

2023 HARDROCK ABANDONED MINE LANDS RECLAMATION AWARD PROGRAM

NOMINATION CATEGORY
PHYSICAL SAFETY HAZARDS

NOMINATION CATEGORY
VC GRAND PRIX
VIRGINIA CITY, NEVADA

SUBMITTED BY

ROBERT GHIGLIERI, DEPUTY ADMINISTRATOR

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PARTNER ORGANIZATIONS & CONTRIBUTORS

NEVADA DIVISION OF MINERALS

NEVADA DEPARTMENT OF WILDLIFE

NEVADA DEPARTMENT OF TRANSPORTATION

STATE HISTORIC PRESERVATION OFFICE

CARSON CITY

BUREAU OF LAND MANAGEMENT, STATE OFFICE

BUREAU OF LAND MANAGEMENT, SIERRA FRONT OFFICE

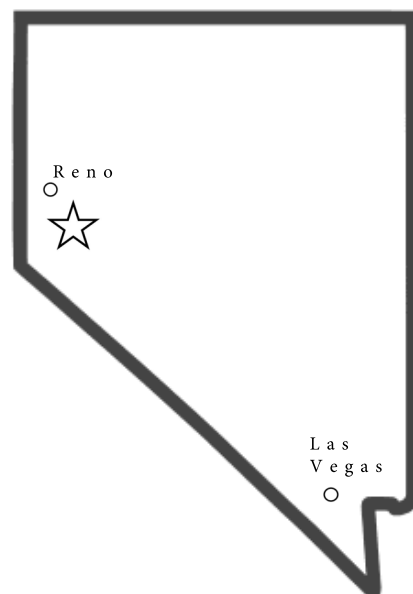
BUREAU OF LAND MANAGEMENT, MEDFORD OREGON

ENVIRONMENTAL PROTECTION SERVICES

PROJECT START TO COMPLETION

FEBRUARY 01, 2022 - JUNE 30, 2022

TOTAL COST: \$738,760

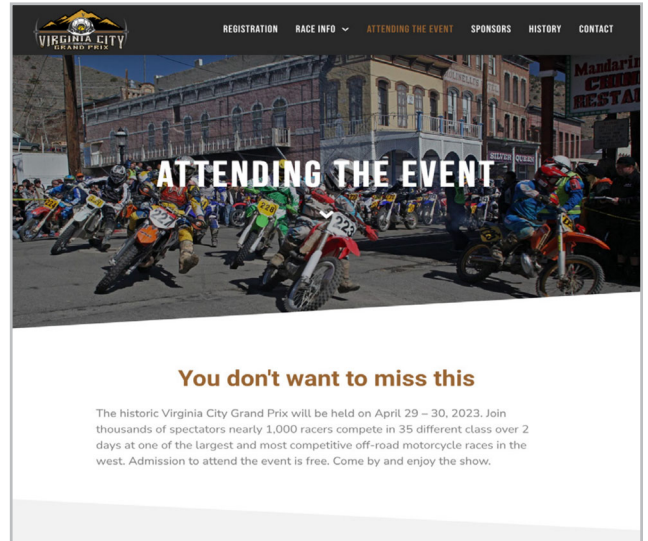
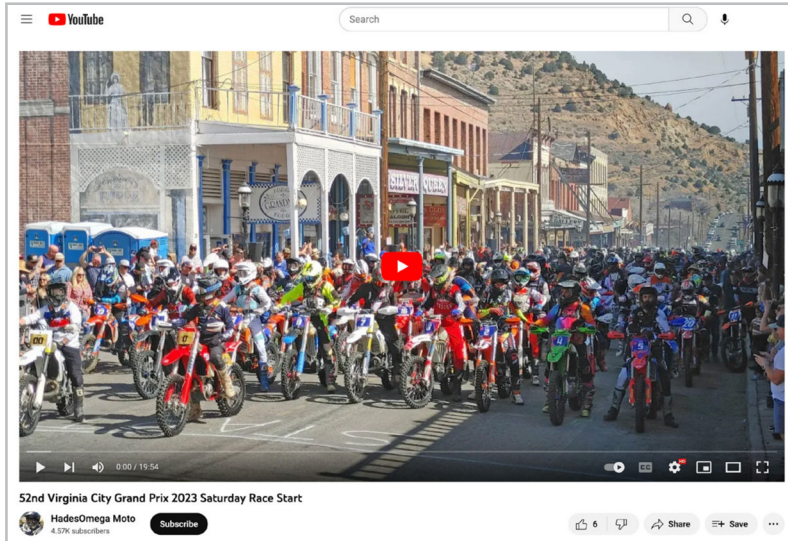


DATE SUBMITTED
JUNE 16, 2023

PROJECT SUMMARY

THE EVENT THAT STARTED IT ALL

Every spring, Virginia City, Nevada hosts a dirt bike race called the “Virginia City Grand Prix,” which attracts hundreds of off-road motorcycle enthusiasts from around the world. Virginia City receives thousands of visitors and racers riding their dirt bikes over hundreds of miles of trails surrounding the historic town. In 2017, the Nevada Division of Minerals (the Division) initiated an AML closure project to address 24 dangerous abandoned mine hazards that were found to be within a 100-foot buffer of a designated race route.



Virginia City Grand Prix 2023 event race start as captured by HadesOmega Moto via YouTube. <https://www.youtube.com/watch?v=Ik9GNClksoc>

Virginia City Grand Prix official website <https://vcgp.com/>

5 YEARS OF PLANNING + \$738,760 = THE LARGEST KNOWN WILDLIFE-COMPATIBLE CUPOLA

After five years of planning and coordination with State, Federal, City, and Local partners, the project was completed in July 2023. All 24 AML hazards were closed with a total project cost of \$738,760.

This project resulted in the creation of the largest known wildlife-compatible cupola, which was constructed over the historic Forman Shaft resulting in less than 120 square feet of surface disturbance. The Division partnered with a greater number of agencies than on any other project in its history and demonstrated the successful completion of a large-scale AML closure project within a National Historic Landmark.



Front view of cupola gate under construction by EPS.



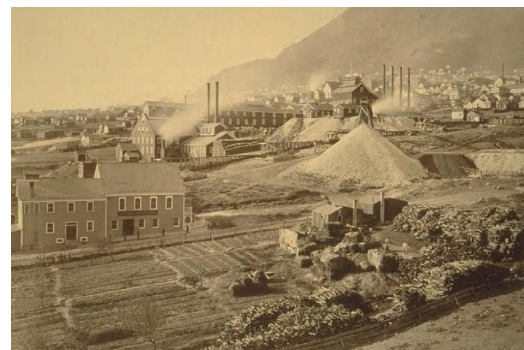
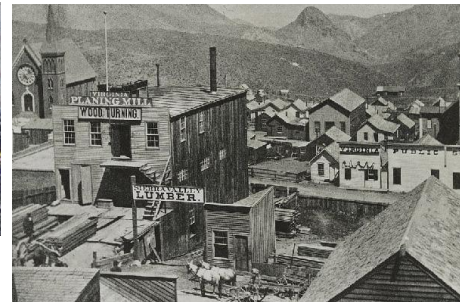
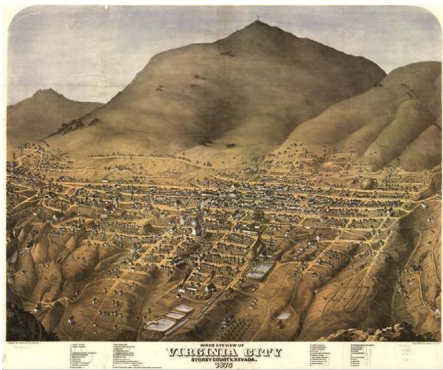
Aerial view of (the largest known) completed wildlife-compatible cupola.

VIRGINIA CITY HISTORY

The history of Virginia City, and to some extent the modern history of Nevada, started in 1849 when prospector Abner Blackburn discovered gold near present town Dayton while on a return trip from California gold mines. The discovery was not rich enough to cause excitement, but he did tell others in his Mormon company about the discovery. This led to other prospectors to start working the gravels in Gold Canyon and a small mining camp was established. It took nearly 10 years for the prospectors to work the few miles up the canyon, and on January 29th, 1859, James Fenimore, familiarly known as "Old Virginia" and who afterwards named Virginia City, together with several others discovered the placer gold source and hence discovered the Comstock Lode.

THE COMSTOCK LODGE

The discovery of The Comstock Lode changed mining in the west instantly. The majority of the gold fields of California were starting to dry up or were completely claimed leaving very little opportunity for prospectors to find new grounds. The Comstock Lode offered new opportunities and quickly other deposits were found throughout Nevada and the West. Mining quickly became the key industry for Nevada, and it continues to be a top industry today. The Comstock Lode stretched from Virginia City to Silver Hill. The discovery was unusual not only for the large presence of silver as well as gold, but also for the spectacular amount of wealth it generated. The Comstock Lode is arguably one of the richest silver deposits in the United States with almost seven million tons of ore extracted and milled between 1860 and 1880. Nearly \$6 billion in today's money was produced from the mines found on the Comstock, with the average price of gold and silver being less than \$19 and \$2 respectively. Also, many new mining technologies were invented and eventually became standards across the world.



Historic imagery depicting Virginia City Mining and development mixed with Native American culture and dwellings. National Parks listing: <https://www.nps.gov/places/virginia-city-historic-district.htm>

WEALTH GROWN POPULATIONS

The immense wealth played a large role in the growth of Nevada as well as the city of San Francisco, California, whose residents' investments in the Comstock mines through the Bank of California and the San Francisco Stock and Exchange Board helped fuel rapid growth in the San Francisco Bay area. Unlike the small Western mining settlements that sprang up during California's Gold Rush in the 1850s, the Comstock District was an urbanized, industrial setting. In 1859 the population of Virginia City was only a few dozen and by 1862 it was 4,000. By 1874 the number had risen to 25,000. In the 1870s, Virginia City was one of the most important cities between Chicago and the West Coast. At its peak, the Virginia City area had 25 theaters, multiple large hotels, several fire companies, fraternal organizations, five police precincts, a red-light district, multiple newspapers, and over 100 saloons. Virginia City also had the first Miner's Union in the U.S. Development stretched in an unbroken line from Virginia City, through Gold Hill, to Silver City four miles to the south.

WORLDWIDE INFLUENCE

The Comstock Mining District left an indelible imprint on U.S. history and established approaches to mining technology, corporate investment, and community growth that were imitated internationally well into the middle of the 20th century. Due to the historical importance of Virginia City, it was recognized as a National Historic Landmark in 1961 and then listed in the National Register of Historic Places. I could take up this entire submittal on the history of Virginia City but to save everyone's time reading this proposal, I highly recommend the latest book on Virginia City, *The Bonanza King*, by Gregory Crouch.

ABANDONED MINE INCIDENTS ON THE COMSTOCK

According to Gregory Crouch's research on Virginia City, AML incidents started within 2 years of the discovery of the Comstock Lode. Below are a few historic news articles clips he found while researching *The Bonanza King*.

2/22/1861 Red Bluff Independent: KILLED. —A dispatch from Virginia City says that a man named Kelly, who left Gold Mill on horseback, during a storm on Monday last, was found on Thursday, together with his horse, in a Shaft one hundred feet deep, about a mile from town —.

7/17/1862 Daily Alta California: The Virginia City Enterprise says Washoe has her mantraps, as well as San Francisco — namely, abandoned shafts. About a year ago, a man was accidentally discovered and rescued from an old shaft, after having been in it three days. A horse and its rider were found, in another last fall. A number of lost men have been tracked to Washoe where all traces of them have disappeared. May they not lie at the bottom of the abandoned shafts of the country?

11/4/1862 Sacramento Daily Union: A small boy, aged about five years, the son of John Webster, living at Gold Hill whilst engaged in playing with several of his companions fell into a shaft about thirty-five feet deep, containing seven feet of water, and was drowned.

5/18/1864 Marysville Daily Appeal: A boy, eight years of age, son of a Mr. Crook, was killed in Virginia City on Wednesday, by falling into an old shaft forty feet deep.

6/9/1864 Marysville Daily Appeal: Within a week, three men have been killed at Virginia City by falling into mine shafts

5/24/1870 Daily Alta California: The skeleton and wasted remains of a man were found this morning, in an old abandoned shaft near the County Hospital. The remains are supposed to be of a man who left the Occidental Mine a year ago, and was never heard of afterward. The skeleton was partially in an upright position when found, and it is supposed that he was not killed by the fall, but died from exposure and starvation.

Recent incidents: AML incidents did not stop after mining ceased in Virginia City and recent fatalities incidents have happened with three in 1996, one in 2002, 2007, 2008, and 2011 respectively. Closure work in Virginia City has been difficult do to the intertwining private patented mining claims and Federal lands, amount of unsolicited securings with little or no detail of what work was done, and the fact of the entire district being within a 14,000 acre National Historic Landmark with a local historical society that in the past, preferred to keep the AML hazards open rather than to close and "destroy" the history of the area.

PROJECT DEVELOPMENT

In 2017, the Division initiated the project and started coordination with the Bureau of Land Management (BLM) State Office and Sierra Front field office. Each year the Virginia City Grand Prix race route changes and they use multiple approved routes to “re-draw” that year’s race route. The project scope was solidified when a shapefile was used to identify all AML hazards within a 100-foot buffer of all designated routes. Due to the Division’s funding source, the project was only going to focus on AML hazards on BLM lands. In total nearly 50 hazards were identified within 100 feet of the race route, but it took several surveys to pinpoint the physical locations and a cadastral survey to identify 100-year-old survey boundaries to finalize the 24 hazards on BLM lands.

WILDLIFE, ENVIRONMENTAL & CULTURAL CONSIDERATIONS OF THE HISTORIC LANDMARK

The Division partnered with the Nevada Department of Wildlife to complete all wildlife surveys and the BLM for the cultural and botany surveys. The cultural work was completed by the Medford BLM Abandoned Mine Lands Unit (Medford). The BLM Sierra Front Field Office started the NEPA process but was unsure if the project would fall under an Environmental Assessment (EA) or Categorical Exclusions (CX) due to the size of a few AML hazards, their historical impacts, and that the entire project was within a National Historic Landmark. Three of the proposed hazards were directly related to or intersected with the Sutro Tunnel, a key operation in the history of Virginia City. Before cultural recommendations would be made, the district archeologist wanted the final closure methods and designs to best determine what adverse effects would need to be mitigated and consultation with the Nevada State Historic Preservation Office (SHPO). Close collaboration between the contractor, Division, and BLM would be key to reduce all adverse effects to cultural resources.

AN INNOVATIVE APPROACH TO CULTURAL AND HISTORICAL PRESERVATION

Wildlife recommendations had been made which helped guide the Division on potential closure methods but knew that working directly with the Medford crew would be key on identifying potential impacts and designing the closure methods to reduce or remove any impacts. After the initial field visits, the Division and its contractor, Environmental Protection Services (EPS) held multiple meetings with Medford, the District Archeologist, and even had a field visit to the Forman Shaft with SHPO to design and engineer closures to minimize the cultural impacts. Innovative closure designs were developed to minimize surface disturbance and the use of off-site fill material at multiple locations was implemented to have nearly no surface impact. This cultural work eventually resulted in a 263-page report which outlined the history of the area and demonstrated that the Division would be able to complete the project with no adverse effects to cultural resources. This report was reviewed and approved by the Nevada State Historic Preservation Office.

HISTORY AND DETAILS OF THE SUTRO TUNNEL AND THE FORMAN SHAFT

THE 4 MILE LONG SUTRO TUNNEL

The Sutro Tunnel Company championed by Adolf Sutro was a long haulage tunnel, projected to drain the water from the deeper workings of the Comstock while providing an economical means to transport men, equipment, and ore, was one of the most publicized engineering achievements in the western United States during the 19th Century.

Construction of the four-mile long Sutro tunnel did not commence until October 19, 1869. The sinking of four ventilation shafts, spaced approximately one mile apart, began shortly after. Two AML features outlined in this project were Shaft No. 1 and No. 3. By July of 1872, Shaft No.1 had been sunk to a depth of 305 feet. Shaft No.3 was 13,545 feet from the mouth of the Sutro Tunnel and was projected to be 1,041 feet deep where it intersected the tunnel. In early 1877, Shaft No.3 flooded, and no further work was mentioned.

By August of 1878, eight years after actual work commenced, the Sutro Tunnel connected underground with the workings of the Savage Mine on the east side of Virginia City. At this point, the tunnel measured 20,170 feet in length. The Sutro Tunnel then lateraled both north and south to follow the strike line of the Comstock Lode where it intersected the Forman Shaft which is included in the project list.

Newspapers reported that the Sutro Tunnel, which at the time was one of the longest tunnels in the world, had resulted in “but five or six deaths by accident” in the time it took to complete. This was a respectable accomplishment considering the mines of the Comstock averaged one death per week. Unfortunately for Sutro by the time the tunnel was completed, the bonanza period was over and there was little high-grade ore left to haul. While some lower grade moved through the Sutro Tunnel into the 20th Century, historians collectively view the Sutro Tunnel as a marvel of 19th century engineering, while simultaneously acknowledging it as a financial failure.

THE FORMAN SHAFT

The Forman Shaft, or Forman’s folly as it was locally known was a joint venture of the Caledonia, Overman, Belcher, Segregated Belcher, and Crown Point mining companies. As originally projected, a five-compartment shaft proposed to open new orebodies at a depth of up to 4,250 feet below the surface. The main hoisting building, a massive, seven-story, classic revival structure, measured 173 feet long by 52 feet wide and 100 feet tall making it the second tallest building in the west behind the International Hotel in Virginia City. This shaft was part of the third-line shafts that were dug to intersect the Comstock ledge at depth. Funded on investor dollars, these third-line shafts were some of the deepest shafts on the Comstock. Most third-line shafts were started between 1875 and 1876 during the height of the bonanza and abandoned by the mid-1880’s. The Forman Shaft intersected the Sutro Tunnel South Lateral at a depth of ~1,650 feet then continued for about 550 feet more for a total depth of 2,200 feet without intersecting an ounce of ore before work ceased in December of 1884. A fire in 1903 burned the 100 foot tall hoist house and surrounding buildings, probably leading to the demise of the shaft and its eventual collapse. Today the shaft is 165 feet deep, but no one knows how the shaft was bridged and what’s below the initial 165 foot bridge.

SAFEGUARDS

Construction of safeguards began in March of 2022 and was complete by early July at a total project cost of \$738,760. All 24 hard closures were completed on time and on budget. This project resulted in the creation of the largest known wildlife-compatible cupola, which was used over the historic Forman Shaft and resulted in less than 120 square feet of surface disturbance.

The Division partnered with a greater number of agencies than on any other project in its history and demonstrated the successful completion of a large-scale AML closure project within a National Historic Landmark.

KEY POINTS WITHIN THE PROJECT

Sutro Tunnel History and Hazards

- Bad land status
- Revealed by cadastral survey
- Huge mining history implications
- Historical native artifacts found

Needed SHPO approval

- No adverse affect

BLM anticipated the need for EA

- Resulted in CX

Methane discovered in one hazard

- Resulting in emergency closure

Forman Shaft

- Size would include, to date, the largest closure in Nevada
- Complexity detailed in presentation of in-depth information and history
- Largest Cupola in US (arguably) with a footprint of less than 120 sqft
- Multiple on and off-site discussions to address difficulties in construction

Hwy road closures

- Off-site materials
- Brought in to minimize impacts to surrounding areas

CULTURAL ASPECTS WORTH NOTING

A few hazards were discovered to have prehistoric artifacts found within the APE, demonstrating the use of the area by Paiutes long before western expansion, requiring multiple visits between the cultural team, contractors, and agency to develop closure methods that would have zero impact to the prehistoric artifacts.

DO NOT DISTURB

Due to many of the mine dumps being considered as contributing historic features, they were not allowed to be disturbed, requiring the use of off-site fill materials. NDOT helped with the highway closure and Carson City provided off-site fill materials at no charge. Over 100 25-mile round trips took place to bring off-site materials.

ADJUST COURSE AND RESUME

One of the two Suro Air-Shafts access was on a road with the intact 1870's hand laid rock retaining wall, requiring a change in equipment to safely access the site while preserving the road.

COLLABORATING AGENCIES AND CONTRACTORS

The VC Grand Prix Hard Closure project was a joint effort including Storey County Sheriff's Department, Nevada Department of Transportation (NDOT), Carson City Municipality, the Bureau of Land Management (BLM), Nevada Department of Wildlife (NDOW), and the Nevada Division of Minerals (NDOM). Environmental Protection Services (EPS) of Carson City and Robison Engineering of Reno designed and installed wildlife compatible and culturally sensitive closure measures. BLM and NDOW were key partners in satisfying NEPA requirements in receiving the categorical exclusion and the overall State Historical Preservation Office approval necessary to complete the project. NDOT, Carson City, and Storey County Sheriff's office provided material support and road closure measures for sites approved for backfill along section of state roads in the project area.

SURVEYING, REPORTING, PLANNING

BLM's Medford Archeological Team led by Duane Ericson completed an in-depth archeological survey including a comprehensive report including closure recommendation. Survey work including lidar mapping at several features which proved to be vital in generating estimates for needed closures material, but also gave project managers a clearer understanding of historical infrastructure present at the 19 century mine site. The Medford Team also developed a detailed narrative on the cultural history of the project area and provided new understanding of Virginia City's Bonanza era. Carson City District BLM completed biological survey work for the project area. NDOW completed all wildlife site surveys and provided recommendations. Both agencies contributed to the decision to establish expansive wildlife compatible and culturally sensitive closure methods. NDOT and Carson City worked with project managers to access and source fill material from material sites in the Carson City area providing over 500 cubic yards of fill for site approved for backfill. Medford BLM continues to work with NDOM for installation of a three panel informational kiosk at the projects principal closure, the Foreman Shaft.

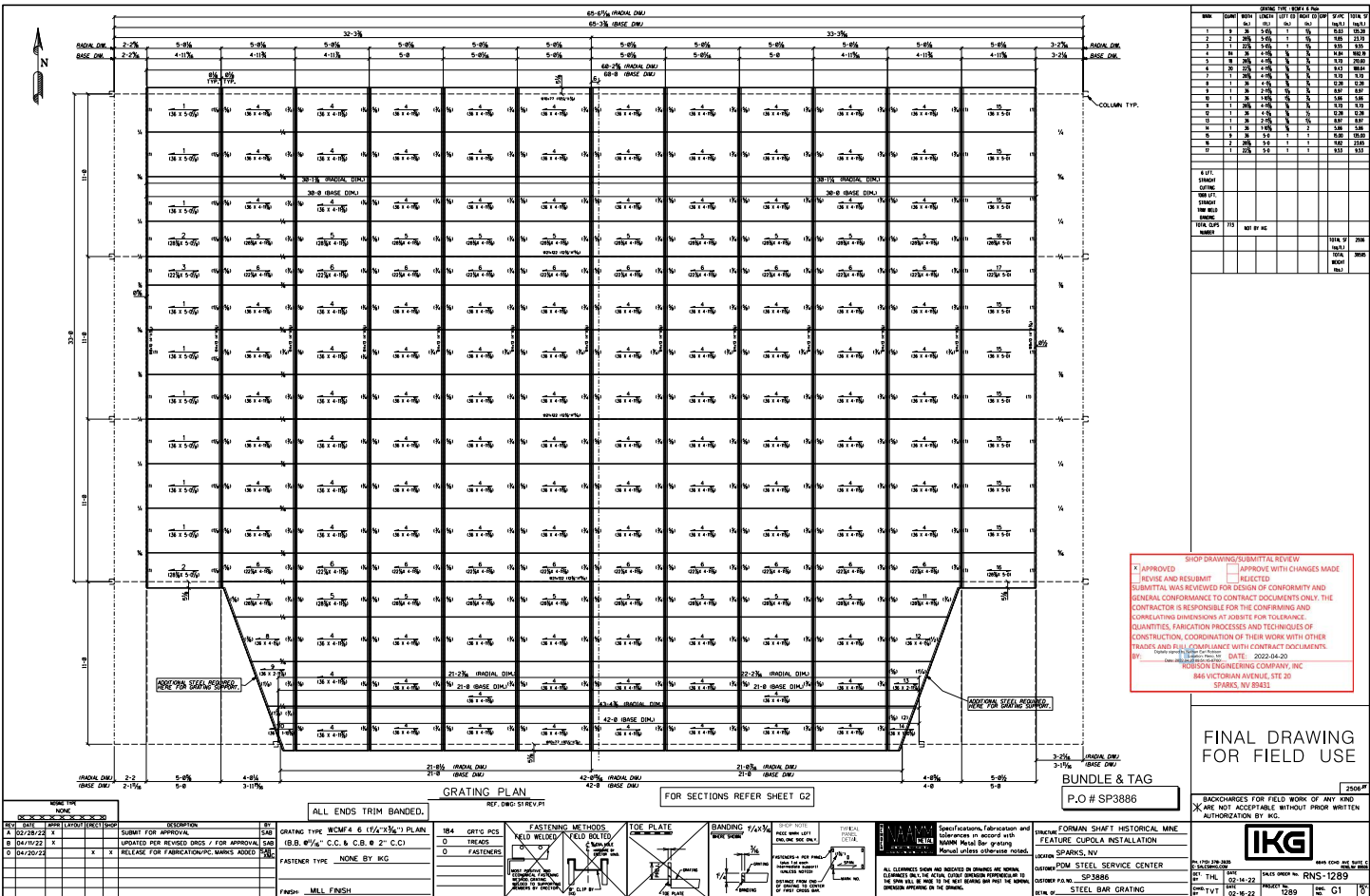
INNOVATIVE DESIGN AND BUILD, SAFELY, AND IN COMPLIANCE

EPS and Robison Engineering worked together on design and build out in compliance with NEPA and SHIPO recommendation for culturally sensitive sites. Specialized design was required to avoid damaging historical foundations and to allow suitable flyways for bat habitation. Many features required grate or cupola construction over voids up to 800ft in depth. EPS and Robison's collaboration was a feat not only of design and planning but also included constant personal safety management, led from start to finish, by Brian Breiter of EPS.

CULTURAL COMPLIANCE NEVER LOOKED THIS GOOD

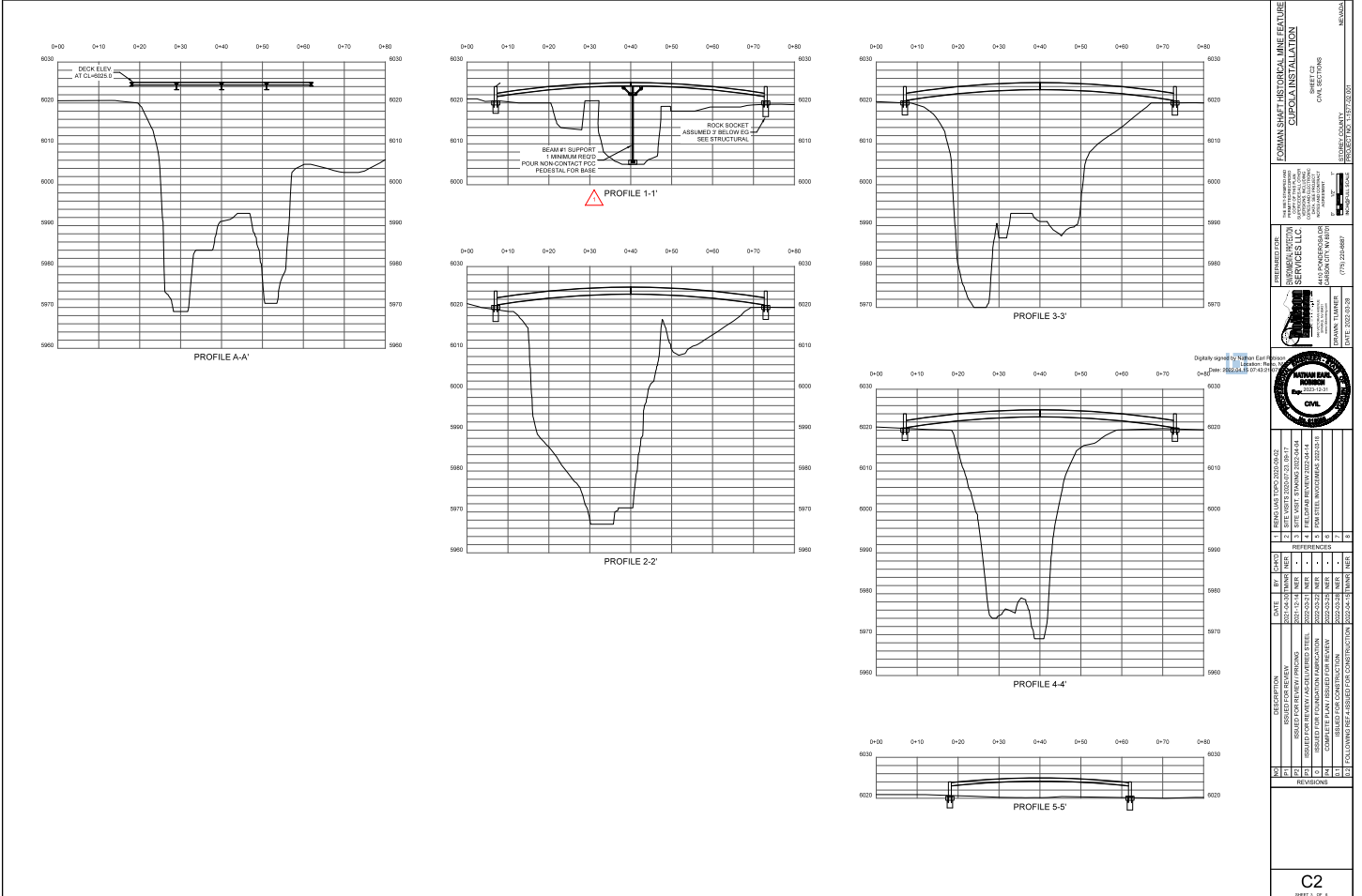


East side of the Virginia City Forman Shaft Cupola. The largest known wildlife-compatible cupola in the United States to date. A work of art in its own right.



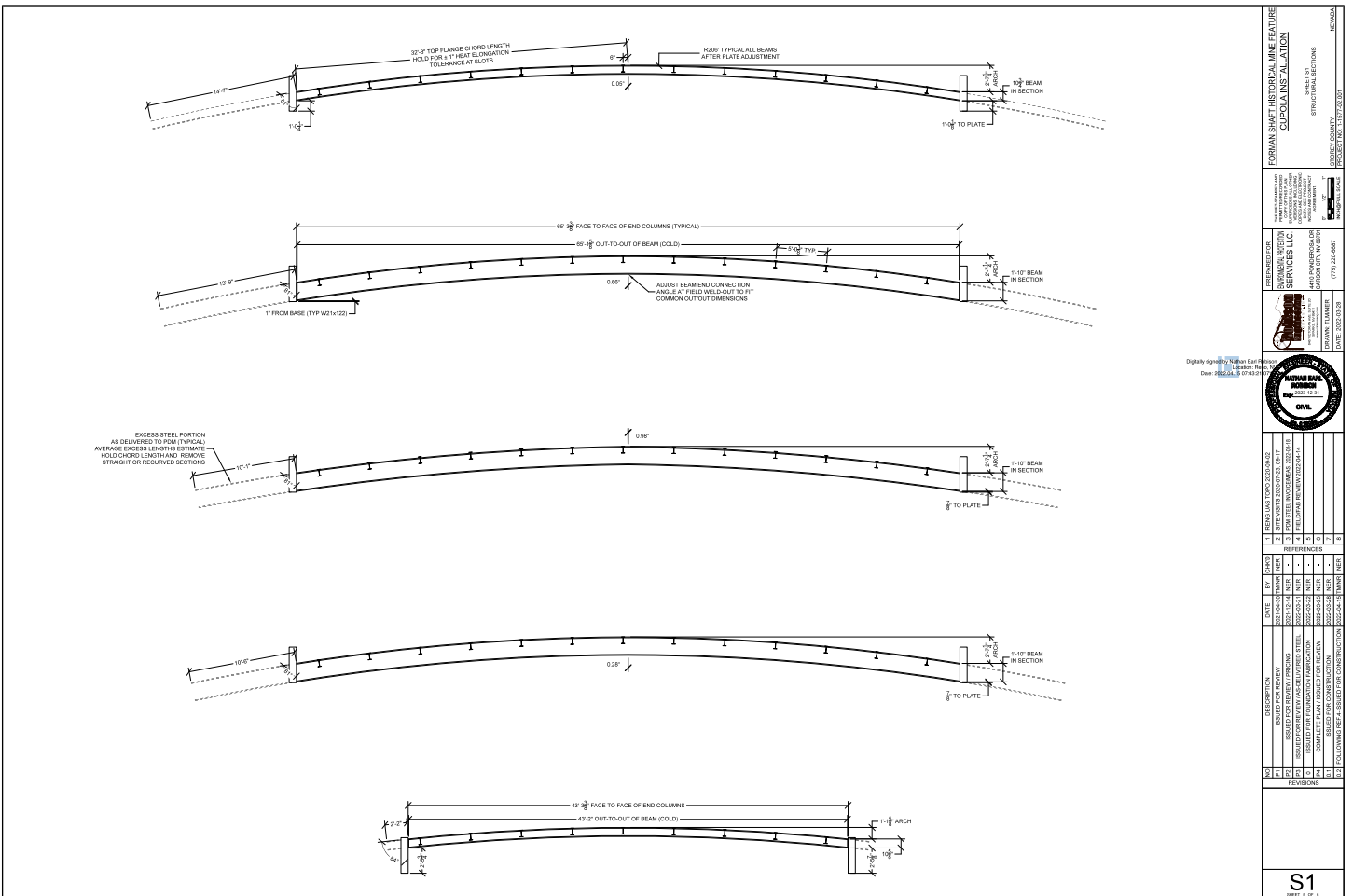


Construction of cupola support and wildlife gate.





Cupola arch, surface and rail construction.



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DATE: 2022-03-02

PROJECT: 2022-03-02

Drawn by: N. B. East
 Checked by: N. B. East
 Date: 2022-03-02

DATE: 2022-03-02

NO.	DESCRIPTION	DATE	BY
1	ISSUED FOR REVIEW	2022-03-02	NBE
2	ISSUED FOR PERMIT APPLICATION	2022-03-02	NBE
3	ISSUED FOR PERMIT APPLICATION	2022-03-02	NBE
4	COMPLETE PERMIT ISSUED FOR PERMIT	2022-03-02	NBE
5	FOR CONSTRUCTION	2022-03-02	NBE

REVISIONS:

S1



Cupola construction of footings and floor, with all footings dug completely by hand. Use of mechanized equipment was prohibited due to cultural concerns. All footing concrete was tested to ensure 4000 psi break strength. Evidence of epoxy before being inserted in Bedrock.

1 TYPICAL PIER FOOTING DETAIL
SCALE: 1" = 1'-0"

2 COLUMN BASE ATTACHMENT
SCALE: 1" = 1'-0"

3 WIDE FLANGE DIMENSIONS & CONNECTIONS
SCALE: 1" = 1'-0"

4 GUSSET FABRICATION DETAILS
SCALE: 2" = 1'-0"

5 WB10 TO GUSSET DIMENSIONS
SCALE: 1" = 1'-0"

6 BAT SCREEN / NORTH FACE DETAIL
SCALE: 1" = 1'-0"

7 BEAM-COLUMN ATTACHMENT
SCALE: 1" = 1'-0"

8 FOUNDATION PLATE FABRICATION DIMENSIONS
SCALE: 1" = 1'-0"

PERMANENT ANCHERS IN PLACE BEFORE CURING INSTALLATION

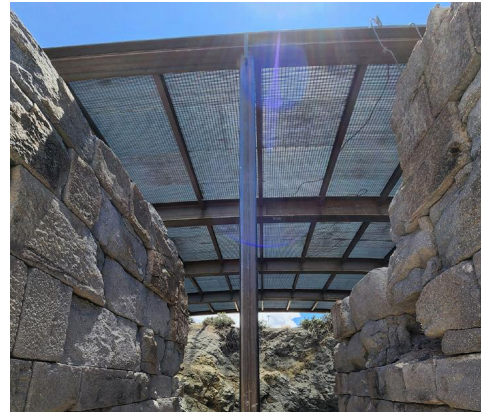
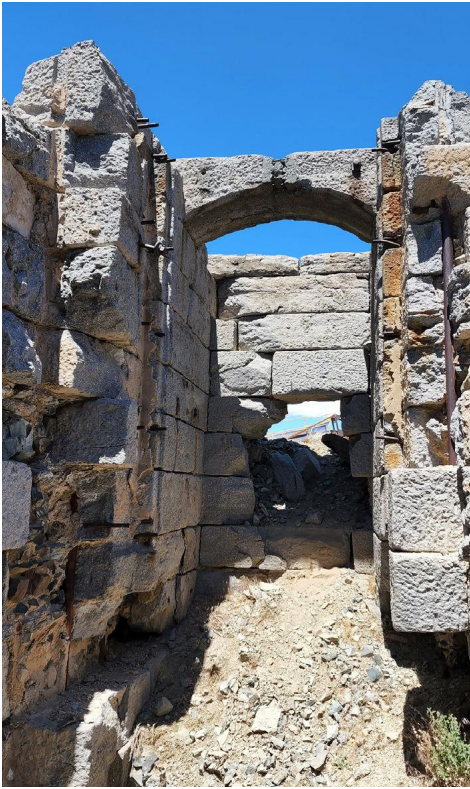
DRAWN BY: T. LAMBERT
CHECKED BY: J. LAMBERT
DATE: 2023-03-20

NO.	DESCRIPTION	DATE	BY	CHK.
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2	REVISION	2023-03-20	JL	TL
3	ISSUED FOR PERMIT	2023-03-20	JL	TL
4	ISSUED FOR CONSTRUCTION	2023-03-20	JL	TL
5	COMPLETE PLAN ISSUED FOR PERMIT	2023-03-20	JL	TL
6	ISSUED FOR CONSTRUCTION	2023-03-20	JL	TL
7	ISSUED FOR CONSTRUCTION	2023-03-20	JL	TL
8	ISSUED FOR CONSTRUCTION	2023-03-20	JL	TL
9	ISSUED FOR CONSTRUCTION	2023-03-20	JL	TL
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11	ISSUED FOR CONSTRUCTION	2023-03-20	JL	TL
12	ISSUED FOR CONSTRUCTION	2023-03-20	JL	TL

SD1
SCALE: 1" = 1'-0"



Off-site construction materials transported to site via air crane with respect to cultural and historical sensitivity.



The arched hand cut historic stone that was the inspiration for the curved beam construction of this closure



Examples of closure methods used to avoid the use of historic waste rock piles. Shaft sealed with polyurethane mine foam to prevent settling. Concrete pumps were used for footing construction to comply with access restrictions.



Bat compatible grate built over Sutro Air Shaft #3 with construction techniques used for cultural avoidance.



Beams span the Forman Shaft, 165 ft. deep during construction.



Incline bat-compatible closure.