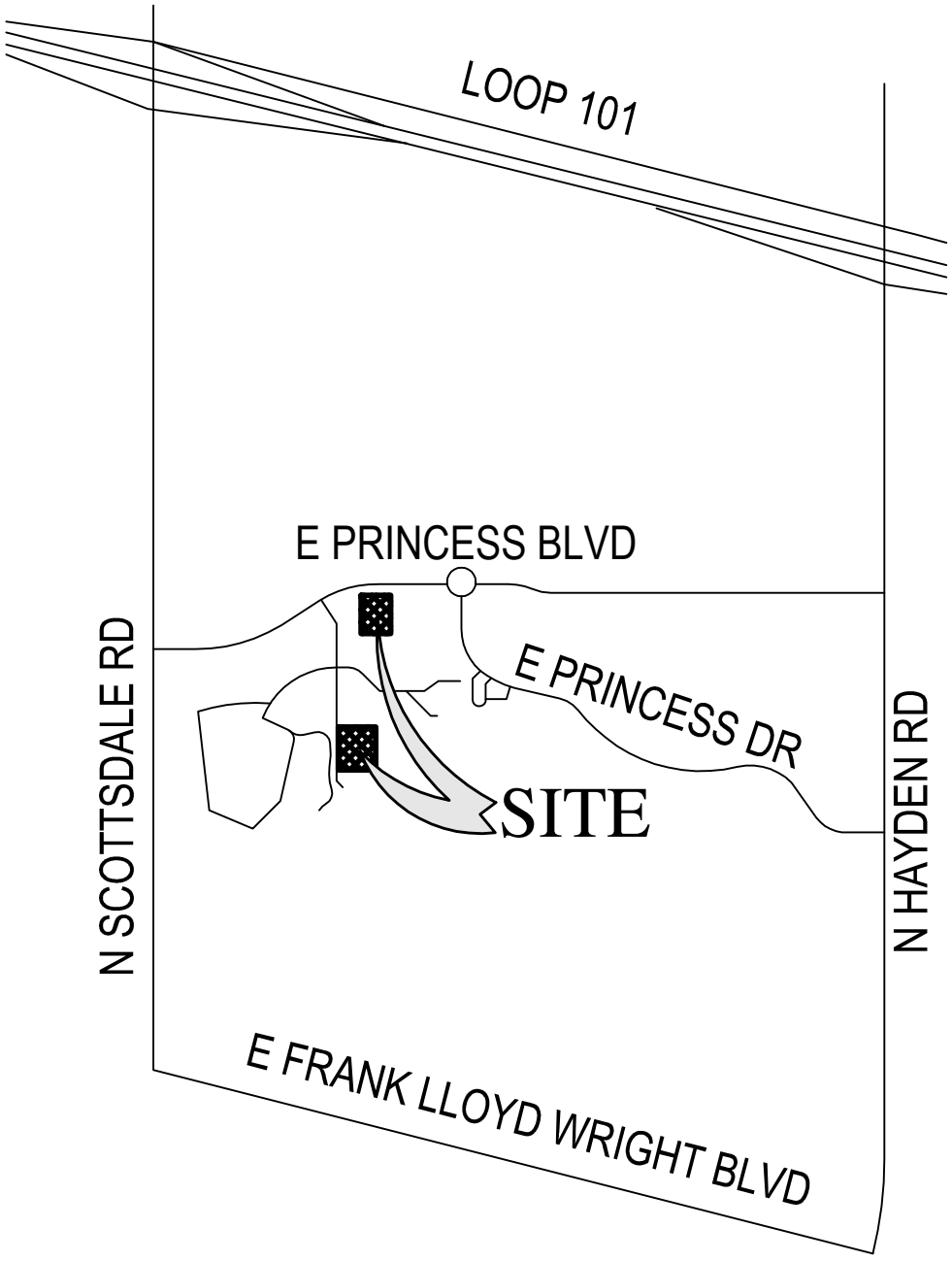
Note: See Plate 1 for HEC-1 concentration point locations.

5/31/2007

APPENDIX A - FOR REFERENCE ONLY

EXHIBIT 1

VICINITY MAP



N

SCOTTSDALE, ARIZONA

N.T.S.

FAIRMONT SCOTTSDALE
HOTEL EXPANSION

EXHIBIT 1
VICINITY MAP

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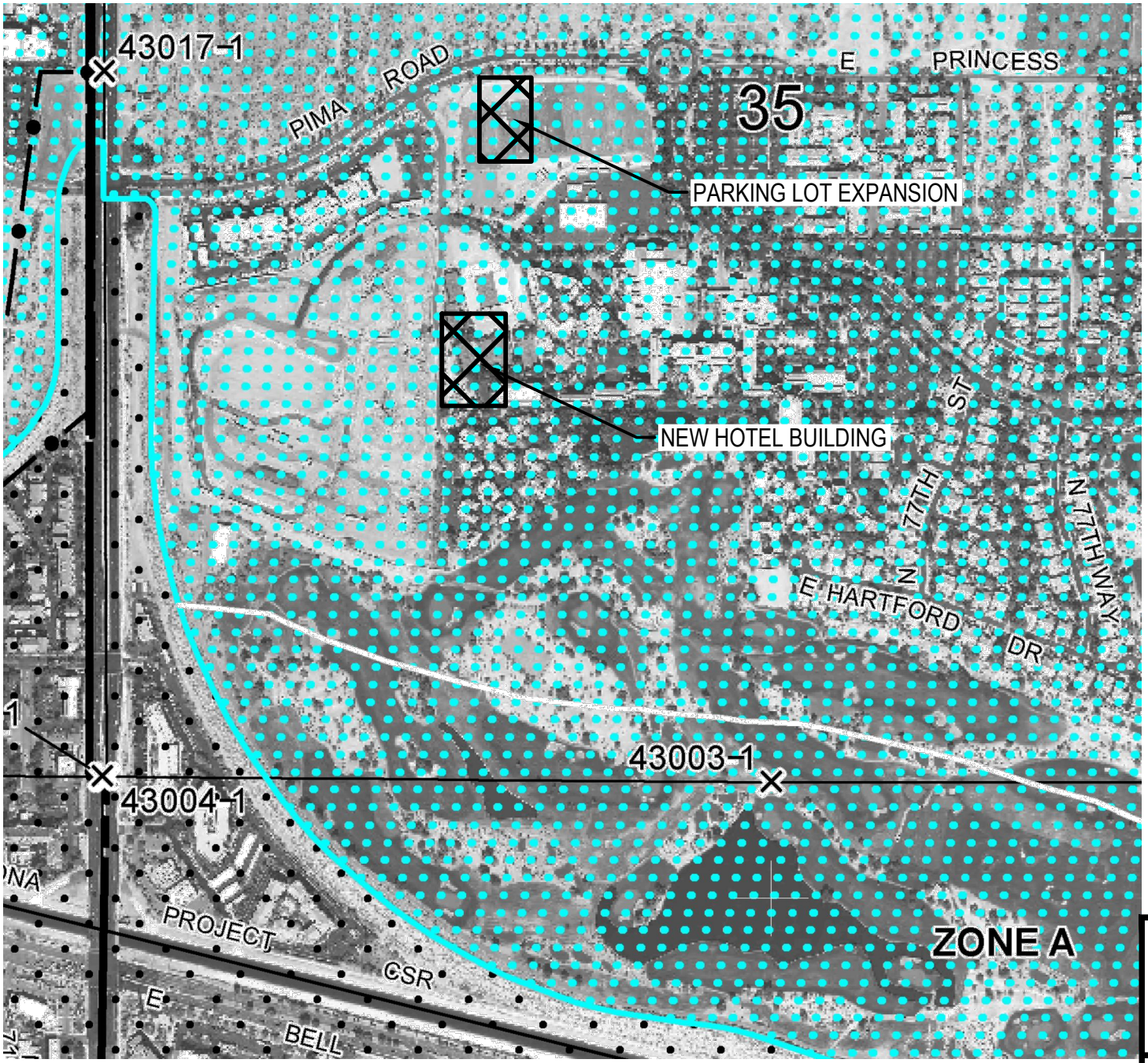
APPENDIX A - FOR REFERENCE ONLY

EXHIBIT 2

FEMA MAP

APPENDIX A - FOR REFERENCE ONLY



NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1320L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1320 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1320	L
PHOENIX, CITY OF	040051	1320	L
SCOTTSDALE, CITY OF	045012	1320	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1320L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

N

600 0 300 600

1 inch = 600 ft.

PROJECT AREA

NOT FOR CONSTRUCTION

FAIRMONT SCOTTSDALE HOTEL EXPANSION

EXHIBIT 2
FEMA FIRM

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JOB# 154302

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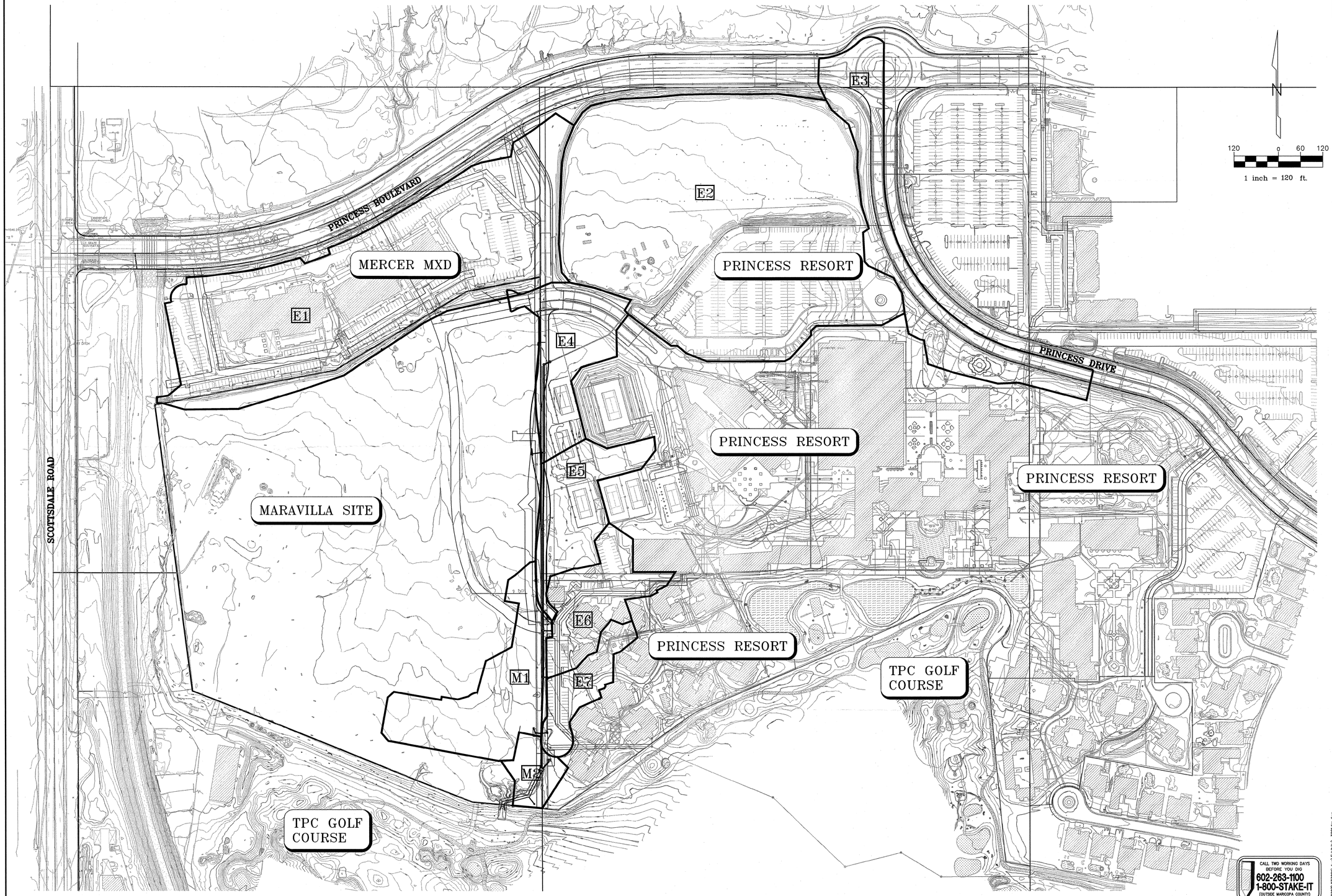
APPENDIX A - FOR REFERENCE ONLY

EXHIBIT 3

MARAVILLA EAST PROPERTY LINE ROAD DRAINAGE MAP



MARAVILLA

EAST PROPERY LINE ROADWAY

DRAINAGE MAP

NOT FOR CONSTRUCTION OR RECORDING

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CONSTRUCTION MANAGEMENT
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Mesa, AZ 85203
(480) 834-3300
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ENGINEER	J. BULKA
DESIGNER	J. HEYWOOD
CAD TECHNICIAN	J. SANCHEZ
SCALE (HORIZ)	SCALE_HORIZ
SCALE (VERT)	SCALE_VERT
DATE	4/09/08
JOB NUMBER	073091
SHEET	1 OF 1

CALL TWO WORKING DAYS BEFORE YOU DIG
602-263-1100
1-800-STAKE-IT
(OUTSIDE MARICOPA COUNTY)

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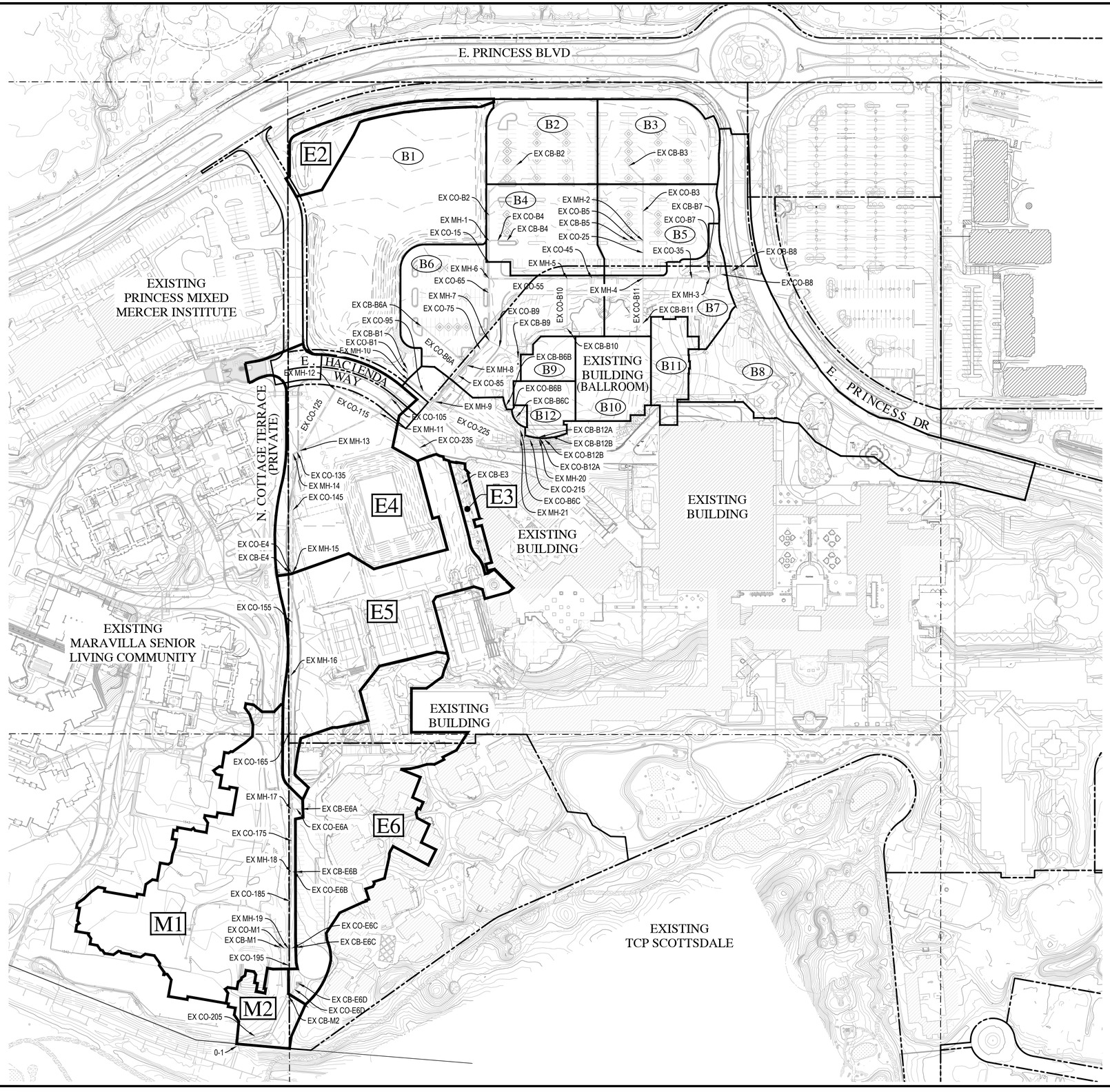
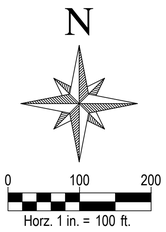
APPENDIX A - FOR REFERENCE ONLY

EXHIBIT 4

EXISTING DRAINAGE MAP





LEGEND

- BASIN BOUNDARY
- PROPERTY BOUNDARY
- FLOW ARROW
- EXISTING STORM DRAIN
- E1 — EXISTING DRAINAGE AREA
- B1 — EXISTING DRAINAGE AREA - BALLROOM ADDITION
- M1 — EXISTING DRAINAGE AREA - MARAVILLA

N:\2015\154302\Project Support\Reports\Drainage\Exhibits\4302 Exhibit 4 - Existing Drainage Map.dwg

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-800-STAKE-IT (782-5348)
In Maricopa County: (602) 263-1100

FAIRMONT SCOTTSDALE HOTEL EXPANSION

EXHIBIT 4
EXISTING
DRAINAGE MAP

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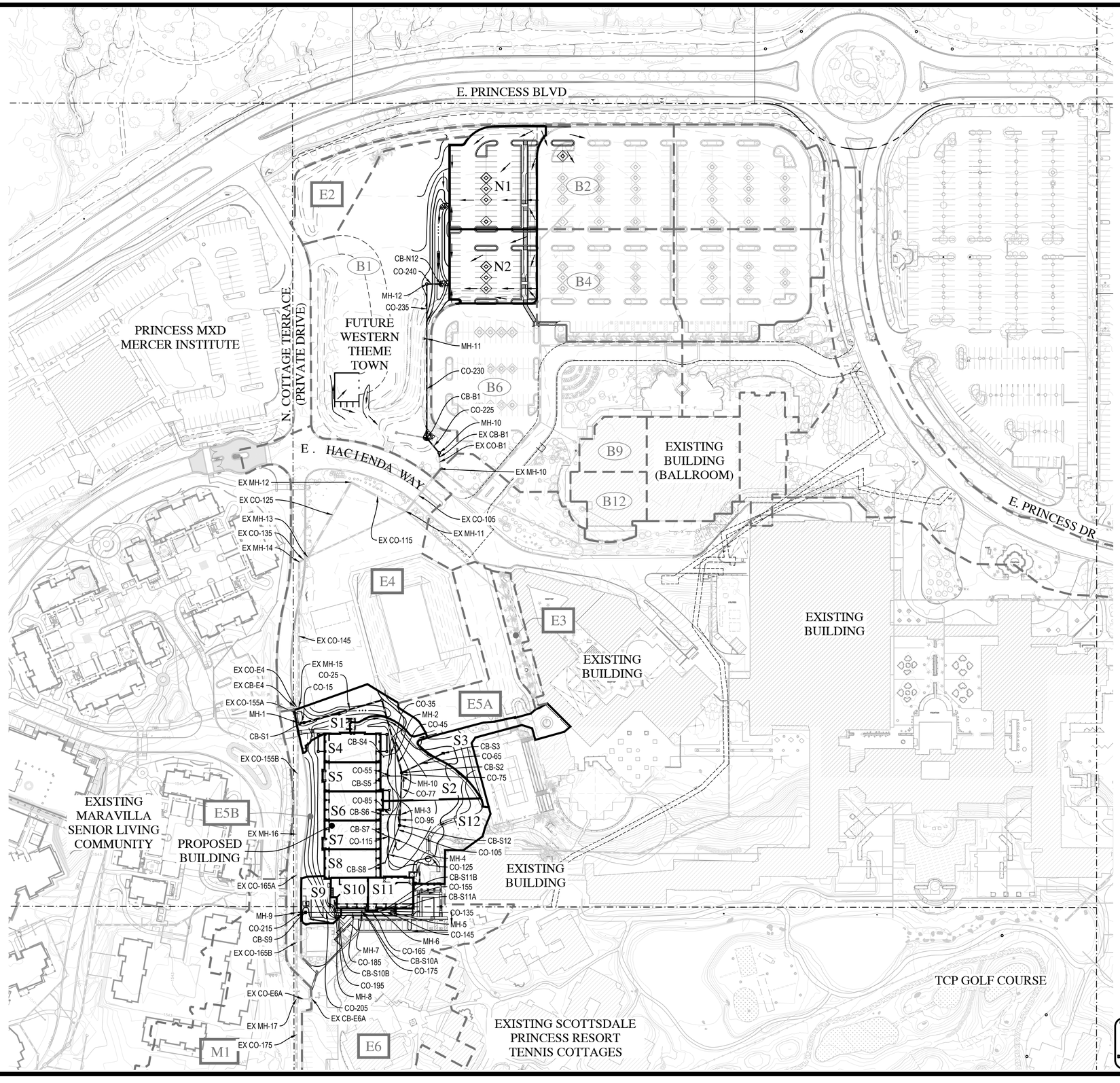
APPENDIX A - FOR REFERENCE ONLY

EXHIBIT 5A

PROPOSED DRAINAGE MAP 1



N

0 80 160

Horz. 1 in. = 80 ft.

LEGEND

- PROPOSED DRAINAGE AREA
- EXISTING DRAINAGE AREA
- PROPERTY BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING INTERMEDIATE CONTOUR
- EXISTING INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- PROPOSED INDEX CONTOUR
- N1 PROPOSED DRAINAGE AREA - NORTH
- S1 PROPOSED DRAINAGE AREA - SOUTH
- E1 EXISTING DRAINAGE AREA
- B1 EXISTING DRAINAGE AREA - BALLROOM ADDITION
- M1 EXISTING DRAINAGE AREA - MARAVILLA
- ULTIMATE OUTFALL ULTIMATE OUTFALL

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FAIRMONT SCOTTSDALE HOTEL EXPANSION

EXHIBIT 5A PROPOSED DRAINAGE MAP-1

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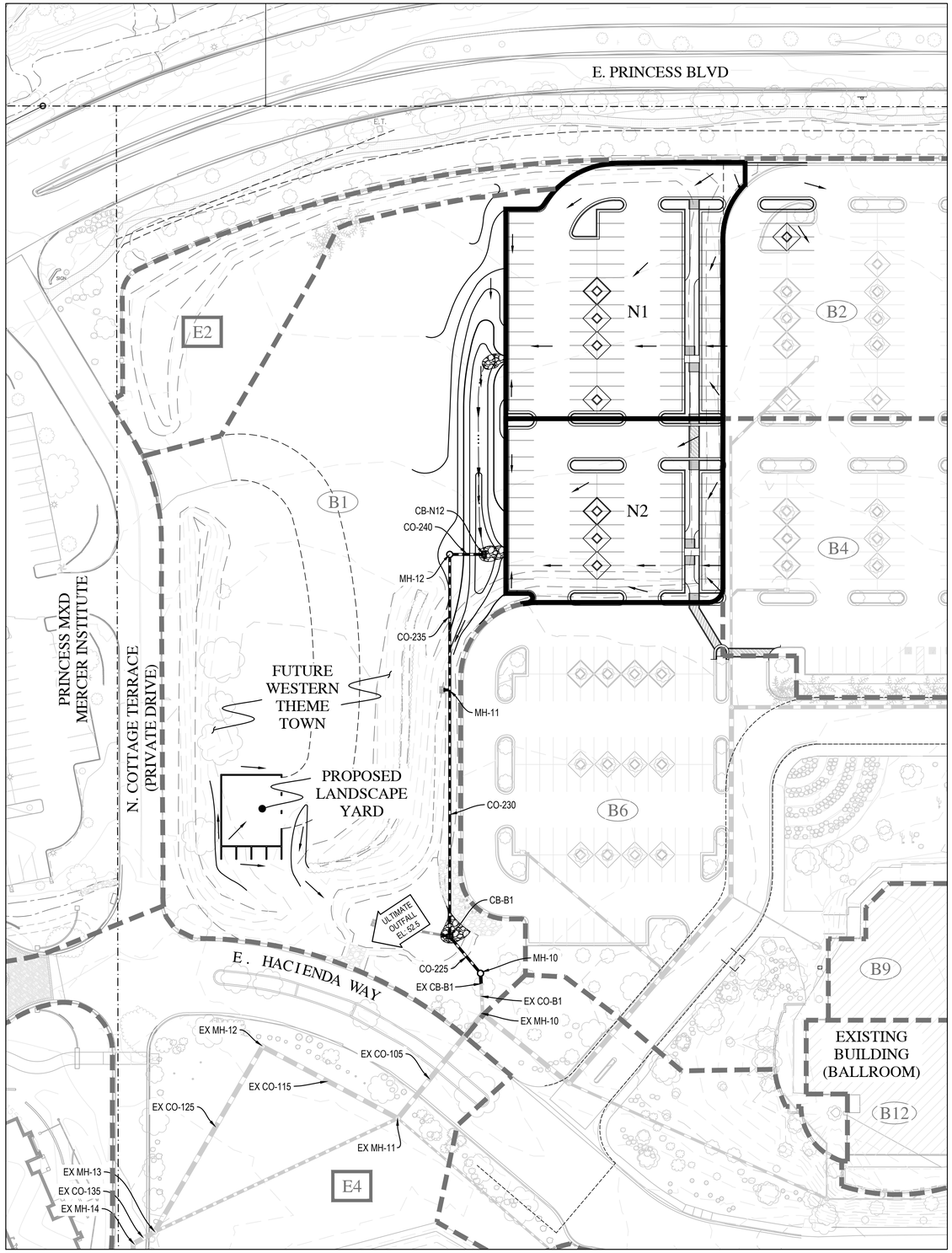
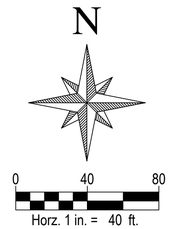
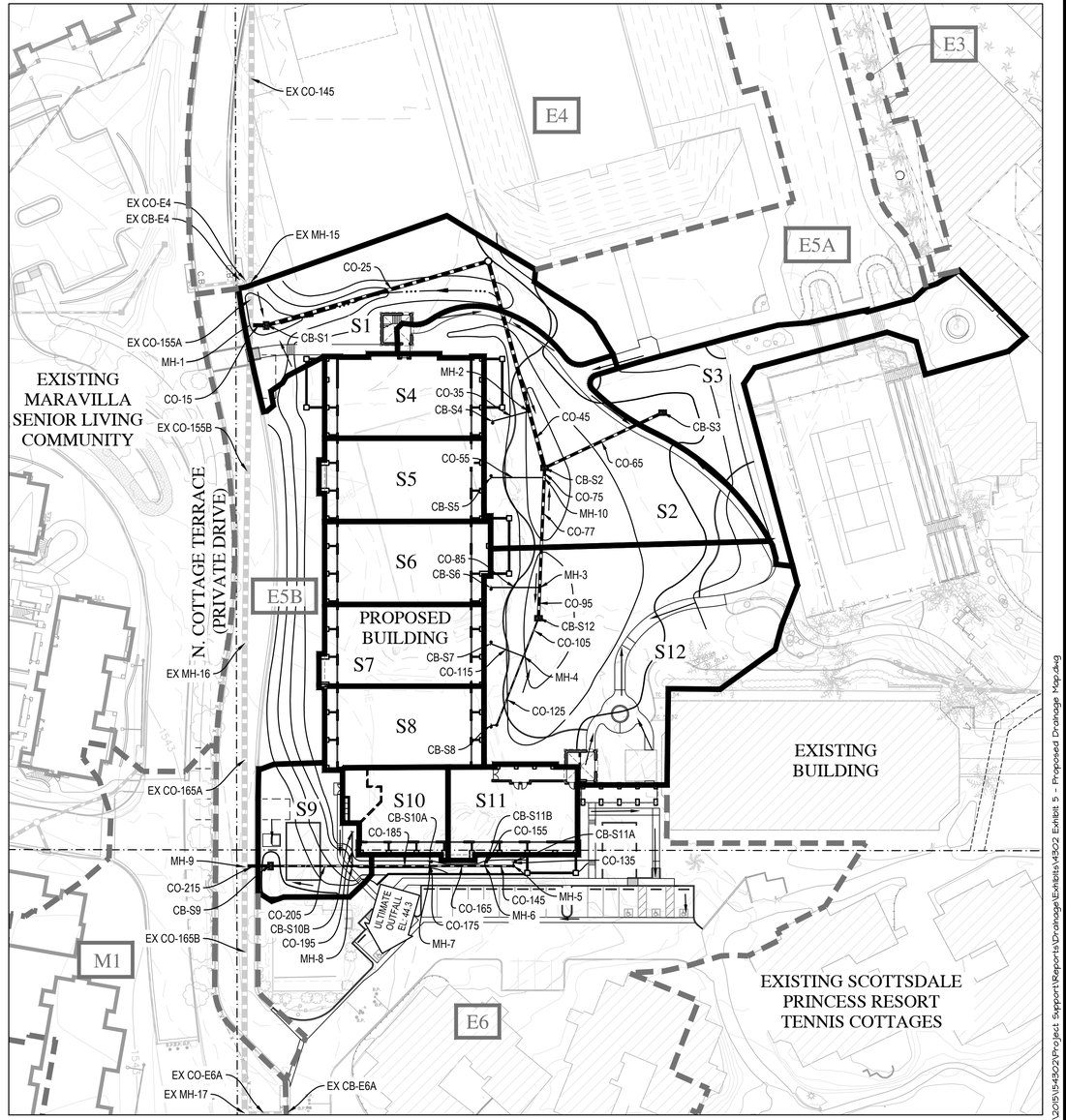
APPENDIX A - FOR REFERENCE ONLY

EXHIBIT 5B

PROPOSED DRAINAGE MAP 2







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LEGEND

- PROPOSED DRAINAGE AREA
- EXISTING DRAINAGE AREA
- PROPERTY BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING INTERMEDIATE CONTOUR
- EXISTING INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- PROPOSED INDEX CONTOUR

- N1 — PROPOSED DRAINAGE AREA - NORTH
- S1 — PROPOSED DRAINAGE AREA - SOUTH
- E1 — EXISTING DRAINAGE AREA
- B1 — EXISTING DRAINAGE AREA - BALLROOM ADDITION
- M1 — EXISTING DRAINAGE AREA - MARAVILLA
- ULTIMATE OUTFALL — ULTIMATE OUTFALL

FAIRMONT SCOTTSDALE HOTEL EXPANSION

EXHIBIT 5B PROPOSED DRAINAGE MAP-2

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JOB# 154302

APPENDIX B – DRAINAGE REPORT FOR FAIRMONT SCOTTSDALE WESTERN THEME TOWN BY WOOD, PATEL & ASSOCIATES, INC., DATED MAY 15, 2015

APPENDIX B - FOR REFERENCE ONLY

DRAINAGE REPORT
FOR
FAIRMONT SCOTTSDALE
WESTERN THEME TOWN

May 15, 2015
WP# 154302.10
C.O.S. No.: 321-PA-2015

Prepared for:

Strategic Hotels and Resorts
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Suite 1700
Chicago, Illinois 60606
Phone: (312) 658-6016

Submitted to:

City of Scottsdale
9388 East San Salvador Drive
Scottsdale, Arizona 85258
Phone: (480) 312-5636

Prepared by:

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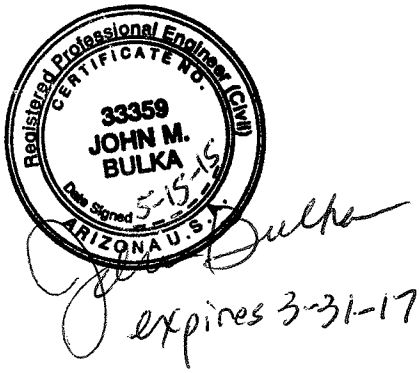

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APPENDIX B - FOR REFERENCE ONLY

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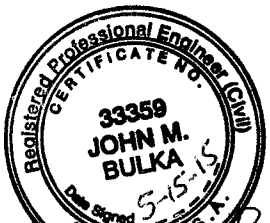

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1.0 INTRODUCTION

The proposed Fairmont Scottsdale Western Theme Town (Town) is a western-themed, outdoor entertainment theater with associated pantry and restroom facilities. The proposed development is located adjacent to the existing parking lot for the existing Fairmont Ballroom, located east of Scottsdale Road and south of Princess Drive. The project includes three (3) new buildings (refer to Exhibit 1 – *Vicinity Map*). The proposed Town is located along Cottage Terrace, on approximately 2.26 acres (ac), and is west of the existing parking lot for the Ballroom. More specifically, the site is located in the southwest quarter of Section 35, Township 4 North, Range 4 East of the Gila and Salt River Meridian (refer to Exhibit 1). The existing property, currently zoned C-2, is primarily undeveloped with a few bushes and trees. Current zoning is expected to stay the same for the proposed improvements.

The purpose of this report is to obtain City of Scottsdale approval for the proposed Fairmont Scottsdale Western Theme Town, with respect to the City of Scottsdale's drainage criteria.

Analysis and modeling for this study was performed in accordance with the requirements of the *Design Standards and Policies Manual, Chapter 4: Grading and Drainage* (DS&PM), City of Scottsdale, 2010 (Ref. 1). The methods of analysis, sources of data and assumptions, and the results of the analysis are discussed in detail in the following sections of this report.

2.0 EXISTING DRAINAGE CONDITIONS AND CHARACTERISTICS

2.1 FEMA Floodplain

The Federal Emergency Management Agency (FEMA) has published a 100-year floodplain, per Flood Insurance Rate Map (FIRM) Panel 1320 of 4425, Map Number 04013C1320L, dated October 16, 2013. The site is within a flood zone labeled "AO-Depth 1 Foot, Velocity 3 FPS".

Zone "AO" is defined by FEMA as follows:

> *"Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined."*

As displayed on the FEMA FIRM panel, the floodplain delineation includes a large portion of land, which includes this project site (refer to Exhibit 2 – *FEMA Map*).

It is the understanding of Wood, Patel & Associates, Inc. (Wood/Patel), based on past experience and interpretations of the City of Scottsdale's floodplain ordinance that development of land within a FEMA Zone "AO" is acceptable as long as, in general, the lowest floor elevation is above or properly protected from the anticipated 100-year water surface elevations. No problems are anticipated with developing the parcel in accordance with the City's floodplain ordinance. No underground structures or parking structures are proposed.

2.2 Offsite Drainage Conditions

A large watershed occurs north of the Fairmont Scottsdale Resort. The watershed has been previously studied and peak flows estimated for existing and proposed conditions, and results were published in the Core North/Core South Drainage Study (Ref. 5). Refer to Appendix D – *Offsite Watershed Exhibits* for the Regional Contour Map, Aerial Map, and Plate 1 and Table 1 from the Core North/Core South study and report (Ref. 5). The Fairmont Scottsdale Resort property is protected from this offsite flow by several past improvements. Originally, when Princess Boulevard was constructed, offsite flows were diverted to the west by a channel on the north site of Princess Boulevard. The flood waters are routed to an existing drainage culvert under Princess Boulevard, just east of

Scottsdale Road. These flood waters are routed south along the east side of Scottsdale Road to the Tournament Players Club (TPC) Golf Course. As the Fairmont Scottsdale Resort continued to develop over the years, the City of Scottsdale requested additional improvements to protect the property from offsite flows from the north. Additional improvements were contingent with the Request for Stormwater Storage Waiver for the Fairmont Scottsdale Resort property in 2008 as development continued (refer to Exhibit B – *Stormwater Storage Waiver / Proposed Drainage Improvements Exhibit*). The additional improvements included adding a flood/screen wall along the south side of Princess Boulevard, providing a high point on Cottage Terrace just south of Princess Drive, providing a high point just south of the traffic circle on Princess Drive, providing a channel and floodwall along the west side of the Maravilla site, and removing and replacing the existing culverts on Princess Drive with a new bridge structure. Currently, all of these improvements have been constructed with past projects (Fairmont Ballroom Addition and the Maravilla Senior Living Community) with the exception of replacing the culverts on Princess Drive with a bridge structure. It is our understanding the Fairmont ownership is working with the City of Scottsdale on an agreement to replace these culverts.

The Hayden/Rhodes (Granite Reef) Aqueduct was constructed as part of the (CAP) by the U.S. Bureau of Reclamation. This existing aqueduct is located along the southern edge of the TPC golf course, and extends east-west the length of the CAP canal. The aqueduct is at a significantly higher elevation than the golf course and acts as a dike which creates stormwater ponding in the existing golf course. The 100-year high water level is at an elevation of 1536.00 NGVD 29 Datum (Ref. 6). The conversion to the NAVD 88 Datum is 1.8 feet, so the 100-year high water level elevation is approximately 1537.80. The proposed finish floors for the new Town buildings will be elevation 1557.00 for the pantry/restroom and restroom buildings, and elevation 1559.30 for the theater building, which are19.20 and 21.50 feet above the 100-year high water elevation, respectively.

When the Maravilla Senior Living Community was constructed, Cottage Terrace Drive (a private drive) was relocated to the west side of the Fairmont Scottsdale Resort property to accommodate vehicle access to the Resort. A storm drain system was installed with the driveway improvements to benefit both properties. An analysis of the storm drain system

was done as a part of the Fairmont Scottsdale Hotel Expansion project for the existing and proposed conditions, and results were published in the *Drainage Report for the Fairmont Scottsdale Hotel Expansion* (Ref. 9).

Runoff from the existing Princess MXD Mercer Institute (MXD) site drains to the west to the existing flood control channel located between Scottsdale Road and the Maravilla project (Ref. 9).

2.3 Onsite Drainage Conditions (Pre-Development)

The existing site slopes generally from the northeast to the southwest with an average slope of approximately two percent (2%). Stormwater is captured into an existing storm drain system via existing catch basins and curb inlets located within Cottage Terrace Drive (private drive), which ultimately drains into the existing TPC Golf Course at the Fairmont Scottsdale Princess Resort, located immediately north of the Hayden-Rhodes Aqueduct. Currently, the site consists of a variety of desert landscaping (bushes and trees). There is some undeveloped area at the northeast corner of the property that is currently dirt and decomposed granite (refer to Exhibit 3). A C-value of 0.37 was used for the existing conditions of the site for desert landscaping (Ref. 9).

3.0 PROPOSED DRAINAGE PLAN

3.1 Onsite Drainage Conditions (Post-Development)

This site was designed to utilize the existing storm drain system in Cottage Terrace Drive and to maintain the existing site outfall locations at the southwest corner of the property. During a 10-year storm event, the proposed storm drain system is designed to capture the runoff through a series of catch basins at low points throughout the project site and convey it to the existing storm drain system located within Cottage Terrace. During a 100-year storm event, the runoff is expected to exceed the capacity of the proposed storm drain system and the excess will be conveyed overland (south on Cottage Terrace Drive) to the outfall at the TPC golf course. The proposed grading is designed to allow for approximately 2.6 feet of ponding for the area to the north before the runoff overtops the local high points and continue towards the outfall location. This depth is a temporary condition, and will likely reduce once the area is developed. Cottage Terrace Drive has been designed to handle the 100-year flow, per the approved *Drainage Report for Maravilla East Property Line Road*, dated May 12, 2008, revised October 15, 2008 (Ref. 4). A weighted C-value of 0.41 was used for the proposed condition of the site for desert landscaping and the buildings of the Town (Ref. 9). Tributary areas, flow directions, catch basins, storm drains, 100-year overland flow paths, and the ultimate site outfall location are labeled on Exhibit 4.

3.2 Lowest Habitable Finished Floor Elevations

The Grading and Drainage Plan has been designed to comply with the City of Scottsdale's floodplain ordinance for a Zone "AO" floodplain. It is our understanding, unless other flood proof measures are presented and approved, the proposed lowest habitable finished floor (LFF) elevation must be designed a minimum of 1 foot above the anticipated 100-year flood elevation. As previously mentioned, the proposed finish floors for the new Town buildings will be at elevations 1557.00 and 1559.30, or 19.20 and 21.50 feet, respectively, above the 100-year high water elevation in the TPC Golf Course. In addition, the lowest finish floor elevation is designed to be a minimum of 1 foot above the adjacent finish grade. Refer to Exhibit 4 for a graphical representation.

The Site is located within a Zone "AO" floodplain, defined as having a flood depth of 1 foot. Therefore, the anticipated 100-year flood elevation is 1 foot above "natural" grade, and proposed LFF elevation must have 1 foot additional freeboard or be a minimum of 2 feet above natural grade. Due to the disturbed condition of the Site from previous

development, the natural grade has been modified. According to Curry's Corner 7.5 minute Topographic Survey Map by USGS from 1964 with a contour interval of 10-feet, the approximate highest natural grade of this site prior to development is 1555.00, which is 2.00 and 4.30 feet lower than the proposed lowest finish floors of 1557.00 and 1559.30, respectively. It is our understanding this is in compliance with the City's floodplain ordinance. Refer to the *Regional Contour Map* within Appendix D, which shows the highest natural grade elevation relative to the proposed building location.

3.3 Stormwater Retention

A Request for Stormwater Storage Waiver was submitted and approved by the City of Scottsdale on October 23, 2008 (refer to Appendix B). Therefore, onsite stormwater retention is not required.

3.4 Operation and Maintenance

The property owner shall be solely responsible for the operation and maintenance of the stormwater drainage system.

4.0 SPECIAL CONDITIONS

4.1 Special Conditions

Currently, there are no washes with 100-year flows greater than 50 cfs that traverse the project site. Also, there are no designated Section 404 washes within the site; therefore, no Section 404 permit is required.

5.0 DATA ANALYSIS

5.1 Hydrologic Analysis

The drainage improvements are to be developed consistent with Chapter 4 of the City of Scottsdale *Design Standards and Policies Manual*, 2010. The Rational Method has been used to quantify peak discharge values for onsite concentration points for the proposed build out scenario during the 10-year and 100-year storm events. Weighted "C" runoff coefficients were referenced from Chapter 4 of the City of Scottsdale *Design Standards and Policies Manual*, 2010. Refer to Appendix A – *Hydrologic and Hydraulic Calculations* for inlet capacity information, Exhibit 4 – *Proposed Drainage Map* for drainage basin tributary area and concentration point locations, and the *Drainage Report for Fairmont Scottsdale Hotel Expansion* for Rational Method calculations and rainfall data.

5.2 Hydraulic Analysis

The onsite storm drain system has been designed to accommodate the 10-year storm event. Bentley StormCAD Version 8i was utilized to analyze the existing and proposed storm sewer system with printouts and storm drain profiles as part of the *Drainage Report for the Fairmont Scottsdale Hotel Expansion* (Ref. 9).

6.0 CONCLUSIONS

The project site is believed to be capable of development as presented with regard to the City of Scottsdale's onsite and offsite drainage requirements. The project's drainage highlights are as follows:

- The site is protected from offsite flows from the north by improvements, as outlined in the approved stormwater storage waiver.

- The proposed drainage infrastructure has been designed in accordance with the City of Scottsdale *Design Standards & Policies Manual*, 2010. The Rational Method was used to estimate peak discharges for all drainage areas. The flow capacities of the proposed storm system have been designed to accept the 10-year storm event.

- No stormwater retention has been provided for this project, per the approved stormwater storage waiver from the City of Scottsdale.

- The onsite 100-year storm event is to be conveyed south, by storm drain and overland flow, to the existing TPC Golf Course, per the *Drainage Report for Fairmont Scottsdale Hotel Expansion.*

- The 100-year high water elevation is 1537.80 in the adjacent TPC golf course, which is 19.20 and 21.50 feet below the proposed new buildings lowest finish floor elevations of 1557.00 and 1559.30, respectively.

- The project site is in a FEMA designated 100-year floodplain (Zone "AO-Depth 1 foot") in both pre- and post-development conditions.

- The lowest finish floor elevations of 1557.00 and 1559.30 are approximately 2.00 and 4.30 feet higher than the highest natural ground elevation of 1555.00. It is our understanding this is in compliance with the City's floodplain ordinance, which requires the lowest finished floor to be a minimum of 2 feet above (1 foot for AO and 1 foot of freeboard) the natural highest grade.

7.0 REFERENCES

1. *Design Standards and Policies Manual, Chapter 4: Grading and Drainage*, City of Scottsdale, January 2010.
2. *Onsite Drainage Report for Fairmont Scottsdale Ballroom Addition*, Wood, Patel & Associates, Inc., July 14, 2011.
3. *Offsite Drainage Report for Fairmont Scottsdale Ballroom Addition*, Wood, Patel & Associates, Inc., July 14, 2011.
4. *Drainage Report for Maravilla East Property Line Road*, Wood, Patel & Associates, Inc., dated May 12, 2008, revised October 15, 2008.
5. *Drainage Study Core North/Core South Scottsdale, AZ*, Robert Ward, P.E., Consulting Engineering, September 25, 2001. Prepared for Arizona State Land Department.
6. *Sedimentation Report Reach 11 Dikes Hayden/Rhodes (Granite Reef) Aqueduct*, Earth Science Division, Surface Water Branch, Sedimentation Office of Denver, Colorado, July 1990.
7. *Maravilla Scottsdale Senior Living Community*, Wood, Patel & Associates, Inc., December 18, 2008, Revised February 13, 2009.
8. *Curry's Corner Quadrangle*, 7.5 Minute Series Topographic Map, USGS, 1964.
9. *Drainage Report for Fairmont Scottsdale Hotel Expansion*, Wood, Patel & Associates, Inc., May 1, 2015.

APPENDIX B - FOR REFERENCE ONLY

APPENDIX A

HYDROLOGIC AND HYDRAULIC CALCULATIONS

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Inlet Capacity Summary

Description: Summary of Inlet Sizing Calculations
Location: Fairmont Scottsdale Western Town

Inlet ID	Contributing Drainage Area ID*	Q10 (cfs)*	Available Head (ft)	Inlet Type	Inlet Capacity (cfs)	10-Year Actual Ponding Depth (ft)
MAG	1/2 B1	2.1	1.0	MAG 535	25.50	0.17
Neenah	1/2 B1	2.1	1.0	Neenah R-2557	9.60	0.15

*Contributing drainage area ID and flow information taken from the *Drainage Report for the Fairmont Scottsdale Hotel Expansion*, Wood, Patel and Associates, dated May 1, 2015.

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Inlet Capacity - Sump Locations

Description: Calculation of Inlet Capacity for Single MAG 535 Catch Basin (w/o Curb)
Location: Fairmont Scottsdale Western Town
Reference: Drainage Design Manual for Maricopa County, Vol. II, Hydraulics, pg. 3-27

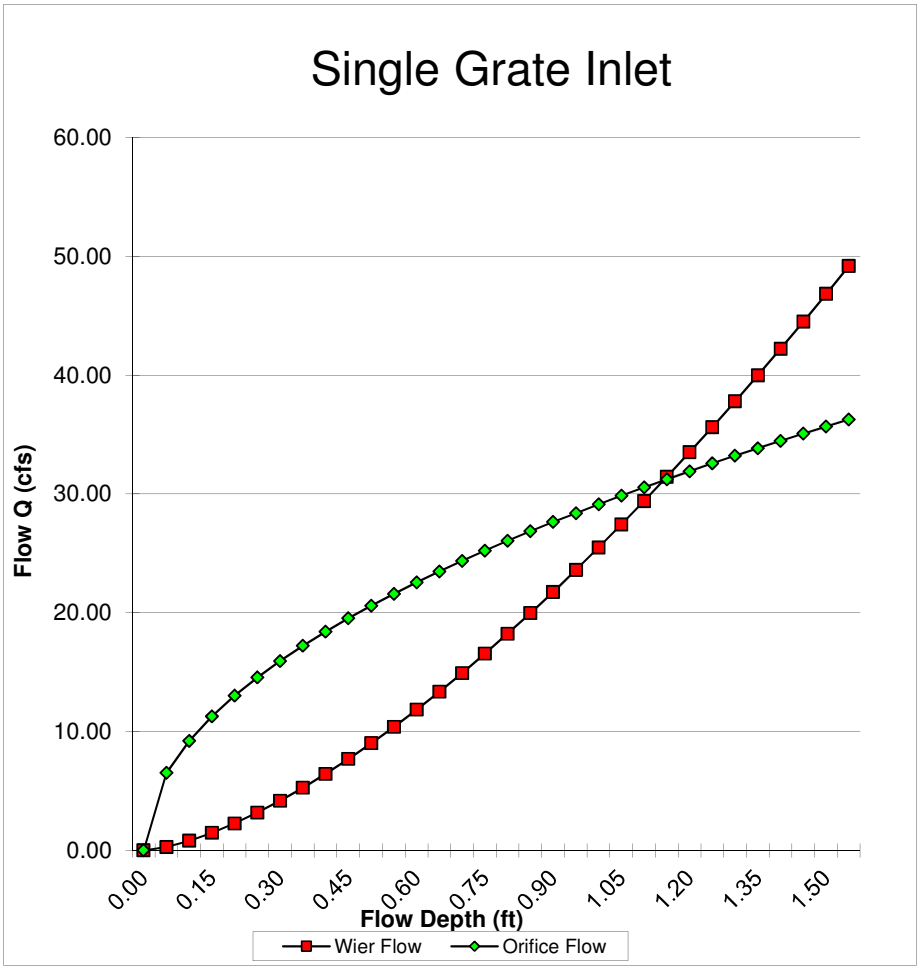
Weir EQ. $Q_i = C_w P d^{1.5}$ **Orifice EQ.** $Q_i = C_o A (2gd)^{0.5}$

Where: $C_w = 3.0$, $C_o = 0.67$

P =	**8.50**	**ft**
A =	**5.42**	**sq.ft.**

where,
P = Perimeter of Catchbasin minus
area of longitudinal & lateral bars (2 Short Sides, 1 Long Side)
A = Total area of grate minus
area of longitudinal & lateral bars

Depth (ft)	Weir Qi (cfs)	Orifice Qi (cfs)
0.00	**0.00**	**0.00**
0.05	**0.29**	**6.52**
0.10	**0.81**	**9.22**
0.15	**1.48**	**11.29**
0.20	**2.28**	**13.03**
0.25	**3.19**	**14.57**
0.30	**4.19**	**15.96**
0.35	**5.28**	**17.24**
0.40	**6.45**	**18.43**
0.45	**7.70**	**19.55**
0.50	**9.02**	**20.61**
0.55	**10.40**	**21.61**
0.60	**11.85**	**22.57**
0.65	**13.36**	**23.49**
0.70	**14.93**	**24.38**
0.75	**16.56**	**25.24**
0.80	**18.25**	**26.07**
0.85	**19.98**	**26.87**
0.90	**21.77**	**27.65**
0.95	**23.61**	**28.40**
1.00	**25.50**	**29.14**
1.05	**27.44**	**29.86**
1.10	**29.42**	**30.56**
1.15	31.45	**31.25**
1.20	33.52	**31.92**
1.25	35.64	**32.58**
1.30	37.80	**33.23**
1.35	40.00	**33.86**
1.40	42.24	**34.48**
1.45	44.52	**35.09**
1.50	46.85	**35.69**
1.55	49.21	**36.28**



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MUNICIPAL PRODUCT SEARCH

Enter a product number. Go

Downloadable Product Catalog

ENGINEERING TOOLS

- Modified Manning Calculators
- Weir and Orifice Calculator
  - Weir Flow
  - Orifice Flow
- Curb Opening Hydraulics Calculator
- R-4999 Vane Trench Grate Hydraulics
- Neenah Grate Information
- Engineering Literature & Videos

WEIR & ORIFICE CALCULATOR

The Weir and Orifice Calculator is used to determine the inlet capacity in sag (ponding) conditions by use of the Weir and Orifice equations. Knowing this information will allow you to select the proper grate type and size for your specific job or project.

Weir Flow Calculations

Weir Equation: $Q = 3.3P(h)^{1.5}$

- **Q** = Capacity in CFS
- **P** = Feet perimeter
- **h** = Head in feet
- Weir Information

Orifice Flow Calculations

Orifice Flow Equation: $Q = 0.6A\sqrt{2gh}$

- **Q** = Capacity in CFS
- **A** = Free open area of grate in sq. ft.
- **g** = 32.2 (feet per sec/sec)
- **h** = Head in feet
- Orifice Information

Instructions:

1. Select a catalog number (will automatically fill in Open Area and Perimeter) or enter your own values
2. Enter head value
3. Click "calculate"

The results will determine automatically if your situation falls into a Weir, Transitional or Orifice flow. Additionally, Neenah grates which fall within the parameters chosen will appear below the calculator.

Catalog Number and Grate Type:

R-2557:G

Feet perimeter (P):	Head in feet (h):	Free open area in sq. ft. (A):
8.4	1	2.0

Calculate

Weir capacity in cfs:	Transitional flow in cfs:	Orifice capacity in cfs:
		9.6

Based on orifice flow, the following grates match the criteria you entered.

Catalog Number	Grate Type
R-1792-GG	G
R-1879-A6G	A or C
R-2557	G
R-2558	G
R-2560-E2	Beehive

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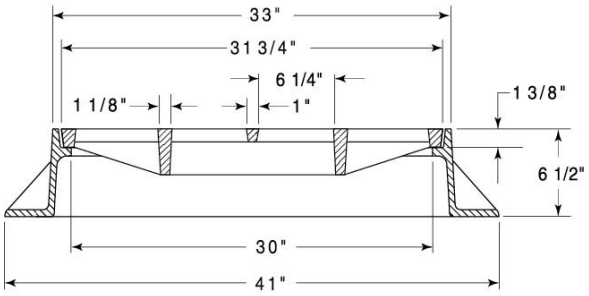
NEENAH FOUNDRY

R-2557 - Inlet Frames & Grates

R-2557

Inlet Frame, Grate

Heavy Duty



CATALOG NUMBER	GRATE TYPE	SQ. FT. OPEN	WEIR PERIMETER LINEAL FEET
R-2557	G	2.0	8.4

Available Lid: **R-1557**

Catalog Number	A	B	C	E	F
R-2557	31-3/4	1-3/8	30	41	6-1/2

All dimensions are listed in inches unless otherwise noted.

To order Neenah Foundry products, please call **800.558.5075**.

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APPENDIX B

STORMWATER STORAGE WAIVER /
PROPOSED DRAINAGE IMPROVEMENTS EXHIBIT

PRINCESS

APPENDIX B - FOR REFERENCE ONLY

10/22

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC# 6332-07-7

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

Date 7/14/08 Project Name Fairmont Scottsdale Princess Resort

Project Location 7575 East Princess Drive Scottsdale, AZ 85255

Applicant Contact John Bulka Company Name Wood Patel & Associates

Phone 480-834-3300 Fax 480-834-3320 E-mail jbulka@woodpatel.com

Address 1855 N. Stapley Mesa, AZ 85203

Waiver Criteria

A waiver is an intentional relinquishment of a claim or right. A project must meet at least one of six criteria listed below for the city to consider waiving some or all required stormwater storage. Check the applicable box and provide a signed engineering report and supporting engineering analyses that demonstrate the project meets the criteria *and* that the effect of a waiver will not increase the potential for flooding on any property.

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

☒ 2. The development is adjacent to a watercourse or channel that an engineering analysis shows is designed and constructed to handle the additional runoff without increasing the potential for flood damage to the subject property or to any other property.

☐ 3. The development is on a parcel less than one-half acre in size in an area where the engineering analysis demonstrates there is no significant increase in potential for flood damage due to its development.

☐ 4. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO). The applicant must demonstrate there is no increased potential for flood damage to the subject property or to any other property. Such conflicts with ESLO may include:

- Total land requirements for storage basin, easements, setbacks, and NAOS prevent building allowable footprint per zoning.
- Topography prevents building storage basin.
- Creating a storage facility requires wash modification.
- Instances where the Zoning Administrator cannot allow a modification to ESL requirements.

☐ 5. The project is located within the Downtown Fee Reduction Area as described and approved by City Council Resolution #6238 (see map). The applicant must demonstrate there is no increased potential for flood damage to any property. Even if the project is located in the Downtown area, if the project creates additional potential for increased flood damage, the developer must provide alternative mitigation methods to prevent the damage.

☐ 6. The project is located within a watershed that drains directly to the Salt River Pima-Maricopa Indian Community (SRPMIC) (see map). The project must provide the pre-development peak discharge flow to the SRPMIC, and attenuate flows over and above pre-development.

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

John Bulka

Developer or Engineer (circle one)

7-16-08

Date

Planning & Development Services Department

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

SWW

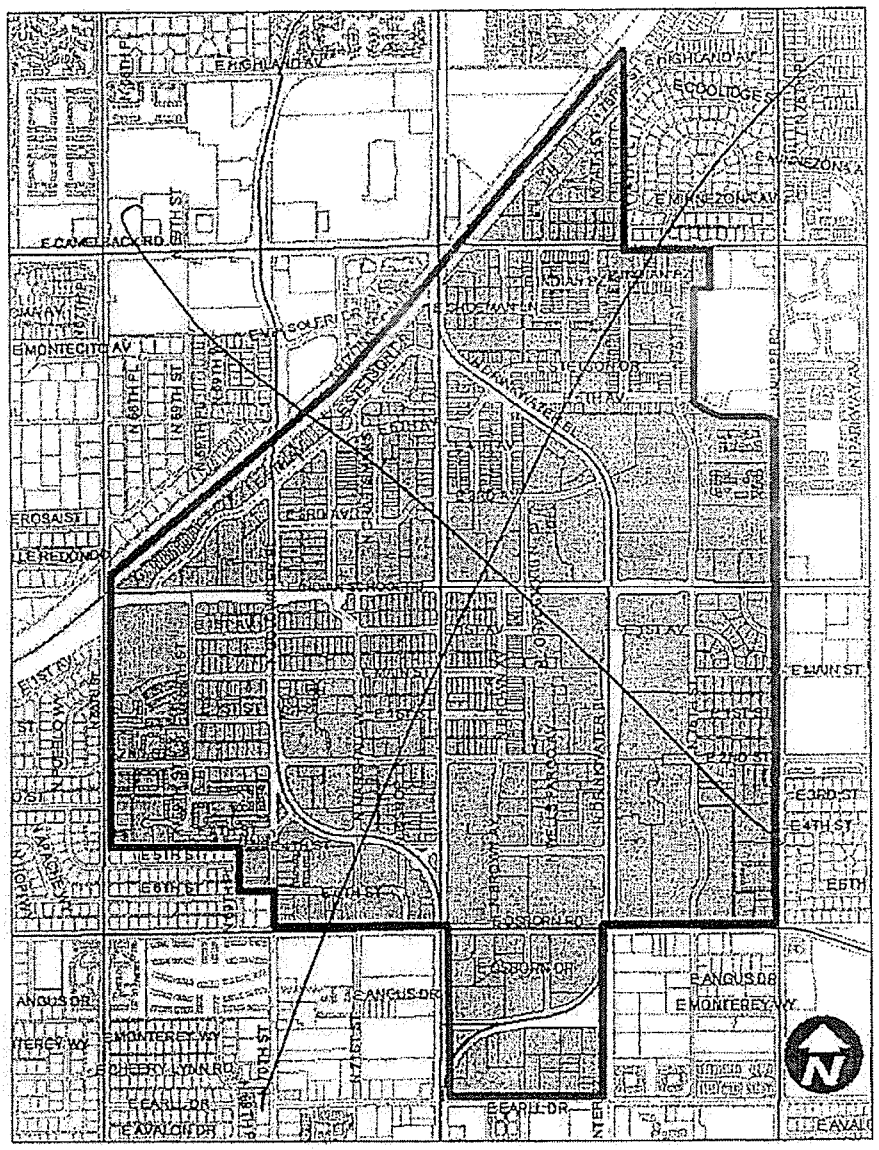
6332-07-7

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ____ ____ - PP - ____ PC#_____



NOT APPLICABLE

Figure 1. Designated Area for Downtown Stormwater Storage Waivers

Planning & Development Services Department

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

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ____ ____ - PP - ____ PC#_____

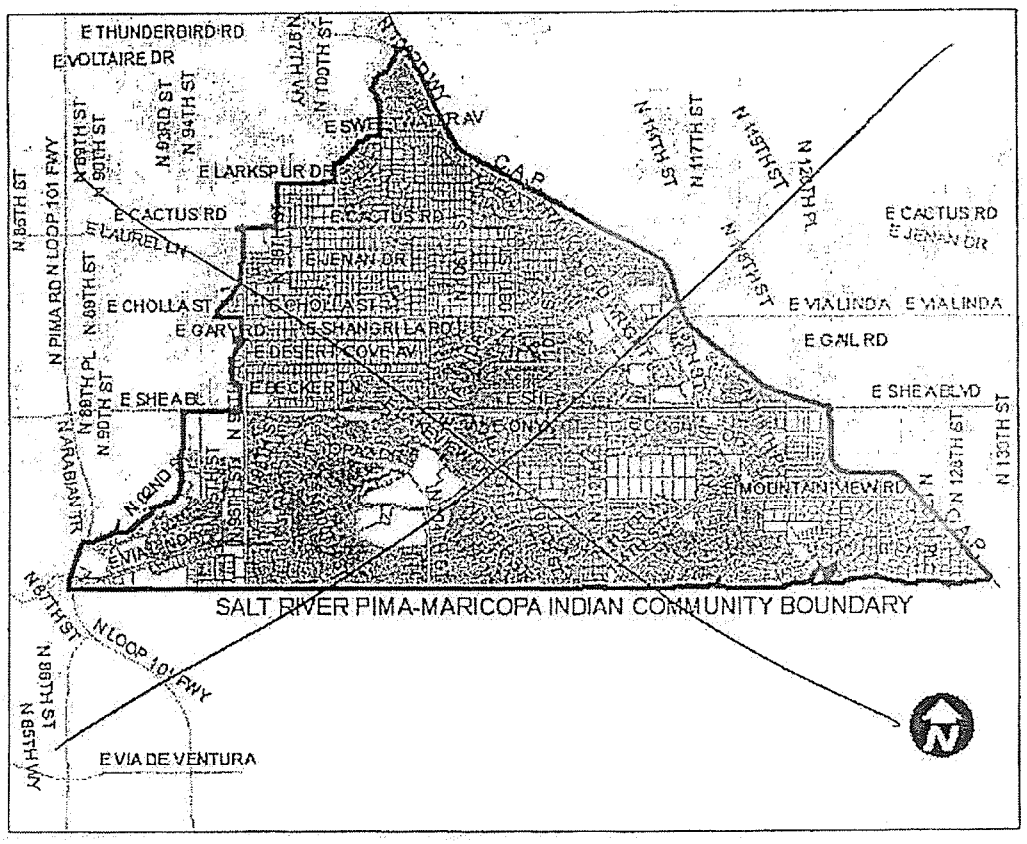


Figure 2. Watersheds Draining to Salt River Pima-Maricopa Indian Community

NOT APPLICABLE

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

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name FAIRMONT SCOTTSDALE PRINCESS RESORT

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

☑ Recommend approve waiver.

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

Explain: _____

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

Explain: _____

Recommended Conditions of Waiver:
- ☒ All storage requirements waived.
- ☐ Pre development conditions must be maintained.
- ☑ Other:

Explain: In land improvements exceed cost of in-lieu fee.

☒ **Waiver approved per above conditions.**

☐ **Waiver denied.**

C. Ashley Couch — Floodplain Administrator or Designee

10/23/08 — Date

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

APPENDIX B - FOR REFERENCE ONLY

Request for Stormwater Storage Waiver

292-SA-2007 City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

In-Lieu Fee and In-Kind Contributions

If the city grants a waiver, the developer is required to calculate and contribute an In-Lieu Fee based on what it would cost the city to provide the waived storage volume, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. For FY 2007/2008, this cost is $3.22 per cubic foot of stormwater stored. This unit cost will be updated annually, but the city reserves the right to revise the unit cost at any time at its sole discretion.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. The Floodplain Administrator or designee must approve in-lieu fees and in-kind contributions.

Project Name Fairmont Scottsdale Princess Resort

The waived stormwater storage volume is calculated as follows:

V =CRA; where
V =stormwater storage volume required, in cubic feet,
C =weighted average runoff coefficient over disturbed area,
R =100-year/2-hour precipitation depth, in feet (2.82 inches, or 0.235 feet, for all regions of Scottsdale), and
A =area of disturbed ground, in square feet

Furthermore,

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

C = 0.9
A = 424,753
V = 89,826
V_p = 0
V_w = 89,826

☐ An In-Lieu Fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $3.22 per cubic foot = 289,240

☒ An In-Kind Contribution will be made, as follows:
See attachment. Princess Drive Bridge Reconstruction, in accordance with approved plans.

☐ No In-Lieu Fee is required. Reason:

Approved by: C. Ashley Conklin 10/23/08

Floodplain Administrator or Designee — Date

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

APPENDIX B - FOR REFERENCE ONLY

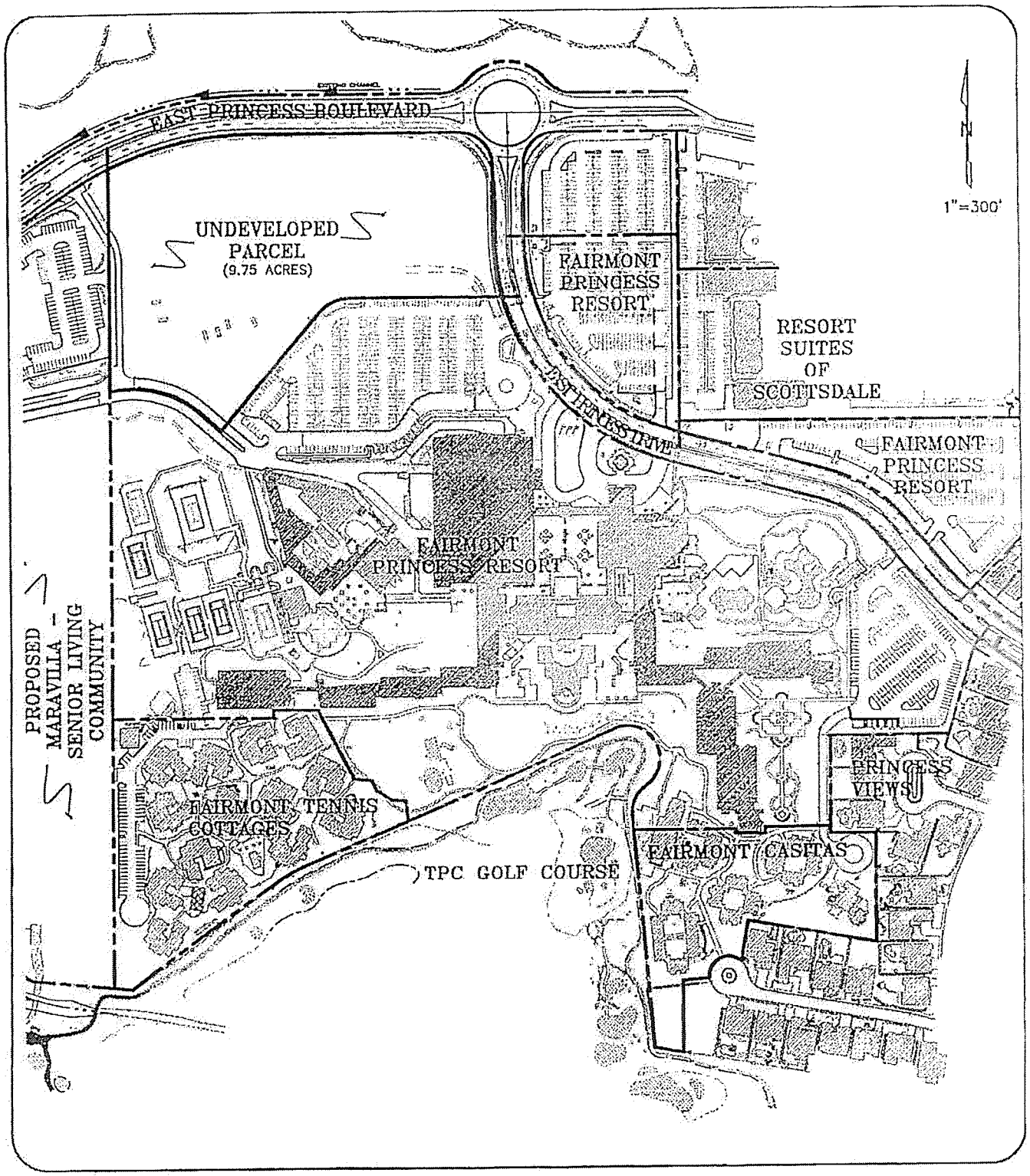


EXHIBIT 1

FAIRMONT SCOTTSDALE PRINCESS RESORT

ENGINEER	J. Bulka
DESIGNER	J. Haywood
CAD TECHNICIAN	J. Sanchez
SCALE	1"=300'
DATE	07/14/08
JOB NUMBER	07910
REF. SHEET	1 OF 1

WOOD/PATEL & ASSOCIATES INC.
Civil Engineers, Hydrologists and Land Surveyors
1855 North Stapley Drive
Mesa, Arizona 85203
(480) 834-3300
(480) 834-3320 FAX

APPENDIX B - FOR REFERENCE ONLY

October 23, 2008

WP# 072910

Attachment to Stormwater Storage Waiver Request

for Fairmont Scottsdale Princess Resort & Regional Flood Control

The Fairmont Scottsdale Princess Resort (Site) is a 60 acre resort located near the southwest corner of Princess Boulevard and Princess Drive. The Site is bounded by the Princess Blvd. to the north, the Maravilla Scottsdale Senior Living Community to the east, the TPC Golf Course to the south and existing residential developments to the west (see Exhibit 1, attached). The existing Fairmont Scottsdale Princess Resort consists of multiple hotel buildings, a ballroom, spa, tennis cottages, tennis courts, and parking. A majority of the site is developed and portions are being updated and renovated. At the north end of the site there is a 9.75 acre portion of the property that has yet to be developed, and other portions are scheduled for upgrades.

It is Wood/Patel's understanding that the ownership of the Fairmont Scottsdale Princess Resort, Strategic Hotels and Resorts, has agreed to fund regional flood control improvements to the public road/channel crossing at Princess Blvd and Scottsdale Road, in return for the City approving this waiver and it being applicable to the entire site. The improvements consist of removing the existing concrete box culvert crossing and replacing it with a bridge structure. The cost of a new bridge structure is estimated at $1,053,000.

City of Scottsdale In-Lieu Fees:

V(req) Volume required = CRA = (0.90) x (0.235 feet) x (9.75 acres) = 89,826 cu-ft.

C (Runoff Coefficient) = 0.90

R (100-year/2-hour precipitation depth) = 0.235 feet

Site area = 9.75 acres

City of Scottsdale In-Lieu Fees = V(req) x $3.22 = (89,826 cu-ft) x $3.22 = $289,240

Summary:

Public Drainage Improvements = $1,053,000 (*)

City of Scottsdale in Lieu Fee = $289,240

(*) See Sheet 2 of 2 Engineering Preliminary Opinion of Probable Cost

October 23, 2008

WP# 072910

Attachment to Stormwater Storage Waiver Request

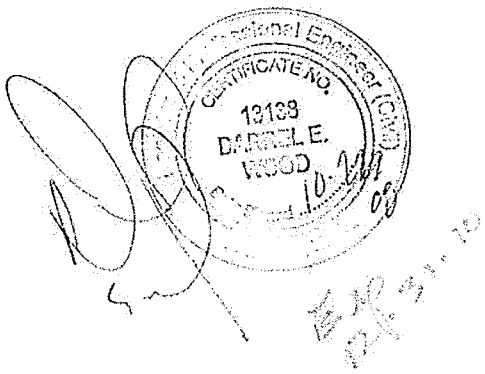
for Fairmont Scottsdale Princess Resort & Regional Flood Control

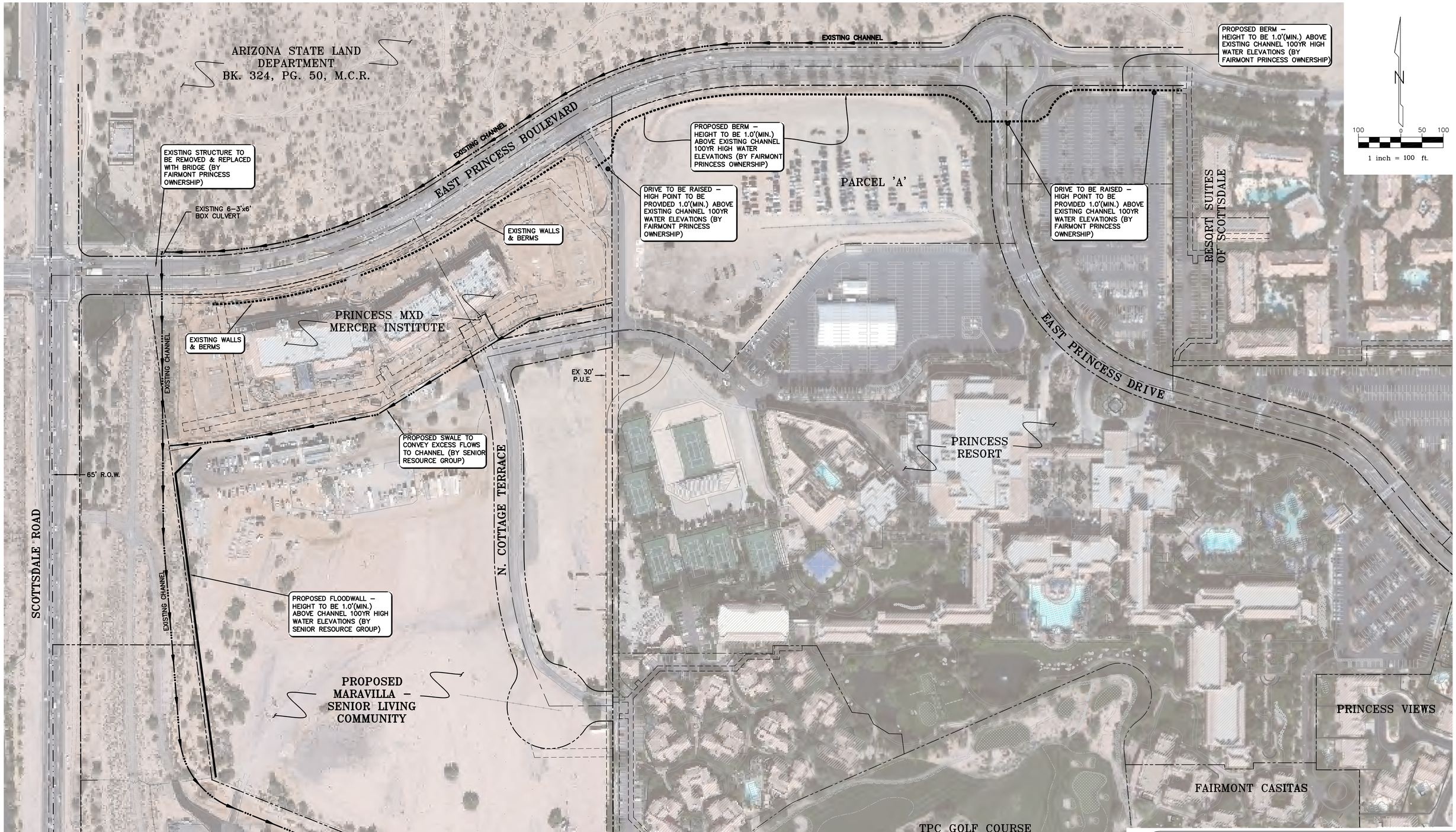
Engineering Preliminary Opinion of Probable Cost (*)

Prepared Bridge Structure at Princess Drive, just east of Scottsdale Road serving unnamed wash.

Estimated Bridge Surface = 8,100 square feet x $130/s.f. $1,053,000

(*) Offered without the benefit of construction documents and specifications.





MARAVILLA SCOTTSDALE/
FAIRMONT SCOTTSDALE PRINCESS RESORT

PROPOSED DRAINAGE IMPROVEMENTS EXHIBIT

DATE: 12/20/07

WOOD/PATEL
LAND DEVELOPMENT • WATER RESOURCES
STRUCTURES • TRANSPORTATION / TRAFFIC
WATER / WASTEWATER • SURVEYING
CONSTRUCTION MANAGEMENT
(480) 834–3300
PHOENIX • MESA • GOODYEAR • TUCSON

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APPENDIX B - FOR REFERENCE ONLY

APPENDIX C

CITY OF SCOTTSDALE FORMS

Appendix 4-1C

WARNING & DISCLAIMER OF LIABILITY

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

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

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

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

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

Plan Check No.	Owner or Agent	Date
		2/6/2015

APPENDIX B - FOR REFERENCE ONLY

Section 404 Certification

Before the City issues development permits for a project, the developer's Engineer or the property owner must certify that it complies with, or is exempt from, Section 404 of the Clean Water Act of the United States. Section 404, administered by the U.S. Army Corps of Engineers (COE), regulates the discharge of dredged or fill material into a wetland, lake, (including dry lakes), river, stream (including intermittent streams, ephemeral washes, and arroyos), or other waters of the United States.

Prior to submittal of improvement plans to Project Review the form below must be completed (and submitted with the improvement plans) as evidence of compliance

Certification of Section 404 Permit Status

Owner's Name: Strategic Hotels and Resorts Phone No. 312-658-6016

Project Name/Description: Fairmont Scottsdale Hotel Exp. Case No. _____

Project Location/Address: 7575 E. Princess Blvd., Scottsdale, Az. 85255

A registered Engineer or the property Owner must check the applicable condition and certify by signing below that:

1. **Section 404 <u>does</u> apply to the project because there will be a discharge of dredged or fill material to waters of the U.S., and:**

   ☐ A Section 404 Permit has already been obtained for this project.

   -or-

   ☐ This project qualifies for a "Nationwide Permit," and this project will meet all terms and conditions of the applicable nationwide permit.

2. **Section 404 <u>does not</u> apply to the project because:**

   ☒ No watercourses or other waters of the U.S. exist on the property.

   ☐ No jurisdictional waters of the U.S. exist on the property. Attached is a copy of the COE's Jurisdictional Determination.

   ☐ Watercourses or other waters of the U.S. do exist on the property, but the project will not involve the discharge of dredged or fill material into any of these waters.

I certify that the above statement is true.

John Bulka
Engineer's Signature and Seal, or Owner's Signature

Registered Professional Engineer (Civil) CERTIFICATE NO. 33359 JOHN M. BULKA Date Signed 2-6-15 ARIZONA U.S.A.

2-6-15
Date

Project Manager
Title

Company Wood, Patel

John Bulka expires: 3-31-17

Planning & Development Services Department
7447 E Indian School Road, Suite 100, Scottsdale, AZ 85251 ◆ Phone: 480-312-2500 ◆ Fax: 480-312-7088

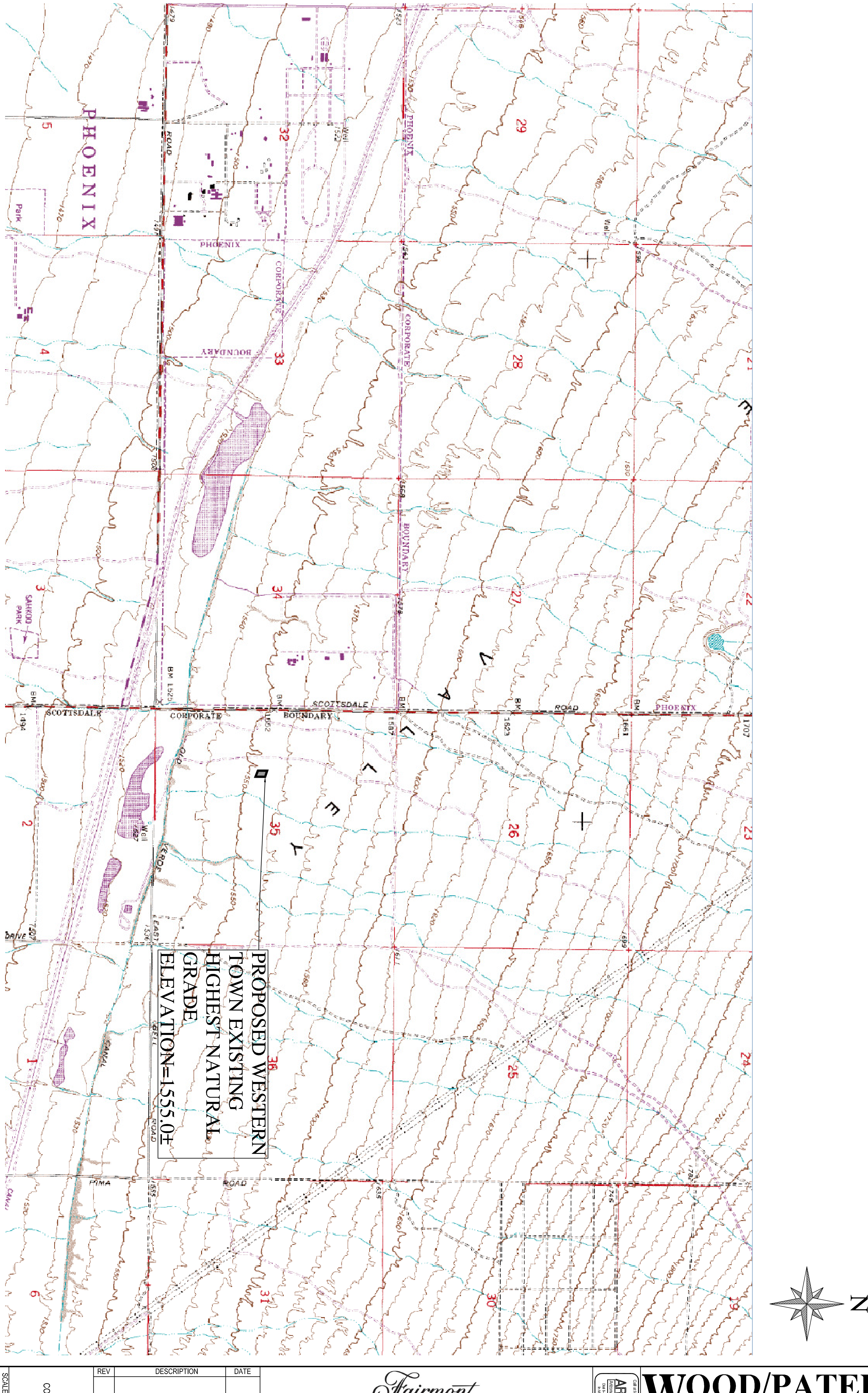
APPENDIX B - FOR REFERENCE ONLY

APPENDIX D

OFFSITE WATERSHED EXHIBITS

APPENDIX B - FOR REFERENCE ONLY

Regional Contour Map /
Opinion of Existing Highest Natural Grade Elevation



REV	DESCRIPTION	DATE

NOT FOR CONSTRUCTION

SCALE (HORIZONTAL) N/A
SCALE (VERTICAL) N/A
DATE 05/15/2015
JOB NUMBER 154302.01
SHEET 1 OF 1

Fairmont
SCOTTSDALE PRINCESS

WESTERN TOWN
REGIONAL CONTOUR MAP/OPINION OF EXISTING HIGHEST NATURAL GRADE ELEVATION

ARIZONA811

WOOD/PATEL
MISSION: CLIENT SERVICE ™
(602) 335-8500
WWW.WOODPATEL.COM
PHOENIX - MESA - TUCSON

APPENDIX B - FOR REFERENCE ONLY

Aerial Map

APPENDIX B - FOR REFERENCE ONLY

EAST PRINCESS BOULEVARD

ARIZONA STATE LAND DEPARTMENT

PROPOSED SITE

EAST PRINCESS DRIVE

RESORT SUITES OF SCOTTSDALE

PRINCESS MXD: MERCER INSTITUTE

APPROXIMATE PROJECT LIMITS

PRINCESS RESORT

N. SCOTTSDALE ROAD

MARAVILLA SENIOR LIVING COMMUNITY

SCOTTSDALE PRINCESS RESORT TENNIS COTTAGES

TCP GOLF COURSE

N

0 100 200

Horz. 1 in. = 100 ft.

X:\N-Drive\Q015\154302\0\Project Support\Reports\Drainage\Exhibits\Ex02 Exhibit - Aerial Map.dwg

FAIRMONT SCOTTSDALE WESTERN TOWN

2015 AERIAL PHOTOGRAPH

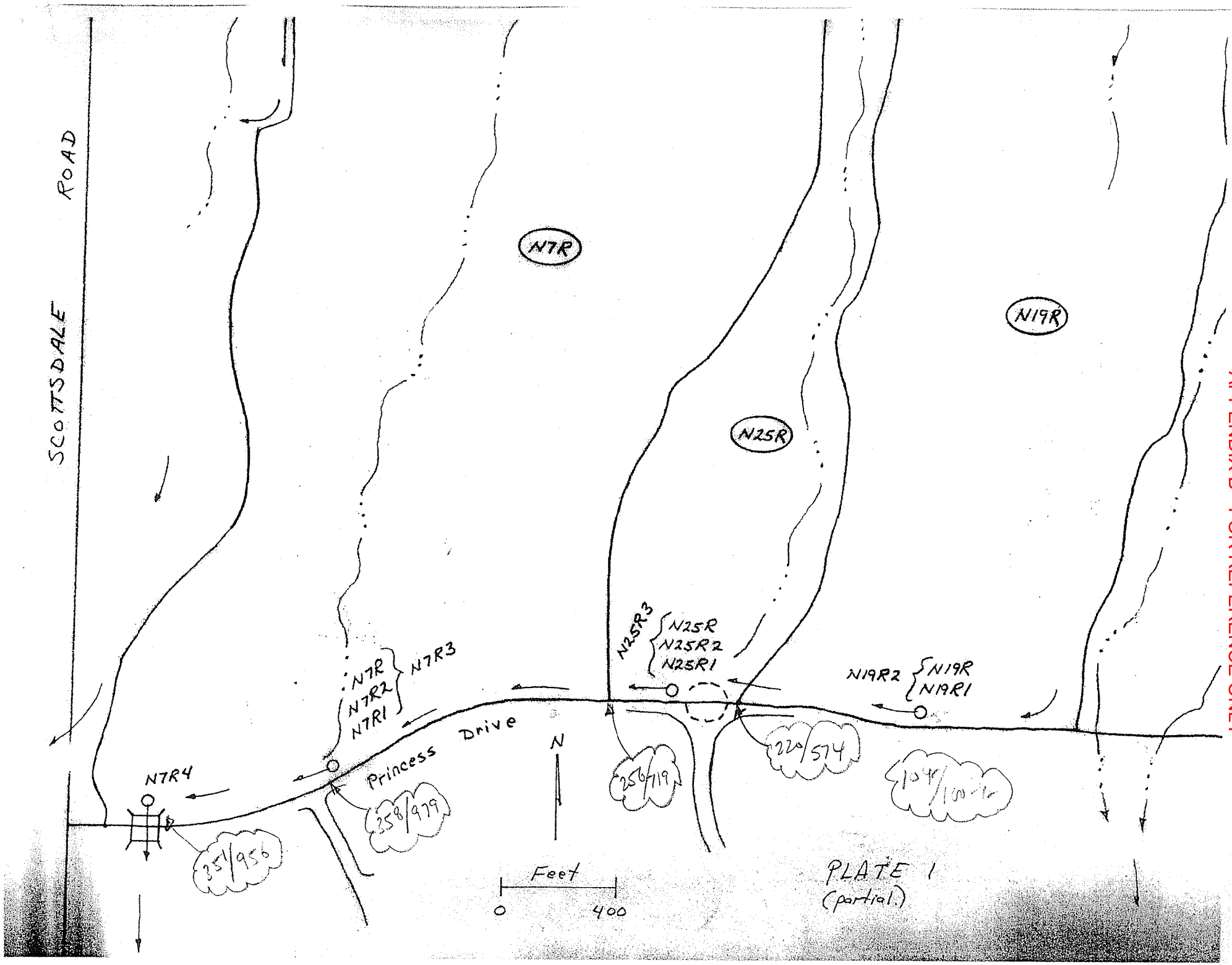
WOOD/PATEL
2220 S. Country Club Dr.
Mesa, AZ 85210
(480) 834-3300
www.woodpatel.com
PHOENIX - MESA - TUCSON

JOB# 154302.10

APPENDIX B - FOR REFERENCE ONLY

Plate 1 Exhibit

(From Core North/Core South Drainage Study)



APPENDIX B - FOR REFERENCE ONLY

Table 1 Spreadsheet

(From Core North/Core South Drainage Study)

APPENDIX B - FOR REFERENCE ONLY

Table 1
Peak Discharge Summary

Princess Drive Channel
Fairmont Scottsdale Princess Resort
Scottsdale, Arizona

Location	HEC-1 CP	Peak Discharge (cfs) By Storm Return Interval (6-Hour Duration)					
		2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr
750-Ft East of Roundabout	N19R2	60	146	220	342	444	574
At Roundabout	N25R3	62	167	256	417	549	719
700-Ft Upstream of Culvert	N7R3	90	228	358	583	787	979
At Princess Drive Culvert	N7R4	89	227	351	580	779	956
HEC-1 File:		PRN2	PRN5	PRN10	PRN25	PRN50	PRN100

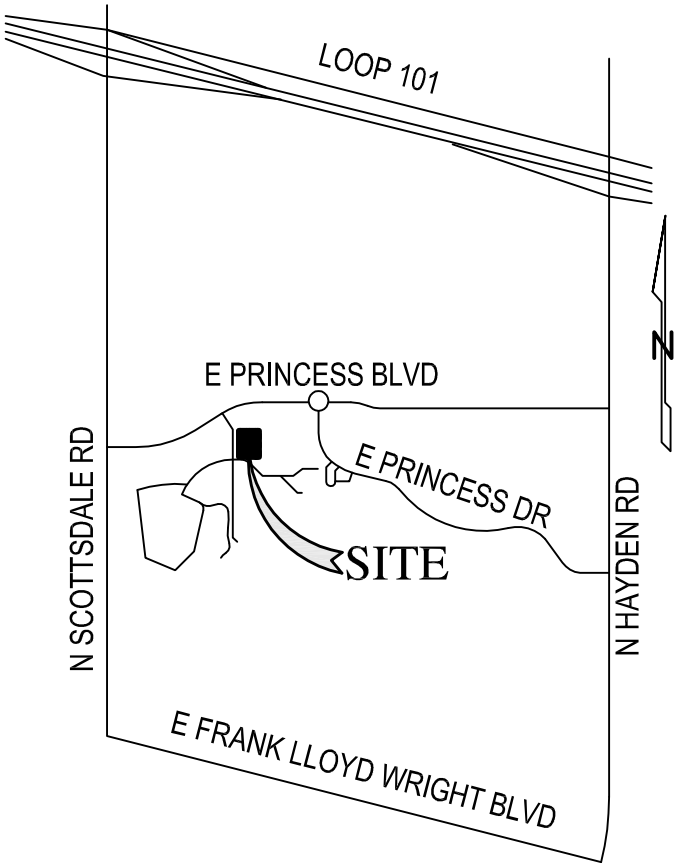
Note: See Plate 1 for HEC-1 concentration point locations.

5/31/2007

APPENDIX B - FOR REFERENCE ONLY

EXHIBIT 1

VICINITY MAP



VICINITY MAP

N.T.S.

N

N.T.S.

SCOTTSDALE, ARIZONA

FAIRMONT SCOTTSDALE
WESTERN TOWN

EXHIBIT 1
VICINITY MAP

WOOD/PATEL
2220 S. Country Club Dr.
Suite 101
Mesa, AZ 85210
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www.woodpatel.com
PHOENIX • MESA • TUCSON

JOB# 154302.10

X:\W-Drive\2015\154302.10\Project Support\Reports\Drainage\Exhibits\ 4302 Exhibit 1 - Vicinity Map.dwg

APPENDIX B - FOR REFERENCE ONLY

EXHIBIT 2

FEMA MAP

APPENDIX B - FOR REFERENCE ONLY

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1320L

FIRM

FLOOD INSURANCE RATE MAP

MARICOPA COUNTY, ARIZONA

AND INCORPORATED AREAS

PANEL 1320 OF 4425

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MARICOPA COUNTY	040037	1320	L
PHOENIX, CITY OF	040051	1320	L
SCOTTSDALE, CITY OF	045012	1320	L

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
04013C1320L

MAP REVISED
OCTOBER 16, 2013

Federal Emergency Management Agency

N

600 0 300 600

1 inch = 600 ft.

PROJECT AREA

NOT FOR CONSTRUCTION

X:\W-Drive\2015\154302.10\Project Support\Reports\Drainage\Exhibits\ 4302 Exhibit 2 - FEMA FIRM.dwg

FAIRMONT SCOTTSDALE WESTERN TOWN

EXHIBIT 2 FEMA FIRM

WOOD/PATEL
2220 S. Country Club Dr.
Suite 101
Mesa, AZ 85210
(480) 834-3300
www.woodpatel.com
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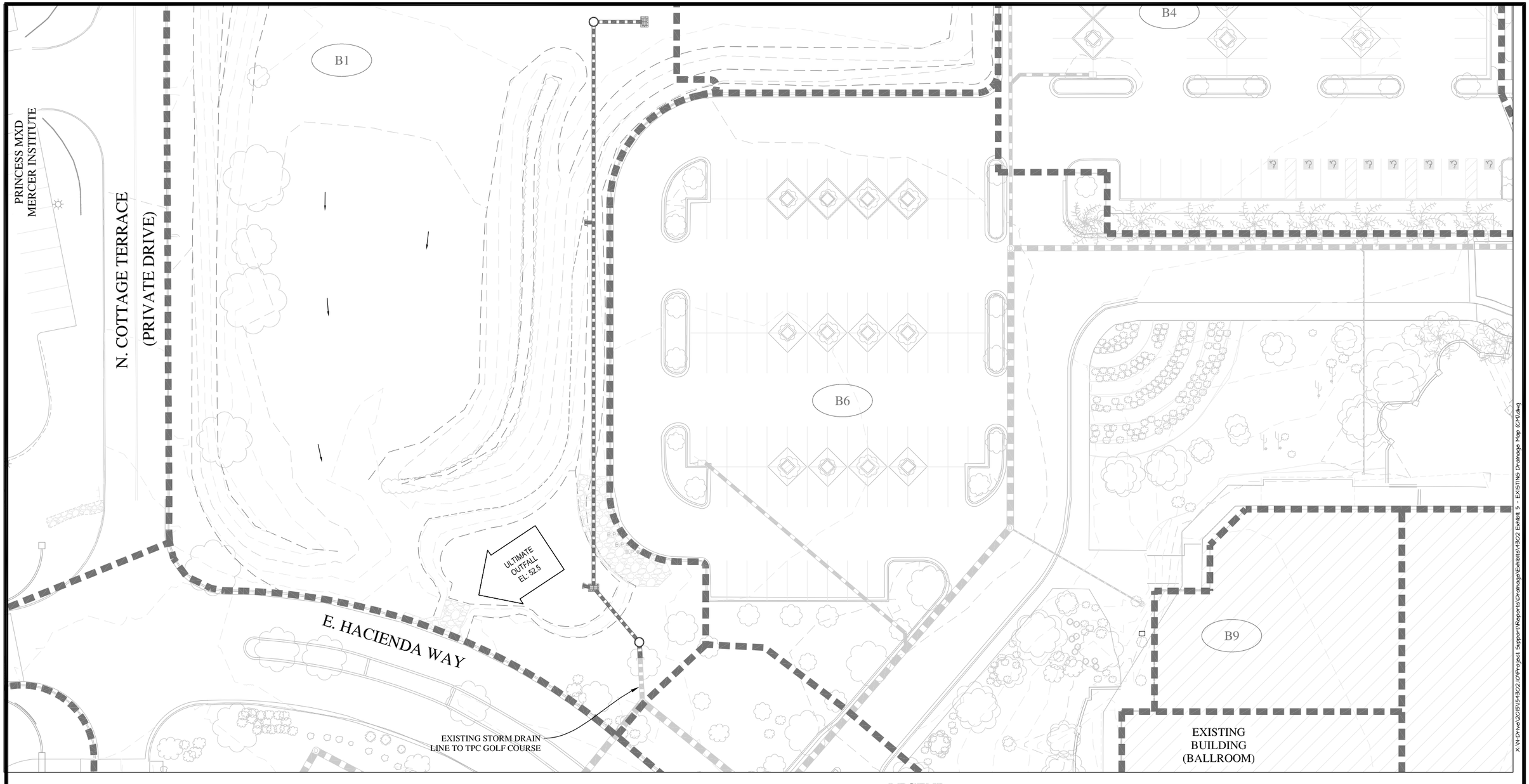
JOB# 154302.10

APPENDIX B - FOR REFERENCE ONLY

EXHIBIT 3

EXISTING DRAINAGE MAP



N

0 20 40

Horz. 1 in. = 20 ft.

LEGEND

- PROPOSED DRAINAGE AREA
- EXISTING DRAINAGE AREA
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING INTERMEDIATE CONTOUR
- EXISTING INDEX CONTOUR
- B1 — EXISTING DRAINAGE AREA - BALLROOM ADDITION
- ULTIMATE OUTFALL — ULTIMATE OUTFALL

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County (602) 263-1100

FAIRMONT SCOTTSDALE WESTERN TOWN

EXHIBIT 3 EXISTING DRAINAGE MAP

WOOD/PATEL
2220 S. Country Club Dr.
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JOB# 154302.10

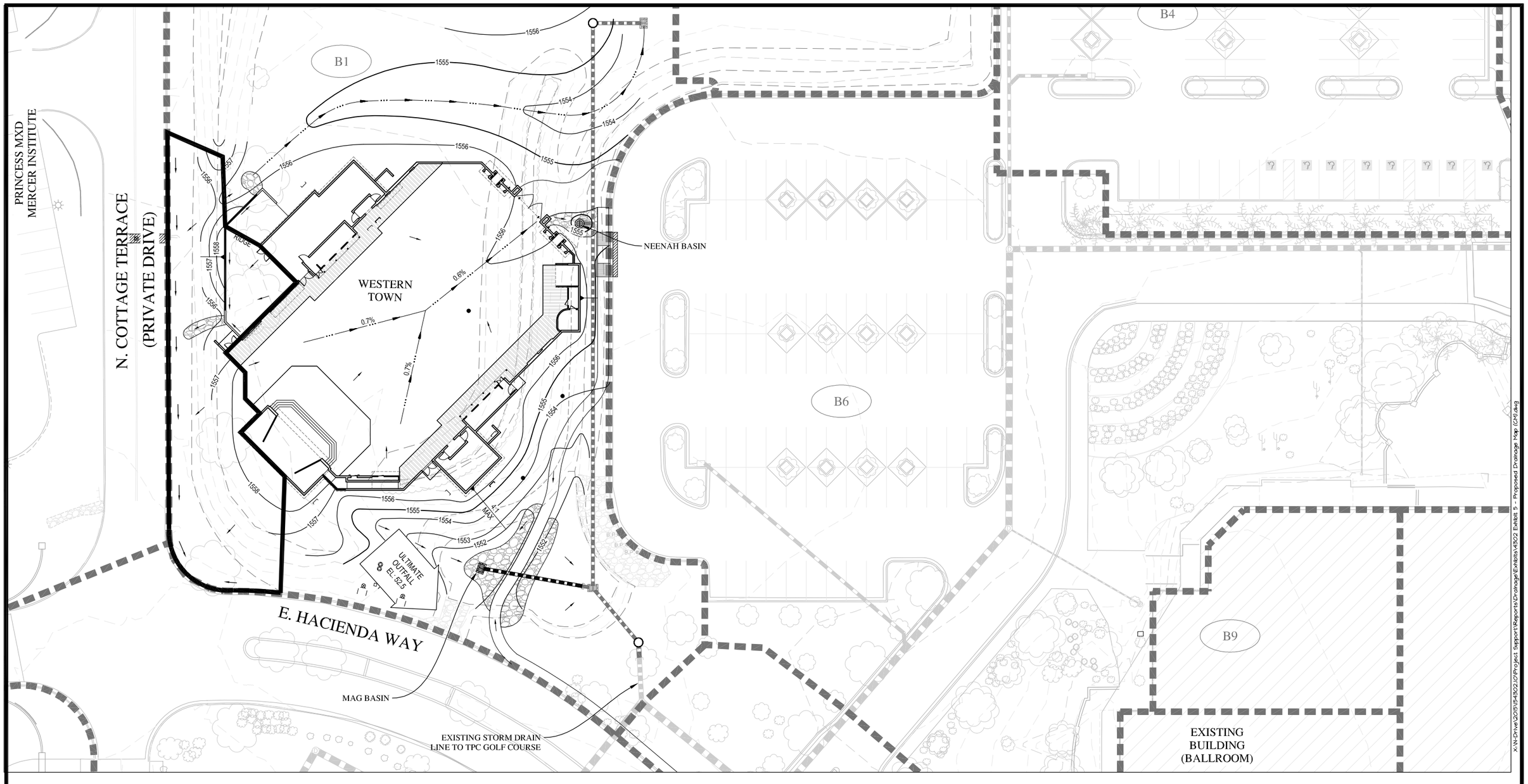
X:\N-Drive\2015\154302.10\Project Support\Reports\Drainage\Exhibits\43022 Exhibit 5 - EXISTING Drainage Map (CM).dwg

APPENDIX B - FOR REFERENCE ONLY

EXHIBIT 4

PROPOSED DRAINAGE MAP

APPENDIX B - FOR REFERENCE ONLY



N

0 20 40

Horz. 1 in. = 20 ft.

LEGEND

- PROPOSED DRAINAGE AREA
- EXISTING DRAINAGE AREA
- PROPERTY BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING INTERMEDIATE CONTOUR
- EXISTING INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- PROPOSED INDEX CONTOUR
- B1 — EXISTING DRAINAGE AREA - BALLROOM ADDITION
- ULTIMATE OUTFALL — ULTIMATE OUTFALL

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

FAIRMONT SCOTTSDALE WESTERN TOWN

EXHIBIT 4 PROPOSED DRAINAGE MAP

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Mesa, AZ 85210
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www.woodpatel.com
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JOB# 154302.10

X:\N-Drive\2015\154302.10\Project Support\Reports\Drainage\Exhibits\43502 Exhibit 5 - Proposed Drainage Map (CM).dwg

APPENDIX C – DRAINAGE MEMO FOR FAIRMONT SCOTTSDALE SUNSET BEACH POOL BY WOOD, PATEL & ASSOCIATES, INC., DATED SEPTEMBER 11, 2015

APPENDIX C - FOR REFERENCE ONLY

DRAINAGE MEMO
FOR
FAIRMONT SCOTTSDALE
SUNSET BEACH POOL

September 11, 2015
WP# 154302.30

Prepared For:

Strategic Hotels and Resorts
Mr. George Stowers
200 West Madison
Suite 1700
Chicago, Illinois 60606
Phone: (312) 658-6016

Submitted To:

City of Scottsdale
9388 East San Salvador Drive
Scottsdale, Arizona 85258
Phone: (480) 312-5636

Prepared By:

Wood, Patel & Associates, Inc.
2220 South Country Club Drive
Suite 101
Mesa, Arizona 85210
Phone: (480) 834-3300
Website: www.woodpatel.com

WOOD/PATEL
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CIVIL ENGINEERS • HYDROLOGISTS • LAND SURVEYORS • CONSTRUCTION MANAGERS

Darrel E. Wood, P.E., R.LS.
Ashok C. Patel, P.E., R.L.S., CFM
Michael T. Young, P.E.
James S. Campbell, P.E.
Thomas R. Gettings, R.L.S.
Darin L. Moore, P.E.
Jeffrey R. Minch, P.E., CFM
Robert D. Gofonia, P.E., R.L.S.

September 11, 2015

City of Scottsdale
9388 East San Salvador Drive
Scottsdale, AZ 85258

(480) 312- 5636
dmann@scottsdaleaz.gov

Re: **Fairmont Scottsdale Sunset Beach Pool**
Drainage Memo
WP# 154302.30

To Whom It May Concern:

The proposed Fairmont Scottsdale Sunset Beach Pool (Pool) project is a 7,000 S.F. pool project with a sand/beach area, splash pad, hardscape and landscaping. The proposed development is located east of Scottsdale Road and south of Princess Drive along Cottage Terrace. More specifically, the site is located in the southwest quarter of Section 35, Township 4 North, Range 4 East of the Gila and Salt River Meridian. Refer to Exhibit 1 – *Vicinity Map* at the back of this report for the project location. The existing property, currently zoned C-2, includes a hotel, parking lot, multiple tennis courts, hardscape and desert landscaping.

This project occurs in the courtyard of the previously-approved Fairmont Scottsdale Hotel Expansion (Plan Check #1708-15-1). This memo will act as a supplement to the drainage report for that project. The items addressed herein are drainage-related items that have changed to accommodate this project. Refer to the *Final Drainage Report for the Fairmont Scottsdale Hotel Expansion*, dated May 1, 2015, for the drainage specifics related to that project.

Storm water flows from the Pool will ultimately discharge into an existing 42-inch storm drain line within Cottage Terrace through a proposed storm drain system. The existing 42-inch storm drain line discharges into the Tournament Players Club (TPC) Golf Course, and has been sized to convey the 10-year storm. The 100-year storm flows overland within Cottage Terrace, as designed to the TPC.

The design criteria used to estimate storm water flows and evaluate system hydraulics are based on Wood, Patel & Associates, Inc.'s (Wood/Patel) understanding of the requirements listed in the *City of Scottsdale Design Standards and Policies Manual, Chapter 4: Grading and Drainage, 2010.*

Existing drainage areas S1 through S3, S12, and E5A, from the Fairmont Scottsdale Hotel Expansion, have been further delineated to include S13 through S20 to accommodate the additional inlets required to accommodate this project. The Pool has been omitted from this study, as the 10-year storm is contained within the pool design. The 100-year storm is anticipated to flow overland to Cottage Terrace. Refer to the *Rational Method Summary* and Exhibit 2 – *Proposed Drainage Map* at the back of this report for more information.

City of Scottsdale
Fairmont Scottsdale Sunset Beach Pool
Drainage Memo
WP# 154302.30

September 11, 2015

The proposed catch basins have been sized to convey the 100-year, 2-hour storm event with virtually no ponding. Refer to the *Inlet Capacity Summary* and the associated catch basin information at the back of this report for more information.

Thank you for your review of this Drainage Memo provided for the Fairmont Scottsdale Sunset Beach Pool. Please feel free to contact me if you have any questions.

Sincerely,

Wood, Patel & Associates, Inc.

John M. Bulka, P.E.
Project Manager

JMB/km

X:\Y-Drive\WP\Reports\Commercial\154302.30 Fairmont Scottsdale Sunset Beach Pool Drainage Memo.docx

APPENDIX C - FOR REFERENCE ONLY

HYDRAULIC AND HYDROLOGIC CALCULATIONS

WOOD/PATEL

Rational Method Summary

Description: Rational Method Inputs and Results
Location: Fairmont Scottsdale Sunset Pool
City of Scottsdale, Arizona

Drainage ID	Longest Watercourse (ft)	Longest Watercourse "L" (mi)	Drainage Area (s.f.)	Drainage Area "A" (acres)	Watershed Resistance Coefficient "K_b"	Top Elev. (ft)	Bottom Elev. (ft)	Basin Slope "S" (ft/mi)	Land Use (1)	Post Q100 "Tc" (min)	100 YR Intensity "i" (in/hr)	100YR Runoff Coefficient "C"	**Post Q100 (cfs)**	Post Q10 "Tc" (min)	10 YR Intensity "i" (in/hr)	10YR Runoff Coefficient "C"	**Post Q10 (cfs)**
Existing																	
E5A	277.4	0.053	12884	0.30	0.0433	52.3	51.5	15	25% Grass 37% Desert 38% Paved	6.4	6.80	0.60	**1.2**	7.9	3.91	0.53	**0.6**
Proposed																	
S1	323.2	0.061	14586	0.33	0.0430	57.0	46.0	180	90% Desert 10% Paved	2.9	8.63	0.50	**1.4**	3.5	5.36	0.42	**0.7**
S2	47.5	0.009	2354	0.05	0.0481	50.0	48.0	222	66% Desert 34% Paved	1.1	8.82	0.62	**0.3**	1.3	5.53	0.54	**0.1**
S3	92.2	0.017	6522	0.15	0.0451	52.5	50.6	109	90% Desert 10% Paved	1.8	8.89	0.50	**0.7**	2.2	5.58	0.42	**0.4**
S12	97.5	0.018	9636	0.22	0.0441	50.4	48.0	130	49% Grass 35% Desert 16% Paved	1.7	8.89	0.45	**0.9**	2.1	5.58	0.37	**0.5**
S13	43.2	0.008	2299	0.05	0.0481	50.0	48.0	244	15% Grass 50% Desert 35% Paved	1.0	8.89	0.60	**0.3**	1.2	5.58	0.51	**0.1**
S14	54.7	0.010	3874	0.09	0.0465	52.5	51.5	97	100% Paved	1.5	8.89	0.95	**0.8**	1.7	5.58	0.90	**0.5**
S15	53.0	0.010	2685	0.06	0.0476	52.5	51.5	100	100% Paved	1.5	8.89	0.95	**0.5**	1.8	5.58	0.90	**0.3**
S16	70.7	0.013	4194	0.10	0.0463	52.5	48.2	321	50% Grass 15% Desert 35% Paved	1.1	8.89	0.53	**0.5**	1.4	5.58	0.44	**0.2**
S17	111.5	0.021	6800	0.16	0.0450	52.5	51.5	47	100% Sand	2.6	8.89	0.25	**0.4**	3.1	5.58	0.15	**0.1**
S18	83.3	0.016	5982	0.14	0.0453	52.5	51.3	76	100% Paved	2.0	8.89	0.95	**1.2**	2.4	5.58	0.90	**0.7**
S19	128.1	0.024	5448	0.13	0.0455	61.2	59.8	58	100% Paved	2.6	8.89	0.95	**1.1**	3.1	5.58	0.90	**0.7**
S20	103.1	0.020	10101	0.23	0.0440	61.2	50.2	563	50% Desert 50% Paved	1.2	8.89	0.70	**1.4**	1.4	5.58	0.61	**0.8**

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Inlet Capacity Summary

Description: Summary of Inlet Sizing Calculations
Location: Fairmont Scottsdale Sunset Pool

Inlet ID	Contributing Drainage Area ID	Q10 (cfs)	Available Head (ft)	Inlet Type	Inlet Capacity (cfs)	10-Year Actual Ponding Depth (ft)
CB-S1	S1	0.7	0.5	MAG 535	9.02	0.09
CB-S2	S2	0.1	1.1	MAG 535	29.42	0.02
CB-S3	S3	0.4	0.7	15" Area Drain	1.70	0.11
CB-S12	S12	0.5	1.1	MAG 535	29.42	0.07
CB-S13	S13	0.1	1.1	MAG 535	29.42	0.02
CB-S14	S14	0.5	0.5	15" Area Drain	1.45	0.30
CB-S15	S15	0.3	0.5	15" Area Drain	1.45	0.08
CB-S16	S16	0.2	1.0	15" Area Drain	2.05	0.08
CB-S17	S17	0.1	1.0	15" Area Drain	2.05	0.04
CB-S19	S19	0.7	0.5	15" Area Drain	1.45	0.16
CB-S20	S20	0.8	1.0	15" Area Drain	2.05	0.17

WOOD/PATEL

CIVIL ENGINEERS * HYDROLOGISTS * LAND SURVEYORS * CONSTRUCTION MANAGERS

Inlet Capacity - Sump Locations

Description: Calculation of Inlet Capacity for Single MAG 535 Catch Basin (w/o Curb)
Location: Fairmont Scottsdale Sunset Pool
Reference: Drainage Design Manual for Maricopa County, Vol. II, Hydraulics, pg. 3-27

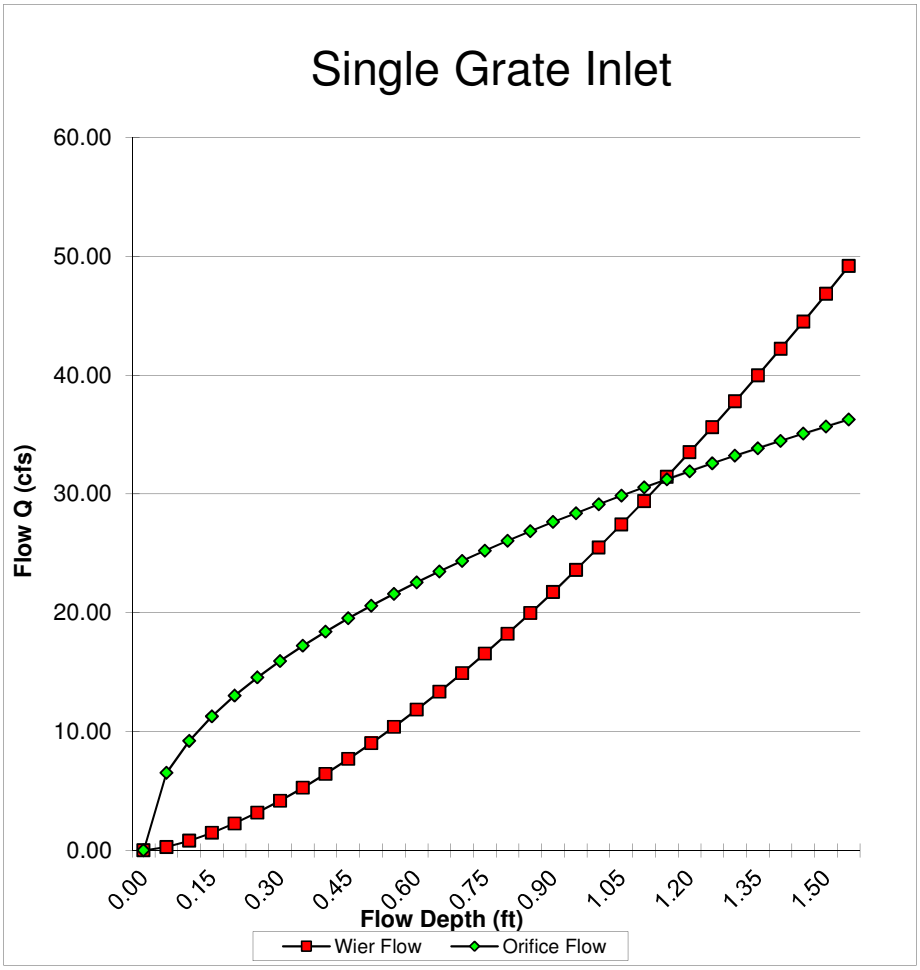
Weir EQ. $Q_i = C_w P d^{1.5}$ **Orifice EQ.** $Q_i = C_o A (2gd)^{0.5}$

Where: $C_w = 3.0$, $C_o = 0.67$

P =	**8.50**	**ft**
A =	**5.42**	**sq.ft.**

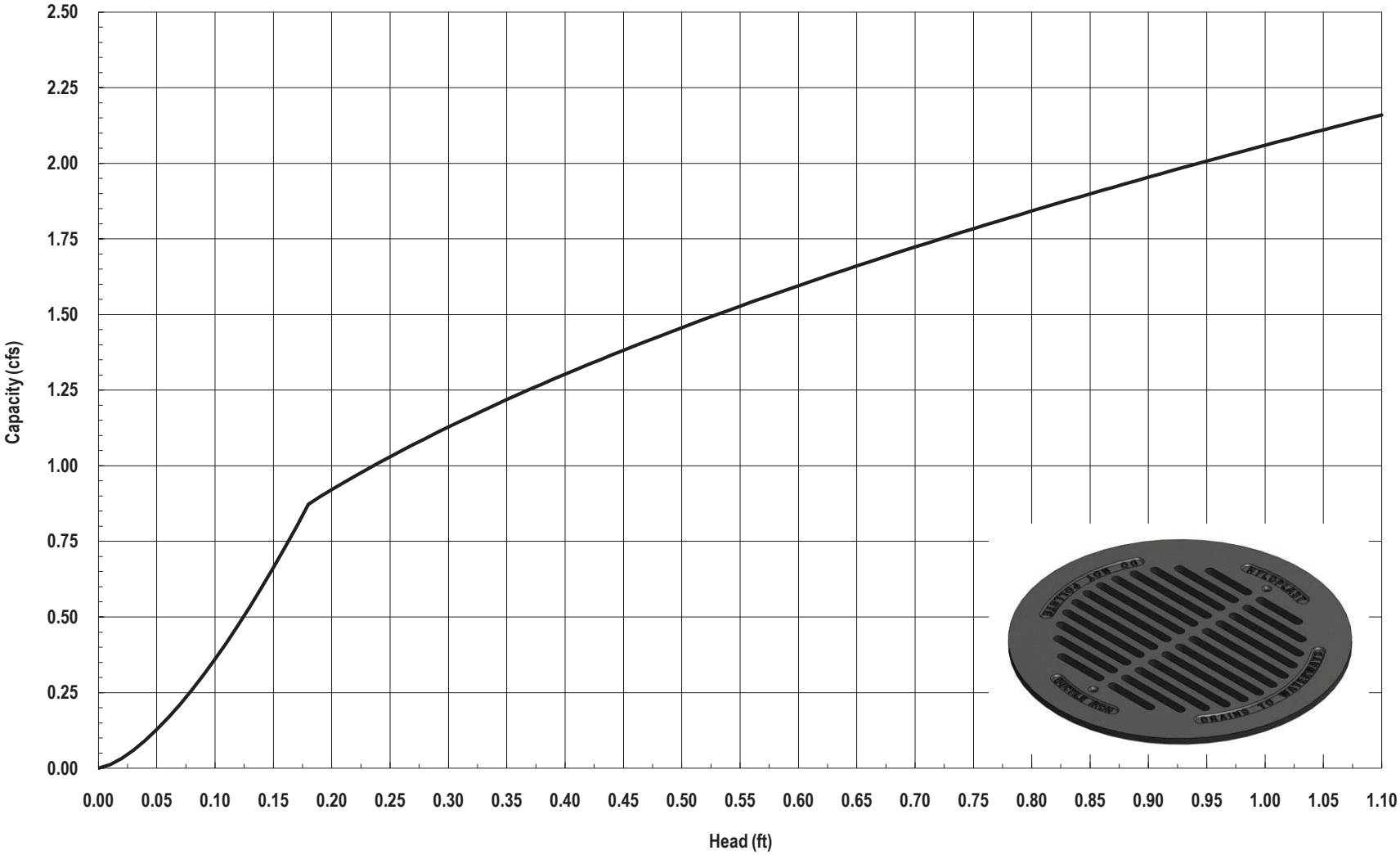
where,
P = Perimeter of Catchbasin minus
area of longitudinal & lateral bars (2 Short Sides, 1 Long Side)
A = Total area of grate minus
area of longitudinal & lateral bars

Depth (ft)	Weir Qi (cfs)	Orifice Qi (cfs)
0.00	**0.00**	**0.00**
0.05	**0.29**	**6.52**
0.10	**0.81**	**9.22**
0.15	**1.48**	**11.29**
0.20	**2.28**	**13.03**
0.25	**3.19**	**14.57**
0.30	**4.19**	**15.96**
0.35	**5.28**	**17.24**
0.40	**6.45**	**18.43**
0.45	**7.70**	**19.55**
0.50	**9.02**	**20.61**
0.55	**10.40**	**21.61**
0.60	**11.85**	**22.57**
0.65	**13.36**	**23.49**
0.70	**14.93**	**24.38**
0.75	**16.56**	**25.24**
0.80	**18.25**	**26.07**
0.85	**19.98**	**26.87**
0.90	**21.77**	**27.65**
0.95	**23.61**	**28.40**
1.00	**25.50**	**29.14**
1.05	**27.44**	**29.86**
1.10	**29.42**	**30.56**
1.15	31.45	**31.25**
1.20	33.52	**31.92**
1.25	35.64	**32.58**
1.30	37.80	**33.23**
1.35	40.00	**33.86**
1.40	42.24	**34.48**
1.45	44.52	**35.09**
1.50	46.85	**35.69**
1.55	49.21	**36.28**



APPENDIX C - FOR REFERENCE ONLY

Nyloplast 15" Drop In Grate Inlet Capacity Chart

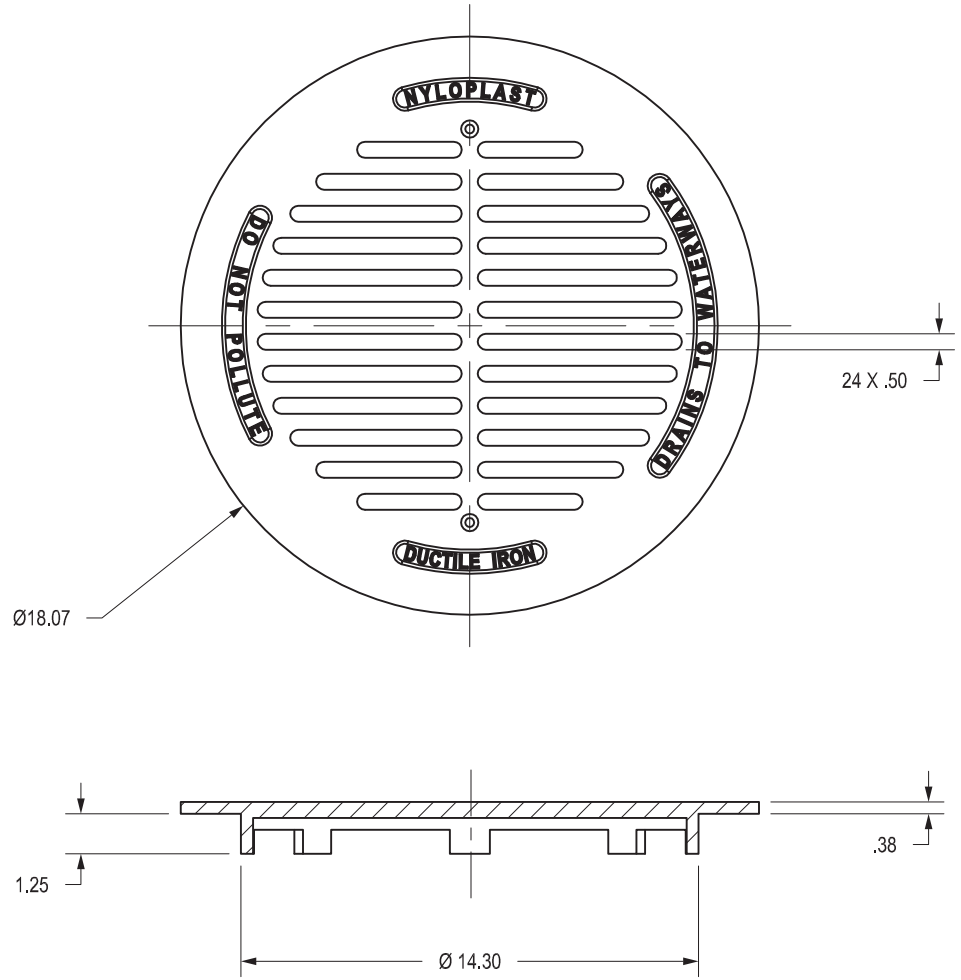


Nyloplast®
3130 Verona Avenue • Buford, GA 30518
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490

APPENDIX C - FOR REFERENCE ONLY

1501DI

APPROX. DRAIN AREA = 62.03 SQ IN
APPROX. WEIGHT = 26.42 LBS



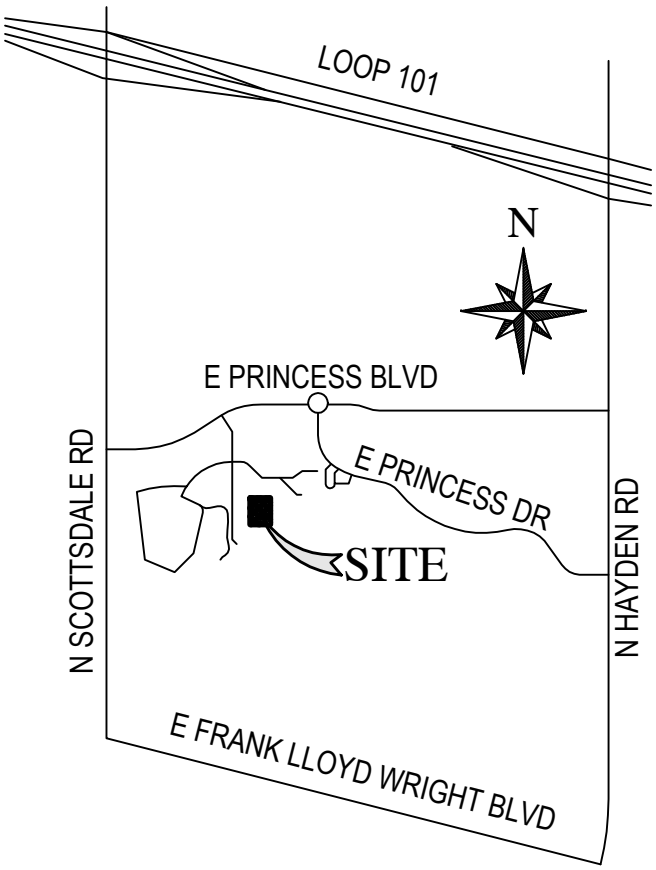
DIMENSIONS ARE FOR REFERENCE ONLY
ACTUAL DIMENSIONS MAY VARY
DIMENSIONS ARE IN INCHES
GRATE HAS LIGHT DUTY RATING
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
SIZE OF OPENING MEETS REQUIREMENTS OF AMERICAN DISABILITY ACT AS STATED IN FEDERAL REGISTER PART III, DEPARTMENT OF JUSTICE, 28 CFR PART 36.

DRAWN BY CJA	MATERIAL	Nyloplast®	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
DATE 7-5-01			
REVISED BY JJC	PROJECT NO./NAME	TITLE	
DATE 8-14-12		15 IN DROP IN	
DWG SIZE A	SCALE 1:6 SHEET 1 OF 1	DWG NO. 7001-110-073	REV D

APPENDIX C - FOR REFERENCE ONLY

EXHIBIT 1

VICINITY MAP



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SCOTTSDALE, ARIZONA

N.T.S.

N:\2015\154302.30\Project Support\Reports\Drainage\Exhibits\ 4302_30 Exhibit 1 - Vicinity Map.dwg

FAIRMONT SCOTTSDALE
SUNSET POOL

EXHIBIT 1
VICINITY MAP

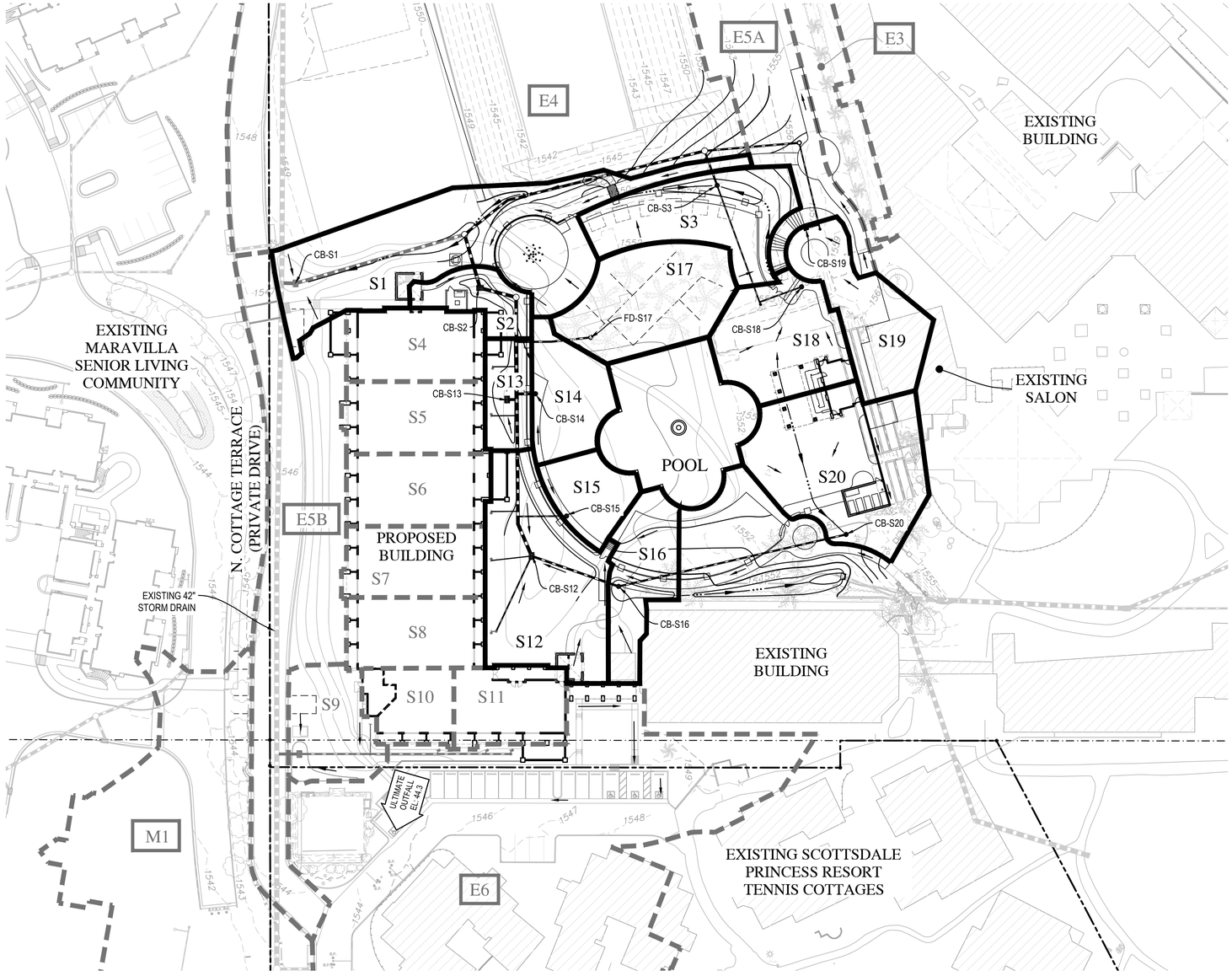
WOOD/PATEL
2220 S. Country Club Dr.
Suite 101
Mesa, AZ 85210
(480) 834-3300
www.woodpatel.com
PHOENIX • MESA • TUCSON

JOB# 154302.30

APPENDIX C - FOR REFERENCE ONLY

EXHIBIT 2

PROPOSED DRAINAGE MAP



N

0 40 80

Horz. 1 in. = 40 ft.

N:\JOB\15\54302.30\Project Support\Reports\Drainage\Exhibits\54302_30 Exhibit 2 - Proposed Drainage Map.dwg

LEGEND

- PROPOSED DRAINAGE AREA
- EXISTING DRAINAGE AREA
- PROPERTY BOUNDARY
- FLOW ARROW
- PROPOSED STORM DRAIN
- EXISTING STORM DRAIN
- EXISTING INTERMEDIATE CONTOUR
- EXISTING INDEX CONTOUR
- PROPOSED INTERMEDIATE CONTOUR
- PROPOSED INDEX CONTOUR

- S1 — PROPOSED DRAINAGE AREA
- E1 — EXISTING DRAINAGE AREA
- M1 — EXISTING DRAINAGE AREA - MARAVILLA
- ULTIMATE OUTFALL — ULTIMATE OUTFALL

Call at least two full working days before you begin excavation. ARIZONA 811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

FAIRMONT SCOTTSDALE SUNSET POOL

EXHIBIT 2 PROPOSED DRAINAGE MAP

WOOD/PATEL
2220 S. Country Club Dr.
Mesa, AZ 85210
(480) 834-3300
www.woodpatel.com
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JOB# 154302.30

APPENDIX D – STORM STORAGE WAIVER / PROPOSED DRAINAGE IMPROVEMENTS EXHIBIT

Princess

10/22

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC# 6332-07-7

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

Date 7/14/08 **Project Name** Fairmont Scottsdale Princess Resort

Project Location 7575 East Princess Drive Scottsdale, AZ 85255

Applicant Contact John Bulka **Company Name** Wood Patel & Associates

Phone 480-834-3300 Fax 480-834-3320 E-mail jbulka@woodpatel.com

Address 1855 N. Stapley Mesa, AZ 85203

Waiver Criteria

A waiver is an intentional relinquishment of a claim or right. A project must meet at least one of six criteria listed below for the city to consider waiving some or all required stormwater storage. Check the applicable box and provide a signed engineering report and supporting engineering analyses that demonstrate the project meets the criteria *and* that the effect of a waiver will not increase the potential for flooding on any property.

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

☒ 2. The development is adjacent to a watercourse or channel that an engineering analysis shows is designed and constructed to handle the additional runoff without increasing the potential for flood damage to the subject property or to any other property.

☐ 3. The development is on a parcel less than one-half acre in size in an area where the engineering analysis demonstrates there is no significant increase in potential for flood damage due to its development.

☐ 4. Stormwater storage requirements conflict with requirements of the Environmentally Sensitive Lands Ordinance (ESLO). The applicant must demonstrate there is no increased potential for flood damage to the subject property or to any other property. Such conflicts with ESLO may include:

- Total land requirements for storage basin, easements, setbacks, and NAOS prevent building allowable footprint per zoning.
- Topography prevents building storage basin.
- Creating a storage facility requires wash modification.
- Instances where the Zoning Administrator cannot allow a modification to ESL requirements.

☐ 5. The project is located within the Downtown Fee Reduction Area as described and approved by City Council Resolution #6238 (see map). The applicant must demonstrate there is no increased potential for flood damage to any property. Even if the project is located in the Downtown area, if the project creates additional potential for increased flood damage, the developer must provide alternative mitigation methods to prevent the damage.

☐ 6. The project is located within a watershed that drains directly to the Salt River Pima-Maricopa Indian Community (SRPMIC) (see map). The project must provide the pre-development peak discharge flow to the SRPMIC, and attenuate flows over and above pre-development.

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

John Bulka

Developer or Engineer (circle one)

7-16-08

Date

Planning & Development Services Department

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

SWW

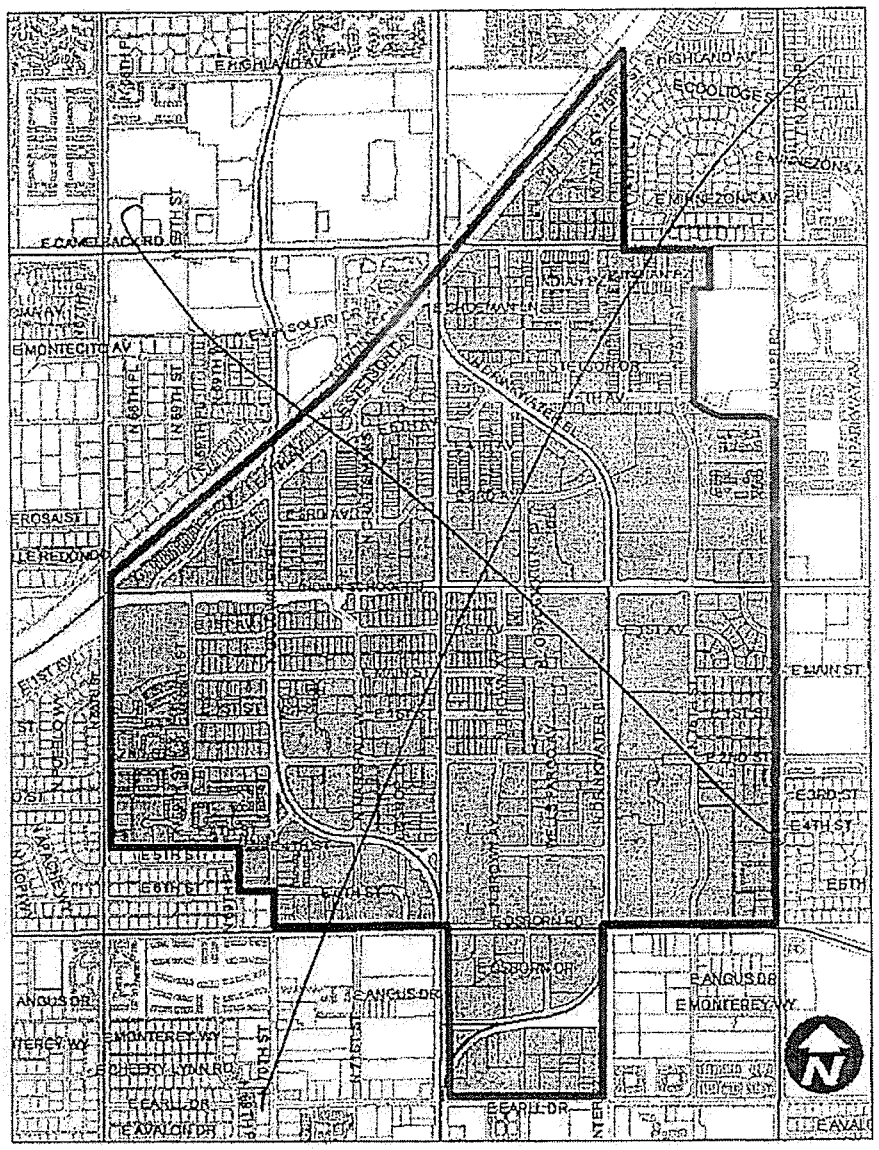
6332-07-7

Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ____ ____ - PP - ____ PC#_____



NOT APPLICABLE

Figure 1. Designated Area for Downtown Stormwater Storage Waivers

Planning & Development Services Department

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

Request for Stormwater Storage Waiver

City of Scottsdale Case Numbers:

___ - PA - ____ ____ - ZN - ____ ____ - UP - ____ ____ - DR - ____ ____ - PP - ____ PC#_____

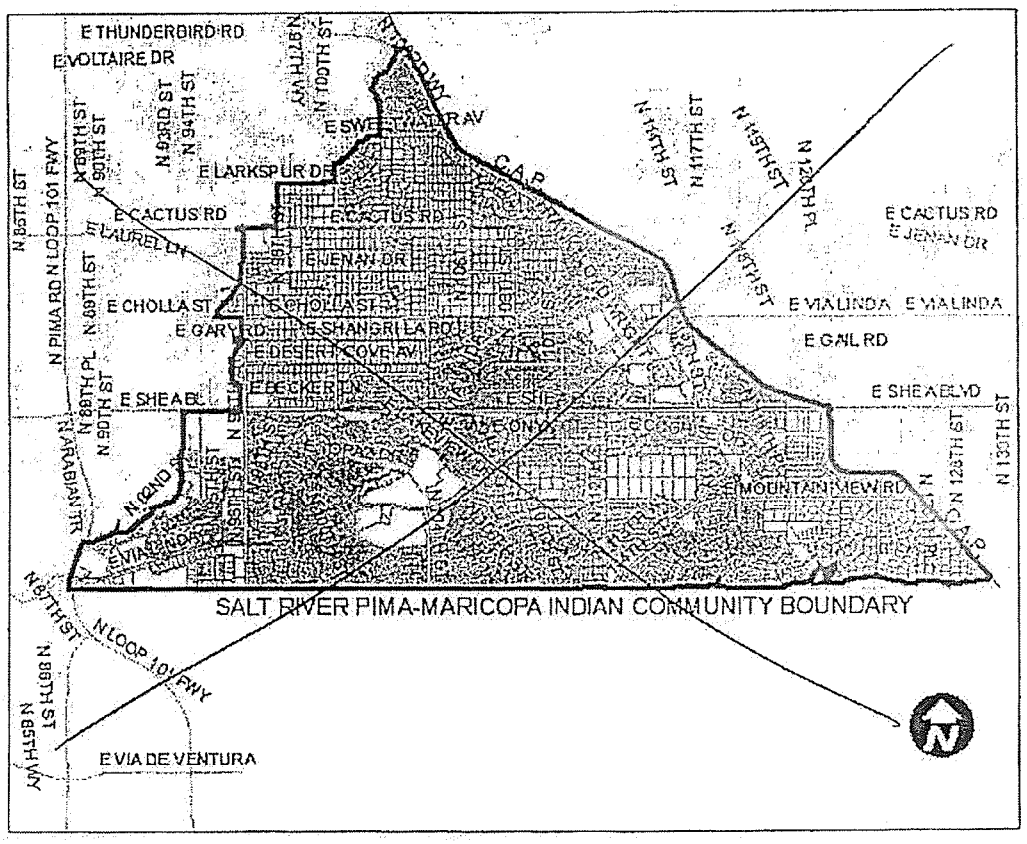


Figure 2. Watersheds Draining to Salt River Pima-Maricopa Indian Community

NOT APPLICABLE

Planning & Development Services Department

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Request for Stormwater Storage Waiver

292-SA-2007

City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

CITY STAFF TO COMPLETE THIS PAGE

Project Name FAIRMONT SCOTTSDALE PRINCESS RESORT

Check Appropriate Boxes:

☐ Meets waiver criteria (specify): ☐ 1 ☑ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6

☑ Recommend approve waiver.

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

Explain: _____

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

Explain: _____

Recommended Conditions of Waiver:
- ☒ All storage requirements waived.
- ☐ Pre development conditions must be maintained.
- ☑ Other:

Explain: In land improvements exceed cost of in-lieu fee.

☒ **Waiver approved per above conditions.**

☐ **Waiver denied.**

C. Ashley Gould — 10/23/08

Floodplain Administrator or Designee — Date

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

Request for Stormwater Storage Waiver

292-SA-2007 City of Scottsdale Case Numbers:

___ - PA - ___ ___ - ZN - ___ ___ - UP - ___ ___ - DR - ___ ___ - PP - ___ PC#_____

In-Lieu Fee and In-Kind Contributions

If the city grants a waiver, the developer is required to calculate and contribute an In-Lieu Fee based on what it would cost the city to provide the waived storage volume, including costs such as land acquisition, construction, landscaping, design, construction management, and maintenance over a 75-year design life. For FY 2007/2008, this cost is $3.22 per cubic foot of stormwater stored. This unit cost will be updated annually, but the city reserves the right to revise the unit cost at any time at its sole discretion.

The Floodplain Administrator considers in-kind contributions on a case-by-case basis. An in-kind contribution can serve as part of or instead of the calculated in-lieu fee. The Floodplain Administrator or designee must approve in-lieu fees and in-kind contributions.

Project Name Fairmont Scottsdale Princess Resort

The waived stormwater storage volume is calculated as follows:

V = CRA; where
V = stormwater storage volume required, in cubic feet,
C = weighted average runoff coefficient over disturbed area,
R = 100-year/2-hour precipitation depth, in feet (2.82 inches, or 0.235 feet, for all regions of Scottsdale), and
A = area of disturbed ground, in square feet

Furthermore,

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

C = 0.9
A = 424,753
V = 89,826
V_p = 0
V_w = 89,826

☐ An In-Lieu Fee will be paid, based on the following calculations and supporting documentation:
In-lieu fee ($) = V_w (cu. ft.) x $3.22 per cubic foot = 289,240

☒ An In-Kind Contribution will be made, as follows:
See attachment. Princess Drive Bridge Reconstruction, in accordance with approved plans.

☐ No In-Lieu Fee is required. Reason:

Approved by: C. Ashley Conklin 10/23/08

Floodplain Administrator or Designee — Date

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

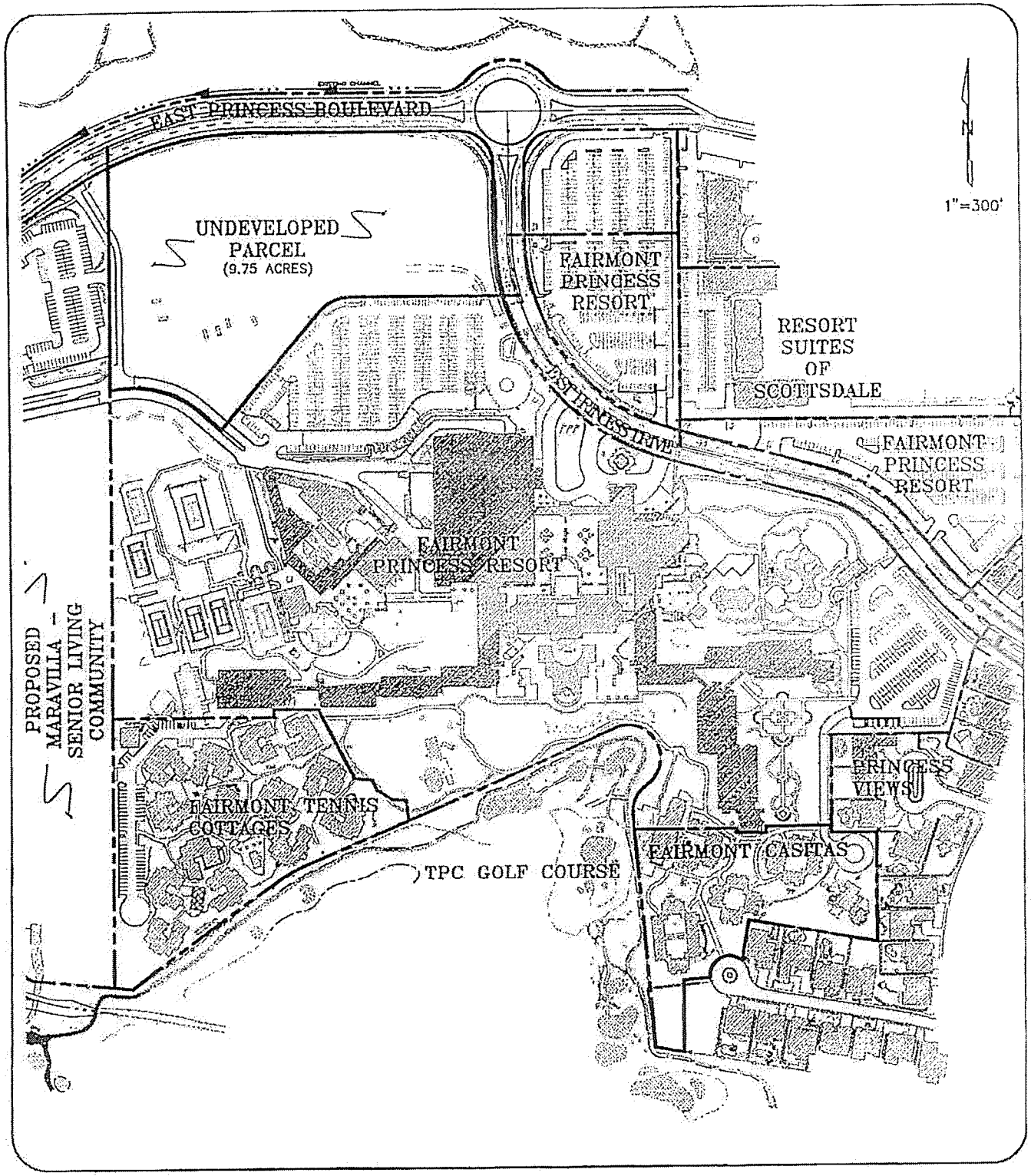


EXHIBIT 1

FAIRMONT SCOTTSDALE PRINCESS RESORT

ENGINEER	J. Bulka
DESIGNER	J. Haywood
CAD TECHNICIAN	J. Sanchez
SCALE	1"=300'
DATE	07/14/08
JOB NUMBER	07910
REF. SHEET	1 OF 1

WOOD/PATEL & ASSOCIATES INC.
Civil Engineers, Hydrologists and Land Surveyors
1855 North Stapley Drive
Mesa, Arizona 85203
(480) 834-3300
(480) 834-3320 FAX

Attachment to Stormwater Storage Waiver Request
for Fairmont Scottsdale Princess Resort & Regional Flood Control

The Fairmont Scottsdale Princess Resort (Site) is a 60 acre resort located near the southwest corner of Princess Boulevard and Princess Drive. The Site is bounded by the Princess Blvd. to the north, the Maravilla Scottsdale Senior Living Community to the east, the TPC Golf Course to the south and existing residential developments to the west (see Exhibit 1, attached). The existing Fairmont Scottsdale Princess Resort consists of multiple hotel buildings, a ballroom, spa, tennis cottages, tennis courts, and parking. A majority of the site is developed and portions are being updated and renovated. At the north end of the site there is a 9.75 acre portion of the property that has yet to be developed, and other portions are scheduled for upgrades.

It is Wood/Patel's understanding that the ownership of the Fairmont Scottsdale Princess Resort, Strategic Hotels and Resorts, has agreed to fund regional flood control improvements to the public road/channel crossing at Princess Blvd and Scottsdale Road, in return for the City approving this waiver and it being applicable to the entire site. The improvements consist of removing the existing concrete box culvert crossing and replacing it with a bridge structure. The cost of a new bridge structure is estimated at $1,053,000.

City of Scottsdale In-Lieu Fees:

V(req) Volume required = CRA = (0.90) x (0.235 feet) x (9.75 acres) = 89,826 cu-ft.

C (Runoff Coefficient) = 0.90

R (100-year/2-hour precipitation depth) = 0.235 feet

Site area = 9.75 acres

City of Scottsdale In-Lieu Fees = V(req) x $3.22 = (89,826 cu-ft) x $3.22 = $289,240

Summary:

Public Drainage Improvements = $1,053,000 (*)

City of Scottsdale in Lieu Fee = $289,240

(*) See Sheet 2 of 2 Engineering Preliminary Opinion of Probable Cost

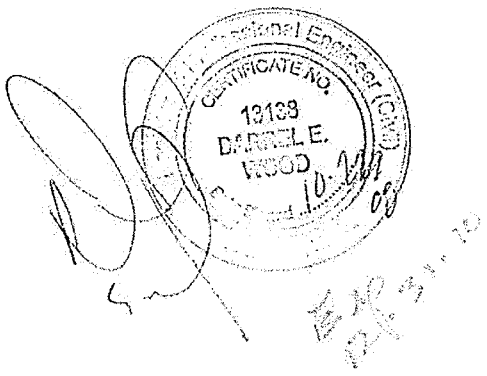
Attachment to Stormwater Storage Waiver Request
for Fairmont Scottsdale Princess Resort & Regional Flood Control

Engineering Preliminary Opinion of Probable Cost (*)

Prepared Bridge Structure at Princess Drive, just east of Scottsdale Road serving unnamed wash.

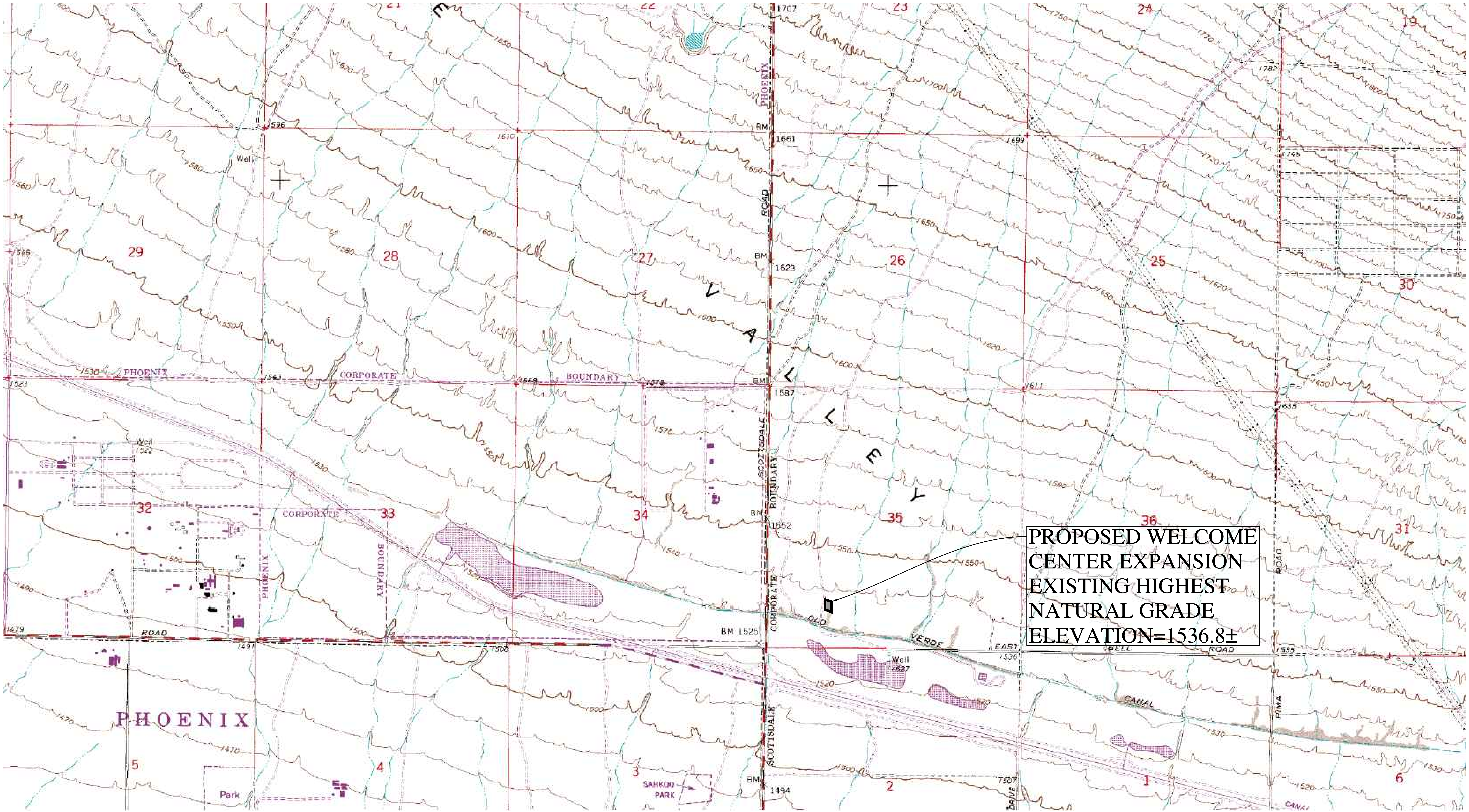
Estimated Bridge Surface = 8,100 square feet x $130/s.f. $1,053,000

(*) Offered without the benefit of construction documents and specifications.



APPENDIX E – REGIONAL CONTOUR MAP / OPINION OF EXISTING HIGHEST NATURAL GRADE ELEVATION

N



WOOD/PATEL

MISSION: CLIENT SERVICE™
(602) 335-8500
WWW.WOODPATEL.COM
PHOENIX - MESA - TUCSON

Call at least two full working days before you begin excavation.
ARIZONA811
Arizona Blue Stake, Inc.

Fairmont
SCOTTSDALE PRINCESS

PRINCESS WELCOME CENTER AND PARKING LOT
REGIONAL CONTOUR MAP/OPINION OF EXISTING HIGHEST NATURAL GRADE ELEVATION

REV	DESCRIPTION	DATE

NOT
FOR CONSTRUCTION

SCALE (HORIZONTAL)	N/A
SCALE (VERTICAL)	N/A
DATE	07/29/2022
JOB NUMBER	215319
SHEET	1 OF 1

APPENDIX F – HYDROLOGIC AND HYDRAULIC CALCULATIONS

IDF DATA FROM FCDMC NOAA – ATLAS 14 PRECIPITATION DATA

WOOD PATEL

SITE I-D-F CURVE

Project	Fairmont Scottsdale Princess Privado Welcome Center and Parking Expansion
Location	Scottsdale AZ
Project Number	215319
Project Engineer	Darin Moore, PE

RAINFALL DEPTHS, INCHES

Duration	Average Reccurence Interval (years)					
	2	5	10	25	50	100
5-min	0.257	0.346	0.415	0.507	0.578	0.651
10-min	0.391	0.526	0.631	0.772	0.880	0.990
15-min	0.484	0.652	0.782	0.957	1.090	1.230
30-min	0.651	0.879	1.050	1.290	1.470	1.650
60-min	0.806	1.090	1.300	1.600	1.820	2.050
2-hr	0.931	1.240	1.480	1.800	2.040	2.290
3-hr	1.020	1.330	1.580	1.920	2.200	2.480
6-hr	1.210	1.540	1.810	2.170	2.450	2.750
12-hr	1.360	1.720	2.000	2.380	2.670	2.970
24-hr	1.610	2.070	2.450	2.970	3.380	3.810

RAINFALL INTENSITY, INCHES/HOUR

Duration minutes	Frequency, years					
	2	5	10	25	50	100
5	3.08	4.15	4.98	6.08	6.94	7.81
10	2.35	3.16	3.79	4.63	5.28	5.94
15	1.94	2.61	3.13	3.83	4.36	4.92
30	1.30	1.76	2.10	2.58	2.94	3.30
60	0.81	1.09	1.30	1.60	1.82	2.05
120	0.47	0.62	0.74	0.90	1.02	1.15
180	0.34	0.44	0.53	0.64	0.73	0.83
360	0.20	0.26	0.30	0.36	0.41	0.46
720	0.11	0.14	0.17	0.20	0.22	0.25
1440	0.07	0.09	0.10	0.12	0.14	0.16

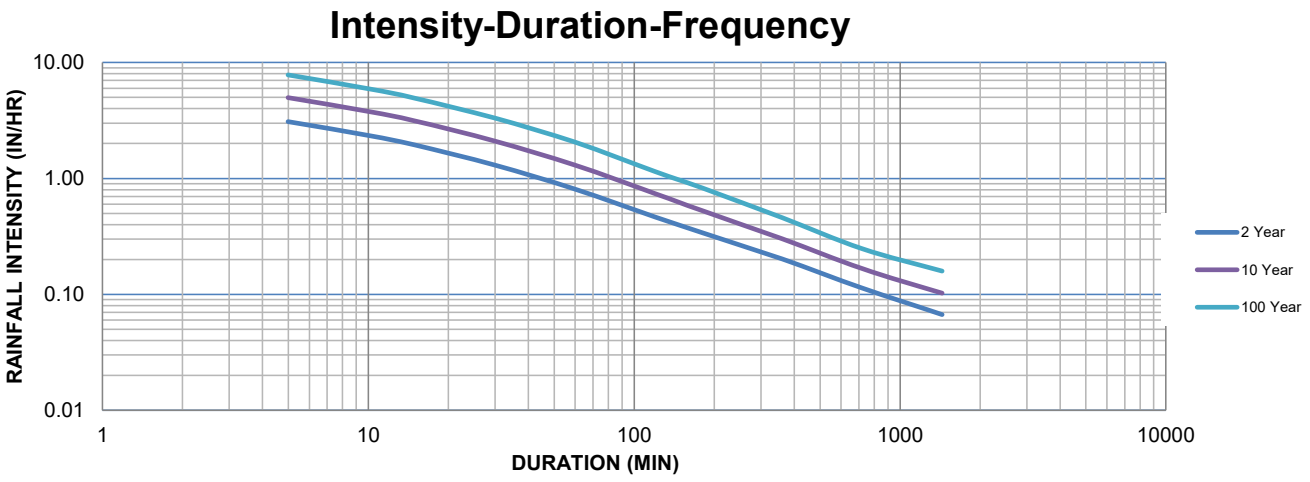


TABLE 1 – EXISTING WEIGHTED C VALUES

WOOD PATEL

COMPOSITE WEIGHTED "C" FACTOR CALCULATIONS
100 YEAR

Project	Fairmont Scottsdale Princess Privado Welcome Center and Parking Expansion
Location	Scottsdale AZ
Project Number	215319
Project Engineer	Darin Moore, PE

Existing C Factor

Drainage Subbasin ID	**Area**	**Desert**		**Paved**		**Roof**		**Grass**		**Commercial**		**100 YR Runoff Coefficient**
(Description/ID)	**(Acres)**	**%**	**"C"**	**%**	**"C"**	**%**	**"C"**	**%**	**"C"**	**%**	**"C"**	**"C"**
S9	0.10	90	0.45	10	0.95	0	0.95	0	0.30	0	0.86	**0.50**
M2	0.40	100	0.45	0	0.95	0	0.95	0	0.30	0	0.86	**0.45**
E6	2.21	0	0.45	0	0.95	0	0.95	0	0.30	100	0.86	**0.86**

TABLE 2 – PROPOSED WEIGHTED C VALUES

WOOD PATEL

COMPOSITE WEIGHTED "C" FACTOR CALCULATIONS
100 YEAR

Project	Fairmont Scottsdale Princess Privado Welcome Center and Parking Expansion
Location	Scottsdale AZ
Project Number	215319
Project Engineer	Darin Moore, PE

Proposed C Factor

Drainage Subbasin ID	**Area**	**Desert**		**Paved**		**Roof**		**Grass**		**Commercial**		**100 YR Runoff Coefficient**
(Description/ID)	**(Acres)**	**%**	**"C"**	**%**	**"C"**	**%**	**"C"**	**%**	**"C"**	**%**	**"C"**	**"C"**
S9	0.10	100	0.45	0	0.95	0	0.95	0	0.30	0	0.86	**0.45**
M2	0.40	100	0.45	0	0.95	0	0.95	0	0.30	0	0.86	**0.45**
E6	2.21	0	0.45	0	0.95	0	0.95	0	0.30	100	0.86	**0.86**
E7	0.19	0	0.45	0	0.95	0	0.95	0	0.30	100	0.86	**0.86**

TABLE 3 – EXISTING RATIONAL METHOD

WOOD PATEL

RATIONAL METHOD SUMMARY
100 YEAR, 10 YEAR

Project	Fairmont Scottsdale Princess Privado Welcome Center and Parking Expansion
Location	Scottsdale AZ
Project Number	215319
Project Engineer	Darin Moore, PE

EXISTING ON-SITE WATERSHEDS

Drainage Subbasin ID	Longest Watercourse 'L' (ft)	Longest Watercourse 'L' (mi)	Drainage Area 'A' (sf)	Drainage Area 'A' (Acres)	'K_b' Type[1]	Watershed Resistance Coefficient 'K_b'	Top Elevation	Bottom Elevation	Basin Slope 'S' (ft/mi)	100 YEAR				10 YEAR			
										Calculated Q100 'Tc' (See Note 2) (min)	100 YEAR Intensity 'i' (in/hr)	100 YR Runoff Coefficient 'C'	Q100 Flow (cfs)	Calculated Q10 'Tc' (See Note 2) (min)	10 YEAR Intensity 'i' (in/hr)	10 YR Runoff Coefficient 'C'	Q10 Flow (cfs)
S9	70	0.013	4,212	0.10	A	0.0463	49.9	44.0	444.4	1.0	9.31	0.50	**0.5**	1.2	5.88	0.41	**0.2**
M2	212	0.040	17,531	0.40	B	0.0854	34.4	31.2	79.7	4.4	8.03	0.86	**2.8**	5.4	4.91	0.37	**0.7**
E6	362	0.069	96,144	2.21	A	0.0379	49.2	41.0	119.6	3.3	8.45	0.45	**8.4**	4.0	5.22	0.80	**9.2**

Notes

1. Per Drainage Design Manual for Maricopa County, Vol. I, Hydrology (2013), Table 3.1: Equation for Estimating Kb in the Tc Equation
2. Minimum Tc is 5 minutes.

TABLE 4 – PROPOSED RATIONAL METHOD

WOOD PATEL

STORMCEPTOR RATIONAL METHOD SUMMARY

100 YEAR, 10 YEAR

Project	Fairmont Scottsdale Princess Privado Welcome Center and Parking Expansion
Location	Scottsdale AZ
Project Number	215319
Project Engineer	Darin Moore, PE

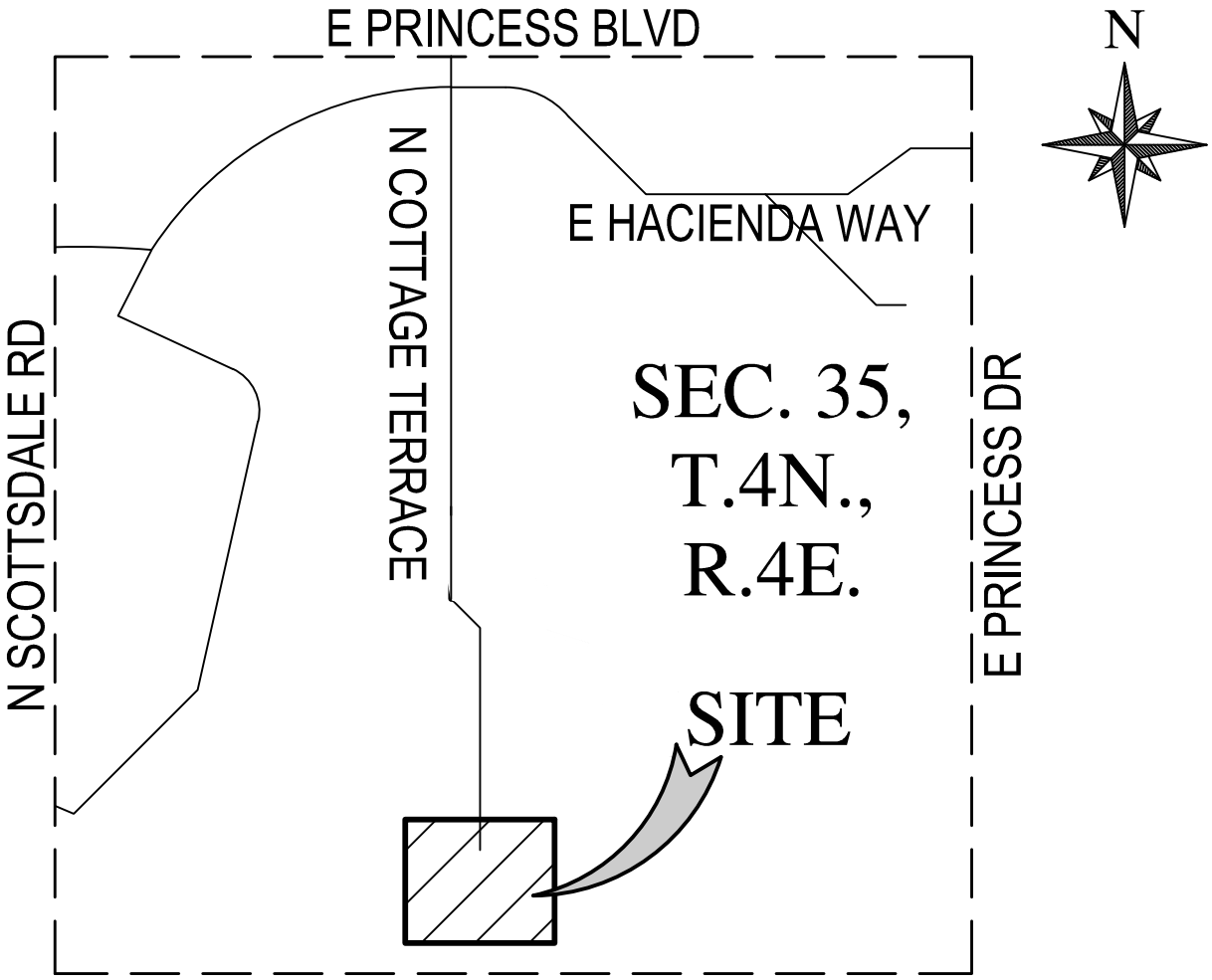
PROPOSED ON-SITE WATERSHEDS

Drainage Subbasin ID	Longest Watercourse 'L' (ft)	Longest Watercourse 'L' (mi)	Drainage Area 'A' (sf)	Drainage Area 'A' (Acres)	'K_b' Type[1]	Watershed Resistance Coefficient 'K_b'	Top Elevation	Bottom Elevation	Basin Slope 'S' (ft/mi)	100 YEAR Calculated Q100 'Tc' (See Note 2) (min)	100 YEAR Intensity 'i' (in/hr)	100 YR Runoff Coefficient 'C'	Q100 Flow (cfs)	10 YEAR Calculated Q10 'Tc' (See Note 2) (min)	10 YEAR Intensity 'i' (in/hr)	10 YR Runoff Coefficient 'C'	Q10 Flow (cfs)
S9	70	0.013	1,896	0.04	A	0.0485	49.9	44.0	444.4	1.1	9.31	0.45	**0.2**	1.3	5.60	0.45	**0.1**
M2	212	0.040	15,864	0.36	B	0.0860	34.4	31.2	79.7	4.5	8.03	0.86	**2.5**	5.4	4.98	0.86	**1.6**
E6	362	0.069	100,754	2.31	A	0.0377	49.2	41.0	119.6	3.3	8.45	0.45	**8.8**	4.0	4.98	0.45	**5.2**
E7	79	0.015	8,111	0.19	A	0.0446	51.2	1539.8	38.0	2.4	8.78	0.86	**1.4**	2.9	4.98	0.86	**0.8**

Notes

1. Per Drainage Design Manual for Maricopa County, Vol. I, Hydrology (2013), Table 3.1: Equation for Estimating Kb in the Tc Equation

EXHIBIT 1 – VICINITY MAP



VICINITY MAP

N.T.S.

NOT
FOR
CONSTRUCTION
OR RECORDING

WOOD PATEL

FAIRMONT SCOTTSDALE PRINCESS PRIVADO WELCOME CENTER AND PARKING MODIFICATIONS

VICINITY MAP EXHIBIT

DATE	7-29-2022	SCALE	N.T.S	SHEET	1 OF 1
JOB NO.	215319	DESIGN	RS	CHECK	
		DRAWN	LBD	RFI #	

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EXHIBIT 2 – FEMA FIRM

National Flood Hazard Layer FIRMette

FEMA

111°55'40"W 33°39'4"N

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

1:6,000

111°55'2"W 33°38'34"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

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 3/31/2021 at 1:10 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.

EXHIBIT 3 – EXISTING DRAINAGE MAP

LEGEND

- EXISTING DRAINAGE AREA
- 1 EXISTING DRAINAGE AREA

N

0 60 120

Horz. 1 in. = 60 ft.

NOT FOR CONSTRUCTION OR RECORDING

WOOD PATEL

FAIRMONT SCOTTSDALE PRINCESS PRIVADO WELCOME CENTER AND PARKING MODIFICATIONS

EXISTING DRAINAGE MAP

DATE	07-29-2022	SCALE	1" = 60'	SHEET	1 OF 1
JOB NO.	215305	DESIGN	DCN	DRAWN	MHS

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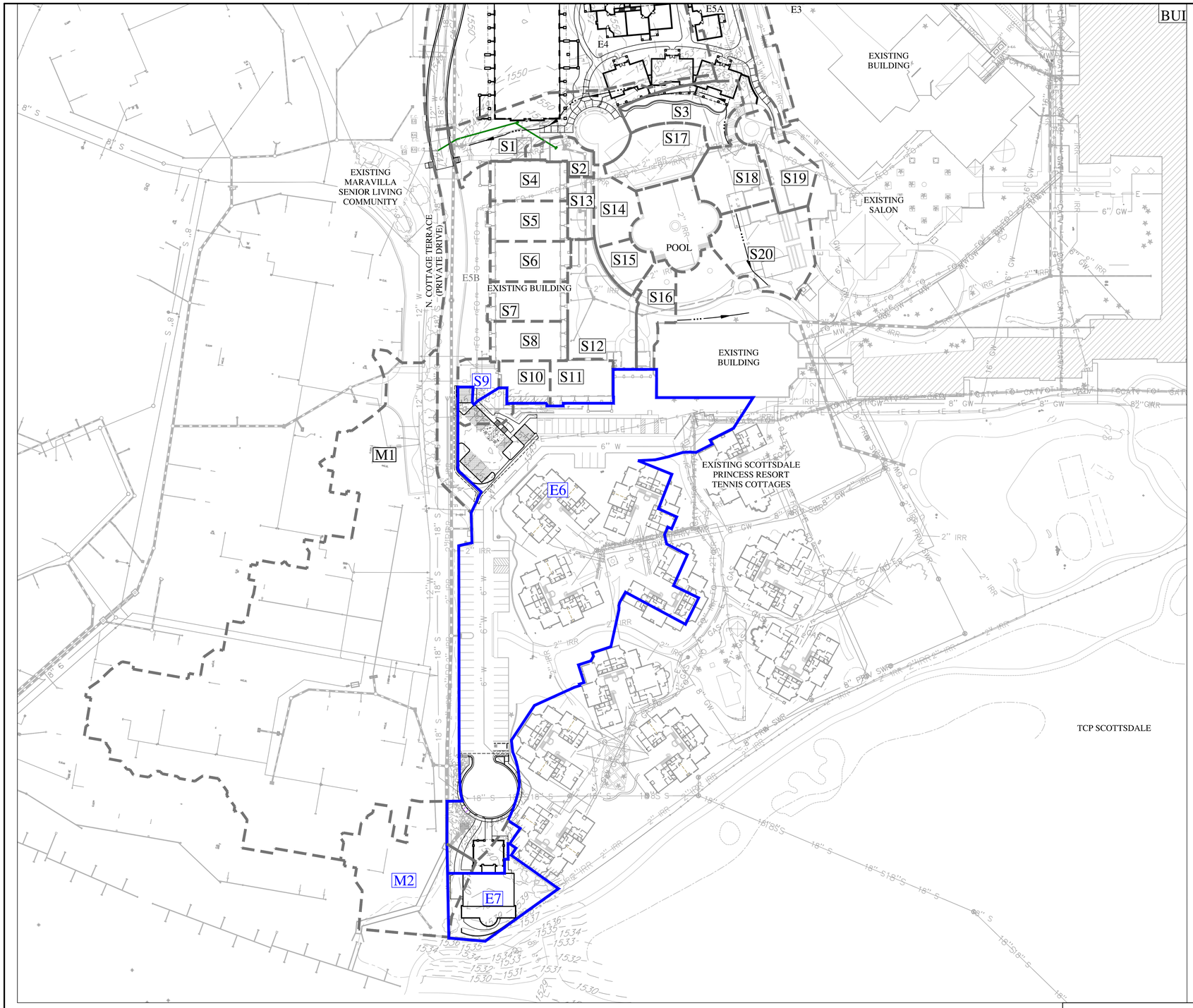
EXHIBIT 4 – PROPOSED DRAINAGE MAP



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WOOD PATEL

FAIRMONT SCOTTSDALE PRINCESS PRIVADO WELCOME CENTER AND PARKING MODIFICATIONS

PROPOSED DRAINAGE MAP

DATE	07-29-2022	SCALE	1" = 60'	SHEET	1 OF 1
JOB NO.	215305	DESIGN	DCN	DRAWN	MHS

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