# SCOPE OF WORK

Red Rock Canyon NCA Administration Building
Phase 2 Building Repairs
Southern Nevada District, Las Vegas, Nevada

June 2026

**Bureau of Land Management**
Nevada

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## APPENDICES


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# 1.0 INTRODUCTION

The purpose of this Statement of Work (SOW) is to define the requirements for Phase 2 repairs and improvements to the Red Rock Canyon National Conservation Area Administration Building (Building), the nearby parking lot restroom facility, and the associated parking lot retaining walls (knee walls), ensuring these structures maintain integrity, functionality, and compliance with applicable standards and regulations.

Red Canyon National Conservation Area (RRNCA) is located approximately 4 miles west of Sky Vista Boulevard in the community of Summerlin. The Building is located at latitude: 36.13567° / longitude: -115.42731° (**Exhibit 1**).

## 1.1 Core Repairs Overview

The BLM requires the Contractor to provide all labor, materials, equipment, and supervision necessary to renovate the Administration Building and associated site structures. Phase 2 of this project completes the essential improvements needed to return these facilities to full operational condition following prior remediation and mechanical upgrades. This phase addresses remaining deficiencies that affect functionality, safety, and long-term performance of the Building and nearby site components.

The scope of Phase 2 includes replacing worn interior finishes and damaged flooring, cleaning and restoring mechanical air-distribution components, installing updated systems furniture, and repairing deteriorated exterior elements. Work also extends to the adjacent parking lot restroom facility and the surrounding retaining walls, which require repainting and stucco repairs to reestablish protective integrity and weather resistance.

# 2.0 BACKGROUND

The Building was originally designed in 1978 and constructed in the early 1980s with an area of approximately 6,655 sq. ft. It later underwent a change-of-use renovation and a small expansion in 2007–2008. The interior first floor now totals 7,120 sq. ft., with an additional 164 sq. ft. second-floor mezzanine. The exterior floor area under roof is 1,200 sq. ft., bringing the total building square footage to 8,484 sq. ft. (Exhibit 2). The Building also includes a 2,470 sq. ft. crawl space. Building occupancy is Group B, and construction type is Type V-B (Not Rated).

The parking lot restroom facility includes men's and women's restrooms, a unisex room, and a janitor's room. The structure is configured as two mirror-image sides, each approximately 490 sq. ft. in area, separated by a 20-foot open space with an overhead wood trellis. In total, the restroom facility encompasses approximately 1,704 sq. ft.

**Exhibit 2** shows the locations of the Building and restroom facility.

## 2.1 Location and Access

Contractors must pass through a visitor pay station with access to the building via paved road as shown on Exhibit 2. On an annual basis approximately 1,000,000 persons pass through the fee station. Spring, fall, holidays and weekends bring heavy visitations. Coordinate with Government for deliveries during heavy visitation times.

## 2.2 Current Building Condition

Recent improvements to the Building include remediation of a severe rodent infestation, installation of new roof sections, repair of interior water damaged areas and replacement of heat pumps and fan coil units.

Energy recovery unit and solar power water heater operations have been hampered by component breakdowns, a lack of maintenance and system complexity.
The Building's rolled carpeting is badly worn, stained, and no longer suitable for an office environment, requiring removal and replacement. The kitchen floor and subfloor are dilapidated and broken, presenting both functional and safety concerns, requiring complete removal and replacement.

The exterior stucco and paint on the Building and Facility exhibit are weathered and deteriorated, showing signs of cracking and fading. Both structures require repair and painting to restore protective and aesthetic qualities.

The HVAC air ducts associated with the energy recovery unit, which provide conditioned return air, were likely installed during the 2006 expansion and have never been cleaned. Combined with the dusty ambient outdoor environment and a recent rodent infestation, the ducts present significant health and air quality concerns. It is imperative that all interior ducts be thoroughly cleaned and sanitized prior to reoccupying the building.

## 2.3 Occupancy and Use

The Administration Building is designated for Bureau of Land Management (BLM) administrative purposes and is designed to accommodate up to 46 staff members. Typical hours of operation are between 6:00 a.m. and 8:00 p.m. The building is currently unoccupied and will remain vacant until all Phase 2 repairs have been completed.

The stand-alone restroom facility operates under the same hours and serves as a critical amenity for visitors. Located between parking areas, it experiences extremely high traffic from individuals arriving in personal vehicles, tour buses, school buses, and other commercial tour vehicles. Red Rock Canyon receives approximately 1,000,000 visitors annually, and this facility likely serves 60–65% of those visitors.

## 2.4 Existing Operations

Certain areas of the Building house equipment and systems that provides critical services to multiple on-site facilities including restrooms, the fee station and visitor center. These systems must remain operational and protected during the project. If temporary shutdowns are required, the Contractor shall provide the Government with at least one weeks advance notice to allow operational adjustments.

## 2.5 Critical Systems

a) Potable water storage and distribution pumping.

b) Information technology equipment including phones, computer servers, building automation systems and communication antennas.

c) Hot water system – Inoperative.

d) Fire suppression system – Inoperative.

e) Electrical panel boards and service entry sections – panel board and service entry sections - Fully operational.

f) Building energy recovery system – Partially operational.

g) Wastewater systems – Full operational.

### 2.6 Site Electrical Power

Critical exterior equipment adjacent to the Building include, NV Energy transformers, a current transformer and meter cabinet and the sites photovoltaic main isolating disconnect (Exhibit 11 and Photo 13).

### 2.7 Temporary Facilities

Temporary power is currently provided to three office trailers located in the lower parking area approximately 325 feet south of the Building. The trailers serve as office space for BLM employees and a volunteer non-governmental organization. Power to the trailers is routed from the Building main power panels to a power pole located approximately 20 feet south of the Building, then overhead to the trailers. Trailers, power poles and overhead line are shown on Exhibit 10 and Photos 10, 11, and 12.

### 2.8 Site Constraints

The area surrounding the Building can become congested with vehicular and pedestrian traffic. School and tour busses regularly use an area near the Buildings as a drop off zone. BLM provides walking tours along a path that passes just north of the Buildings north side.

The east, north and west areas adjacent to the building can be used as needed for material and equipment laydown and are shown on Figure 2, Appendix A of the NEPA Categorical Exclusion Documentation (pdf page 21).

### 2.9 Seasonal RRC hours:

| | | |
|---|---|---|
| a) | November thru February | 6 a.m. – 5 p.m. |
| b) | March | 6 a.m. – 7 p.m. |
| c) | April thru September | 6 a.m. – 8 p.m. |
| d) | October | 6 a.m. – 7 p.m. |

To facilitate construction activities and material deliveries, contractors will be permitted to bypass the Red Rock Canyon fee station. Coordination with BLM staff is required to ensure delivery vehicles are properly identified and scheduled to avoid conflicts with visitor traffic. Drivers should follow designated routes and comply with posted speed limits and safety protocols while on site.

### 2.10 Building Utilities

The Administration Building's mechanical systems include an energy recovery unit that provides evaporative cooling through a swamp cooler function and heat transfer capability linked to a solar water

heating system. While the energy recovery unit remains operational, the solar water heating system is currently non-functional. Its water source—local groundwater—is high in mineral content (hard water), which has contributed to scaling and system failure over time.

As part of Phase 1 of the renovation, all heat pumps and fan coil units were removed and replaced with new, modern units to improve efficiency and reliability. Electrical service to the building is adequate for current and anticipated loads, with no known limitations.

The site relies on two separate septic systems: one serving the Administration Building and another, much larger system, supporting public restrooms. The restroom system includes two transfer pumps and six discharge pumps to handle heavy visitor usage. Both systems perform reliably when properly maintained, and any repair work should ensure continued functionality and access for maintenance.

## 3.0 PROJECT MANAGEMENT AND COORDINATION

Project management and coordination are essential to ensuring that all construction activities proceed in an organized, efficient, and clearly documented manner. This section outlines the processes required to manage submittals, coordinate work across disciplines, and maintain effective communication throughout the project.

### 3.1 Information Submittals

Prepare and submit information for materials, products, procedures, etc. as noted throughout this document. Submit information with a titled cover sheet to allow for tracking of the submittal. Submittals to be submitted and numbered sequentially starting with Submittal 001. Contractor to keep a running list of submittals which is to include, but not limited to, the submittal number, submittal date, returned date, and response of the Government in reviewing the information.

### 3.2 Coordination Procedures

Coordinate construction operations included in different sections of this Statement of Work to ensure efficient and orderly installation of each part of the work. Coordinate construction operations, included in different sections that depend on each other for proper installation, connection, and operation.

a) Schedule construction operations in sequence required to obtain the best results where installation of one part of the work depends on installation of other components, before or after its own installation.

b) Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service and repair.

c) Make adequate provisions to accommodate items scheduled for later installation.

d) Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components including mechanical and electrical.

### 3.3 Project Meetings

a) Schedule and conduct meetings and conferences at project site, unless otherwise indicated.

1) Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Government of scheduled meeting dates and times.

2) Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

3) Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Government, within (7) days of meeting.

b) Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to the Government, but no later than 15 days after Notice to Proceed. Hold the conference at project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments, review required work, project drawings, Statement of Work, construction schedules, payroll, payments, and administrative provisions of the contract. Be prepared to summarize and explain procedures planned for the project and present specified preconstruction submittals.

c) Preinstallation Meetings: Conduct a preinstallation meeting at the project site before each construction activity that requires coordination with other construction.

1) Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including; deliveries, submittals, review of mockups, time schedules, and weather limitations.

2) Record significant meeting discussions, agreements, and disagreements, including required corrective measures and actions.

3) Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

d) Progress Meetings: Conduct progress meetings at biweekly intervals. Hold the meetings at the project site. Coordinate dates of meetings with preparation of payment requests. Additional progress meetings may be requested by either the Government or Contractor.

1) Attendees: In addition to representatives of Government, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the project and authorized to conclude matters relating to the work.

2) Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect project progress. Include topics for discussion as appropriate to status of project.

i) Interface requirements.
ii) Sequence of operations.
iii) Status of submittals.
iv) Deliveries.
v) Access.
vi) Site utilization.

vii) Temporary facilities and controls.
viii) Work hours.
ix) Hazards and risks.
x) Red Rock visitor safety.
xi) Progress cleaning.
xii) Field observations.
xiii) Requests for information/interpretation.

3) Minutes: Record the meeting minutes.

4) Reporting: Distribute minutes of the meeting to each party present and to parties that who should have been present.

5) Schedule Updating: Revise Contractors construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

### 3.4 Requests For Interpretation (RFI)

a) Procedure: Immediately on discovery of the need for interpretation of the contract documents, and if not possible to request interpretation at project meeting, prepare and submit an RFI in the form specified:

1) RFI's shall originate with Contractor. RFI's submitted by entities other than the Contractor will be returned with no response.

2) Coordinate and submit RFI's in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

## 4.0 SUMMARY OF WORK

Phase 2 consists of interior, mechanical, and exterior improvements to the Building and ancillary site structures necessary to return these facilities to a fully serviceable condition.

The major items of work included in Phase 2 are summarized below:

a) Carpet Removal and Replacement.

b) Kitchen Floor Removal and Replacement.

c) Air Duct Cleaning.

d) Removal and Replacement of the Energy Recovery Unit (ERU).

e) Installation of New Office Cubicles and Workstations.

f) Exterior Painting and Associated Repairs.

Note: The Government possesses as-built drawings of the Building that are from the 2006/2007

remodel and Building design drawings from 1978. Due to the size of these files, they will be provided to the Contractor upon request using the Contractors preferred method file transfer.

## 5.0 EXECUTION OF FIELD WORK

The intent of this statement of work is to provide for the completion of the work in every detail described herein which includes all incidental and related work and services. The Contractor shall have adequate plant to mobilize their forces, equipment and materials as may be reasonably required to complete the work in accordance with the specifications and terms of the contract.

The Contractor shall perform all tasks in a systematic and coordinated manner to minimize disruption and ensure quality results. Work shall be executed promptly and efficiently to avoid unnecessary delays. All activities must comply with project specifications, applicable safety standards, and will be closely coordinated with Government representatives to address issues quickly and maintain steady progress toward timely completion.

Final inspections will be conducted jointly by the Government and Contractor to verify compliance with all specifications, ensure quality workmanship, and confirm readiness for acceptance.

## 6.0 REMOVE AND REPLACE INDOOR CARPETING

The Contractor shall remove all existing rolled carpeting and underlayment from designated areas and prepare the subfloor for installation of new carpet tiles. Carpet tiles shall be installed in accordance with approved specifications to ensure a durable, professional finish that meets the functional and aesthetic requirements of the Administration Building. All work shall be performed in a manner that minimizes disruption, maintains alignment and adhesion standards, and complies with applicable safety and quality requirements. **Exhibit 3** shows where Building carpeting is located. **Photos 1, 2, and 3** show typical locations where the existing carpet is located.

### 6.1 Methods of Materials Qualification

To demonstrate that the materials to be used in this project conform to these specifications, the Contractor may pursue any of the following:

a) Certificates of compliance with specification requirements signed by an authorized officer of the manufacturer or processor of approved trade association involved. Such certificates shall show the name and address of the Contractor and the name and location of the project. The certificate shall be accompanied by all supporting product data so that adequate evaluation by the Government can be made.

a) Labeling by the manufacturer on unbroken/unopened containers.

b) Official marking or labeling by recognized grading organization or national code association indicating compliance.

### 6.2 Submittals

To ensure the Government can fully evaluate and approve all carpet-related products and installation

materials, the Contractor shall submit the following documentation and samples prior to ordering or installation.

a) Carpet Tile (Catalog cut and sample).

b) Carpet Adhesive (Catalog cut and MSDS sheets).

c) Transition pieces if any (Transition shall be vinyl or rubber 1-½ " wide).

d) Product Data: Manufacturer data for carpet tiles, adhesives, and accessories.

e) Samples: Minimum 3 carpet tile samples showing color, pattern, and construction for Government selection. Samples shall be a minimum of 6-inches long.

f) Installation Instructions: Manufacturers' written installation procedures.

g) Warranty: Manufacturer's standard commercial flooring warranty.

Note: Samples shall be 6" (minimum) long.

### 6.3 Carpet Tile

Carpet shall be recyclable nylon carpet tile (24 inch by 24 inch) meeting the specifications listed herein, and shall be installed in accordance with the Carpet and Rug Institute standard CRI – 104 Standard for Installation of Commercial Carpet, and in accordance with manufacturer's recommendations. Carpet shall be suitable for gluing down. Pre-Glued carpet will not be accepted. Carpet must be 100% Recyclable and shall have a fiberglass-reinforced modular tile backing system with recycled content.

### 6.4 Carpet Specification

Carpet tile shall be commercial-grade and of a dark, neutral gray/black tone consistent with "carbon charcoal," or equivalent.

Final color and pattern selection shall be made by the Government based on submittals.

| | |
|---|---|
| a. Construction | Level Loop |
| b. Fiber System | Nylon |
| c. Dye Method | Solution |
| d. Gauge | 1/10 |
| e. Stitches per Inch | Min 9.0 per inch |
| f. Pile Thickness | Min 0.010 inches |
| g. Total Thickness | 0.259 Inches |
| h. Pile Weight | Min 20 oz |
| i. Density | Min 6,900 oz per cubic yard |

| | |
|---|---|
| j. Product Size | 24 inches by 24 inches |
| k. Total Weight | Min 94 oz per square yard |
| l. Weight Density | Min 138,400 ox per cubic yard |
| m. Primary Backing | Polypropylene |
| n. Secondary Backing | Synthetic/Composition |
| o. Backing Recycled Content | Min 40% |
| p. Radiant Panel ASTM E-648 | Class 1 |
| q. NBS Smoke Chamber Test | Less than 450 (flaming) |
| r. Electrostatic Propensity | 3.5 kV or lower |
| s. Warranties | 10 year commercial stain warranty |

### 6.5 Quality Assurance

a) Installer shall have a minimum of 2-years of experience installing commercial carpet tile.

b) Installation shall comply with comply with CRI 104 and manufacturer requirements.

### 7.6 Delivery, Storage, and Handling

a) Deliver materials in original unopened packages with manufacturers label intact.

b) Store materials in conditioned space and protect from damage, moisture, and contamination.

### 6.7 Quantities

All dimensions and quantities are approximate. The Contractor bears full responsibility for verifying actual quantities prior to ordering or installation.

### 6.8 Temporary Utilities and Controls

Temporary utilities (electricity) will be provided by the Government at no cost to the Contractor. The Contractor shall provide and remove, at no cost to the Government, all additional equipment and other apparatus necessary to serve the work site. The Government makes no guarantee as to quality, quantity or continuity of such services and will not be liable for any effects these services have on Contractors' equipment or the progress schedule.

### 6.9 Execution

a) When removing cove bases, the Contractor shall take care shall take necessary precautions to ensure that walls and paint are not damaged during the removal. Any and all damages to the wall shall be repaired by the Contractor at no additional cost to the Government.

b) Verify substrates are clean, dry, smooth, level, and structurally sound.

c) Report conditions that could adversely affect installation to government.

d) Do not begin installation until deficiencies are corrected.

e) Prepare substrates in accordance with CRI 104 and manufactures requirements.

f) Remove dust, debris, oils, curing compounds, adhesives, and contaminants.

g) Install carpet tile in accordance with CRI 104 and manufacturers written instructions.

h) Maintain consistent orientation, dye lot, and pattern alignment. Do not mix dye lots in same area.

i) Install modular carpet tile using full spread, low-VOC releasable pressure-sensitive adhesive to allow for individual tile replacement, per manufactures recommendations.

j) Provide tight seams and secure adhesion without visible gaps or irregularities.

k) Fit neatly at fixtures, door frames, columns, and utility penetrations.

l) Transitions shall be heavy duty EPDM rubber reducers. Transition types shall be selected to maintain smooth, ADA-compliant walking surfaces and match expected wear conditions. Transitions to be mechanically or epoxy-bonded to the concrete.

### 6.10 Cleaning and Protection

a) Contractor shall thoroughly clean each room upon completion of work to include the following:

1) Vacuum to remove all debris, scraps, lint, etc.

2) Wipe down vinyl cove base and transition strips to remove dirt, dust grime, and excess glue and glue residual.

3) Wipe down horizontal surfaces that might have become dirty/dusty during carpet installation.

4) Protect installed carpet tile from traffic and construction activities until final acceptance.

### 6.11 Warranty

a) Provide 1-year installation from date of Government acceptance.

b) Provide manufacturers standard commercial flooring warranty.

### 6.12 Resilient Base and Accessories

Provide resilient rubber base for interior walls where carpet is installed, including gypsum wall boards and retrofit stucco walls.

a) General

1) References:

i) ASTM F1861 – Resilient Wall Base, Type TP (thermoplastic).

ii) Group 1, Style B (cove).

iii) CRI 104 – Standard for Installation of Commercial Carpet.

b) Submittals:

Product Data – Manufacturers specification, installation instructions and maintenance requirements.
Samples – 12-inch length of wall base in specified color and profile.

c) Warranty:

1) Manufacturer's Warranty – Minimum 5 years against defects in materials.

2) Installers Warranty – Minimum 1years against installation defects.

d) Products

1) Materials – Rubber Base Wall

2) Height: 4-inches.

3) Thickness: 1/8 inch.

4) Color: Black, homogenous throughout.

5) Profile: Coved for carpeted area.

e) Adhesives

Manufacturer approved adhesive suitable for gypsum board and stucco wall with heavy lace texture. High-tack or contact adhesive recommended for stucco walls. Coordinate with Government prior to application on stucco wall surface.

**6.13 Execution**

a) Examination:

1) Remove existing rubber resilient base in carpeted areas.

2) Verify wall surfaces are clean, dry, and free of dust or contaminants.

3) For stucco walls: Fill deep voids or irregularities with patching compound for smooth adhesion.

b) Installation:

1) Apply adhesive per manufacturers instructions.

2) Press wall base firmly into place; roll with hand roller to ensure full contact.

3) Seal joints tightly; avoid gaps.

4) For stucco walls: Use high performance adhesive and consider priming if surface is chalky.

c) Cleaning and Protection

1) Remove excess adhesive immediately.

2) Protect installed wall base from damage until project completion.

## 7.0 REMOVE AND REPLACE KITCHEN FLOOR

The kitchen floor is approximately 230 square feet in size with a small counter area. The existing vinyl tile flooring and subfloor are badly damaged and require removal and replacement. Refer to **Exhibit 3** for its location and **Photo 4** for the existing state of the floor.

The scope includes the complete removal of the existing vinyl tile flooring and the underlying wood subfloor, followed by installation of a new flooring system that meets durability, safety, and aesthetic standards appropriate for the facility's operational needs.

The Contractor shall furnish all labor, materials, equipment, transportation, disposal and supervision required to remove the existing kitchen flooring system and replace with new resilient vinyl tile flooring over a new wood subfloor.

Work includes;

a) Selective demolition of existing flooring, adhesive, base and damaged subfloor.

b) Inspection and replacement of wood subfloor ¾-inch plywood.

c) Installation of new vinyl tile flooring and resilient base.

d) Cleanup, protection of adjacent areas, and disposal of debris offsite.

### 7.1 Contractor Qualifications

Contractor shall have a minimum of 5 years of documented experience performing similar resilient flooring work including:

a) Vinyl composition tile or luxury vinyl tile installation.

b) Subfloor preparation.

c) Underlayment installation.

d) Adhesive application and leveling compound work.

### 7.2 Demolition

a) Removal all existing vinyl tile flooring and wood subfloor panels in the designated kitchen area.

b) Protection:

   1) Perform removal without damage to adjacent construction, framing, or utilities.

   2) Protect walls, cabinets, and remaining finishes during demolition.

   3) Removal Method:

      i) Use mechanical or manual means appropriate for the material type.

      ii) Leave framing undamaged and clean and ready for new subflooring.

### 7.3 Wood Sub-Floor Installation

a) ¾-inch plywood.

b) Exterior C-C Plugged.

c) Span rating as required for framing.

d) Fastening – Use 8d or 10d ring-shank nails or #8 or #10 wood screws, minimum length 2.5-inches. Along panel edges fasten at 6-inches on center. Fasten at 12-inches on center within the panel field.

e) Adhesive – Apply construction adhesive to joist tops before placing plywood panels to minimize movement and squeaks. Adhesive shall comply with APA recommendations for subfloor installation.

f) Installation – Drive fasteners flush without breaking the plywood surface. Stagger panel joints and install panels perpendicular to joists.

g) Submittals:

   1) Product data for plywood panel – grade, compliance with APA DOC PS-1, thickness, span rating, edge type, APA grade stamp documentation. Fastener and adhesive information.

### 7.4 Resilient Vinyl Tile Installation

a) Verify that substrates are smooth, clean dry and free of ridges, depressions, contaminants or conditions that will affect adhesion.

b) Verify that ambient temperature and humidity comply with flooring manufacturer requirements.

c) Do not begin installation until satisfactory conditions are corrected.

d) Submittals:

1) Product Data – manufacturers data for tile, adhesives, primers and accessories. ASTM F1700 classification for tile. VOC compliance documentation.

2) Samples for Government approval – Submit (3) physical samples for each tiles color, tile style/pattern, tile finish (matte, semi-gloss)

3) Transition strips and resilient base.

5) Adhesive certification (VOC, compatibility, warranty compliance)

6) Maintenance Data – include cleaning instructions and after-installation cure time requirements.

Note: No material shall be purchased until Government provides written approval.

e) Warranty:

1) Manufacturers 10-year warranty - wear-through, manufacturing defects and premature deterioration under normal conditions.

2) Contractors 1-year workmanship warranty – loose tiles, bond failure, open joints or lifting edges, adhesive failure not caused by moisture intrusion.

3) Exclusions – damage from abuse, flooding, or improper maintenance is excluded.

f) Substrate Preparation

1) Clean substrate of dust, soil, adhesives, curing compounds, oils, and foreign materials that may interfere with bond.

2) Fill voids, joints and surface irregularities with patching or leveling compound to produce a smooth uniform substrate.

3) Sand or plane high spots and repair loose or damaged subfloor sections.

4) Apply manufacturer approved primer if required for adhesive bond.

g) Installation of Tile Flooring

1) Install resilient tile flooring according to manufacturer written instructions and in alignment with approved shop drawings, patterns and layout.
2) Mix and apply adhesive per manufacturer requirements for trowel size, open time, working time, and cure time.

3) Lay tile with tight joints, flush edges, and uniform contact with adhesives – no gaps, raised edges or lippage permitted.

4) Roll flooring immediately after placement using a 100-pound roller to ensure full adhesion.

5) Maintain proper bond lines at walls, thresholds, and transitions.

h) Field Quality Control

1) Inspect completed installation for surface defects, misalignment, open joints, bubbles, or adhesive bleed-through.
2) Replace tiles that are damaged, out of alignment, or not fully bonded.

i) Cleaning and Protection

1) Remove excess adhesive and debris from the floor surface during installation.

2) Protect installed flooring from foot traffic, rolling loads moisture, and construction activities until substantial completion.

j) Resilient Rubber Base:

1) Provide 4-injch black rubber, coved profile with toe, complying with ASTM F1861 type TP, Style B.

2) Proper Wall Surface Preparation – Walls must be smooth, clean, dry and free of dust, loose paint, or contaminants that prevent adhesive bond.

3) Use Only Approved Adhesive – Apply adhesive recommended by the base manufacturer-required ranges before and during installation.

4) Maintain Temperature and Humidity Requirements – Condition base, adhesives, and room to manufacture required ranges before and during installation.

5) Install Base Plumb, Level, and Tight to the Wall – Press firmly into adhesive, ensuring no gaps top or bottom.

6) Make Clean, Accurate Cuts – Use sharp knives to create smooth vertical cuts at ends, door frames, and fixtures. Cuts must be clean to prevent peeling and curling.

7) Form Inside and Outside Corners Properly – corners must be either pre-molded or job-formed using heat or scoring to ensure a tight, durable fit.

8) Maintain tight Flush Joint – butt seams together neatly without gaps, overlaps or raised edges.

9) Roll the Base after Installation – Use a hand roller to ensure full adhesive contact and eliminate voids along the top edge, bottom edge and corners.

## 8.0 AIR DUCT CLEANING

The building HVAC infrastructure consists of two independent systems: a ductless, multi-zone heat-pump system serving several occupied areas, and a separate ducted system connected to the building energy recovery unit. The ERU associated ductwork has not been cleaned in more than 20 years. Refer to **Appendix A** for the Buildings as-built HVAC plans. **Photograph's 5 thru 9** show the existing ducts.

During recent facility assessments and corrective work, a significant rodent infestation was identified within various building spaces including adjacent to HVAC system components. Comprehensive rodent-remediation measures were subsequently completed, as documented in the projects rodent remediation and existing conditions reports.
Despite the completion of these efforts, contamination risks remain within the duct work due to the extended period of deferred maintenance and the presence of rodent activity. Therefore, thorough cleaning of all supply, return and exhaust ducts – including those associated with the Energy Recovery Unit – is required to remove residual contaminants and restore acceptable indoor air quality.

Please refer to **Appendix A** for mechanical drawings that show the ducted system layout. **Photos 5 through 10** shows return air ducts and floor grills, supply air ducts and outside air ducts.

### 8.1 Qualifications

a) HVAC System Cleaning Contractor

1) Supervisor – Shall be NADCA – Certified Air Systems Cleaning Specialist (ASCS) responsible for project oversight. Shall have 2 to 3 years of HVAC cleaning experience.

2) Inspector – Shall be NADCA – Certified ASCS, or NADCA – certified Ventilation Inspector (CVI) to perform site inspections.

b) Licensing:

1) Submit copy of NADCA certification.

### 8.2 Information Submittals

a) Prior to any work being performed, the Contractor to make the following submittals to Government for review and approval.

1) Qualification data for Supervisor and Inspector.

2) Project existing conditions report.

3) Evaluations and recommendations, including cleanliness verification.

4) Duct cleaning work plan.

5) EPA/CDC approved disinfectants.

b) Provide post project report.

### 8.3 Project Management and Coordination

Coordinate all HVAC air duct cleaning activities with the work of the contractor responsible for removal of the existing energy recovery units and installation of a new 6-ton split system condenser and air handler. Duct cleaning shall be scheduled so that cleaning of all supply, return and associated ductwork occurs after demolition activities and prior to final installation and commissioning of the new equipment.

The duct cleaning contractor shall cooperate with the mechanical contractor to ensure system components are accessible, sequencing is maintained, and no re-contamination occurs due to overlapping work.

### 8.4 Scope of Work

The Contractor shall provide all labor, materials, equipment, transportation, incidentals, and services required to complete the work as specified and in accordance with National Air Duct Cleaners Association (NADC).

Clean all duct work associated with existing energy recovery unit including:

a) Supply-air ducts, including turning vanes to the energy recovery unit.

b) Return/exhaust air ducts and grills to the energy recovery unit.

### 8.5 Preparation

a) Inspect HVAC air-distribution equipment, ducts, plenums, and system components to determine appropriate methods, tools, and equipment required for performance of Work.

b) Perform "Project Evaluation and Recommendation" according to NADCA ACR.

c) Cleaning Plan: Prepare a written plan for air-distribution system cleaning that includes strategies and step by step procedures.

   At a minimum include the following:

   1) Supervisor contact information.

   2) Work schedule.

   3) Methods ad materials planned for each HVAC component type.

   4) Required support from other trades.

   5) Equipment and material storage requirements.

   6) Exhaust equipment setup locations.

### 8.6 Existing Conditions Report

Prepare a written report that documents existing conditions of the systems and equipment. Include list of conditions detrimental to performance of the Work.

Proceed with work only after conditions detrimental to performance of the Work have been corrected. Use the existing service openings as required for proper cleaning at various points of the HVAC system for physical and mechanical entry and for inspection.

Comply with NADCA ACR "Guidelines for Constructing Service Openings In HVAC Systems" section. Mark the position of manual volume dampers and air-directional mechanical devices inside the system prior to cleaning. Restore them to their marked position on completion of cleaning.

## 8.7 Cleaning

a) Comply with NADCA ACR, including items identified as “recommended”, “advised” and “suggested”.

b) Perform electrical lockout and tagout according to Owner’s standards or authorities having jurisdiction.

c) Remove non-adhered substances and deposits from within the HVAC system.

d) Complete cleaning in accordance with Owner-Contractor agreed-upon scope of work.

e) Collect debris removed during cleaning. Ensure that debris is not dispersed outside the HVAC system during cleaning process.

f) Particulate Collections

   1) For particulate collection equipment, include adequate filtration to contain debris removed. Located equipment downwind and away from all air intakes and other points of entry into the building.

   2) HEPA filtration with 99.97 percent collection efficiency for particles sized 0.3 micrometer or larger shall be used where the particulate collection equipment is exhausting inside the building.

g) Control odors and mist vapors during the cleaning and restoration process.

h) System components shall be cleaned so that all HVAC system components are visibly clean. Upon completion, all components must be returned to those settings recorded just prior to cleaning operations.

i) Clean all air-distribution devices, registers, grilles, and diffusers.

j) Ensure that a suitable operative drainage system is in place prior to beginning wash-down procedures.

## 8.8 Air Distribution Systems

a) Mechanically clean air-distribution systems specified to remove visible contaminants, so that the systems are capable of passing the HVAC System Cleanliness Tests (refer to NADCA ACR).

## 8.9 Debris Removal

Debris shall be removed from the Red Rock Canyon NCA according to applicable Federal, state and local requirements.

## 8.10 Mechanical Cleaning Methodology

Source removal Cleaning Methods: The HVAC system shall be cleaned using source-removal mechanical cleaning methods designed to extract contaminants from within the HVAC system and to safely remove these contaminants from the building. No cleaning method, or combination of methods, shall be used that could potentially damage components of the HVAC system or negatively alter the integrity of the system.

a) Use continuously operating vacuum-collection devices to keep each section under negative pressure.

b) Cleaning methods that require mechanical agitation devices to dislodge debris that is adhered to interior surfaces of the HVAC system components shall be equipped to safely remove these devices. Cleaning methods shall not damage the integrity of the HVAC system components or damage porous surface materials, such as duct and plenum liners.

c) Cleaning Mineral-Fiber Insulation Components

1) Fibrous glass thermal or acoustical insulation elements present in equipment or ductwork shall be thoroughly cleaned with HEPA vacuuming equipment while the HVAC system is under constant negative pressure and shall not be permitted to get wet according to NADCA ACR.

2) Cleaning methods used shall not cause damage to fibrous glass components and will render the system capable of passing the HVAC System Cleanliness Tests (refer to NADCA ACR).

3) Fibrous materials that become wet shall be discarded and replaced.

**8.11 Cleanliness Verification**

a) Verify cleanliness according to NADCA ACR, "Verification of HVAC system Cleanliness" section.

b) Verify system cleanliness after mechanical cleaning and before applying any treatment or introducing any treatment-related substance to the HVAC system, including biocidal agents and coatings.

c) Surface Cleaning Verification: Perform visual inspection for cleanliness. If no contaminants are evident through visual inspections, the HVAC system will be considered clean. If visible contaminants are evident through visual inspection, those portions of the system where contaminates are visible shall be re-cleaned and subjected to re-inspection for cleanliness.

d) Additional Verification

Perform surface comparison testing or NADCA vacuum test.

e) Prepare a written cleanliness verification report. At a minimum, include the following:

1) Written documentation of the success of the cleaning.

2) Site inspection reports, initialed by supervisor, including notation on areas of inspection.

3) Surface comparison test results.

4) System areas found to be damaged.

5) Photographic Documentation

6) Provide photographic documentation of HVAC system conditions before cleaning, during cleaning, and after cleaning.

7) Photo Frequency – Every 8 to 12 feet of duct run, at every change in direction, at every duct feature, i.e. dampers, vanes etc.

8) Submit in JPEG format.

9) Minimum resolution: 8 megapixels or higher.

10) Each photo to have duct – supply, return, photo location and before, during or after designation.

11) Acceptance Criteria – Photos shall demonstrate removal of all visible debris and shall support visual verification required by NADCA ACR.

## 9.0 REMOVE AND REPLACE ENERGY RECOVERY UNIT (ERU)

The existing ERU serving the building has reached the end of its serviceable life and no longer provided reliable ventilation, temperature moderations, or energy recovery performance. The ERU system has shown progressive degradation, increased maintenance burden, and diminished operational efficiency over time, contributing to reduced occupant comfort and inconsistent airflow delivery throughout the conditioned spaces. The age of the ERU, combined with recurring operational issues, makes continued repair neither cost-effective nor consistent with current BLM building performance goals.

To restore dependable ventilation and improve overall system performance, this project replaces the obsolete ERU with a new high efficiency single phase split-system heat pump and associated components. This upgraded system shall provide improved reliability, simplified maintenance, and better efficiency while maintaining or closely matching the original design airflow distribution to protect indoor air comfort and acoustics.

The work includes full removal for the ERU, reconnection or modification of existing ductwork, installation of new mechanical components, and commissioning to ensure balanced well-distributed airflow.

**Appendix A** contains the as-built mechanical designs sheet for the existing ERU. Note that sheet AD-M2.3 shows how the solar water heater system interconnects with the ERU. **Photos 10 and 11** show the existing ERU. Note that **Photo 12** shows return air, outside air and exhaust air ducting.

### 9.1 Existing Conditions

The existing ERU is a separate system that works in conjunction with a new Fujitsu ductless system composed of three (4) ton heat pumps and 14 air handling units with Edge Controller. Remote management of the system is performed through Johnson Controls Metasys.

The ERU system includes connected supply, return, exhaust and outdoor air ductwork, blowers, blower controllers, and multiple duct-mounted sensors, gauges, dampers, and actuators. The exact quantity and condition of these devices are documented and shall be field verified by the Contractor for purpose, need, condition and reusability with the new system.

The ERU serves an approximately 7,500 sq. ft. indoor area through the existing ductwork that will remain in service after the ERU is removed and replaced.

Site power is single phase only.
An HVAC contractor recently evaluated both the ERU and new ductless system. The contractor determined that based on existing duct sizes, the ductless system capacity and the anticipated building population, a split system would be adequate to replace the ERU.

## 9.2 Scope of Work

a) Remove existing ERU with connected supply, return, exhaust, and outdoor air ductwork, and multiple duct-mounted sensors, gauges, dampers, and actuators indicated or reasonable inferred from the contract documents.

b) Install a new split-system HVAC unit (indoor air-handling unit and outdoor condenser/heat-pump unit) and connect to the existing duct system, including refrigerant and condensate piping, concrete pad, supports , and duct modifications.

c) Provide variable speed blowers and controllers compatible with the existing duct system formerly serving the ERU.

d) Provide all electrical power, grounding, and bonding from the MCC/main panel, including breakers, feeders, disconnects, and lock-out/tag-out (LOTO) implementation.

e) Assess existing duct mounted sensors, dampers, actuators and related devices associated ERU. Identify which are to be removed, abandoned retained, or replaced and implement approved removals and replacements under the contract allowance.

f) Perform testing, adjusting and balancing (TAB) of the new split system and associated ductwork to verify that airflow, external static pressure, and unit operation meet the design criteria established by the Mechanical Engineer and document results in TAB report.

g) Full integration of all new HVAC equipment, controllers, sensors, etc., into the building Metasys building automation system, including configuration of the system network engine, graphics updates, point discovery, and database export as required by Government.

## 9.3 Roles and Responsibilities

a) General Contractor

   1) Provide overall project management, coordination, schedule control and site safety.

   2) Coordinate mechanical, electrical, and control, sheet metal trades and Johnson Controls for integration with BLM operations.

b) HVAC Subcontractor and Mechanical Engineer

   1) The HVAC subcontractor shall retain a qualified licensed professional Mechanical Engineer.

   2) The Mechanical Engineer shall be responsible for:

      i) Basis of design for the new split-system, including capacity, airflow, static pressure and ventilation compliance, duct/pressure assumptions.

      ii) Design intent for duct modifications, device strategy and control sequences.

      iii) Review and where required, stamping of mechanical design drawings and calculations.

      iv) HVAC load calculations to support sizing decision.

c) Sheet Metal Subcontractor (or Sheet metal Work under HVAC Subcontractor)

1) Removal and capping/patching of existing WRU related duct connections and openings.

2) Sheet metal work shall include fabrication, modification, installation and repair of all ductwork required to connect the new indoor unit to the existing duct system, including transitions, offsets and branches.
3) Installation, adjustment and sealing of duct mounted dampers, access doors and related sheet metal accessories.

4) Installation and sealing of duct and wall penetrations associated with refrigerant line sets and related piping where sheet metal sleeves or plates are used.

d) Electrical Subcontractor

Provide all electrical demolition and new work associated with removal of the ERU and installation of the new split-system, including feeders, breakers, disconnects, grounding, bonding, labeling, and coordination with the building motor control center (MCC)/main panel in accordance with the National Electric Code (NEC).

### 9.4 Mechanical Engineer and Drawings

The HVAC subcontractor under the Mechanical Engineer, shall prepare drawings that clearly show:

a) Removal limits for the existing ERU and associated ductwork, piping, and devices.

b) New or modified ductwork connecting the new indoor unit to the existing duct system, including duct sizes and routing.

c) New/revised refrigerant and condensate piping and connection points.

d) Locations and general functions of duct-mounted sensors, dampers, and actuators that will remain in service or be replaced.

e) The Contractor shall maintain redline markups of mechanical drawings during construction to record field changes.

f) The Mechanical Engineer shall review and indicate in writing that the mechanical as-built drawings are an accurate record of the installed HVAC work.

### 9.5 System Acoustics

HVAC modifications associated with the ERU replacement and new split-system shall be designed and installed such that occupied office areas served by the system do not exceed a target background noise level of NC-35 under normal operating conditions and NC-40 for open plan areas.

The Mechanical Engineer and Contractor shall consider equipment selection, fan speed settings, existing duct layout and diffuser type and vibration isolation as needed to meet this noise criterion.

If field conditions indicate that NC-35 cannot be reasonably achieved in a given space without compromising required airflow, the Contractor shall notify the Government and propose reasonable mitigation measures (fan speed adjustments, diffuser changes, or additional acoustic treatment) for review and approval.

## 9.6 Controls and User Interface

a) The Air Handling Unit (AHU) shall feature an integrated, factory-installed inverter driven controller or electronically commutated motor (ECM). To minimize mechanical room footprint and reduce wiring complexity, external, field-mounted variable frequency drives (VFD) are discouraged. The controller must be natively mapped to the systems logic to allow for automatic static pressure adjustment without third party programming.

a) The system shall include a high-resolution, backlit local controller designed for each of use by non-technical facility staff. The interface must meet the following criteria:

1) Plain Text Diagnostic – Maintenance alerts and system status must be displayed in clear, non-coded English text. (e.g. "filter clean" or "communication error") rather than cryptic numeric codes requiring a manual.

2) Simplified Menu Navigation – The user-interface shall feature a "tiered" menu system allowing basic temperature and fan adjustments on the primary screen while sequestering advanced engineering settings behind a secondary password-protected or long-press menu.

3) Visual Icons – Use of intuitive ISO-standard icons for heating, cooling, and fan modes is required to ensure immediate recognition by non-practitioner staff.

b) Tool-Free Local Access

The indoor unit controller must allow for on-site configuration and airflow adjustment via a wall mounted interface or localized plug-in tool. Systems requiring proprietary external laptops or complex software licenses for basic fan speed commissioning are not acceptable.

c) Controller memory shall be non-volatile memory and be able to withstand loss of power loss.

d) Task-Oriented Operating Instructions

Contractor shall develop and provide a site-specific Technical Operating Procedure for the indoor and outdoor units. This documentation shall be formatted as a sequential "checklist" (step by step) rather than a general manual. Instructions must include the specific button-press sequences required to:

1) Access Sensor Data.

2) Check Static Pressure – Navigate the service menu to verify fan RPM and External Static Pressure (ESP).

3) Clear Maintenance Alerts – Reset "Filter" or "Service" icons after routine maintenance.

4) System Overrides – Manually force “high” or “low” fan speeds for troubleshooting.

e) Physical Point of Use Labeling

Contractor to provide a weatherproof laminated quick-card. Card size minimum = 8.5” x 11” shall be permanently affixed to the inside door of the indoor air handler. This card must utilize a “Sequence of Operations” format (as described elsewhere in this section) to allow non-HVAC practitioners to verify system health without a laptop or external gauges.

## 9.7 Split-System Air Conditioner

a) Provide a factory matched split-system air sourced heat pump consisting of and outdoor heat pump condensing unit(s) and an indoor air-handling unit(s) with cooling coil and integral electric resistance heat, designed and rated a complete system.

b) Equipment shall comply with AHRI, UL, and ASHRAE standards, and shall meet or exceed the minimum efficiency requirements of the governing energy code for air-sourced heat pumps of this size and type for the project climate zone.

c) Manufacturers

1) Basis of Design: Commercial split-system heat pump (outdoor unit and matching indoor air handler) or equivalent.

2) Acceptable Manufacturers: Fujitsu, Trane, Carrier, Lennox, Daikin, Mitsubishi, or other manufacturers meeting this section and capable of full Metasys integration.

3) Substitutions: Proposed substitutions shall demonstrate equal or better capacity, efficiency, sound, controllability, and physical compatibility with existing conditions.

d) Outdoor Unit(s)

1) Air-Cooled, Refrigerant-Based Heat Pump – Outdoor unit shall be factory-assembled, air-cooled heat pump system consisting of compressor, condenser/evaporator coil, reversing valve assembly, outdoor fan, and all required components necessary to provide both mechanical cooling and mechanical heating via a reversible refrigeration cycle.

2) Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gauge ports on exterior of casing.

3) Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal and current-sensitive overload devices, start capacitor, relay and contactor.

i) Compressor Type: Scroll.

ii) Refrigerant: R-410A or R-32..

iii) Heat-Pump Components: Unit shall include a factory-installed reversing valve, low-temperature-air cutoff thermostat, and all controls, sensors, and refrigerant

management devices required for full heat pump heating operation. Units shall be fully capable of providing heating in heat-pump mode using only the refrigeration cycle. Auxiliary or back-up heat shall be supplemental only.

iv) Fan: aluminum propeller type, directly connected to motor.

v) Motor: Permanently lubricated, with integral thermal-overload protection.

vi) Concrete Mounting Base: 4-inches thick, 3,500 psi, 6-inch overhang on all sides.

e) Indoor Units

Floor Mounted Evaporator-Fan Components

1) Cabinet: Enameled steel with removable panels on front and ends in color selected by Government.

i) Insultation – faced, glass-fiber duct liner.

ii) Drain Pans – galvanized steel with connection located at lowest point. Confirm slope with Government prior to ordering unit.

2) Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal expansion valve. Comply with ARI 206/110.

3) Electric Heating Coil: Helical, nickel-chrome, resistance-wire heating elements; with factory ceramic support bushings, automatic-reset thermal cutout, built-in magnetic contactors, manual-reset thermal cut-out, airflow proving device, and one-time fuses in terminal box for overcurrent protection.

4) Fan: direct drive, centrifugal.

5) Fan Motors:

1) Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Masterspec 230513 “Common Motor Requirements for HVAC Equipment”.

2) Multi-tapped, multispeed with internal thermal protection and permanent lubrication.

g) Air Filtration:

1) General Requirements for Air Filtration.

i) Comply with NFPA 90A.

ii) Minimum MERV according to ASHRAE 52.2.

iii) Filter Holding Frames: provide factory installed filter holding rack for disposable panel filters. Filters shall be removable from the equipment - room access side.

iv) Disposable Panel Filters:
v) Factory-fabricated, viscous-coated, flat-panel type.

vi) Thickness: One or two inches as directed by manufacturer.

vii) Media: Interlaced glass fibers sprayed with non-flammable adhesive and antimicrobial agent.

viii) Frame: Galvanized steel, with metal grid on outlet side, steel rod grid on inlet side, and hinged; with pull and retaining handles.

### 9.8 Remove and Replace HVAC Duct Mounted Devices

As needed, remove and replace duct devices and sensors and properly integrate with duct modifications and new split system.

### 9.9 Building Pressurization

To support healthy indoor air quality , prevent uncontrolled infiltration, and maintain occupant comfort, the building shall be operated so that indoor static pressure remains marginally higher than the exterior ambient pressure under normal operating conditions.

The HVAC system shall maintain the building at a slight positive pressure relative to the outdoors, targeting +0.02 to +0.05 in. w.g. (5–12 Pa) in accordance with accepted ASHRAE office-building practice. Supply airflow shall exceed total exhaust/infiltration and the system shall be TAB-verified to confirm stable pressurization under normal operation. Adjustments to outdoor air, fan settings, and ductwork components shall be made to ensure compliance with this requirement.

### 9.10 METASYS Integration

Provide all labor, materials, programming, and coordination required to integrate new HVAC equipment and controls into the existing Johnson Controls **Metasys** Building Automation System (BAS). Work includes BACnet communication setup, SNE configuration, graphics updates, and verification of system performance.

The Contractor shall be responsible for coordinating with Johnson Controls to ensure proper integration into METASYS.

Note: Products that require and outside internet connection to operate or be initially programmed from outside the Government IT network such as Fujitsu's Airstage Edge Controller will not be accepted.

a) Building Automation System Compatibility – All equipment and controllers shall communicate on BACnet MS/TP or BACnet/IP, suitable for integration with Metasys.

b) Network Engine (SNE) – Contractor shall configure required objects, alarms, and trends within the Metasys SNE.

c) Programming and Graphics

1) Provide full point mapping, alarm setup, and operational graphics matching existing BLM formats.

2) Implement all sequences of operation and verify logic control.

d) Testing and Acceptance

1) Provide full point mapping, alarm setup, and operational graphics matching existing Government formats.

2) Demonstrate trends, alarms, commands, and schedules operating correctly.

3) Correct deficiencies and provide updated backups and turnover.

**9.11 Mechanical Work**

a) Remove the existing ERU, associated duct connections, supports, condensate lines, and water piping directly serving the ERU.

b) Remove associated control and power wiring to the nearest accessible junction box or panel or to a location that makes efficient use of wiring during the retrofit of the split-system.

c) New HVA Split System

1) Provide and install split system outdoor condensing/heat pump unit and factory matching indoor air handling unit.

2) Provide a variable speed ECM blower (or equivalent variable speed motor) capable of delivering required airflow across the range of static pressures associated with the existing duct system.

d) Duct Modification and Sealing

1) Modify existing ductwork as needed to disconnect the ERU and connect the new indoor unit.

2) Seal all new and disturbed joints, seams, and openings with UL listed mastic and/or tape to achieve tightness equal to or better than existing ductwork.

e) Water Line Capping

1) Identify and cap water lines(s) serving the ERU swap-cooler function and water lines associated with related solar water heating system – hot water supply, hot water return.

3) Provide permanent tags indicating “CAPPED WATER LINE – FORMER SWAP COOLER”.

f) Solar Water Heater System

1) Remove solar hot water dump coil.

g) CMU Wall Penetrations

1) Provide neat penetrations through CMU walls for refrigerant line sets and associated piping.

2) Drill approximately sized holes, avoid reinforcement/embedded utilities and provide sleeves where required.

3) Seal penetrations with appropriate sealant or firestopping per wall rating and exterior/interior conditions.

### 9.12 Electrical, Grounding and Lock-Out/Tag-Out (LOTO)

a) Electrical Demolition – Remove electrical feeders and control wiring serving the ERU back to panels or junction boxes.

b) New Power and Grounding

1) Provide new circuit breakers or fused disconnects in the main electrical control panel sized per manufacturer minimum circuit ampacity and maximum overcurrent protection.

2) Provide feeders and branch circuits with adequate ampacity, derating, and insulation type for the new unit(s).

3) Provide grounding and bonding for indoor and outdoor units and associated metallic systems per the most current addition of the National Electric Code.

c) Lock Out / Tag-Out

1) Implement LOTO procedures.

2) De-energize, log, tag, and verify absence of voltage before work.

3) Maintain LOTO until work is complete and system is safe to re-energize.

### 9.13 System Commissioning and Training

The Contractor shall commission the new split-system heat pump, indoor air-handling unit, associated duct modifications, electrical work, and all reconfigured control components to verify proper operation in accordance with the Mechanical Engineer's design intent, manufacturer requirements, and project performance criteria. Commissioning shall include verification of airflow delivery, external static pressure, building pressurization (+0.02 to +0.05 in. w.g.), inverter/ECM blower operation, sensor functionality, damper operation, refrigerant system performance, and all safety and supervisory functions. Functional testing shall confirm reliable heating/cooling performance, stable integration with the remaining ductless system, and balanced distribution through the reused ductwork serving the 7,500 sq. ft. building. All deficiencies identified during commissioning shall be corrected and retested prior to acceptance.

The Contractor shall perform complete Testing, Adjusting, and Balancing (TAB) of the new system, documenting supply, return, and outdoor airflow quantities; external static pressure; and fan performance in a final TAB report. Controls commissioning shall include full integration of the new equipment into the

Johnson Controls Metasys BAS, including BACnet setup, SNE configuration, point mapping, alarm verification, trend setup, and operational graphics updates. The Contractor shall submit commissioning documentation including functional test forms, startup sheets, TAB reports, redline drawings, and updated O&M materials.

Upon successful commissioning, the Contractor shall provide training to BLM facility staff covering operation, troubleshooting, and routine maintenance of the new indoor and outdoor units, user-interface navigation, accessing diagnostic text, resetting maintenance alerts, verifying static pressure, and performing basic overrides. Training shall be task-oriented and supported by a site-specific Technical Operating Procedure and an 8.5"×11" laminated quick-reference card permanently installed at the indoor unit. Training shall ensure non-technical personnel can confidently operate and monitor the system without specialized tools, laptops, or proprietary software.

## 9.14 Submittals

a) Administrative Submittals

1) Project Schedule – Show removal of ERU, installation sequence, electrical work, and duct modifications.
2) Site Safety Plan/LOTO Procedures for electrical isolation during ERY removal and installation of new split system.
3) Coordination Plan – Coordination with Johnson Controls Metasys integration, electrical, sheet metals and mechanical trades.

b) HVAC Product Submittals.

1) Outdoor Unit – Manufacturer cut sheets, dimensional drawings, electrical data, sound ratings, heating/cooling capacities, refrigerant type.

2) Indoor Unit – Manufacturer cut sheets, coil data, blower performance tables, motor specifications, filter rack details.

3) Electrical heating Coil – Safety details showing limits, airflow-proving device, fuses and staging method.

4) Controls Hardware – Controller specifications, ECM or inverter specifications, local interface, icons, and menu functionality.

c) Accessories and Components

1) Concrete Pad – Mix design (3,500 psi), dimensions, reinforcement details.

2) Refrigerant Piping – Line set sizes, insulation type, and wall penetrations.

3) Condensate Drain System – Piping, hangers, materials, termination point and trap detail.

4) Ductwork Modifications – Transitions, offsets, flanges, dampers, access doors.

5) Duct Mounted Sensors, Dampers, Actuators – Identifications of each existing device with disposition (remove, reuse, replace).

6) Electrical Components – Breakers, feeders, disconnects, grounding and bonding, panel schedules, wire sizing, conduit.

d) Controls and Integration

1) METASYS Integrations – Points list, addressing, communication method, sequences, GUI interface behavior.

2) Sequence of Operation – Including ventilation strategy, fan speed logic, static pressure control, alarms.

3) User Interface Demonstration – Screenshots or manufacturer documentation verifying plain English diagnostics and icon based navigation.

e) Engineer Submittals

1) Mechanical Engineers Signed/Stamped Drawings:

i) Removal limits of ERU.

ii) New duct routing and sizes.

iii) Refrigerant and condensate piping.

iv) Locations of sensors/dampers/actuators.

2) Load Calculations – Split-system sizing justifications.

3) Ventilation Compliance Documentation – Outdoor air rates.

f) Quality Assurance

1) TAB Plan – Procedure for measuring airflow, static pressure, balancing, and reporting.

2) Factory Certification – Installer qualifications, refrigerant handling certification.

3) Equipment Start-Up Sheets – Manufacturer forms for both indoor and outdoor units.

4) Commissioning Checklists – Including airflow proving, sensor mapping, METASYS handoff.

g) Closeout

1) Final TAB Report – Airflow, external static pressure (ESP), blower motor speed (RPM), and unit performance verification.

2) As-Built Drawings (engineer reviewed) – Mechanical.

3) Operations and Maintenance Manuals – Manufacturer O&M plus project specific technical operating procedures described below.

i) Accessing sensor data.

ii) Fan Speed adjustments.

iii) Clearing alarms.

iv) Static pressure check procedures.

v) Maintenance tasks.

### 9.15 Warranties

a) Contractor Warranty – One year workmanship.

1) Installation quality.

2) Duct modifications.

3) Refrigerant piping and charging,

4) Electrical feeders, breakers, disconnects.

5) Controls wiring.

6) Sensors, dampers, and actuators.

7) Startup, balancing, and commissioning workmanship.

b) Manufacturer Warranties.

1) Compressor – 5 years.

2) Parts – 1 year.

3) Refrigerant components – 1 year.

## 10.0 OFFICE CUBICLES AND WORKSTATIONS

Contractor shall be responsible to provide, deliver and install modular systems furniture (cubicles) and work station tables of a quality and configuration comparable to a commercial steel-framed panel system (e.g., Friant system 2, Novo, or Interra or equal.). The Contractor shall furnish all labor, materials, equipment, and supervisions necessary to provide fully functional work stations as described in this section.

**Exhibit 4** show the preliminary layout of cubicles and works stations along with existing power outlets, data and communication wall drops and cubicle whips. The preliminary layout is the same as the prior layout with the exception that there will be 24 cubicles instead of 17 and the cubicles will be smaller. A total of 107 existing communication/data wall drops spread throughout the building were recently tested. Of the 45-communication wall drops tested, only one was found to be bad. Of the 62-data wall drops

tested only 2 were found to be bad. Note that all communication/data wiring is Category 6.

The project includes furnishings and installing systems in three distinct work areas within the building. In the largest open office room, the Contractor shall provide and install twenty-four (24) modular cubicles arranged as 3 clusters of 8 cubicles consistent with the Government approved layout. A separate, smaller office shall receive four (4) additional cubicles of the same general construction and performance requirements. In a third room, the Contractor shall furnish and install thirteen (13) bench style work stations to support collaborative and touchdown work functions. All modular systems and workstations shall be fully coordinated with the existing building layout, power and data infrastructure, and any additional electrical or data requirements necessary to support the workstation systems.

## 10.1 Performance Objectives

a. Provide workstations that are durable enough for full-time federal office use, with reinforced metal frames and panel construction designed for a minimum 10-year service life under normal use.

b. Provide a frame and panel system that can be reconfigured and expanded in the future without replacing the entire system (stackable frames or panels, removable tiles, and compatible power and data routing.

c. Provide an integrated power and data distribution solution within the furniture base or beltline that meets applicable electrical and low voltage codes.

d. Provide cubicle with a typical footprint of 41.25 sq. ft. (+/- 10 percent), comparable to industry standard cubicles in the 36 to 48 sq. ft. range. Bench style work stations shall be approximately 3.8 feet by 2.4 feet.

e. Provide sufficient power and mounting capacity at each workstation to support one laptop computer with docking station, two 27-inch monitor, and wall-hung storage cabinets with underside fluorescent lighting.

## 10.2 Required Results

a. Cubicle Electrical Power Requirements

Each cubicle shall be provided with a complete modular electrical distribution system to support BLM operational equipment loads. Electrical performance shall meet or exceed NEC, UL and manufacturer requirements.

1) System Configuration

i) In the largest space, the system shall include a 3-circuit, 8 wire modular electrical system, expandable to four circuits if required based on final equipment loads.

ii) In the main room with (24) cubicles, each group of (8) cubicles shall be supplied by a dedicated bus feed, with no more than (8) bench style workstations powered from a single feed.

iii) Power harnesses, jumpers and all internal raceway wiring shall be provided by the Contractor as part of a complete system.

b. Receptacles per Cubicle

Each cubicle shall be provided with a minimum of (4) duplex receptacles allocated as follows:

1) One duplex for laptop/docking station and height adjustable work surface.

2) One duplex for dual 27-inch monitors.

3) One duplex for under cabinet task lighting.
4) One duplex for auxiliary/personal device charging (e.g. mobile phone, radio, headphones, other mobile devices).

c. Receptables Bench Style Work Station

1) For bidding purposes assume one duplex power outlet per work bench.

2) Task Lighting.

3) Each cubicle shall include wall mounted overhead cabinets equipped with integrated under cabinet fluorescent or LED task lighting.

4) Task lighting shall be hard-wired into the furniture raceway system and shall operate from a local switched connection as permitted by the modular system.

e. Cubicle Circuit Distribution

1) Computer equipment (laptop, doc, monitors) shall be separated from lighting and auxiliary loads to minimize nuisance tripping.

2) Personal charging receptacles may share a general-use or accessory circuit depending on the final furniture configuration.

f) Data and Communications.

1) Each cubicle shall include (2) data drops, routed through the panel raceway where feasible.

2) Each bench style workstation shall include (1) data drop.

3) Contractor shall coordinate all data routing with Government.

**10.3 Cubicle Panel Construction**

a) Panel Frame

i) Welded steel or aluminum internal frame.

ii) Vertical members with integrated cable channel.

iii) capable of supporting overhead, wall mounted cabinets.

b. Panel Core

1) Acoustic mineral wool or fiberglass core

2) Sound Transmission Class (STC) – Greater than or equal to 20.

c. Panel Thickness

1) 2.0 – 3.5 inches typical.

d. Panel Height

i) 54-inches (seated privacy).

ii) Mixed height panels permitted.

e. Panel Surfaces - Fabric wrapped tackable.

f. Top Trim - Extruded aluminum or powder-coated steel.

**10.4 Cubicle Worksurfaces**

a. Shape – L shaped – 24-inch depth.

b. One side of L shall be electrically powered height adjustable surface equipped with front edge mounted controls labeled with clear direction indicators ("Up" and "Down"). Thr lift mechanism shall operate from a standard 120-volt power supplied through the modular furniture electrical system, using a factory approved connector and with out the need for separate wall power.

b. Construction – 1 to 1.25-inches thick particle board core with high pressure laminate and pvc of vinyl edge banding.

c. Support – Cantilevered brackets.

d. Cable Access – Factory-cut grommets.

e. Storage – Overhead with locking door.

f. The Contractor shall provide integrated USB-A and USB-C charging capability at each cubicle and bench style workstation. The charging ports shall be incorporated into the work surface or factory-approved surface-mounted module, as compatible with the selected furniture system. Each unit shall include: (1) USB-A port and (1) USB-C port capable of device charging without reliance on docking-station USB ports.

USB charging modules shall be UL-listed, low-profile, and designed for permanent installation on or in the work surface. All power for the USB charging unit shall be derived from the associated workstation duplex receptacle connection. Installation shall not reduce the structural integrity of the work surface and shall comply with the furniture manufacturer's installation requirements.

The Contractor shall coordinate exact placement of modules with Government-provided workstation layout drawings to ensure accessibility, cable-routing compatibility, and compliance with ergonomic clearances.

### 10.5 Bench Style Work Stations

Bench-style touchdown workstation shall be designed to support transient users who need a simple, efficient place to dock a laptop and perform short-duration tasks. The workstation provides a clean, storage-free layout with integrated power, USB charging, and data connectivity to ensure compatibility with standard Government IT equipment.

The office space for these workstations is open. Flexibility, durability, and minimal infrastructure impact are priorities.

a. Work Surface and Structure

   1) Type – Linear bench surface, laminated or solid-surface. Minimum 24-inches deep and 48-inches wide per station.

   2) Frame – Steel or aluminum benching frame with integrated cable trough or raceway.

   3) Storage – No storage, no pedestal, shelving or overheads.

   4) Accessories – Gromet(s) for cable pass through.

b. Power and Data Requirements

   1) Primary Power Feed – Wall - (1) duplex 120-volt, 20-amp circuit per two stations.

   2) Per Station Power Access - (2) 120-V convenience outlets minimum (receptacles on station or in shared power bar.

   3) Integrated USB-A and USB-C charging module – 15 to 60-W output.

c. Data and IT Requirements

   1) Provide (1) CAT 6 data jack per workstation.

   2) Home-run CAT 6 cable to IT room patch panel.

d. Cable Management

   1) Provide under-bench wireway or tray to route power and data separately.

   2) Provide vertical cable risers if feeding from floor boxes.

e. Installation and Coordination

   1) Confirm available panel capacity, branch circuit locations, and pathway routing.

   2) Patch and paint any surface affected by installation.

3) Provide as-built updates noting power and data locations.

4) Installation shall comply with most current edition of NEC or IEC.

5) All electrical components shall be UL-listed.

6) Coordinate with Government prior to home running data and power to avoid conflicts with existing utilities.

f. Submittals

1) Product Data – Manufacturer's catalog sheets for bench workstation components, work surfaces, frames, legs, and finishes.

2) Shop Drawings - Dimensioned workstation layouts showing bench lengths, grommet locations, cable routing and power/data/USB locations.

3) Samples - Work surface finish (minimum 3-inches by 3-inches). Metal frame/leg finish.

g. Warranties

1) Manufacturer

i) Work Surfaces and Frame – Minimum 10-year warranty against defects in materials, structural failure, delamination, premature wear.

ii) Electrical Modules (power bar, USB charging) – Minimum 1-year warranty covering electrical performance. USB module functionality, and failures under normal office use.

2) Contractor

i) Minimum 1-year workmanship warranty covering installation, alignment, leveling, and proper power/data termination.

ii) Minimum 1-year warranty for corrections of any installation-related defects at no cost to Government.

### 10.6 Electrical and Data

The Contractor shall relocate, adjust, and add power, data, and communications infrastructure as necessary to accommodate the new cubicle layout shown on **Exhibit 5**.

a) Existing device locations indicated on the Exhibit are approximate and shall be field-verified by the Contractor. To the maximum extent practicable, the Contractor shall reuse existing outlets, modular furniture power feed assembly locations, and low-voltage drops; however, the Contractor is responsible for making all modifications required to achieve fully functional service at each new workstation location. Installations shall comply with the NEC, UL listings, and manufacturer requirements.

b) Power Routing - The Contractor shall furnish all labor, materials, and means to route

new/relocated branch-circuit conductors to the building's main (or designated) electrical panel(s), install breakers where directed, and make final terminations per Government direction and applicable codes.

b) Low-Voltage Routing - The Contractor shall route new/relocated data and communications cabling from wall drops to the designated telecommunications room/patch panel(s) and make final terminations and cross-connects per Government direction and prevailing standards. Final routing and exact device locations will be confirmed during the bid walk and pre-bid Q&A. Installations shall comply with the NEC, UL listings, and Government conventions for labeling, testing, and closeout documentation.

## 10.7 Contractor / Government Coordination

a) The Contractor shall meet in person with Government to confirm functional requirements, cubicle and workstation counts, and any special needs. The Contractor shall attend follow-up coordination meeting, as requested, to review proposed layouts, finishes, and product solutions and address Government comments.

b) The Contractor shall prepare properly scaled proposed furniture layouts (including panel heights, workstation sizes, circulation, power and data locations for Government review and approval.

   The Contractor shall not order or fabricate any systems furniture components until Government provides written approval of the final layout drawings.

c) The Contractor shall submit product information clearly identifying the proposed systems furniture line(s) and option(s) for Government review and approval. The specific cubical system, configuration, and finishes shall be approved in writing by the Government prior to any purchase, release to production, or shipment.

## 10.8 Submittals

a) Pre-Purchase

   1) Scaled furniture layout drawings (plan and typical elevations) showing cubicle sizes, panel heights, power/data locations and circulation.
   2) Product data for proposed cubicle system(s) including frame construction (material and gauge), panel construction, power distribution, worksurfaces, storage and finishes.

b) Pre-Installation

   1) Finish samples (fabrics, laminates, paints, and trim) for Government selection and approval.

   2) Hardware and accessories – work surfaces – including bench style worktables/stations, task lighting, overhead cabinets.

   3) Final government-approved layout drawings with keyed bill of materials.

   4) Installation schedule and sequencing plan.

c) Closeout

1) As-built furniture layouts reflecting final installed conditions.

2) Manufacturers operation, maintenance, and cleaning instructions for all furniture components.

### 10.9 Warranties

a) Furniture – The Contractor shall provide the manufacturers standard commercial warranty which shall include a 10 year warranty on panel/frame structures and a 5-year warranty on worksurfaces, storage and accessories.

Warranty coverage shall include repair or replacement of defective components (materials or workmanship) at no additional cost to the Government, including labor during normal business hours.

b) Workmanship – The Contractor shall warrant installation workmanship (leveling, alignment, connections, trims and fit) for a minimum of one year from the date of Government acceptance.

During this period, the Contractor shall correct, at no cost to the Government, any defects in installation that result in misalignment, instability, improper operations of desks or cabinets.

## 11.0 PAINTING

The exterior surfaces of the Red Rock Administration Building, Lower Restroom Facility, and surrounding parking lot walls were last painted approximately twenty years ago and now exhibit significant deterioration. The stucco coatings are heavily faded from prolonged desert exposure, and wood trellis elements show widespread peeling, chipping, and coating failure. These conditions reduce the protective performance of the building envelope and have contributed to localized moisture intrusion, particularly at the restroom parapet walls. This project provides comprehensive surface restoration, stucco repair, and application of new protective coating systems to restore appearance, ensure long-term durability, and protect the exterior from future weathering and deterioration. Please refer to **Exhibit 5** for painting locations. **Photographs 12 thru 20** show existing facilities, features and walls that required paint.

### 11.1 Summary

The project encompasses a total of approximately 23,983 square feet of exterior surfaces across the following buildings and wall systems:

a) Administration building and associated access walls – 9,050 sq. ft.

b) Two administration building trellis systems - 6,877 sq. ft.

c) Lower restroom facility – 3,035 sq, ft.

d) Lower restroom facility trellis system - 3,056 sq. ft.

e) Parking lot knee walls - 1,968 sq. ft.

Work includes all labor, materials, equipment, and supervisions required for exterior surface preparation, vegetation clearing, stucco repair, parapet repair, roof cant installation, priming, painting, environmental protection, public safety, field quality control, site cleaning and waste disposal

## 11.2 Administrative Requirements

Administrative requirements prioritize strong coordination with Red Rock staff to ensure that unavoidable site-access interruptions are safely planned and communicated. Given the heavy visitor use of the area, Contractor operations - including traffic management and painting – must be carefully synchronized with Red Rock's safety expectations.

a) Coordinate color selection and sheen with BLM staff.

b) All colors must meet Visual Resource Management (VRM) criteria.

c) No materials may be ordered until written approval is received.

d) Parking Lot Traffic Management Plan - A pre-activity traffic control plan is required to ensure that all work within the parking area is performed safely and with full consideration of visitor circulation patterns. The Contractor shall submit the plan for review and obtain formal approval from Red Rock staff before any work begins in or adjacent to the parking lot. This plan must clearly identify anticipated access interruptions, pedestrian detours, parking stall closures, and protective measures necessary to maintain safe conditions throughout construction activities.

e) Pre-Construction Meeting

1) Review sequencing, schedule, safety, and protection measures with Government.

2) Identify environmental and visitor-traffic constraints with Government.

## 11.3 Submittals

a. Product Data

1) Primers, paint, stucco patching materials, roof cant materials.

2) Technical Data Sheets (TDS) for all coating systems.

b. Samples

1) Minimum 4 sq. ft. of samples of each coating system.

2) Step-coating samples showing primer and each coat.

c. Mockups

1) Provide 4 sq. ft. of sample of stucco patching and coating system.

2) Mockups must be approved by Government prior to work initiation.

d. Traffic Management Plan

1) Include pedestrian routing, barricades, equipment staging, and parking impacts.

e. Quality Control Testing Reports

1) Moisture testing results.

2) Adhesion testing results.

3) DFT measurements.

f) Closeout Submittals

1) Color schedule listing exact products, colors, and batch numbers used.

2) Warranty documents.

## 11.4 Quality Assurance

a) Provide an exterior-grade primer specifically formulated for cementitious stucco substrates to ensure proper adhesion, penetration, and compatibility with the selected topcoat system.

b) Primer shall comply with the applicable Master Painters Institute (MPI) standards for exterior masonry primers and be listed in the MPI Approved Products List for the specified category.

c) Coating products shall utilize a high-quality acrylic or elastomeric chemistry suitable for rough-texture stucco in high-UV desert environments. All submitted coating systems must demonstrate compatibility with cementitious substrates and provide the manufacturer-recommended protective film build for long-term durability.

d) Coating system shall be applied to achieve the Dry Film Thickness (DFT) recommended by the coating manufacturer for the approved product and substrate conditions.

## 11.5 Paints and Coating

a) Exterior acrylic paint meeting:

1) Gloss level 1 (VRM-compliant).

2) ASTM D523.

i) ≤ 5 gloss units at 60°.

ii) ≤ 10 gloss units at 85°.

b) Primers (Exterior Masonry/Stucco)

1) Provide an exterior grade primer formulated for cementitious stucco to ensure adhesion,

penetration and topcoat compatibility.

c) Approved Coating System

1) Full prime coat.

2) Two finish coats applied to required DFT.

**11.6 Roof Cant Materials**

a) Wood Blocking – Beveled or built-up to form positive drainage slope.

b) Spray on polyurethane foam encapsulations to match existing roof system. Apply manufacturers UV-resistant elastomeric top-coat to match existing.

c) Fasteners: Corrosion resistant roofing screws appropriate for deck or blocking. Length sufficient to secure attachment without damaging roof components (to be fully encapsulated by polyfoam/topcoat after installation.

**11.7 Stucco Patching Compound**

a) Cementitious patching compound compatible with existing stucco; capable of matching texture and receiving specified coating.

**11.8 Cleaning Materials**

a) Non-ammonia detergent, TSPP-based cleaner, sodium hypochlorite (mildewcide) as approved.

**11.9 Execution**

a) Verify substrate conditions. Identify loose/delaminated coating, cracks, spalls, chalking, contamination.
   1) Conduct substrate moisture testing – do not prime/paint above manufacturer limits.

   2) Notify Government of conditions preventing proper work.

b) Vegetation Management

   1) Trim/remove vegetation only as necessary for safe effective access to structures that will receive primer and paint. Protect in place desirable/native plants. Coordinate efforts with Government prior to work initiation.

   2) For the heavy vegetation at parking lot walls, cut back brush/vines/low limbs to create safe effective access to structures that will receive primer and paint.

c) Cleaning and Preparation

   The Contractor shall implement all necessary measures to prevent the release of paint chips, dust, or debris into adjacent soils during surface preparation and painting activities.

Pressure wash at 100 to 400 psi, gentlest method, rinse thoroughly, allow to dry, clean with approved solutions.

1) Provide ground protection (tarps, sheeting, or rigid containment systems) to prevent paint chips from contacting or migrating into adjacent soils.

2) Install vertical containment (e.g., plastic sheeting, scaffolding shrouds) as needed to capture airborne paint particles.

3) Use controlled-flow nozzles and low-pressure techniques where possible to minimize overspray and runoff.

4) Capture all pressure-wash effluent using portable berms, vacuum-recovery systems, or equivalent containment devices.

5) Prevent any wash water from entering soil, drainage channels, storm drains, or natural resource areas.

6) Collect, containerize, and properly dispose of all paint waste, debris, and wastewater in accordance with environmental regulations and project specifications.

7) Inspect containment systems daily and after wind events; repair or reinforce as needed to ensure continuous effectiveness.

8) Maintain documentation of waste handling, disposal quantities, and containment inspections for Government review.

d) Stucco Repairs

1) Remove loose and/or damaged stucco. Patch with cementitious compound. Match texture/finish.

2) Restroom Parapet Walls – Perform detailed inspection; remove delaminated/cracked material; rebuild wall profile where needed. Notify Government of the presence of concealed moisture damage.

e) Restroom Roof Cant

i) Constr**u**ct cant from wood blocking shaped to create positive drainage. Anchor using corrosion-resistant roofing screws suitable for existing roof deck and wood blocking.

ii) Encapsulate cant and fasteners with sprayed on foam and tying into existing foam membrane. Apply UV-resistant elastomeric topcoat to create seamless, waterproof transition.

iii) Do not damage existing roofing.

f) Public Protection and Traffic Management

i) Pre-Work Traffic Control Plan – Submit and obtain Government approval before any

work is performed in or near the parking areas. Identify anticipated Contractor induced interruptions, pedestrian detours, parking stall closures, barricades/cones/tape/flaggers and emergency access.

ii) Barricade work zones adjacent to public paths. Provide "Wet Paint / Work Overhead / Keep Out" signage. Protect vehicles with barriers and stop painting during winds that risk overspray.

g) Primer and Paint Application

i) Prime all stucco and wood surfaces per manufacturer guidance.

ii) Apply two finish coats to achieve uniform color, sheen and required film build.

iii) Weather Limits – 50 to 95°F, relative humidity less than 85 percent, wind speed less than 15 mph. Do not apply primer or paint if rain or fog is present and stop work if conditions deteriorate such that the value of any of these parameters is outside the indicated parameter limits.

iv) No primer or paint shall be applied to doors, handrails, window frames, etc.

h) Field Requirements

Coating system shall be applied to achieve the Dry Film Thickness (DFT) recommended by the coating manufacturer for the approved product and substrate conditions. The Contractor shall verify DFT using calibrated gauges and shall perform measurements at representative locations on each building and wall surface. Any areas found to be below the manufacturer's required DFT shall receive additional coating at no additional cost to the Government until full compliance is achieved.

i) Field Quality Control – Painting

Government inspections will be performed at the following stages:

i) After surface preparation and protection of adjacent surfaces and before primer.

ii) After first finish coat and before topcoat.

iii) Testing – Adhesion, primer to substrate, finish to primer, DFT measurements, moisture verification.

## 12.0 SITE AND BUILDING CLEANUP

Provide final cleaning in accordance with ASTM E 1971. Leave premises "broom clean". Perform general purpose cleaning and bathroom cleaning. Use only non-hazardous cleaning materials, including natural cleaning materials, in the final cleanup. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains, and foreign substances' polish transparent and glossy surfaces, vacuum carpeted and soft surfaces, sweep and vacuum kitchen floor. Clean equipment and fixtures to a sanitary condition.

Clean adjacent buildings and improvements of dust, dirt and debris caused by operations. Return adjacent areas to condition existing before operations began.

Remove debris from elevated portions of building using method(s) that will convey debris to grade level in a controlled descent.

Clean debris from roof, gutters, downspouts, and drainage systems. Sweep paved areas and rake clean landscaped areas. Do not allow removed material to accumulate on site. This includes but is not limited to the following:

a) Roofing material.

b) Stucco.

c) Painting material.

d) Demolished HVAC equipment.

e) Packing materials.

f) Plastic tarps, rags.

## 13.0 SITE MANAGEMENT

Red Rock Canyon National Conservation Area (RRNCA) attracts over 4 million visitors a year, a significant percentage of which come from countries other than the United States with many visitors not able to speak or read English. Daily, large tour busses, school busses and smaller touring vehicles stop at the front of the Building to drop off visitors so they can access the Red Rock Visitor Center.

Conduct site operations to ensure minimum interference with roads, walkways and other occupied and used facilities. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities.

### 13.1 Disposal of Waste and Recyclable Materials

a) Unless otherwise indicated, removed equipment and material (waste) becomes the property of Contractor.

b) Except for items or materials that might otherwise be reused and recycled, remove waste materials from site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

c) Recycle items where possible including, but not limited to metal construction waste, removed metal roofing, packing materials, and general site and project generated materials.

d) Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

e) Remove waste and surplus materials, rubbish form the site. Promptly and legally transport and dispose of any trash. Do not burn, bury, or otherwise dispose of trash on the project site.

f) Transport waste materials off Government property and legally dispose of them.

g) Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

## 14.0 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

A Categorical Exclusion (CX) has been prepared and signed for this project. The CX is not included in this Statement of Work but will be made available to the Contractor upon request.

**Exhibit 6** identifies the designated, equipment staging and material laydown areas surrounding the Building. This exhibit is also presented in Appendix B of the CX.

The Contractor shall comply with all applicable stipulations, terms and conditions and mitigation measures contained in the CX. Particular attention shall be given to requirements related to migratory birds, noxious weeds and desert tortoise protection.

a) Information on migratory birds can be found in Appendix A – Stipulations and Mitigation Measures – Section 6 Migratory Birds (document pdf page 11).

b) Information on noxious weeds can be found in Appendix A – Stipulations and Mitigation Measures – Section 8 – Non-Native and Invasive Species and Noxious Weeds (document pdf page 12).

c) Information on the Desert Tortoise can be found in Appendix B Biological Opinion Terms and Conditions, Measure 32 (document pdf page 28).

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# APPENDIX - A

EXHIBITS

EXHIBIT 1 - VICINITY MAP

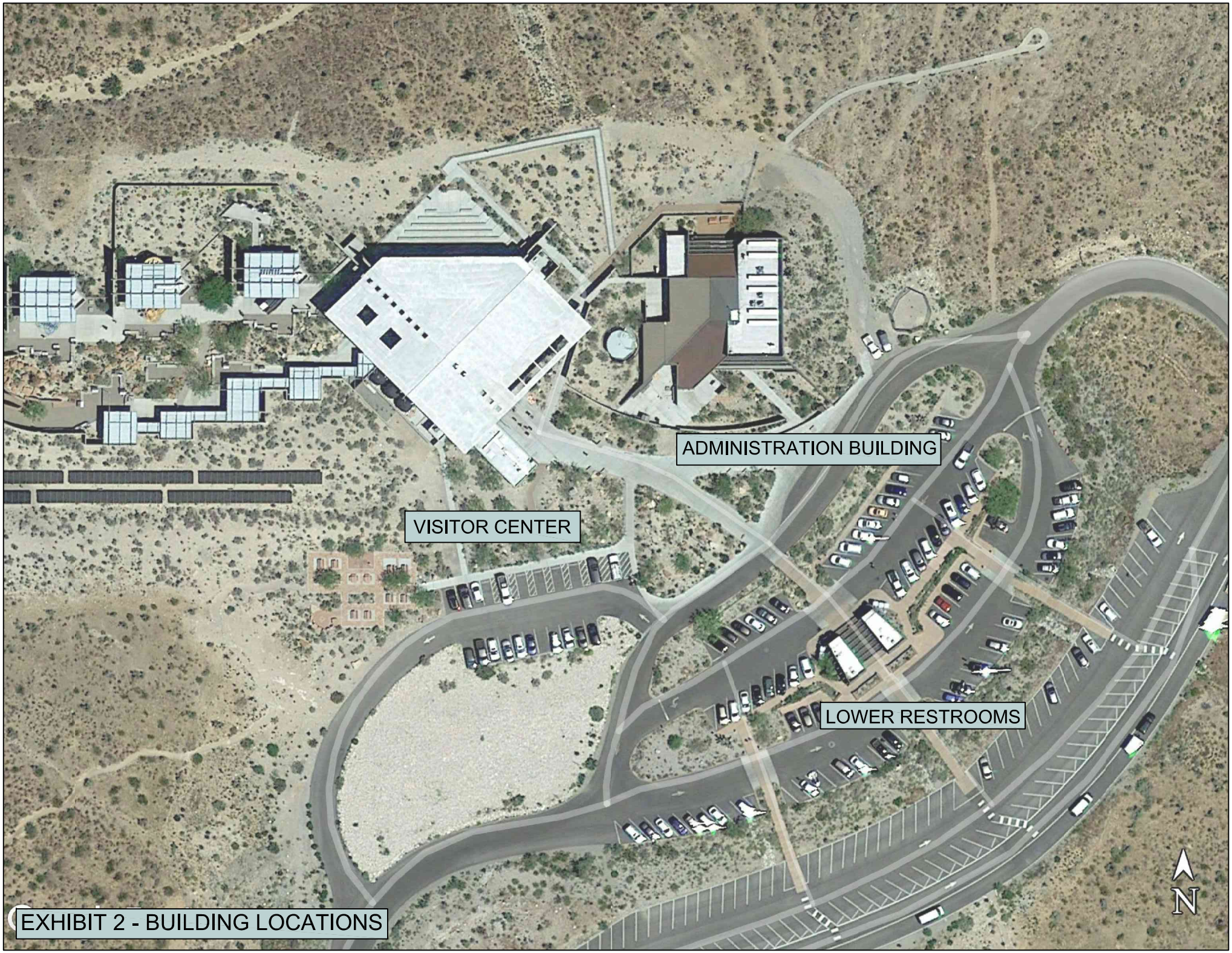
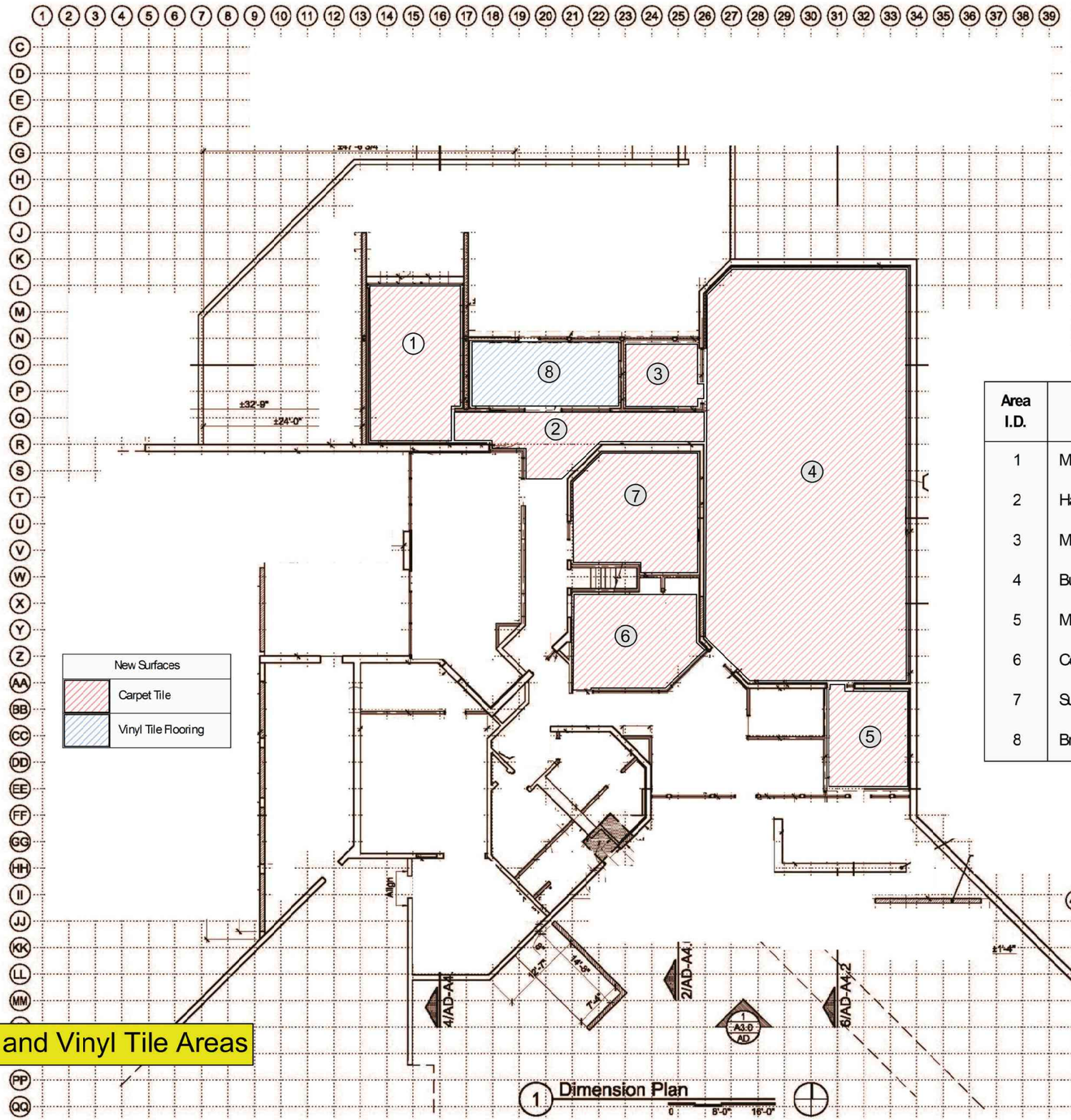



EXHIBIT 2 - BUILDING LOCATIONS




## General Dimension Notes

A. Background reference grid indicated on this Drawing is 4'-0" x 4'-0"
B. Dimensions are given to face of masonry walls and centerline of stud walls and window frames U.N.O. - see Wall Types for wall thickness and construction.
C. Contracting Officer shall be notified of any discrepancies or variations in dimensions of the building layout prior to proceeding with the work.
D. Refer to entire set of Drawings for information not shown here to clarify specific transitions, intersections, reveals, etc. Notify Contracting officer of any clarifications needed that may not be shown on Drawings.
E. Dimensions are given to rough opening for openings in masonry U.N.O.
F. Dimensions for framed partitions that terminate without an intersection to another wall are given to face of wall finish and NOT end of stud.

## Keynotes - Sheet AD-A2.0

1. Centerline of wall/aluminum window frame
2. Align finish of new wall with corner of existing wall
3. Soffit above - see RCP
4. See Window/Door Details for alignment of new construction with existing
5. New ±72" x ±50" concrete infill slab - top shall be flush with adjacent tile subfloor level
6. Dimension given to face of wall finish
7. Existing 6 x 6 wood post to remain
8. New removable floor access panel - see Detail, sheet AD-A1.1

| Area I.D. | Area Name | Size (sq. ft) |
|---|---|---|
| 1 | Manager Office - 1 | 335 |
| 2 | Hallway | 230 |
| 3 | Manager Office - 2 | 120 |
| 4 | Bullpen | 1925 |
| 5 | Manager Office - 3 | 185 |
| 6 | Conference Room | 275 |
| 7 | Supervisors Room | 330 |
| 8 | Break Room | 230 |

Exhibit 3 - Carpet and Vinyl Tile Areas

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

Red Rock Canyon Visitor Center Area Redevelopment

Administration Remodel

Red Rock Canyon National Conservation Area
United States Department of the Interior Bureau of Land Management

Line and Space, LLC
827 East Speedway Blvd. Tucson, Arizona 85705 (520) 623-1313

Sheet Title: Dimension Plan

Checked by: JB/MK

Revisions:

| # | Description | Date |
|---|---|---|

REGISTERED ARCHITECT CERTIFICATE NO. 27512 HENRY TOM ARIZONA U.S.A.

BLM Project # AENV.083

Architect's Job # 02.07.C

Date: 8/31/07

AD-A2.0

Sheet 22 of 76

RRCVC

ADMINISTRATION AD

AD-A2.0, 9/12/2007 12:18:04 PM, Adobe PDF_11x17.pc3, Copyright - Line & Space, LLC

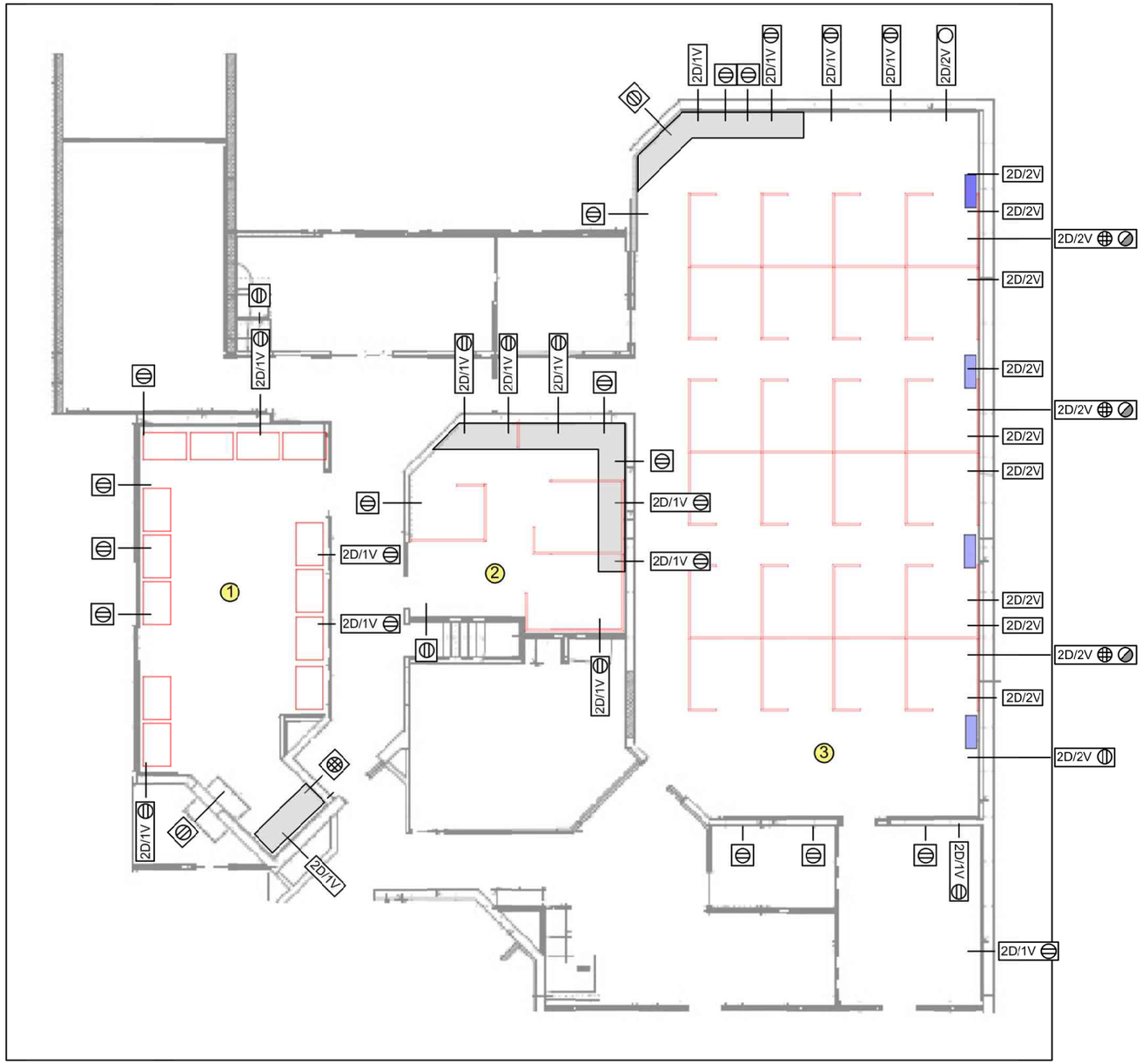
## LEGEND

- ① — Field Staff Office - 540 sq. ft.
- ② — Supervisors Office - 356 sq. ft.
- ③ — Bullpen - 1,936 sq. ft.
- Existing Desks, Counters and/or Wall Cabinets.
- Existing HVAC Fan Coil Units.
- 2D/2V — (2) Data and (2) Voice Ports, (2) Duplex Electrical Outlet, (1) Cubicle Whip.
- 2D/2V — (2) Data and (2) Voice Ports, (1) Duplex Electrical Outlet.
- 2D/1V — (2) Data Ports and (1) Voice Port, (1) Duplex Electrical Outlet.
- 2D/2V — (2) Data and (2) Voice Ports.
- (1) Duplex Electrical Outlet.
- (2) Duplex Electrical Outlets.

**NOTE 1**: In the Supervisors Office - ② - remove existing workstation tables and wall cabinets as necessary to install cubicles.

**NOTE 2**: The Field Staff Office - ① - , The Supervisors Office - ② - and the Bullpen - ③ - will receive cubicles.

Exhibit 4 - Proposed Cubicle and Workstation Layout




UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

CUBICLE AND WORK STATION LAYOUT

ADMINISTRATION BUILDING – PHASE 2 REPAIRS

| MARK | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| | | | |

PROJECT NO:
DESIGN OFFICE:
DESIGNED BY:
DRAWN BY:
CHK'D BY:
APPROVED BY:
DATE:

SHEET OF

EXHIBIT 5 - PAINTING AREAS

N

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

EXTERIOR PAINT AREAS

ADMINISTRATION BUILDING REPAIRS – PHASE 2

| MARK | DESCRIPTION | DATE | APPROVED |
|---|---|---|---|
| | | | |

PROJECT NO:
DESIGN OFFICE:
DESIGNED BY:
DRAWN BY:
CHK'D BY:
APPROVED BY:
DATE:

SHEET OF

**Figure 2. Plan View of Proposed Staging Areas Located Around Administrative Building**

Exhibit 6 - Equipment Staging and Material Laydown Areas

# APPENDIX – B

PHOTOGRAPHS

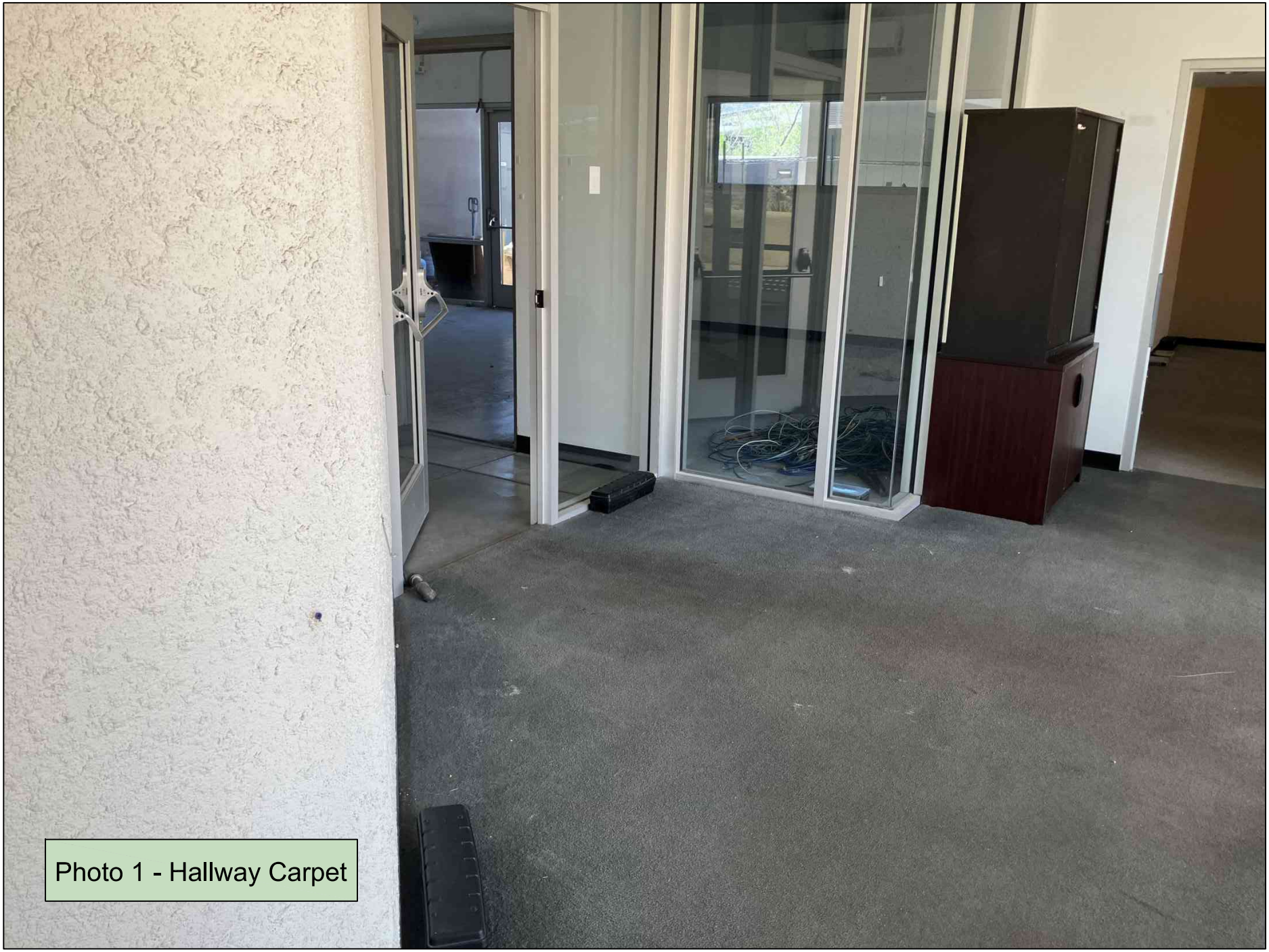


Photo 1 - Hallway Carpet

Photo 2 - Managers Office Carpet

Photo 3 - Main Staff Work Area Carpet

Photo 4 - Kitchen / Break Room Floor

Photo 5 - Supply Air Duct

Photo 6 - Return Air Floor Grills

Photo 7 - Return and Supply Air Ducts at ERU

Photo 8 - Outside Air Ducts Leading to ERU

Photo 9 - Outside Air Ducts Leading to ERU

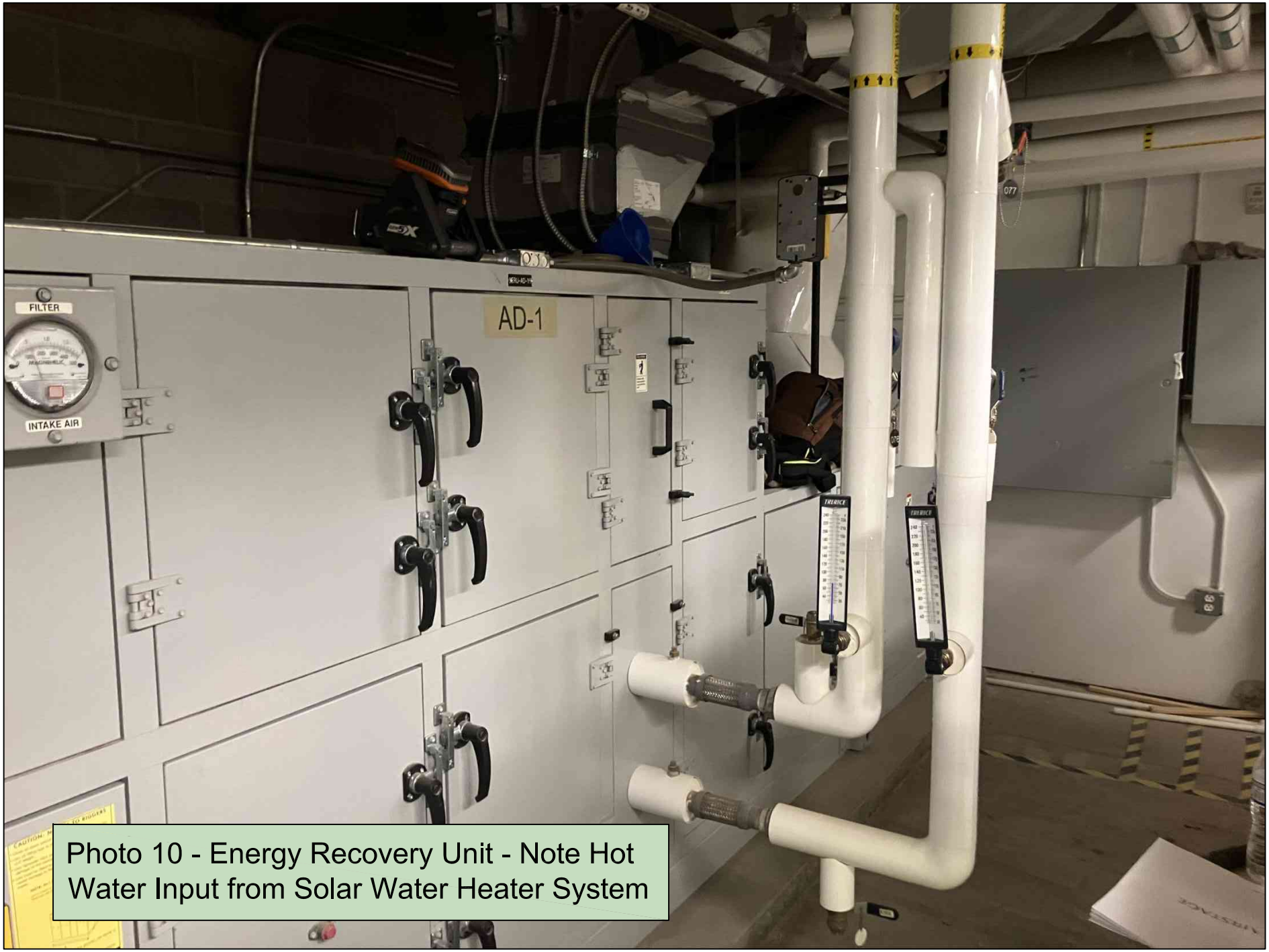



Photo 10 - Energy Recovery Unit - Note Hot Water Input from Solar Water Heater System

Photo 11 - Energy Recovery Unit - Note Return, Outside and Exhaust Air Ducts

Photo 12 - Administration Building Entrance

Photo 13 - Administration Building - South Trellis at Building Entrance

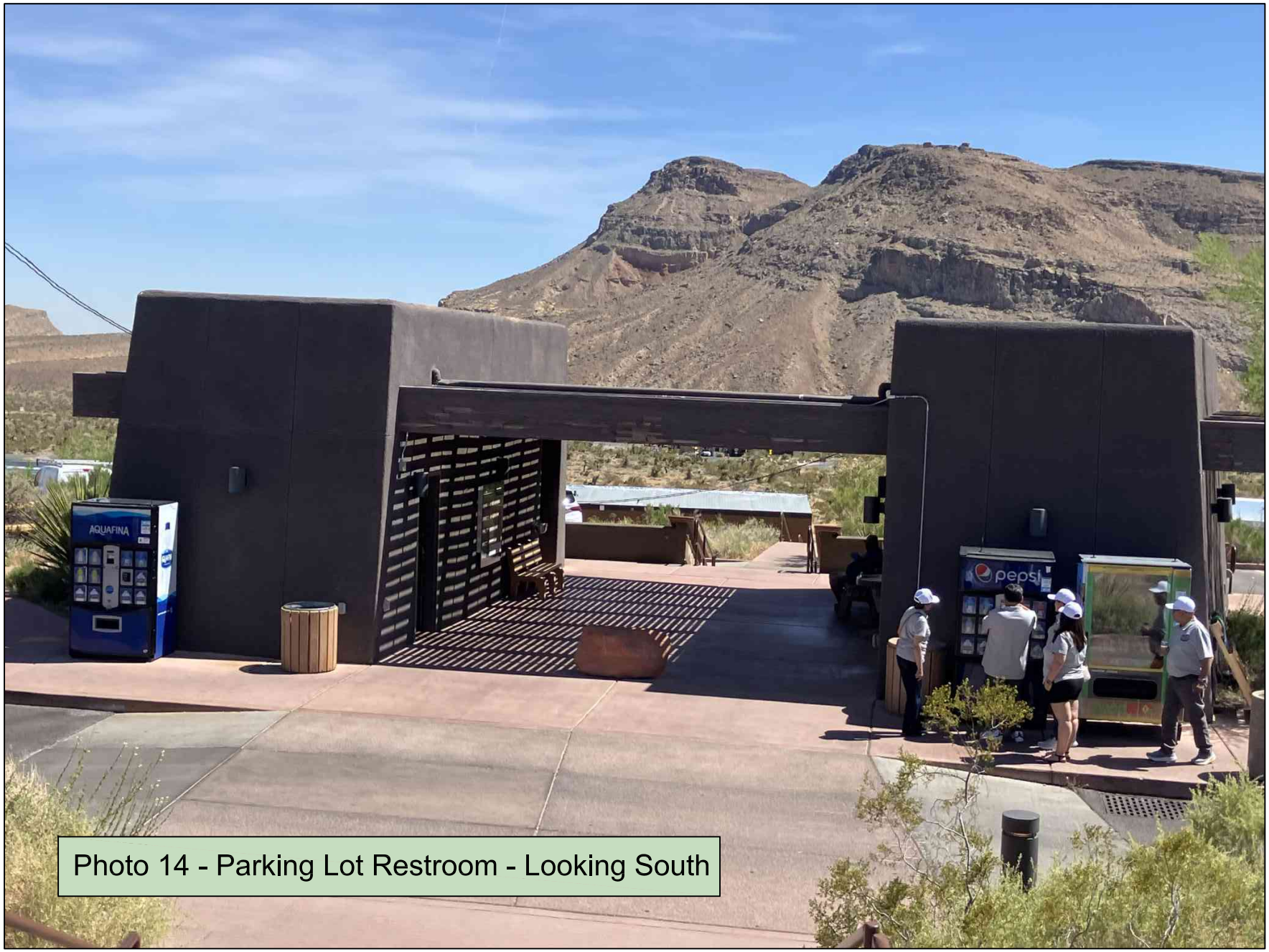



Photo 14 - Parking Lot Restroom - Looking South

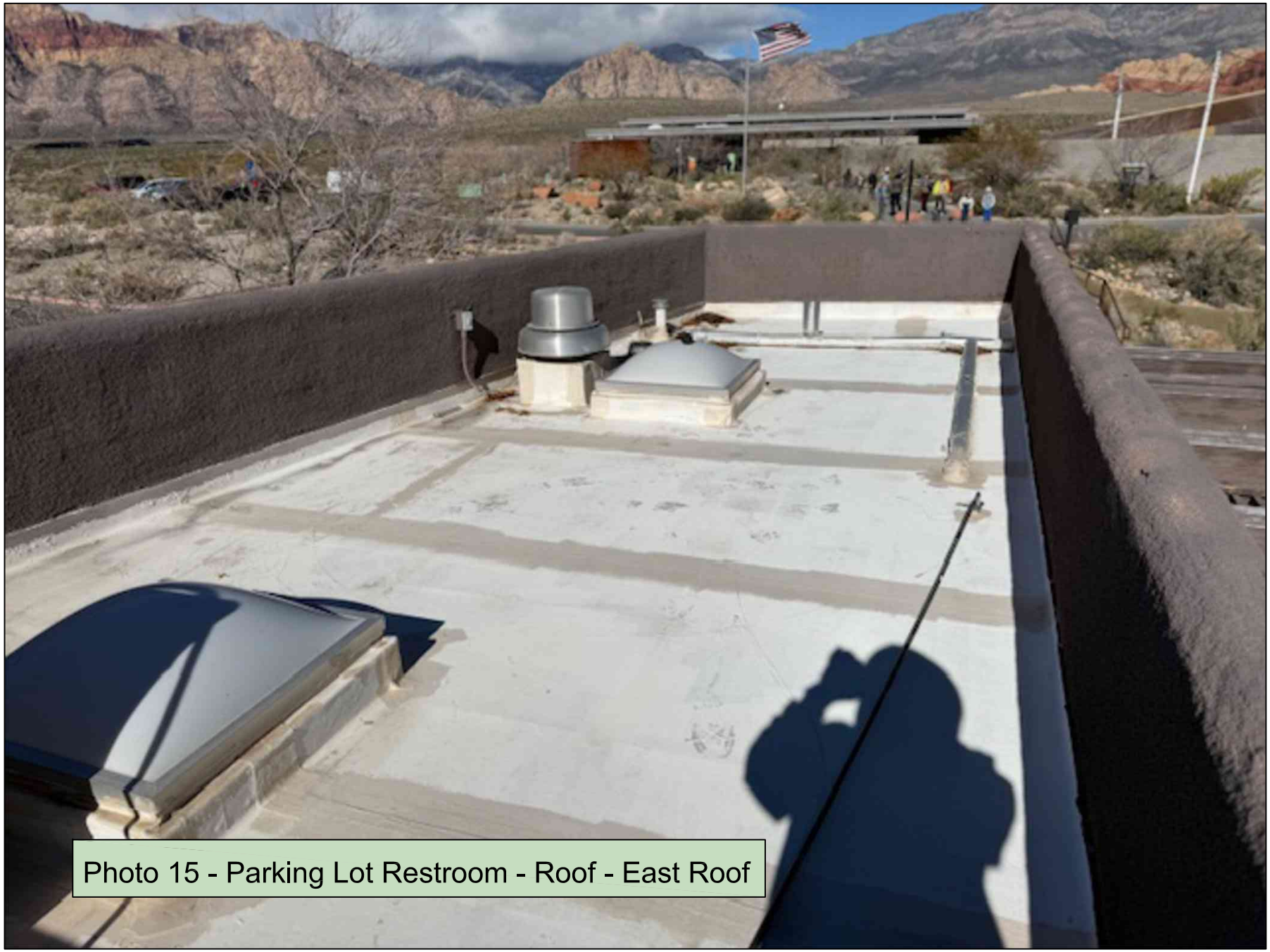


Photo 15 - Parking Lot Restroom - Roof - East Roof

Photo 16 - Parking Lot Restroom - East Roof Parapet Wall

Photo 17 - Parking Lot Restroom - Connecting Trellis

Photo 18 - Low Parking Lot Wall -1

Photo 19 - Low Parking Lot Wall - 2

Photo 20 - Low Parking Lot Wall - 3

# APPENDIX - C

RED ROCK CANYON ADMINISTRATION BUILDING

AS-BUILT

MECHANICAL PLANS

# GENERAL NOTES

1. THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC IN CHARACTER AND CANNOT SHOW EVERY CONNECTION IN DETAIL OR EVERY DUCT IN ITS EXACT LOCATION. THESE DETAILS ARE SUBJECT TO THE REQUIREMENTS OF EXISTING STRUCTURAL AND ARCHITECTURAL CONDITIONS. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE STRUCTURAL AND FINISH CONDITIONS AND SHALL COORDINATE THE SEPARATE TRADES IN ORDER TO AVOID INTERFERENCE BETWEEN THE VARIOUS PHASES OF WORK. WORK SHALL BE LAID OUT SO THAT IT WILL BE CONCEALED IN FURRED CHASES OR ABOVE SUSPENDED CEILINGS, ETC., IN FINISHED PORTIONS OF THE BUILDING, UNLESS SPECIFICALLY NOTED OR INDICATED TO BE EXPOSED. WORK SHALL BE INSTALLED TO AVOID CRIPPLING OF STRUCTURAL MEMBERS. ALL WORK SHALL BE RUN PARALLEL OR PERPENDICULAR TO THE LINES OF THE BUILDING UNLESS OTHERWISE NOTED.

2. SHOULD THERE BE CONFLICTS BETWEEN DRAWINGS OR WITH THE SPECIFICATIONS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONTRACTING OFFICER AND SHALL PERFORM AND/OR FURNISH THE BETTER QUALITY OR GREATER QUANTITY OF WORK OR MATERIALS UNLESS OTHERWISE DIRECTED BY THE CONTRACTING OFFICER IN WRITING. IN CASE THE SPECIFICATIONS SHOULD NOT FULLY AGREE WITH THE SCHEDULES, THE LATTER SHALL GOVERN. FIGURES INDICATED ON DRAWINGS GOVERN SCALE MEASUREMENTS AND LARGE SCALE DETAILS GOVERN SMALL SCALE DRAWINGS.

3. THE CONTRACTOR SHALL FURNISH INTERMEDIATE SUPPORTING STEEL ANGLES, CHANNELS, RODS, ETC. TO COMPLY WITH MINIMUM SUPPORT SPACING CRITERIA. INTERMEDIATE STEEL SUPPORTS SHALL SPAN BETWEEN AND FASTEN (WELDED OR BOLTED) TO BUILDING STRUCTURAL MEMBERS.

4. ALL WORK MUST COMPLY WITH THE MINIMUM CODE STANDARDS FOR THE FOLLOWING CODES, THE 2006 INTERNATIONAL BUILDING CODE , OSHA INDOOR AIR QUALITY REQUIREMENTS FOR BUILDINGS UNDER CONSTRUCTION, LIFE SAFETY CODE, NATIONAL UNIFORM PLUMBING CODE, 2006 INTERNATIONAL MECHANICAL CODE, STATE OF NEVADA, UNIFORM PLUMBING CODE, NFPA IN TOTAL, ASHRAE STANDARD 90.1-1999, ASHRAE STANDARD 62-2001, AIR CONDITIONING AND REFRIGERATION INSTITUTE, ASSOCIATED AIR BALANCE COUNCIL, AMERICAN WATER WORKS ASSOCIATION, USGBC-LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED) FOR NEW CONSTRUCTION VERSION 2.1.

5. THE MECHANICAL CONTRACTOR SHALL SUBMIT COORDINATION SHOP DRAWINGS PRIOR TO ANY FABRICATION OR INSTALLATION OF DUCTWORK, PIPING, OR EQUIPMENT. UNAPPROVED INSTALLED ITEMS THAT HAVE BEEN TAKEN EXCEPTION TO OR FOUND TO BE IN CONFLICT WITH OTHER TRADES SHALL BE REPLACED OR CORRECTED AT NO COST TO THE GOVERNMENT.

6. THE MECHANICAL CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL DIFFUSERS, GRILLES, DUCTWORK, PIPING, EQUIPMENT, ETC. WITH THE REFLECTED CEILING PLANS, LIGHTING, SPEAKERS, SPRINKLER HEADS, AND ALL ASSOCIATED WORK UNDER OTHER TRADES PRIOR TO ANY MECHANICAL INSTALLATION.

7.**DUCT DIMENSIONS AS INDICATED ON DRAWINGS ARE NET INSIDE DIMENSIONS REQUIRED FOR AIRFLOW. FOR SUPPLY AND RETURN AIR DUCTWORK WITHIN 30' OF AN AIR HANDLING DEVICE, INCREASE RECTANGULAR DUCT SIZE TO ALLOW FOR DUCT LINER THICKNESS .**

# MECHANICAL ABBREVIATIONS

| SYMBOL ABBR | DESCRIPTION |
|---|---|
| AFF | ABOVE FINISHED FLOOR |
| AHU | AIR HANDLING UNIT |
| B | BOILER |
| BDD | BACKDRAFT DAMPER |
| CD | CONDENSATE DRAIN |
| CF | CHEMICAL FEED |
| CH | CHILLER |
| CHWP | CHILLED WATER PUMP |
| CHWR | CHILLED WATER RETURN |
| CHWS | CHILLED WATER SUPPLY |
| CT | COOLING TOWER |
| CWP | CONDENSER WATER PUMP |
| CWR | CONDENSER WATER RETURN |
| CWS | CONDENSER WATER SUPPLY |
| DCW | DOMESTIC COLD WATER |
| D | DRAIN |
| DG | DOOR GRILLE |
| DHW | DOMESTIC HOT WATER |
| DHWP | DOMESTIC HOT WATER PUMP |
| DIA | DIAMETER |
| DW | DOMESTIC WATER |
| ED | EXHAUST AIR DUCT |
| EF | EXHAUST FAN |
| EG | EXHAUST AIR GRILLE |
| ER | EXHAUST AIR REGISTER |
| ET | EXPANSION TANK |
| FCU | FAN COIL UNIT |
| FD | FIRE DAMPER |
| FLEX. | FLEXIBLE |
| FPM | FEET PER MINUTE |
| FPS | FEET PER SECOND |
| FT | FOOT |
| FS | FLOW SWITCH |
| GA | GAGE OR GAUGE |
| GAL | GALLON |
| GPM | GALLONS PER MINUTE |
| HD | HEAD |
| HR | HOUR |
| HP | HORSEPOWER |
| HWP | HOT WATER PUMP |
| HWR | HEATING WATER RETURN |
| HWS | HEATING WATER SUPPLY |
| HX | HEAT EXCHANGER |
| HZ | HERTZ |
| IN | INCH |
| IW | INDUSTRIAL WATER |
| IPS | INCHES PER SECOND |
| KW(h) | KILOWATT (HOUR) |
| LAT | LEAVING AIR TEMPERATURE |
| LBS | POUNDS |
| LIN FT | LINEAR FEET |
| LP | PROPANE GAS |
| LWT | LEAVING WATER TEMPERATURE |
| MAX | MAXIMUM |
| MBH | BRITISH THERMAL UNITS PER HOUR (THOUSANDS) |
| MIN | MINIMUM |
| MMBH | BRITISH THERMAL UNITS PER HOUR (MILLIONS) |
| (N) | NEW |
| NC | NORMALLY CLOSED |
| N.I.C. | NOT IN CONTRACT |
| NO | NORMALLY OPEN |
| NO. | NUMBER |
| NOM | NOMINAL |
| NPSH | NET POSITIVE SUCTION HEAD |
| OA | OUTSIDE AIR |
| OBD | OPPOSED BLADE DAMPER |
| OC | ON CENTER |
| OFOI | OWNER FURNISHED OWNER INSTALLED |
| OFCI | OWNER FURNISHED CONTRACTOR INSTALLED |
| PH | PHASE |
| PRESS | PRESSURE |
| PRV | PRESSURE REDUCING VALVE |
| PSIA | POUNDS PER SQUARE INCH ABSOLUTE |
| PSIG | POUNDS PER SQUARE INCH GAGE |
| PSI | POUNDS PER SQUARE INCH |
| RA, R/A | RETURN AIR |
| RAR | RETURN AIR REGISTER |
| RET | RETURN |

| SYMBOL ABBR | DESCRIPTION |
|---|---|
| RPM | REVOLUTIONS PER MINUTE |
| RH | RELATIVE HUMIDITY |
| SA, S/A | SUPPLY AIR |
| SAR | SUPPLY AIR REGISTER |
| SAT | SUPPLY AIR TEMPATURE |
| SCFM | STANDARD CU. FI PER MINUTE |
| SF | SUPPLY FAN |
| SENS | SENSIBLE COOLING CAPACITY |
| SHWP | SOLAR HOT WATER PUMP |
| SHWR | SOLAR HOT WATER RETURN |
| SHWS | SOLAR HOT WATER SUPPLY |
| SP | STATIC PRESSURE |
| SQ | SQUARE |
| SQ FT | SQUARE FEET |
| STD | STANDARD |
| TD | TEMPERATURE DIFFERENTIAL |
| TDH | TOTAL DYNAMIC HEAD |
| TEMP | TEMPERATURE |
| TES | THERMAL ENERGY STORAGE |
| TG | TRANSFER GRILLE |
| TON | REFRIGERATION CAPACITY |
| TSP | TOTAL STATIC PRESSURE |
| TYP | TYPICAL |
| UG | UNDERGROUND |
| V | VOLTAGE |
| VAV | VARIABLE AIR VOLUME |
| VFD | VARIABLE FREQUENCY DRIVE |
| WB | WET BULB TEMPERATURE |
| WC | WATER COLUMN |
| WCO | WALL CLEAN OUT |
| WPD | WATER PRESSURE DROP |

# MECHANICAL SYMBOLS LEGEND

| SYMBOL | DESCRIPTION |
|---|---|
| | CROSS SECTION OF ROUND DUCT |
| | CEILING DIFFUSER, RECTANGULAR OR SQUARE |
| | CEILING RETURN GRILLE, RECTANGULAR OR SQUARE |
| | CEILING EXHAUST GRILLE, RECTANGULAR OR SQUARE |
| | DUCT SECTION - SUPPLY |
| | DUCT SECTION - RETURN |
| 12 x 24 | DUCTWORK DIMENSIONS FOR SHEET METAL SECOND SIZE IS SIDE DOWN |
| UP | DUCT RISE IN DIRECTION OF FLOW OR DROP DOWN (DN) |
| | FLEXIBLE DUCT CONNECTOR |
| | RADIUS DUCT ELBOW |
| MBD | MANUAL BALANCING DAMPER WITH LOCKING QUADRANT |
| | DUCT ELBOW W/ TURNING VANES |
| MOD | AUTOMATIC (MOTORIZED) DAMPER |
| FD/SD | FIRE DAMPER WITH DUCT ACCESS DOOR FD/SD FIRE & SMOKE DAMPER |
| | BRANCH CONNECTOR 45 deg THROAT WITH MANUAL DAMPER AND LOCKING QUADRANT |
| | ELBOW AWAY |
| | ELBOW TOWARD |
| | SQUARE TO ROUND TRANSITION |
| | DUCT TURNING DOWN |
| | DUCT TURNING UP |
| | DUCT TRANSITION (CONCENTRIC) |
| | DUCT TRANSITION (ECCENTRIC) |

| SYMBOL | DESCRIPTION |
|---|---|
| Ø | ROUND |
| | HARD DUCT RUNOUT WITH MAX. 4' OF FLEX |
| T | THERMOSTAT- MOUNTING HEIGHT TO MEET CURRENT ADA STDS |
| 24X24-A-CFM | GRILL/DIFF. SIZE, I.D. 'A', 'B', ETC., CFM |
| *** | EQUIPMENT SYMBOL |
| *** | EQUIPMENT NUMBER |
| | ARROW INDICATES DIRECTION OF FLOW |
| | PIPE DOWN |
| | PIPE UP |
| | POINT OF CONN. (NEW TO EXISTING) |
| | TEE DOWN |
| | TEE UP |

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Administration Remodel

Red Rock Canyon National Conservation Area
Under Bidns Department of the Interior Bureau of Land Management
Line and Spoke, LLC
627 East Speedway Blvd. Tucson, Arizona 85705 (520) 623-1313

Sheet Title:
Mechanical General Notes
Symbols and Abbreviations

Checked by: HWJ

Revisions:

| # | Description | Date |
|---|---|---|

Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8/31/07 ARIZONA U.S.A.

BLM Project # AENV.083

Architect's Job # 02.07.C

Date: 8/31/07

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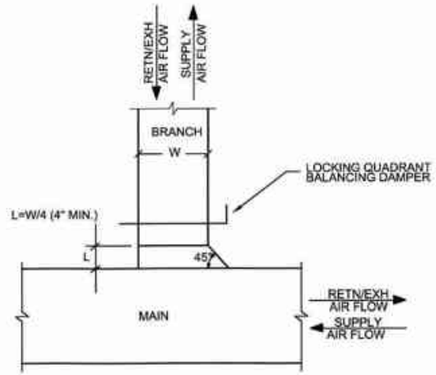
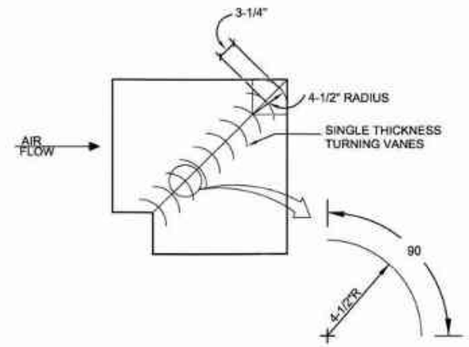
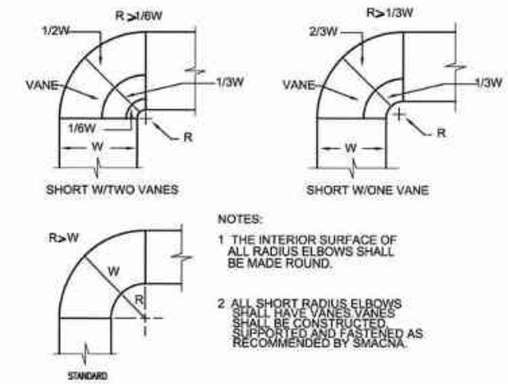



1 Low Velocity, Rectangular Branch Duct Fitting
N.T.S.




2 Miter Elbow W/ Turning Vanes
N.T.S.

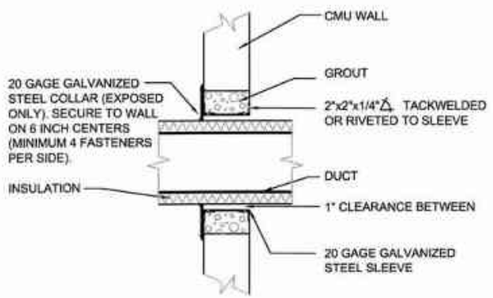



NOTES:

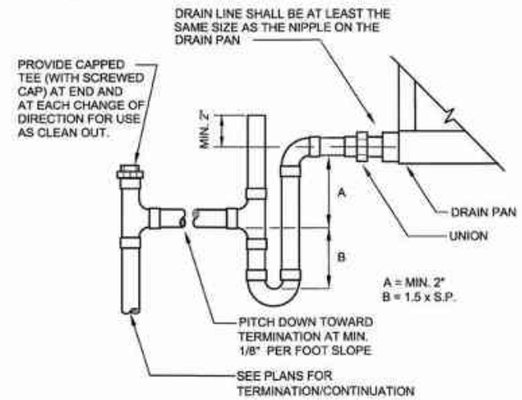
1 THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.

2 ALL SHORT RADIUS ELBOWS SHALL HAVE VANES VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

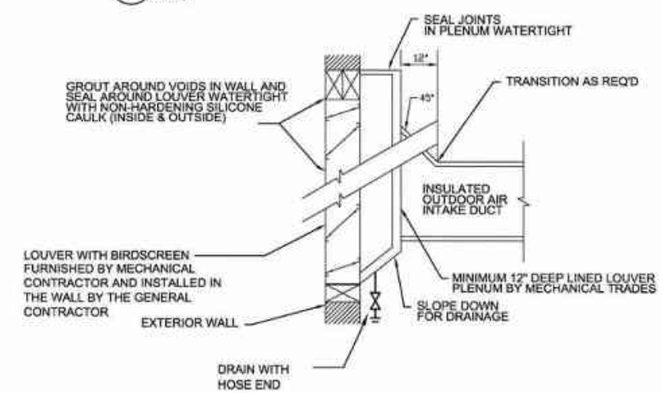
3 Radius Elbows
N.T.S.



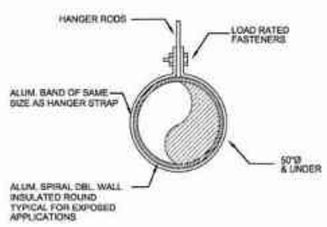

4 Duct/Pipe Penetration Through Wall (Not Applicable To Fire-Rated Walls)
N.T.S.




5 Condensate Trap Drain
N.T.S.




6 Louver Installation Detail
N.T.S.




TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION, BUT NO EXTERNAL LOAD.

7 Exposed Round Duct Hanger
N.T.S.

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Sheet Title: Mechanical Details

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Revisions: # Description Date

Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8-31-07 ARIZONA U.S.A.

BLM Project # AENV.083

Architect's Job # 02.07.C

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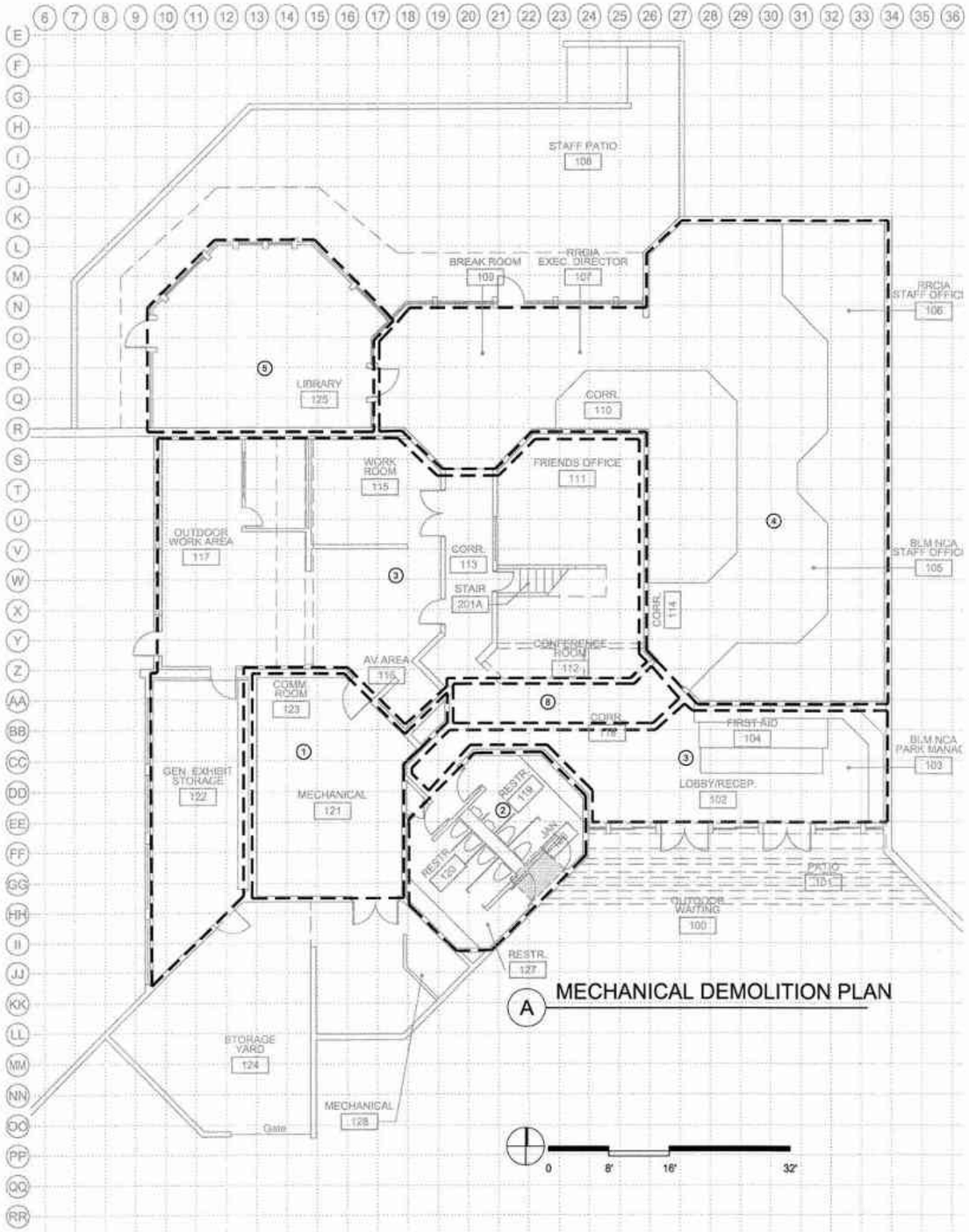
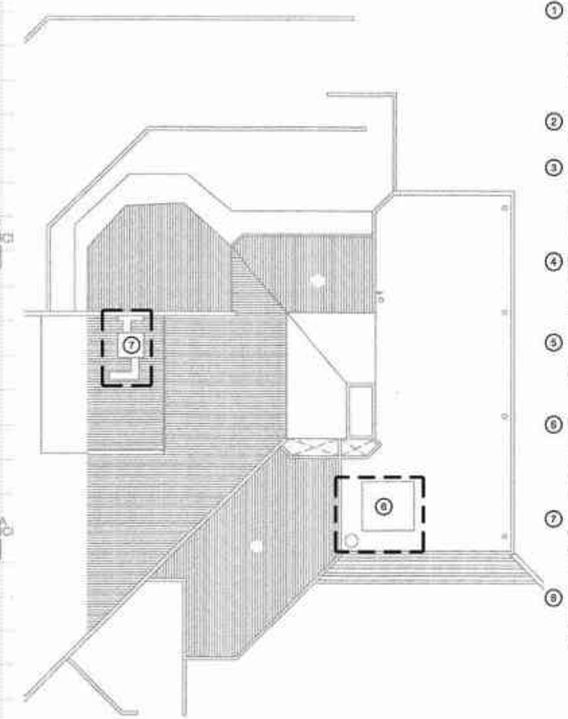



A MECHANICAL DEMOLITION PLAN



B MECH. DEMOLITION ROOF PLAN

NTS

## MECHANICAL DEMOLITION NOTES:

1. MECHANICAL ROOM: DISCONNECT AND REMOVE CENTRAL STATION AIR HANDLING UNIT, CONTROLS, HUMIDIFIER, CONNECTIVE SUPPLY/EXHAUST/RETURN DUCTORK, ZONE STRIP HEATERS, AND REFRIGERANT PIPING. PULL ALL WIRING BACK TO PANELS. EXISTING OUTDOOR AIR LOUVER TO REMAIN.
2. TOILET ROOMS: REMOVE ALL EXHAUST AIR DUCTWORK AND ASSOCIATED EXHAUST AIR GRILLES.
3. LOBBY AND GENERAL OFFICE AREA: REMOVE ALL OVERHEAD SUPPLY/RETURN AIR DUCTWORK AND ASSOCIATED AIR DIFFUSERS AND GRILLES. DISCONNECT AND REMOVE TEMPERATURE SENSORS AND CONTROL WIRING.
4. EXHIBIT AREA: REMOVE ALL BELOW FLOOR SUPPLY/RETURN AIR DUCTWORK AND ASSOCIATED FLOOR/WALL MOUNTED AIR DIFFUSERS AND GRILLES. DISCONNECT AND REMOVE TEMPERATURE/HUMIDITY SENSORS AND CONTROL WIRING.
5. FRIENDS ROOM: REMOVE ALL OVERHEAD SUPPLY/RETURN AIR DUCTWORK AND ASSOCIATED CEILING/WALL MOUNTED AIR DIFFUSERS AND GRILLES. DISCONNECT AND REMOVE TEMPERATURE SENSORS AND CONTROL WIRING.
6. ROOF, WITHIN PARAPET: DISCONNECT AND REMOVE RESTROOM EXHAUST FAN, SPLIT SYSTEM CONDENSING UNIT, CONTROLS, AND REFRIGERANT PIPING. PULL ALL WIRING BACK TO PANELS. EXHAUST FAN ROOF CURB TO REMAIN. CAP AND SEAL OFF DUCT CONNECTION.
7. ROOF: DISCONNECT AND REMOVE PACKAGED HEAT PUMP, CONNECTIVE DUCTWORK, CONTROLS, AND PULL ALL WIRING BACK TO PANEL. CAP AND SEAL OFF ALL ROOF PENETRATIONS. CAP/SEAL TO MATCH EXISTING ROOF.
8. RECEPTION CORRIDOR: SUPPLY AND RETURN DUCTORK BELOW SLAB TO REMAIN. CAP AND SEAL SUPPLY DUCTWORK AT BOTH ENDS. RETURN DUCTORK TO BE UTILIZED TO ROUTE PLUMBING PIPING UNDER NEW WORK.

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Sheet Title: Mechanical Demolition Plan

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Registered Professional Engineer Certificate No. 26040 HENRY WEBB JOHNSTONE III Arizona U.S.A.

BLM Project # AENV.083

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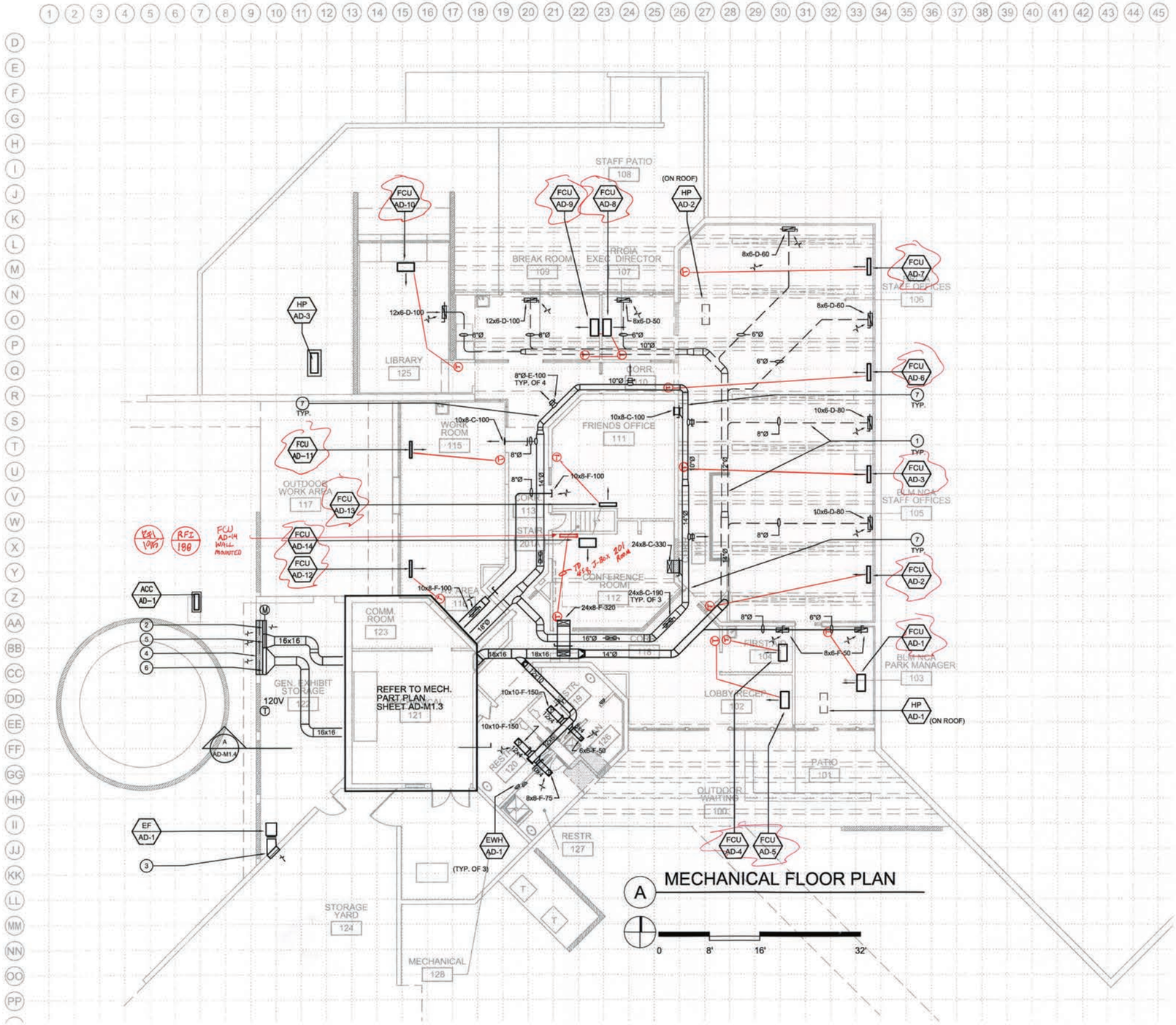


MECHANICAL PLAN KEY NOTES:

1. DUCTORK BELOW FLOOR, TYP.
2. PROVIDE LOUVER PLENUM PARTITON AT 26", 1000 CFM. PROVIDE 120 V MOTOR OPERATED DAMPER AND INTERLOCK DAMPER WITH EF-AD-1 AND LINE VOLTAGE THERMOSTAT. ALL LINE VOLTAGE WIRING BY ELECTRICAL CONTRACTOR.
3. 24x24 RAIN RESISTANT/DRAINABLE EXHAUST AIR LOUVER WITH MINIMUM 50% FREE AREA AND INSECT SCREEN, 1000 CFM. LOUVER FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED IN THE WALL BY GENERAL CONTRACTOR. TRANSITION FROM LOUVER AND MAKE FINAL FLEXIBLE CONNECTION WITH EF-AD-1.
4. EXISTING WINDOW OPENING TO BE USED FOR INTAKE AIR LOUVER, ROUGH OPENING 103x16. MAXIMIZE LOUVER SIZE TO FIT OPENING. PROVIDE RAIN RESISTANT/DRAINABLE INTAKE AIR LOUVER WITH MINIMUM 50% FREE AREA AND INSECT SCREEN, APROX. 4000 CFM. LOUVER FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED IN THE WALL BY GENERAL CONTRACTOR. PROVIDE 12" PLENUM AND PARTITION AT26",26", AND 51" WIDTHS.
5. PROVIDE LOUVER PLENUM PARTITON AT 26", 1000 CFM. PROVIDE 120 V MOTOR OPERATED DAMPER AND INTERLOCK DAMPER WITH EF-AD-2 AND LINE VOLTAGE THERMOSTAT LOCATED IN MECHANICAL ROOM (REFER TO SHEET AD-M1.3. ALL LINE VOLTAGE WIRING BY ELECTRICAL CONTRACTOR. TRANSITION TO 16x16 MECHANICAL ROOM VENTILATION AIR DUCTWORK.
6. PROVIDE LOUVER PLENUM PARTITON AT 51", APROX. 2000 CFM AND TRANSITION TO 16x16 OUTDOOR AIR DUCT.
7. EXPOSED DUCTWORK APPLICATIONS - PROVIDE ALUMINUM-SPIRAL, DOUBLE-WALL INSULATED ROUND DUCTWORK. HANGER MATERIAL TO MATCH DUCTORK, REFER TO DETAIL 7 SHEET AD-M0.1.

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Sheet Title: Mechanical Floor Plan

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Architect's Job # 02.07.C

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Sheet 50 of 76

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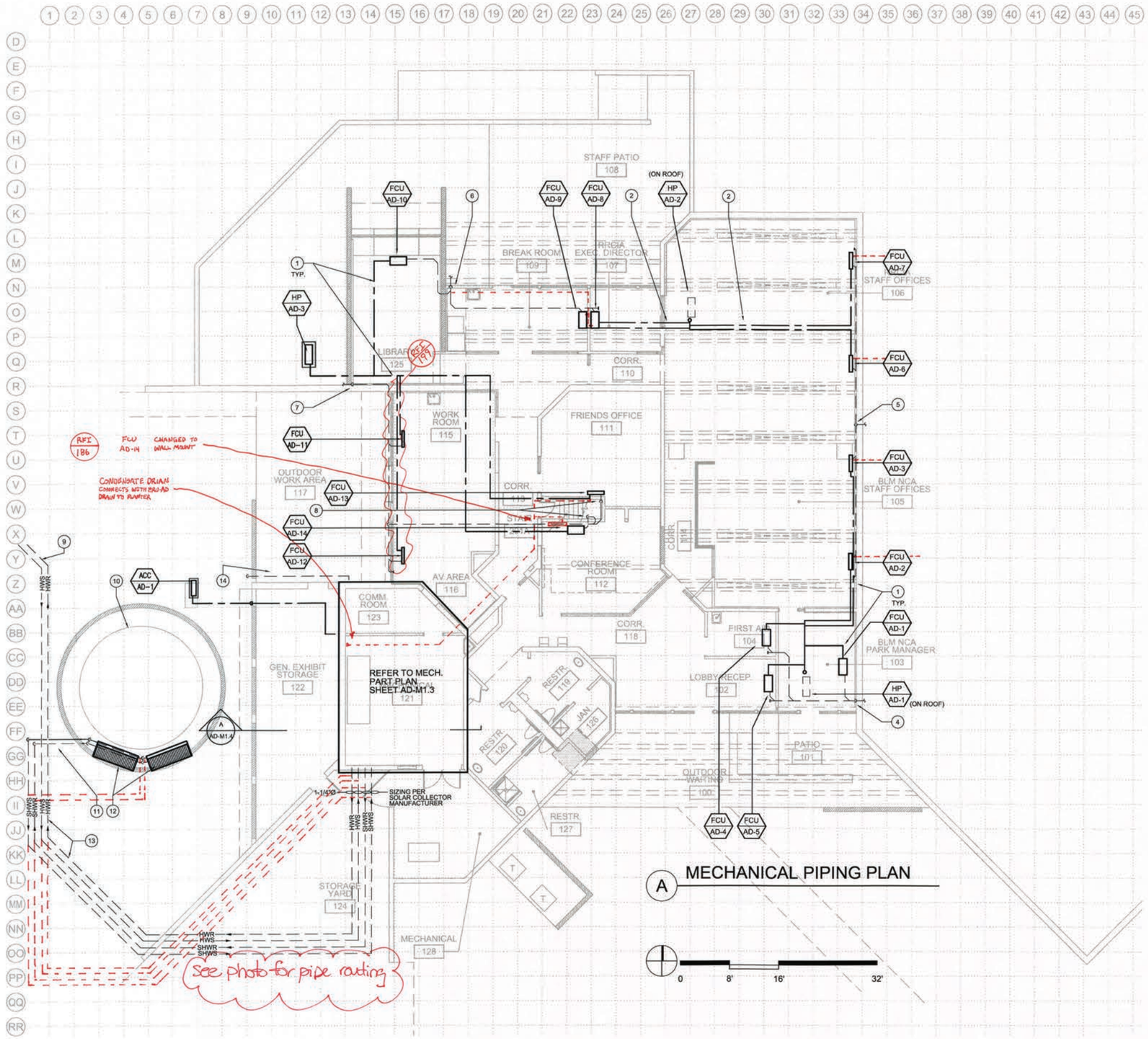
AS - BUILD




## MECHANICAL PIPING PLAN KEY NOTES:

1. REFRIGERANT LIQUID AND VAPOR LINES, REFER TO MANUFACTURERS RECOMMENDATIONS PIPE SIZING.
2. EXPOSED PIPING - ROUTE REFRIGERANT BRANCH LINES TIGHT TO NORTH SIDE OF EXISTING BEAMS.
3. EXPOSED PIPING - ROUTE REFRIGERANT BRANCH LINES TO TO EXTERIOR WALL.
4. 1" COMBINED CONDENSATE DRAIN DOWN IN FURRING AND DAYLIGHT TO EXTERIOR WITH SPLASH BLOCK. TOP OF EXTERIOR EARTH BERM +- 8'-4" AFF. BOTTOM OF RECESSED FAN COIL UNITS FLUSH WITH CEILING AT +- 9'-0" AFF. PROVIDE 3/4" BRANCH CONDENSATE DRAIN LINES. SLOPE ALL CONDENDATE DRAIN LINE PIPING AT 1/4" FALL PER FOOT. PROVIDE CLEANOUTS AS INDICATED
5. 1" COMBINED CONDENSATE DRAIN DOWN IN FURRING AND DAYLIGHT TO EXTERIOR WITH SPLASH BLOCK. TOP OF EXTERIOR EARTH BERM +- 8'-4" AFF. BOTTOM OF WALL HUNG FAN COIL UNITS +- 10'-0" AFF. PROVIDE 3/4" BRANCH CONDENSATE DRAIN LINES AND ROUTE WITHIN FURRING. SLOPE ALL CONDENDATE DRAIN LINE PIPING AT 1/4" FALL PER FOOT. PROVIDE WALL CLEANOUTS AS INDICATED.
6. 1" COMBINED CONDENSATE DRAIN DOWN IN FURRING AND DAYLIGHT TO EXTERIOR WITH SPLASH BLOCK. BOTTOM OF RECESSED FAN COIL UNITS FLUSH WITH CEILING AT +-13'-0" AFF. PROVIDE 3/4" BRANCH CONDENSATE DRAIN LINES. SLOPE ALL CONDENDATE DRAIN LINE PIPING AT 1/4" FALL PER FOOT. PROVIDE CLEANOUTS AS INDICATED
7. 1" COMBINED CONDENSATE DRAIN DOWN IN FURRING AND DAYLIGHT TO EXTERIOR WITH SPLASH BLOCK. BOTTOM OF WALL HUNG FAN COIL UNITS +- 10'-0" AFF. PROVIDE 3/4" BRANCH CONDENSATE DRAIN LINES AND ROUTE WITHIN FURRING. SLOPE ALL CONDENDATE DRAIN LINE PIPING AT 1/4" FALL PER FOOT. PROVIDE WALL CLEANOUTS AS INDICATED.
8. PROVIDE INTERNAL UNIT MOUNTED CONDENSATE PUMP FOR FCU-AD-13 AND FCU-AD-14. ROUTE 1" FORCED RETURN ABOVE CONFERENCE ROOM CEILING AND CONNECT TO GRAVITY DRAIN PER NOTE 7.
9. 1-1/4" DIRECT BURIED HWS&R TO ERU-VC-1 IN ARRIVAL STRUCTURE MECHANCIAL ROOM. REFER TO VA-M1.1 FOR CONTINUATION.
10. WATER TANK, REFER TO CIVIL DRAWINGS.
11. SHWS&R DOWN AND INTERFACE WITH DIRECT BURIED PIPING. CONSULT SOLAR COLLECTION SYSTEM MANUFACTURER FOR PIPE SIZING.
12. SOLAR HOT WATER COLLECTORS, (2) @ APROX 84"x80"x6" VIESSMAN VITOSOL 300 OR EQUAL. COLLECTOR ARRAY TO BE MOUNTED TO WATER TANK. CONSTRUCT UNITSTRUT SUPPORT STRUCTURE TO SUPPORT COLLECTORS AT MANUFACTURER SUGGESTED SOLAR TILT ANGLE. WELD TOP AND BOTTOM UNISTRUT SUPPORTS TO TANK. BOTTOM OF COLLECTOR ELEVATION APROX. 3FT ABOVE BOTTOM OF TANK. COLLECTORS CONNECTION HARDWARE AND FIELD PIPING PER MANUFACTURER SHOP DRAWINGS.
13. COORDINATE ALL DIRECT BURIED MECHANICAL PIPING WITH FIRE PROTECTION PIPING, REFER TO CIVIL DRAWINGS.
14. DRAIN LINE FROM ERU-AD-1 EVAPORATIVE COOLER SECTION, SIZE PER MANUFACTURER. DROP BELOW SLAB AT EXTERIOR WORKER'S AREA. EXTEND AS SHOWN AND DAYLIGHT TO PLANTER.

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U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

Red Rock Canyon Visitor Center Area Redevelopment

# Administration Remodel

Red Rock Canyon National Conservation Area
United States Department of the Interior Bureau of Land Management
Line and Space, LLC
627 East Speedway Blvd. Tucson, Arizona 85705 (520) 623-1313

Sheet Title: Mechanical Piping Plan

Checked by: HWJ

Revisions:

| # | Description | Date |
|---|---|---|
| | | |

Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8-31-07 ARIZONA U.S.A.

BLM Project # AENV.083

Architect's Job # 02.07.C

Date: 8/31/07

AD-M1.2

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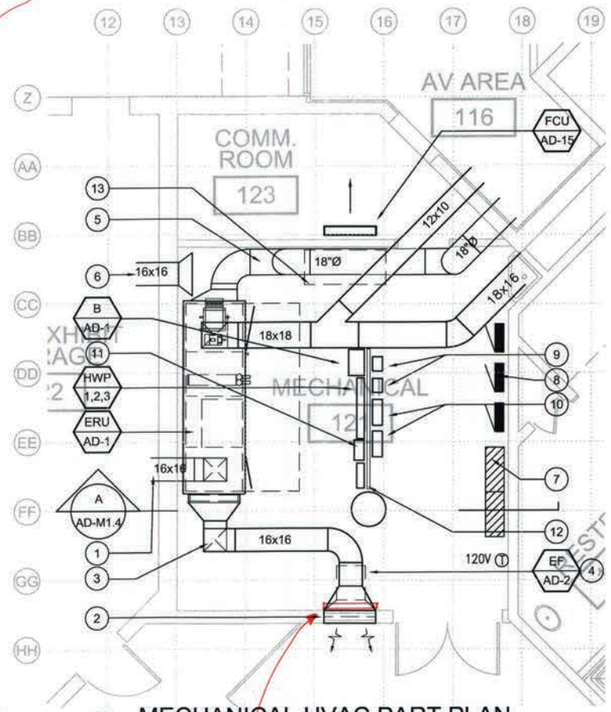



A MECHANICAL HVAC PART PLAN

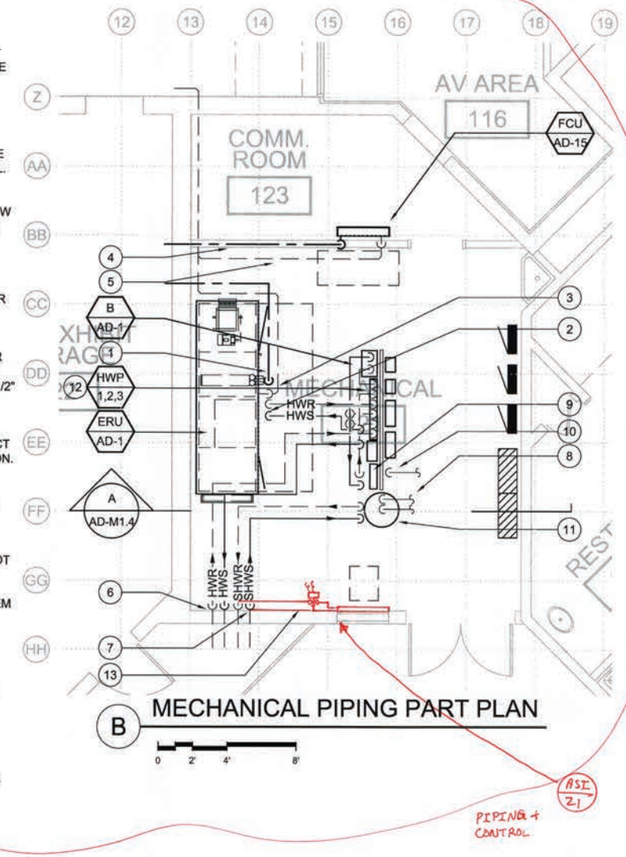
0 2' 4' 8'

MECHANICAL HVAC PART PLAN KEY NOTES:

1. 16x16 OUTDOOR AIR THROUGH MECHANICAL ROOM WALL FROM STORAGE ROOM (REFER TO SHEET AD-M1.1 FOR CONTINUATION). EXTEND, RADIUS ELBOW DOWN, AND MAKE FINAL FLEXIBLE CONNECTION WITH ERU-AD-1.
2. 48x96 EXISTING LOUVER, PROVIDE NEW BIRDSCREEN AND 8" SHEET METAL PLENUM. NEAR TOP OF LOUVER, PROVIDE 36x36 OPENING AND TRANSITION TO 16x16 EXHAUST AIR DUCT. NEAR BOTTOM, PROVIDE 24x24 OPENING AND TRANSITION TO EF-AD-2.
3. EXTEND 16x16 EXHAUST AIR DUCT HIGH, DROP, TRANSITION, AND MAKE FINAL FLEXIBLE CONNECTION TO ERU-AD-1.
4. EF-AD-2 BELOW ERU-AD-1 EXHAUST AIR DUCTWORK. PROVIDE FLEXIBLE CONNECTION TO EF-AD-2. MOUNT UNIT ON UNISTRUT SUPPORT WITH NEOPRENE VIBRATION ISOLATORS.
5. 18"Ø SUPPLY AIR DOWN. EXTEND AND MAKE FINAL FLEXIBLE CONNECTION WITH ERU-AD-1.
6. 16x16 MECH ROOM VENTILATION DUCT THROUGH MECHANICAL ROOM WALL FROM STORAGE ROOM (REFER TO SHEET AD-M1.1 FOR CONTINUATION). PROVIDE BELLMOUTH TERMINATION AND COVER OPENING WITH 1/2" MESH.
7. ELECTRICAL SERVICE ENTRANCE BY ELECTRICAL CONTRACTOR
8. ELECTRICAL PANEL (TYP.) BY ELECTRICAL CONTRACTOR
9. ERU SUPPLY AND EXHAUST FAN VARIABLE FREQUENCY DRIVES
10. TEMPERATURE CONTROL PANELS
11. SOLAR HOT WATER SYSTEM CONTROL PANEL
12. FIELD FABRICATED UNISTRUT EQUIPMENT SUPPORT RACK
13. OPERATOR COMPUTER STATION FOR ENERGY MANAGEMENT/TEMPERATURE CONTROL SYSTEM

MECHANICAL PIPING PART PLAN KEY NOTES:

1. REFRIGERANT LIQUID AND VAPOR LINES DOWN AND MAKE FINAL CONNECTION TO ERU-AD-1, REFER TO MANUFACTURERS LITERATURE FOR PIPE SIZES. FOR CLARITY, SINGLE LINE REPRESENTS VAPOR AND LIQUID PIPE.
2. 1-1/4" HOT WATER SUPPLY AND RETURN DOWN AND MAKE FINAL FLEXIBLE CONNECTION TO ERU-AD-1 HEATING COIL.
3. ERU EVAP COOLER DRAIN, SIZING PER ERU MANUFACTURER. ROUTE 1-1/2" COMBINED DRAIN LINE LOW AND DAYLIGHT TO PLANTER (REFER TO SHEET M1.2 FOR CONTINUATION). SLOPE AT 1/8" PER FOOT.
4. REFRIGERANT LIQUID AND VAPOR LINES DOWN IN PARTITION WALL AND MAKE FINAL CONNECTION TO FCU-AD-15, REFER TO MANUFACTURERS LITERATURE FOR PIPE SIZES. FOR CLARITY, SINGLE LINE REPRESENTS VAPOR AND LIQUID PIPE.
5. FCU CONDENSATE DRAIN, SIZE PER FCU MANUFACTURER DRAIN CONNECTION. ROUTE THROUGH PARTITION WALL AND LOW ACROSS MECH ROOM FLOOR TO COMBINED 1-1/2" DRAIN LINE.
6. 1-1/4" HOT WATER SUPPLY AND RETURN TO VISITOR ARRIVAL STRUCTURE DOWN AND INTERFACE WITH DIRECT BURIED PIPING. REFER TO SHEET M1.2 FOR CONTINUATION.
7. SOLAR HOT WATER SUPPLY AND RETURN PIPING TO SOLAR COLLECTOR ARRAY DOWN AND INTERFACE WITH DIRECT BURIED PIPING. REFER TO SHEET M1.2 FOR CONTINUATION.
8. DOMESTIC WATER LINE AND CONNECTIONS TO SOLAR HOT WATER TANK BY PLUMBING CONTRACTOR
9. SOLAR HOT WATER PUMP PER SOLAR HOT WATER SYSTEM MANUFACTURER.
10. DOMESTIC HOT WATER RETURN PUMP BY PLUMBING CONTRACTOR
11. SOLAR HOT WATER STORAGE TANK ON HOUSE KEEPING PAD
12. MOUNT HOT WATER PUMPS 1,2, AND 3 IN THE VERTICAL POSITION
13. FIRE PROTECTION RISER BY PLUMBING FP CONTRACTOR.




B MECHANICAL PIPING PART PLAN

0 2' 4' 8'

U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

Red Rock Canyon Visitor Center Area Redevelopment

Administration Remodel

Red Rock Canyon National Conservation Area
United States Department of the Interior Bureau of Land Management
Line and Space, LLC
8277 East Speedway Blvd. Tucson, Arizona 85705 (520) 623-1313

Sheet Title: Mechanical Part Plans

Checked by: HWJ

Revisions:

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Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8/31/07 ARIZONA U.S.A.

BLM Project # AENV.083

Architect's Job # 02.07.C

Date: 8/31/07

AD-M1.3

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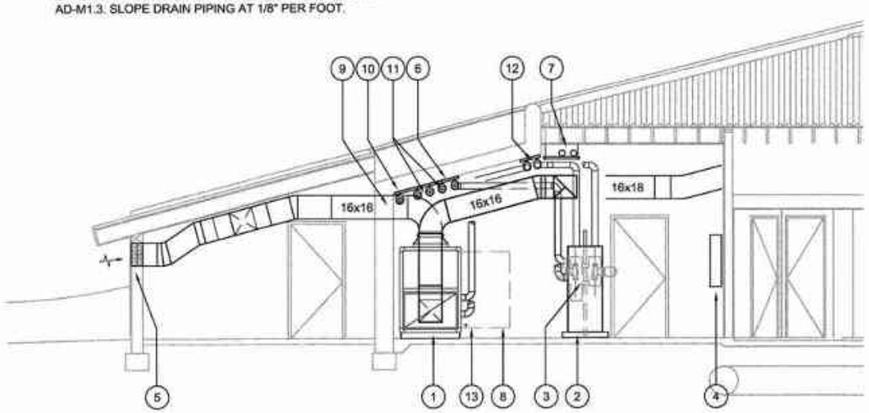
MECHANICAL SECTION 'A' KEY NOTES:

1. ERU-AD-1 ON STEEL RAIL SUPORT SYSTEM.
2. SOLAR HOT WATER STORAGE TANK ON HOUSEKEEPING PAD
3. FIELD FABRICATED UNITSTRUT EQUIPMENT SUPPORT RACK (BACKGROUND) FOR MOUNTING OF HOT WATER CIRCULATION PUMPS, BOILER, AND CONTROL PANELS.
4. ELECTRICAL PANEL BY ELECTRICAL CONTRACTOR
5. EXISTING WINDOW OPENING TO BE USED FOR INTAKE AIR LOUVER, ROUGH OPENING 16x103. MAXIMIZE LOUVER SIZE TO FIT OPENING. PROVIDE RAIN RESISTANT/DRAINABLE INTAKE AIR LOUVER WITH MINIMUM 50% FREE AREA AND INSECT SCREEN, APROX. 4000 CFM. LOUVER FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED IN THE WALL BY GENERAL CONTRACTOR. PROVIDE 12" PLENUM AND PARTITION AT 26",26", AND 51" WIDTHS.
6. UNISTRUT / CLEVIS PIPE HANGER ASSEMBLY, TYP. FASTEN UNISTRUT TO CONCRETE CEILING WITH CONCRETE ANCHOR BOLTS.
7. 1-1/2" HWS&R PIPING ON TRAPESE HANGER ASSEMBLY
8. ERU-AD-1 REQUIRED CLEARANCE FOR MAINTENANCE
9. 16x16 OUTDOOR AIR THROUGH MECHANICAL ROOM WALL FROM STORAGE ROOM. EXTEND WITH RADIUS ELBOW DOWN, AND MAKE FINAL FLEXIBLE CONNECTION WITH ERU-AD-1. ROUTE DUCTWORK TIGHT TO STORAGE ROOM CEILING TO MAXIMIZE CLEARANCE.
10. 2" DCW BY PLUMBING CONTRACTOR
11. 1-1/4" HWSR AND SHWS&R PIPING (SHWS&R PIPE SIZING PER MANUFACTURER).
12. 1-1/4" DHW AND 1-1/4" DHWR BY PLUMBING CONTRACTOR.
13. 1-1/4" HWS&R PIPING DOWN AND MAKE FINAL FLEXIBLE CONNECTION TO ERU-AD-1. EVAPORATIVE COOLER DRAIN LINE BELOW. SIZING PER UNIT MANUFACTURER. ROUTE COMBINED 1-1/2" DRAIN LINE LOW AND EXTEND TO EXTERIOR PLANTER, REFER TO SHEETS AD-M1.2 AND AD-M1.3. SLOPE DRAIN PIPING AT 1/8" PER FOOT.

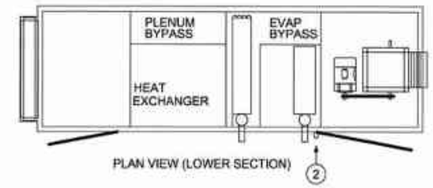



A SECTION THROUGH MECHANICAL & STORAGE ROOMS

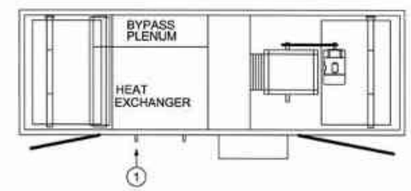
0 2' 4' 8'

ENERGY RECOVERY UNIT COMPONENTS

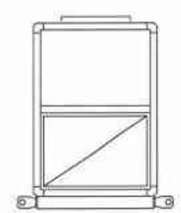
1.) CONDENSATE DRAIN (1" MPT, TYP OF 2)
2.) COIL CONDENSATE DRAIN (1 1/4" MPT)
3.) 85% OUTSIDE AIR FILTER
4.) OUTSIDE AIR HEAT EXCHANGER FACE DAMPER
5.) OUTSIDE AIR HEAT EXCHANGER BYPASS DAMPER
6.) CROSS FLOW HEAT EXCHANGER
7.) EXHAUST BLOWER/MOTOR ASSEMBLY
8.) PREFILTER
9.) EXHAUST AIR GRAVITY DAMPER
10.) HOT WATER COIL
11.) EVAPORATIVE COOLING SECTION
12.) SUPPLY BLOWER/MOTOR ASSEMBLY
13.) NOTE: CONTROL PANEL/MAIN DISCONNECT REMOTELY LOCATED



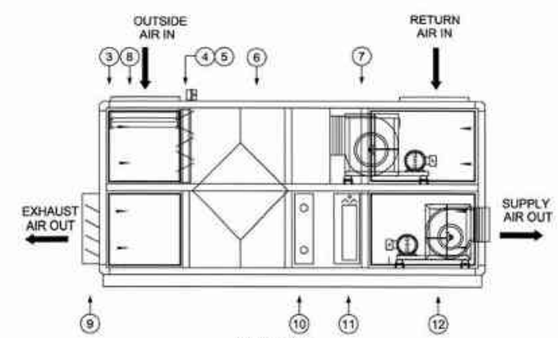

PLAN VIEW (LOWER SECTION)




PLAN VIEW (UPPER SECTION)



LEFT END VIEW




FRONT VIEW

B ENERGY RECOVERY UNIT ELEVATION

NTS

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Red Rock Canyon National Conservation Area

United States Department of the Interior Bureau of Land Management

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Sheet Title: Mechanical Sections and Equipment Elevations

Checked by: HWJ

Revisions: # Description: Date:

Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8/31/07 ARIZONA U.S.A.

BLM Project # AENV.083

Architect's Job # 02.07.C

Date: 8/31/07

AD-M1.4

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# ENERGY RECOVERY UNIT SCHED.

| | | |
|---|---|---|
| UNIT DESIGNATION ERU - | | AD-1 |
| SUPPLY AIR FAN - VARIABLE SPEED | | |
| AIR QUANTITY | CFM | 2000 |
| EXTERNAL S.P. | IN. $H_2O$ | .5 |
| FAN SIZE/TYPE | INCHES | - |
| ELECTRIC | VOLT./PH./AMP. | 240/1/ |
| MOTOR HP | | 1/2 |
| EXHAUST AIR FAN - VARIABLE SPEED | | |
| AIR QUANTITY | CFM | 2000 |
| EXTERNAL S.P. | IN. $H_2O$ | .75 |
| FAN SIZE/TYPE | INCHES | - |
| ELECTRIC | VOLT./PH./AMP. | 230/1/- |
| MOTOR HP | | 3/4 |
| CROSS FLOW HEAT EXCHANGER - WINTER | | |
| OUTDOOR AIR TEMP. | °FDB/°FWB | 19 |
| OUTDOOR AIR QUANTITY | CFM | 2000 |
| RETURN AIR TEMP. | °FDB/°FWB | 65 |
| RETURN AIR QUANTITY | CFM | 2000 |
| EFFICIENCY | °FDB/°FWB | - |
| CROSS FLOW HEAT EXCHANGER - SUMMER | | |
| OUTDOOR AIR TEMP. | °FDB/°FWB | 100/63 |
| OUTDOOR AIR QUANTITY | CFM | 2000 |
| RETURN AIR TEMP. | °FDB/°FWB | 78/58.7 |
| RETURN AIR QUANTITY | CFM | 2000 |
| EFFICIENCY | °FDB/°FWB | - |
| EVAPORATIVE COOLER (COOLING AND HUMIDIFICATION) | | |
| PUMP ELECTRIC | VOLT./PH./HP | 120V/1/.25 |
| MEDIA | | GLASDEK |
| SUMMER ENTERING AIR TEMP. | °FDB/°FWB | 85.7/57.2 |
| SUMMER LEAVING AIR TEMP. | °FDB/°FWB | 70 |
| WINTER ENTERING AIR TEMP. | °FDB/%RH | 46.6/5% |
| WINTER LEAVING AIR TEMP. | °FDB/%RH | -/30% |
| HOT WATER TEMPERING COIL | | |
| ENTERING AIR TEMP. | °FDB/°FWB | 40 |
| LEAVING AIR TEMP. | °FDB/°FWB | 65 |
| CAPACITY | MBH | 50 |
| FLOW RATE | GPM | 6 |
| EWT/LWT | °F/°F | 120/100 |
| AIR FILTERS | | |
| PRE FILTER: THROWAWAY | EFF. % | 30 |
| FINAL: ANGLE | EFF. % | 85 |
| BASIS OF DESIGN: INNOVENT | MODEL | RHXC-1/SP |

*ALL SELECTIONS TO BE MADE AT 3800 FT ELEVATION*

NOTES:
1. PROVIDE SEPERATE POWER FEEDS FOR SUPPLY/EXHAUST/COOLER PUMP.
2. PROVIDE FACE AND BYPASS DAMPER FOR HEAT EXCH. AND EVAP COOLER SECTIONS

# DUCTLESS HEAT PUMP SPLIT SYSTEM SCHEDULE

| INDOOR FAN COIL | | | | | OUTDOOR CONDENSER | | PERFORMANCE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SYMBOL | MANFR./MODEL MITSUBISHI | ELECTRIC VOLTS/Ø | ELECTRIC AMPS | CFM HI/MED/LOW | SYMBOL | MANFR./MODEL MITSUBISHI | COOLING (MBH) TOTAL | HEATING (MBH) TOTAL | SEER | ELECTRIC VOLTS/Ø | ELECTRIC AMPS | ELECTRIC MFS |
| FCU-AD-1 | PMFY-08 | 230/1 | <1 | 258-328 | HP-AD1 | PUMY-48 (S-SERIES) | 48 | 54 | 14 | 230/1 | 26 | 40 |
| FCU-AD-2 | PKFY-15 | 230/1 | <1 | 283-406 | | | | | | | | |
| FCU-AD-3 | PKFY-15 | 230/1 | <1 | 283-406 | | | | | | | | |
| FCU-AD-4 | PMFY-06 | 230/1 | <1 | 230-307 | | | | | | | | |
| FCU-AD-5 | PMFY-12 | 230/1 | <1 | 258-328 | | | | | | | | |
| FCU-AD-6 | PKFY-15 | 230/1 | <1 | 283-406 | HP-AD2 | PUMY-48 (S-SERIES) | 48 | 54 | 14 | 230/1 | 26 | 40 |
| FCU-AD-7 | PKFY-15 | 230/1 | <1 | 283-406 | | | | | | | | |
| FCU-AD-8 | PMFY-06 | 230/1 | <1 | 230-307 | | | | | | | | |
| FCU-AD-9 | PMFY-08 | 230/1 | <1 | 258-328 | | | | | | | | |
| FCU-AD-10 | PMFY-08 | 230/1 | <1 | 258-328 | HP-AD3 | PUMY-48 (S-SERIES) | 48 | 54 | 14 | 230/1 | 26 | 40 |
| FCU-AD-11 | PKFY-08 | 230/1 | <1 | 173-208 | | | | | | | | |
| FCU-AD-12 | PKFY-08 | 230/1 | <1 | 173-208 | | | | | | | | |
| FCU-AD-13 | PKFY-12 | 230/1 | <1 | 283-406 | | | | | | | | |
| FCU-AD-14 | PKFY-12 | 230/1 | <1 | 283-406 | | | | | | | | |

REF 186

REF 186

REMARKS:
1. INSTALLING CONTRACTOR SHALL BE CERTIFED BY MANUFACTURER.
2. EC SHALL SHALL FURNISH AND INSTALL INDOOR AND OUTDOOR DISCONNECTS
3. PROVIDE SHOP DRAWINGS FOR COMPLETE SYSTEM INDICATING MANUFACTURER SIZED REFRIGERANT PIPING, AND CONTROL WIRING.
4. SYSTEM SHALL BE INTEGRATED IN TO BUILDING EMCS VIA BACNET INTERFACE.
5. DESIGN CONDITIONS: INDOOR 78°F/60°F, AMBIENT 100°F

*ALL SELECTIONS TO BE MADE AT 3800 FT ELEVATION*

# TERMINAL HEATING EQUIPMENT

| MARK | HEATING SOURCE | CFM | GPM @ 180/160 EWT/LWT | MBH (KW) | MOUNTING | ELECTRIC VOLT/PH/AMPS | BASIS OF DESIGN | REMARKS |
|---|---|---|---|---|---|---|---|---|
| EWH-AD1 | ELECTRIC | - | - | (1) | WALL-RECESSED | 115/1/8.3 | BERKO - CRA | 1,2 |

REMARKS:
1. ELECTRIC WALL HEATER
2. THERMOSTAT KNOB - DISCONNECT MEANS

# EXHAUST FAN SCHEDULE

| FAN TAG | DESCRIP. | LOCATION AND/ OR SERVICE | ACCESSORIES | CFM | STATIC PRESS IN. WG | CONTROL | RPM (MAX.) | ELECTRICAL VOLT/Ø | ELECTRICAL HP(W) | ELECTRICAL FLA | MAX. WEIGHT (LBS.) | BASIS OF DESIGN GREENHECK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EF-AD-1 | IL,BD | STORAGE VENT. | BDD,VI, CMS, IG | 1000 | .375 | DDC | 1119 | 115/1 | 1/3 | - | 111 | BSQ-140-HP |
| EF-AD-2 | IL,BD | MECH. RM. VENT. | BDD,VI, CMS, IG | 1000 | .375 | DDC | 1119 | 115/1 | 1/3 | - | 111 | BSQ-140-HP |

*ALL SELECTIONS TO BE MADE AT 3800 FT ELEVATION*

ABBREVIATIONS:

| | | | |
|---|---|---|---|
| BD | BELT DRIVE | MMS | MANUAL MOTOR STARTER BY E.C. |
| BDD | BACK DRAFT DAMPER | RC | ROOF CAP |
| CMS | COMB MTR STR. BY E.C. | RE | ROOF EXHAUSTER |
| D | DISCONNECT BY E.C. | SC | SPEED CONTROL |
| DDC | DIR. DIGITAL CTRL | SWT | SPRING WOUND TIMER (FURNISHED AND WIRED BY MC) |
| IG | INLET GUARD | VI | VIBRATION ISOLATION |
| IL | IN LINE | WC | WALL CAP |

# DUCTLESS COOLING SPLIT SYSTEM SCHEDULE

| INDOOR FAN COIL | | | | | OUTDOOR CONDENSER | | PERFORMANCE | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SYMBOL | MANFR./MODEL MITSUBISHI | ELECTRIC VOLTS/Ø | ELECTRIC AMPS | CFM HIGH/MED/LOW | SYMBOL | MANFR./MODEL MITSUBISHI | COOLING (MBH) TOTAL | HEATING (MBH) TOTAL | SEER | ELECTRIC VOLTS/Ø | ELECTRIC AMPS | ELECTRIC MFS |
| FCU-AD-15 | MS-A09WA | 120/1 | 1.2 | 183-335 | ACC-AD-1 | MU-A09WA (M-SERIES) | 9 | NA | 13 | 120/1 | 14 | 15 |

REMARKS:
1. CONTROL WIRING BETWEEN INDOOR AND OUTDOOR UNIT BY HVAC CONTRACTOR.
2. EC SHALL SHALL FURNISH AND INSTALL INDOOR AND OUTDOOR DISCONNECTS
3. DESIGN CONDITIONS: INDOOR 78°F/60°F, AMBIENT 100°F

*ALL SELECTIONS TO BE MADE AT 3800 FT ELEVATION*

# PUMP SCHEDULE

| PUMP TAG | PUMP SERVICE | CAPACITY GPM | CAPACITY HD. (FT) | ELECTRICAL RPM | ELECTRICAL HP(W) | ELECTRICAL VOLT/Ø | ELECTRICAL FLA | TYPE | CONTROL | OPERATION | FLOW PROFILE | MODEL | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HWP-1 | HWS/R | 12 | 15 | - | 1/25 | 115/1 | - | INLINE | DDC | DUTY | CONSTANT | GRUNDFOS UP | 1 |
| HWP-2 | ERU-AD-1 | 6 | 10 | - | 1/25 | 115/1 | - | INLINE | DDC | DUTY | CONSTANT | GRUNDFOS UP | 1 |
| HWP-3 | ERU-VC-1 | 6 | 30 | - | 1/25 | 115/1 | - | INLINE | DDC | DUTY | CONSTANT | GRUNDFOS UP | 1 |
| SHWP-1 | SOLAR | - | - | - | - | 115/1 | - | INLINE | SOLAR | DUTY | CONSTANT | - | 2 |

RFI 54

NOTES:
1. PUMP DISCONNECT AND MOTOR STARTER FURNISHED AND WIRED BY E.C.
2. SOLAR HOT WATER PUMP PER SOLAR COLLECTOR MANUFACTURER

*SOLAR HOT WATER SYSTEM SELECTIONS WITH 20% PROPYLENE GLYCOL*

# SOLAR HOT WATER BOOSTER BOILER SCHEDULE

| TAG | SERVICE | CAPACITY MBH | CAPACITY GPM | CAPACITY EWT °F | CAPACITY LWT °F | ELECTRICAL VOLT/Ø | ELECTRICAL kW | CAPACITY CONTROL | MOUNTING | CONTROL | MODEL | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| B-1 | HWS/R | 120 | 12 | 100 | 120 | 240/1 | 35 | FULLY MODULATING | VERTICAL | PER MFR | THERMOLEC B35UM | 1 |

NOTES:
1. DISCONNECT AND MOTOR STARTER FURNISHED AND WIRED BY E.C.

# SOLAR THERMAL HOT WATER COLLECTOR SCHEDULE

| COLLECTORS QTY. | COLLECTORS MANUFACTURER | COLLECTORS LOCATION | COLLECTORS ACTIVE AREA (FT2) | STORAGE MANUFACTURER | DAILY WATER USE (GAL PER DAY) | DESIRED WATER TEMPERATURE (°F) | SYSTEMS SERVED | NOTES |
|---|---|---|---|---|---|---|---|---|
| 2 | VIESSMANN VITOSOL 300 | EXTER. WATER TANK | 94 | VIESSMANN VITOCELL B - 79 GAL. DUAL COIL TANK | 100 | 120 | DHW & ERU AIR HTG. | 1,2,3 |

NOTES:
1. MANUALY CHARGE WITH 20% PROPYLENE GLYCOL SOLUTION. ETHYLEN GLYCOL NOT ACCEPTABLE.
2. SOLAR COLLECTOR MANUFACTURER TO PROVIDE SIZING AND SHOP DRAWING DATA FOR COLLECTORS, PIPING, SOLAR PUMP, EXPANSION TANK, ETC.
3 SOLAR COLLECTOR SYSTEM CONTROLS PER MANUFACTURER.


GLHN ARCHITECTS & ENGINEERS, INC.
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U.S. DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

Red Rock Canyon Visitor Center Area Redevelopment

Administration Remodel

Red Rock Canyon National Conservation Area
United States Department of the Interior Bureau of Land Management


Line and Space, LLC
827 East Speedway Blvd. Tucson, Arizona 85705 (520) 623-1313


Sheet Title: Mechanical Schedules and Controls

Checked by: HWJ

Revisions:

| # | Description | Date |
|---|---|---|
| | | |

Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8/31/07 ARIZONA U.S.A.

BLM Project # AENV.083

Architect's Job # 02.07.C

Date: 8/31/07

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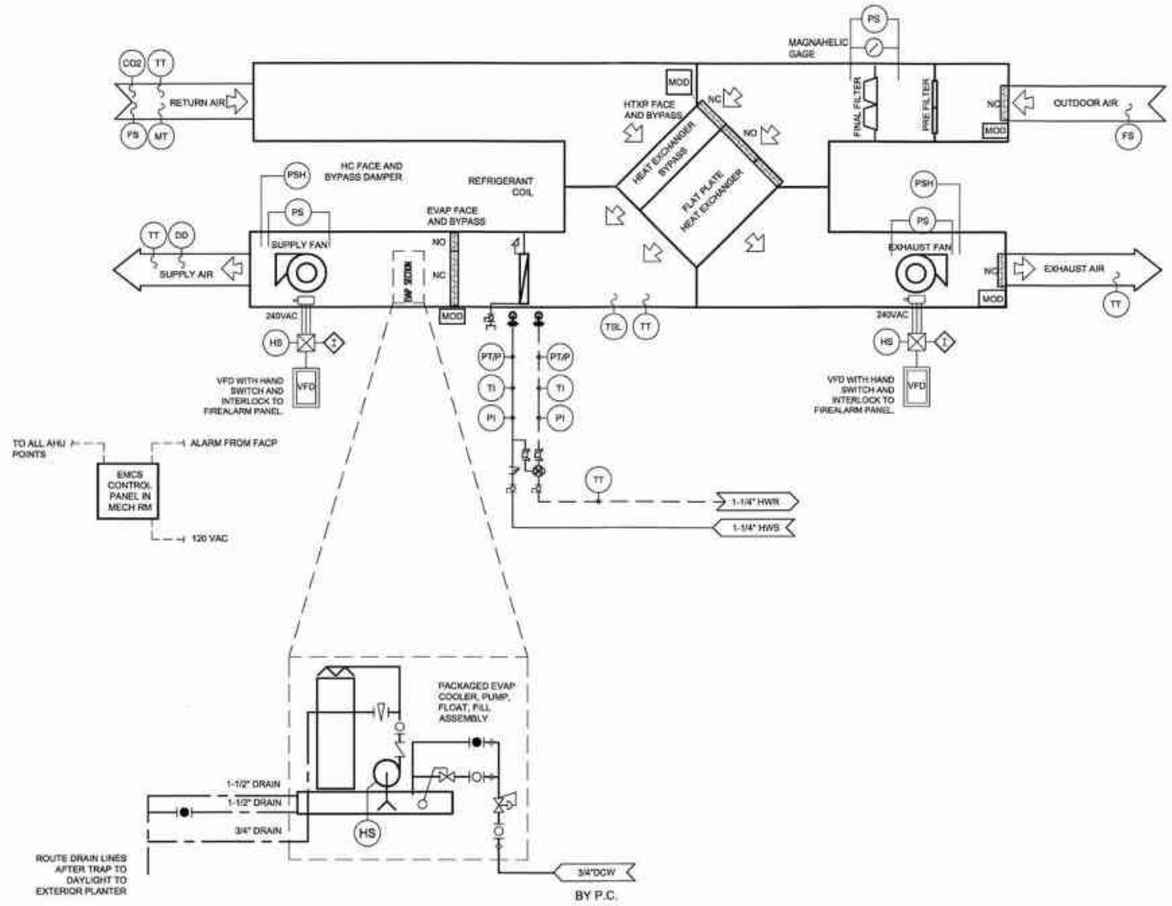


| ERU HARADWARE CONTROL POINTS | SIGNAL |
|---|---|
| SUPPLY FAN ENABLE | BO |
| SUPPLY FAN SPEED | AI |
| SUPPLY FAN STATUS | BI |
| EXHAUST FAN ENABLE | BO |
| EXHAUST FAN SPEED | AI |
| EXHAUST FAN STATUS | BI |
| EVAP PUMP ENABLE | BO |
| EVAP PUMP STATUS | BI |
| EVAP SECTION F & B DAMPER | AO |
| HOT WATER COIL VALVE POSITION | AO |
| HOT WATER RETURN TEMPERATURE | AI |
| UNIT DISCHARGE AIR TEMPERATURE | AI |
| RETURN AIR TEMPERATURE | AI |
| RETURN AIR HUMIDITY | AI |
| RETURN C02 LEVEL | AI |
| RETURN AIR FLOW | AI |
| OUTDOOR AIR FLOW | AI |
| OUTDOOR AIR DAMPER POSITION | BO |
| EXHAUST AIR TEMPERATURE | AI |
| EXHAUST AIR DAMPER POSITION | BO |
| HTXR SUPPLY AIR TEMPERATURE | AI |
| HTXR BYPASS DAMPER POSITION | AO |
| | |
| FILTER STATUS, ALARM | BI |
| FIRE ALARM STATUS | BI |
| FREEZSTAT, ALARM | BI |
| HIGH CO2 LEVEL, ALARM | BI |
| DUCT MOUNTED SMOKE DETECTOR | BI |

**LEGEND**

| | |
|---|---|
| | LOCAL DEVICE |
| | ELECTRIC SIGNAL |
| | AIR VENT |
| | UNION |
| | PRESSURE RELIEF VALVE |
| | CHECK VALVE |
| | GATE ISOLATION VALVE |
| | BUTTERFLY ISOLATION VALVE |
| | BALL ISOLATION VALVE |
| | 2-WAY, 3-WAY MODULATING CONTROL VALVE |
| | CIRCUIT SETTER |
| | STRAINER |
| AI | ANALOG INPUT |
| AO | ANALOG OUTPUT |
| BI | BINARY INPUT |
| BO | BINARY OUTPUT |
| DD | DUCT MOUNTED SMOKE DETECTOR |
| EMCS | ENERGY MANAGEMENT CONTROL SYSTEM |
| FACP | FIRE ALARM CONTROL PANEL |
| FI | FLOW INDICATOR |
| FS | FLOW STATION |
| HS | HAND SWITCH |
| I | INTERLOCK |
| MOD | DAMPER - MODULATING |
| MT | MOISTURE TRANSMITTER |
| NC | NORMALLY CLOSED |
| NO | NORMALLY OPEN |
| PI | PRESSURE INDICATOR GAGE |
| PS | PRESSURE SENSOR |
| PSH | PRESSURE SENSOR HIGH |
| PT | PRESSURE TRANSMITTER |
| PT/P | PETES PLUG |
| SD | COMBINATION FIRE/SMOKE DAMPER |
| TC | TEMPERATURE CONTROLLER |
| TI | TEMPERATURE INDICATOR THERMOMETER |
| TS | TEMPERATURE SENSOR |
| TSL | TEMPERATURE SENSOR LOW |
| TT | TEMPERATURE TRANSMITTER |
| VFD | VARIABLE FREQUENCY DRIVE |
| VT | VELOCITY TRANSMITTER |

1 ENERGY RECOVERY UNIT PIPING AND INSTRUMENTATION DIAGRAM

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Sheet Title: Mechanical Controls

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Registered Professional Engineer (Mechanical) CERTIFICATE NO. 28010 HENRY WEBB JOHNSTONE Date Signed 8/31/07 ARIZONA U.S.A.

BLM Project #AENV.083

Architect's Job # 02.07.C

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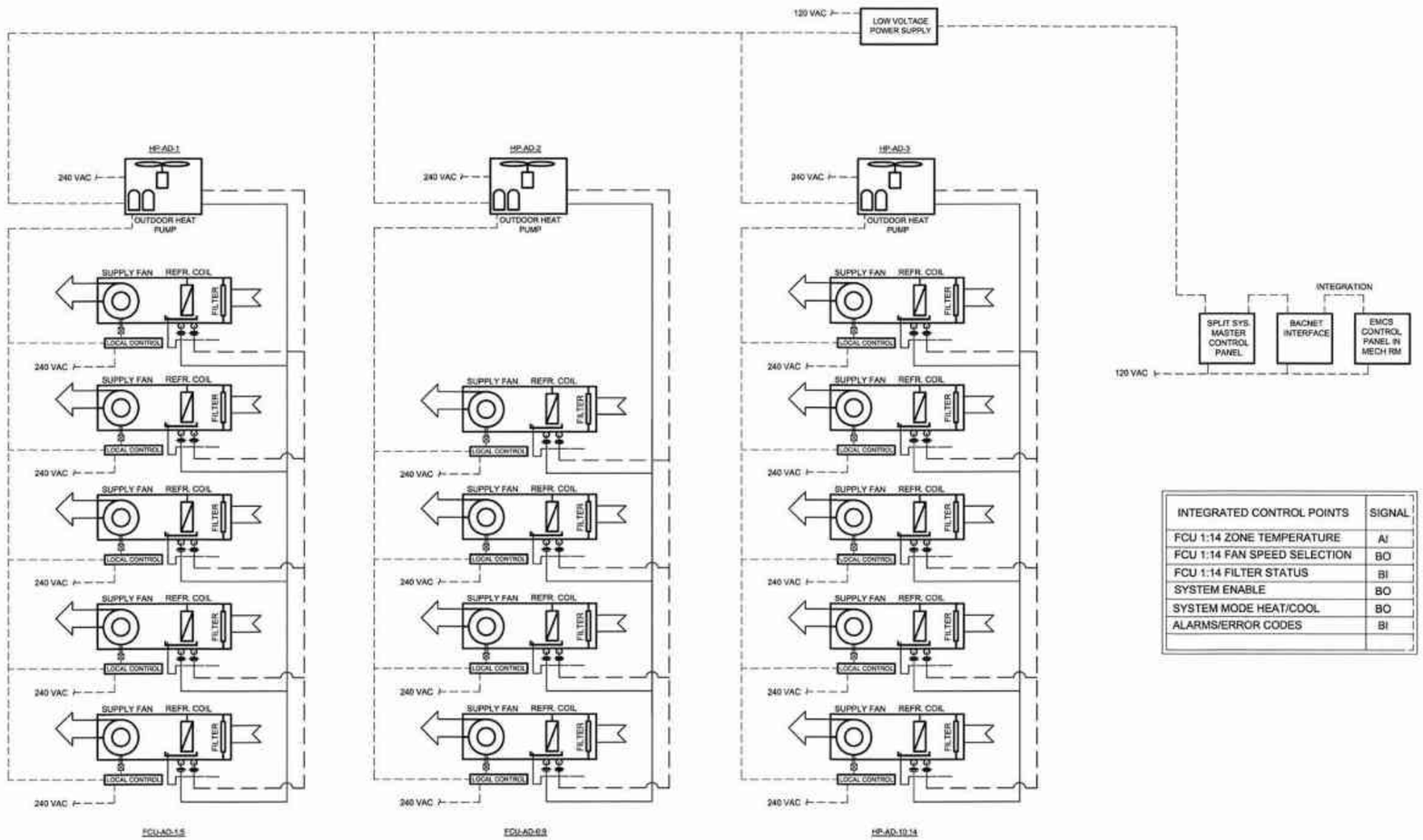


| INTEGRATED CONTROL POINTS | SIGNAL |
|---|---|
| FCU 1:14 ZONE TEMPERATURE | AI |
| FCU 1:14 FAN SPEED SELECTION | BO |
| FCU 1:14 FILTER STATUS | BI |
| SYSTEM ENABLE | BO |
| SYSTEM MODE HEAT/COOL | BO |
| ALARMS/ERROR CODES | BI |
| | |

1 DUCTLESS SPLIT HEAT PUMP SYSTEM PIPING AND INSTRUMENTATION DIAGRAM

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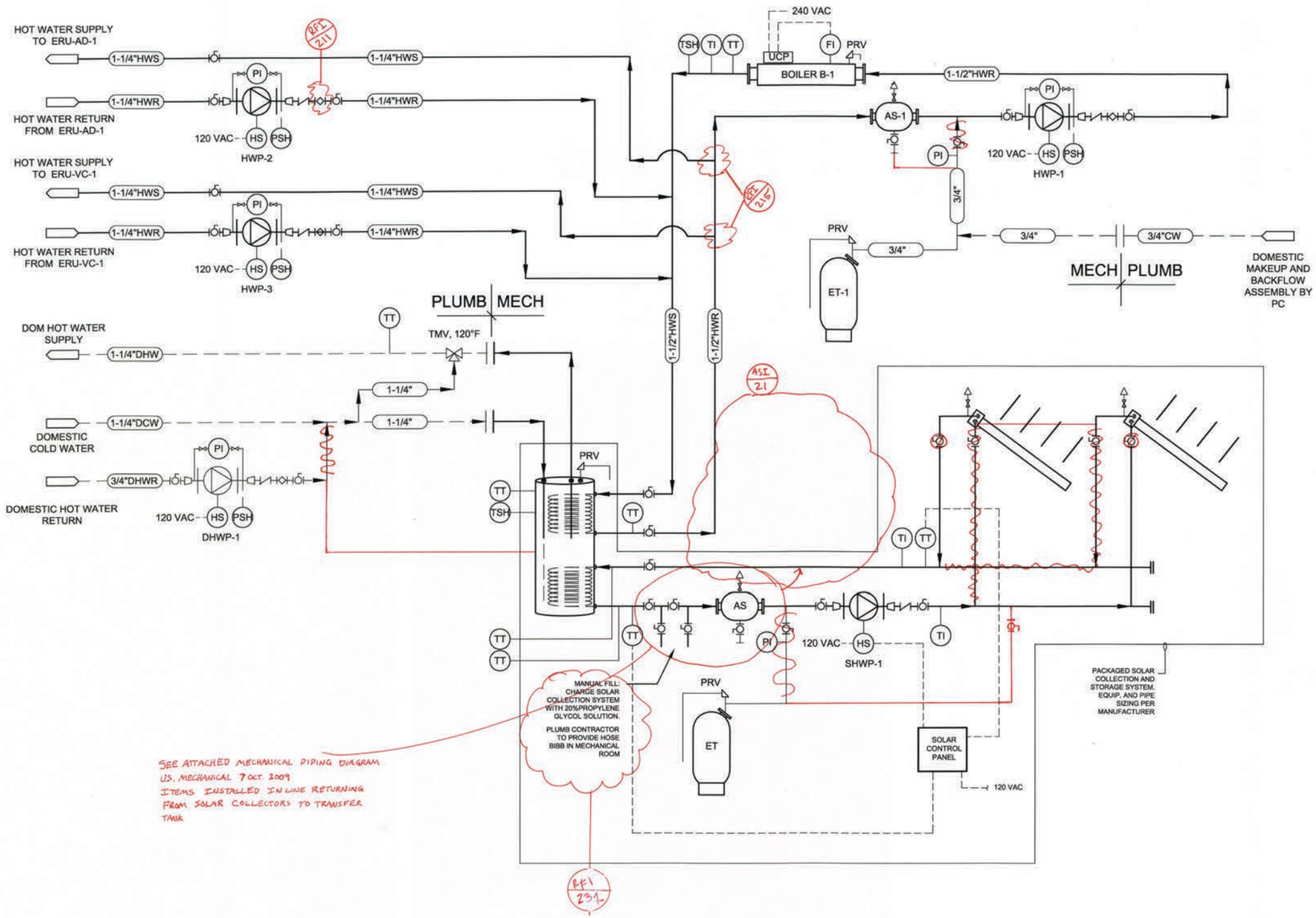


SEE ATTACHED MECHANICAL PIPING DIAGRAM
US. MECHANICAL 7 OCT. 2009
ITEMS INSTALLED IN LINE RETURNING FROM SOLAR COLLECTORS TO TRANSFER TANK

1 SOLAR HOT WATER COLLECTOR ARRAY PIPING AND INSTRUMENTATION DIAGRAM

| SOLAR HOT WATER SYSTEM POINTS | SIGNAL |
|---|---|
| DHWP-1 ENABLE | BO |
| DHWP-1 STATUS | BI |
| HWP-1 ENABLE | BO |
| HWP-1 STATUS | BI |
| HWP-2 ENABLE | BO |
| HWP-2 STATUS | BI |
| HWP-3 ENABLE | BO |
| HWP-3 STATUS | BI |
| B-1 ENABLE | BO |
| B-1 STATUS | BI |
| DOM HOT WATER SUPPLY TEMP | AI |
| HOT WATER SUPPLY TEMP | AI |
| HOT WATER RETURN TEMP | AI |
| SOLAR HOT WATER SUPPLY TEMP | AI |
| SOLAR HOT RETURN SUPPLY TEMP | AI |
| TANK WATER TEMP | AI |
| DHWP-1 HIGH PRESSURE ALARM | BI |
| HWP-1 HIGH PRESSURE ALARM | BI |
| HWP-2 HIGH PRESSURE ALARM | BI |
| HWP-3 HIGH PRESSURE ALARM | BI |
| HIGH HWS TEMP ALARM | BI |
| HIGH TANK WATER TEMP ALARM | BI |
| | |
| | |
| | |
| | |

**LEGEND**

| | |
|---|---|
| | LOCAL DEVICE |
| | ELECTRIC SIGNAL |
| | AIR VENT |
| | UNION |
| | PRESSURE RELIEF VALVE |
| | CHECK VALVE |
| | GATE ISOLATION VALVE |
| | BUTTERFLY ISOLATION VALVE |
| | BALL ISOLATION VALVE |
| | 2-WAY, 3-WAY MODULATING CONTROL VALVE |
| | CIRCUIT SETTER |
| | STRAINER |
| AI | ANALOG INPUT |
| AO | ANALOG OUTPUT |
| BI | BINARY INPUT |
| BO | BINARY OUTPUT |
| DD | DUCT MOUNTED SMOKE DETECTOR |
| EMCS | ENERGY MANAGEMENT CONTROL SYSTEM |
| FACP | FIRE ALARM CONTROL PANEL |
| FI | FLOW INDICATOR |
| FS | FLOW STATION |
| HS | HAND SWITCH |
| I | INTERLOCK |
| MOD | DAMPER - MODULATING |
| MT | MOISTURE TRANSMITTER |
| NC | NORMALLY CLOSED |
| NO | NORMALLY OPEN |
| PI | PRESSURE INDICATOR GAGE |
| PS | PRESSURE SENSOR |
| PSH | PRESSURE SENSOR HIGH |
| PT | PRESSURE TRANSMITTER |
| PT/P | PETES PLUG |
| SD | COMBINATION FIRE/SMOKE DAMPER |
| TC | TEMPERATURE CONTROLLER |
| TI | TEMPERATURE INDICATOR THERMOMETER |
| TS | TEMPERATURE SENSOR |
| TSH | TEMPERATURE SENSOR HIGH |
| TT | TEMPERATURE TRANSMITTER |
| VFD | VARIABLE FREQUENCY DRIVE |
| VT | VELOCITY TRANSMITTER |

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Sheet Title: Mechanical Controls

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Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8/31/07 ARIZONA U.S.A.

BLM Project #AENV.083

Architect's Job # 02.07.C

Date: 8/31/07

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ENVIRONMENTAL DESIGN CONDITIONS:

RED ROCK CANYON VISITOR CENTER ADMINISTRATION BUILDING
RED ROCK CANYON, NV
APROX. ELEVATION:3800 FT.
OUTDOOR DESIGN TEMPERATURE:
WINTER DRY BULB:17°F
SUMMER DRY BULB: 100°F
SUMMER WET BULB: 63°F
BUILDING OCCUPANCY:

THE EMCS SHALL DETERMINE OCCUPANCY WHEN USER PLACES SYSTEM INTO EITHER MANUAL, OR TIME-OF-DAY SCHEDULING.

MANUAL: THE USER MAY SELECT OCCUPIED/UNOCCUPIED MODE

TIME-OF-DAY SCHEDULING WITH OPTIMUM START/STOP:
NORMAL OCCUPIED HOURS: 6AM TO 6PM, MON:FRI (ADJ.)
NORMAL UNOCCUPIED HOURS: 6PM TO 6AM MON:FRI, ALL SAT/SUN & HOLIDAYS

ACCEPTABLE INDOOR ENVIRONMENTS:

THE EMCS WILL REFERENCE OCCUPANCY AND SEASONAL TEMPERATURES WHEN CONTROLLING TO THE FOLLOWING ZONE SETPOINTS (ADJUSTABLE):

| OCCUPIED: | SUMMER(TOA>=65F) | WINTER(TOA<65F) |
|---|---|---|
| ADMINISTRATIVE: | 75°F AND 55%RH | 72°F AND 30%RH |
| MEETING SPACE: | 75°F AND 55%RH | 72°F AND 30%RH |
| LOBBY/RECEP: | 75°F AND 55%RH | 72°F AND 30%RH |
| RESTRM/STORAGE: | 80°F AND 55%RH | 60°F AND 30%RH |

| UNOCCUPIED: | SUMMER(TOA>=65F) | WINTER(TOA<65F) |
|---|---|---|
| ADMINISTRATIVE: | 85°F AND 55%RH | 60°F AND 30%RH |
| MEETING SPACE: | 85°F AND 55%RH | 60°F AND 30%RH |
| LOBBY/RECEP: | 85°F AND 55%RH | 60°F AND 30%RH |
| RESTRM./STORAGE: | 85°F AND 55%RH | 60°F AND 30%RH |

REF 157

ENERGY RECOVERY UNIT TEMPERATURE CONTROLS SEQUENCE OF OPERATION

ERU-AD-1 IS A VARIABLE AIR VOLUME DEDICATED OUTDOOR AIR ENERGY RECOVERY UNIT WITH THE FOLLOWING: FLAT PLATE SENSIBLE ENERGY HEAT EXCHANGER WITH FACE AND BYPASS DAMPER, VARIABLE SPEED DRIVE AND SUPPLY FAN, VARIABLE SPEED DRIVE AND EXHAUST FAN, EVAPORATIVE COOLING SECTION WITH FACE AND BYPASS DAMPER, HOT WATER HEATING COIL, PRE AND FINAL FILTER SECTION, OUTDOOR AND EXHAUST AIR DAMPERS.

WHEN INDEXED TO THE OCCUPIED BY THE EMCS, THE OUTDOOR AIR AND EXHAUST AIR DAMPERS SHALL ADJUST TO PRESET POSITIONS AS SET BY THE BALANCER AND THE UNIT SUPPLY AND EXHAUST FAN SHALL BE ENABLED TO RUN.

OUTSIDE AIR MONITORING – THE EMCS SHALL CONTINUALLY MONITOR OUTSIDE AIR CFM THROUGH AN AIR FLOW STATION MOUNTED IN THE OUTSIDE AIR DUCT.

ERU FAN SPEED CONTROLLER – UNDER NORMAL OPERATING MODE, THE EMCS SHALL CONTINUALLY MONITOR EXHAUST AIR CO2 THROUGH A CO2 SENSOR MOUNTED IN THE EXHAUST AIR DUCT. THE SUPPLY FAN VFD WILL MODULATE TO MAINTAIN CO2 SETPOINT VIA PID CONTROL LOOP. THE RETURN FAN VFD SHALL TRACK THE SUPPLY FAN VFD

AHU DISCHARGE TEMPERATURE CONTROLLER – THE EMCS SHALL CONTINUALLY MONITOR ERU DISCHARGE AIR TEMPERATURE THROUGH A TEMPERATURE SENSOR MOUNTED IN THE SUPPLY AIR DUCT. UPON A CALL FOR HEATING, THE EMCS SHALL ENABLE HWP-1 AND HWP-2. THE ERU HEATING CONTROL VALVE WILL MODULATE TO CONTROL AHU DISCHARGE AIR TEMPERATURE VIA A PID LOOP. UPON A CALL FOR COOLING, THE EMCS SHALL ENABLE THE EVAPORATIVE COOLER PUMP. THE EVAPORATIVE COOLER FACE AND BYPASS DAMPERS SHALL MODULATE TO MAINTAIN DISCHARGE AIR TEMPERATURE SETPOINT.

DISCHARGE AIR TEMPERATURE – THE ERU DISCHARGE TEMPERATURE SETPOINTS ARE 75F-COOLING, 65-HEATING (ADJ.) AS SET FORTH BY THE DUCTLESS SPLIT HEATPUMP SYSTEM MODE.

ECONOMIZER MODE OVERIDE: IF THE DUCTLESS SPLIT HEAT PUMP SYSTEM IS IN COOLING MODE AND THE OUTDOOR AIR TEMPERATURE IS LESS THAN 75(ADJ.), THE ERU WILL BE OVERIDEN TO ADJUST TO ECONOMIZER MODE. THE SUPPLY AND EXHAUST FANS SHALL ADJUST TO DESIGN AIRFLOW, THE HEAT EXCHANGER FACE DAMPER CLOSES AND BYPASS DAMPER OPENS, AND THE ERU DISCHARGE AIR TEMPERATURE SHALL BE RESET DOWN TO OUTSIDE AIR TEMPERATURE, MINIMUM 50F. THIS RESET ROUTINE SHALL REMAIN ACTIVATED UNTIL THE DUCTLESS SPLIT HEAT PUMP SYSTEM CHANGES OVER TO HEATING MODE.

HUMIDITY CONTROLLER – THE EMCS SHALL CONTINUALLY MONITOR BUILDING HUMIDITY THROUGH A MOISTURE SENSOR IN THE COMMON RETURN AIR DUCT. IF RETURN AIR HUMIDITY IS BELOW LOW HUMIDITY SETPOINT 30%RH (ADJ), THE EVAPORATIVE COOLING PUMP IS ENABLED, THE SECTION FACE AND BYPASS DAMPER WILL MODULATE TO MAINTAIN RETURN AIR HUMIDITY SETPOINT VIA A PID CONTROL LOOP. IN COOLING MODE, IF RETURN AIR HUMIDITY IS ABOVE HIGH HUMIDITY SETPOINT (55%RH ADJ), THE EVAPORATIVE COOLING SECTION IS DISABLED

UNOCCUPIED MODE – WHEN INDEXED TO THE UNOCCUPIED MODE BY THE EMCS, THE ERU OUTDOOR AIR DAMPER SHALL CLOSE AND THE ERU FANS SHALL STOP.

ALARMS – THE EMCS SHALL GENERATE ALARMS IN THE EVENT OF THE FOLLOWING: (1) DIRTY FILTER, (2) FAN FAILURE, (3) HIGH DUCT STATIC PRESSURE, (4) LOW HUMIDITY LEVEL (5) HIGH HUMIDITY LEVEL (6) LOW SUPPLY AIR TEMPERATURE (7) RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON,

UPON AN ENABLING OF A DUCT MOUNTED SMOKE DETECTOR INTERLOCKED THROUGH THE FIRE ALARM SYSTEM, OR A HIGH DUCT STATIC PRESSURE ALARM, THE ERU FANS SHALL BE STOPPED, AND ALL ACTUATORS SHALL RETURN TO NORMAL POSITIONS.

A FILTER DIFFERENTIAL PRESSURE SWITCH SHALL BE PROVIDED FOR MONITORING PURPOSES OF THE FILTERS.

AN ALARM SHALL BE REPORTED IF THE MIXED AIR TEMPERATURE DROPS BELOW 45 DEGREES (ADJ).

THE BMS SHALL MEASURE STATIC PRESSURE AT THE FAN. A HIGH DUCT STATIC PRESSURE ALARM SETPOINT SHALL BE VERIFIED AND SET AFTER STARTUP.

ACTUATOR CONFIGURATIONS:

2-POSITION OUTDOOR AIR DAMPER – NORMALLY OPEN
MODULATING HTXR FACE AND BYPASS AIR DAMPER – NORMALLY CLOSED TO BYPASS
MODULATING EVAP COOLER FACE AND BYPASS AIR DAMPER – NORMALLY CLOSED TO EVAP COOLER
3-WAY HOT WATER TEMPERATURE CONTROL VALVE – NORMALLY CLOSED TO THE COIL

DUCTLESS SPLIT HEAT PUMP SYSTEM

THE DUCTLESS SPLIT HEAT PUMP SYSTEM IS THE ADMIN BUILDING'S PRIMARY SOURCE FOR HEATING AND COOLING. THIS SYSTEM COMPRISES OF MULTIPLE INDOOR FANCOIL UNITS COUPLED TO COMMON OUTDOOR HEATPUMPS. THE COMPLETE SYSTEM IS LARGELY CONTROLED THROUGH STANDALONE ALONE PROPRIETARY CONTROLS AND IS MONITORED THROUGH THE EMCS VIA INTEGRATION THROUGH BACNET INTERFACE.

REF 170

REF 157

SOLAR HOT WATER COLLECTION AND HEATING SYSTEM

AN ARRAY OF EVACUATED TUBE SOLAR HOT WATER COLLECTORS ARE MOUNTED ON A WATER STORAGE TANK BETWEEN THE ADMIN AND ARRIVAL STRUCTURE BUILDINGS. SOLAR HOT WATER IS COLLECTED AND STORED TO PROVIDE AND INDIRECT HEAT SOURCE FOR 1) VISITOR ARRIVAL BUILDING ERU-1 HEATING COIL 2) ADMIN BUILDING ERU-1 HEATING COIL AND 3) DOMESTIC HOT WATER LOADS AT THE ADMIN BUILDING. THE SOLAR COLLECTOR ARRAY, DUAL COIL STORAGE TANK, PUMP, AND AND ASSOCIATED ANCILLARY COMPONENTS INCLUDING SOLAR SYSYEM CONTROLLER MAKEUP A PACKAGED SYSTEM. SYSTEM CONTROL IS STANDALONE. SOLAR/HOT/DOMESTIC HOT WATER IS AVAILABLE YEAR ROUND

AN ELECTRIC RESISTANCE BOILER PROVIDES SUPPLEMENTAL DIRECT HEATING AND INDIRECT DOMESTIC WATER HEATING WHEN THE SOLAR COLLECTION SYSTEM CANNOT MEET DEMAND. THE HOT AND DOMESTIC HOT WATER LOOPS ARE CONTROLLED THROUGH THE EMCS.

UPON A CALL FOR HEATING BY EITHER ERU UNIT, THE THE HOT WATER PUMP HWP-1 SHALL RUN UNTIL HEATING IS NO LONGER REQUIRED.

UPON A CALL OF LOW TANK TEMPERATURE (110 F ADJ), THE HOT WATER PUMP SHALL RUN AND THE BOILER SHALL BE ENABLED UPON PROOF OF FLOW. THE BOILER AND PUMP SHALL CYCLE TO MAINTAIN TANK MINIMUM SETPOINT TEMPERATURE (120 F ADJ.)

THE EMCS SHALL ADDITIONALLY MONITOR SOLAR HOT WATER SUPPLY AND RETURN TEMPERATURE.

HOT WATER SYSTEM ALARMS SHALL BE PROVIDED FOR 1) PUMP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF, 2) RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON, 3) A CONDITION OF HIGH PUMP PRESSURE (SETPOINT VERIFIED AND SET AFTER STARTUP), 4) A CONDITION OF HIGH SUPPLY WATER TEMPERATURE, 5) A CONDITION OF HIGH TANK TEMPERATURE.

THE EMCS SHALL CONTROL THE DOMESTIC HOT WATER RETURN PUMP OPERATION BASED UPON A TIME-OF-DAY SCHEDULE. WHEN INDEXED TO THE OCCUPIED MODE, THE DOMESTIC HOT WATER PUMP SHALL RUN.

THE EMCS SHALL ADDITIONALLY MONITOR DOMESTIC HOT WATER SUPPLY TEMPERATURE.

DOMESTIC WATER RETURN PUMP ALARMS SHALL BE PROVIDED FOR 1) PUMP FAILURE: COMMANDED ON, BUT THE STATUS IS OFF, 2) RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON, 3) A CONDITION OF HIGH PRESSURE (SETPOINT VERIFIED AND SET AFTER STARTUP).

GENERAL EQUIP MONITORING, CONTROL, AND INTEGRATION:

VARIABLE FREQUENCY DRIVE (VFD) INTERFACE MONITOR –CURRENT VFD STATUS AND OPERATING CONDITIONS SHALL BE MONITORED THROUGH THE VFD COMMUNICATIONS INTERFACE PORT. THE FOLLOWING POINTS SHALL BE MONITORED AND TRENDED THROUGH INTEGRATION AS FOLLOWS: MOTOR SPEED RPM, HERTZ, AMPS, RUNTIME, STATUS, IN FAULT CONDITION, IN BYPASS MODE.

ELECTRIC WALL HEATERS – ELECTRIC HEATERS SHALL BE CONTROLLED BY AN INTEGRAL THERMOSTAT PROVIDED BY THE UNIT MANUFACTURER. NO WORK SHALL BE REQUIRED BY THE BMS CONTRACTOR.

POWER SYSTEM MONITORING: THE EMCS SHALL MONITOR kW, kWh, MAIN CIRCUIT BREAKER STATUS, AND RUN TIME HOURS AT MAIN SERVICE(S) FOR EACH BUILDING.

PV ARRAY MONITORING: THE EMCS SHALL MONITOR PHOTOVOLTAIC ARRAY kW, kWh, AND RUNTIME HOURS AT THE SYSTEM INVERTERS.

FIRE ALARM MONITORING: THE EMCS SHALL MONITOR FIRE ALARM STATUS.

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Sheet Title: Mechanical Controls Sequence of Operation

Checked by: HWJ

Revisions:

| # | Description | Date |
|---|---|---|
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Registered Professional Engineer (Mechanical) CERTIFICATE NO. 26010 HENRY WEBB JOHNSTONE Date Signed 8/31/07 ARIZONA U.S.A.

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