FOUR CORNERS POWER PLANT
INFLOW / FLOOD CONTROL §257.82(b)
UPPER RETENTION SUMP
FC_InflowFlood_011_2011017

This *Inflow Design Flood Control System Plan* (Plan) document has been prepared specifically for the Upper Retention Sump at the Four Corners Power Plant. This Plan has been prepared in accordance with our understanding of the requirements prescribed in §257.82 of the Federal Register, Volume 80, Number 74, dated April 17, 2015 (U. S. Government, 2015) for hydrologic and hydraulic capacity requirements for CCR surface impoundments associated with existing Coal Combustion Residual (CCR) surface impoundments. Section §257.82 is reproduced below for reference purposes. This document serves as the *initial plan* described in §257.82.

The Upper Retention Sump is an existing CCR surface impoundment facility. Calculations have been prepared in support of the facility operation and have been included herein to address the requirements listed.

§257.82 Hydrologic and Hydraulic capacity requirements for CCR surface impoundments

(a) The owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section.

(1) The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph (a)(3) of this section.

(2) The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph (a)(3) of this section.

(3) The inflow design flood is:

(i) For a high hazard potential CCR surface impoundment, as determined under §257.73(a)(2) or §257.74(a)(2), the probable maximum flood;

(ii) For a significant hazard potential CCR surface impoundment, as determined under §257.73(a)(2) or §257.74(a)(2) , the 1,000-year flood;

(iii) For a low hazard potential CCR surface impoundment, as determined under §257.73(a)(2) or §257.74(a)(2), the 100-year flood; or

(iv) For an incised CCR surface impoundment, the 25-year flood.

(b) Discharge from the CCR unit must be handled in accordance with the surface water requirements under §257.3-3.

(c) *Inflow design flood control system plan* –

(1) *Content of the Plan*. The owner or operator must prepare initial and periodic inflow design flood control system plans for the CCR unit according to the timeframes specified in paragraphs (c)(3) and (4) of this section. These plans must document how the inflow design flood control system has been

designed and constructed to meet the requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator of the CCR unit has completed the inflow design flood control system plan when the plan has been placed in the facility's operating record as required by §257.105(g)(4).

(2) *Amendment of the Plan*. The owner or operator of the CCR unit may amend the written inflow design flood control system plan at any time provided the revised plan is placed in the facility's operating record as required by §257.105(g)(4). The owner or operator must amend the written inflow design flood control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.

(3) *Timeframes for preparing the initial plan* -

(i) *Existing CCR surface impoundments*. The owner or operator must prepare the initial inflow design flood control system plan no later than October 17, 2016.

(ii) New CCR surface impoundments and any lateral expansion of a CCR surface impoundment. The owner of operator must prepare the initial inflow design flood control system plan no later than the date of initial receipt of CCR in the CCR unit.

(4) *Frequency for revising the plan*. The owner or operator must prepare periodic inflow design flood control system plans required by paragraph (c)(1) of this section every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first periodic plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. For purposes of this paragraph (c)(4), the owner or operator has completed an inflow design flood control system plan when the plan has been placed in the facility's operating record as required by §257.105(g)(4).

(5) The owner or operator must obtain a certification from a qualified engineer stating that the initial and periodic inflow design flood control system plans meet the requirements of this section.

(d) The owner or operator of the CCR unit must comply with the record keeping requirements specified in §257.105(g), the notification requirements specified in §257.106(g), and the internet requirements specified in §257.107(g).

SITE INFORMATION	
Site Name / Address	Four Corners Power Plant / 691 CR-6100, Fruitland, NM 85416
Owner Name / Address	Arizona Public Service / 400 North 5th Street, Phoenix, AZ 85004
CCR Unit	Upper Retention Sump

OVERVIEW

The UPPER RETENTION SUMP located at the Four Corners Power Plant (FCPP) (Exhibit 1) is an incised surface impoundment that receives process and storm water inflow from the flue gas desulfurization (FGD) thickener system used to dispose of FGD from Unit 4 and 5. This is in addition to the direct precipitation associated with the impoundment. The Upper Retention Sump is an approximately 2-acre surge pond with crest elevation at 5354 feet (NAVD88). The normal operating water surface elevation is assumed to be 5351 feet based on survey data.

This inflow / flood control plan describes the contributing runoff volumes and storage capacities estimated for the Upper Retention Sump. Incised surface impoundments are required to accommodate the 25-year runoff volume per §257.82 of the Federal Register.

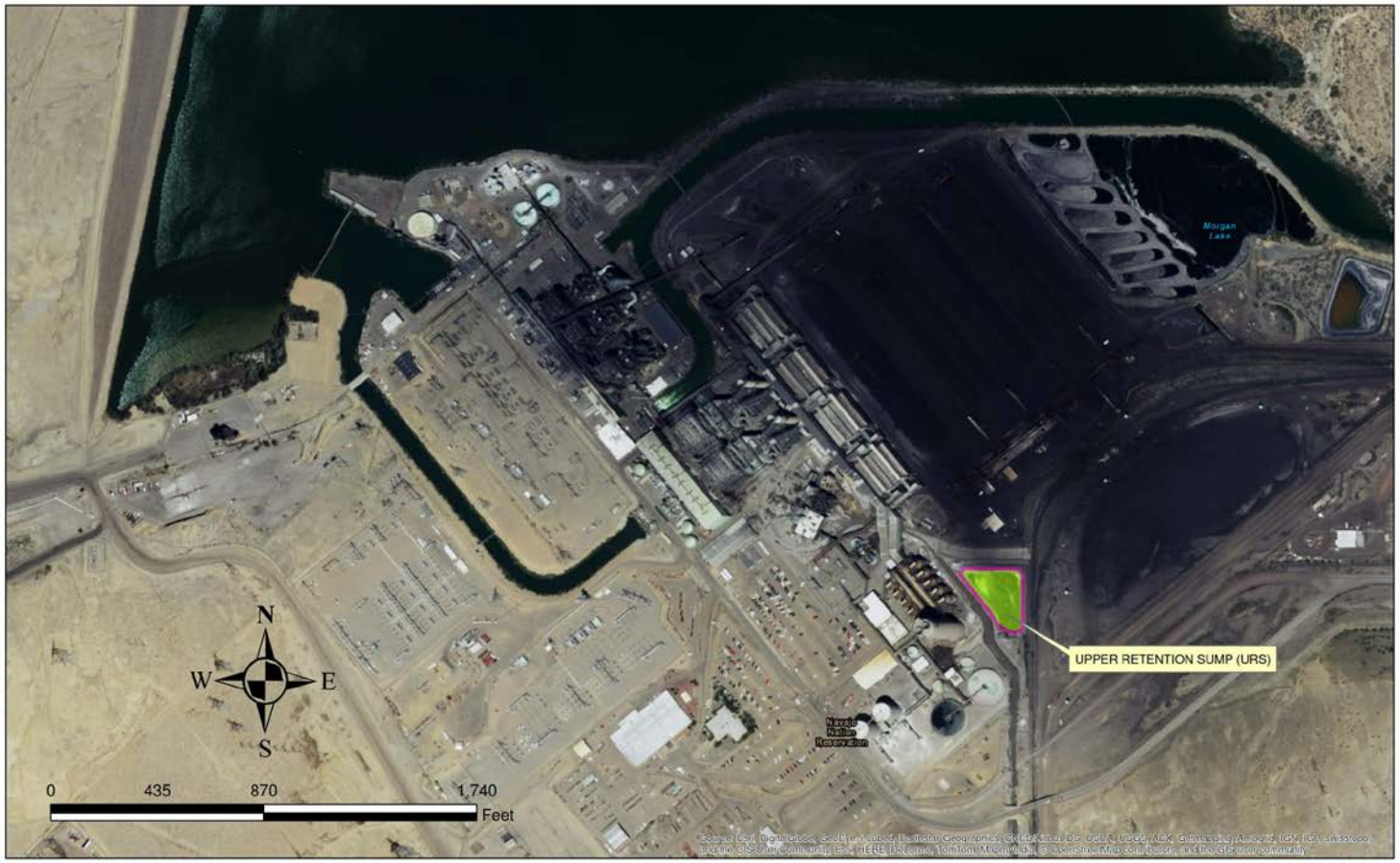


Exhibit 1 – Upper Retention Sump at Four Corners Power Plant Facility

§257.82 (a)(1)(2)(3) Hydrologic and Hydraulic capacity requirements for CCR surface impoundments	
(a) The owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section. (1) The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph (a)(3) of this section.	The 25-Year 24-Hour storm water runoff produced from the contributing watershed is 1.97 acre-feet, as shown in the attached calculations. This volume is based on 1.86 inches precipitation depth, and a runoff curve number of 95 for the facilities and 100 for the pond impoundment. The Upper Retention Sump receives runoff from direct precipitation and runoff from the area around the FGD thickeners which is collected in drains and trenches and is pumped to the Upper Retention Sump. The normal operating water surface elevation is 5351 feet with a top of pond elevation of 5354 feet based on survey and as-built data. The Upper Retention Sump accommodates the 1.97 acre- feet runoff volume in the impoundment at a maximum water surface elevation of 5352.8 feet. This provides 1.2 feet of freeboard from the top of pond elevation.
(a) The owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section. (2) The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph (a)(3) of this section.	The Upper Retention Sump provides sufficient storage volume to accommodate the runoff from the 25-Year 24-Hour storm event without a discharge from the CCR unit. Stormwater collected in the Upper Retention Sump is pumped to the thickener underflow system and is used to sluice FGD solids to the Lined Ash Impoundment. Refer to response to (a)(1) for additional details regarding the Inflow Design Flood Control System Plan for the Upper Retention Sump.

(a)(3) The inflow design flood is: (i) For a high hazard potential CCR surface impoundment, as determined under §257.73(a)(2) or §257.74(a)(2), the probable maximum flood; (ii) For a significant hazard potential CCR surface impoundment, as determined under §257.73(a)(2) or §257.74(a)(2) , the 1,000-year flood; (iii) For a low hazard potential CCR surface impoundment, as determined under §257.73(a)(2) or §257.74(a)(2), the 100-year flood; or (iv) For an incised CCR surface impoundment, the 25-year flood.	The Upper Retention Sump is an incised surface impoundment.
§257.82 (b) Hydrologic and Hydraulic capacity requirements for CCR surface impoundments	
(b) Discharge from the CCR unit must be handled in accordance with the surface water requirements under §257.3-3.	The discharge is handled in accordance with the surface water requirements under §257.3-3. Stormwater collected in the Upper Retention Sump is pumped to the thickener underflow system and is used to sluice FGD solids to the Lined Ash Impoundment. Water in the Lined Ash Impoundment decants to the Lined Decant Water Pond where it is pumped to the plant to be used as process water.

§257.82 (c)(1)(2)(3)(4)(5) Hydrologic and Hydraulic capacity requirements for CCR surface impoundments	
(c)(1) *Content of the plan.* The owner or operator must prepare initial and periodic inflow design flood control system plans for the CCR unit according to the timeframes specified in paragraphs (c)(3) and (4) of this section. These plans must document how the inflow design flood control system has been designed and constructed to meet the requirements of this section. Each plan must be supported by appropriate engineering calculations. The owner or operator of the CCR unit has completed the inflow design flood control system plan when the plan has been placed in the facility's operating record as required by §257.105(g)(4).	This *Inflow Design Flood Control Plan* serves as the initial plan prescribed herein.
(c)(2) *Amendment of the Plan*. The owner or operator of the CCR unit may amend the written inflow design flood control system plan at any time provided the revised plan is placed in the facility's operating record as required by §257.105(g)(4). The owner or operator must amend the written inflow design flood control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.	The owner or operator acknowledges and will comply with this requirement.
(c)(3*) Timeframes for preparing the initial plan* – (i) Existing CCR surface impoundments. The owner or operator must prepare the initial inflow design flood control system plan no later than October 17, 2016. (ii) New CCR surface impoundments and any lateral expansion of a CCR surface impoundment. The owner or operator must prepare the initial inflow design flood control system plan no later than the date of initial receipt of CCR in the CCR Unit	The Upper Retention Sump is an existing CCR impoundment at Four Corners Power Plant. The inflow design flood control system plan is included herein. The owner or operator acknowledges and will comply with this requirement.

(c)(4) *Frequency for revising the plan*. The owner or operator must prepare periodic inflow design flood control system plans required by paragraph (c)(1) of this section every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first periodic plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. For purposes of this paragraph (c)(4), the owner or operator has completed an inflow design flood control system plan when the plan has been placed in the facility's operating record as required by §257.105(g)(4).	The owner or operator acknowledges and will comply with this requirement.
(c)(5) The owner or operator must obtain a certification from a qualified professional engineer stating that the initial and periodic inflow design flood control system plans meet the requirements of this section.	Certification by a professional engineer is included as an attachment to this document.
§257.82 (d) Hydrologic and Hydraulic capacity requirements for CCR surface impoundments	
(d) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the notification requirements specified in §257.106(g), and the internet requirements specified in §257.107(g).	The owner or operator acknowledges and will comply with this requirement.

References

U.S. Government, April 2015, **Federal Register, Volume 80, Number 74, Rules and Regulations.**

Certification Statement 40 CFR § 257.82(c)(5) – Initial Inflow Design Flood Control System Plan for an Existing CCR Surface Impoundment

CCR Unit: Arizona Public Service; Four Corners Power Plant; Upper Retention Sump

I, Alexander W. Gourlay, being a Registered Professional Engineer in good standing in the State of New Mexico, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the information contained in the initial inflow design flood control system plan dated August, 31, 2016 meets the requirements of 40 CFR § 257.82.

Alexander W. Gourlay, P.E.

Printed Name

August 31, 2016

Date

APPENDIX 1 - CALCULATIONS

PROBLEM STATEMENT:

The purpose of this calculation package is to calculate the retention volume in the Upper Retention Sump (URS).

REQUIRED DELIVERABLES:

- Maximum runoff volume for a 25-year 24-hour storm.

ASSUMPTIONS:

- Runoff is calculated based on the Simplified Peak Flow Method using Equation 3-22 from the NMSHTD Drainage Manual, where q_u is the unit peak discharge from the watershed, in cfs/ac-in, and T_c is the time of concentration, in hours.
- The intensity, I, is extracted from the NOAA 14 DDF curves for 25-year, 24 hour storm events.
- The direct runoff, Q_d, is obtained from Equation 3-23 of the NMSHTD Drainage Manual.
- For the plant and sump area, a Curve Number (CN) of 95 was assumed. For the pond area, the CN was assumed to be 98.
- Calculation results are provided based on NAVD88 vertical datum. As-builts are based on NGVD29. A conversion factor of 3.012 feet was used to convert NGVD29 to NAVD88.

RESULTS:

The total runoff for the URS facility was calculated to be 1.97 ac-ft. Tables 1 and 2 show the total runoff volumes and the stage storage volume calculations, respectively. Figure 1 illustrates the drainage areas contributing to the URS.

Table 1 – Runoff Volume

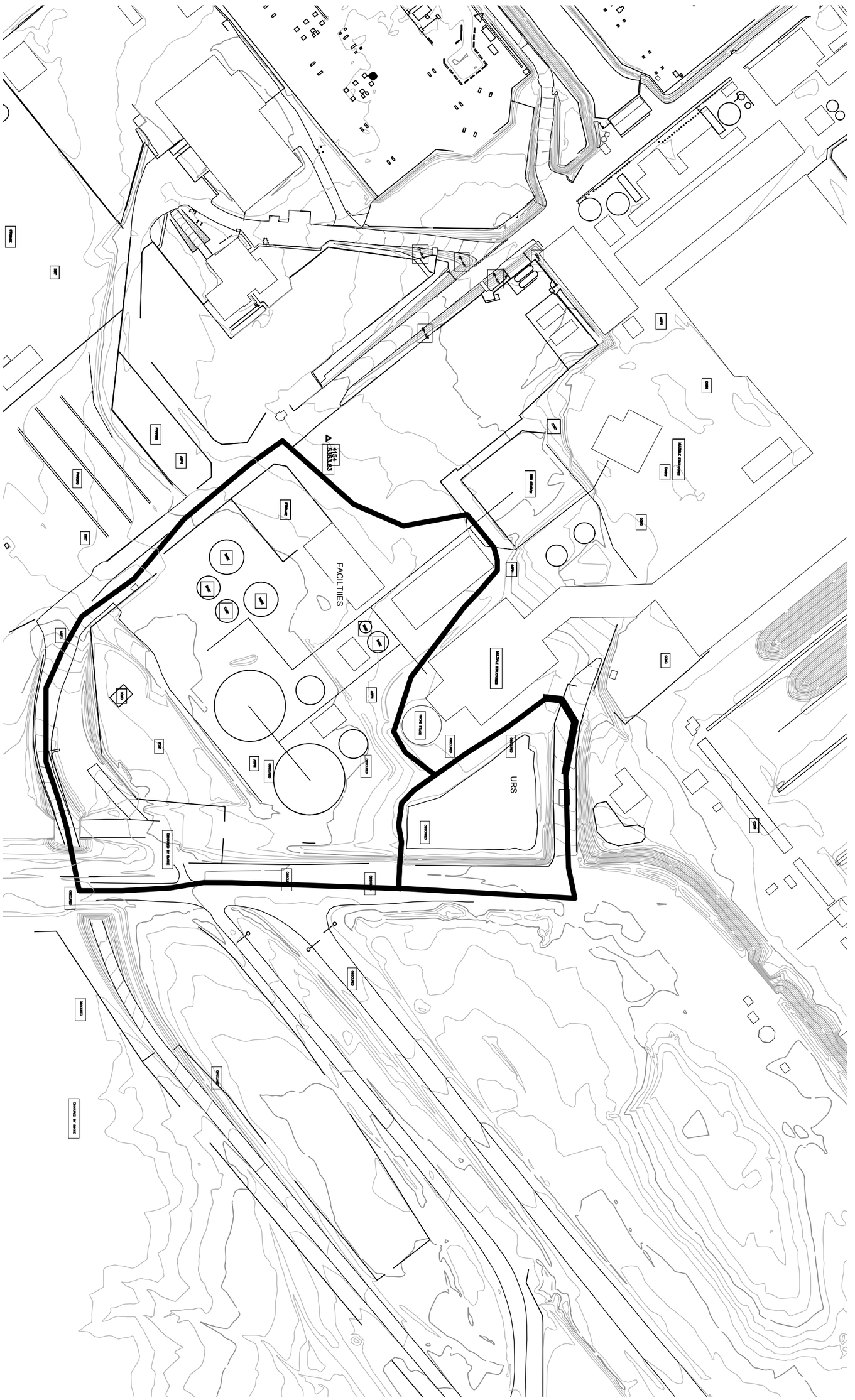
Sub-basin	Area (sq ft)	Area (acre)	Curve number	Precipitation	Direct runoff	Runoff Volume
			CN	P (inch)	Qd (inch)	Qv (ac-ft)
FACITLITIES	608090	13.96	95	1.86	1.35	1.57
URS	113169	2.60	100	1.86	1.86	0.40
					Total Runoff	1.97

Table 2 – Stage Storage Volume

STAGE	DEPTH	AREA	VOL_{INC}	VOL_{INC}	VOL_{CUM}	VOL_{CUM}
	[ft]	[ft^2]	[ft^3]	[ac-ft]	[ft^3]	ac-ft
5,351.00	0.0	43,018.31	0.00	0.00	0.00	0.00
5,352.00	1.0	45,539.37	44,279	1.02	44,279	1.02
5,353.00	2.0	53,019.03	49,279	1.13	93,558	2.15
5,354.00	3.0	59,632.63	56,326	1.29	149,884	3.44

FIGURE 1

Last saved by: PANDITG(2016-07-14) Last Plotted: 2016-07-15
Filename: P:\PROJECTS\ARIZONA_PUBLIC_SERVICE\60492608_FCPP_CCR_REPORTS\6_DELIVERABLES\URS SUPPORTING CALCULATIONS\WORKING FILES\FIGURE 1-URS_DRAINAGE_AREAS.DWG
Project Management Initials: Designer:GP Checked:JBH Approved:AWG ANSI B 11" x 17"



Four Corners Power Plant CCR
Arizona Public Service
Four Corners Power Plant, Farmington, NM
60492608 Date: 2016-07-14

Four Corners URS Drainage Areas

AECOM

Figure: 1

NOAA 14 PRECIPITATION INFORMATION

NOAA Atlas 14, Volume 1, Version 5
Location name: Waterflow, New Mexico, US*
Latitude: 36.6899°, Longitude: -108.4778°
Elevation: 5334 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	**0.147** (0.126–0.172)	**0.190** (0.162–0.221)	**0.255** (0.219–0.296)	**0.309** (0.265–0.360)	**0.387** (0.328–0.451)	**0.452** (0.380–0.525)	**0.521** (0.433–0.605)	**0.596** (0.489–0.694)	**0.703** (0.565–0.821)	**0.792** (0.627–0.929)
10-min	**0.224** (0.192–0.261)	**0.288** (0.247–0.336)	**0.388** (0.333–0.451)	**0.471** (0.403–0.548)	**0.590** (0.500–0.686)	**0.688** (0.578–0.799)	**0.792** (0.659–0.922)	**0.907** (0.745–1.06)	**1.07** (0.860–1.25)	**1.21** (0.954–1.41)
15-min	**0.277** (0.238–0.324)	**0.358** (0.307–0.416)	**0.481** (0.413–0.559)	**0.584** (0.500–0.680)	**0.731** (0.620–0.851)	**0.853** (0.717–0.990)	**0.982** (0.817–1.14)	**1.12** (0.923–1.31)	**1.33** (1.07–1.55)	**1.49** (1.18–1.75)
30-min	**0.373** (0.321–0.436)	**0.482** (0.413–0.561)	**0.647** (0.557–0.753)	**0.786** (0.673–0.915)	**0.984** (0.835–1.15)	**1.15** (0.966–1.33)	**1.32** (1.10–1.54)	**1.51** (1.24–1.76)	**1.79** (1.44–2.09)	**2.01** (1.59–2.36)
60-min	**0.462** (0.397–0.540)	**0.596** (0.511–0.694)	**0.801** (0.689–0.932)	**0.973** (0.833–1.13)	**1.22** (1.03–1.42)	**1.42** (1.20–1.65)	**1.64** (1.36–1.90)	**1.87** (1.54–2.18)	**2.21** (1.78–2.58)	**2.49** (1.97–2.92)
2-hr	**0.503** (0.439–0.583)	**0.638** (0.559–0.741)	**0.851** (0.746–0.983)	**1.03** (0.898–1.19)	**1.29** (1.11–1.49)	**1.51** (1.29–1.74)	**1.75** (1.47–2.02)	**2.01** (1.67–2.32)	**2.40** (1.94–2.78)	**2.72** (2.16–3.17)
3-hr	**0.555** (0.493–0.632)	**0.699** (0.618–0.800)	**0.910** (0.807–1.04)	**1.09** (0.957–1.23)	**1.35** (1.18–1.52)	**1.56** (1.35–1.77)	**1.80** (1.53–2.04)	**2.05** (1.73–2.34)	**2.44** (2.01–2.79)	**2.75** (2.23–3.18)
6-hr	**0.651** (0.588–0.730)	**0.808** (0.728–0.905)	**1.02** (0.918–1.15)	**1.20** (1.08–1.34)	**1.47** (1.30–1.64)	**1.69** (1.48–1.88)	**1.92** (1.66–2.15)	**2.17** (1.86–2.44)	**2.55** (2.13–2.88)	**2.86** (2.34–3.24)
12-hr	**0.759** (0.688–0.842)	**0.944** (0.855–1.05)	**1.17** (1.06–1.30)	**1.35** (1.22–1.50)	**1.61** (1.44–1.77)	**1.81** (1.61–1.99)	**2.01** (1.78–2.22)	**2.22** (1.95–2.47)	**2.57** (2.17–2.91)	**2.89** (2.37–3.27)
24-hr	**0.834** (0.762–0.913)	**1.05** (0.953–1.14)	**1.32** (1.20–1.44)	**1.54** (1.40–1.69)	**1.86** (1.68–2.02)	**2.10** (1.90–2.29)	**2.36** (2.12–2.58)	**2.63** (2.34–2.87)	**3.00** (2.65–3.29)	**3.29** (2.88–3.62)
2-day	**0.943** (0.859–1.03)	**1.18** (1.08–1.29)	**1.47** (1.34–1.60)	**1.70** (1.55–1.85)	**2.03** (1.84–2.21)	**2.27** (2.06–2.47)	**2.53** (2.28–2.75)	**2.79** (2.50–3.04)	**3.15** (2.80–3.43)	**3.42** (3.02–3.73)
3-day	**1.01** (0.926–1.11)	**1.26** (1.16–1.38)	**1.57** (1.44–1.71)	**1.81** (1.66–1.97)	**2.14** (1.95–2.33)	**2.40** (2.18–2.60)	**2.66** (2.40–2.89)	**2.92** (2.63–3.18)	**3.28** (2.93–3.57)	**3.55** (3.15–3.88)
4-day	**1.08** (0.994–1.18)	**1.35** (1.24–1.47)	**1.67** (1.53–1.82)	**1.92** (1.77–2.09)	**2.26** (2.07–2.46)	**2.52** (2.30–2.74)	**2.79** (2.53–3.03)	**3.05** (2.76–3.32)	**3.41** (3.06–3.72)	**3.67** (3.28–4.02)
7-day	**1.20** (1.11–1.31)	**1.50** (1.37–1.63)	**1.84** (1.70–2.00)	**2.11** (1.94–2.29)	**2.46** (2.27–2.67)	**2.73** (2.50–2.95)	**2.99** (2.74–3.24)	**3.26** (2.96–3.53)	**3.60** (3.25–3.90)	**3.85** (3.47–4.18)
10-day	**1.33** (1.22–1.45)	**1.66** (1.53–1.80)	**2.04** (1.88–2.21)	**2.33** (2.15–2.53)	**2.72** (2.50–2.94)	**3.00** (2.75–3.24)	**3.28** (3.00–3.55)	**3.55** (3.24–3.85)	**3.90** (3.54–4.23)	**4.15** (3.76–4.53)
20-day	**1.65** (1.52–1.79)	**2.06** (1.89–2.24)	**2.54** (2.33–2.75)	**2.90** (2.67–3.14)	**3.39** (3.11–3.67)	**3.75** (3.43–4.06)	**4.11** (3.75–4.45)	**4.46** (4.05–4.84)	**4.92** (4.44–5.35)	**5.26** (4.73–5.73)
30-day	**1.95** (1.80–2.13)	**2.44** (2.24–2.65)	**2.99** (2.75–3.25)	**3.40** (3.13–3.69)	**3.93** (3.61–4.26)	**4.31** (3.96–4.68)	**4.69** (4.29–5.09)	**5.06** (4.61–5.49)	**5.51** (5.00–6.00)	**5.85** (5.29–6.37)
45-day	**2.33** (2.15–2.53)	**2.90** (2.68–3.15)	**3.56** (3.29–3.85)	**4.04** (3.73–4.36)	**4.64** (4.28–5.01)	**5.07** (4.67–5.47)	**5.48** (5.04–5.91)	**5.87** (5.38–6.33)	**6.33** (5.79–6.84)	**6.65** (6.07–7.18)
60-day	**2.63** (2.43–2.85)	**3.27** (3.02–3.54)	**3.98** (3.68–4.30)	**4.50** (4.16–4.86)	**5.16** (4.76–5.56)	**5.62** (5.18–6.05)	**6.06** (5.58–6.52)	**6.47** (5.94–6.96)	**6.96** (6.38–7.50)	**7.29** (6.67–7.85)

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

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

Please refer to NOAA Atlas 14 document for more information.

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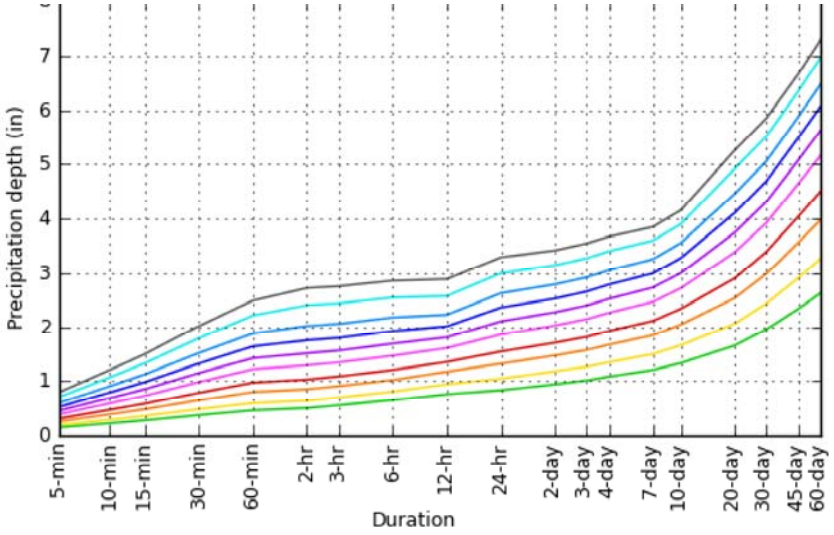
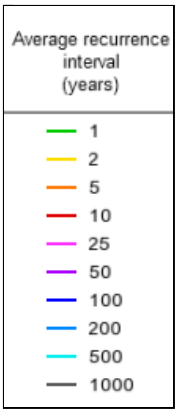
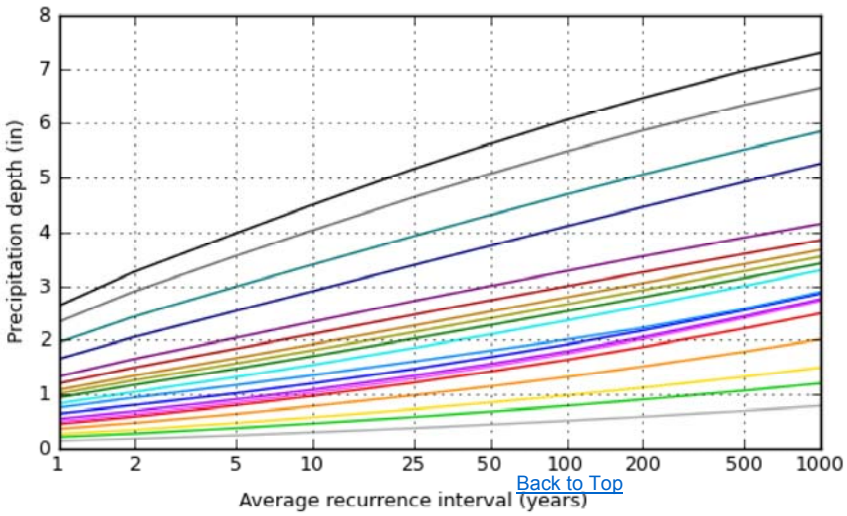
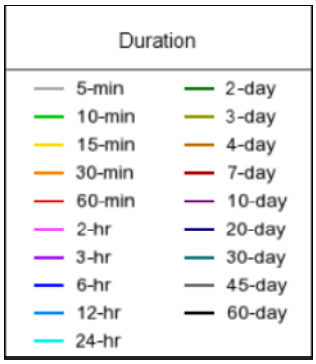
PF graphical









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Maps & aerials

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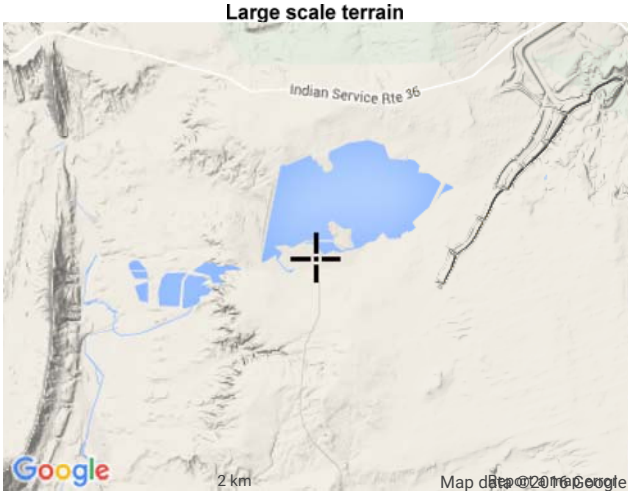
Small scale terrain

Large scale terrain



Large scale map

Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910

Questions?: HDSC.Questions@noaa.gov

Disclaimer

VERTICAL DATUM CONVERSION INFORMATION

APS

Four Corners

28 February 2011

INPUT	OUTPUT
State Plane, NAD83	State Plane, NAD27
3003 - New Mexico West, U.S. Feet	3003 - New Mexico West, U.S. Feet
Vertical - NAVD88, U.S. Feet	Vertical - NGVD29 (Vertcon94), U.S. Feet

Accuracies of conversions from NAD 83 to NAD 27 are typically 12 to 18 cm.

3119

1/3

Northing/Y:	2070171.29	**Northing/Y:**	2070108.945
Easting/X:	2526557.36	**Easting/X:**	303648.046
Elevation/Z:	5256.59	**Elevation/Z:**	5253.581
Convergence:	-0 24 01.74021	**Convergence:**	-0 24 00.36715
Scale Factor:	0.999960861	**Scale Factor:**	0.999960779
Combined Factor:	0.999712839	**Combined Factor:**	0.999709557

Grid Shift (U.S. ft.): X/Easting = -2222909.3, Y/Northing = -62.3

Datum Shift (m.): Delta Lat. = -0.173, Delta Lon = -57.032

^Z = 3.009 feet

3124

2/3

Northing/Y:	2068657.97	**Northing/Y:**	2068595.641
Easting/X:	2528437.23	**Easting/X:**	305527.916
Elevation/Z:	5325.39	**Elevation/Z:**	5322.375
Convergence:	-0 23 47.73518	**Convergence:**	-0 23 46.36266
Scale Factor:	0.999960020	**Scale Factor:**	0.999959938
Combined Factor:	0.999708710	**Combined Factor:**	0.999705427

Grid Shift (U.S. ft.): X/Easting = -2222909.3, Y/Northing = -62.3

Datum Shift (m.): Delta Lat. = -0.183, Delta Lon = -57.018

^Z = 3.015 feet

3117

3/3

Northing/Y:	2067386.15	**Northing/Y:**	2067323.844
Easting/X:	2524575.80	**Easting/X:**	301666.494
Elevation/Z:	5158.64	**Elevation/Z:**	5155.628
Convergence:	-0 24 15.87006	**Convergence:**	-0 24 14.49696
Scale Factor:	0.999961757	**Scale Factor:**	0.999961674
Combined Factor:	0.999718419	**Combined Factor:**	0.999715134

Grid Shift (U.S. ft.): X/Easting = -2222909.3, Y/Northing = -62.3

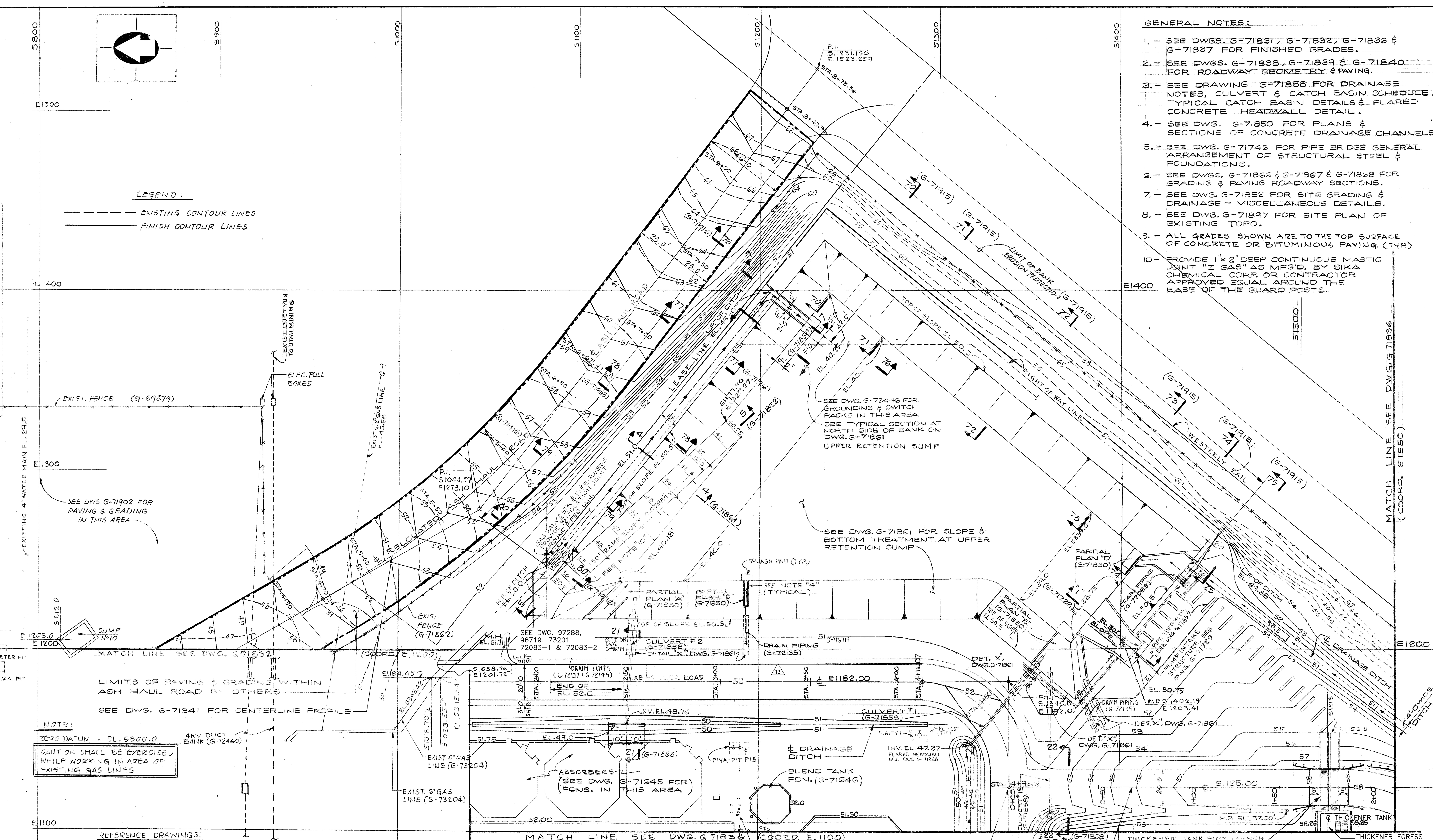
Datum Shift (m.): Delta Lat. = -0.178, Delta Lon = -57.049

^Z = 3.012 feet

USE AVERAGE ^Z = 3.012 feet

Remark: NGVD29 to NAVD88 Vertical Datum Shift

URS AS-BUILT DRAWING



GENERAL NOTES:

1. – SEE DWGS. G-71831, G-71832, G-71836 & G-71837 FOR FINISHED GRADES.
2. – SEE DWGS. G-71838, G-71839 & G-71840 FOR ROADWAY GEOMETRY & PAVING.
3. – SEE DRAWING G-71858 FOR DRAINAGE NOTES, CULVERT & CATCH BASIN SCHEDULE, TYPICAL CATCH BASIN DETAILS & FLARED CONCRETE HEADWALL DETAIL.
4. – SEE DWG. G-71850 FOR PLANS & SECTIONS OF CONCRETE DRAINAGE CHANNELS.
5. – SEE DWG. G-71746 FOR PIPE BRIDGE GENERAL ARRANGEMENT OF STRUCTURAL STEEL & FOUNDATIONS.
6. – SEE DWGS. G-71866 & G-71867 & G-71868 FOR GRADING & PAVING ROADWAY SECTIONS.
7. – SEE DWG. G-71852 FOR SITE GRADING & DRAINAGE – MISCELLANEOUS DETAILS.
8. – SEE DWG. G-71897 FOR SITE PLAN OF EXISTING TOPO.
9. – ALL GRADES SHOWN ARE TO THE TOP SURFACE OF CONCRETE OR BITUMINOUS PAVING (TYP.)
10. – PROVIDE 1"x2" DEEP CONTINUOUS MASTIC JOINT "I GAS" AS MFG'D. BY SIKA CHEMICAL CORP. OR CONTRACTOR APPROVED EQUAL AROUND THE BASE OF THE GUARD POSTS.

LEGEND:

- – – – – – EXISTING CONTOUR LINES
- ———— FINISH CONTOUR LINES

NOTE:

ZERO DATUM = EL. 5300.0

CAUTION SHALL BE EXERCISED WHILE WORKING IN AREA OF EXISTING GAS LINES

REFERENCE DRAWINGS:

- G-71902 — LAYDOWN AREA SOUTH OF BAGHOUSE PAVING & GRADING
- G-71645 — ABSORBER AREA – FOUNDATIONS – SH. 1
- G-71746 — PIPE BRIDGE GENERAL ARRANGEMENT (STRUCTURAL STEEL & FOUNDATIONS)
- G-71729 — UPPER RETENTION SUMP – FOUNDATIONS – SH. 1
- G-72083 — UPPER RETENTION SUMP AREA – DRAIN PIPING
- G-73201 — YARD FIRE PROTECTION – POTABLE WATER & SANITARY SEWER PLAN
- G-72360 — KEY GROUNDING PLAN
- G-71832 — WASTE PROCESSING AREA – FINISHED GRADES
- G-71836 — THICKENER AREA – FINISHED GRADES
- G-71841 — RELOCATED ASH HAUL ROAD CENTERLINE PROFILE & TYPICAL SECTION
- G-71857 — MISCELLANEOUS FOUNDATIONS – PLANS & DETAILS
- G-71861 — UPPER RETENTION SUMP – SECTIONS & DETAILS
- G-73204 — YARD GAS PIPING RELOCATION – PLANS & DETAILS

REFERENCE DRAWINGS (CONT.):

- G-96719 — UPPER RETENTION SUMP DRAIN LINE MOD. PLAN & DETAILS SH. 1 & 2
- G-72420 — 4 KV DUCT BANK – REROUTING PLAN & PROFILES
- G-72446 — CONSTRUCTION POWER DISTRIBUTION – SH. 1
- G-71863 — SO_2 REMOVAL PROJECT – AREA CONSTR. FACILITIES
- G-69879 — BAGHOUSE AREA – YARD FENCE – PLAN & DETAILS
- G-69795 — YARD FENCING – PLAN & DETAILS
- G-71862 — SO_2 AREA – FENCE PLAN & DETAILS
- G-71646 — ABSORBER AREA – FOUNDATIONS – SH. 2
- G-71866 — GRADING & PAVING ROADWAY SECTIONS – SH. 1
- G-71867 — GRADING & PAVING ROADWAY SECTIONS – SH. 2
- G-71868 — GRADING & PAVING ROADWAY SECTIONS – SH. 3
- G-71897 — SITE PLAN OF EXISTING TOPO
- G-71896 — YARD FENCING PLAN – UPPER RETENTION SUMP
- G-72135 — THICKENER & SILO AREA – DRAIN PIPING
- G-71843 — ABSORBER ROAD, ACCESS ROAD "A" & "B", ℄ PROFILES

REV.	DATE	DESCRIPTION
14	9/9/08	AS BUILT
13	7/16/08	ASH HAUL ROAD IMPROVEMENT
12	10/5/93	AS-BUILT 03-9260-00
11		ADDED NEW ABOVE GROUND DRAIN LINES AND RELOCATION OF FIRE HYDRANT – SEE APS DWG. G-96719 FOR REF.
10	2/15/85	REMOVED REVISION MARKINGS FOR RECORD ISSUE
9	1-15-85	REVISED SUMP FENCING TO SHOW FIELD TIE-IN TO EXISTING FENCE
8		AS 71 -FIELD CHANGES ...
7	6-1-84	REVISED GRADES PER SAN JUAN ENG. SURVEY DATED 5-22-84
6	7/1/84	REVISED TO SHOW AS-BUILT LOCATION OF M.H.
5	3-30-84	REVISED BANK EROSION PROTECTION, ADDED RAMP TO ABSORBER ROAD, UPDATED ASH HAUL ROAD & GRADE ELEV.
4	8/15/83	ADDED BANK CORRECTION AND NOTE NO. 10, RELOCATED GAS VALVE STATION AS PER FIELD SURVEY
3	7/8/83	REMOVED EXISTING CONTOURS & ABANDONED GAS LINES
2		REVISED LOCATION OF C.B. ...
1	3/83	GENERAL REVISION
0	12-8-82	FIRST ISSUE

7213-F-101831

united engineers

STATE REG. NEW MEXICO NO. 7591

FOUR CORNERS STEAM ELECTRIC STATION UNITS 4 AND 5
UPPER RETENTION SUMP AREA
FINISHED GRADES

ARIZONA PUBLIC SERVICE COMPANY
PHOENIX

SCALE 1" = 20'-0 DATE 12-8-82

SO_2 Removal Project

DRAWING NO. G-71831

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