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2231 E. CAMELBACK RD.
SUITE 250
PHOENIX, AZ 85016 USA
602.381.4400 **PHONE**

City of Mesa
Central Mesa Reuse Pipeline – Plants
Intermediate Pump Station
Mesa CIP No. CP0896

B&V Project 411073
March 6, 2023

City of Mesa Development Services
55 N Center Street
P.O. Box 1466
Mesa, AZ 85211-1466

Central Mesa Reuse Pipeline – Plants (Intermediate Pump Station)
3626 E. Thomas Road
Council Use Permit and Bonus Intensity Zone Narrative

Site Description

The proposed Central Mesa Reuse Pipeline (CMRP) Intermediate Pump Station (IPS) project is part of a multi-site improvements project that is critical to the City of Mesa (COM) fulfilling its future water supply requirements. The proposed CMRP project will ultimately convey reclaimed water from the COM's water reclamation plants to the Gila River Indian Community (GRIC) for agricultural irrigation purposes. By providing reclaimed water to the GRIC, the City will receive, in exchange, a portion of the GRIC's Central Arizona Project (CAP) water credits at a favorable rate and at a ratio that will allow the City to supply water to meet its future needs. Conveyance of reclaimed water to the GRIC will require the construction of a new transmission pipeline, improvements to existing reclaimed water pump stations, and construction of the new IPS, located at 3626 E Thomas Road. The proposed IPS will include the following major facilities:

- A 25-ft tall steel reclaimed water storage tank with a volume of approximately 0.5 million gallons
- A 13-ft tall 13,300-gallon horizontal surge tank to accommodate potential pipeline pressure surges and to protect the CMRP system infrastructure
- A 17-ft tall masonry electrical building will provide the secured storage for pump motor starters, variable frequency drives (VFDs) and monitoring / control equipment
- Three new reclaimed water pumps, located outside with vertical motors ~12-ft tall
- Above grade valves, piping, and monitoring and control equipment
- A retention basin to collect site runoff

The IPS site is located on the northeast corner of the intersection of Val Vista Drive and Thomas Road in Mesa, Arizona. The site is somewhat triangular in shape and is bounded on the north by a drainage channel and SR-202 owned by the Arizona Department of Transportation (ADOT).

For infrastructure security reasons an 8-ft perimeter wall is required around the site perimeter. As this is a tall wall, it will be the primary site design aesthetic. The south and west sides of the site will be coordinated with the wall planned for the future development on the south side of E

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Thomas Road to be harmonious. Landscaping on the south and west sides of the site will utilize native vegetation to encourage biodiversity, reduce environmental impacts, and conserve water.

The development adjacent to the IPS site, Estates at Pioneer Crossing at 3559 N. Val Vista Dr, includes the extension of the sidewalk on the north side of East Thomas Rd. along the south side of the IPS site all the way to the cul-de-sac and ties into the development for Estates at Pioneer Crossing. The Estates at Pioneer Crossing will also modify the existing sidewalk ramp on the northeast corner of E. Thomas Rd. and Val Vista Dr. to meet current ADA standards per COM Std. Det. M-44.02 or .03.

For infrastructure security, this unmanned site will include video surveillance and will be monitored by City of Mesa. During regular operations, the IPS site will be visited once per day by one COM truck, pickup size. Visits may be less frequent when the IPS pumps are not operating. Since the secured site is unmanned and limits public access, designated parking areas and secure bicycle storage is not needed.

A shade canopy with exposed steel columns will be installed over critical electrical equipment associated with the surge tank to protect the equipment from UV exposure and extreme temperatures. More sensitive electrical equipment will be housed in the air conditioned, masonry electrical building.

A fire alarm system is required and will be provided for the new electrical building. Fire sprinklers are not required in the building because it falls under exemption #2 section 903.3.1.1 of the Mesa Code Ordinances, and will meet the following provisions of NFPA 13:

- The room will be dedicated to electrical equipment only.
- Only dry type electrical equipment is used.
- Equipment is installed in a 2-hour fire rated enclosure including protection for penetrations.
- No combustible storage is permitted to be stored in the room.

<u>Request for Council Use Permit (CUP)</u>

The COM recently purchased this undeveloped property from ADOT with the intended use being for the construction of the IPS. The property is zoned General Industrial (GI) and will be rezoned to Public and Semi-Public with a Bonus Intensity Zone overlay. Per Section 11-10-2 of the Mesa Zoning Ordinance (MZO), the proposed major utilities use is allowed within the PS zoning district with granting of a Council Use Permit. A CUP is being requested for the IPS site (PS-BIZ-CUP).

The General Plan character area designation for the IPS site is Neighborhood Village Center and is also located within the Falcon Field Sub-Area. The proposed project will advance the goals and be consistent with the purposes of the General Plan and Sub-Area by:

- Providing infrastructure support for the wide range of opportunities for the employment of professionals, technical experts, and high-skilled labor in high-quality settings.
- Developing a previously unutilized area to help the City of Mesa achieve its future water supply goals and provide a needed service for the City.

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- Supporting Mesa's Water Resources goal of ensuring an adequate, reliable water supply to create and maintain great neighborhoods, grow and maintain diverse and stable jobs, and provide rich, high-quality public spaces.
- Providing critical infrastructure improvements needed for anticipated growth.
- Support environment and conservation efforts by maximizing resource efficiency that will benefit future generations.
- Providing fiscally sound planning, design, and construction of a public facility.
- Implementing landscape that restores natural desert beauty to the area and is cognizant of aviation safety concerns.

The proposed project will not be injurious or detrimental to surrounding properties. This project will support the continued growth and development of the surrounding area and the greater City of Mesa. The design of the IPS site architecture has been coordinated with neighboring developments to be consistent and blend into the community. Additionally, there are adequate public services, facilities, and infrastructure to support this project.

Bonus Intensity Zone

We are aware of the importance in providing a site design that adheres to the principles and standards detailed in MZO Section 11. It is not without considerable effort that we have determined that strict compliance to all principles under Section 11 is impractical. Due to the site constraints, direct requests from the City, and need to protect critical Mesa infrastructure and maintain site safety, the project team is requesting a Bonus Intensity Zone (BIZ) Overlay District, as described in Mesa Zoning Ordinance (MZO) section 11-21.

Table 1 has summarized the variances being requested by providing the relevant MZO section number, the corresponding requirement(s) of that section, the variance being requested based on what is actually being provided, and a reasoning for that variance. Following Table 1 is a justification for these variances based on superior quality design elements that are being provided.

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Table 1: Variance Request Summary

MZO Section	Requirement	Variance Requested	Reasoning
11-10-3	• Collector street side setback: 25-ft for building and landscape (E. Thomas Rd.) • Freeway side setback: 30-ft for building (north side of site) • Rear setback: 15-ft for building (east side of site)	• Collector street side setback: 1-ft 9-in minimum for building, 0-ft for landscape; 5-ft 5in min landscape width • Freeway side setback: 9-ft 3-in minimum for building • Rear setback: 11-ft 2-in for building	In order to accommodate all necessary design features and equipment in this unique site configuration where space is limited, not all building and landscaping setbacks as defined in this section can be met. As illustrated on the site plan, with all setbacks in place the maximum site dimensions would be 48-ft 9-in, which would not even be large enough for the 66-ft diameter water storage tank. The available site area would be approximately 7,770 SF. The total occupied area for above grade structures and equipment is approximately 7,400 SF, which would be over 95% of the total available site area. This would be impractical for site safety and access to equipment.
11-30-9(I)	6-ft tall wall on interior lot lines	8-ft tall site perimeter walls	The City of Mesa has requested the site perimeter walls to be 8 feet tall for critical infrastructure security.
11-30-10	25-ft radius setback from intersection	23-ft radius setback from intersection	The setback from the corner of the site to the Val Vista Dr. and Thomas Rd. intersection is 23-ft to accommodate requirements for the retention basin and necessary equipment on the site. Transportation has previously confirmed that this deviation is acceptable.
11-32-(4)(A)	50-ft setback for parking spaces along main drive aisles connecting directly to a street	36-ft 5-in setback for parking (minimum measured dimension)	No parking spaces exist on the site however it is expected that City vehicles accessing the site will park along the single wraparound driveway connected to Thomas Rd. or on the driveway to the electrical building. Parking along the north side of the main wraparound driveway will have a setback range of 58-ft to 75-ft 7-in, however the setback for parking on the driveway to the electrical building will at minimum be 35-ft 9-in. This variance is being requested to accommodate the unique site configuration and accommodate all necessary design features of the site. Parking at the site will not be open to the public, only Mesa operations and maintenance personnel will have access to the site.

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Table 1: Variance Request Summary

MZO Section	Requirement	Variance Requested	Reasoning
11-33-3(A)	• Collector Streets require 1 tree and 6 shrubs per 25 linear feet of site frontage (E. Thomas Rd. is 448-ft and would require 18 trees and 107 shrubs) • Collector Street minimums: 25% of trees shall be 36" box, 50% of trees shall be 24" box, 50% of shrubs shall be 5 gallon.	• Along E. Thomas Rd. there are 0 trees and 59 shrubs • 0% of trees are 36" box; 0% of trees are 24" box • 100% of shrubs are minimum 5 gallon; 10% of shrubs are 15 gallon	Trees are unable to be planted along Thomas Rd. due to the SRP easement for the overhead power line and the SRP Technical Provisions requirement that states that trees are prohibited from being planted in such easements. To mitigate pipeline infrastructure corrosion, Mesa Water Resources has requested that no landscaping or water emitting irrigation be placed within 10-ft of the new buried pipelines entering the site, resulting in 110-ft of the frontage being free of landscaping. Native seed mix over these areas and vines/trellises on the walls are also undesirable due to maintenance concerns and site security concerns respectively. Additionally, to maintain traffic visibility and safety, there are no plants in the designated sight visibility triangles. Because of this, the total number of shrubs is unable to be met.
11-33-3(B)(2)	• 15-ft width landscape yard for non-single residence uses adjacent to non-single residence uses • Minimum of 3 non-deciduous trees and 20 shrubs per 100 linear feet • Minimum tree size shall be 15-gallon for GI districts.	For east side (37-ft 3-in long): • 0-ft width landscape yard (no landscaping) • 0 out of 2 non-deciduous trees and 0 out of 8 shrubs For north side (350-ft long): • 0-ft width landscape yard (no landscaping) • 0 out of 11 non-deciduous trees and 0 out of 70 shrubs	In order to accommodate all necessary design features and equipment in this unique site configuration where space is limited, not all landscaping requirements as defined in this section can be met. In an effort to provide a site configuration that considers Mesa personnel and maintenance staff needs related to the equipment, no landscaping has been provided on the rear (east) or freeway (north) sides of the property.

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We are committed to providing the following superior design qualities in return for the requested modifications to the standards:

- To provide a greater degree of compatibility with the surrounding area, the IPS site wall has been designed to match the perimeter wall of the development south of E. Thomas Rd. (Estates at Pioneer Crossing). This coordination will create consistency in the area's aesthetic and allow the site to blend into the surroundings while also exceeding typical site perimeter wall design standards.
- The architectural finish of the masonry electrical building has been designed to be coordinated with the IPS site wall and the wall of the residential development south of E. Thomas Rd.
- Along N. Val Vista Dr. (Arterial Street) 6 trees will be provided in the landscaping exceeding the required 5 trees.
- Along N. Val Vista Dr. (Arterial Street) 100% of the trees with be 36-in box size exceeding the requirement that a minimum of 50% of trees be at least 24-in box size and a minimum of 25% of trees be at least 36-in box size.
- Along N. Val Vista Dr. (Arterial Street) 28 shrubs will be provided in the landscaping exceeding the required 26 shrubs.
- Along N. Val Vista Dr. (Arterial Street) and E. Thomas Rd. (Collector Street) 100% of all shrubs will be 5-gallon or larger which exceeds the requirement that a minimum of 50% of shrubs be 5-gallon or larger. Additionally, 9 of the shrubs will be 15-gallon.
- Bio-swales have been provided in the landscaping design to promote water efficiency and support storm water management by cleaning storm water before it percolates into the ground.
- When selecting plants for the site landscaping, their effect on the surrounding area was considered to promote their viability and long-term maturation. All nine plant types are heat and drought tolerant, all can tolerate the heat reflected by the site wall, and all survive well on streetscapes.
- The masonry electrical building has been designed to be fully insulated to meet the City of Mesa's Energy Conservation Code. The HVAC system at the electrical building has also been designed with an economizer for further energy efficiency.
- The pumps at the IPS site have been designed with premium efficiency rated motors and variable frequency drives to further energy savings and efficiency.

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We appreciate your review of this submission for this critical City of Mesa project. Please contact us with any further questions.

Thank you,

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March 6, 2024

City of Mesa Development Services
55 N Center Street
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Central Mesa Reuse Pipeline – Plants (Intermediate Pump Station)
Alternative Landscape Plan Narrative

The proposed Central Mesa Reuse Pipeline (CMRP) Intermediate Pump Station (IPS) project is part of a multi-site improvements project that is critical to the City of Mesa (COM) fulfilling its future water supply requirements. Due to the unique geometry of the property and necessary configuration of proposed site equipment, not all landscaping standards as required by Mesa Zoning Ordinance (MZO) Section 11-33 are able to be fulfilled.

For this reason, we are requesting a modification to the standard for minimum percentage of perimeter landscaping vegetative ground coverage to be 50%. The perimeter landscaping vegetative ground coverage to be provided is 37%. On the north and east sides no landscaping setbacks are being provided to maximize site area for required equipment. This standard is listed as an allowable modification in MZO Section 11-33-7(B)(2)(a). In return, we will provide the following 7 enhanced landscape design principles:

1. Plant Variety (11-33-7(A)(3)): we will be providing a variety of plant materials, colors, forms, and textures. Two different types of trees will be provided: the chaste tree that has purple flowers and the Mexican bird of paradise that has yellow flowers. All trees will be 36-inch box size which exceeds the minimum tree size requirements. Six different types of shrubs will be provided including: triangle leaf bursage that is a small rounded shrub with triangular shaped leaves; emu bush that has deep green foliage with glabrous branches and leaves and yellow trumpet flowers; hybrid fairy duster that has gray hued leaves and bright red fanning flowers; brittlebush that is a rounded shrub with long oval silver leaves that are somewhat fuzzy and small yellow flowers that form on long stalks well above the leafy stems; gold mountain lantana has dense, compact, dark green foliage that is excellent for trailing growth and groundcover and has brilliant golden yellow flower clusters; yellow bells is irregularly shaped and has lance-shaped, olive green leaves and clusters of large trumpet shapes yellow flowers. Red hesperaloe will also be provided as an accent plant, these plants have soft yucca-like evergreen leaves and coral colored tubular flowers on pink stems.
2. Naturalistic Design (11-33-7(A)(4)): in order to provide a naturalistic landscaping design, plantings will follow a curvilinear pattern, there will be no rows of plants or squares. The

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curvilinear planting patterns and grouping of plants will create a harmonious aesthetic with the native surroundings. Additionally, bio-swales are being provided near paved areas.

3. Compatibility with Surrounding Uses (11-33-7(A)(5)): in order to provide a greater degree of compatibility with the surrounding area, the IPS site wall has been designed to match the perimeter wall of the development south of E. Thomas Rd. (Estates at Pioneer Crossing). This coordination will create consistency in the area's aesthetic and allow the site to blend into the surroundings.
4. Water Efficiency (11-33-7(A)(6)): A water efficient drip irrigation system will be provided to limit and conserve the amount of water used. Compared to the 65% - 75% efficiency of sprinklers, drip irrigation is closer to 90% efficient. Drip irrigation reduces runoff and evaporation and allows the plants to use the majority of the water that is applied. Xeriscaping will also be implemented by providing native plants that have low water requirements such as: the triangle leaf bursage, hybrid fairy duster, and the brittle bush. Additionally, bio-swales will be provided as part of the landscaping design to allow cleaned rainwater to percolate into the ground more efficiently.
5. Storm Water Management (11-33-7(A)(7)): Bio-swales are being provided as part of the site perimeter landscaping as indicated on the landscaping plans. The bio-swales will have plant material and desert varnish to clean storm water before it percolates into the ground.
6. Plant Viability and Longevity (11-33-7(A)(10)): When selecting plants for the site landscaping, consideration of their effect on the surrounding area was taken into account to promote their viability and long-term maturation. The microclimate of the plant' locations were also accounted for such that all nine plant types are heat and drought tolerant, all can tolerate the heat reflected by the site wall, and all survive well on streetscapes. Additionally, as the plants, specifically the trees, mature they will provide moderate shade along Val Vista Dr. without limiting visibility from adjacent streets. All plants will be located outside of vehicle traffic sight angles as shown on the landscape plans. Since the site does not have developed hardscapes, the use of advanced installation techniques such as structured soils is not applicable.
7. Overhead Utility Line Easements (11-33-7(A)(11)): SRP overhead power lines run along the south perimeter of the site on E. Thomas Rd. as well as a 10-ft SRP easement. Per the requirements listed in SRP's Technical Provisions, trees are prohibited from being located within such easements. The plants provided along E. Thomas Rd. will eliminate the potential of mature plant limbs interfering with overhead utility lines. They are also plants approved by SRP for placement near utility lines.

Thank you,

Peter Olszewski, P.E.
Senior Engineering Manager
Black & Veatch

OlszewskiP@bv.com
602-381-4434

CITY OF MESA LANDSCAPE GENERAL NOTES

1. LANDSCAPE CONTRACTOR SHALL CONFIRM LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO ANY EXCAVATION AND SHALL BE RESPONSIBLE FOR THE FOLLOWING:
   A. DAMAGES TO SUCH UTILITIES CAUSED AS A RESULT OF THE CONTRACTOR'S ACTIVITIES.
   B. DAMAGES TO EXISTING WALKS, WALLS, DRIVES, CURBS, ETC.
   C. INSPECTING THE SITE IN ORDER TO BE FULLY AWARE OF EXISTING CONDITIONS PRIOR TO SUBMITTING A BID.
2. INSTALLATION OF ALL LANDSCAPE AND IRRIGATION MATERIALS SHALL COMPLY WITH SECTIONS 424, 425, 757, AND 795 OF THE MAG STANDARD SPECIFICATIONS.
3. CONTRACTOR SHALL REPAIR ANY DAMAGE MADE TO THE EXISTING SPRINKLER SYSTEM TO THE SATISFACTION OF THE CITY AT NO ADDITIONAL COST TO THE CITY.
4. LANDSCAPE REMOVAL IS A NON-PAY ITEM UNLESS OTHERWISE NOTED.
5. ALL EXISTING VEGETATION, WEEDS, DEBRIS, ETC. NOTED TO BE REMOVED ON THE PLANS AND SPECIFICATIONS SHALL BE REMOVED FROM PROJECT AREA AND DISPOSED OF PROPERLY OFF THE SITE AT THE CONTRACTOR'S EXPENSE (SCARIFY EXISTING SUBGRADE, MINIMUM SIX (6) INCHES DEPTH).
6. DAMAGE TO TURF SHALL BE REPAIRED BY CONTRACTOR, I.E., RUTS FILLED WITH CLEAN SOIL, COMPACTED TO MATCH SURROUNDING GRADES, EXCESS SOIL, ROCK, ETC. SHALL BE REMOVED TO LEAVE THE SITE CLEAN.
7. ALL PLANT MATERIAL, OTHER THAN TREES, SHALL CONFORM TO GRADING, TYPE, ETC. AS SET FORTH IN THE AMERICAN STANDARD FOR NURSERY STOCK BY THE AMERICAN ASSOCIATION OF NURSERYMEN. ALL TREES SHALL CONFORM TO THE CURRENT ARIZONA NURSERY ASSOCIATION TREE SPECIFICATIONS AND MAG SPEC 795.7. SHOULD ANY CONFLICTS IN THE SPECIFICATIONS OCCUR, THE ARIZONA NURSERY ASSOCIATION'S SPECIFICATIONS SHALL PREVAIL.
8. CITY RESERVES THE RIGHT TO INSPECT SHRUBS AND CONTAINERED TREES FOR CONDITION OF ROOT BALLS. FOR ANY SUCH INSPECTIONS WHICH MAY DESTROY ROOTBALL, CONTRACTOR SHALL SUPPLY ADDITIONAL PLANT AT NO COST TO CITY.
9. PLANT PITS SHALL BE INSPECTED BY CITY PRIOR TO PLANTING BY THE CONTRACTOR BY REQUESTING AN INSPECTION 48 HOURS IN ADVANCE.
10. ROUGH AND FINE GRADING TO ESTABLISH UNIFORM SMOOTH GRADE IS INCLUDED IN THIS PROJECT.
11. SOIL TEST FOR FERTILITY AND ADDITIVE RECOMMENDATIONS (FOR TURF AND ORNAMENTALS) SHALL BE COMPLETED BY CONTRACTOR TO DETERMINE IF ADDITIVES ARE REQUIRED. CONTRACTOR SHALL PROVIDE COPY OF SOIL TEST RESULTS FOR REVIEW AND APPROVAL TO ENGINEERING INSPECTOR AT LEAST SEVEN (7) DAYS PRIOR TO ANTICIPATED PLANTING. AFTER APPROVAL BY THE CITY, THE CONTRACTOR SHALL PROVIDE AND INCORPORATE ANY ADDITIVES REQUIRED PRIOR TO OR AT TIME OF PLANTING.
12. PLANT PIT SOIL MIXTURE SHALL CONSIST OF FOUR AND ONE-HALF PARTS NATURAL FERTILE, FRIABLE SOIL AND ONE PART HUMUS BY VOLUME, THOROUGHLY MIXED PRIOR TO BACKFILLING IN PITS. BACKFILLING SHALL BE IN 6" LIFTS WITH EACH LIFT WATER SETTLED WITHOUT PUDDLING.
13. CONTRACTOR SHALL STAKE TREE AND SHRUB LOCATIONS FOR 5-GALLON PLANTS AND LARGER. STAKES SHALL BE MARKED WITH PLANT NAME OR PLANT LEGEND ITEM NUMBER FROM PLANS.
14. ALL EXISTING (GAS, ELECTRIC, WATER, ETC.) COVERS AND BOXES SHALL REMAIN UNCOVERED. CONTRACTOR TO ADJUST TO FINAL GRADE AS NECESSARY. NON-PAY ITEM (NPI) UNLESS OTHERWISE NOTED.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING THE UNDERGROUND SPRINKLER SYSTEMS IN ADVANCE OF CONSTRUCTION. THE SPRINKLER SYSTEM LOCATIONS NOTED ON PLANS ARE FOR REFERENCE ONLY.
16. CONTRACTOR TO VERIFY DEPTH OF ALL INLET STRUCTURES AND SPRINKLER SYSTEMS PRIOR TO TRENCHING FOR LOW-FLOW CHANNEL.
17. CONTRACTOR TO PROVIDE PUMPING WITHIN FIVE (5) DAYS AFTER THE NOTICE TO PROCEED IS GIVEN AS REQUIRED TO DRY THE AREA SUFFICIENTLY TO BEGIN CONSTRUCTION.
18. CONTRACTOR SHALL ARRANGE FOR SPRINKLER SYSTEM SHUTDOWN DURING CONSTRUCTION BY CONTACTING THE ENGINEERING INSPECTOR.
19. NO ROCKS LARGER THAN 1" IN DIAMETER SHALL BE ALLOWED IN THE TOP SIX (6) INCHES OF TOPSOIL WHERE TURF ESTABLISHMENT IS SPECIFIED. ROCK REMOVAL AS NECESSARY IS A NON-PAY (NPI) ITEM UNLESS OTHERWISE NOTED.
20. WHERE CALICHE IS ENCOUNTERED IN PLANT PITS, DEPTH AND WIDTH OF PIT SHALL BE INCREASED BY ONE-THIRD (1/3) OVER SPECIFICATION, AND A LIQUID PENETRATOR, "AL-KALICHE" OR EQUAL, SHALL BE INCORPORATED FOR EACH PIT PER MANUFACTURER'S RECOMMENDATIONS.
21. CONTRACTOR SHALL INSTALL DECOMPOSED GRANITE TO A ROLLED DEPTH PER THE APPROVED PLANS AND SPECIFICATIONS. DECOMPOSED GRANITE SHALL BE PER THE APPROVED PLANS AND SPECIFICATIONS WITH THE COLOR AS SPECIFIED ON THE PLANS. PRE-EMERGENT HERBICIDE SHALL BE APPLIED BEFORE AND AFTER PLACEMENT OF DECOMPOSED GRANITE PER THE MANUFACTURER'S RECOMMENDATIONS. PRE-EMERGENT HERBICIDE SHALL BE SURFLAN, DACTHAL, OR APPROVED EQUAL. SAMPLE TO BE PROVIDED FOR CITY REVIEW AND APPROVAL. CONTRACTOR SHALL WASH OFF ROCK MULCH ONCE FINAL PLACEMENT HAS OCCURRED.
22. RESTORE ALL EXISTING LANDSCAPE IRRIGATION SYSTEMS, COMPONENTS AND LANDSCAPE AREAS IMPACTED BY ANY WORK UNDER THIS CONTRACT. RESTORE ALL EXISTING IRRIGATION AND LANDSCAPE IN ACCORDANCE WITH THE LANDSCAPE RESTORATION NOTES INDICATED WITHIN THESE DOCUMENTS. AT A MINIMUM, ALL RESTORATION SHALL BE IN ACCORDANCE WITH M.A.G. SPECIFICATION 107.9 - PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE. ALL RESTORATION WORK SHALL BE COMPLETED TO THE SATISFACTION OF THE CITY OF MESA ENGINEER.
23. ALL RESTORATION WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE REFERENCED DETAILS AND ANY ADDITIONAL DETAILS PROVIDED.
24. REFER TO LANDSCAPE PLANTING SHEETS AND ENGINEERING DRAWINGS FOR ADDITIONAL RESTORATION NOTES AND REQUIRED COORDINATION.

PROJECT INFORMATION

PROPERTY ADDRESS:	3626 E. THOMAS RD. MESA, AZ 85213
APN:	141-22-066
TOTAL GROSS ACREAGE:	0.753 ACRES 32,823 SF
TOTAL OPEN SPACE	4,753 SF
LANDSCAPE AREA (SEE LANDSCAPE PLAN)	6,365 SF
BUILDING AREA	1,075 SF
MAX HEIGHT: PROPOSED STL TANK)	25 FT
ZONING: (PUBLIC AND SEMI-PUBLIC)	PS-BIZ-CUP
PROPOSED LAND USE:	PUMP STATION
LOT DEVELOPMENT	
SRP EASEMENT	10 FT
INTERIOR / REAR SETBACK	11'-2"
PREVIOUS AREA	12, 532 SF
IMPERVIOUS AREA	16,951 SF
BASIN AREA	3,318 SF
ARTERIAL STREET SETBACK (N. VALVISTA DR.)	52'-3"
COLLECTOR STREET SETBACK (E. THOMAS RD.)	1'-9"
FREEWAY SIDE SETBACK	9'-3"
LOT COVERAGE	52%

PROJECT TEAM

OWNER / DEVELOPER

CITY OF MESA
20 E. MAIN STREET
MESA, AZ 85021
P: (480) 644-2251
WWW.MESAAZ.GOV

LANDSCAPE ARCHITECT

LOGAN SIMPSON
51 W. 3RD STREET, SUITE 450
TEMPE, AZ 85281
WAYNE COLEBANK | 480.967.1343
WCOLEBANK@LOGANSIMPSON.COM

CIVIL ENGINEER

PETER OLSZEWSKI, P.E.
BLACK AND VEATCH
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PHOENIX, AZ 85016
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OLSZEWSKIP@BV.COM

LANDSCAPE SCHEDULE

TREES	QTY	BOTANICAL NAME	COMMON NAME	CONT	CALIPER
	3	VITEX AGNUS-CASTUS	CHASTE TREE	36" BOX	1.75" CALIPER MULTI-TRUNK
	3	CAESALPINIA MEXICANA	MEXICAN BIRD OF PARADISE	36" BOX	1.5" CALIPER MULTI-TRUNK

SHRUBS	QTY	BOTANICAL NAME	COMMON NAME	CONT
	30	AMBROSIA DELTOIDEA	TRIANGLELEAF BURSAGE	5 GAL
	4	CALLIANDRA X `SIERRA STARR` TM	HYBRID FAIRY DUSTER	5 GAL
	16	ENCELIA FARINOSA	BRITTLEBUSH	5 GAL
	21	EREMOPHILA PROSTRATA 'OUTBACK SUNRISE'	EMU BUSH	5 GAL
	5	LANTANA CAMARA 'GOLD MOUND'	GOLD MOUND LANTANA	5 GAL
	9	TECOMA STANS `GOLD STAR`	YELLOW BELLS	15 GAL

ACCENTS	QTY	BOTANICAL NAME	COMMON NAME	CONT
	3	HESPERALOE PARVIFLORA	RED HESPERALOE	5 GAL

INERT MATERIALS	QTY	ITEM	SIZE	COLOR
	6,568 SF	DECOMPOSED GRANITE (DG)	½" SCREENED (2" DEPTH)	PAINTED DESERT

SHEET INDEX

L-00-001 LANDSCAPE LEGEND, NOTES AND TABLES
L-00-002 PLANTING PLAN
L-00-003 PLANTING DETAILS
L-00-004 IRRIGATION PLAN
L-00-005 IRRIGATION DETAILS

PROJECT NARRATIVE

THE CITY OF MESA HAS PROPOSED A REUSE PIPELINE INTERMEDIATE PUMP STATION ON THE NORTHEAST CORNER OF THOMAS AND VAL VISTA DRIVE. THE SITE IS APPROXIMATELY 1 ACRE WITH RETENTION BASIN, RESERVOIR, AND PUMP STATION. VARIOUS CMU VENEER WALLS ENCLOSE THE FACILITY. THE LANDSCAPE CONSISTS OF DROUGHT TOLERANT PLANTS THAT ARE ON THE APPROVED PLANT LIST OF THE ARIZONA DEPARTMENT OF WATER REOURCES AND THE SRP EASEMENT PLANTING REQUIREMENTS. DECOMPOSED GRANITE WILL COMPLEMENT THE WALL'S TAN COLOR AND BLEND INTO THE SONORAN DESERT LANDSCAPE. THE PLANT MATERIALS OFFER SEASONAL COLOR, FOLIAGE AND TEXTURE TO THE SITE.

LANDSCAPE REQUIREMENTS

CITY OF MESA CODE OF ORDINANCES - FIFTY PERCENT (50%) OF ALL REQUIRED OPEN SPACE SHALL CONTAIN LIVE PLANT MATERIAL FOR LOTS OR RIGHT-OF-WAYS

TOTAL SITE AREA: 6365 SF
REQUIRED COVERAGE: 3183 SF (50%)
PROVIDED COVERAGE: 2380 SF (37%) *

PLANT TYPE	MESA CREDIT (SF) PER PLANT	PROVIDED	
SHADE TREES	50	6 TREES	300 SF
LARGE SHRUBS	50	9 SHRUBS	450 SF
SMALL SHRUBS	10	23 SHRUBS	230 SF
EVERGREEN GROUND COVER (EGC)	25	56 (EGC)	1400 SF
TOTAL			2380 SF

CITY OF MESA CODE OF ORDINANCES PER SECTION 11-33-3(A) - ARTERIAL AND COLLECTOR STREETS REQUIRE (1) TREE AND (6) SHRUBS PER 25 LINEAR FEET OF STREET FRONTAGE.

STREET RIGHT-OF-WAY	PLANT TYPE	REQUIRED	PROVIDED
ARTERIAL - N. VAL VISTA DR.	1 TREE PER 25 LINEAR FEET	5	6
TOTAL LINEAR FEET = 118	6 SHRUBS PER 25 LINEAR FEET	24	28
COLLECTOR - E. THOMAS RD.	1 TREE PER 25 LINEAR FEET	18	0
TOTAL LINEAR FEET = 448	6 SHRUBS PER 25 LINEAR FEET	107	59

CITY OF MESA CODE OF ORDINANCES PER SECTION 11-33-3(A) - ARTERIAL AND COLLECTOR MINIMUM SIZE OF PLANT MATERIALS AS FOLLOWS:

STREET RIGHT-OF-WAY	PLANT SIZE	REQUIRED %	PROVIDED %
ARTERIAL - N. VAL VISTA DR. COLLECTOR - E. THOMAS RD.	36" BOX TREE	25	100
	24" BOX TREE	50	0
	5 GALLON OR LARGER SHRUB	50	100

* DEVIATION IS BEING ADDRESSED BY THE ALTERNATIVE LANDSCAPE PLAN (ALP), PLEASE SEE NARRATIVE.

CITY OF MESA CODE OF ORDINANCES PER SECTION 11-33-3(B)(2) - LANDSCAPING FOR NON-SINGLE RESIDENCE USES ADJACENT TO OTHER NON-SINGLE RESIDENCE.

	REQUIRED	PROVIDED
LANDSCAPE YARD	15' WIDE	0'
VEGETATIVE GROUND COVERAGE	50%	0%
TREE / SHRUB QUANTITY (EAST SIDE ; NORTH SIDE)	2 / 8 ; 11 / 70	0 / 0 ; 0 / 0
24" BOX OR LARGER TREES	50%	0%

TREES

VITEX AGNUS-CASTUS
CHASTE TREE

CAESALPINIA MEXICANA
MEXICAN BIRD OF PARADISE

SHRUBS & GROUNDCOVER

AMBROSIA DELTOIDEA
TRIANGLELEAF BURSAGE

CALLIANDRA X 'SIERRA STARR'
HYBRID FAIRY DUSTER

ENCELIA FARINOSA
BRITTLEBUSH

EREMOPHILA 'OUTBACK SUNRISE'
EMU BUSH

LANTANA CAMARA 'GOLD MOUND'
GOLD MOUND LANTANA

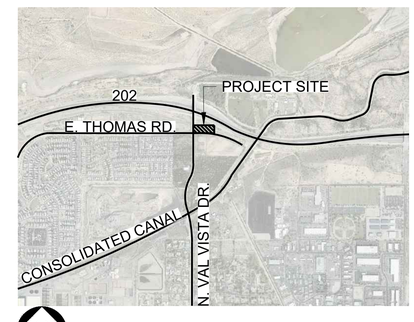
TECOMA STANS 'GOLD STAR'
YELLOW BELLS

ACCENTS

HESPERALOE PARVIFLORA
RED HESPERALOE

VICINITY MAP

NTS



NORTH

CITY OF MESA BENCHMARK
BRASS TAG, HANDHOLE MCHD,
INTERSECTION BASELINE ROAD AND
RECKER ROAD ELEVATION = 1322.726

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

LANDSCAPE
LEGEND, NOTES AND TABLES

L-00-001

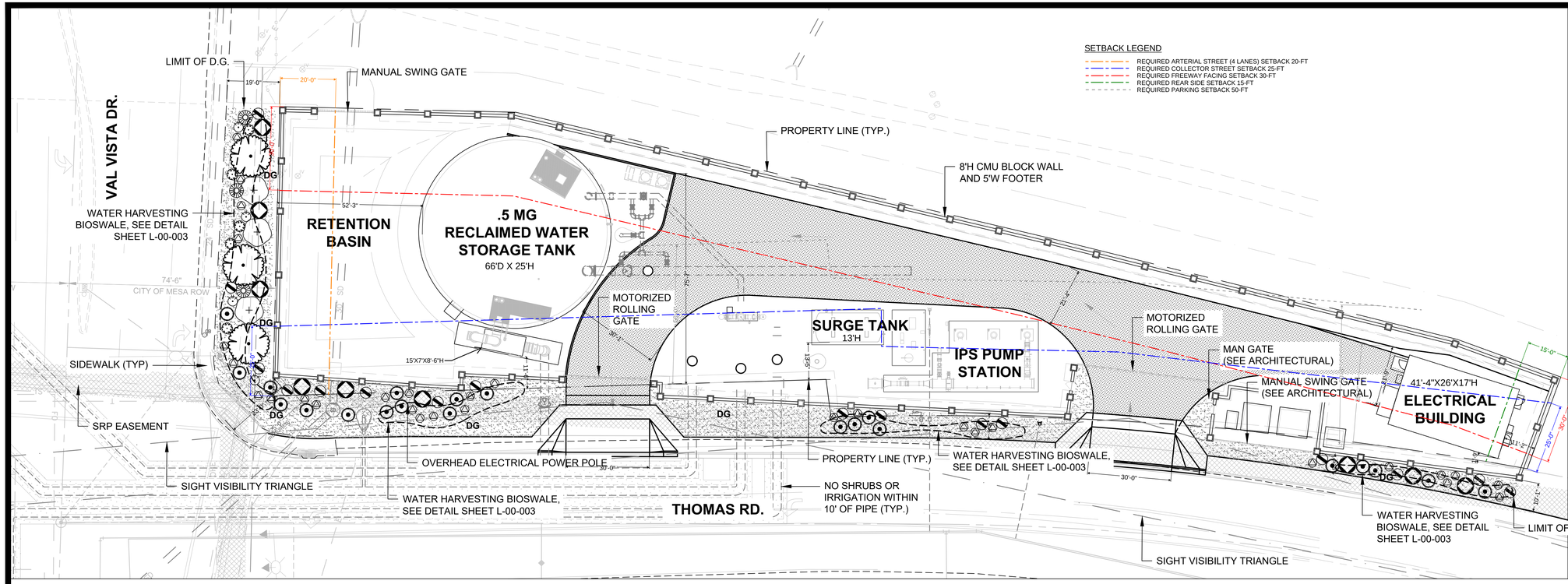
DRAWN BY: TR
ENGINEER: N/A
APPROVED BY: JM

ACTIVITY:
PROJ. NO.: CP0896

SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/9/24 N:\PROJECTS\2022\225302 CENTRAL MESA REUSE PIPELINE (1.DES)\40-CAD\1-SHEET FILES\225302 C-00.DWG



SETBACK LEGEND

- REQUIRED ARTERIAL STREET (4 LANES) SETBACK 20-FT
- REQUIRED COLLECTOR STREET SETBACK 25-FT
- REQUIRED FREEWAY FACING SETBACK 30-FT
- REQUIRED REAR SIDE SETBACK 15-FT
- REQUIRED PARKING SETBACK 50-FT

SCALE: 1" = 10' (H)
1" = 2' (V)
0 10 20 30 40

CITY OF MESA BENCHMARK BRASS TAG, HANDHOLE MCHD, INTERSECTION BASELINE ROAD AND RECKER ROAD ELEVATION = 1322.726

SIGHT VISIBILITY TRIANGLE

SIGHT VISIBILITY TRIANGLES AT EACH SITE DRIVEWAY ARE BASED ON THE FOLLOWING CRITERIA:

1. DESIGN SPEED IS 40 MPH WHICH IS BASED ON THE SPEED LIMIT OF THOMAS RD. BEING 35 MPH + 5 MPH.
2. APEX OF TRAINGLE IS MEASURED FROM THE CENTER OF THE DRIVEWAY, 15 FT FROM THE FACE OF CURB.
3. MAXIMUM THROUGH ROAD WIDTH OF THOMAS RD IS 55 FT ON WEST SIDE. DESIGN USED 4LD / 5LU ROAD WIDTH TO BE CONSERVATIVE.
4. REQUIRED SITE DISTANCE IS 500 FT AND IS MEASURED TO THE CENTER OF TRAVEL LANE ON EITHER SIDE.
5. SITE DISTANCES ON SECTIONS OF ROAD THAT CURVE ARE MEASURED AS A CHORD LENGTH ON THE CURVE.

GENERAL LANDSCAPE NOTES - NOT APPROVED AS PART OF THIS PLAN

GENERAL INFORMATION:

1. ALL PLANT MATERIAL SHALL HAVE A ONE YEAR WARRANTY FROM OWNER'S ACCEPTANCE DATE OF SUBSTANTIAL COMPLETION.
2. PLANT ESTABLISHMENT BY THE CONTRACTOR SHALL BE FOR 90 DAYS, BEGINNING DATE OF SUBSTANTIAL COMPLETION OF LANDSCAPING. MAINTENANCE SHALL CONSIST OF MAINTAINING ALL WORK INSTALLED UNDER CONTRACT AND MONITORING THE WATERING SYSTEM (INCLUDING IF INSTALLED BY OTHERS). AFTER 90 DAYS THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE FOR A SITE INSPECTION. UPON ACCEPTANCE OF PLANTS AND MAINTENANCE, THE OWNER ASSUMES MAINTENANCE RESPONSIBILITIES. PROJECT WARRANTY REMAINS IN EFFECT FOR 1 YEAR FROM DATE OF SUBSTANTIAL COMPLETION ACCEPTANCE.
3. PRIOR TO COMMENCEMENT OF ANY WORK, DETERMINE LOCATION OF ALL UNDERGROUND UTILITIES THROUGH 'BLUE STAKE' OR OTHER METHOD AND PERFORM WORK IN A MANNER WHICH WILL AVOID POSSIBLE DAMAGE. HAND EXCAVATE, AS REQUIRED. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGES CAUSED AS A RESULT OF HIS WORK.
4. ALL AREAS DISTURBED DURING CONSTRUCTION SHALL BE REPAIRED TO THEIR ORIGINAL CONDITION WHEN NO LANDSCAPE IMPROVEMENTS ARE SHOWN ON THE PLANS. VERIFY TREATMENT WITH THE OWNER'S REPRESENTATIVE PRIOR TO IMPLEMENTATION.

FINISH GRADE / LANDSCAPE PREPARATION

5. SITE GRADING NECESSITATED BY THE WORK AS IT PROGRESSES AND NOT SPECIFICALLY CALLED OUT ON THE PLANS WILL BE CONSIDERED INCIDENTAL WORK.
6. CONTRACTOR SHALL INSPECT SUBGRADES PREPARED BY OTHERS PRIOR TO COMMENCING WITH CONTRACTED LANDSCAPING OR IRRIGATION ACTIVITIES. ADVISE OWNER'S REPRESENTATIVE OF DISCREPANCIES WITH DRAWINGS OR TECHNICAL SPECIFICATIONS. ALL PLANTING AREAS SHALL BE LEFT FREE OF CONSTRUCTION DEBRIS AND/OR TOXIC MATERIAL AND SUBGRADED TO A LEVEL TO PERMIT LANDSCAPE CONSTRUCTION. TRENCHES OR OTHER FILLED EXCAVATIONS SHALL BE COMPACTED PRIOR TO LANDSCAPE INSTALLATION.
7. ALL TEMPORARY CONSTRUCTION ROADS AND COMPACTED AREAS DEVELOPED THAT ARE WITHIN THE LANDSCAPE AREAS SHALL BE SCARIFIED AND LOOSENED THEN WATER-SETTLED TO A DEPTH OF 12" PRIOR TO BEGINNING LANDSCAPE AND IRRIGATION WORK.
8. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FINISH GRADE AND SHALL BEAR FINAL RESPONSIBILITY FOR PROPER SURFACE DRAINAGE OF PLANTED AREAS. FINISH GRADES SHALL MATCH ENGINEERS PLANS AND SPECIFICATIONS.
9. FINISH GRADE FOR PLANTED AREAS SHALL BE PER THE DETAILS WITH SMOOTH EVEN LINES AT EDGES OF STRUCTURES.
10. FINISH GRADE IF NOT SPECIFIED ON THE PROJECTS'S GRADING PLANS SHALL SLOPE AT A 2% GRADE AWAY FROM CURBS, WALKS, AND WALLS FOR MINIMUM OF 10 FEET.

PLANTING

11. ALL PLANT MATERIAL AND SPECIFICATIONS TO CONFORM TO THE ARIZONA NURSERY ASSOCIATION STANDARDS UNLESS OTHERWISE NOTED. THE OWNER'S REPRESENTATIVE RESERVES THE RIGHT TO REFUSE PLANT MATERIAL NOT MATCHING THE STANDARD FOR SIZE, HEALTH, AND FORM.
12. DO NOT MAKE SUBSTITUTIONS; IF SPECIFIED LANDSCAPE MATERIAL IS NON-OBTAINABLE, SUBMIT PROOF OF NON-AVAILABILITY FROM AT LEAST FIVE SUPPLIERS TO OWNER'S REPRESENTATIVE, TOGETHER WITH A PROPOSAL FOR SUBSTITUTION OF EQUIVALENT MATERIAL FOR ACCEPTANCE.
13. LAYOUT INDIVIDUAL TREE AND PLANT LOCATIONS AND AREAS FOR MULTIPLE PLANTINGS, STAKE LOCATIONS AND OUTLINE AREAS AND SECURE OWNER'S REPRESENTATIVE ACCEPTANCE BEFORE START OF PLANTING WORK. MAKE MINOR ADJUSTMENTS AS MAY BE DIRECTED.
14. PLANT QUANTITIES LISTED IN THE LANDSCAPE SCHEDULE ARE FOR THE CONVENIENCE OF THE CONTRACTOR. IN THE CASE OF ANY DISCREPANCIES, PLANS SHALL OVERRIDE THE LANDSCAPE AND BID SCHEDULE QUANTITIES. CONTRACTOR SHALL VERIFY QUANTITIES SHOWN ON THE PLANS AND BASE THEIR BID ACCORDINGLY.
15. ALL PLANT MATERIALS SHALL HAVE A MINIMUM SETBACK FROM EDGE OF CURBS, WALKS, WALLS, PADS, ETC. AS FOLLOWS UNLESS OTHERWISE DIRECTED BY THE OWNER'S REPRESENTATIVE AS FOLLOWS:
    - TREES 5 FOOT MINIMUM SETBACK
    - SHRUBS 3 FOOT MINIMUM SETBACK
    - GROUNDCOVER AN 18 INCH MINIMUM SETBACK
16. EXCAVATE PLANTING PITS, AS SHOWN ON THE DRAWINGS AND SCHEDULES. LOOSEN HARD SUBSOIL IN BOTTOM OF EXCAVATION. TEST DRAINAGE OF TREE, SHRUB AND PLANT PITS BY FILLING WITH WATER TWICE IN SUCCESSION. CONDITIONS PERMITTING THE RETENTION OF WATER IN PLANTING PITS FOR MORE THAN TWENTY-FOUR (24) HOURS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE. IF PLANT PIT DOES NOT DRAIN WITHIN 24 HOURS, THEN DRILL ONE (1) 6" DIAMETER X 24" DEEP HOLE. AT EDGE OF EXCAVATED PIT, RE-TEST PERCOLATION PER SPECIFICATIONS, CERTIFY PERCOLATION AND FILL HOLE WITH PEA GRAVEL. COORDINATE LOCATION WITH TREE STAKES.
17. IF ROCK, UNDERGROUND CONSTRUCTION, ADVERSE DRAINAGE CONDITIONS, OR OTHER OBSTRUCTIONS ARE ENCOUNTERED IN EXCAVATION FOR PLANTING OF TREES, SHRUBS, OR PLANTS NOTIFY OWNER'S REPRESENTATIVE. NEW LOCATIONS MAY BE DETERMINED, OR INSTRUCTIONS MAY BE ISSUED TO DIRECT REMOVAL OF OBSTRUCTION. PROCEED WITH WORK ONLY AFTER APPROVAL OF OWNER'S REPRESENTATIVE.
18. ALL PLANT BACKFILL MIXES SHALL BE AMENDED AS DESCRIBED ON THE LANDSCAPE DRAWING DETAILS, UNLESS SUPERCEDED BY SPECIFIC SOIL TESTING AND OR LANDSCAPE SPECIFICATIONS. BACKFILL MIX SHALL BE PLACED IN 6" LIFTS AND TAMPED INTO PLACE TO OBTAIN COMPACTION. NO TRANSPLANTING SHALL BE DONE WHEN SOIL IS EXCESSIVELY WET. DO NOT COUNTERSINK AROUND CACTI OR SUCCULENTS. PROVIDE POSITIVE DRAINAGE AWAY FROM PLANT.
19. ALL SHRUBS SHALL HAVE A FULL HEAD THAT COVERS THE CAN DIAMETER (CAN FULL) AND A MINIMUM OF THREE STEMS/BRANCHES.
20. PLANT BACKFILL MIX SHALL CONFORM TO LANDSCAPE DETAIL NOTES, UNLESS OTHERWISE SPECIFIED.
21. FERTILIZER TABLETS SHALL BE AGRIFORM (21 GRAM 20-10-5) OR EQUAL. QUANTITY OF TABLETS SHALL BE PLACED ½ THE DEPTH OF THE ROOTBALL AT THE FOLLOWING RATE:
    - 1 TABLET PER 1 GALLON CONTAINER
    - 2 TABLETS PER 5 GALLON CONTAINER
    - 3 TABLETS PER 15 GALLON CONTAINER
    - 4 TABLETS PER 24" BOX
    - 6 TABLETS PER 36" BOX
    - 8 TABLETS PER 48" BOX
    - AT A RATE OF 1 TABLET PER EACH ADDITIONAL 6" BOX SIZE.

    WHEN MULTIPLE QUANTITIES OF TABLETS ARE REQUIRED THEY SHALL BE EQUALLY SPACED AT THE SPECIFIED DEPTH.

LANDSCAPE SCHEDULE NOTES

1. THE INERT MATERIALS DO NOT INCLUDE ANY RIP-RAP QUANTITIES SHOWN ON THE CIVIL SHEETS
2. THE CONTRACTOR IS RESPONSIBLE FOR APPLYING 2" D.G. TO ALL AREAS DISTURBED BY CONSTRUCTION OUTSIDE THE LIMIT OF WORK OR THE LIMIT OF D.G. SHOWN ON THE PLANS. IF THERE ARE SIGNIFICANT AREAS, THE REVISION TO THE D.G. LIMITS SHALL BE BROUGHT TO THE OWNER'S ATTENTION.
3. THE QUANTITIES OF MATERIAL ARE SHOWN FOR REFERENCE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR THEIR OWN TAKE-OFFS FOR BID AND PURCHASING.

NOTE: A PRE-EMERGENT HERBICIDE SHALL BE APPLIED TO THE GROUND AFTER THE PLACEMENT OF NON-VEGETATIVE MULCH MATERIALS TO PREVENT WEEDS

INERT MATERIALS	ITEM	SIZE	COLOR
	DECOMPOSED GRANITE (DG)	½" SCREENED (2" DEPTH)	PAINTED DESERT

PLANTING SCHEDULE

TREES	COMMON NAME
	CHASTE TREE
	MEXICAN BIRD OF PARADISE
SHRUBS	**COMMON NAME**
	TRIANGLELEAF BURSAGE
	HYBRID FAIRY DUSTER
	BRITTLEBUSH
	EMU BUSH
	GOLD MOUND LANTANA
	YELLOW BELLS
ACCENTS	**COMMON NAME**
	RED HESPERALOE

NORTH

SCALE: 1" = 20'
0' 10' 20' 40' 80'

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

LANDSCAPE
PLANTING PLAN

L-00-002

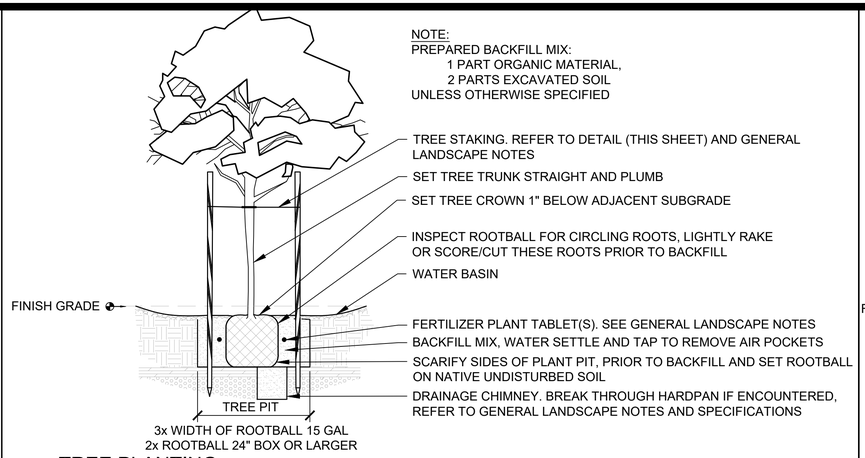
DRAWN BY: TR
ENGINEER: N/A
APPROVED BY: JM

ACTIVITY: _____
PROJ. NO.: CP0896

SHEET
OF

CATALOG NUMBER:

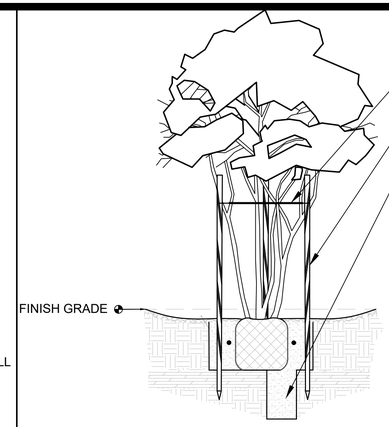
DATE SAVED: 2/12/24 N:\PROJECTS\2022\225302 CENTRAL MESA REUSE PIPELINE (1.DES)\40-CAD\1-SHEET FILES\225302 LL-01.DWG



NOTE:
PREPARED BACKFILL MIX:
1 PART ORGANIC MATERIAL,
2 PARTS EXCAVATED SOIL
UNLESS OTHERWISE SPECIFIED

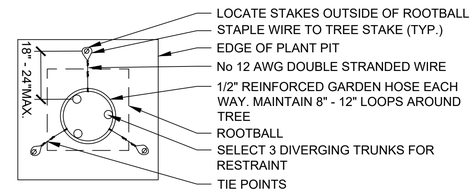
- TREE STAKING. REFER TO DETAIL (THIS SHEET) AND GENERAL LANDSCAPE NOTES
- SET TREE TRUNK STRAIGHT AND PLUMB
- SET TREE CROWN 1" BELOW ADJACENT SUBGRADE
- INSPECT ROOTBALL FOR CIRCLING ROOTS, LIGHTLY RAKE OR SCORE/CUT THESE ROOTS PRIOR TO BACKFILL
- WATER BASIN
- FERTILIZER PLANT TABLET(S). SEE GENERAL LANDSCAPE NOTES
- BACKFILL MIX, WATER SETTLE AND TAP TO REMOVE AIR POCKETS
- SCARIFY SIDES OF PLANT PIT, PRIOR TO BACKFILL AND SET ROOTBALL ON NATIVE UNDISTURBED SOIL
- DRAINAGE CHIMNEY. BREAK THROUGH HARDPAN IF ENCOUNTERED, REFER TO GENERAL LANDSCAPE NOTES AND SPECIFICATIONS

1 TREE PLANTING
SCALE: N.T.S.



NOTE:
REMOVE ALL NURSERY SUPPORT/STAKES, AND FILL AND TAMP HOLES PRIOR TO STAKING.

- 1/2" I.D. REINFORCED RUBBER HOSE. MAXIMIZE SUPPORT WHILE ALLOWING SOME MOVEMENT, USE AN 8" TO 12" LOOP AT TREE. TIE WIRE TO BE No. 12 AWG DOUBLE STRANDED WIRE AND STAPLED TO TREE STAKE. LOCATE TIE ABOVE FIRST BRANCH
- (3) 2" DIA. X 8' LONG TREE STAKES. LOCATE STAKES 12" OUTSIDE ROOTBALL. PLACE STAKES FOR MAXIMUM SUPPORT. AVOID PENETRATING ROOTBALL. DRIVE STAKES 3' INTO GROUND TO FIRM BEARING
- DRAINAGE CHIMNEY. BREAK THROUGH HARDPAN IF ENCOUNTERED, REFER TO GENERAL LANDSCAPE NOTES AND SPECIFICATIONS.



MULTI-TRUNK STAKING PLAN VIEW

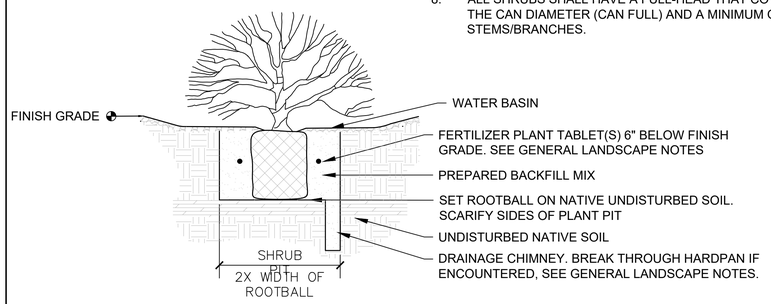
2 TREE STAKING (MULTI-TRUNK)
SCALE: N.T.S.

SCALE: 1" = 10' (H)
1" = 2' (V)
0 10 20 30 40

CITY OF MESA BENCHMARK
BRASS TAG, HANDHOLE MCHD,
INTERSECTION BASELINE ROAD AND
RECKER ROAD ELEVATION = 1322.726

NOTES:
1. PREPARED BACKFILL MIX:
   - 1 PART ORGANIC MATERIAL,
   - 2 PARTS EXCAVATED SOIL

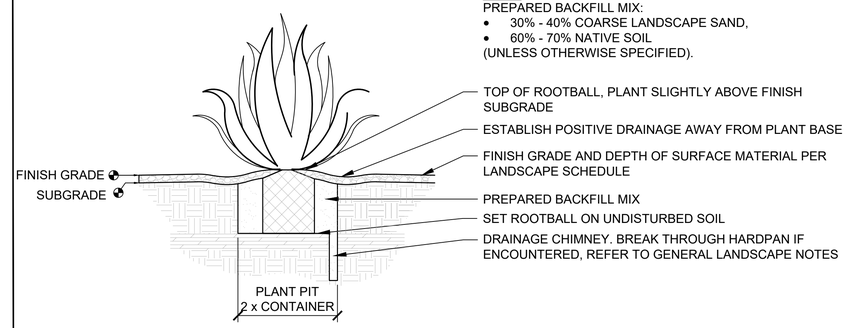
   UNLESS OTHERWISE SPECIFIED
2. PRE-WET PITS WHEN TEMPERATURE IS ABOVE 100°.
3. SCARIFY SIDES OF PLANT PIT WHEN GLAZED SMOOTH OR OVERLY COMPACTED.
4. PLACE PLANT ACCORDING TO BEST ORIENTATION.
5. SCORE ROOTBALL WITH VERTICAL CUTS (1/2" DEEP). A MINIMUM OF 6 LOCATIONS AROUND ROOTBALL.
6. SET TOP OF ROOTBALL FLUSH OR 1" ABOVE ESTABLISHED SOIL GRADE.
7. WATER SETTLE AND TAMP BACKFILL MATERIAL TO REMOVE AIR POCKETS.
8. ALL SHRUBS SHALL HAVE A FULL-HEAD THAT COVERS THE CAN DIAMETER (CAN FULL) AND A MINIMUM OF THREE STEMS/BRANCHES.



3 SHRUB / GRASS PLANTING
SCALE: N.T.S.

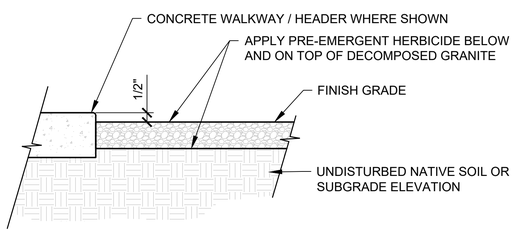
NOTE:
PREPARED BACKFILL MIX:
- 30% - 40% COARSE LANDSCAPE SAND,
- 60% - 70% NATIVE SOIL

(UNLESS OTHERWISE SPECIFIED).



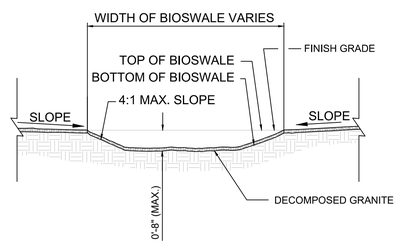
4 CACTUS / SUCCULENT PLANTING (CONTAINER STOCK)
SCALE: N.T.S.

NOTES:
1. FINISH GRADE SHALL BE RAKED SMOOTH WITH NO CONTAMINANTS OF CONSTRUCTION AND/OR UNDULATION CREATED BY CONSTRUCTION.
2. APPLY PRE-EMERGENT HERBICIDE PRIOR TO INSTALLATION AND ONE WEEK AFTER INSTALLATION OF DECOMPOSED GRANITE. EACH APPLICATION OF PRE-EMERGENT HERBICIDE SHALL BE WATERED PER MANUFACTURER'S RECOMMENDATIONS.
3. FINE GRADE SUBGRADE PRIOR TO PLACEMENT OF DECOMPOSED GRANITE. REMOVE ROCK LARGER THAN 1/2" FROM SURFACE OF SUBGRADE.
4. WATER AND SETTLE DECOMPOSED GRANITE POST INSTALLATION AND LEVELING.
5. ENSURE DECOMPOSED GRANITE CREATES LEVEL AND SMOOTH CONNECTIONS AT STRUCTURES, WALLS, BUILDINGS AND OTHER SITE FEATURES.



5 DECOMPOSED GRANITE
SCALE: N.T.S.

NOTES:
1. CONTRACTOR SHALL LAYOUT LIMITS OF BIOSWALE FOR ENGINEER'S APPROVAL.
2. BIOSWALE SHALL BE EXCAVATED TO A DEPTH OF 8 INCHES, FOR A FINISH DEPTH OF 6 INCHES AFTER THE PLACEMENT OF 2 INCHES OF DECOMPOSED GRANITE.



6 WATER HARVESTING BIOSWALE
NTS

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

LANDSCAPE
PLANTING DETAILS

L-00-003

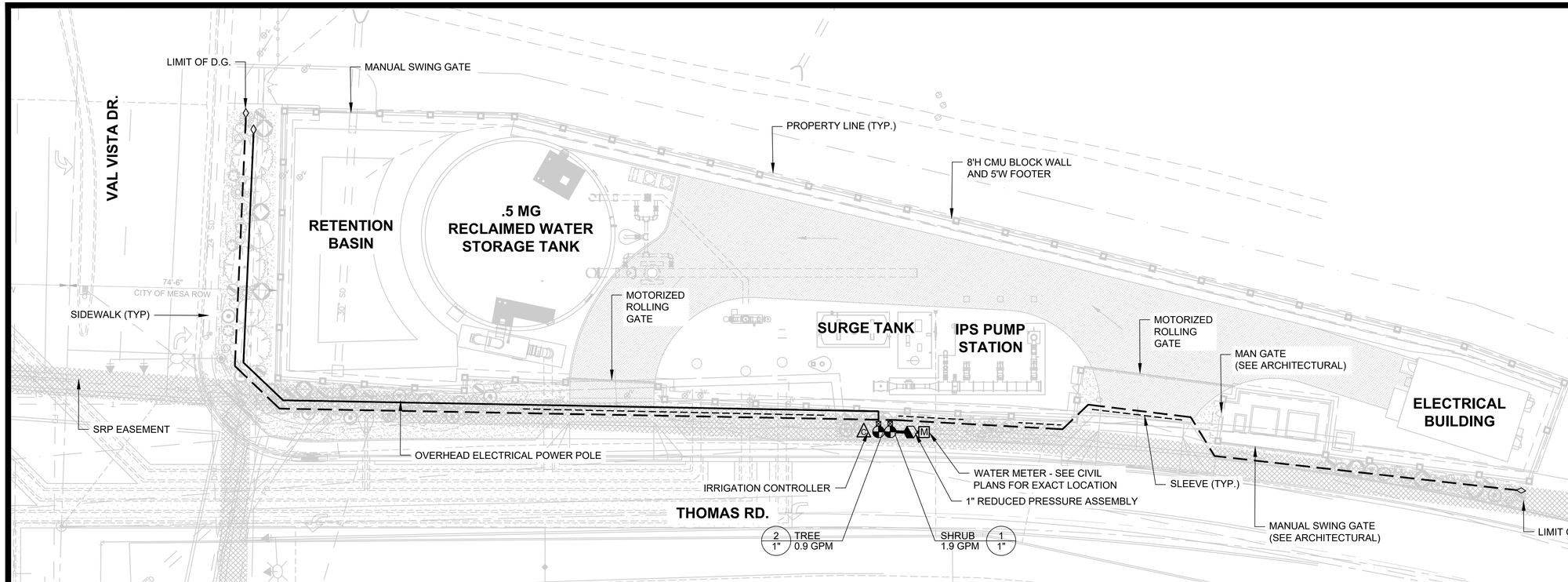
DRAWN BY: TR
ENGINEER: N/A
APPROVED BY: JM

ACTIVITY: ____
PROJ. NO.: CP0896

SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/12/24 N:\PROJECTS\2022\225302 CENTRAL MESA REUSE PIPELINE (1.DES)\40-CAD\1-SHEET FILES\225302 LL-01.DWG



SCALE: 1" = 10' (H)
1" = 2' (V)
0 10 20 30 40

CITY OF MESA BENCHMARK
BRASS TAG, HANDHOLE MCHD,
INTERSECTION BASELINE ROAD AND
RECKER ROAD ELEVATION = 1322.726

IRRIGATION LEGEND

SYMBOL	BRAND	MODEL	DESCRIPTION
M	EXISTING		WATER METER
	FEBCO	825	REDUCED PRESSURE ASSEMBLY
C	DIG	LEIT-4000	SOLAR IRRIGATION CONTROLLER
	RAIN BIRD	PEB	REMOTE CONTROL VALVE
	WILKENS	500XLYSBR-G	PRESSURE REDUCING VALVE WITH GAUGE
N/S	BOWSMITH	ML206	MULTI OUTLET EMITTER (0.6 GPH)
N/S	BOWSMITH	ML210/220	MULTI OUTLET EMITTER (1.0/2.0 GPH)
	SPEARS	AP-100	END CAP

- ¾" SCHEDULE 40 PVC PIPE LATERAL (TREE)
- ¾" SCHEDULE 40 PVC PIPE LATERAL (SHRUB)
- SCHEDULE 40 PVC PIPE MAINLILNE
- SCHEDULE 40 PVC SLEEVE

IRRIGATION SLEEVES

1. USE SCHEDULE 40 PIPE, 2 TIMES THE DIAMETER OF THE PIPE(S) BEING SLEEVED, MINIMUM 2".
2. CONTROL WIRES INSTALLED THROUGH IRRIGATION SLEEVES SHALL BE ENCASED IN A PVC ELECTRICAL CONDUIT SIZED TO CONTAIN THE REQUIRED NUMBER OF CONDUCTORS. WIRE SLEEVES CROSSING STREET PAVING SHALL HAVE A 10" PULL BOX AT EACH END.
3. FURNISH AND INSTALL DC LATCHING SOLENOID FOR THE SPECIFIED REMOTE CONTROL VALVE

VALVE CALLOUT

VALVE # — VALVE TYPE
TREE
1" 0.0 GPM
VALVE SIZE — TOTAL GPM

EMITTER SCHEDULE

1251
749439.24
902689.37
1326.06

COMMON NAME	FLOW PER OUTLET	MANIFOLD OUTET	OPEN OUTLETS	GPH PER PLANT
TREES				
CHASTE TREE	2.0 GPH	MULTI-OUTLET	6	12.0 GPH
MEXICAN BIRD OF PARADISE	1.0 GPH	MULTI-OUTLET	6	6.0 GPH
SHRUBS\ACCENTS				
BURSAGE	0.6 GPH	MULTI-OUTLET	1	0.6 GPH
FAIRY DUSTER	0.6 GPH	MULTI-OUTLET	1	0.6 GPH
BRITTLEBUSH	0.6 GPH	MULTI-OUTLET	1	0.6 GPH
EMU BUSH	0.6 GPH	MULTI-OUTLET	2	1.2 GPH
LANTANA	0.6 GPH	MULTI-OUTLET	2	1.2 GPH
YELLOW BELLS	0.6 GPH	MULTI-OUTLET	3	3.6 GPH
RED HESPERALOE	0.6 GPH	MULTI-OUTLET	1	0.6 GPH

EMITTER NOTES
1. REFER TO EMITTER DETAILS FOR EMITTER SPECIFICATIONS AND LAYOUT
2. ADJUST IRRIGATION OPERATING TIMES TO ACCOMMODATE PLANT MATURITY, SOIL TYPE, PLANT EXPOSURE AND SEASONAL REQUIREMENTS.

IRRIGATION NOTES:

1. PRIOR TO COMMENCEMENT OF ANY WORK, THE CONTRACTOR SHALL CONTACT BLUE STAKE TO VERIFY LOCATIONS AND DEPTHS OF ANY UTILITIES THAT MAY BE AFFECTED BY HIS/HER WORK, AND SHALL BE RESPONSIBLE FOR DAMAGES TO SUCH UTILITIES CAUSED AS A RESULT OF THIS WORK.
2. THE CONTRACTOR WILL BE RESPONSIBLE FOR FAULTY MATERIAL OR FAULTY WORKMANSHIP FOR THE PERIOD OF 1-YEAR FROM SUBSTANTIAL COMPLETION OF LANDSCAPE WORK.
3. THE IRRIGATION SYSTEM IS DESIGNED FOR A MINIMUM OF 60 PSI. CONTRACTOR SHALL PROVIDE A STATIC PRESSURE READING BEFORE STARTING ANY WORK. IF WATER PRESSURE IS LESS THAN 60 PSI NOTIFY THE CONTRACTING OFFICER OR HIS DESIGNEE BEFORE STARTING WORK.
4. THE CONTRACTOR WILL COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS, CODES, AND REGULATIONS APPLICABLE TO THE IRRIGATION SYSTEM COVERED BY THESE PLANS.
5. ALL PERMITS, REQUIRED TO COMPLETE THE IRRIGATION WORK SHOWN ON THE PLANS SHALL BE OBTAINED BY THE CONTRACTOR PRIOR TO START OF WORK.
6. IRRIGATION PLANS ARE SCHEMATIC. ALL VALVES AND PIPING ARE SHOWN DIAGRAMMATICALLY FOR CLARITY. CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER PLACEMENT OF SYSTEM COMPONENTS. ALL IRRIGATION COMPONENTS TO BE LOCATED IN PLANTING AREAS. SOME IRRIGATION IS SHOWN OUTSIDE OF PLANTING AREAS FOR CLARITY PURPOSES ONLY. COORDINATE IRRIGATION WORK WITH LANDSCAPE PLANS TO AVOID CONFLICTING LOCATIONS BETWEEN PIPING AND PLANT PITS.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR 100% IRRIGATION COVERAGE TO PLANT AND SOD MATERIAL SHOWN ON THE PLANS, INCLUDING EXISTING TREES AND PLANTS TO REMAIN.
8. ALL PIPES SHALL BE INSTALLED PER THE MANUFACTURER'S SPECIFICATION AND ASTM STANDARD D-2774 AT THE DEPTHS SHOWN IN THE IRRIGATION DETAILS.
9. ALL THREADED JOINTS SHALL BE COATED WITH TEFLON TAPE UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER. USE LIQUID TEFLON ON METAL PIPE THREADS ONLY.
10. CONTRACTOR SHALL FLUSH ALL LINES PRIOR TO INSTALLATION OF EMITTERS, END CAPS OR ANY OTHER DEVICE THAT IMPACTS THE OUTWARD FLOW OF SYSTEM WATER.
11. ALL ELECTRICAL CONNECTIONS SHALL BE MADE WITHIN REMOTE CONTROL VALVE BOXES, CONTROLLER ENCLOSURES AND VALVE BOXES DESIGNATED SPECIFICALLY FOR ELECTRICAL CONNECTIONS. NO SPLICES OUTSIDE OF BOXES OR ENCLOSURES WILL BE ACCEPTED.
12. INSTALL ALL TWO WIRE CABLE IN 1-1/4" PVC ELECTRICAL CONDUIT.
13. INSTALL ALL REMOTE CONTROL VALVES AT HEIGHTS INDICATED ON DETAILS, AS HIGH AS POSSIBLE BUT ALLOWING CLEARANCE BETWEEN VALVE BOX LID AND FLOW CONTROL HANDLE ON REMOTE CONTROL VALVE.
14. AT THE COMPLETION OF THE PROJECT, SUPPLY THE FOLLOWING MATERIAL TO THE CONTRACTING OFFICER OR HIS DESIGNEE: TWO (2) WRENCHES FOR DISASSEMBLY AND ADJUSTING OF EACH TYPE OF VALVE SUPPLIED. TWO (2) KEYS FOR EACH TYPE OF CONTROLLER. THREE (3) VALVE BOX KEYS OR WRENCHES. (20) EMITTERS FOR EACH TYPE OF GPH USED. (10) i-20 ROTORS.
15. TREES AND SHRUBS SHALL BE IRRIGATED ON SEPARATE REMOTE CONTROL VALVES.
16. AS-BUILT DRAWINGS, CONTROLLER CHARTS, MAINTENANCE MANUALS AND SPECIALTY TOOLS SHALL BE TURNED OVER TO THE CONTRACTING OFFICER OR HIS DESIGNEE AT THE COMPLETION OF CONSTRUCTION.
17. A ONE-YEAR WARRANTY ON MATERIALS AND INSTALLATION SHALL COMMENCE AT THE SUBSTANTIAL COMPLETION.
18. ALL IRRIGATION PIPING REGARDLESS OF SIZE AND CLASS IS TO BE INCASED IN A PIPE SLEEVE WHEN LOCATED UNDER IMPERVIOUS SURFACE MATERIAL, INCLUDING ANGULAR ROCK AREAS.
19. CONTRACTOR SHALL ENSURE THAT ALL REMOTE CONTROL VALVES WITHIN THE LIMITS OF WORK ARE FUNCTIONING AND FULLY OPERABLE. REPORT ANY DEFICIENT OR DAMAGED VALVES TO OWNERS REPRESENTATIVE.
20. CONTRACTOR SHALL FIELD VERIFY AND LOCATE DAMAGED IRRIGATION MAINLINE SECTIONS FOR REPLACEMENT IN LIKE KIND (INCLUDING CONTROLLER WIRE). ENSURE THAT PIPE TRANSITIONS FROM NEW PIPE TO EXISTING PIPE ARE INCLUDED AS PART OF THE PROJECT SPECIFIED AS-BUILT DRAWINGS.
21. REPLACE ANY AND ALL DAMAGED VALVE BOXES AND/OR VALVE BOX LIDS IN LIKE KIND WITHIN THE LIMITS OF WORK.
22. CONTRACTOR SHALL ADJUST SYSTEM LAYOUT AS NECESSARY TO ENSURE MAINLINE, LATERALS AND HEADS ARE 10' AWAY FROM EXISTING AND PROPOSED TREE (TRUNK) LOCATIONS. ENSURE ANY ADJUSTMENTS TO HEAD LAYOUT DOES NOT IMPACT HEAD-TO-HEAD COVERAGE/100% COVERAGE. AS-BUILT ANY FIELD ADJUSTMENTS TO EQUIPMENT LOCATIONS.

NORTH

SCALE: 1" = 20'
0' 10' 20' 40' 80'

LOGAN SIMPSON
51 WEST THIRD STREET, SUITE 450
TEMPE, AZ 85281
P (480) 967-1343

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

LANDSCAPE
IRRIGATION PLAN

L-00-004

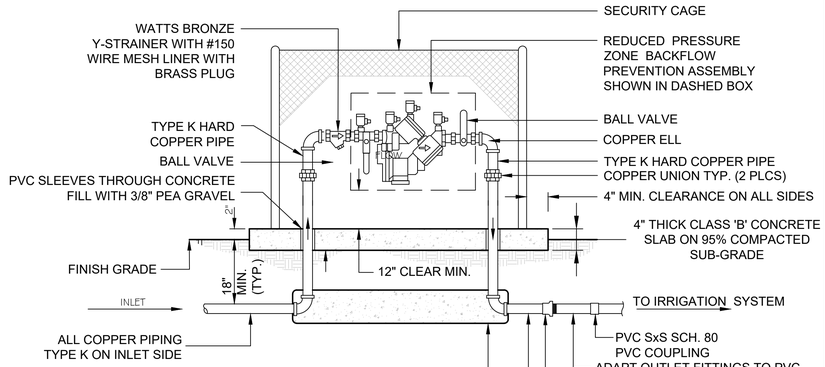
DRAWN BY: TR
ENGINEER: N/A
APPROVED BY: JM

ACTIVITY: _____
PROJ. NO.: CP0896

SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/12/24 N:\PROJECTS\2022\225302 CENTRAL MESA REUSE PIPELINE (1.DES)\40-CAD\1-SHEET FILES\225302 LI-01 (UPDATE).DWG

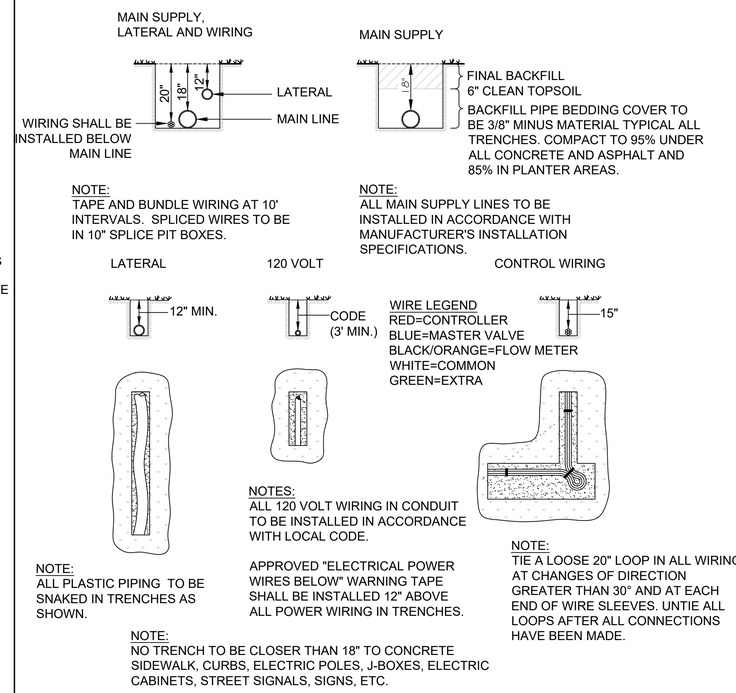


GENERAL BACKFLOW ASSEMBLY NOTES:

- REDUCED PRESSURE ZONE BACKFLOW PREVENTER ASSEMBLY (FOR 3" DIAMETER PIPE OR SMALLER).
- THE REQUIRED BACKFLOW PREVENTION ASSEMBLY SHALL BE A MANUFACTURER AND MODEL NUMBER DESIGNATED IN THE CURRENT CITY OF MESA LIST OF APPROVED BACKFLOW PREVENTION ASSEMBLIES. (CONTRACTOR TO VERIFY PRIOR TO ORDERING AND ASSEMBLY.)
- THE BACKFLOW PREVENTION ASSEMBLY SHALL BE TESTED AND APPROVED BY A CERTIFIED TECHNICIAN DESIGNATED IN THE CURRENT CITY OF MESA LIST OF APPROVED CERTIFIED INSPECTORS PRIOR TO THE REQUEST FOR FINAL INSPECTION.
- INSTALL BACKFLOW PREVENTION UNIT WITHIN 24" OF WATER METER.
- COPPER FITTINGS SHALL BE CONNECTED WITH LEAD FREE SOLDER JOINTS.
- AFTER TESTING, INSTALL A BRASS. PLUG-IN EACH TEST CLOCK ON THE ASSEMBLY.

1 REDUCED PRESSURE ZONE BACKFLOW PREVENTION UNIT

SCALE: N.T.S.



NOTE:
TAPE AND BUNDLE WIRING AT 10' INTERVALS. SPLICED WIRES TO BE IN 10" SPLICE PIT BOXES.

NOTE:
ALL MAIN SUPPLY LINES TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION SPECIFICATIONS.

NOTE:
ALL PLASTIC PIPING TO BE SNAKED IN TRENCHES AS SHOWN.

NOTES:
ALL 120 VOLT WIRING IN CONDUIT TO BE INSTALLED IN ACCORDANCE WITH LOCAL CODE.

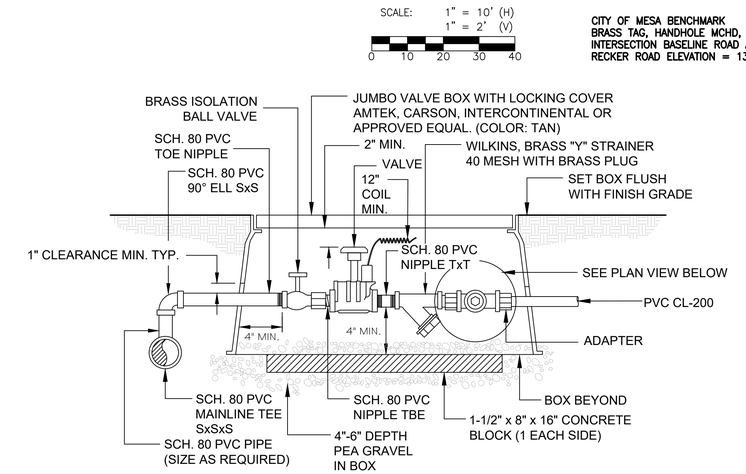
APPROVED "ELECTRICAL POWER WIRES BELOW" WARNING TAPE SHALL BE INSTALLED 12" ABOVE ALL POWER WIRING IN TRENCHES.

NOTE:
TIE A LOOSE 20" LOOP IN ALL WIRING AT CHANGES OF DIRECTION GREATER THAN 30° AND AT EACH END OF WIRE SLEEVES. UNTIE ALL LOOPS AFTER ALL CONNECTIONS HAVE BEEN MADE.

NOTE:
NO TRENCH TO BE CLOSER THAN 18" TO CONCRETE SIDEWALK, CURBS, ELECTRIC POLES, J-BOXES, ELECTRIC CABINETS, STREET SIGNALS, SIGNS, ETC.

2 TYPICAL TRENCHING DETAIL

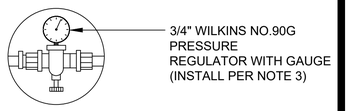
SCALE: N.T.S.



NOTES:

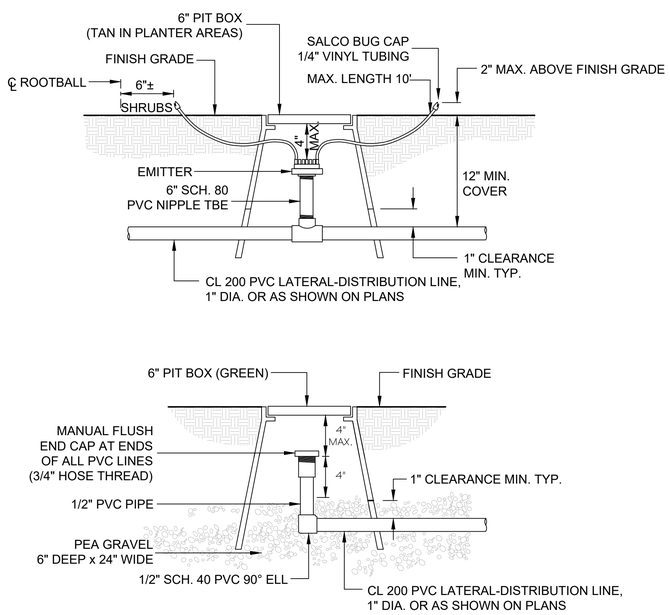
1. PROVIDE EXPANSION COILS AT EACH WIRE CONNECTION IN VALVE BOX. (WRAP AROUND 1/2" PIPE 15 TIMES)
2. DO NOT REST VALVE BOX ON MAIN LINE OR LATERAL LINE.
3. INSTALL REGULATOR HORIZONTALLY TO ENSURE GAUGE CAN BE READ AND ADJUSTED EASILY.
4. INSTALL IDENTICAL FOR TURF REMOTE CONTROL VALVES EXCEPT OMIT THE FILTER AND REGULATOR.

PRESSURE REGULATOR PLAN VIEW



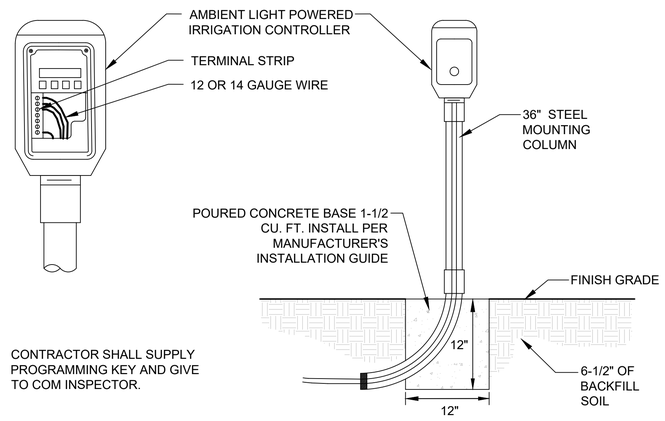
3 DRIP SYSTEM REMOTE CONTROL VALVE ASSEMBLY

SCALE: N.T.S.



4 DRIP SYSTEM-EMITTER DETAIL AND FLUSH CAP ASSEMBLY

SCALE: N.T.S.



CONTRACTOR SHALL SUPPLY PROGRAMMING KEY AND GIVE TO COM INSPECTOR.

5 SOLAR IRRIGATION CONTROLLER

SCALE: N.T.S.

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CITY OF MESA ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS INTERMEDIATE PUMP STATION

LANDSCAPE

IRRIGATION DETAILS

L-00-005

DRAWN BY: TR
ENGINEER: N/A
APPROVED BY: JM

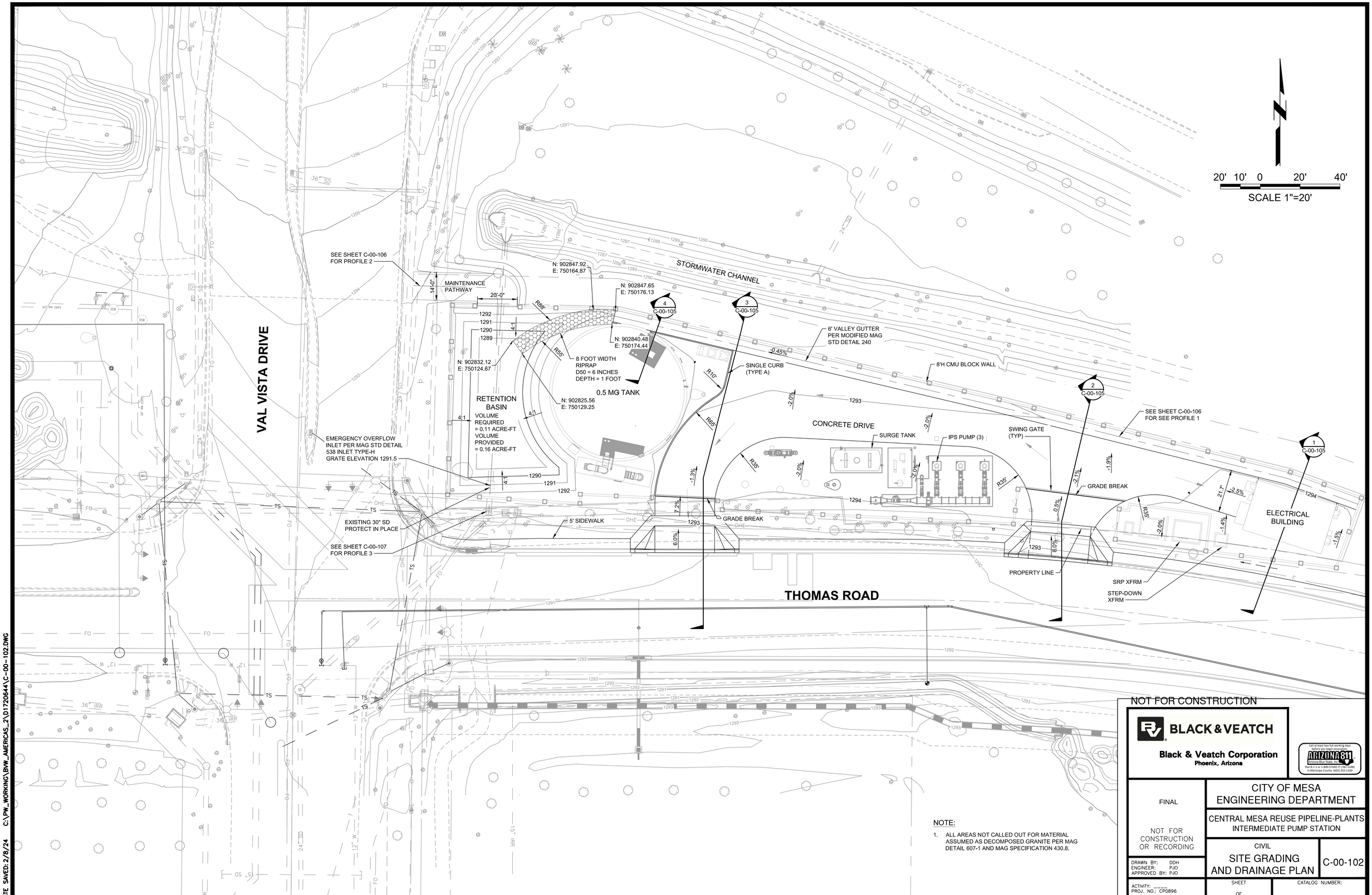
ACTIVITY: _____
PROJ. NO.: CP0896

SHEET

OF

CATALOG NUMBER:

DATE SAVED: 2/12/24 N:\PROJECTS\2022\225302 CENTRAL MESA REUSE PIPELINE (1.DES)\40-CAD\1-SHEET FILES\225302 L1-01 (UPDATE).DWG



NOTE:

1. ALL AREAS NOT CALLED OUT FOR MATERIAL ASSUMED AS DECOMPOSED GRANITE PER MAG DETAIL 607-1 AND MAG SPECIFICATION 430.8.

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ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

CIVIL

SITE GRADING AND DRAINAGE PLAN

C-00-102

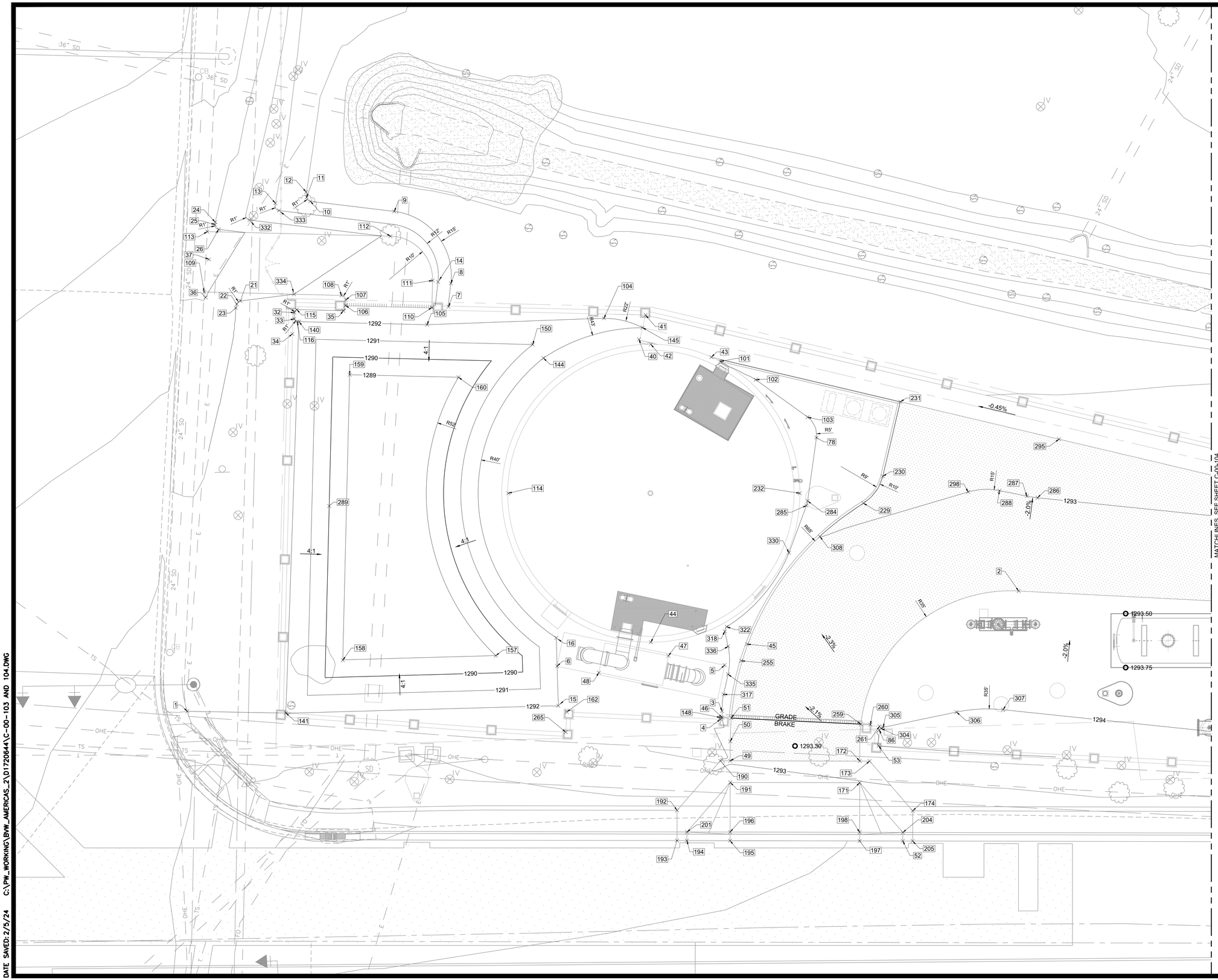
DRAWN BY: DDH
ENGINEER: PJO
APPROVED BY: PJO

ACTIVITY: ____
PROJ. NO.: CP0896

SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/8/24 C:\PW_WORKING\BW_AMERICAS_2\D1720644\C-00-102.DWG



10' 0 10' 20'
1"=10'

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ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

CIVIL
SITE ENLARGED GRADING PLAN - 1

C-00-103

DRAWN BY: DDH
ENGINEER: CA
APPROVED BY: PJO

ACTIVITY: ----
PROJ. NO.: CP0896

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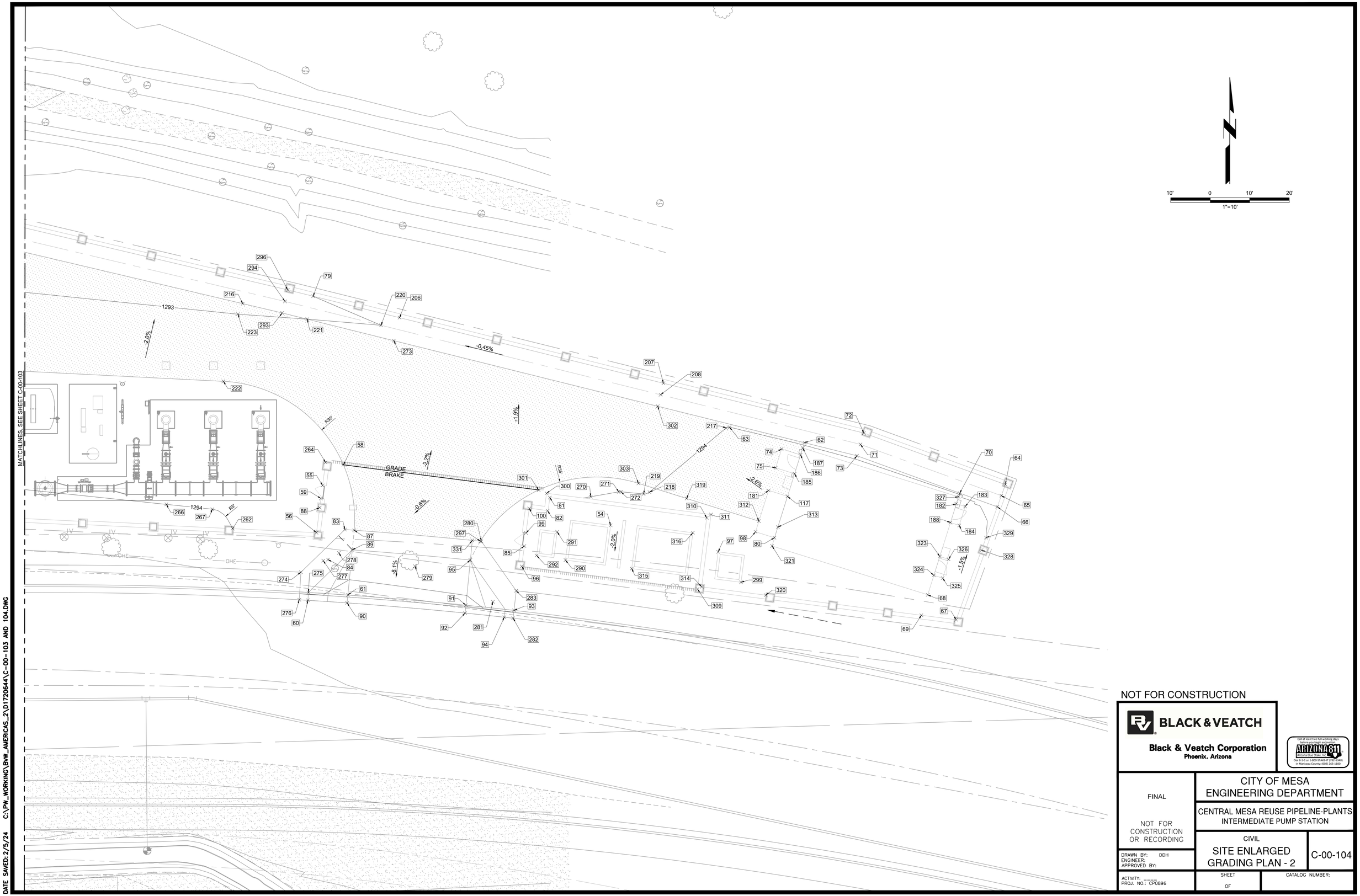
OF

CATALOG NUMBER:

DATE SAVED: 2/5/24 C:\PW_WORKING\BVW_AMERICAS_2\D1720644\C-00-103 AND 104.DWG



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CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

CIVIL

SITE ENLARGED GRADING PLAN - 2

C-00-104

DRAWN BY: DDH
ENGINEER:
APPROVED BY:

ACTIVITY: ____
PROJ. NO.: CP0896

SHEET
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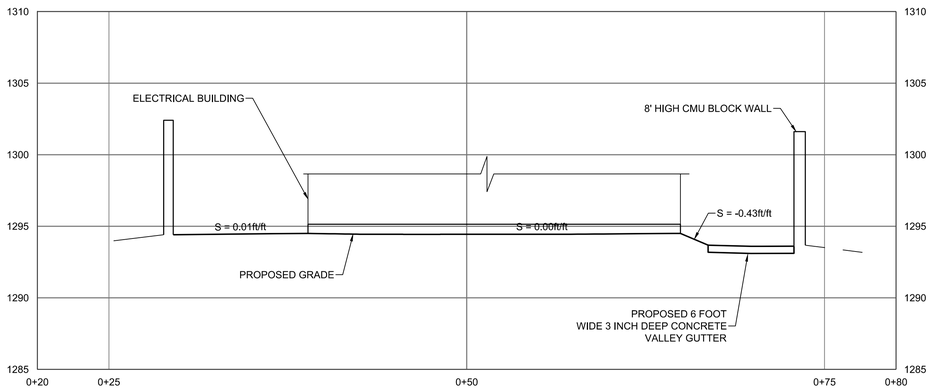

SECTION - 1
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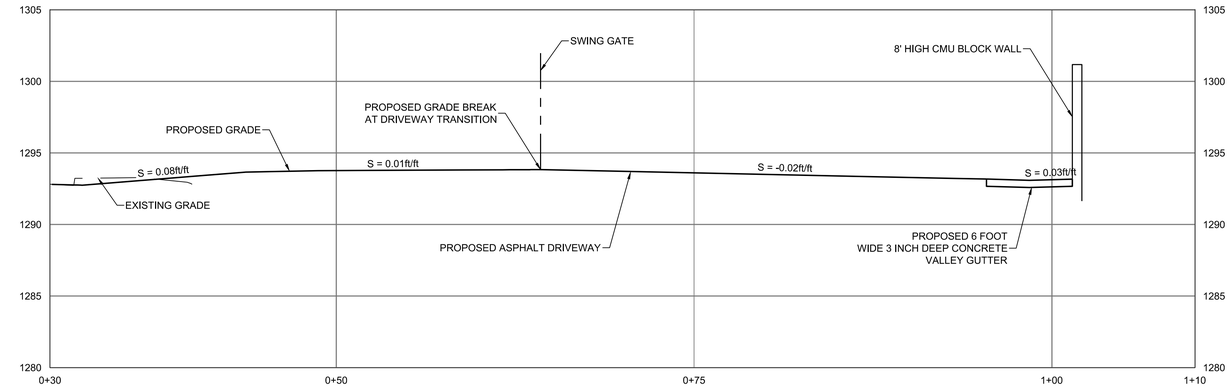
VER 1" : 1'



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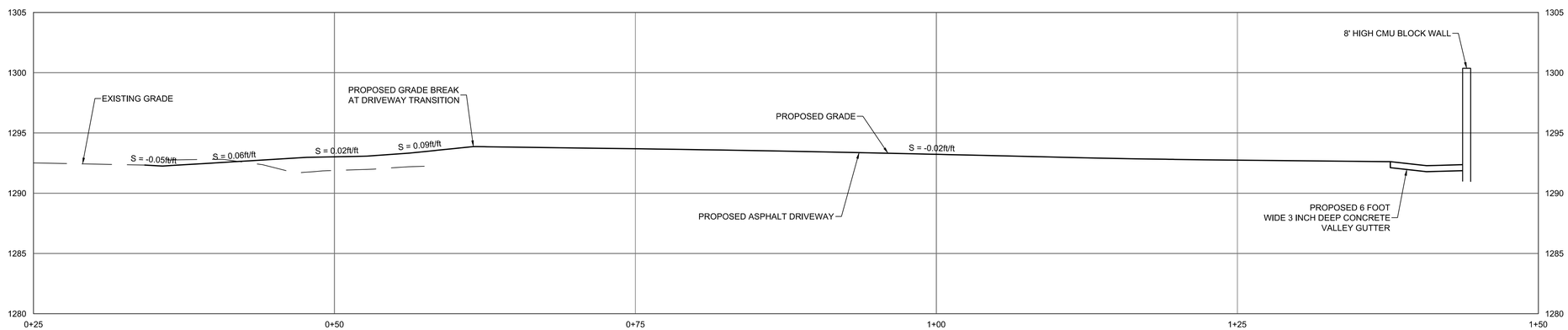
VER 1" : 1'



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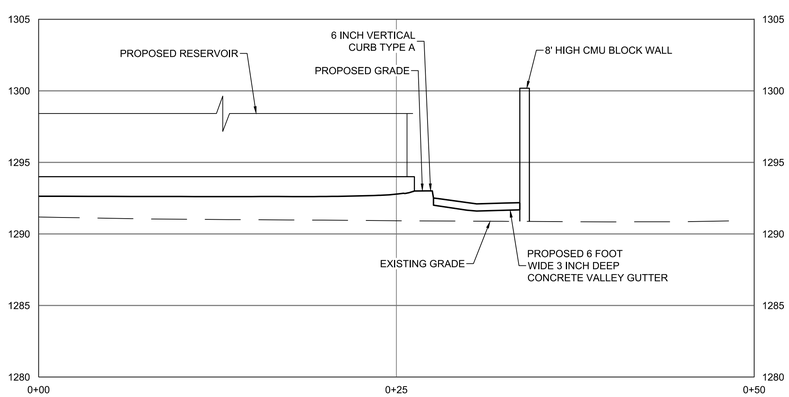

SECTION - 4
SCALE = HOR 1" : 5'
VER 1" : 1'

1" 3/4" 1/2" 1/4" 0 1" 2"
VERTICAL SCALE 1"=1"

5' 3' 0 5' 10'
HORIZONTAL SCALE 1"=5'

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ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

CIVIL

GRADING SECTIONS

C-00-105

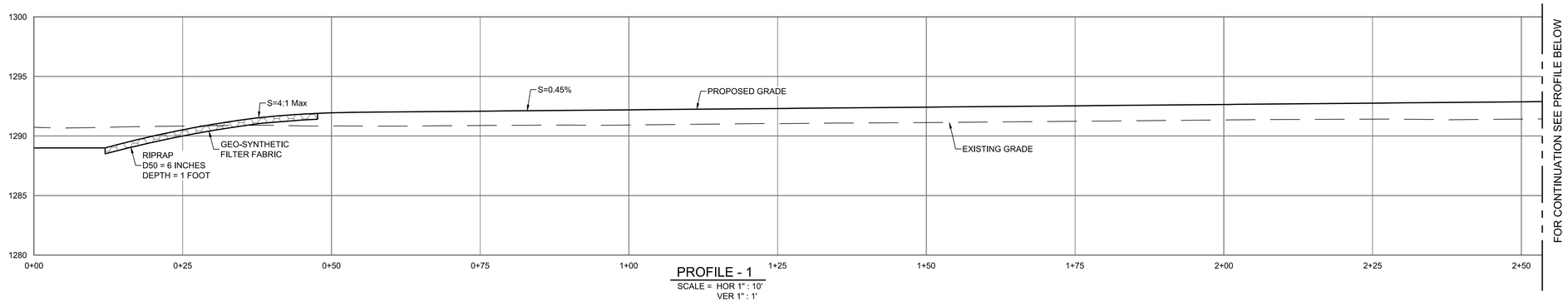
DRAWN BY: DDH
ENGINEER: CA
APPROVED BY: PJO

ACTIVITY: ----
PROJ. NO.: CP0896

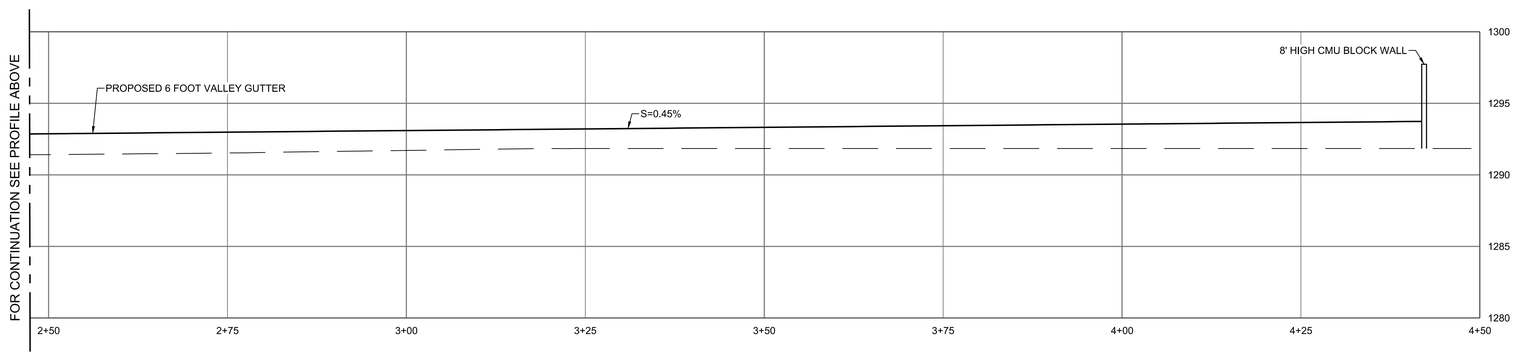
SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/8/24 C:\PW_WORKING\BVW_AMERICAS_2\D1720644\C-00-105.DWG



PROFILE - 1
SCALE = HOR 1" : 10'
VER 1" : 1'



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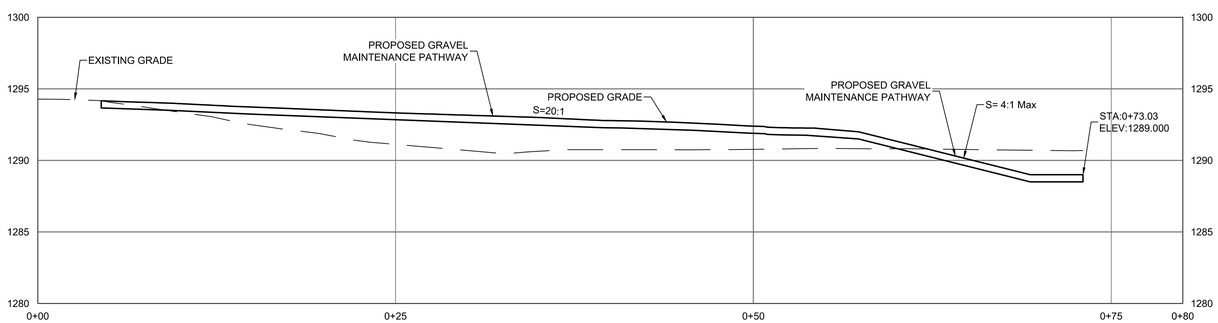
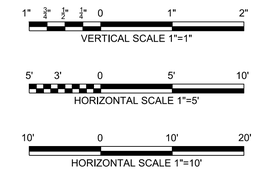
SCALE = HOR 1" : 10'
VER 1" : 1'



PROFILE - 2
SCALE = HOR 1" : 5'
VER 1" : 1'



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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

CIVIL
GRADING PROFILES 1

C-00-106

DRAWN BY: DDH
ENGINEER: CA
APPROVED BY: PJO

ACTIVITY: ------
PROJ. NO.: CP0896

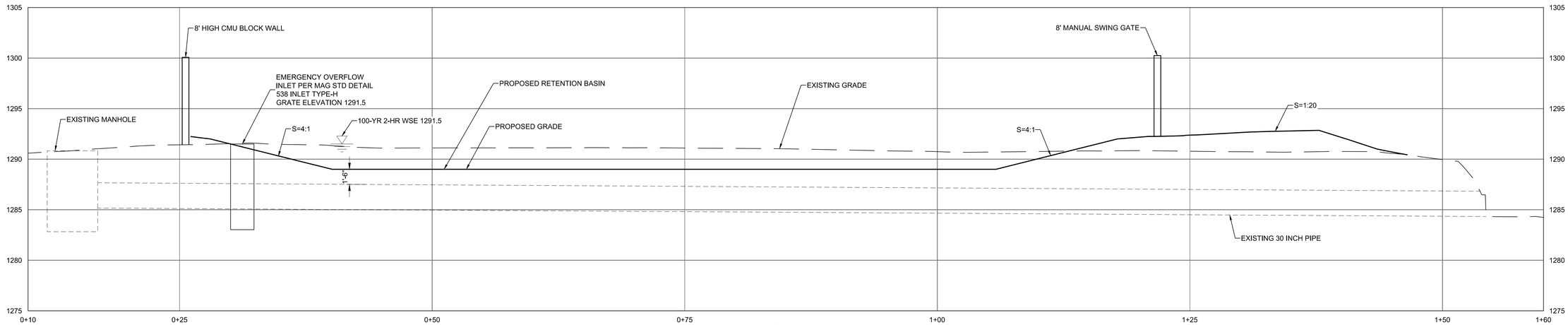
SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/8/24 C:\PW_WORKING\BVW_AMERICAS_2\D1720644\C-00-106 AND 107.DWG

12" 9" 6" 3" 0 1' 2'
VERTICAL SCALE 1"=1'-0"

5' 3' 0 5' 10'
HORIZONTAL SCALE 1"=5'



PROFILE - 3
SCALE = HOR 1" : 5'
VER 1" : 1'

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

CIVIL
GRADING PROFILES 2

C-00-107

DRAWN BY: DDH
ENGINEER:
APPROVED BY:

ACTIVITY: ------
PROJ. NO.: CP0896

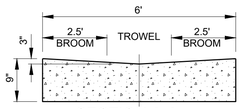
SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/5/24 C:\PW_WORKING\BWW_AMERICAS_2\D1720644\C-00-106 AND 107.DWG

NOTES:

1. ALL CONCRETE TO BE CLASS 'A' UNLESS OTHERWISE APPROVED (SECTION 725).
2. EITHER A CONSTRUCTION JOINT OR CONTRACTION JOINT IS REQUIRED AT THE STREET CENTERLINE.
3. A SEPARATE CONCRETE PAD IS REQUIRED AT ALL EXPANSION JOINTS AND ALL CONSTRUCTION JOINTS.
4. EXPANSION JOINTS SHALL COMFORM TO SECTION 340.
5. CONTRACTION JOINTS SHALL SEPARATE LARGE AGGREGATE BY MOVING THE AGGREGATE TO EITHER SIDE OF THE JOINT FOR A MINIMUM DEPTH OF 2½ INCHES. THE FINISHED JOINT SHALL HAVE 1/4 INCH MAXIMUM RADII AT THE TOP SURFACE AND BE A MINIMUM OF 3/4 INCHES OF DEPTH.



SECTION A-A
VALLEY GUTTER

MODIFIED MAG STD DETAIL 240
VALLEY GUTTER
NO SCALE

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION

CIVIL

MISCELLANEOUS SITE DETAILS 5

C-00-505

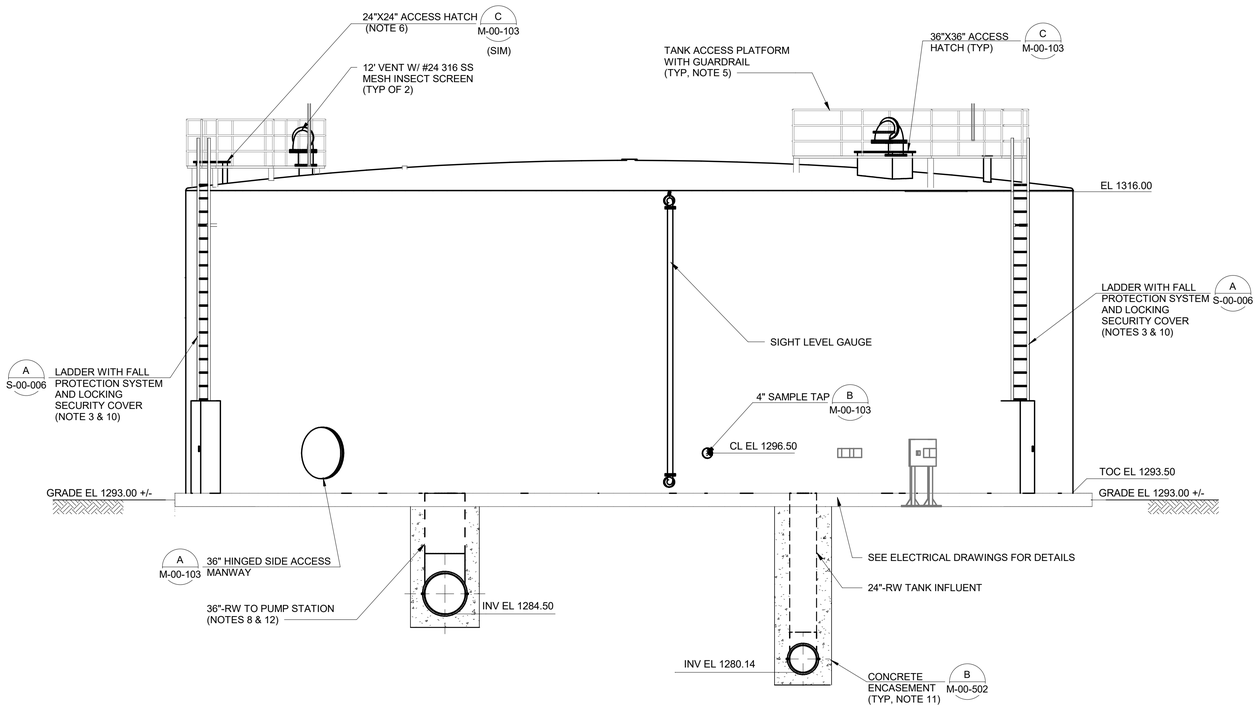
DRAWN BY: BR
ENGINEER: JMW
APPROVED BY: PJO

ACTIVITY: ------
PROJ. NO.: CP0896

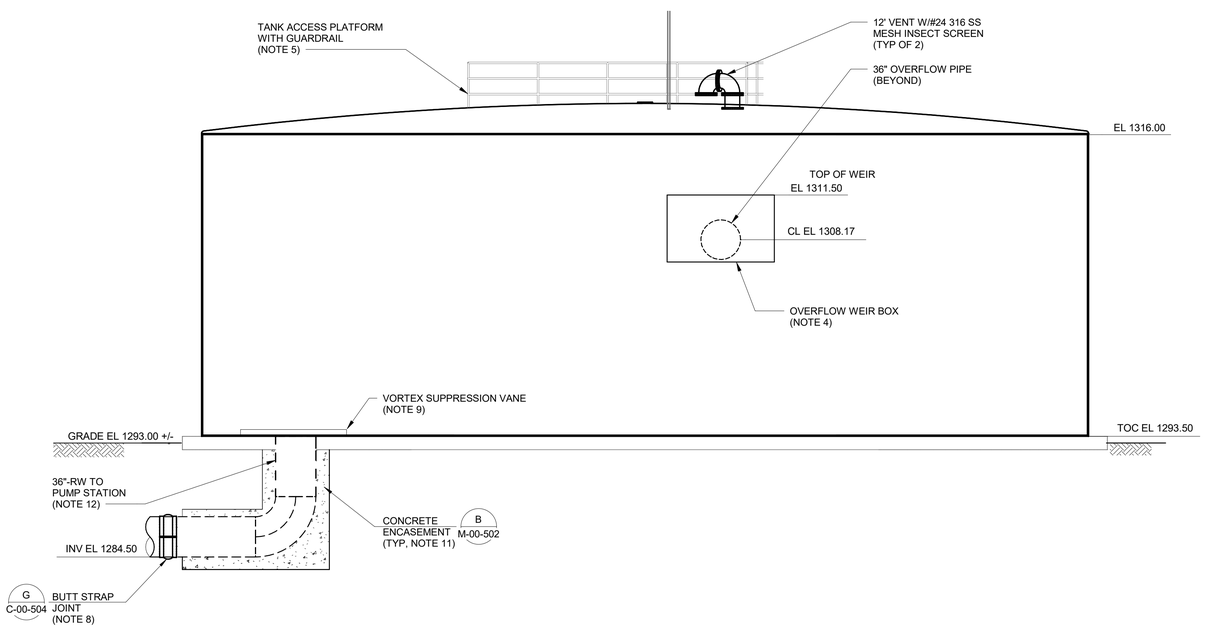
SHEET
OF

CATALOG NUMBER:

DATE SAVED: 2/9/24 C:\PW_WORKING\BWW_AMERICAS_2\D1720644\C-00-505.DWG



1 M-00-101 SECTION 1
3/16" = 1'-0"



2 M-00-101 SECTION 2
3/16" = 1'-0"

NOTES:

1. REFER TO PIPING AND INSTRUMENTATION DIAGRAMS (P&IDs) FOR ADDITIONAL GUIDANCE. IN THE CASE OF DISCREPANCY BETWEEN THE MECHANICAL DRAWINGS AND THE P&IDs, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER FOR ADDITIONAL DIRECTION.
2. TANK ROOF PENETRATIONS FOR CATHODIC PROTECTION ANODES BY CATHODIC PROTECTION SYSTEM SUPPLIER NOT SHOWN. CATHODIC PROTECTION DESIGN SHALL BE COORDINATED WITH THE STEEL TANK MANUFACTURER. SEE CATHODIC PROTECTION DRAWINGS FOR DETAILS.
3. FALL PROTECTION SAFETY SYSTEM SHALL BE OSHA APPROVED AND SHALL CONSIST OF A CARRIER, SAFETY SLEEVE, LANYARD, AND CONNECTORS, AND BE SUITABLE FOR OPERATION HARNESS SHALL BE PROVIDED BY OWNER. FALL PROTECTION SAFETY SYSTEM SHALL BE MILLER SAF-T-CLIMB WITH REMOVABLE HATCH DISMOUNT, 3M LAD-SAF SYSTEM, OR EQUAL. LOCKING SECURITY COVER SHALL HAVE AN AFFIXED SIGN STATING: "CAUTION FALL PROTECTION REQUIRED".
4. OVERFLOW WEIR BOX SHALL BE DESIGNED BY THE TANK MANUFACTURER. WEIR SHALL HAVE A MINIMUM LENGTH OF 9-FT. REFER TO SECTION 331613.13 FOR ADDITIONAL INFORMATION.
5. ACCESS PLATFORM, GUARDRAIL WITH KICKPLATE, SAFETY HARNESS TIE OFF POINTS, AND LADDER FALL PROTECTION SAFETY RAIL SHALL BE PROVIDED BY THE TANK MANUFACTURER AND DESIGNED BY A PROFESIONAL ENGINEER LICENSED IN ARIZONA. SEALED DRAWINGS SHALL BE PROVIDED TO THE ENGINEER FOR REVIEW. SAFETY HARNESS TIE OFF POINTS SHALL BE PROVIDED NEAR ALL ROOF HATCHES AND OPENING IN GRATING FOR AIR VENTS AND LEVEL SENSOR SHALL BE BANDED, PROVIDING A MAXIMUM CLEARANCE OF 1" AROUND PIPE. REFER TO SPECIFICATION SECTION 331613.13 FOR ADDITIONAL INFORMATION.
6. TANK 24-INCH ACCESS HATCH SHALL BE LOCATED ABOVE THE INTERNAL TANK OVERFLOW BOX.
7. STEEL TANK MANUFACTURER SHALL DESIGN THE TANK ROOF SUPPORT SYSTEM TO AVOID CONFLICT WITH THE PROPOSED ROOF PENETRATIONS AND OPENINGS.
8. 36" OUTLET PIPING AT TANK SHALL BE STEEL AND TRANSITION TO CCP AT THE BUTT STRAP.
9. VORTEX SUPPRESSION VANE SHALL BE DESIGNED BY THE TANK MANUFACTURER. REFER TO SPECIFICATION SECTION 331613.13 FOR ADDITIONAL INFORMATION.
10. STEEL LADDER WITH LOCKING SECURITY COVER SHALL PROVIDED BY THE STEEL TANK MANUFACTURER. LADDER CONNECTIONS TO TANK SHALL BE DESIGNED BY MANUFACTURER. SEE SECTION 331613.13 FOR ADDITIONAL INFORMATION.
11. CONCRETE ENCASESMENT SHALL AT MINIMUM EXTEND TO THE EDGE OF SLAB. A PIPE JOINT SHALL BE PROVIDED AT THE END OF EACH CONCRETE ENCASEMENT PER SECTION 400524.
12. BOTTOM OF TANK SHOULD BE SLOPED SUCH THAT THE OUTLET PIPE TO THE PUMP STATION IS THE LOW POINT.

6' 4' 2' 0' 5' 10'
3/16" = 1'-0"

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE - PLANTS
INTERMEDIATE PUMP STATION

PROCESS MECHANICAL
RECLAIMED WATER TANK SECTIONS

DRAWING
M-00-102

DRAWN BY: BR/AM
ENGINEER: CA
APPROVED BY: PJO

ACTIVITY.
PROJECT NO.: CP0896

SHEET
OF

CATALOG NUMBER:

FILE: BIM 360://411073 - Central Mesa Reuse Pipeline/411073-00-IPS-RESERVOIR.rvt

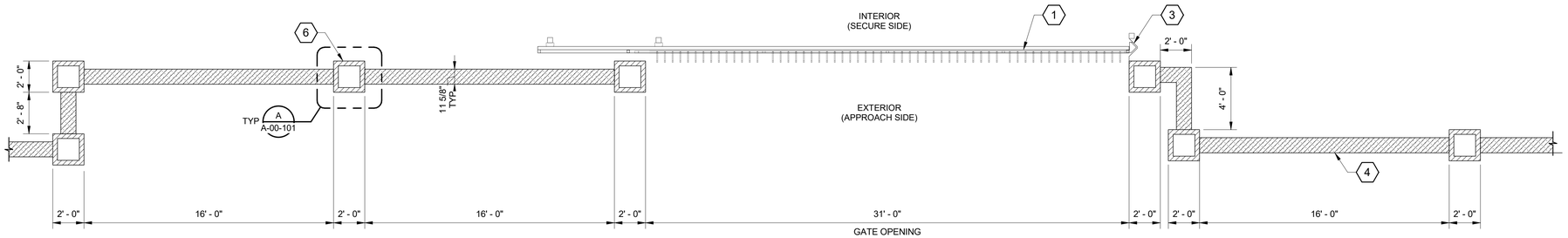
PLOTTED: 2/8/2024 10:15:47 AM

GENERAL SHEET NOTES

1. SEE CIVIL DRAWINGS FOR SITE WALL AND GATE LOCATIONS.

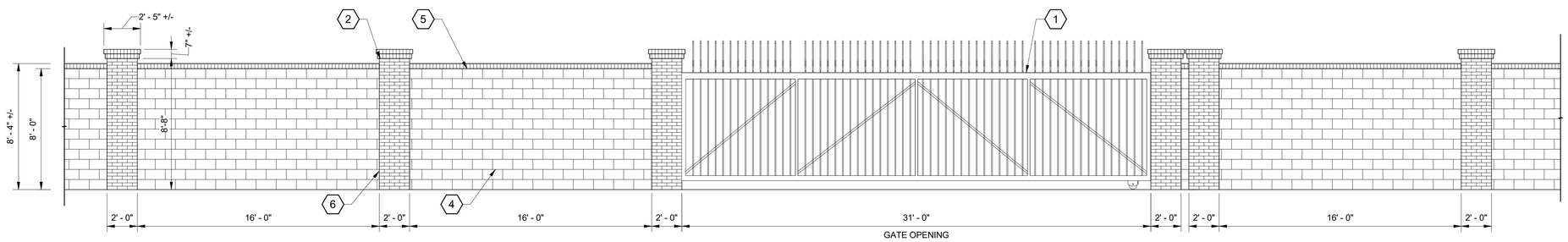
SHEET KEYNOTES

1. MOTORIZED ACCESS ROLLER GATE, SEE ELECTRICAL DRAWINGS FOR GATE CONTROLLER.
2. DOUBLE BRICK COLUMN CAP IN ROWLOCK COURSING, TYPICAL.
3. GATE MOUNTING POST, TYPICAL.
4. 12" SMOOTH FACE CONCRETE BLOCK, TYPICAL.
5. SINGLE BRICK CAP IN ROWLOCK COURSING, TYPICAL.
6. BRICK VENEER COLUMN, TYPICAL.
7. SOLID CONCRETE BLOCK CAP, TYPICAL.
8. CONCRETE BLOCK COLUMN CAP, TYPICAL.



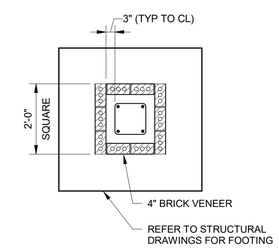
WESTERN GATE PLAN

1/4" = 1'-0"

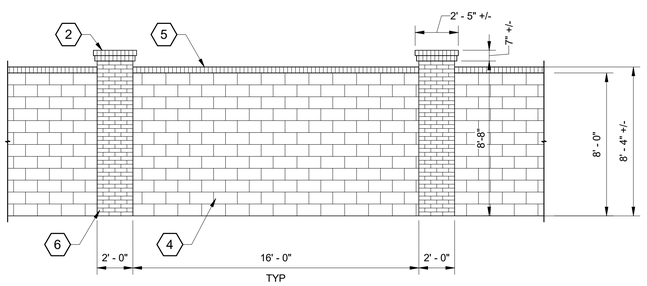


WESTERN GATE ELEVATION

1/4" = 1'-0"

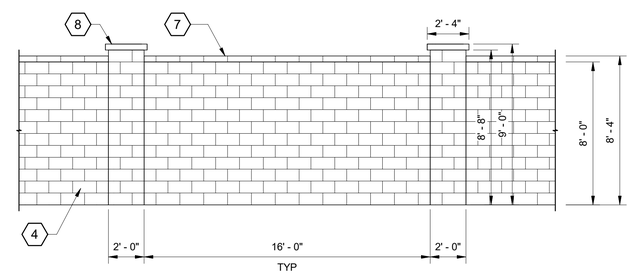


A A-00-101 DETAIL 1/2" = 1'-0"



PRIMARY SITE WALL ELEVATION

1/4" = 1'-0"



SECONDARY SITE WALL ELEVATION

1/4" = 1'-0"

12" 6" 0' 1' 2' 3' 4' 5'
1/2" = 1'-0"

4' 2' 0' 4' 8'
1/4" = 1'-0"

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ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE - PLANTS
INTERMEDIATE PUMP STATION

ARCHITECTURAL
WESTERN GATE PLAN & ELEVATIONS

DRAWING
A-00-101

DRAWN BY: RML
ENGINEER: GMP
APPROVED BY: RAB

ACTIVITY, PROJECT NO.: CP0896

SHEET
OF

CATALOG NUMBER:

FILE: BIM 360:/411073 - Central Mesa Reuse Pipeline/411073-00-IPS-SITE FENCE DETAIL.rvt

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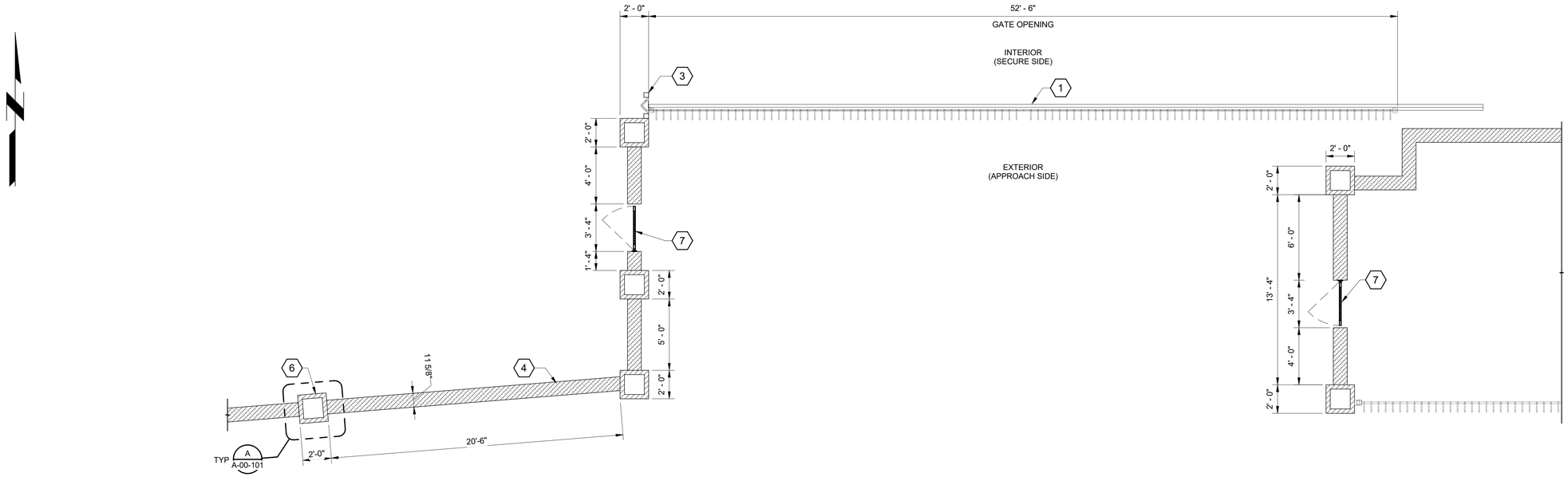
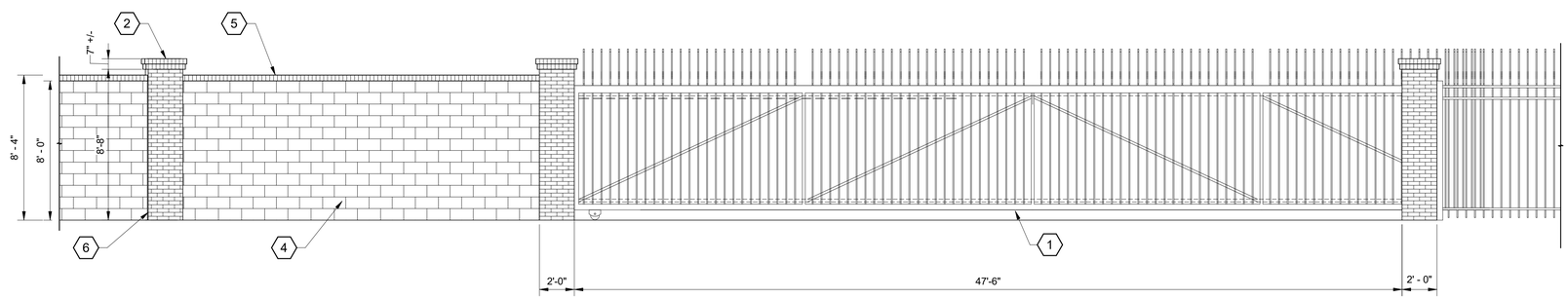


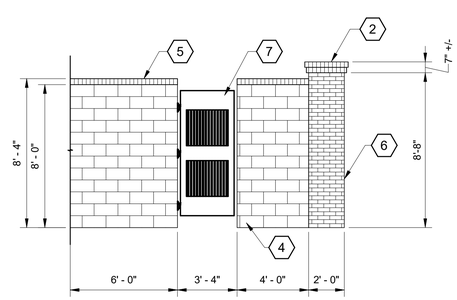
EASTERN GATE PLAN

1/4" = 1'-0"



EASTERN GATE ELEVATION

1/4" = 1'-0"



EGRESS GATE ELEVATION

1/4" = 1'-0"

GENERAL SHEET NOTES

1. SEE CIVIL DRAWINGS FOR SITE WALL AND GATE LOCATIONS.

SHEET KEYNOTES

1. MOTORIZED ACCESS ROLLER GATE. SEE ELECTRICAL DRAWINGS FOR GATE CONTROLLER.
2. DOUBLE BRICK COLUMN CAP IN ROWLOCK COURSING, TYPICAL.
3. GATE MOUNTING POST, TYPICAL.
4. 12" SMOOTH FACE CONCRETE BLOCK, TYPICAL.
5. SINGLE BRICK CAP IN ROWLOCK COURSING, TYPICAL.
6. BRICK VENEER COLUMN, TYPICAL.
7. EGRESS MAN GATE.

4' 2' 0' 4' 8'

1/4" = 1'-0"

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ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE - PLANTS
INTERMEDIATE PUMP STATION

ARCHITECTURAL

EASTERN GATE PLAN & ELEVATIONS

DRAWING

A-00-102

DRAWN BY: RML
ENGINEER: GMP
APPROVED BY: RAB

ACTIVITY.
PROJECT NO.: CP0896

SHEET

OF

CATALOG NUMBER:

FILE: BIM 360://411073 - Central Mesa Reuse Pipeline/411073-00-IPS-SITE FENCE DETAIL.rvt

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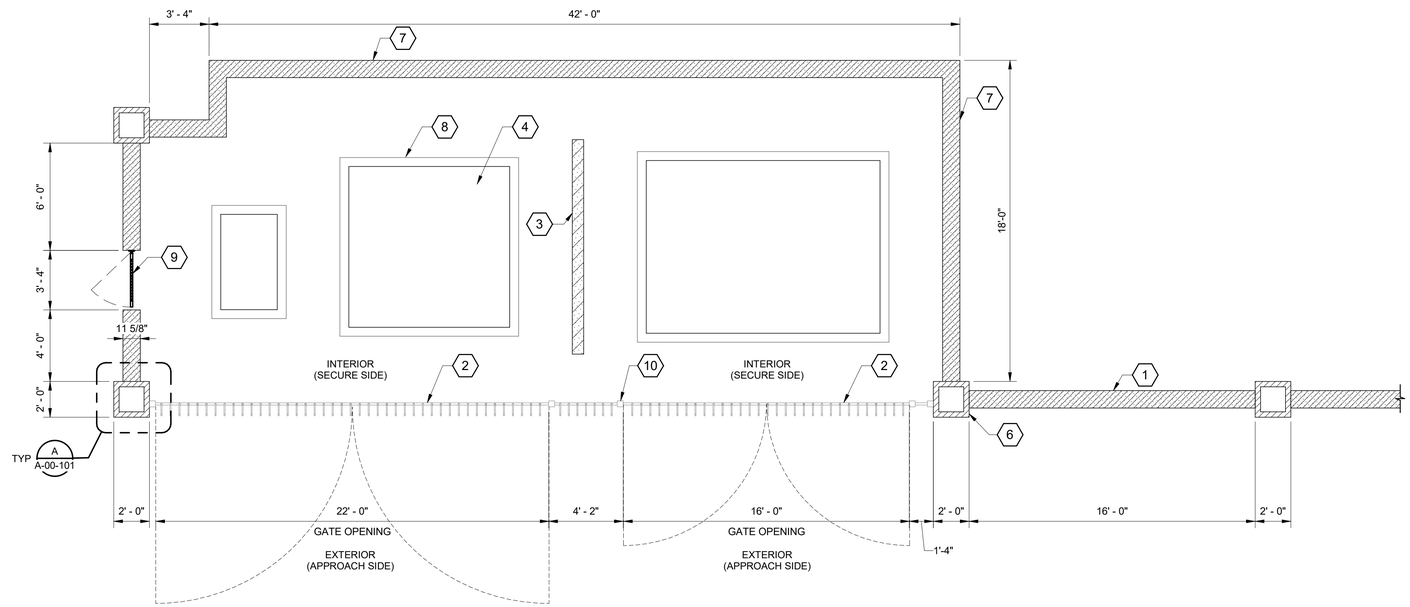
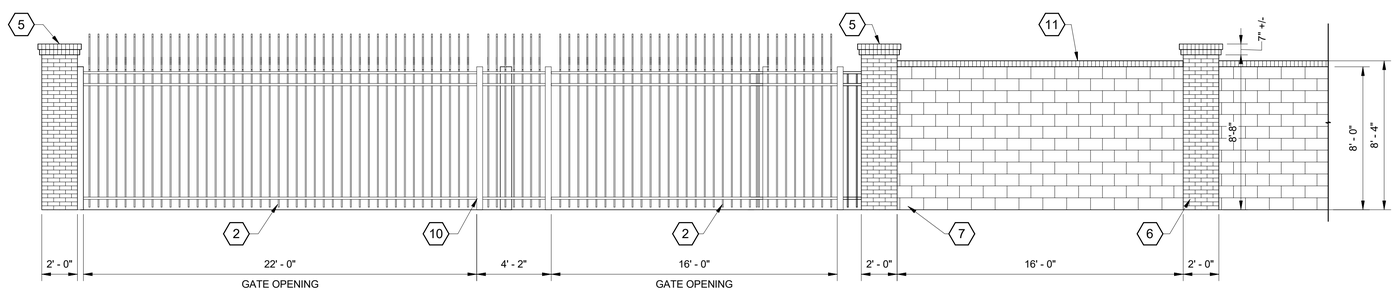


SRP GATE PLAN

1/4" = 1'-0"



SRP GATE ELEVATION

1/4" = 1'-0"

GENERAL SHEET NOTES

1. SEE CIVIL DRAWINGS FOR SITE WALL AND GATE LOCATIONS.

SHEET KEYNOTES

1. PRIMARY SITE WALL, SEE CIVIL DRAWINGS.
2. MANUAL SWING DOUBLE ACCESS GATE.
3. CONCRETE BLOCK FIRE WALL, SEE STRUCTURAL DRAWINGS.
4. ELECTRICAL EQUIPMENT, SEE ELECTRICAL DRAWINGS, TYPICAL.
5. DOUBLE BRICK COLUMN CAP IN ROWLOCK COURSING, TYPICAL.
6. BRICK VENEER COLUMN, TYPICAL.
7. 12" SMOOTH FACE CONCRETE BLOCK, TYPICAL.
8. CONCRETE EQUIPMENT PAD, SEE STRUCTURAL DRAWINGS, TYPICAL.
9. EGRESS MAN GATE.
10. ALUMINUM FENCE POST, TYPICAL.
11. SINGLE BRICK CAP IN ROWLOCK COURSING, TYPICAL.

4' 2' 0' 4' 8'

1/4" = 1'-0"

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CENTRAL MESA REUSE PIPELINE - PLANTS
INTERMEDIATE PUMP STATION

ARCHITECTURAL

SRP GATE
PLAN & ELEVATION

DRAWING

A-00-103

DRAWN BY: RML
ENGINEER: GMP
APPROVED BY: RAB

ACTIVITY.
PROJECT NO.: CP0896

SHEET

OF

CATALOG NUMBER:

FILE: BIM 360://411073 - Central Mesa Reuse Pipeline/411073-00-IPS-SITE FENCE DETAIL.rvt

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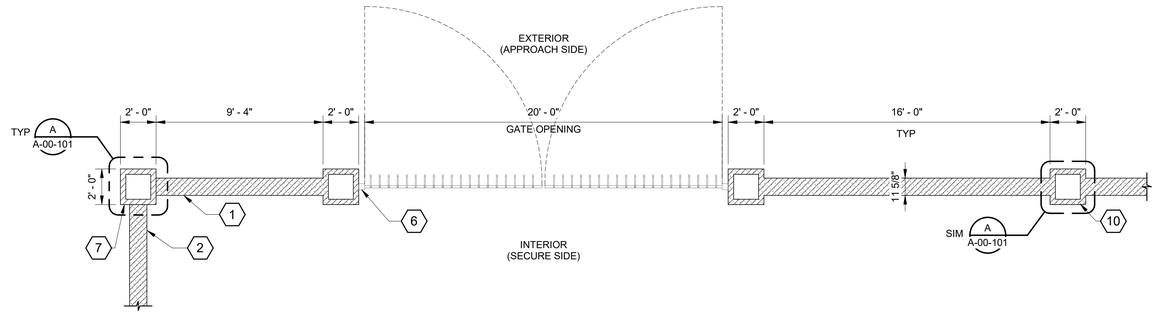
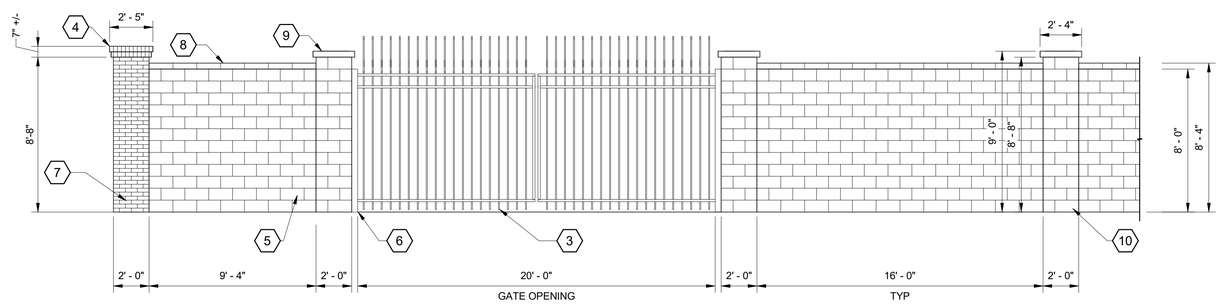


NORTHERN GATE PLAN

1/4" = 1'-0"



NORTHERN GATE - ELEVATION

1/4" = 1'-0"

GENERAL SHEET NOTES

1. SEE CIVIL DRAWINGS FOR SITE WALL AND GATE LOCATIONS.

SHEET KEYNOTES

1. SECONDARY SITE WALL, SEE CIVIL DRAWINGS.
2. PRIMARY SITE WALL, SEE CIVIL DRAWINGS.
3. MANUAL SWING DOUBLE ACCESS GATE.
4. DOUBLE BRICK COLUMN CAP IN ROWLOCK COURSING, TYPICAL.
5. 12" SMOOTH FACE CONCRETE BLOCK, TYPICAL.
6. ALUMINUM FENCE POST, TYPICAL.
7. BRICK VENEER COLUMN, TYPICAL.
8. SOLID CONCRETE BLOCK CAP, TYPICAL.
9. CONCRETE BLOCK COLUMN CAP COLUMN, TYPICAL.
10. SMOOTH FACE BLOCK VENEER COLUMN, TYPICAL.

4' 2' 0' 4' 8'

1/4" = 1'-0"

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INTERMEDIATE PUMP STATION

ARCHITECTURAL

NORTHERN GATE PLAN & ELEVATION

DRAWING

A-00-104

DRAWN BY: RML
ENGINEER: GMP
APPROVED BY: RAB

ACTIVITY.
PROJECT NO.: CP0896

SHEET

OF

CATALOG NUMBER:

FILE: BIM 360:/411073 - Central Mesa Reuse Pipeline/411073-00-IPS-SITE FENCE DETAIL.rvt

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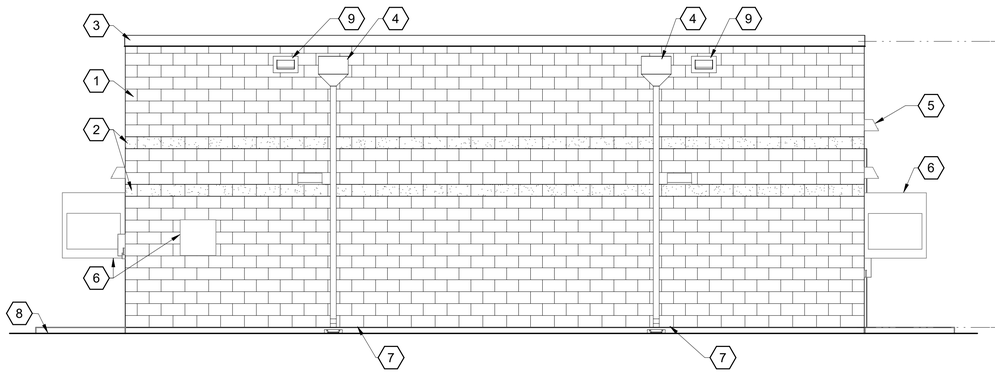
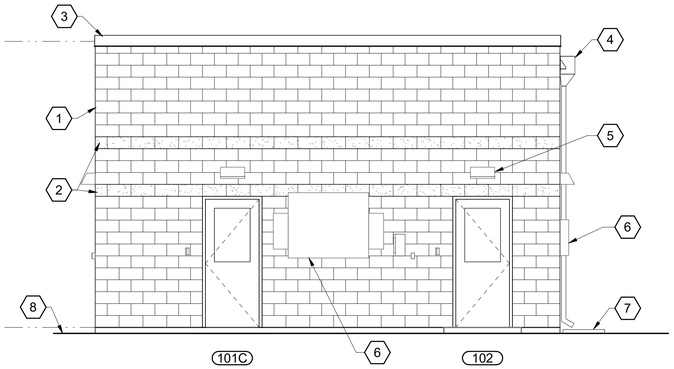
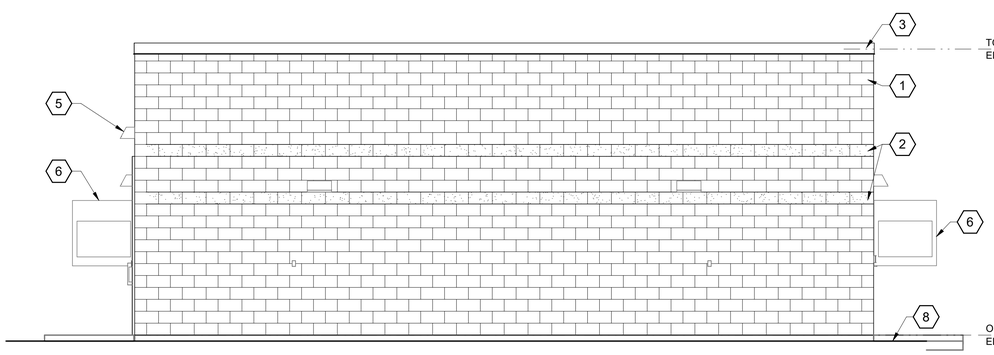


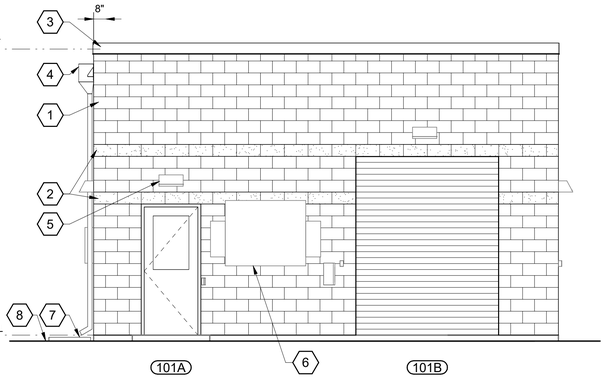
NORTH ELEVATION
1/4" = 1'-0"



EAST ELEVATION
1/4" = 1'-0"



SOUTH ELEVATION
1/4" = 1'-0"



WEST ELEVATION
1/4" = 1'-0"

4' 2' 0' 4' 8'
1/4" = 1'-0"

GENERAL SHEET NOTES

1. FOR ARCHITECTURAL SYMBOL LEGEND, SEE SHEET A-00-106. FOR ARCHITECTURAL ABBREVIATIONS, SEE SHEET A-00-601.

SHEET KEYNOTES

1. 8" SMOOTH FACE CONCRETE BLOCK.
2. 8" SPLIT FACE CONCRETE BLOCK.
3. PREFINISHED METAL COPING.
4. PREFINISHED METAL SCUPPER AND DOWNSPOUT.
5. LIGHT FIXTURE, SEE ELECTRICAL DRAWINGS, TYPICAL..
6. HVAC EQUIPMENT, SEE HVAC DRAWINGS. COORDINATE OPENING SIZE WITH EQUIPMENT PROVIDED.
7. CONCRETE SPLASHBLOCK, TYPICAL.
8. FINISH GRADE, SEE CIVIL DRAWINGS.
9. SECONDARY OVERFLOW SCUPPER WITH EXTENDED DRIP.

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CENTRAL MESA REUSE PIPELINE - PLANTS
INTERMEDIATE PUMP STATION

ARCHITECTURAL
E-HOUSE
BUILDING ELEVATIONS

DRAWING
A-00-201

DRAWN BY: RML
ENGINEER: GMP
APPROVED BY: RAB

ACTIVITY.
PROJECT NO.: CP0896

SHEET
OF

CATALOG NUMBER:

FILE: BIM 360:/411073 - Central Mesa Reuse Pipeline/411073-00-IPS-E HOUSE.rvt

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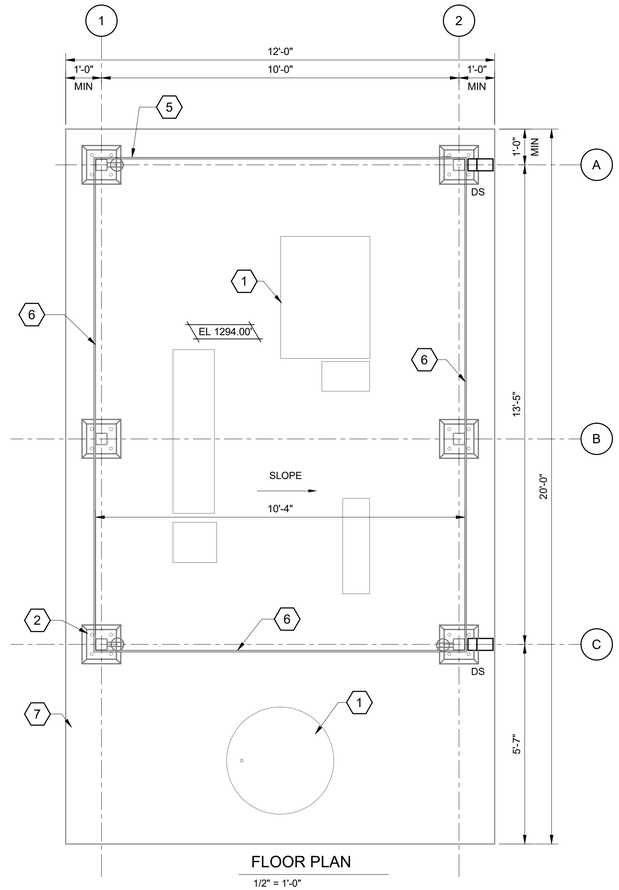
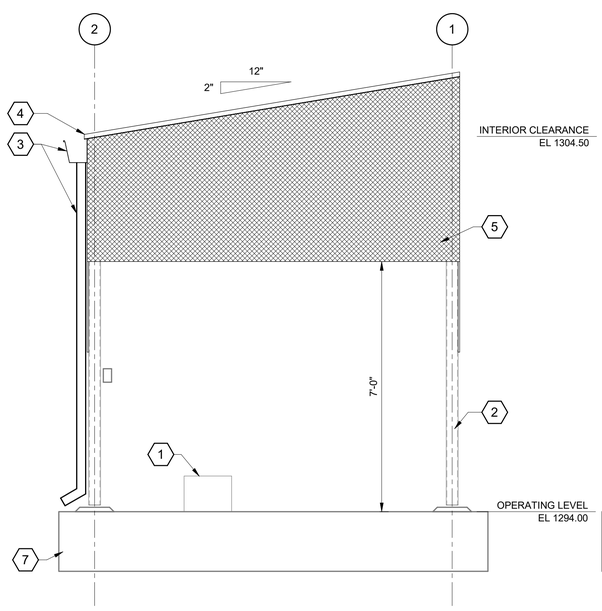
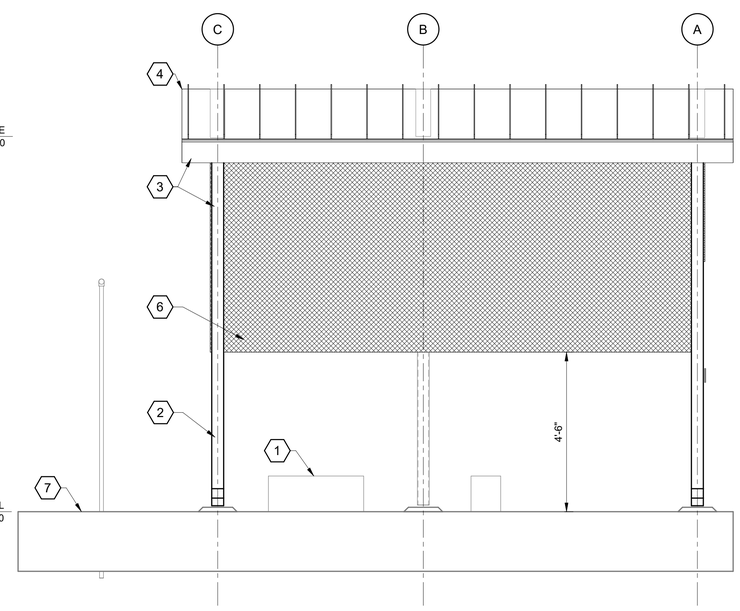


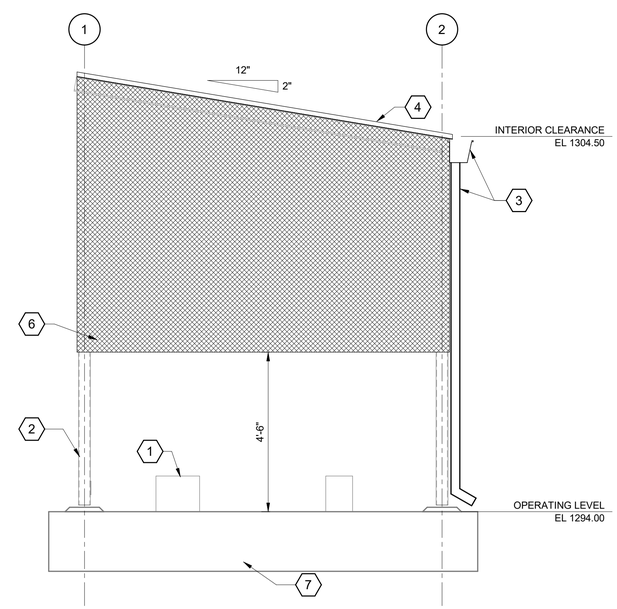
FLOOR PLAN
1/2" = 1'-0"



NORTH ELEVATION
1/2" = 1'-0"



EAST ELEVATION
1/2" = 1'-0"



SOUTH ELEVATION
1/2" = 1'-0"

GENERAL SHEET NOTES

SHEET KEYNOTES

1. MECHANICAL EQUIPMENT, SEE MECHANICAL DRAWINGS, TYPICAL.
2. STRUCTURAL FRAMING, SEE STRUCTURAL DRAWINGS, TYPICAL.
3. PREFINISHED METAL GUTTER AND DOWNSPOUTS.
4. PREFINISHED METAL ROOF PANEL SYSTEM (STANDING SEAM).
5. REMOVABLE FABRIC PANEL, ATTACHED TO STRUCTURAL FRAMING PER MANUFACTURER, SEE SPECIFICATION 13 34 20. 7'-0" CLEAR SHALL BE MAINTAINED FROM TOP OF SLAB TO BOTTOM OF FABRIC PANEL.
6. REMOVABLE FABRIC PANELS, ATTACHED TO STRUCTURAL FRAMING PER MANUFACTURER, SEE SPECIFICATION 13 34 20. 4'-6" CLEAR SHALL BE MAINTAINED FROM TOP OF SLAB TO BOTTOM OF FABRIC PANEL.
7. CONCRETE SLAB, SEE STRUCTURAL DRAWINGS.

12" 6" 0' 1' 2' 3' 4' 5'
1/2" = 1'-0"

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Black & Veatch Corporation
Phoenix, Arizona

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FINAL

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CITY OF MESA
ENGINEERING DEPARTMENT

CENTRAL MESA REUSE PIPELINE - PLANTS
INTERMEDIATE PUMP STATION

ARCHITECTURAL
IPS CANOPY
PLAN & ELEVATIONS

DRAWING
A-00-105

DRAWN BY: RML
ENGINEER: GMP
APPROVED BY: RAB

ACTIVITY:
PROJECT NO.: CP0896

SHEET
OF

CATALOG NUMBER:

FILE: BIM 360://411073 - Central Mesa Reuse Pipeline/411073-00-IPS-SURGE TANK.rvt

PLOTTED: 2/6/2024 6:23:20 AM

Citizen Participation Plan for CMRP IPS

Date: January 15, 2024

Purpose: The purpose of this Citizen Participation Plan is to inform citizens, property owners, neighborhood associations, agencies, and businesses in the vicinity of the site of an application for the City of Mesa Intermediate Pump Station. The site is located at 3626 East Thomas Road at the northeast corner of the intersection of East Thomas Road and North Val Vista Drive. The Intermediate Pump Station will be located within a 0.753-acre area and surrounded by 8-ft CMU block site walls. This project includes the installation of 0.5 million gallon above grade steel reclaimed water tank, reclaimed water pump station, electrical building and other related appurtenances. The site plan for this phase is required to be reviewed and approved by the Planning and Zoning Board, and Design Review Board. The Citizen Participation plan will ensure that those affected by this application will have an adequate opportunity to learn about and comment on the planned project.

Contact:

Peter Olszewski, P.E., P.Eng
2231 East Camelback Road, Suite 250
Phoenix, AZ 85016
(602) 381-4431
Email: OlszewskiP@BV.com

Pre-Submittal Conference:

The pre-submittal conference with the City of Mesa Planning was held on 11/1/22. Staff reviewed the application and recommended that the Somerset Estates Homeowner's Association be contacted.

Action Plan:

In order to provide effective citizen participation in conjunction with the application, the following actions will be taken to provide opportunities to understand and address any real or perceived impacts that members of the community may have. The Citizen Participation Plan includes:

1. A contact list will be developed for citizens, property owners, neighborhood associations, agencies, and businesses in this area including:
    a. Somerset Estates Homeowner's Association
    b. All applicable parties within a 1000 feet vicinity of the exterior boundary of the IPS property.
2. All identified parties listed on the contact list will receive a letter describing the project, project schedule, and site plan, that is planned to be sent out the week of February 12, 2024. The attachment will provide the names and contact numbers for the City's Engineering Public Relations professionals.

3. The mailing list and map noting the location of the notified property owners, registered neighborhood associations, and businesses contacted will be provided to the Planning staff for inclusion in the case file.
4. The City's Engineering Public Relations professionals will keep a log of any comments received from citizens calling the Public Relations number provided in the attachment and how they were addressed. They will also provide copies of comment letters, petitions and other pertinent information if received from residents and other interested parties.
5. Other Citizen Participation opportunities will depend on the comments and interest received.

Schedule:

Pre-Application meeting – 11/1/2022

P&Z Application Submittal – 9/7/2023

P&Z Application Comments Received – 10/3/23

P&Z Application Resubmittal – 1/15/24

P&Z Application Resubmittal Comments Received – 1/29/24

Notification mailers sent – 2/12/24

Submittal of Citizen Participation Report and Notification materials – 3/12/24

Design Review Board Hearing – 3/12/24

Planning and Zoning Board Hearing – 3/27/24

Citizen Participation Report for ZON23-00743

Central Mesa Reuse Pipeline – Intermediate Pump Station

Date: March 20, 2024

The Central Mesa Reuse Pipeline – Intermediate Pump Station Project will include the installation of 0.5 million gallon above grade steel reclaimed water tank, reclaimed water pump station, electrical building and other related appurtenances. The site is 0.753 acre area and is located at 3626 East Thomas Road at the northeast corner of the intersection of East Thomas Road and North Val Vista Drive. Efforts were made to inform citizens, property owners, neighborhood associations, agencies, and businesses in the vicinity of the site of the planned project and provide adequate opportunity to learn about and comment on the project. Below is a summary of the efforts made and the subsequent responses and resolutions.

On November 1, 2022 the pre-submittal conference with the City of Mesa Planning was held. Staff reviewed the application and recommended that the Somerset Estates Homeowner's Association be contacted.

On January 29, 2024 a contact list was developed for citizens, property owners, neighborhood associations, agencies, and businesses in this area including Somerset Estates Homeowner's Association and all applicable parties within a 1000 feet vicinity of the exterior boundary of the IPS property.

On March 12, 2024 notification letters were sent out to all identified parties listed on the contact list. Notification letters included a project description, site plan, elevations, renderings an invitation to attend the Mesa Planning and Zoning Board hearing on March 27, 2024 and contact information for Black & Veatch and the City's Engineering Public Relations professionals. Additionally on this date, a sign including project contact information and Planning and Zoning hearing date was posted to the site.

The following page includes the list of neighbors who were sent notification letters, their received responses, and the provided resolution. No citizen feedback was received on the project by either Black & Veatch nor the City of Mesa.

Parcel Number (APN)	Property Owner	Property Address	Mailing Address	Responses from Citizens	Resolution to Comments
14119596	JOSHUA/BRITTANY JEFFS	3459 N Orchard MESA, AZ 85213	3459 N Orchard MESA, AZ 85213	None	NA
14119597	JARED/ELIZABETH LEBER	3465 N Orchard MESA, AZ 85213	3465 N Orchard MESA, AZ 85213	None	NA
14119598	TYSON FARNSWORTH/ALISHA MAXWELL	3466 E RIVERDALE ST MESA, AZ 85213	3466 E RIVERDALE ST MESA AZ USA 85213	None	NA
14119599	OCTAVIO REYNA/EMMERSON SALMON	3462 E RIVERDALE ST MESA, AZ 85213	3462 E RIVERDALE ST MESA AZ USA 85213	None	NA
14122100	RESERVE 100 LLC	3741 E SAYAN ST MESA, AZ 85215	2231 E BASELINE RD GILBERT, AZ 85234	None	NA
14123011	SALT RIVER AGRIC IMP & POWER DISTRICT	PENDING	PO BOX 1980 PHOENIX AZ USA 85001	None	NA
14118002A	NEXMETRO LEHI CROSSING LLC	3425 E THOMAS RD MESA, AZ 85213	2355 E CAMELBACK RD 805 PHOENIX AZ USA 85016	None	NA
14118008G	BURDEN WEST LIMITED PARTNERSHIP LLP	3404 N VAL VISTA DR MESA, AZ 85213	3404 N VAL VISTA DR MESA, AZ 85213	None	NA
14121004E	ARIZONA DEPT OF TRANSPORTATION	PENDING	205 S 17TH AVE STE 612E PHOENIX, AZ 85007	None	NA
14121004H	SALT RIVER AGRIC IMP & POWER DISTRICT	3540 E THOMAS RD MESA, AZ 85213	PO BOX 52025 PHOENIX, AZ 85072	None	NA
14123003K	SALT RIVER AGRIC IMP & POWER DISTRICT	PENDING	PO BOX 52025 PHOENIX, AZ 85072	None	NA
14123005G	BURDEN ORCHARDS BUILD TO RENT LLC	3411 N VAL VISTA DR MESA, AZ 85215	49009 N SCOTTSDALE RD 4900 SCOTTSDALE, AZ 85251	None	NA
14123005H	CITY OF MESA	3411 N VAL VISTA DR MESA, AZ 85215	20 E MAIN ST 6TH MESA, AZ 85201	None	NA

Stakeholder	Address	Responses from Citizens	Resolution to Comments
Somerset Estates Homeowners Association	3821 E Palm Cir Mesa, AZ 85207	None	NA

DRAFT

CENTRAL MESA REUSE PIPELINE-PLANT

Basis of Design Report
Intermediate Pump Station

CITY PROJECT NO. CP0896PLNT

B&V PROJECT NO. 411073
B&V FILE NO. 50.0101

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PREPARED FOR

City of Mesa, Arizona

15 DECEMBER 2023

BLACK & VEATCH
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List of Abbreviations and Acronyms

The following abbreviations and acronyms are used in this report:

“	inch/inches
%	Percent
°F	Degrees Fahrenheit
AAC	Arizona Administrative Code
AC	Alternating current
ACI	American Concrete Institute
ADA	Arizonans with Disabilities Act
ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AFD	Adjustable Frequency Drive
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
ARS	Arizona Revised Statutes
ASCE	American Society of Civil Engineers
ASD	Allowable Strength Design
ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gauge
AWWA	American Water Works Association
AZ	Arizona

AZPDES	Arizona Pollutant Discharge Elimination System
BAS	Building Automation System
B&V	Black & Veatch
BFV	Butterfly valve
CAP	Central Arizona Project
CCP	Concrete Cylinder Pipe
CFR	Code of Federal Regulations
CMAR	Construction Management at Risk
CMC	Cement Mortar Coated
CML	Cement mortar lined
CMRP	Central Mesa Reuse Pipeline
COM	City of Mesa
CPVC	Chlorinated polyvinyl chloride
DC	Domain Controllers
dia	diameter
DIP	Ductile Iron Piping
DRB	Design Review Board
E	East
EE	energy efficient
EPR	ethylene-propylene rubber
FO	Fiber Optic
ft	foot or feet
gal	gallon
GFCI	ground fault interrupting capability
gpm	Gallons per minute
GRIC	Gila River Indian Community

GRUSP	Granite Reef Underground Storage Project
GWRP	Greenfield Water Reclamation Plant
HGL	Hydraulic grade line
HID	High intensity discharge
hp	horsepower
HMI	Human Machine Interface
HMIS	Hazardous Materials Identification System
HMMP	Hazardous Materials Management Process
HVAC	heating, ventilating and air conditioning
I/O	Input-output
I&C	Instrumentation and Control
IBC	International Building Code
ICC	International Code Council
ICEA	Insulated Cable Engineers Association
IEBC	International Existing Building Code
IECC	International Energy Conservation Code
IEEE	Institute of Electrical and Electronic Engineers
IES	Illuminating Engineers Society
IFC	International Fire Code
IFGC	International Fuel Gas Code
IMC	International Mechanical Code
in	Inch or Inches
IPC	International Plumbing Code
IPS	Intermediate Pump Station
ISA	Instrument Society of America
ksi	kilopounds per square inch

kV	Kilovolt
kVA	Kilovolt-Ampere
lbs	pounds
MAG	Maricopa Association of Governments
MAX	Maximum
MCAQD	Maricopa County Air Quality Department
MCC	Motor Control Center
MCESD	Maricopa County Environmental Services Division
MCFCD	Maricopa County Flood Control District
MERV	minimum efficiency reporting value
mgd	million gallons per day
MIN	Minimum
mph	Miles per hour
N	North
NA	Not Applicable
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NESC	National Electrical Safety Code
NETA	National Electrical Testing Association
NFPA	National Fire Protection Agency
NSF	National Sanitation Foundation
NWWRP	Northwest Water Reclamation Plant
O&M	Operation & Maintenance
OIT	Operator Interface Terminal
OSHA	Occupational Safety and Health Act
oz/ft^2	Ounce per square foot

P&IDs	Process and Instrumentation Diagrams
pcf	Pounds per Cubic Foot
PCL	centrifugal pump
PDFD	power distribution functional diagram
PF	Public Facility
PLC	Programmable Logic Controller
psf	pounds per square foot
psi	pounds per square inch
psia	pounds per square inch absolute
psig	pounds per square inch, gage
PVC	polyvinyl chloride
RCYW	recycled water
Rd	Road
SCADA	Supervisory Control and Data Acquisition
SCFM	Standard cubic feet per minute
SES	Service Entrance Sections
SEWRP	Southeast Water Reclamation Plant
SF	Square Foot
SMACNA	Sheet Metal and Air Conditioning Contractor National Association
sq/ft	square foot
SRP	Salt River Project
SS	SCADA Servers
SW	Sherwin Williams
TBD	To be determined
TDH	Total Dynamic Head
THHN	Thermoplastic High Heat-resistant Nylon-coated

THWN	Thermoplastic Heat and Water-resistant Nylon-coated
TS	Terminal Server
UL	Underwriters Laboratory
UPS	Uninterruptible Power System
V	Volt
VFD	variable frequency drives
WRP	Water Reclamation Plant
XHHW	High Heat-resistant Water-resistant

1.0 INTRODUCTION

1.1 PURPOSE

This report sets forth the basis of design for the City of Mesa's Central Mesa Reuse Pipeline (CMRP) Project Intermediate Pump Station (IPS). Furthermore, this document reflects decisions by the City and the engineering design team and provides design criteria for major IPS system components and equipment. Information is included for process, civil, architectural, structural, mechanical, electrical, and instrumentation. This information will be used during detailed design to prepare the detailed design drawings and specifications.

1.2 BACKGROUND

The CMRP project will convey reclaimed water from the City of Mesa's water reclamation plants to the Gila River Indian Community (GRIC) for agricultural irrigation purposes. By providing reclaimed water to the GRIC, the City will receive, in exchange, a portion of the GRIC's Central Arizona Project (CAP) water credits at a favorable rate and at a ratio that will allow the City to supply water to meet its future development needs.

2.0 GENERAL REQUIREMENTS

2.1 PROJECT DESCRIPTION

The CMRP reclaimed water transmission system will convey water treated at Mesa's Northwest Water Reclamation Plant (NWWRP) to the Gila River Indian Community (GRIC) for agricultural irrigation purposes. Currently NWWRP discharges to SRP's Granite Reef Underground Storage Project (GRUSP), when that facility is available, or into the Salt River. Two existing City facilities, the Southeast Water Reclamation Plant (SEWRP) and the Greenfield Water Reclamation Plant (GWRP) are currently capable of discharging reclaimed water to the GRIC.

Should the GRIC not need Mesa's reclaimed water, reclaimed water from both the NWWRP and SEWRP will be conveyed to the GRUSP. Figure 2-1 illustrates the CMRP project.

Conveying reclaimed water to the GRIC and GRUSP will require the construction of a new transmission pipeline, the new IPS, and improvements to the existing reclaimed water pump stations at the NWWRP and the SEWRP. The IPS will include the following major facilities:

- Three new reclaimed water pumps with similar flow range as the existing effluent pumps at the NWWRP.
- A hydraulic break tank that will receive flows from the NWWRP. The tank will be above grade with a working volume of 0.5 million gallons.
- A surge tank to accommodate potential pipeline pressure surges and to protect the CMRP system infrastructure.
- Pressure sustaining / flow control valve.
- A masonry electrical building to house pump motor starters and variable frequency drives (VFDs) and monitoring and control equipment.
- A retention basin to collect site runoff.

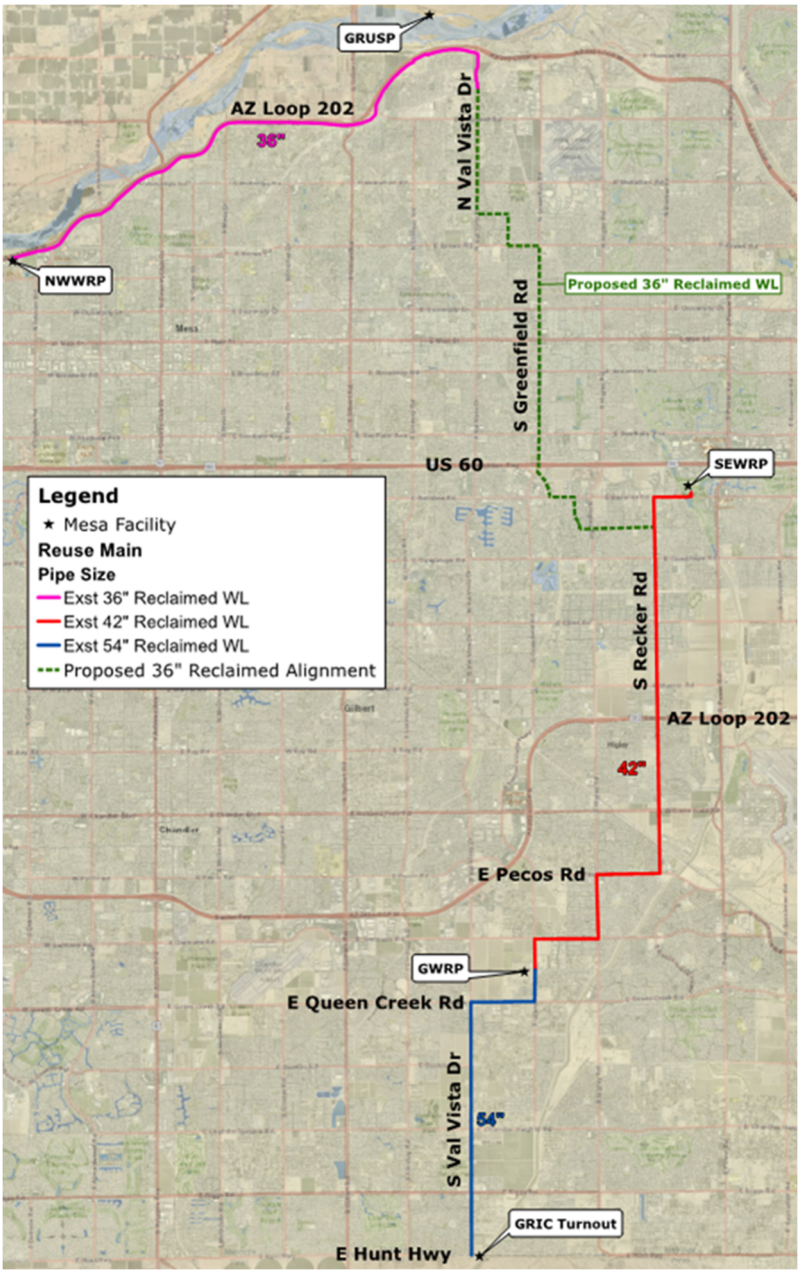


Figure 2-1: CMRP System

2.2 PROJECT SITE

The IPS site is located on the northeast corner of the intersection of Val Vista Drive and Thomas Road in Mesa, Arizona. The site is bounded on the north by an offsite drainage channel and SR-202 owned by Arizona Department of Transportation (ADOT). The IPS site is shown on Figure 2-2. The site is somewhat triangular in shape and is generally flat in topography, with slopes from east to west. The site is protected from surface flows from

the east and north by the ADOT drainage channel. Surface drainage from Thomas Road and from Val Vista Drive is conveyed to existing stormwater collection inlets in Thomas Road that discharge to the ADOT drainage channel.

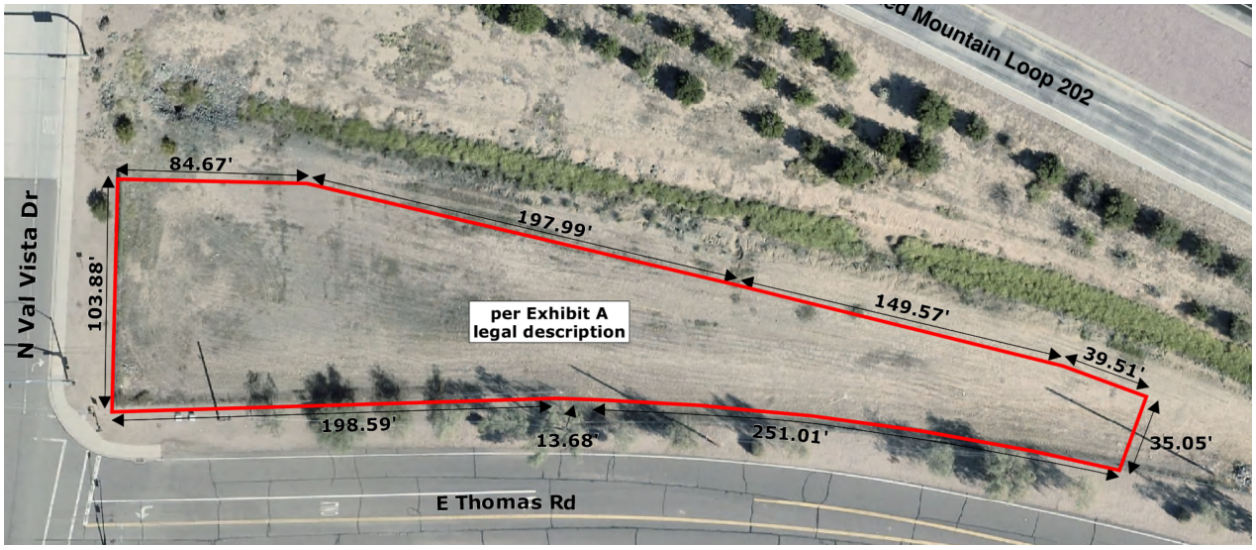


Figure 2-2: IPS Site

2.3 DATUM AND SITE CONTROL

The horizontal and vertical control benchmark that will be used for the IPS is the brass cap located in manhole MCHD at the intersection of Baseline Rd. and Recker Rd., as follows:

- State Plane Coordinates: 865740.612N; 764695.049E
- Elevation: 1322.726 (NAVD88)

2.4 GEOTECHNICAL DATA

A complete geotechnical investigation and report will be finalized as part of the Preliminary Design Phase Services, including boring, sampling, in situ soil resistivity and laboratory testing. This report will be provided to the City under separate cover.

2.5 REGULATORY AGENCIES, CODES, AND PERMITS

2.5.1 Codes and Standards

The codes and standards currently adopted by the City of Mesa are summarized below in Table 2-1. The City of Mesa has adopted the 2018 International Code Council (ICC) “family” of codes and the 2017 National Electric Code produced by the National Fire Protection Association. These Codes and their amendments went into effect on February

10, 2019. Although it is anticipated that the City will adopt newer editions of the International Building Codes and the National Electric Code in future, the currently adopted editions will be the basis for the design of the IPS.

Table 2-1: Current Applicable Codes

Title	Acronym
Mesa City Code	-
Mesa Administrative Code	-
2018 International Building Code (with amendments)	IBC
2018 International Existing Building Code (with amendments)	IEBC
2018 International Fire Code (with modifications)	IFC
2018 International Fuel Gas Code (with modifications)	IFGC
2018 International Mechanical Code (with modifications)	IMC
2018 International Plumbing Code (with modifications)	IPC
2017 National Electrical Code (with modifications and includes Lighting Code)	NEC
2018 International Energy Conservation Code (with modifications)	IECC
The Arizonans with Disabilities Act and Implementing Rules (Federal Americans with Disabilities Act Guidelines for Building and Facilities)	ADA
2021 Mesa Engineering and Design Standards Manual	-
2020 Uniform Standard Specifications for Public Works Construction and 2020 Uniform Standard Details for Public Works Construction (with modifications)	MAG
Arizona Department of Environmental Quality (ADEQ) Engineering Bulletin #10	-

2.5.2 Regulatory Agencies and Permits

Agency and utility coordination will be required throughout the design process for various approvals, reviews, and permits. Table 2-2 summarizes the key agencies and utilities that will be involved in the water treatment plant approval process.

Table 2-2: Key Review Agencies and Utilities	
Agency/Utility	**Key Review/Permit**
Arizona Department of Environmental Quality (ADEQ)	AZPDES Stormwater Permits[1]
Maricopa County Environmental Services Division (MCESD)	Approval to Construct Approval to Commence Operations Approval of Construction
Maricopa County Air Quality Department (MCAQD)	Air Quality Permit (Dust Control)[1]
Cox Communications	Conflict review as needed
Southwest Gas	Conflict review as needed
Century Link	Conflict review as needed
Salt River Project – Electric	Electric service design and review Overhead & Underground conflict review, if applicable Easement encroachment permit for construction in SRP easement.[2]
City of Mesa	See Section 2.5.3.

Notes:
[1] Will be obtained by the CMAR.
[2] If near power lines or across SRP easement need to coordinate w/ SRP through design process including reviews at design milestones.

2.5.3 City of Mesa Review Process

The site is zoned as GI (General Industrial) and will be rezoned to Public and Semi Publc (PS) with a Business Intensity Zone (BIZ) overlay and granted a Council Use Permit (CUP). Design Review Board (DRB) approval is also required for the IPS. Upon completion of the 95% Contract Drawings, the construction drawings will be submitted to the City's Development Services Department for plan review (signed and sealed). Table 2-3 and Table 2-4 provide a listing of the required reviews during the design and construction phase.

Table 2-3: Design Phase Reviews	
City of Mesa Review Entity	**Review**
Design Review Board	Design approval, if applicable
Development & Sustainability	Code review including fire hydrants, FD access, electrical, structural,

Table 2-3: Design Phase Reviews	
City of Mesa Review Entity	**Review**
Engineering	Plan review for water, sewer, roads, grading, and drainage including security plan coordination
Information Technology	Design approval
Water Resources	Design approval

Table 2-4: Construction Phase Reviews	
City of Mesa Review Entity	**Review**
Development Services[1]	Code inspection and building permits[1] Fire sprinkler inspections and permits[1]
Engineering	Construction inspection[2] for water, sewer, roads, grading, and drainage (as needed)
Notes: [1] Development Services inspections and building permits will be obtained by the CMAR. [2] Mesa Engineering construction inspections for water, sewer, roads, grading and drainage will obtained and managed by the CMAR.	

2.6 WORK BY OTHERS/COORDINATION

The IPS project design will require coordination with the following program projects by Others. These associated projects are summarized below in Table 2-5.

Table 2-5: Work by Others	
Project Name	**Description**
Central Mesa Reuse Pipeline North Segment CP0896	From about ½ mile souths of Thomas Road on Val Vista Drive to South of University Drive on Greenfield Rd
Central Mesa Reuse Pipeline South Segment CP0896	From University Drive on Greenfield Rd to South Recker Rd and E. Houston Ave

2.7 CONSTRUCTION MATERIAL REQUIREMENTS

Construction materials were selected to provide adequate and reliable service when subjected to the various water and chemical characteristics anticipated for the Class A+ reclaimed. The reclaimed water piping and valves shall be in accordance with:

- Arizona Administrative Code (AAC) and Arizona Revised Statutes (ARS)

- Maricopa Association of Governments (MAG), Uniform Standard Specification and Details for Public Works Construction, 2021
- City of Mesa Engineering Department, Engineering & Design Standards, 2021
- City of Mesa, Mesa Standard Details & Specifications: Amendments to MAG Uniform Standard Details & Specifications for Public Works Construction, 2021
- City of Mesa, Approved Products List – Water, 2021
- American Water Works Association, Standard C303, Current Version
- American Water Works Association, Manual M9, Current Version
- American Water Works Association, Manual M42, Current Version

Construction materials and coatings recommended for the CMRP Program for the 36-inch buried piping reclaimed water piping will provide additional protection against corrosion as a result of exposure to the existing in-situ conditions.

In addition, all materials which may come into contact with drinking water will conform to National Sanitation Foundation Standards 60, 61 and 372 and shall be lead-free as defined in Arizona Administrative Code (A.A.C) R18-5-504 and R18-4-101.

Bronze components of new equipment which that will be in contact with the water will be specified to be resistant to dezincification (less than 7 percent zinc) and de-aluminization. Galvanic couples between different materials are to be avoided.

All new ferrous metal surfaces, including surfaces cast in concrete (other than rebar), will be painted for corrosion protection with an epoxy enamel meeting the requirements detailed below in Table 2-6. Coatings will be checked for porosity with a holiday detector and will be repaired and the coating retested.

Table 2-6 lists some of the construction material requirements that will be incorporated into the design.

Table 2-6: Construction Material Requirements	
Location	**Material Requirements**
Reclaimed Water Piping	
Buried ≥ 36-inch	AWWA C303 Concrete Cylinder Pipe (CCP) w/ bonded joints and coal tar epoxy coating such as SW Targuard coal tar epoxy per Program standards.
Other Buried < 36" and above grade	Per Mesa Approved Product List – Water.
Steel – Above Grade	ANSI/AWWA C200. Steel with CML; CMC where buried and liquid epoxy coated where exposed. Min yield strength ≤ 45,000 psi and ≥ 36,000 psi.
DIP	DIP w/minimum ANSI/AWWA Pressure Class 350, CML with seal coat, liquid epoxy coated where exposed, asphaltic coating w/ two layers polyethylene encasement where buried. Where ductile iron pipe is also embedded or encased in concrete the polyethylene encasement shall be installed around the pipe for 5 feet extending into each end of the concrete encasement.
Submerged Surfaces	
Valves and Wall Fittings	
Interior and Exterior surfaces of ferrous metal and concrete in contact with reclaimed water	Epoxy Enamel (NSF certified system) Ameron "Amerlock 400 High- Solids Epoxy Coating", Carboline "Carboguard 891", or Tnemec "Series N140 Pota-Pox Plus", Immersion Service.
Valve Trim	Stainless steel AISI Type 316 or equivalent or low zinc bronze trim will be used. Elastomers to be used as conditions dictate.
3-inch and larger	Cement mortar lining.
Less than 3-inch	Copper, CPVC, or other as conditions dictate.
Pumps	Bronze alloys subject to dezincification or de-aluminization will not be used. Stainless steel AISI Type 316 or equivalent or low zinc bronze trim will be used.
Pump Bowls	Porcelain-enameled cast iron ASTM A48, Class 30.
Non-Abrasive Service	Cast iron, ASTM A48.
Abrasive Service	High chrome cast iron, ASTM A532 Type III or Ni-Hard, Brinell 500+.
Impellers	(1) ASTM B148 Nickel Aluminum Bronze Alloy C95800; or ASTM A743 stainless steel Grade CF-3M.
Non-Abrasive Service	Nickel Aluminum Bronze, ASTM B148 – C95800.
Abrasive Service	Stainless steel, AISI Type 316.
Impeller Wearing Rings	Bronze or martensitic stainless steel, Brinell 200-250.

Table 2-6: Construction Material Requirements	
Location	**Material Requirements**
Bowl Wearing Rings	Bronze, or martensitic stainless steel, Brinell 300+.
Bowl Assembly Shaft	Martensitic stainless steel, AISI Type 410 or 416.
Bowl Bearings	Bismuth tin bronze, C89835 – lead free.
Lineshaft	Martensitic stainless steel, AISI Type 410 or 416.
Lineshaft Sleeves	Martensitic stainless steel, Brinell 400+.
Shaft Couplings	Carbon steel or martensitic stainless steel.
Miscellaneous Submerged Supports	Stainless steel AISI 304(L) or 316(L).
Miscellaneous Metals – Not Submerged	
Pipe	Aluminum ASTM B429, Alloy 6061-T6, Schedule 40.
Shapes and Plates	Aluminum ASTM B308, Alloy 6061-T6, for shapes. ASTM B209, Alloy 6061-T6, for Plates.

3.0 HYDRAULIC DESIGN CRITERIA

Table 3-1 presents the projected NWWRP reclaimed water flows to the IPS. These include the initial annual average flows, buildout annual average flows, peaking factors and buildout peak hour flows.

Table 3-1: NWWRP Reclaimed Water Flows

Plant	Initial Annual Average Flow	Buildout Annual Average Flow	Buildout Peaking Factor	Buildout Peak Hour Flow
NWWRP	9 mgd	14 mgd	1.25	18 mgd

The NWWRP effluent pump station will convey reclaimed water flows into the break tank. The break tank will have a total volume of 0.5 million gallons, with a working volume of 0.25 million gallons. The remaining volume provides a 20-minute period for operations staff to address an emergency condition at the IPS before the tank overflows. The tank will overflow into the GRUSP discharge pipe. In the event that the isolation valve on the GRUSP discharge line (which is normally open) is closed, overflow will be conveyed through a secondary overflow pipe that discharges to the IPS onsite retention basin. However, this secondary overflow pipe includes a flow sensor that, upon detecting flow, will transmit a signal to shut down the NWWRP pumps. In the event that the secondary overflow flow sensor fails, the capacity of the retention basin provides approximately an additional 8 minutes for staff to address conditions to prevent any reclaimed water from being discharged offsite

The IPS pumps will be vertical turbine can pumps that will be selected to deliver the range of flows set forth in Table 3-1 against a TDH of 226 feet at the peak hour flow rate. The pumps will have adjustable frequency drives to maximize flow range. As at the NWWRP effluent pump station, the IPS pump station will include 2 duty, and 1 standby pumps.

Pumped flow from the IPS and SEWRP through the CMRP shall be coordinated such that combined flowrates listed in Table 3-2 are not exceeded. Table 3-2 shows the possible simultaneous flows and associated pumping configuration from the IPS and the SEWRP through the CMRP.

Table 3-2: Maximum IPS and SEWRP Flows Through CMRP (mgd)		
IPS (2 duty + 1 standby)	**SEWRP[1] (3 duty + 1 standby)**	**SEWRP[1] (2 duty + 2 standby)**
0	10.5	8.5
4.5	10	8.2
9	9	7.5
12	8.5	7.3
15	8	7
18	7.5	6.5

Note:
[1] Typical SEWRP pump configuration will be 3 duty + 1 standby however flow for 2 duty + 2 standby pumps is also shown.

3.1 SURGE TANK

The transient modeling and analyses performed on the IPS pumping station system as part of the July 2020-2021 Hydraulic Study by B&V showed the most critical surge event occurred during a power failure scenario when pumping to GRIC at maximum capacity, 18 mgd, while the other pump stations are off, and the GWRP wetwell and effluent pumping station are bypassed. The results showed unacceptable low pressures would occur without the addition of a surge mitigation system.

In order to mitigate surge impacts, a hydro-pneumatic surge tank system combined with the addition of dual 4-inch anti-slam combination air release and vacuum valves was chosen as the most effective strategy. A pressurized surge tank system can mitigate negative pressures very efficiently as it can store both energy and water and supply the pipeline after a pump station power loss event.

The July 2020-2021 Hydraulic Study recommended a 13,300 gallon pressurized air chamber (surge tank) for surge mitigation. The surge tank inlet/outlet pipe will be of 30-inch diameter and connected to the discharge manifold of the IPS pumps. The surge tank should maintain a compressed air volume of at least 2,000 cubic feet under normal conditions of pressure and temperature (at atmospheric pressure and 77 °F).

With the downhill pumping from IPS to GRIC maintaining positive pressure inside the entire length of the pipeline is not possible. For this reason, the surge tank is sized to control the pressure drop at the location of the anti-slam air valves and provide safe air valve operation.

3.2 AIR VALVES

The July 2020-2021 Hydraulic Study results showed that a hydro-pneumatic surge tank system, combined with the addition of dual 4-inch anti-slam combination air release and vacuum valves would be the most effective strategy to mitigate the impacts of the most critical transient event. The air release and vacuum valves are recommended to be installed at the three high points of the proposed 36-inch CMRP transmission line. Design for these valves and pipelines is by others.

3.3 HIGH PRESSURE RELIEF VALVE

Steady state and transient modeling and analyses were performed on the IPS Pumping Station system as part of the July 2020-2021 Hydraulic Study. When a pumping system includes downstream controlled valves, there is a possibility that these would close against operating pumps, and if no other outlet is available, the system pressure would rise and normally trip the pump on high pressure shut off. If the pump high pressure shut off control was to fail, the maximum pressure would raise up to the operating pump shut off head. In the proposed system the pump shut off pressures would be so high that pipe damage may occur. To prevent steady state pressures from exceeding 100 psi in the downstream pipeline system, a 12-inch spring type slow closing, high pressure relief valve is recommended at the IPS pump station. The opening set point for the valve is an HGL of 1510 ft, however, may need to be adjusted as a function of actual pump curves received during construction phase services.

4.0 CIVIL DESIGN CRITERIA

4.1 GENERAL

The following subsections provide information on general civil criteria to be used for the IPS design.

4.2 SITEWORK AND YARD STRUCTURES

The IPS site plan is shown in Appendix A. The site is bounded on the west by Val Vista Road, on the north and east by an Arizona Department of Transportation drainage channel and State Route 202 embankment, and on the south by Thomas Road. Thomas Road continues to the east where it is dead ends at its intersection with the SRP South Canal.

4.2.1 Site Arrangement

The planned IPS site process components/facilities include the following:

- Hydraulic break tank (0.5 MG)
- Pump Station
- Surge Tank with compressed air system
- Above grade piping, valves and flowmeters
- Electrical Building
- On-site stormwater retention basin

The masonry electrical building will be located on the east end of the site to maximize space for the 0.5 MG reservoir on the west side of the site. The electrical building footprint is estimated to be approximately 24 ft wide x 39 ft long. There will be a drive up to the roll up door on the west side of the electrical building for purposes of removing and loading electrical equipment.

Per the City's request there is a separate fenced and gated area on the south side of the site for locating the SRP service entrance section (SES) and transformer. This provides SRP with access to their equipment without accessing the site.

4.2.2 Site Access/Maintenance Provisions

The IPS site is small in area and individual components are arranged as required to best serve the process and as needed for equipment maintenance, removal and replacement. The site road is arranged to provide fire truck access and appropriate crane access for

lay-up for heavy equipment, including the reclaimed water pumps. The site road is designed so semi-trailer size vehicles can negotiate the site without being required to travel in a reverse direction for extended distances. Corners are provided with turning radii compatible with fire safety vehicles.

Per the City of Mesa Fire Department, the following dimensions are required for fire access:

- Gates - minimum 20 ft wide
- Drives – minimum 20 ft wide
- Curves – 35 ft interior radius and 55 ft exterior radius
- Load Capacity – 78,000 lbs

The ingress rolling gate will be inset to allow for vehicle parking and manual opening. There will be a knox box with key on the exterior side of the ingress gate for Fire Department access. There will be a sign on the ingress gate indicating FIRE ACCESS LANE. The egress gate will be automatic rolling type. Per Chris Clark of the Mesa Fire Department, an automatic optical sensor is not required for the exit gate.

The ingress side curbing to the electrical building should be painted red for fire lane identification.

Supplemental access to the site will be provided at the northwest corner of the site via a twenty foot wide gravel access road connecting to Val Vista Road. A manual swing gate north of the retention basin will provide access for maintenance and cleaning of the retention basin.

4.2.3 Yard Facilities

Yard facilities to be located around the IPS site include the following:

- One on-site stormwater retention basin
- Above grade piping and valves
- Rock or concrete paved drainage swales

The number of buried yard valves will be minimized to increase access for O&M and safety. Frequently operated valves will be located in an above-grade area where possible. Where manual operated buried valves are required, they will be gate valves per the CMRP

program standard. Direct-bury valves will be provided with appropriate protective coatings to minimize corrosion where applicable.

4.2.4 Buried Yard Piping and Electrical Duct Banks

Buried yard piping will be arranged to minimize piping and duct bank crossings. To the extent possible, buried piping and duct banks will be segregated into separate routing corridors to minimize potential conflicts and simplify future maintenance.

In general, the reclaimed water pipelines will be routed directly between facilities, while the main electrical conduits will be routed in the main plant drive around new facilities.

All potable water and reclaimed water piping will be provided with either sufficient clearance or protection as required by code.

For ease of the construction and future maintenance, new piping alignments will maintain the following minimum design clearances between the outer diameters of parallel lines, regardless of the lines being existing or new:

- 36-inch diameter or larger: 3-foot horizontal clearance
- 8-inch to 30-inch diameter: 2-foot horizontal clearance
- 6- inch diameter or smaller: 3-foot horizontal clearance
- Potable water parallel to sewer: 6-foot horizontal clearance

A minimum of 4 feet of cover will be provided on all major yard piping to allow for electrical conduit to have approximately 3 feet of cover. In areas where less cover must be provided, adequate protection will be provided. Vertical clearance between crossing pipes will maintain a minimum of 6 inches vertical clearance between opposing outer bell diameters.

Piping systems will generally be layered into the following levels to minimize conflicts and provide easy access to lines which are more likely to be accessed in the future. These levels, ordered from shallowest to deepest are:

- Chemical lines (future, if required)
- Electrical conduit or duct banks
- Potable water & service / fire supply water
- Larger diameter reclaimed water

4.2.5 Sanitary Sewer

No sanitary sewer is anticipated to be required on the IPS site. Washdown hose bibs will drain to grade and drainage will be directed to the retention basin.

4.3 SITE SURFACING

Unpaved areas of the site will be treated with decomposed granite for dust and erosion control. The site access drive will be concrete pavement with a design load of 78,000 lb. The electric building pad and smaller equipment pads will be reinforced concrete over an aggregate base course over sub-base. Pedestrian walkways will be concrete sidewalks per City of Mesa Standard details.

4.4 ACCESS DRIVEWAYS & SITE DRIVES

Access into and out of the IPS site will be through a semicircular drive which will be accessed from Thomas Road. This drive will provide access for maintenance vehicles and public safety and fire vehicles. The east driveway will include a recessed rolling gate. The west driveway will have an exit only automatic rolling gate. In addition, a man gate will be provided next to the east vehicle gate, which will be a manual swing gate. Each drive gate will be provided with emergency key box (Knox Box) for rapid access and provision for a *Secure*™ card access control system. The manual swing gate on the west corner of the north site wall will provide maintenance access to the retention basin. This gate will be accessed via a graded gravel maintenance pathway from Val Vista Dr. as described in Section 4.2.2.

4.5 PARKING

Parking on the IPS site will be limited to operation and maintenance vehicles and will be in unmarked areas next to the access drives. No visitor or ADA parking will be provided on the IPS site.

4.6 SITE DRAINAGE

The proposed onsite drainage conditions will convey flow in a general southeast to northwest direction. The site components will be bounded by an 8’ concrete security wall and graded to convey all onsite stormwater into the retention basin either through the valley gutter along the inside of the north security wall or by sheet flow. Further discussion and calculations for the site drainage can be found in the IPS Drainage Report.

The retention basin on the west side of the site is designed for the 100-year, 2-hour storm event. Total calculated runoff was less than 0.107 acre-feet. In accordance with the City of Mesa drainage and grading regulations the basin was designed with 4:1 side slopes and a maximum depth of 2.5-feet. An emergency overflow inlet will be at the 100-year, 2-hr elevation of 1291.5-feet allowing for interception of flows beyond the 100-year, 2-hour storm. The emergency overflow inlet allows water to be conveyed to its historical outfall within the ADOT drainage channel. The total retention volume of the proposed basin is 0.148 acre feet. The basin's storage was maximized to account for any emergency where the proposed reservoir overflow would be required to drain into the basin. The steel water tank will be drained through the dewatering standpipe on the inlet and outlet piping. Drained water will be conveyed to the retention basin. To drain the surge tank, a hose will be connected to the tank's drain outlet and routed to the retention basin. All retention calculations for the site can be found in IPS Drainage Report.

Based on percolation tests completed during preliminary design it was determined that the basin can drain within the 36-hour requirement through direct percolation. Mesa Standard 806.21.1 describes the requirements required for direct percolation. One of the requirements is that the basin be less than 12-inches in depth. The proposed basin does not meet this requirement as it is 2.5 feet deep. A variance request dated June 2nd, 2023 was delivered to the City of Mesa regarding this requirement and our recommendation to exclude it since the basin will be enclosed by the site's 8-foot perimeter wall and there is limited access and a low drowning risk to the public.

4.7 UTILITY CONNECTIONS

Electrical service will be provided by Salt River Project (SRP) from the existing 12.47 kVa overhead service which will be stepped down at the service entrance to a 480 V service. Chapter 9 of this Basis of Design Report provides greater detail on the existing and planned proposed electrical power distribution system design.

The City has indicated a preference for fiber optic (FO) communications to and from the IPS site. There is no available FO service at the IPS site. FO cable and conduit will be required to be extended either from the Public Safety Training Facility, which is approximately 1 mile southeast of the IPS site, or from McDowell Road north along Val Vista Drive; a distance of approximately 2 miles. The IPS site will communicate into the NWWRP network which shares a common control network with the SEWRP and the GWRP. Primary communications to the site will be through the GWRP SCADA network.

There is no provision for natural gas service on the IPS site.

The plant's primary source of potable water for washdown hose bibs will be through an extension of the existing potable water line located in the intersection of Thomas Road and Val Vista Drive to the east along Thomas Road. This water line will be extended from Val Vista Drive to the east under a separate project and will be tapped into under this project to provide potable water service to the IPS site.

5.0 ARCHITECTURAL DESIGN CRITERIA

5.1 GENERAL

This section describes the basis of architectural design for the new Electrical Building, free-standing metal shade structures, and the masonry wall and gates.

5.2 APPLICABLE CODES AND STANDARDS

The architectural design of the new structures will conform to the follow codes:

- 2018 International Building Code
- 2018 International Energy Conservation Code

The new structures will conform to the following occupancy requirements from the 2018 International Building Code:

Table 5-1: Occupancy Classification Requirements

E-House Electrical Building	
Occupancy	Group F-1
Type of Construction	Type II-B
Allowable Floor Area Actual Area	15,500 SF per story 928 SF
Allowable Building Height Actual Height	2 stories (55 FT) ~18 FT
Design Occupant Loads	100 SF/person (industrial) 300 SF/person (electrical and mechanical equipment rooms)
Means of Egress	2 minimum or maximum 75 FT travel distance
Accessibility	Not required (IBC 1103.2.9)
Fire Separation	Not required
Fire Sprinklers	Not required[1]

Note:
[1]Per Chris Clark Mesa Fire Department Per Mesa Code 903.1.1 exception 2 Fire Code Official deems Sprinklers in unoccupied Electrical Building are undesirable.

5.3 ELECTRICAL BUILDING AND SHADE STRUCTURE

5.3.1 Architectural Design Approach

The architectural design for the Electrical Building will follow the exterior aesthetics of the City's standards and be complementary to the site wall. The building will be one story

above grade, approximately 16'-0" in height. No roof access ladders are planned for the structure.

5.3.2 Wall Construction

Exterior walls will be single-wythe concrete masonry units (CMU) construction. The overall height of the walls will be approximately 16'-0" to accommodate a short parapet for roof flashing. The top of the parapet walls will be protected with a prefinished metal coping. Interior walls will be single-wythe 8-inch CMU construction for durability. The interior surfaces of CMU will be painted.

5.3.3 Roof Construction

Roof construction will consist of tapered rigid insulation with a single-ply thermoplastic polyolefin (TPO) membrane. Rainwater drainage will be accomplished with gutters and downspouts.

5.3.4 Floor Construction

The concrete floors throughout the building will be protected with a clear floor sealer finish.

5.3.5 Building Openings

All exterior personnel and service doors in the building will be of steel construction. Panic door hardware will be provided where required by code. No windows will be used for the building. There will be one roll up door for electrical equipment access provided on the west side of the building. At least one building door will have provisions for a *Secure*™ card access control system.

5.4 MASONRY SITE WALL AND GATES

The site will be surrounded by an 8 ft above grade concrete masonry fence wall matching the site walls of the Pioneer Crossing development located on the south side of Thomas Road. The west and south walls (N Val Vista Road and Thomas Road) will consist of smooth face concrete block and brick with stone veneer columns. The west wall will also have scuppers to allow flow to drain from the shoulder area along N. Val Vista Rd. into the retention basin. The remaining site wall and columns will be smooth face concrete block. The masonry block will be integral color reinforced concrete masonry unit. The site will consist of two motorized roller gates and three manual swing gates.

5.5 SHADE CANOPY

A shade canopy will be provided over the surge tank ancillary equipment and will consist of exposed steel columns, installed on cast-in-place concrete foundation and roof framing with metal decking roof. The shade canopy structure including support and anchorage will be a performance specification and designed by the canopy supplier. Fabric panels will be provided on the sides of the structure. A protective coating will be applied to all exposed steel. This is found to be the most cost-effective supply model as each canopy supplier has structural stock preferences and supply availability.

6.0 STRUCTURAL DESIGN CRITERIA

6.1 GENERAL

This structural design criteria establishes the minimum design requirements for building, liquid containing structures, yard structures, miscellaneous equipment foundations, non-structural components, piping supports, and other miscellaneous items requiring structural design.

6.2 APPLICABLE CODES, STANDARDS, AND REFERENCES

The codes, standards, and references listed below will serve as the basis for structural design.

- International Building Code (IBC), 2018 Edition with City of Mesa's amendment.
- ASCE 7-16: Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- Geotechnical Investigation Report.
- ACI 318-14: Building Code Requirements for Structural Concrete.
- ACI 350-06: Code Requirements for Environmental Engineering Concrete Structures and Commentary ACI 350R-06.
- ACI 350.3-06: Seismic Design of Liquid Containing Structures and Commentary ACI 350.3R-06.
- TMS 402/602-16: Building Code Requirements and Specification for Masonry Structures.
- Aluminum Design Manual, 2015 Edition.
- AISC Manual of Steel Construction, 15th Edition.
- AISC 360: Specification for Structural Steel Buildings, 2016.

6.3 MATERIAL PROPERTIES

6.3.1 Concrete

Concrete strength as indicated by nominal 28-day compressive stress:

- Cast-in-place structural concrete
  (flatwork, mortar puddle, and drilled piers): f'_c = 4,000 psi
  (environmental structures): f'_c = 4,500 psi
  (other structures): f'_c = 4,500 psi

- Structural concrete (precast/prestressed): f'_c = 5,000 psi
- Nonstructural concrete (concrete fill, duct banks, pipe blocking, pipe encasement): f'_c = 3,000 psi

6.3.2 Concrete and Masonry Reinforcement

- Deformed Reinforcing Bars (ASTM A615 or ASTM A706): f_y = 60,000 psi
- Welded Wire Mesh (ASTM A185 or A497): f_y = 60,000 psi

6.3.3 Masonry

- Masonry unit assembly: f'_m = 2,500 psi

6.3.4 Structural Steel

- W and WT Shapes (ASTM A992, Grade 50): f_y = 50,000 psi
- S, M, HP, C Shapes (ASTM A36 or ASTM A572 Grade 50): f_y = 36,000 psi
- Angles, bars, plates, and other structural shapes (ASTM A36): f_y = 36,000 psi
- Pipe sections (ASTM A53, Type E or S, Grade B): f_y = 35,000 psi
- Round Structural Tube sections (ASTM A500, Grade B): f_y = 42,000 psi
- Square and Rectangular Tube sections (ASTM A500, Type B): f_y = 46,000 psi
- Weld materials (ANSI/AWS D1.1, Table 3.1), using E70XX filler metal with minimum tensile strength: F_w = 70 ksi
- High strength bolts (ASTM A325, Type 1), tensile strength:
  (1/2 inch to 1 inch diameter bolts) F_t = 120 ksi
  (over 1 inch up to 1-1/2 inch diameter bolts) F_t = 105 ksi

6.3.5 Aluminum

- Aluminum Association standard shapes (ASTM B308, Alloy 6061-T6)
- Sheet and Plate (ASTM B209, Alloy 6061-T6)
- Material strengths for all aluminum materials:
  Tensile yield strength: F_{ty} = 35,000 psi
  Compressive yield strength: F_{cy} = 35,000 psi
  Shear yield strength: F_{sy} = 20,000 psi

6.4 LOADING CRITERIA

6.4.1 Dead Loads

Dead load will include the weight of all permanent construction including roofs, walls, floors, partitions, interior finishes, fixed equipment, tanks including contents, equipment bases, pipes, HVAC ducting, and electrical lighting.

Table 6-1: Dead Load Design Criteria	
Equipment, tanks, etc.	Actual weights
Pipe, 12 inch diameter and smaller	25 psf over full member length
Pipe, 14 inch diameter and larger	Actual weights
Phantom load	2,000 lbs on primary beams, 1,000 lbs on secondary beams
Concrete (normal weight)	150 pcf
Concrete (buoyancy check)	145 pcf
Roofing and insulation	Actual, (15 psf minimum)
HVAC ductwork (general)	5 psf
Lighting (general)	3 psf

6.4.2 Live Loads (Floor and Roof)

Floor and roof live loads shall be in accordance with ASCE 7 and the Building Code designated as “Office Buildings”. In addition, floor and roof live loads in buildings or structures used for mechanical process or equipment areas shall be designed for the minimum loads shown in Table 6-2 below. The anticipated pathway for transporting equipment or materials may be higher than the normal loading and would thus control design loads used for equipment lay-down. For large equipment areas, the combined weight of equipment and concrete pad plus an additional live load of 50 psf over the base area may be used as the live load. The equipment weight may be assumed distributed over an area 3’-0” all around beyond the concrete pad perimeter.

Table 6-2: Live Load Design Criteria	
Equipment or process operating areas	150 psf
Walkways, platforms, stairs	100 psf
Light storage Heavy storage	125 psf 250 psf
Electrical control room floors	250 psf
Roof live load (Unless used as an operating floor)	20 psf minimum (no reduction taken)

6.4.3 Snow Loads

Minimum ground snow load at the site is zero psf. Therefore, snow load will not be included in the design.

6.4.4 Wind Loads

Wind loads will be determined for primary frames and components of structures in accordance with IBC Section 1609 in conjunction with ASCE 7, Chapter 26. ASCE 7, Chapter 28 (Wind Loads on Buildings – MWFRS) will be used for low-rise buildings meeting the scope requirements of Section 28.1.1. For other structures, ASCE 7, Chapter 29 (Wind Loads on Other Structures and Building Appurtenances – MWFRS) will apply. ASCE 7, Chapter 30 will be applied to components and cladding. Basic wind load parameters are given in Table 6-3.

Table 6-3: Wind Load Design Criteria	
Risk Category	III
Basic (Ultimate) Design Wind Speed	110 mph
Basic (ASD) Design Wind Speed	85 mph
Ground Elevation Factor, K_e	1.0
Exposure Category	Exposure C

6.4.5 Seismic Loads

Seismic loads will be determined for primary frames and components of building structures in accordance with IBC Section 1613 in conjunction with ASCE 7, Chapter 11. ASCE 7, Chapter 12 will be the basis of design for buildings and similar structures. Non-structural components that are required to be designed for seismic loading will be designed for the seismic loads indicated in ASCE 7, Chapter 13. Non-building structures will be designed for the seismic loads indicated in ASCE 7, Chapter 15. Liquid-containing concrete structures will be designed for the seismic loads indicated in ACI 350.3. Interior walls and partitions will be designed for a minimum lateral pressure of 16 psf or 10% of effective dead weight (strength-level). Basic seismic load parameters are given in Table 6-4.

Table 6-4: Seismic Load Design Criteria	
Short period spectral acceleration (S_s)	0.205 g
One second period spectral acceleration (S_1)	0.070 g
Risk Category	III
Seismic Design Category	B
Structural System Coefficient	ASCE 7, Chapter 12

Table 6-4: Seismic Load Design Criteria	
Short period design acceleration (S_{DS})	0.177 g
One second design acceleration (S_{D1})	0.070 g
Importance Factor, (I_e)	1.25
Total Seismic Dead Loads	Actual
Soil Site Class	C

6.4.6 Soil and Backfill Loads

Lateral backfill loadings on walls and below grade structures will be based upon the recommendations of the geotechnical report. Geotechnical load criteria are indicated in Table 6-5.

Table 6-5: Geotechnical Loads Design Criteria	
Lateral earth pressures (psf/ft)	
• Active earth pressure (non-saturated)	40
• Active earth pressure (saturated)	81
• At-rest (non-saturated)	58
• At-rest (non-saturated)	89

A compaction load will be applied at the top of grade for buried walls to account for extra compaction stresses resulting from using mechanical compaction equipment. The compaction loading will be additive to the lateral earth pressure and will be a constant 400 psf decreasing linearly at the rate of the lateral earth pressure until the lateral earth pressure exceeds 400 psf.

Where vehicular truck traffic can come within a horizontal distance from the top of the structure equal to one-half its exposed height, the design shall include a live load surcharge pressure equal to 2-feet of earth for an equivalent HL-93 loading. This surcharge is not to be applied concurrently with the compaction load above.

6.4.7 Equipment and Piping Loads

Piping thrust loads will be considered live loads and will be located and sized prior to structural design.

6.4.8 Impact Loads

Structural systems will be designed for impact loads from machinery and other moving items. Impact loads will be determined in accordance with ACI 350.4R and IBC Section

1607.9 for machinery. Weight of machinery and moving loads will be increased as indicated in Table 6-6.

Table 6-6: Machinery and Moving Loads Design Percentage Increase	
Machinery loads	100%
Light Machinery, Shaft or Motor Driven	20%
Reciprocating Machinery or Power Driven Units	50%
Hangers for Floors and Balconies	33%

6.4.9 Load Combinations

Building structures, components, and cladding will be designed in accordance with the load combinations contained in IBC, Section 1605 or ASCE 7. Reinforced concrete for non-environmental structures will be designed using the load combinations in ACI 318, Section 5.3. Reinforced concrete for environmental structures will be designed using load combinations in ACI 350, Section 9.2.

6.5 DESIGN PROCEDURES

6.5.1 Reinforced Concrete Design

Liquid-containing structures, and below grade structures in contact with groundwater in normal conditions will be designed in accordance with ACI 350. Other concrete structures will be designed in accordance with IBC Chapter 19 and ACI 318. Concrete will be designed for 4,000 psi strength even when 4,500 psi strength is specified.

6.5.2 Steel Water Storage Tank Design

The 0.5 MG steel reclaimed water storage tank and supporting structure will be a performance specification and designed by the tank manufacturer. The tank shall be designed to comply with API 650 “Welded Steel Tanks for Oil Storage” and AWWA-D100 “Standard for Welded Steel Tanks for Water Storage”. Shop drawings, including calculations, will be required to be signed and sealed by a professional engineer registered in the State of Arizona.

6.5.3 Reinforced Masonry Design

Concrete masonry will be designed in accordance with IBC Chapter 21 and TMS 402. Where needed the wall would be provided with drains to mitigate ponding on the interior side. Where the interior grade is higher than the exterior grade and where grading may cause ponding on the interior side, the block wall will be provided w/ mastic waterproofing

on the interior side and a drainage board extending to wall drains draining to the exterior grade.

6.5.4 Structural Steel Design

Structural steel will be designed in accordance with IBC Chapter 22, AISC Manual of Steel Construction, and AISC 360.

6.5.5 Aluminum Design

Aluminum will be designed in accordance with IBC Chapter 20, and the Aluminum Design Manual.

6.5.6 Geotechnical Design

Geotechnical design will be in accordance with the criteria indicated in Table 6-7, which is obtained from the recommendations of the geotechnical report. Minimum frost depth for soil bearing foundations will be zero inches.

Table 6-7: Geotechnical Design Criteria	
Net-allowable soil bearing pressures	2000psf
Modulus of subgrade reaction, slabs-on-grade	200pci
Allowable passive earth pressure	204psf/ft
Soil/concrete coefficient of friction	0.53
Normal groundwater level elevation	N/A

6.5.7 Flotation

Structures will be designed to resist flotation based on the weight of the structure including weights of fixed equipment and soil above the top surface of the structure. Safety factors will be as indicated in Table 6-8.

Table 6-8: Flotation Safety Factors	
Normal Operating Condition	1.25
Extreme Maintenance or Flood Condition	1.1

While not currently anticipated, water retaining basins, if required, will be designed for uplift conditions when drained for maintenance. Uplift may be due to flood, groundwater, or perched groundwater (as determined by the geotechnical report) due to surface runoff or basin leakage. Uplift resistance may be obtained by weight of the structure. The uplift

resistance system, if required will be designed in conjunction with the geotechnical engineer.

6.5.8 Impact and Vibration Design

Structures supporting large equipment such as pumps and generators will be investigated for the effects of impact and vibration.

6.5.9 Non-Structural Components

Non-structural components (electrical and mechanical) listed under the Meteorological and Seismic Design Criteria Section of the technical specifications for non-structural components and their anchorage (created during detailed design) will be designed by the manufacturer for the seismic requirements specified in ASCE 7, Chapter 13, and structural calculations will be required to be signed and sealed by a professional engineer registered in the State of Arizona. Components located outdoors will also be subject to wind loading requirements as applicable.

The design for small piping and miscellaneous equipment supports shall be performed and provided by the Contractor in accordance with performance design specification prepared by Black & Veatch and based on the approved submittal data of the actual installed unit. The contract documents shall indicate the general locations and nature of the supports to be designed by the Contractor, while design force requirements and criteria will be provided in the specifications. The Contractor shall be required to submit design drawings and calculations to demonstrate that their proposed design meets the requirements of the contract documents. Black & Veatch will design pipe supports for pipes larger than 12” in diameter, with the contractor to be responsible for the support design for smaller diameter piping. Component anchorages would be bolted, welded, or other means to provide a positive direct connection without the benefit of frictional resistance produced by the effects of gravity. In addition to providing adequate support and attachment to the components, the effects of seismic relative displacements and movement would be considered in the design.

6.5.10 Shade Canopy

The shade canopy is a delegated design items under the contractors scope of work and will be performance specified. Delegated engineer who undertakes specialty design service regarding a portion of the engineering will design and comply with the most stringent requirements of the applicable building code, OSHA 29 CFR Part 1926 Subpart R, and all other pertinent OSHA regulations and local safety regulations. Shop drawings,

including calculations, will be required to be signed and sealed by a professional engineer registered in the State of Arizona.

6.6 SPECIAL INSPECTION REQUIREMENTS

Special inspections during construction are to comply with the applicable building code. The Code Required Special Inspections and Procedures specification will be provided to facilitate the special inspections program.

7.0 MECHANICAL DESIGN CRITERIA

The IPS will receive reclaimed water that is initially pumped from the NWWRP and conveyed into the CMRP pipeline for delivery the GRIC. Under normal operating conditions, reclaimed water that is pumped from the NWWRP will flow into the 0.5 MG on-site hydraulic break tank. The suction manifold of the pump station will be connected to the tank outlet.

When the GRIC is not in need of reclaimed water, the reclaimed water from the NWWRP as well as that from the SEWRP will flow north through the CMRP conveyance system to the GRUSP.

The City also desires the flexibility to split the NWWRP reclaimed water flow at various percentages to both GRUSP and GRIC through the IPS system.

Described in this section is the design for the major mechanical components of the IPS: the 0.5 MG tank, reclaimed water pumps, and surge mitigation system.

Building mechanical system basis of design information is described in Section 8. Building mechanical systems include plumbing, heating, ventilating and air conditioning (HVAC).

7.1 STEEL WATER STORAGE TANK (HYDRAULIC BREAK TANK)

The above grade steel water storage tank will provide a full hydraulic disconnect between the NWWRP-GRUSP system and the CMRP system. The tank will be a carbon steel circular tank on an above grade cast-in-place concrete foundation on the west side of the IPS site.

A minimum tank storage volume of 0.25 million gallons was recommended in the Hydraulic Analysis. This volume would provide a storage capacity of 10 minutes at the peak hour flow of 18 mgd, and a working volume of 0.125 million gallons. The volume of the break tank was increased at the City's request to 0.50 million gallons to provide approximately 20 minutes to react to emergency conditions at the IPS site.

Table 7-1: Water Storage Tank	
Tank type	Welded steel, AWWA D100
Tank corrosion protection system	Sacrificial anode
Volume, gal	500,000
Normal Working Volume, gal	255,000
Diameter, ft	66

Table 7-1: Water Storage Tank	
Tank floor elevation	1293.50
Normal maximum operating HGL, ft	1303.46
Approximate Tank height (above grade), ft	25
Connected Pipe size	
Inlet	24 in. through slab w/ 6 in. silt stop above floor
Outlet	36 in. through slab w/ 6 in. silt stop above floor
Overflow (side top), in	36
Maximum tank inlet design flow rate, gpm	12,500
Minimum tank inlet design flow rate, gpm	3,173
Maximum discharge design flow rate, gpm	12,500
Minimum discharge design flow rate, mgd	3,173
Tank Overflow[1]	
Tank design overflow rate, mgd	18
Tank overflow line size, in	36
Overflow weir elevation	1311.50
Tank Drain size, in	8
Tank Side Access Manway	
Number	1
Size, in	36
Centerline distance above grade, in	42
Tank top Access Manway	
Number	2
Type	One 36-in sq rectangular (access) One 24-in sq rectangular (over overflow)
Vents[2]	Two 12-in

Notes:
[1] The tank will include an overflow pipe that will discharge into the GRUSP delivery pipe.
[2] Vents to be sized for the larger mismatch for inlet and outlet flow or uncontrolled drainage from 8-inch pipeline puncture.

7.2 PUMPS

The IPS pumps will be vertical turbine can-type pumps. There will be a total of 3 pumps; 2 duty and 1 standby. The pumps will be designed to deliver a range of flows up to the peak hour flow of 18 mgd against a TDH of 226 feet.

Table 7-2: Intermediate Pump Station

Description	Value
Number	3 (2+1) PVT-00-011 PVT-00-012 **PVT-00-013**
Rated head, ft	226
Pump capacity at rated head, gpm	5450
Motor horsepower, HP	650-700
Pump Drive	Adjustable Frequency Drive
Connecting pipe size, in	16
Discharge Check Valve, type	Dual Disc (Non-Slam)
Discharge Manifold size, in	36
Discharge Flowmeter Type	Magnetic
Discharge Flowmeter size, in	16

7.3 SURGE SYSTEM

The maximum allowable surge pressure in the CMRP system is 150 psi. The IPS surge system will consist of a surge tank and air compressor.

7.3.1 Surge Tank

A surge tank will be provided as a part of a surge control system designed to minimize the effects of transient pressure waves in the pipe distribution system. The surge tank will control surge associated with normal pump stop and start, pump power failure, and pipeline filling/draining.

The surge tank will be a hydro-pneumatic pressure vessel of welded construction in accordance with American Society of Mechanical Engineers (ASME) Boiler and Pressure Code – Section VIII.

A summary of the surge tank design criteria is presented in Table 7-3:

Table 7-3: IPS Surge Tank Mechanical Design	
Description	**Value**
Surge Tank type	Welded steel air chamber[1]
Capacity, gal	13,300
Minimum volume of air at atmospheric pressure, ft^3	2000[2]
Surge tank orientation	Horizontal
Inside diameter, ft	10.5
Approx. straight side length, ft	18
Design Temperature	150° F
Maximum working pressure due to surge, psig	150
Air chamber design pressure, psig	200
Connection line to force main, in	30
Minimum Maintenance Access Manway Diameter, in.	36

Notes:
[1] Tank design, materials, fabrication, erection, and testing of the air chamber shall conform to all sections of ASME Boiler and Pressure Vessel Code, Section VIII for Unfired Pressure Vessels.
[2] At atmospheric pressure and 77º F.

The IPS surge tank will be a 13,300 gallon welded steel pressure tank rated for 225 psi. The tank will normally be filled with water and a pad of air to maintain a minimum quantity of air volume corresponding to a volume of 2,000 cubic feet at atmospheric pressure and 77°F. The surge tank will have a maximum temperature of 150^0 F.

7.3.2 Air Compressor

The surge control system will require a compressed air system to keep the surge tank pressurized. The system will consist a single air-cooled, reciprocating air compressor with an air receiver. The air compressor and accessories will be located adjacent to the surge tank under a shade structure.

The following is the design criteria for the Air Compressor System.

Table 7-4: Air Compressor	
Description	**Value**
Type	Reciprocating
Number	1
Service conditions	
Barometric pressure, psia	14.1
Ambient air temperature range, ºF	37 to 110
Maximum ambient air design temperature, ºF	150
Design relative humidity at max. ambient air temperature, %	60
Capacity rate, scfm	15
Maximum pressure, psi	125
Motor horsepower, hp	15
Compressor approx. dimensions, LxWxH, in	41x30x37
Min. clear distance, all sides, in	36
Air receiver nominal volume, gallons	500
Air receiver dimensions, dia x H, in	36x117
Minimum design pressure, psi	150

7.4 CONTROL VALVES

There will be a single flow/pressure control valve at the IPS. The 16” control valve will be a ClaVal-type valves. The City’s Backflow Prevention Program Office determined that there was potential for cross contamination of the potable water system by reclaimed water flowing through the control valves if the pilot source of water was potable water. Therefore, the pilot source water will be reclaimed water from the 36” line from SEWRP.

7.5 AIR/VACUUM RELEASE VALVES

There will be two, 2-inch combination air/vacuum release valves on the 24-inch pipe common to the hydraulic break tank inlet and the GRUSP discharge connection. Air release valves will also be located on the discharge of each of the IPS pumps. A 3-inch air release valve will be located on combined pump discharge pipe, upstream of the surge tank. Combination air/vacuum release valves will be placed on high points of pipes where needed.

Additionally, dual 4-inch anti-slam combination air release and vacuum valves will be installed in the proposed 36-inch CMRP transmission line. Each set will be installed at one of the three highest points of the proposed transmission line.

7.6 PRESSURE RELIEF VALVES

An 12-inch pressure relief valve will be located on the discharge pump manifold. The pressure relief valve will be a spring actuated slow closure valve. The blowoff piping from this valve will be routed to the pump suction header. The pressure relief valve will be an APCO series 3000 PRV, or equal.

7.7 MISCELLANEOUS VALVES

7.7.1 Butterfly Valves

Butterfly valves will be used for isolation of the control valve and pumps.

8.0 BUILDING MECHANICAL DESIGN CRITERIA

8.1 GENERAL

This section presents the criteria and basis of building mechanical design associated with the plumbing and HVAC. The intent of this section is to define the design criteria, establish the minimum design requirements, and describe the building mechanical systems. The selection of the systems will be based on operating performance, system efficiency, life safety considerations, long-term durability, redundancy, local representation/service, ease of operation as well as site and specific requirements identified by the project team or Owner as described herein.

8.2 APPLICABLE CODES AND STANDARDS

In addition to the applicable building codes and standards previously identified, the system designs will also be based on but not limited to the following publications and standards:

- American Society of Plumbing Engineers (ASPE) Handbooks.
- American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) Handbooks and Standards.
- Sheet Metal and Air Conditioning Contractor National Association (SMACNA) Handbooks.
- National Fire Protection Association Recommended Practices (NFPA) and Manuals.
- Recommended Standards for Sewage Works - Great Lakes - Upper Mississippi River Board of Sanitary Engineers (10 States Standards).
- Occupational Safety and Health Act (OSHA) Standards Manual.

8.3 LOCATION & METEOROLOGICAL DESIGN CRITERIA

Table 8-1 describes the design criteria that will be used for the building mechanical systems.

Table 8-1: Location and Meteorological Design Criteria

Criteria	Value
Site Elevation, above sea level, ft	1473
Site Location(1)	
Scottsdale Municipal, AZ, USA	
North Latitude, degrees	33.623
West Longitude, degrees	111.911
Ambient Design Temperatures (2)	
Winter, design dry bulb, F	38.7
Summer, design dry bulb/mean coincident wet bulb, F	106.4 / 68.1
Climate Zone	2B
Climate Data	
Mean Daily Dry Bulb Temperature Range, F	20.1

Notes:
(1) The site location is for determining representative weather data for the project site but is not necessarily the specific project location.
(2) The winter and summer design temperatures are based on the ASHRAE frequency levels 99.0 percent and 1.0 percent, respectively.

8.4 MATERIALS

Materials will be selected giving preference to those materials that require the least maintenance and have the longest life. These are summarized in Table 8-2.

Table 8-2: Mechanical Systems Materials

System	Materials
Water Systems	Copper

8.5 SEISMIC

The seismic design will comply with the “Seismic Design Requirements for Nonstructural Components” of the latest edition of American Society of Civil Engineers Standard ASCE/SEI 7, “Minimum Design Loads for Buildings and Other Structures”.

8.6 PLUMBING DESIGN

The following is a description of the plumbing systems serving the facility.

8.6.1 Storm Drainage Systems

The roof drainage system of the IPS Electrical Building will consist of gutters and downspouts which will discharge above grade to splash blocks. Refer to Section 5.3.3 for further details.

8.6.2 Sanitary Drainage Systems

There are no sanitary drainage systems planned for this project.

8.6.3 Water Piping Systems

The anticipated water pressure is approximately 50-70 psig, therefore water pressure boosting equipment will not be required. Where the water pressure exceeds 80 psig, pressure reducing stations will be provided to reduce the water pressure. Water metering equipment will be required. Piping materials will consist of soft annealed copper tubing with flared fittings for buried sizes 2 inch and smaller and Type K hard drawn copper tubing with solder joint fittings for above grade piping.

All materials in contact with the potable water will comply with the Safe Drinking Water Act of 1986 as amended by the Reduction of Lead in Drinking Water Act of 2011. All plumbing fittings and fixtures intended to convey or dispense water for human consumption will comply with the requirements of NSF/ANSI 61 and NSF/ANSI 372 for low lead.

Protection of the potable water system will be in accordance with City of Mesa codes or standards. Vacuum breakers will be provided on hose faucets served by the potable water system.

A new yard hydrant will be provided around the new outdoor IPS Pump Station that may require periodic washdown.

8.7 HEATING, VENTILATION, AND AIR CONDITIONING

The following is a description of the HVAC systems that will be included on the project.

8.7.1 Indoor Design Conditions

Table 8-3 describes the indoor design conditions that will be used for the design of the HVAC system.

Table 8-3: Indoor Design Conditions					
Area	Design Temperatures (F) (1)			Ventilation Requirements	Ventilation Notes
	SUMMER	WINTER(2)			
	DESIGN	DESIGN	SETPOINT		
IPS Electrical Building					
Electrical Room	85	---	---	Air Conditioned	1
ITD Room	78	---	---	Air Conditioned	1

(1) Indoor conditions reflect operating temperatures for personnel comfort, code/standard recommendations, or equipment protection.

(2) No heating systems are planned.

Note:

1. The ventilation rate will be based on the exhaust requirements or as required by ASHRAE 62, whichever is more stringent.

8.7.2 HVAC General Requirements

8.7.2.1 Air Filtration

Outdoor air will be filtered for areas serving air-conditioned areas. Filtration will consist of 2 inch (50 mm) disposable pleated media filters with a minimum efficiency reporting value (MERV) based on ASHRAE 52.2 guidelines of at least 8.

8.7.2.2 Internal Load Factors

Heating and cooling loads will be calculated in accordance with ASHRAE Standard 183-2007. Internal heat gains will be included in the calculations based on the following:

- Lighting: 1.3 watts/sq ft (unless otherwise indicated)
- Equipment: Equipment heat loss from equipment anticipated to operate simultaneously

8.7.2.3 Ductwork

The electrical building will utilize wall-mounted units. Therefore, no ductwork is anticipated.

8.7.3 Heating Systems

There are no heating systems planned for this project.

8.7.4 Exhaust Air Systems

There are no exhaust air systems planned for this project.

8.7.5 Air Conditioning Systems

In the IPS Electrical Building, the air conditioning systems will consist of multiple single zone, constant volume, packaged wall mounted air conditioning units. Two air conditioning units will serve the Electrical Room and one air conditioning unit will serve the ITD Room. Each unit will be controlled by a remote wall mounted thermostat to maintain the desired space temperature. Each unit serving the Electrical Room will be equipped with economizers for free cooling capabilities in the cooler seasons.

8.7.6 Building Control Systems

The HVAC controls will consist of automatic industrial grade electromechanical and electronic controls. Control component enclosures will be selected based on the environment where they are installed. Typical controls will consist of the following:

- Differential pressure gauge and differential pressure switch with alarm across air filters.
- Programmable electric thermostats for control of packaged air conditioning systems.
- Temperature sensor to alert SCADA when the cooling systems are not functioning properly.

A microprocessor-based standalone system or building automation system (BAS) is not anticipated for the facilities due to the environment and simplicity of the HVAC systems. However, if deemed preferable by the City, a BAS system can be incorporated to replace the electric and electronic controls and provide central monitoring, operation, and management of the HVAC systems.

8.8 FIRE MONITORING

A fire monitoring system will be provided for the IPS electrical building. The fire protection design will be in accordance with Mesa adopted building and fire codes. Per Chris Clark Mesa Fire Department Per Mesa Code 903.1.1 exception 2 Fire Code Official deems Sprinklers in unoccupied Electrical Building are undesirable.

A fire and smoke detection monitoring and fire alarm system / control panel will be provided. It will transmit alarm signal at constantly attended location or approved UL listed supervising station. The HVAC units serving the Electrical Room will shutdown upon fire and smoke detection.

9.0 ELECTRICAL DESIGN CRITERIA

9.1 GENERAL

This section presents the general electrical design criteria for the electrical power system at the Intermediate Pumping Station (IPS). The intent is to provide a safe and reliable means of delivering and distributing power while maintaining ease of maintenance as much as possible. The following criteria also address a number of other electrical requirements that are not specifically related to power delivery.

9.2 CODES AND STANDARDS

Electrical design shall conform to the latest editions of the following applicable standards and codes:

- National Electrical Code 2017 (NEC-NFPA 70)
- National Electrical Safety Code (NESC)
- Life Safety Code (NFPA-101-AB)

Standards and codes of the following organizations shall also govern where applicable:

- Standard for Electrical Safety in the Workplace (NFPA 70E)
- American National Standards Institute (ANSI)
- Illuminating Engineers Society (IES)
- Instrument Society of America (ISA)
- National Electrical Manufacturers Association (NEMA)
- National Electrical Testing Association (NETA)
- Institute of Electrical and Electronic Engineers (IEEE)
- Insulated Cable Engineers Association (ICEA)
- Occupational Safety and Health Act (OSHA)
- American Society for Testing and Materials (ASTM)
- Underwriters Laboratory (UL)
- Utilities Process Controls Specifications

Applicable Federal and local codes and UL listing requirements shall be followed, including the Lighting Control Ordinance of the City of Mesa Lighting and Electrical Code.

Exit signs, emergency egress lighting, and emergency lighting power supply will conform to requirements of the local code authority.

9.3 POWER DISTRIBUTION PLANNING

The electrical design for the project will follow the current design guidelines as recognized by IEEE and current industry standards.

The IPS facility will receive a new utility service from Salt River Project (SRP) and will be powered from a new 2000kVA, 12.47kV - 480V pad mounted utility transformer. The utility transformer will connect with a new 2000A, 480V, three-phase, four wire service entrance section (SES) where utility metering occurs, and a circuit breaker disconnect is installed. The SES will then power a new 480V main indoor switchboard that feeds the new IPS pump adjustable frequency drives (AFDs) and a new low voltage motor control center (MCC).

As described above, the IPS electrical distribution system includes a 2000A, 480V three-phase, three wire main indoor switchboard located in a new electrical building. The main switchboard provides power to a 600A, 480V MCC. The main switchboard also feeds power to three 480V, 450HP AFDs for the IPS pumps. The main indoor switchboard will include a dedicated circuit breaker that connects to an outdoor docking station for connection to a temporary portable generator to ensure backup power to the facility when the primary power service is unavailable. For safety purpose, a key interlock will be provided between the main switchboard main incoming breaker and the main switchboard breaker for the generator docking station. The new electrical building will house the main switchboard, three low-voltage AFDs for the intermediate pumps, one low-voltage MCC, lighting panel, and auxiliary electrical support equipment.

Smaller equipment and standard utilization power will be rated at 120/208V as desired. The electrical building will also house an Uninterruptible Power System (UPS) to support lower voltage loads critical to pumping station operation such as pumping station control system Programmable Logic Controllers (PLC's), process control instrumentation, and network equipment. The UPS will provide a reliable source of uninterruptible power with no break in AC output power during complete or partial interruption of supply voltage. The UPS will be provided with an external maintenance by-pass system and will include audio/visual alarms for monitoring performance

9.4 DISTRIBUTION/UTILIZATION VOLTAGES

Plant distribution voltage will be 480 volts, grounded wye, 3-phase (low-impedance grounded). Utilization voltage will be 480 volts, solidly grounded wye, 3-phase. The following equipment voltages will be used:

Table 9-1: Utilization Voltages	
Equipment	**Power Supply**
Emergency lighting	120/208 volts, single-phase
High-pressure sodium, Metal Halide, or LED lighting	120/208 volts, single-phase
Convenience outlets	120 volts, single-phase
UPS	120 volts, single-phase
Motor Control	120 volts, single-phase
Motors, greater than 1/2 HP	480 volts, three-phase
Motors, less than 1/2 HP	120 volts, single-phase

9.5 LOAD ANALYSIS

A preliminary load survey was prepared to help plan the power distribution system. Major loads, including future and standby load values were identified to establish load center sizes. Redundant and standby units were excluded from the total running load to establish the critical load requirements. In addition, some diversity factors were considered for the expected loads.

The final loads will be analyzed during detailed design. Final computations will be based on the actual loads shown in the drawings, HVAC and general load for the electrical building, process load on actual motor horsepower, and the connected lighting load.

Electrical distribution equipment preliminary load summary information is shown in Table 9-2 below.

Table 9-2: Electrical Distribution Equipment Load Summary		
Equipment Description	**Max Connected Load (Amp)**	**Max Running Load (Amp)**
Main Indoor Switchboard @480V	1800	1253
MCC@480V	200	170

9.6 ELECTRICAL POWER EQUIPMENT

The following criteria identify the general requirements and guidelines to be used for the electrical power equipment and support systems in the electrical design.

9.6.1 Low Voltage Switchboard

The incoming power from the outdoor utility transformer will be distributed by low voltage switchboards. The SES switchboard will be installed outdoor near the utility transformer and will be service entrance rated. The main distribution switchboard will be installed indoor and will distribute power to various loads. SES switchboard will be 480 volts, three-phase, four-wire. Main distribution switchboard will be 480 volts, three-phase, three-wire. The SES switchboard enclosure will be NEMA 3R outdoor rated. Switchboard will have copper phase buses and a copper ground bus. The circuit breakers on the switchboard will be molded case type with solid state trip units. Transient voltage surge suppressors will be provided integral to each switchboard assembly. The switchboards will be sized to handle new and future loads. Switchboards will be specified to be manufactured by Cutler-Hammer (Eaton), Siemens Automation or Square D without exception

9.6.2 Low Voltage MCCs and Starters

Indoor, Class II Type B wiring MCCs will be used in areas that will contain multiple motors. The supply circuit to MCCs will be 480 volts, three-phase, three-wire. MCCs will have copper phase buses and a copper ground bus. MCCs will be specified to be manufactured by Cutler-Hammer (Eaton), Siemens Automation or Square D without exception. Some spares and spaces will be allowed (on the order of 5 percent spares and 10 percent spaces). Transient voltage surge suppressors will be provided integral to each MCC assembly.

Solid-state reduced voltage motor starters may be utilized where required due to power utility requirements. It is anticipated that motors 75 HP and above may require solid-state reduced voltage starters or AFD's. This will be evaluated in the detailed design phase.

Except for packaged and HVAC equipment, motor starters will generally be located within the MCC. Starters will include a green indicating lamp for OFF, a red indicating lamp for RUNNING and an amber indicating lamp for trouble for FAILURE (where applicable).

9.6.3 Motors & Adjustable Frequency Drives

Motors will be specified with a premium efficiency rating. Motor enclosures will be suitable for the environment in which they are installed. All motors driven from adjustable frequency drives (AFDs) will be inverter duty rated.

All motors shall have a service factor of 1.15. Motors larger than ½ horsepower will be designed to operate on 480V, three-phase. No heaters will be provided for motors.

AFDs will be pulse width modulated type. AFDs will be fed from a dedicated 480V, three-phase feeder from main indoor switchboard. A harmonic analysis will be provided on the connected bus serving AFDs. Drives for motor larger than 75hp will use18 pulse type drives or active front end to minimize harmonics.

9.6.4 Low Voltage Panelboards

Lighting panelboards will be 208Y/120-volt, three-phase, four-wire type with the main circuit breaker sized to match the lighting transformer capacity. Panelboards will be surface mounted in process areas and flush mounted in office or other finished areas.

Panelboards will be provided to supply power to instruments and control panels where the equipment to be supplied requires a conditioned power supply.

Each panelboard will have a minimum of 20 percent spare breakers with spaces, bus work, and terminations to complete the standard size panelboard. Panelboard schedules will show the circuit description, protective device trip rating, number of poles, rating of main lugs or main circuit breaker, neutral bus size, ground bus size, and interrupting rating of breakers.

9.6.5 Transformers

Transformers that supply 208Y/120-volt three-phase power will be dry-type suitable for the areas where they will be located. Transformers will be industry standard, EE energy efficient, and in readily available sizes. All transformers will be provided with copper windings. Transformers will be specified to be manufactured by Square D, Cutler Hammer (Eaton) or Siemens without exception.

9.6.6 Convenience Receptacles

Convenience receptacles for general service will have ground fault interrupting capability (GFCI) and will be spaced not more than 40 feet apart at the pump station and 75 feet apart in other areas. Receptacles will be located near all air conditioning units and air handling units as required by NEC.

Where wash down is expected, outlets will be located 48 inches above the floor and furnished with weatherproof covers.

9.6.7 Cable

All lighting, control and power wiring rated 600 volts and below will use stranded cable.

All 600-volt No. 10 AWG and smaller power cable shall have THHN/THWN insulation.

All 600-volt No. 8 AWG and larger power cable shall have XHHW insulation.

Individual No. 14 AWG conductors will be used for discrete control circuits, unless it is practical to use multi-conductor cables to group control circuits. Multi-Conductor cables shall have 600V insulation.

Twisted-shielded pair control cable shall be 16 AWG individual stranded copper conductors and shall have an aluminum Mylar tape shield around the pair with PVC insulation.

9.6.8 Raceway

Specific types of raceway will be chosen for use in various locations in the facility based on moisture, temperature, exposure to damage, corrosion, and voltage. An underground duct bank consisting of concrete-encased, polyvinyl chloride (PVC) conduits will be provided for all circuits that are routed outside on the site.

The following systems shall be grouped in duct banks:

- Power wiring above 600 volts.
- Power and discrete control wiring below 600 volts.
- Process instrumentation analog and communication wiring, including 24-volt discrete signals, intrinsically safe circuits, and LAN/Data Highway computer circuits shall be routed in steel conduit. Intrinsically safe circuits and computer circuits shall be carried through dedicated handholes and manholes or in steel raceway.

Duct banks will generally include a minimum of two spare conduits. Underground raceways that are not installed in a duct bank will be direct buried, Schedule 40 PVC conduit. All 90 degree bends will be PVC coated rigid steel conduit.

The following general guidelines shall be used for raceway sizing, selection, and installation:

- The minimum diameter of exposed conduit in all areas will be 3/4 inch. Exception may be made for short distances from a junction box to a device which has a 1/2- inch knockout provided by the manufacturer of the device.
- Concealed conduits will not be smaller than 1-inch.

- Raceways in duct banks will not be smaller than 1-inch.
- Embedded and buried nonmetallic conduits will be converted to PVC coated rigid steel conduit before exiting from masonry or earth and continue 6 inches above finish grade. All 90 degree bends will be PVC coated rigid steel conduit.
- The number of conduit bends will be limited to an equivalent of 270 degrees on long runs.
- Exterior, exposed conduit will be PVC-coated rigid galvanized steel.
- Exterior, underground, direct-buried conduit will be Schedule 40 PVC.
- Exterior, underground, concrete-encased conduit will be Schedule 40 PVC.
- Interior, exposed, non-corrosive, dry areas, conduit will be galvanized rigid steel.
- Exposed conduits in corrosive indoor areas will be PVC coated rigid steel.
- All conduit stub ups shall be PVC coated Rigid Steel.
- Duct bank concrete shall have red powder applied on top when poured.

9.6.9 Grounding & Lightning Protection

The electrical system and equipment will be grounded in compliance with the NFPA National Electrical Code (NEC). Conductors will be a minimum of No. 4/0 AWG copper for interconnecting ground rods and for connections to transformers, MCCs and switchboard. A grounding ring will be provided around new buildings and major structures. Ground rings will be connected together by ground cable installed along the outside of each duct-bank. Electrical equipment, devices, panelboards, and metallic raceways that do not carry current will be connected to the ground conductors. Transformer neutrals of wye connected transformers will be solidly grounded through a grounding conductor connected to the grounding system. A ground wire will be installed in all raceways that contain power conductors at any voltage.

A lightning risk factor calculation will be completed for the project. If the calculated risk of lightning strike is substantial, lightning protection systems meeting the requirements of NFPA 780, Standard for Lightning Protection systems, will be provided for the appropriate new buildings or structures.

9.7 LIGHTING REQUIREMENTS

Lighting levels for all lighting will be designed following the recommended levels as suggested in the Illumination Engineering Society (IES) handbook. The suggested foot

candle levels will be the targeted levels for design. Lighting shall be shielded to maintain dark sky ambience and mitigate light pollution off-site. The following table shows the suggested foot candle levels for facility areas required to be illuminated:

Table 9-3: Plant Illumination

Plant Area	Illumination Level
Roadways	1 foot candle
Door egress/ingress	1 foot candle
Process Areas, Outside	5 foot candles
Walkways	5 foot candles
Exterior Building	1 foot candles
Electrical Building	35 foot candles

The following general types of light source will be used to provide the proposed foot candle levels:

Table 9-4: Light Sources

Plant Area	Light Source
Process, above 14 feet mounting heights	LED
Walkway, outside	LED
General site	LED

9.7.1 Aesthetic Considerations

To address the issue of light pollution at the facility all exterior light fixtures (luminaries) will be “Full Cutoff” type luminaries. If necessary, shielding may also be added to cut down on light trespass.

9.7.2 Equipment and Lighting Control

LED lamps will be used on all exterior luminaries and process areas. LED lamps will also be used for all other indoor areas.

All building and pole mounted exterior luminaries will be controlled by photo-electric cells and timers to control how long the lights remain on after personnel have left the area. Luminaries on or near miscellaneous yard structures will be manually switched. All luminaries mounted on buildings or near miscellaneous yard structures will be powered from a 120 volt AC power source. Poles will be furnished with 120 volt AC duplex

receptacles to provide convenience power for maintenance personnel. All roadway luminaries will be powered from 120 or 208 volt AC power source. All roadway luminaries will be mounted on 20'-0" poles, and furnished with LED lamps.

9.8 SHORT-CIRCUIT / VOLTAGE DROP ANALYSIS

For purposes of design, estimated short-circuit levels and steady state voltage drops will be calculated during detailed design using a computer-based program. Short-circuit values obtained will be used to specify the appropriate short-circuit ratings for electrical equipment. Design will generally be such that voltage drops will not exceed 3 percent for branch voltage and 5 percent for bus voltages under steady-state conditions.

9.9 HARMONICS ANALYSIS

Since it is anticipated that the project will require the use of AFDs, a harmonics analysis on the power distribution system will be specified to be performed by the contractor. The purpose of the analysis will be to ensure that the total harmonic voltage and current distortion limits will not exceed those as set forth in IEEE 519.

9.10 SECURITY SYSTEM

Security countermeasures will be employed at the intermediate pumping station and are intended to reduce the vulnerability of the pump station to a low risk level. City of Mesa will provide locations for security cameras for the IPS site. Conduits will be provided to the installation locations of security cameras. IPS site entrance gate and electrical building will have key card entry.

9.11 FIRE ALARM SYSTEM

A fire alarm system will be included in the Electrical Building and coordinated with City of Mesa Building & Fire Safety as required by applicable codes. Smoke detectors and manual fire stations will be provided for the Electrical Building and connected to the fire alarm control panel.

10.0 INSTRUMENTATION AND CONTROL DESIGN CRITERIA

This section describes the instrumentation and control system design criteria for the Central Mesa Reuse Pipeline – Intermediate Pump Station (IPS). The plant control system (PCS) will generally match the standards utilized at other City of Mesa water and wastewater facilities. The control system will be connected to the City's existing SCADA system for remote monitoring and controls. The Control System Network Diagram is included in Appendix C.

10.1 GENERAL

The PCS utilizes a field mounted Operator Interface Terminal (OIT) and a programmable logic controller (PLC) as the process control equipment. All major process equipment is monitored by the PCS. A remote communication link between the Intermediate Pump Station (IPS) and the City of Mesa SCADA system will be provided via a fiber optic network.

The PCS equipment will be provided and installed by a control system integrator/supplier who regularly engages in providing SCADA control systems for water projects of similar size and complexity. The control system integrator/supplier will operate as a subcontractor to the General Contractor.

The PLC, operator interface terminals, and process control instruments will be powered from a UPS system.

10.1.1 Existing City of Mesa Control System

The City of Mesa has standardized on certain types of control system hardware and software, such as Modicon M580 large PLCs, Modicon M340 small PLCs, Red Lion Graphite series OIT, Ethernet Modbus TCP communications networks (type of communication is based on the equipment being communicated with), and Intellution iFIX Human-Machine Interface (HMI) software. This same brand and type of hardware and software will be utilized for the IPS control system.

The following is a list of the new equipment to be installed:

1. IPS PLC panel.

10.2 IPS CONTROL SYSTEM

The IPS control system will meet the requirements of the City's Utilities process controls specifications and will include major components and features as described herein.

10.2.1 Central Control Locations

The plant is normally monitored and controlled from a control room located in the Operations Building at the Greenfield WRP.

10.2.2 PLC Hardware

The IPS control system will utilize a non-redundant Modicon M340 series PLC in a single backplane rack. The rack will contain the power supply, analog modules, discrete modules, and Ethernet communication module.

An Operator-Interface-Terminal (OIT) will be provided to allow local monitoring and controls of the IPS.

The control system block diagram shows the distribution of the I/O modules and connection to SCADA.

10.2.3 Computer Hardware and Software

The existing computer hardware consists of redundant SCADA Servers (SS), Domain Controllers (DC), and Terminal Servers (TS).

The existing Intellution iFIX HMI software is utilized.

10.2.4 Plant Control System Network

The plant control system utilizes an Ethernet Modbus TCP based Plant SCADA Network communication system as indicated on the Control Block Diagram. The IPS control system will be connected to SCADA via fiber backbone. The PLC, OIT, and VFDs will be connected to a common Ethernet switch. Network cabling within the area envelope is generally category-6 metallic network cable.

10.2.5 Plant Power Monitoring

Power monitoring will be provided using Ethernet Modbus TCP communication protocol. Power monitoring will be integrated into the original HMI software. Power monitors are Schweitzer Engineering Laboratories, Inc. (SEL).

10.2.6 Equipment Networks

The variable frequency drives (VFDs) for the IPS pumps hard-wired status, alarm and controls in addition to Ethernet Modbus TCP communication to SCADA for data.

Electrically operated control valves will be hard-wired for status, alarm, and control and will not be networked.

Typical instruments will have hard-wired 4-20 mA signals and not be networked.

UPS' and power monitors will be networked to SCADA over Ethernet Modbus TCP.

10.2.7 Instrumentation and I/O Signal Standards

Analog field instrumentation will utilize 4-20 mA type signals to/from the plant control system. Discrete signals (running status, alarm, etc.) will utilize 24 volt DC signals to/from the plant control system.

10.2.8 Vendor – Packaged Control Systems – N/A

10.2.9 Software Configuration

PLC and HMI Software configuration (programming) for the plant control system will be provided by the control system integrator/supplier. This will include development of the database for the control system and development of the graphic display screens and reports for the operator workstation computers. Remote monitoring, alarming, and control of these systems will be integrated into the overall plant control system as previously described. Network switch software configuration is provided by the City of Mesa.

10.3 CONTROL SYSTEM DESIGN STANDARDS

10.3.1 P&ID Drawings

Process and Instrumentation Diagram (P&ID) drawings for the IPS are included in Appendix C. Drawing format follows City of Mesa standard P&ID drawings as described in the COM Process Controls Drawings Standard. Tag numbering conventions will follow numbering as described herein. Drawings will be schematic in nature and will not show every fitting or miscellaneous valve. Piping system codes will be shown on the P&IDs and will denote the associated system stream such as RCYW for recycled water. Pipeline size will be indicated on the P&ID drawings. Pipeline material will be indicated on pipelines related to chemical systems, or as otherwise required. P&ID drawings for the break tank, GRUSP piping, as well as for the pump station are included in Appendix C.

10.3.2 Device Tag Numbers and Instrument Loop Numbers

Each piece of major process equipment will be assigned a tag number in accordance with the equipment tagging scheme as described on the P&ID legend sheets. Certain

components of major equipment that can be separated such as large pumps and pump motors, and gates and gate actuators, will be assigned separate tag numbers.

The tag numbers will consist of a facility code (in this case "RIPS"), a function code, a plant area code, and a sequence code. The combination of function code, area code, and sequence code will be unique. Function codes denote the associated equipment abbreviation such as BFV for butterfly valve or PCL for centrifugal pump. Plant area codes are presented as the first two digits in the list below. The sequence code is a unique numeric identifier as presented as the final three digits in the list below. For example; a butterfly valve, located in a raw water line, might have the following tag number designation: RIPS-BFV-00-110.

Each instrument shown on the P&ID drawings will be assigned a tag number consisting of identification letters and a loop numbers. The identification letters match established City of Mesa tagging abbreviations where abbreviations exist. Where established abbreviations do not exist, the identification letters will follow ISA standards. All abbreviations used are given on the legend sheets. Loop numbers follow the sequence code convention as described below. For example, a flow indicating transmitter, located in a recycled water line, might have the following tag number designation: RIPS-FIT-00-001.

A list of plant area codes and sequence numbers provided by COM is as follows:

RIPS
00-(001-020)
Surge Tank
00-(200-299)

10.4 SPECIFIC PROCESS CONTROL DESCRIPTIONS

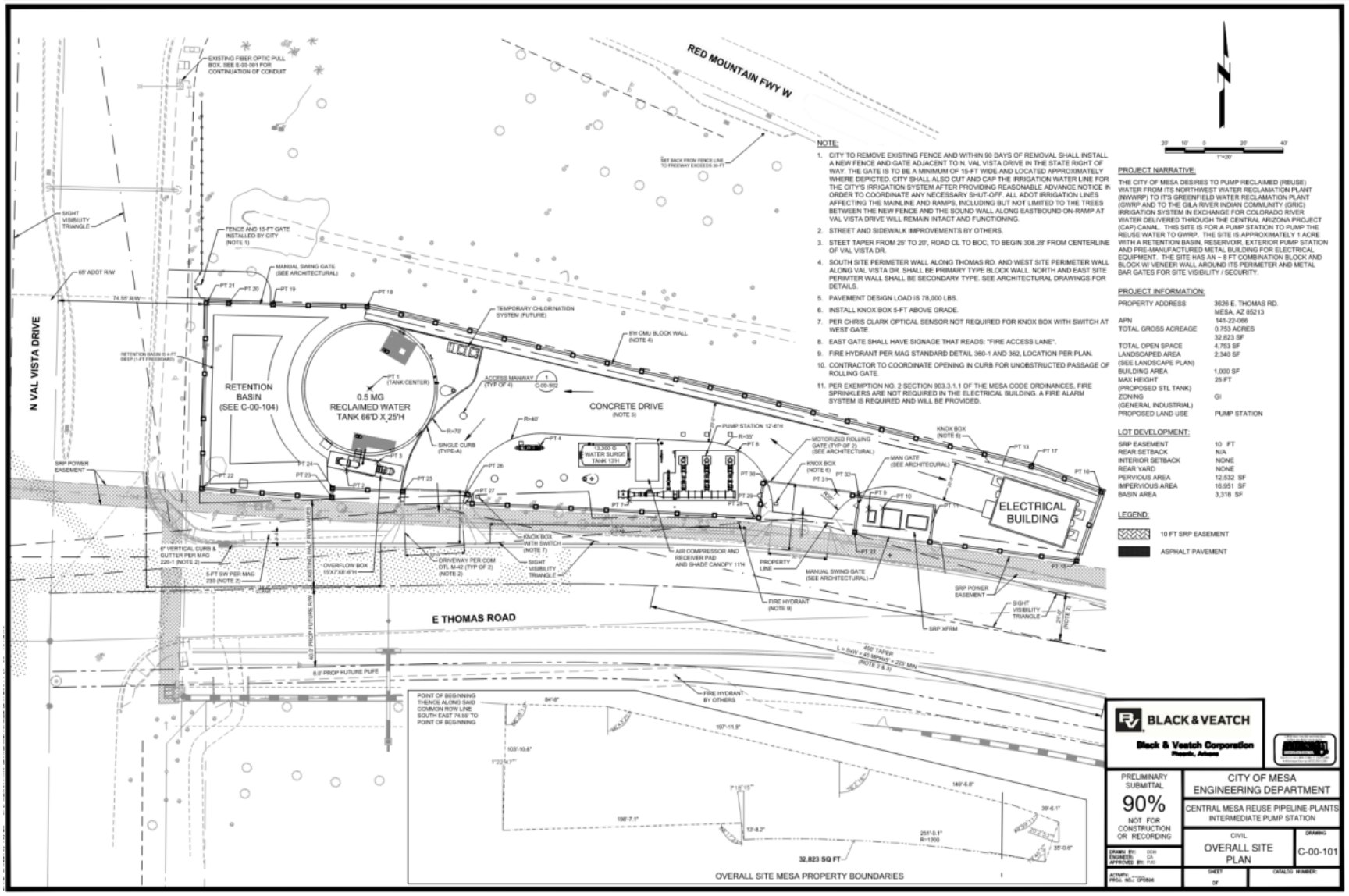
The P&IDs indicate basic control functions for individual pieces of equipment and generally identify interlocks. Detailed control functions will be provided in the Software Control Block Descriptions section of the detailed design specifications.

10.4.1 Specific Instrumentation

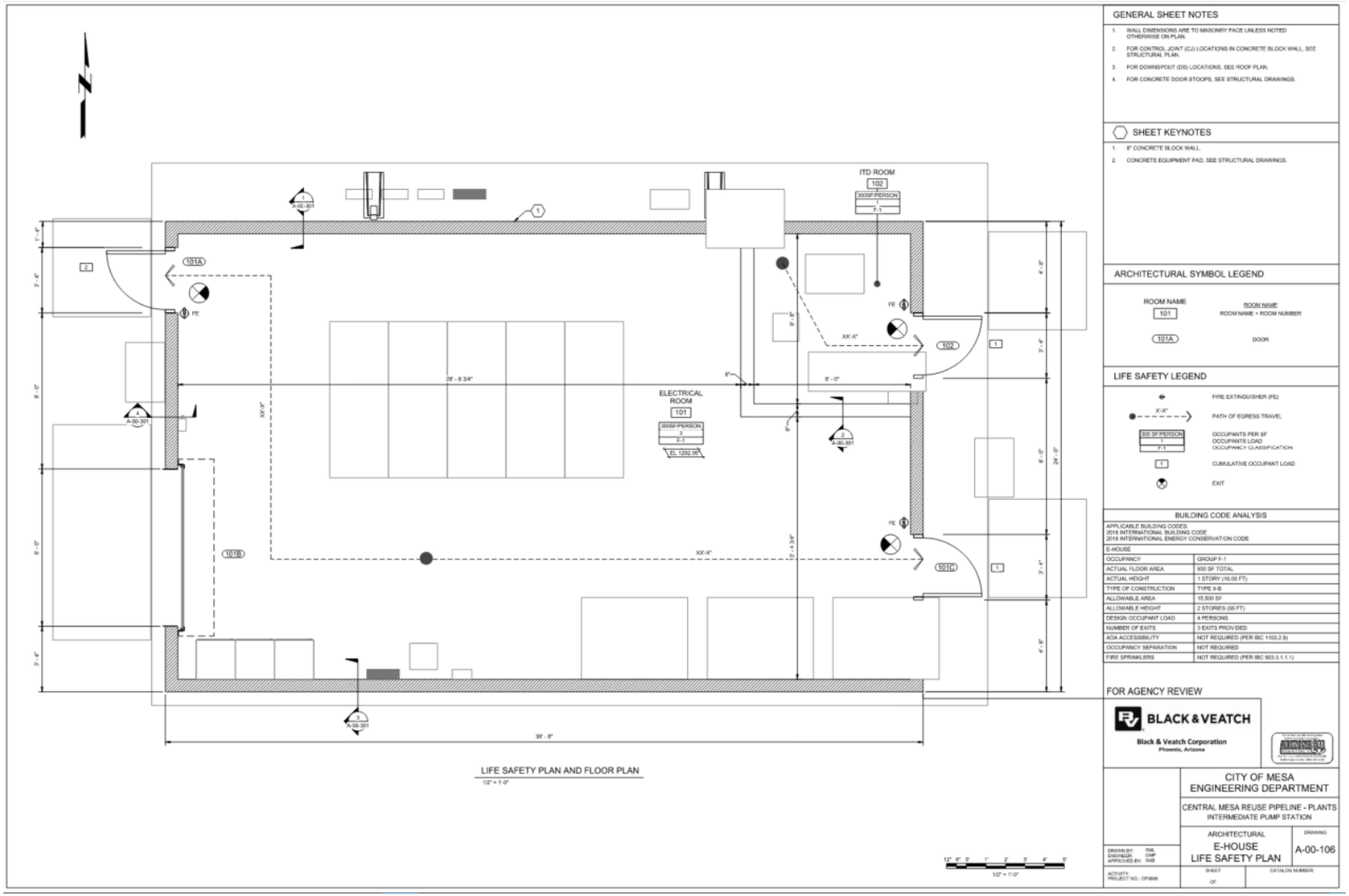
Instrumentation devices used for the IPS will be shown on the P&ID drawings and provided in the detailed design specifications. Instrumentation will be installed 4-5 feet above work area wherever practical and will designed for easy access by plant staff. All instrumentation will include local indication.

A transient pressure data logger will be installed to monitor surge conditions in the IPS discharge pipeline. The pressure logger will provide the operator with downloadable transient pressure data for analysis.

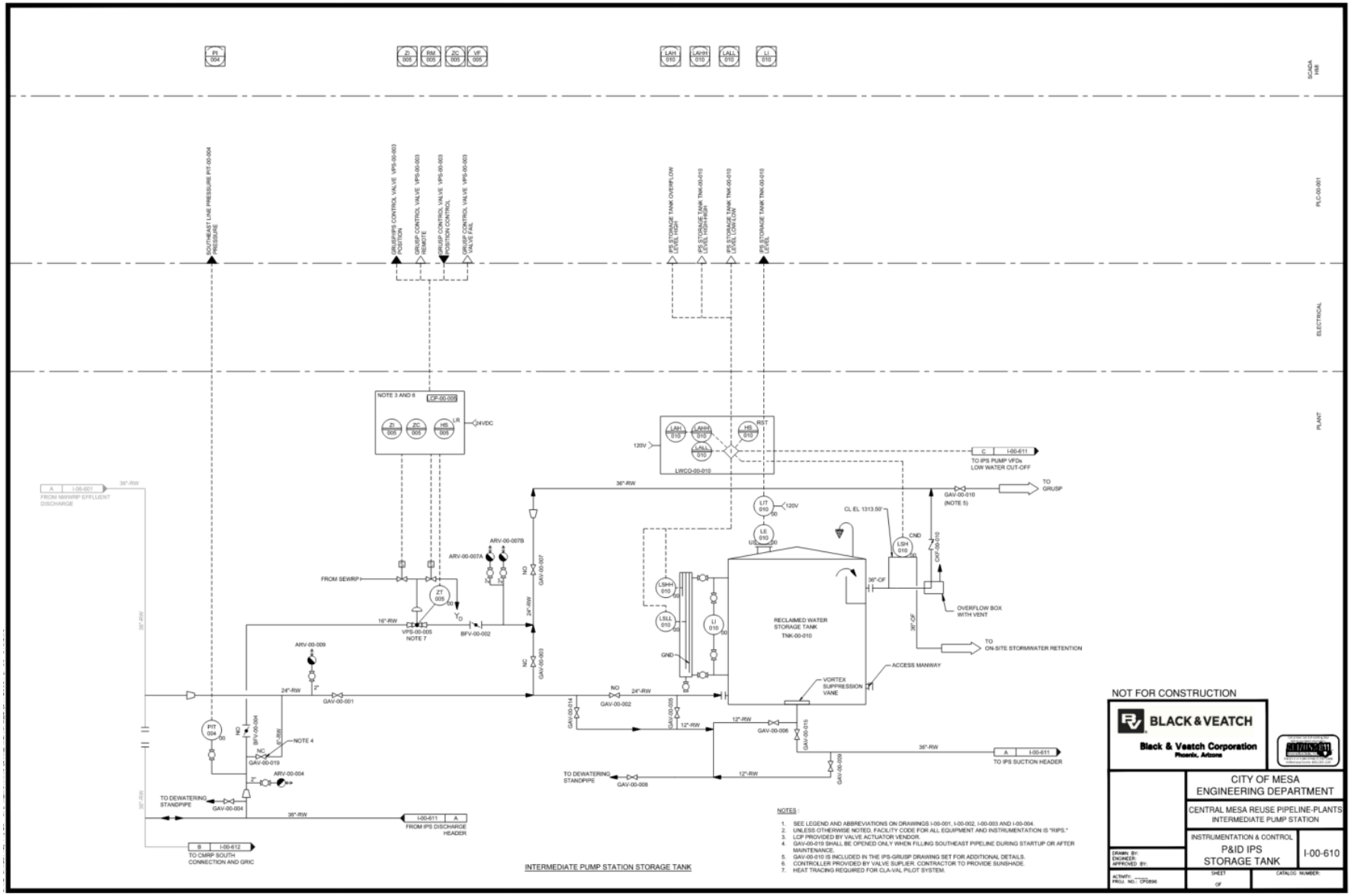
Appendix A. IPS Site Plan

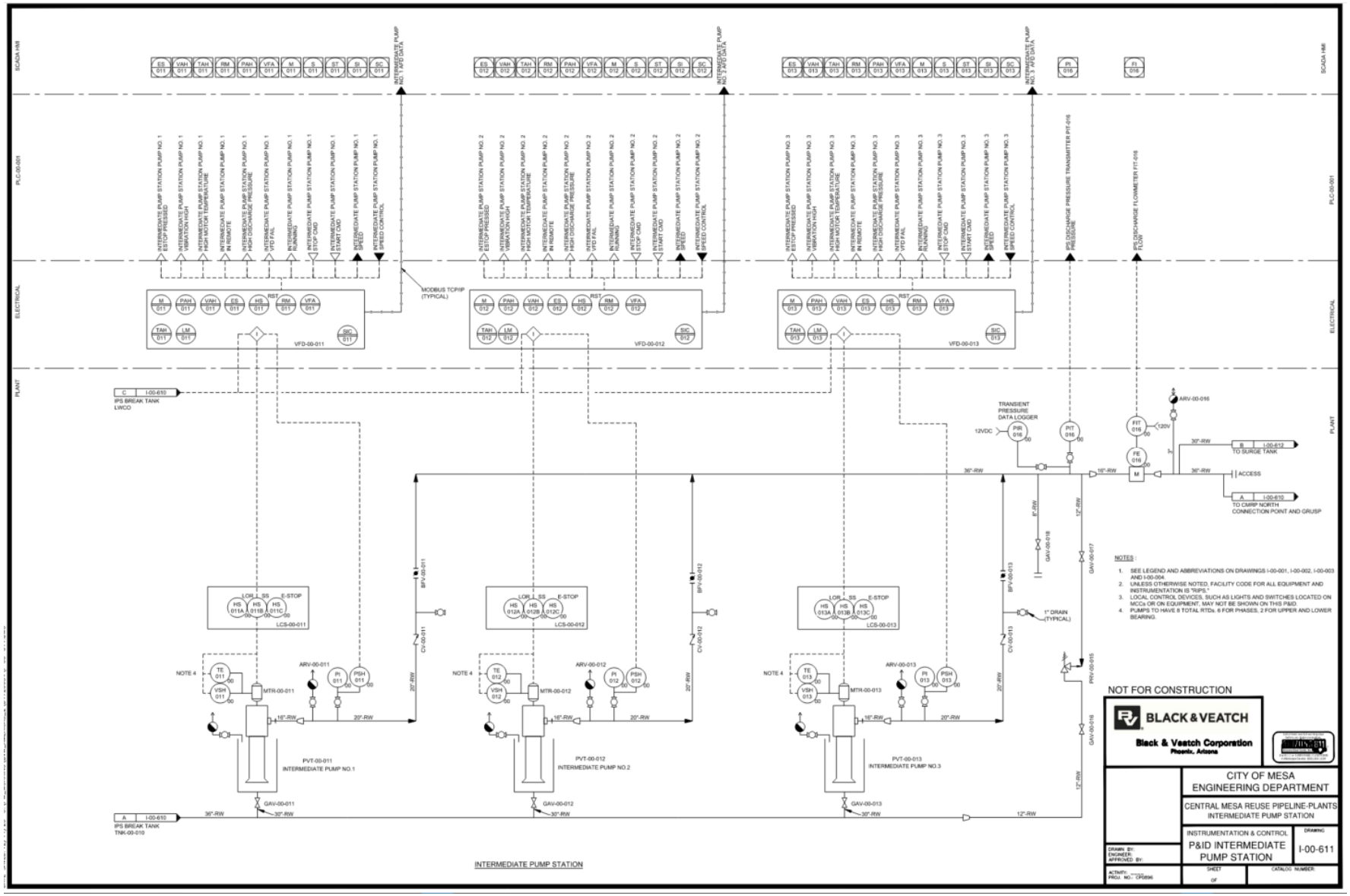

RED MOUNTAIN FWY W
N VAL VISTA DRIVE
E THOMAS ROAD
RETENTION BASIN (SEE C-00-104)
0.5 MG RECLAIMED WATER TANK 66'D X 25'H
CONCRETE DRIVE
ELECTRICAL BUILDING
NOTE:
1. CITY TO REMOVE EXISTING FENCE AND WITHIN 90 DAYS OF REMOVAL SHALL INSTALL A NEW FENCE AND GATE ADJACENT TO N. VAL VISTA DRIVE IN THE STATE RIGHT OF WAY. THE GATE IS TO BE A MINIMUM OF 15-FT WIDE AND LOCATED APPROXIMATELY WHERE DEPICTED. CITY SHALL ALSO CUT AND CAP THE IRRIGATION WATER LINE FOR THE CITY'S IRRIGATION SYSTEM AFTER PROVIDING REASONABLE ADVANCE NOTICE IN ORDER TO COORDINATE ANY NECESSARY SHUT-OFF. ALL ADOT IRRIGATION LINES AFFECTING THE MAINLINE AND RAMPS, INCLUDING BUT NOT LIMITED TO THE TREES BETWEEN THE NEW FENCE AND THE SOUND WALL ALONG EASTBOUND ON-RAMP AT VAL VISTA DRIVE WILL REMAIN INTACT AND FUNCTIONING.
2. STREET AND SIDEWALK IMPROVEMENTS BY OTHERS.
3. STEET TAPER FROM 25' TO 20', ROAD CL TO BOC, TO BEGIN 308.28' FROM CENTERLINE OF VAL VISTA DR.
4. SOUTH SITE PERIMETER WALL ALONG THOMAS RD. AND WEST SITE PERIMETER WALL ALONG VAL VISTA DR. SHALL BE PRIMARY TYPE BLOCK WALL. NORTH AND EAST SITE PERIMTER WALL SHALL BE SECONDARY TYPE. SEE ARCHITECTURAL DRAWINGS FOR DETAILS.
5. PAVEMENT DESIGN LOAD IS 78,000 LBS.
6. INSTALL KNOX BOX 5-FT ABOVE GRADE.
7. PER CHRIS CLARK OPTICAL SENSOR NOT REQUIRED FOR KNOX BOX WITH SWITCH AT WEST GATE.
8. EAST GATE SHALL HAVE SIGNAGE THAT READS: "FIRE ACCESS LANE".
9. FIRE HYDRANT PER MAG STANDARD DETAIL 360-1 AND 362, LOCATION PER PLAN.
10. CONTRACTOR TO COORDINATE OPENING IN CURB FOR UNOBSTRUCTED PASSAGE OF ROLLING GATE.
11. PER EXEMPTION NO. 2 SECTION 903.3.1.1 OF THE MESA CODE ORDINANCES, FIRE SPRINKLERS ARE NOT REQUIRED IN THE ELECTRICAL BUILDING. A FIRE ALARM SYSTEM IS REQUIRED AND WILL BE PROVIDED.
PROJECT NARRATIVE:
THE CITY OF MESA DESIRES TO PUMP RECLAIMED (REUSE) WATER FROM ITS NORTHWEST WATER RECLAMATION PLANT (NWWRP) TO ITS GREENFIELD WATER RECLAMATION PLANT (GWRP AND TO THE GILA RIVER INDIAN COMMUNITY (GRIC) IRRIGATION SYSTEM IN EXCHANGE FOR COLORADO RIVER WATER DELIVERED THROUGH THE CENTRAL ARIZONA PROJECT (CAP) CANAL. THIS SITE IS FOR A PUMP STATION TO PUMP THE REUSE WATER TO GWRP. THE SITE IS APPROXIMATELY 1 ACRE WITH A RETENTION BASIN, RESERVOIR, EXTERIOR PUMP STATION AND PRE-MANUFACTURED METAL BUILDING FOR ELECTRICAL EQUIPMENT. THE SITE HAS AN ~ 8 FT COMBINATION BLOCK AND BLOCK W/ VENEER WALL AROUND ITS PERIMETER AND METAL BAR GATES FOR SITE VISIBILITY / SECURITY.
PROJECT INFORMATION:
PROPERTY ADDRESS 3626 E. THOMAS RD. MESA, AZ 85213
APN 141-22-066
TOTAL GROSS ACREAGE 0.753 ACRES 32,823 SF
TOTAL OPEN SPACE 4,753 SF
LANDSCAPED AREA (SEE LANDSCAPE PLAN) 2,340 SF
BUILDING AREA 1,000 SF
MAX HEIGHT (PROPOSED STL TANK) 25 FT
ZONING (GENERAL INDUSTRIAL) GI
PROPOSED LAND USE PUMP STATION
LOT DEVELOPMENT:
SRP EASEMENT 10 FT
REAR SETBACK N/A
INTERIOR SETBACK NONE
REAR YARD NONE
PERVIOUS AREA 12,532 SF
IMPERVIOUS AREA 16,951 SF
BASIN AREA 3,318 SF
LEGEND:
10 FT SRP EASEMENT
ASPHALT PAVEMENT
POINT OF BEGINNING THENCE ALONG SAID COMMON ROW LINE SOUTH EAST 74.55' TO POINT OF BEGINNING
32,823 SQ FT
OVERALL SITE MESA PROPERTY BOUNDARIES
BLACK & VEATCH
Black & Veatch Corporation
PRELIMINARY SUBMITTAL
90%
NOT FOR CONSTRUCTION OR RECORDING
CITY OF MESA ENGINEERING DEPARTMENT
CENTRAL MESA REUSE PIPELINE-PLANTS INTERMEDIATE PUMP STATION
CIVIL
OVERALL SITE PLAN
C-00-101

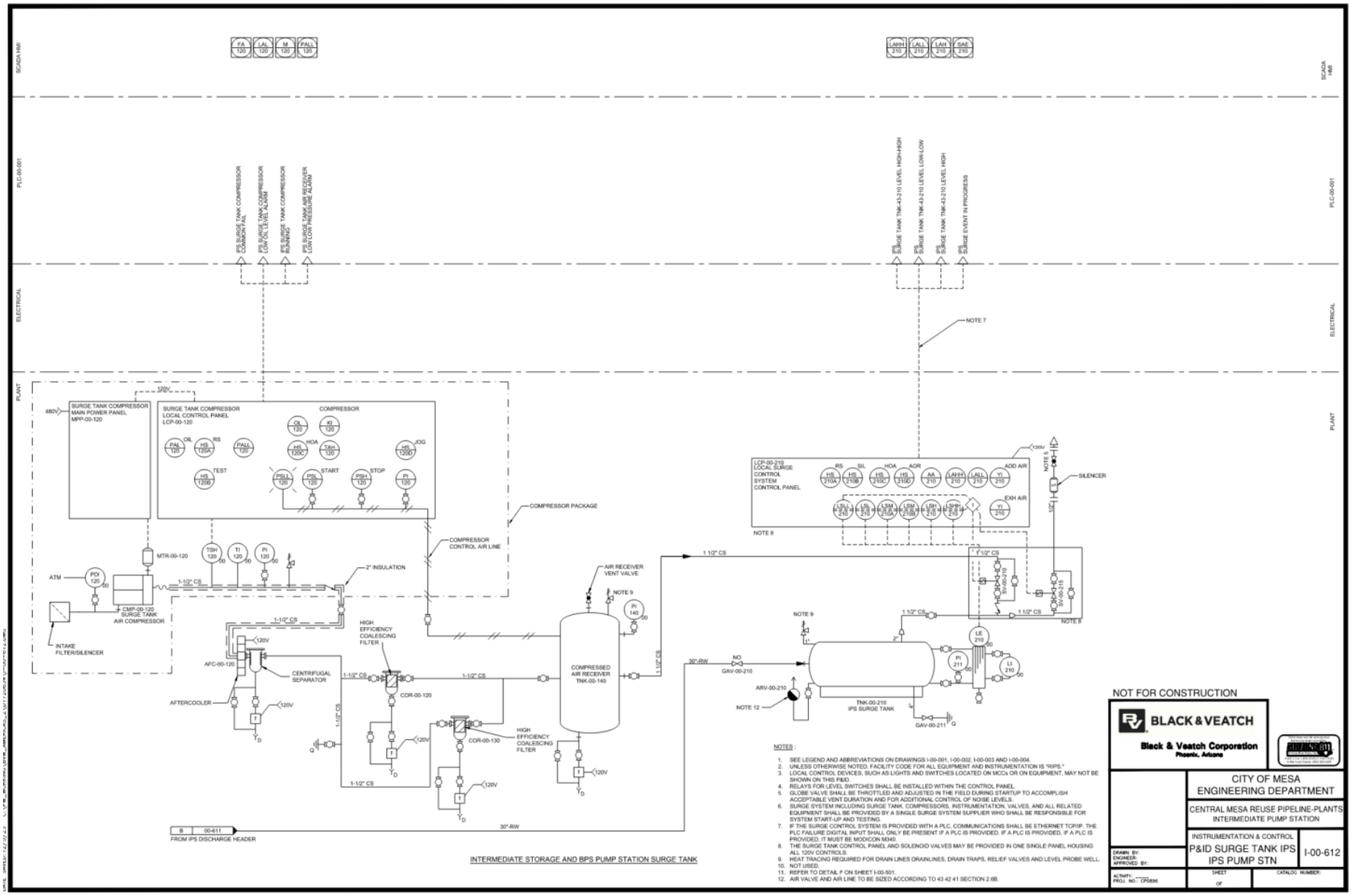
Appendix B. Electrical Building Floor Plan



Appendix C. P&IDs


SCADA HMI
PLC-00-001
ELECTRICAL
PLANT
SOUTHEAST LINE PRESSURE PIT-00-004 PRESSURE
GRUSP/IPS CONTROL VALVE VPS-00-003 POSITION
GRUSP CONTROL VALVE VPS-00-003 REMOTE
GRUSP CONTROL VALVE VPS-00-003 POSITION CONTROL
GRUSP CONTROL VALVE VPS-00-003 VALVE FAIL
IPS STORAGE TANK OVERFLOW LEVEL HIGH
IPS STORAGE TANK TNK-00-010 LEVEL HIGH-HIGH
IPS STORAGE TANK TNK-00-010 LEVEL LOW-LOW
IPS STORAGE TANK TNK-00-010 LEVEL
NOTE 3 AND 6
CP-00-005
24VDC
LWCO-00-010
120V
TO IPS PUMP VFDs LOW WATER CUT-OFF
TO GRUSP
GAV-00-010 (NOTE 5)
CL EL 1313.59'
OVERFLOW BOX WITH VENT
TO ON-SITE STORMWATER RETENTION
ACCESS MANWAY
VORTEX SUPPRESSION VANE
RECLAIMED WATER STORAGE TANK TNK-00-010
FROM SEWRP
ARV-00-007A
ARV-00-007B
ARV-00-009
VPS-00-005 NOTE 7
BFV-00-002
GAV-00-001
GAV-00-002
GAV-00-003
GAV-00-006
GAV-00-008
GAV-00-009
GAV-00-010
GAV-00-014
GAV-00-015
GAV-00-019
ARV-00-004
BFV-00-004
NOTE 4
TO DEWATERING STANDPIPE
FROM IPS DISCHARGE HEADER
TO IPS SUCTION HEADER
TO CMRP SOUTH CONNECTION AND GRIC
FROM NWWRP EFFLUENT DISCHARGE
INTERMEDIATE PUMP STATION STORAGE TANK
NOTES :
1. SEE LEGEND AND ABBREVIATIONS ON DRAWINGS I-00-001, I-00-002, I-00-003 AND I-00-004.
2. UNLESS OTHERWISE NOTED, FACILITY CODE FOR ALL EQUIPMENT AND INSTRUMENTATION IS "RIPS."
3. LCP PROVIDED BY VALVE ACTUATOR VENDOR.
4. GAV-00-019 SHALL BE OPENED ONLY WHEN FILLING SOUTHEAST PIPELINE DURING STARTUP OR AFTER MAINTENANCE.
5. GAV-00-010 IS INCLUDED IN THE IPS-GRUSP DRAWING SET FOR ADDITIONAL DETAILS.
6. CONTROLLER PROVIDED BY VALVE SUPLIER. CONTRACTOR TO PROVIDE SUNSHADE.
7. HEAT TRACING REQUIRED FOR CLA-VAL PILOT SYSTEM.
NOT FOR CONSTRUCTION
BLACK & VEATCH
Black & Veatch Corporation
Phoenix, Arizona
CITY OF MESA
ENGINEERING DEPARTMENT
CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION
INSTRUMENTATION & CONTROL
P&ID IPS
STORAGE TANK
I-00-610
DRAWN BY:
ENGINEER:
APPROVED BY:
ACTIVITY:
PROJ. NO.: CP0896
SHEET
OF
CATALOG NUMBER:


SCADA HMI
PLC-00-001
ELECTRICAL
PLANT
MODBUS TCP/IP (TYPICAL)
VFD-00-011
VFD-00-012
VFD-00-013
IPS BREAK TANK LWCO
IPS BREAK TANK TNK-00-010
TRANSIENT PRESSURE DATA LOGGER
TO SURGE TANK
ACCESS
TO CMRP NORTH CONNECTION POINT AND GRUSP
LCS-00-011
LCS-00-012
LCS-00-013
PVT-00-011 INTERMEDIATE PUMP NO.1
PVT-00-012 INTERMEDIATE PUMP NO.2
PVT-00-013 INTERMEDIATE PUMP NO.3
NOTES:
1. SEE LEGEND AND ABBREVIATIONS ON DRAWINGS I-00-001, I-00-002, I-00-003 AND I-00-004.
2. UNLESS OTHERWISE NOTED, FACILITY CODE FOR ALL EQUIPMENT AND INSTRUMENTATION IS "RIPS."
3. LOCAL CONTROL DEVICES, SUCH AS LIGHTS AND SWITCHES LOCATED ON MCCs OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
4. PUMPS TO HAVE 8 TOTAL RTDs. 6 FOR PHASES, 2 FOR UPPER AND LOWER BEARING.
NOT FOR CONSTRUCTION
BLACK & VEATCH
Black & Veatch Corporation
Phoenix, Arizona
CITY OF MESA
ENGINEERING DEPARTMENT
CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION
INSTRUMENTATION & CONTROL
P&ID INTERMEDIATE PUMP STATION
I-00-611
INTERMEDIATE PUMP STATION


SCADA HMI
PLC-00-001
ELECTRICAL
PLANT
SURGE TANK COMPRESSOR MAIN POWER PANEL MPP-00-120
SURGE TANK COMPRESSOR LOCAL CONTROL PANEL LCP-00-120
COMPRESSOR
COMPRESSOR PACKAGE
COMPRESSOR CONTROL AIR LINE
2" INSULATION
MTR-00-120
CMP-00-120 SURGE TANK AIR COMPRESSOR
INTAKE FILTER/SILENCER
AFC-00-120
CENTRIFUGAL SEPARATOR
AFTERCOOLER
HIGH EFFICIENCY COALESCING FILTER
COR-00-120
COR-00-130
AIR RECEIVER VENT VALVE
COMPRESSED AIR RECEIVER TNK-00-140
FROM IPS DISCHARGE HEADER
30"-RW
LCP-00-210 LOCAL SURGE CONTROL SYSTEM CONTROL PANEL
SILENCER
GAV-00-210
ARV-00-210
TNK-00-210 IPS SURGE TANK
GAV-00-211
NOTES:
1. SEE LEGEND AND ABBREVIATIONS ON DRAWINGS I-00-001, I-00-002, I-00-003 AND I-00-004.
2. UNLESS OTHERWISE NOTED, FACILITY CODE FOR ALL EQUIPMENT AND INSTRUMENTATION IS "RIPS."
3. LOCAL CONTROL DEVICES, SUCH AS LIGHTS AND SWITCHES LOCATED ON MCCs OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
4. RELAYS FOR LEVEL SWITCHES SHALL BE INSTALLED WITHIN THE CONTROL PANEL.
5. GLOBE VALVE SHALL BE THROTTLED AND ADJUSTED IN THE FIELD DURING STARTUP TO ACCOMPLISH ACCEPTABLE VENT DURATION AND FOR ADDITIONAL CONTROL OF NOISE LEVELS.
6. SURGE SYSTEM INCLUDING SURGE TANK, COMPRESSORS, INSTRUMENTATION, VALVES, AND ALL RELATED EQUIPMENT SHALL BE PROVIDED BY A SINGLE SURGE SYSTEM SUPPLIER WHO SHALL BE RESPONSIBLE FOR SYSTEM START-UP AND TESTING.
7. IF THE SURGE CONTROL SYSTEM IS PROVIDED WITH A PLC, COMMUNICATIONS SHALL BE ETHERNET TCP/IP. THE PLC FAILURE DIGITAL INPUT SHALL ONLY BE PRESENT IF A PLC IS PROVIDED. IF A PLC IS PROVIDED, IT MUST BE MODICON M340.
8. THE SURGE TANK CONTROL PANEL AND SOLENOID VALVES MAY BE PROVIDED IN ONE SINGLE PANEL HOUSING ALL 120V CONTROLS.
9. HEAT TRACING REQUIRED FOR DRAIN LINES DRAINLINES, DRAIN TRAPS, RELIEF VALVES AND LEVEL PROBE WELL.
10. NOT USED.
11. REFER TO DETAIL F ON SHEET I-00-501.
12. AIR VALVE AND AIR LINE TO BE SIZED ACCORDING TO 43 42 41 SECTION 2.6B.
INTERMEDIATE STORAGE AND BPS PUMP STATION SURGE TANK
NOT FOR CONSTRUCTION
BLACK & VEATCH
Black & Veatch Corporation
Phoenix, Arizona
CITY OF MESA
ENGINEERING DEPARTMENT
CENTRAL MESA REUSE PIPELINE-PLANTS
INTERMEDIATE PUMP STATION
INSTRUMENTATION & CONTROL
P&ID SURGE TANK IPS
IPS PUMP STN
I-00-612
DRAWN BY:
ENGINEER:
APPROVED BY:
ACTIVITY:
PROJ. NO.: CP0896
SHEET
OF
CATALOG NUMBER: