



FLAGSTAFF MOUNTAIN RESORT
A PLANNED RESORT COMMUNITY
DEER VALLEY, UTAH

EXHIBITS TO
LARGE SCALE MASTER PLANNED
DEVELOPMENT

VOLUME 1 OF 2



FLAGSTAFF MOUNTAIN RESORT
A PLANNED RESORT COMMUNITY
DEER VALLEY, UTAH

TABLE OF CONTENTS
VOLUME 1 OF 2

- EXHIBIT 1 – MINE SOIL HAZARD MITIGATION PLAN
- EXHIBIT 2 – DESIGN GUIDELINES
- EXHIBIT 3 AND 4 – TRANSIT AND PARKING MANAGEMENT PLANS
- EXHIBIT 5 – OPEN SPACE MANAGEMENT PLAN
- EXHIBIT 6 – HISTORIC PRESERVATION PLAN
- EXHIBIT 7 – EMERGENCY RESPONSE PLAN
- EXHIBIT 8 – TRAILS MASTER PLAN
- EXHIBIT 9 – PRIVATE ROAD ACCESS LIMITATION PROCEDURES
- EXHIBIT 10 – CONSTRUCTION AND DEVELOPMENT PHASING PLAN



FLAGSTAFF MOUNTAIN RESORT
A PLANNED RESORT COMMUNITY
DEER VALLEY, UTAH

MINE SOIL HAZARD MITIGATION PLAN
EXHIBIT 1

MAY 2001
REVISED AND APPROVED DECEMBER 2001

PREPARED FOR:
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**MINE SOIL HAZARD MITIGATION PLAN
FLAGSTAFF MOUNTAIN RESORT**

EXHIBIT 1

Prepared for

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Prepared by

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**JUNE 2002
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TABLE OF CONTENTS

INTRODUCTION AND REPORT SCOPE	1
PREVIOUS INVESTIGATIONS.....	3
TYPES OF WORKINGS	5
Stopes.....	5
Shafts.....	6
Monitor Shaft.....	7
Orient Shaft and HDR Items 36 and 37	7
Last Chance Shaft.....	7
Quinn Shaft	7
Occident Shaft.....	8
Daly Mine No. 2 Shaft.....	8
Highbinder Shaft.....	8
Mazepah Shaft	9
Putman Decline	9
Lucky Bill Shaft.....	9
Flagstaff Shaft.....	10
Star Flats Shaft.....	10
Unknown Shaft (HDR No. 42).....	10
Raises	10
Tunnels and Adits	11
Discovery or Prospect Pits.....	11
MITIGATION.....	12
Recommended Mitigation Procedure	12
FIGURES 1 THROUGH 6.....	14

APPENDIX 1 "Physical Mine Hazards Mitigation Plan"

APPENDIX 2 "Update to the Mine Soil and Physical Mine Hazard Mitigation Plan"

INTRODUCTION AND REPORT SCOPE

This study is one of several reports that have been prepared to support the Flagstaff Mountain Resort's Large Scale Master Plan Development (LSMPD) application. As LSMPDs are programmatic in nature and subject to refinement at subsequent Master Planned Development (MPD) or Conditional Use Permit (CUP) stages, correspondingly, the contents of this report should be viewed as conceptual in nature and subject to change as specific plans are developed. Details developed at the MPD or CUP stage will not require a modification of this plan provided that they comply with the Goals and Objectives of this Plan.

This report was first approved by Park City Municipal Corporation in December of 2001. That edition dealt solely with the Physical Hazards of the mine working and did not address soil contamination issues as not a great deal of information was available at that time. This revision has provided an appended report that deals with the clean up of contaminated soils in the attached Appendix 2 labeled "Update to the Mine Soil and Physical Hazard Mitigation Plan". No other changes have been made to the previous report.

United Park City Mines Company (United Park) is the owner of a 1,600-acre parcel of land (Property) located directly south of Park City, Utah. The Property lies in Empire Canyon between the ski run development of Deer Valley Resort on the east and Park City Mountain Resort to the west. In May of 1999, Park City Municipal Corporation annexed the Flagstaff property into the municipal boundaries of Park City. Proposed for development are over 750 units of varying density types and configurations on approximately 244 acres. This real estate development will be known as the Flagstaff Mountain Resort (Project or Flagstaff Project). Figure 1 shows the relationship between the Project boundaries and the Developable Areas.

The Park City area is well known for its mining history. The northernmost portion of the 244-acre developable area mentioned above is bracketed by two of the more sizeable producers in the area: the Ontario and Daly West mines (see Figure 2). The presence of near-surface mining related features have prompted an investigation into the geotechnical circumstances surrounding these near surface mine related workings. In

1999, United Park commissioned a report that addressed the mine-related hazards appearing at the surface of the ground. This 1999 report identified all of the known mine workings that extend onto the surface of the ground. The scope of this current investigation is to focus on the workings identified in the 1999 study, their presence within 150 feet of the surface and any other workings located within 150 feet of the ground surface that were not the subject of the 1999 study. Any significant mine opening, regardless of the type, is indicated and addressed in this report.

Any of the findings in this report are based on the available information within the engineering files of United Park City Mines Company and field investigations by both independent consultants and United Park personnel. Because the findings of this report are based on information that was collected over 100 years ago, the accuracy of which is not feasible to determine, there may be instances where mine related features exist but none is indicated in the data. These types of features are basically unknowns and appear to consist mostly of small prospect or discovery pits. These are features that were not part of a mine's overall infrastructure development and, therefore, were not located on the maps. They generally are not significant features but should nevertheless be addressed.

A section of this report entitled "Mitigation" has been developed and is the last section of this report. It establishes investigative procedures to follow prior to the development of any parcel in an effort to ascertain the risk posed by a particular mine hazard. It will also outline, in general terms, the geo-technical considerations that must be taken to address the feature prior to construction.

PREVIOUS INVESTIGATIONS

In 1999, United Park contracted with HDR Engineering, Inc. to investigate physical and environmental hazards related to historic mining activities within the Flagstaff Project Boundary. Their study identified 15 physical hazards located within the Developable Area anticipated at the time of their investigation. Within the current Developable Area boundaries, three hazards identified by HDR in 1999 lie outside the boundary and, therefore, have been eliminated from the investigation and an additional four are added as they lie within the current boundary. One hazard (indicated below) was incorrectly located on HDR's mapping. The 1999 HDR report is included here by reference, and the HDR report, *Physical Mine Hazards Mitigation Plan*, prepared in September of 2000, updating the 1999 study is attached hereto as Appendix 1.

Listed below are the hazards identified by HDR and this study that lie within the currently accepted Developable Boundaries:

HDR ID NO.	NAME	DEVELOPMENT POD
32	Orient Shaft	Pod A
36	Unnamed	Pod A
37	Unnamed	Pod A
24	Monitor Shaft	Pod A
39	Unnamed (Occident)	Pod A
20	Last Chance	Pod A
10	Daly No. 2 Shaft	Pod B-1
49	Bedsprings	Pod B-1*
9	Central Tunnel	Pod B-1
18	Highbiner	Pod B-2
None	Mazepah	Pod B-2
33	Putman	None
22	Lucky Bill	None
15	Flagstaff Shaft	None
43	Unnamed (Star)	Pod D
42	Unnamed	Pod D

*It should be noted that number 49 "Bedsprings" is located incorrectly on Figure 1 of HDR's 1999 report. This working is actually located almost directly across Empire Canyon at about the same elevation as noted on their Figure 1. There is not a surface opening at the location of number 49 as indicated on HDR's Figure 1.

The Mazepah shaft and the Quinn Shaft were added to the inventory after HDR's 1999 report. The Lucky Bill and Flagstaff shafts along with the Putman were also added due to a shift in the Developable Area Boundary.

TYPES OF WORKINGS

There are basically six different types of mine workings that are common to mining operations: Stopes, Shafts, Tunnels or Adits, Raises, Included Shafts and Discovery Pits. Any of these types of workings can typically be within 150 feet of the ground surface but not all are found within the Flagstaff Developable Area.

Stopes

Stopes are the physical voids in the bedrock that remain after the ore has been removed. In the Ontario, Daly and Daly West mines, the upper ore bodies were all mineralized veins in the upper Weber Quartzite formation. At depth, these veins were hosted in the Humbug and Doughnut formations. These formations contain horizons that are host rocks for bedded replacement type deposits. This type of deposit is generally lower grade than the vein deposits but contains higher tonnage. As a result, the stopes are generally larger than in the vein-type deposits. Generally, the stopes in the study area are narrow and steep. However, a thickness of over 15 feet is common and in places, stopes up to 30 feet across occur. The steepness of the stope is directly related to the steepness of the vein. In the southeasterly end of Pod A, the vein dips generally less than 50 degrees. In the southwest part of the Project, near the new Empire Day Lodge, the veins are steep, generally over 70 degrees. Stopes are typically backfilled with gob or waste rock from the development work.

There are no stopes that come to the surface within the developable areas. However, based on the available information, it appears that stoping occurs within 150 feet more or less of the surface along the southernmost and uppermost limits of Pod B-1 and near the southwesterly and southeasterly corners of Pod A. The attached Figures 3 and 4 show the relationship of the stoping to the developable areas.

No stoping comes within 150 feet of the ground surface in the area around the Empire Day Lodge, Pod B-2 or Pod D.

Shafts

Shafts are the vertical mine openings that are generally the main entries into the mine. In the Park City Mining District, the big main mine shafts are generally three compartment shafts. Historically, two compartments were used for the transportation of men, ore and materials. Typically, the third compartment was used for utilities such as water, steam and compressed air. The third compartment also had a manway or set of ladders extending down into the shaft.

Many of the main mine shafts are several hundred feet deep. The deepest shaft in the Empire Canyon area is the Daly West Shaft with workings over 2,100 feet from the ground surface at the top of the shaft. The deepest shaft in the Developable Area is the Daly No. 2 Shaft at 1,200 feet below ground surface. Other shafts may have nothing more than a single five foot by five foot compartment no more than a few tens of feet deep. These shafts were most likely exploratory in nature.

There are several shafts within the Developable Area. The main operating shafts for the primary mines are well located. The smaller shafts, which may have been exploration shafts located within mining claims and constructed for the sole purpose of promoting the claims, are less well known. Some of these shafts date back to the earliest days of mining in the Park City area. Many of them were most likely constructed as the Ontario and Daly mines were developing into large-scale silver producers. At that time, the small exploratory or promotional shafts had not been consolidated into the large blocks of mining claims that later represented the main land holdings of the large mining companies.

Based on the available information, all known shafts within the Developable Area and within 150 feet of the ground surface are listed in this study. Also included are brief descriptions of each shaft. Figures 2, 3, 4, 5 and 6 show the locations of the shafts within the Developable Area.

Monitor Shaft

The Monitor Shaft is located in the easterly portion of Pod A. Data indicates that it is 370 feet deep. There are likely workings off of the shaft at 200 and 300 feet. The extent of these workings is not known. However, the available information indicates that there is no stoping from these workings.

The Monitor Shaft is in proximity to proposed construction.

Orient Shaft and HDR Items 36 and 37

The Orient shaft, along with two unnamed shafts noted in HDR's 1999 study as Nos. 36 and 37, are located in the southeastern most end of Pod A. The Orient shaft is believed to be 110 feet deep. There may be a working off of the shaft at the 100-foot level. The Orient shaft and Shafts 36 and 37 are located away from any proposed construction.

Last Chance Shaft

The Last Chance Shaft is located along the old road at the westerly edge of Pod A. This shaft is of unknown depth and construction. The related dump is small and for that reason it is not considered to be more than 50 feet deep.

Quinn Shaft

There is a shaft located along the northwesterly reaches of Pod A on the Quinn Mining Claim. The depth is unknown but based on the size of the mine dump, it appears to be no more than 25 feet deep.

Occident Shaft

There is a notation on the mine maps of a shaft of unknown depth near the Ontario Mine water tank. No mine dump was found in the area and there is not a depression. The mine dump may have been used to create a platform for the water tank construction in 1974. There is a small mine dump very near the southern edge of the water tank. It is difficult to determine if it is associated with the construction of the water tank or perhaps it is the dump from the shaft in question. If it is the dump from the shaft, the shaft is not very deep judging from the dump size.

Daly Mine No. 2 Shaft

This shaft is located in Pod B-1. There is a great deal of information available about this shaft. In August of 1983, the Daly Mine No. 2 Shaft, located between the Ontario and Daly West mines, caved in. Based on the factual and historical information available, the most plausible explanation for this event is that the near surface timbering, particularly that constructed through the glacial moraine, failed allowing the unconsolidated material to fall or cave into the shaft. The rough volume of the shaft is within 14,000 cubic feet of volume of the hole measured at the surface of the shaft near the end of the caving event. The failure of the near surface timbering allowed the alluvial material to cave into the shaft thus filling it. The large hole remaining near the surface of the shaft was then filled in with excavation construction excess from the Silver Lake area of Deer Valley. This shaft has been studied in the past. Attached as Exhibit A is a letter from Doug Hawkes with Applied Geotechnical Engineering Consultants. Mr. Hawkes recently re-evaluated the setback requirements from the Daly No. 2 Shaft.

Highbiner Shaft

This is a small shaft, 60 feet deep. It is not known why this shaft was excavated.

This shaft is located in close proximity to Deer Valley's new Day Lodge. Available mapping puts the shaft within the building footprint on the northerly corner of the building just south of the delivery ramp. However, there is a certain amount of inaccuracy in the mine as the survey technology that existed at the time the mapping was made was crude by today's standards. There can be discrepancies in mapped locations and actual locations as established today using modern techniques.

The best way to locate a mine working is to physically locate it on the ground surface. This was done prior to the construction of the Day Lodge. Whether or not the shaft is actually in the building footprint is not known. Nor are the measures taken by Deer Valley or their contractor to stabilize this shaft prior to construction.

Mazepah Shaft

This shaft is located about 500 feet southeasterly of the Day Lodge. It is within the Developable Area but not in close proximity to any building construction. It is, however, close to proposed road construction. It is a secondary production shaft for the Daly / Daly West mines. It appears to be 300 feet deep with workings off of the shaft on the 300-foot level accessing stopes located southwest of the shaft.

Putman Decline

This is an angular shaft or decline. The depth is not known but it is only one compartment in size. It lies about 800 feet east of the Quincy Mine and below Guardsman Pass Road.

Lucky Bill Shaft

The Lucky Bill Shaft is a very prominent shaft located near the top of the Flagstaff Project. The depth of this shaft is not known. The dump size is

substantial, however. It should be considered to be several hundred feet deep. Material was dozed into the shaft in 1994 or 1995, when the near surface timbering failed causing the shaft to open to ground surface. Enough material was dozed into the shaft to close off the opening but the condition of the shaft is not known. There is no construction proposed within close proximity to this shaft.

Flagstaff Shaft

The Flagstaff Shaft is a very prominent shaft located on the divide between Summit and Wasatch counties. The depth is not known but it is believed to be several hundred feet deep. The shaft was closed in the mid to late 1960s. The closure method and condition of the shaft are not known. There is no residential construction proposed in the immediate location of this shaft.

Star Flats Shaft

This shaft is indicated by the presence of a small mine dump located on the backside of Flagstaff Mountain. It is adjacent to the main access road into Pod D and is within 85 feet of the location of the building pad for a single-family lot. The depth is not known but the dump is small and, therefore, the shaft is most likely not very deep.

Unknown Shaft (HDR No. 42)

Little is known about this shaft. From its surface appearance, it is shallow.

Raises

Raises are small accessways between the levels of the mines. They are used for access into stopes and to transfer ores from one level to another or from the stopes to the main level for haulage to the shaft. Boutwell references the existence of a few raises coming through to the surface from underground mine

workings. However, the data indicates that no raises have come to the surface from underground workings in the Developable Area or within close proximity to the Developable Area.

Tunnels and Adits

Tunnels and Adits are horizontal entries or accessways into mines. Tunnels are generally larger in size and longer in length than adits. Based on the available data, there are no known adits or tunnels having their portals within the Developable Area. However, the Central Tunnel, located in close proximity to the Daly Mine No. 1 Shaft, travels under the Developable Area just south of Pod B-1. The depiction of this tunnel and its relationship to the ground surface is shown on Figure 3.

The Federal and Ontario No. 1 and No. 2 Tunnels also pass under the Developable Area but at depths much greater than 150 feet.

Discovery or Prospect Pits

A Discovery or Prospect Pit is nothing more than a hole or very shallow shaft in the ground. It can be a few to several tens of feet deep.

Theoretically, every mining claim has a discovery point or a place where the initial discovery of mineralization was made. If the discovery was made on the surface, there is usually, but not always, an excavation of some kind associated with it. If the discovery was made in the underground workings, there would not necessarily be an associated excavation. These types of features almost always appear as holes in the ground with elevated mounds of dirt completely surrounding the holes. On steeper slopes, the pile of dirt is generally on the downhill side of the hole.

There are most likely numerous discovery or prospect pits located within the Developable Area. On Figures 3 through 6, known discovery pits are located. The discovery pits identified on the figures represent the bulk of the pits known in the area, but may not represent all of them.

MITIGATION

The mitigation of any physical mine hazard may take on many forms. It is dependent upon the physical characteristics of each mine hazard and the risk posed to future land use by the particular hazard. Each mine hazard identified and/or found needs to be evaluated based on the risk that hazard poses should it collapse or subside. A small mine hazard such as a discovery pit may require a higher level of specialized mitigation measures if it is located in close proximity to building construction than a 100-foot deep shaft may require if it is located over 100 feet from any building construction.

For example, based on the available information, the Monitor shaft appears to be about 370 feet deep. It is most likely a two-compartment shaft, and therefore, would be approximately seven feet wide and 15 feet long. Logically, there would be levels 200 and 300 feet down the shaft. The data supports this assumption. Based on the surface area of 105 square feet of shaft opening and 370 feet of depth, the void representing the vertical open shaft is just over 1,400 yards. Should the surface of the shaft collapse into a presumed open shaft, the resultant hole could be very large and would pose a substantial risk to any building construction located within close proximity to the shaft. Should buildings be proposed for locations in a calculated area of influence of any potential shaft failure, then special mitigation measures would most likely be necessary. If there is to be no building construction within close proximity to the shaft, the risk is substantially less. Consequently, less sophisticated and, therefore, less costly mitigation measures could be taken to eliminate any risk failure of the shaft would pose.

All physical mine hazards mentioned in this report or found in the field whether mentioned or not, should not be ignored. Failure to address each physical mine hazard and the risk it poses could lead to significant problems in building construction located within the zone of influence of the mine feature.

Recommended Mitigation Procedure

The initial and perhaps the single most important step to take to mitigate a physical mine hazard is to determine the nature and extent of the hazard. A qualified geotechnical engineer should work closely with United Park personnel

to determine the geometric configuration of the hazard. This can be done by one of three ways:

- Searching through available records within the offices of United Park or elsewhere
- Field observation
- Actual excavation of the particular hazard

Once the extent of the risk posed by a particular hazard is ascertained, the geotechnical engineer should prepare a mitigation strategy for the risk posed by the particular mine hazard.

FIGURES 1 THROUGH 6

PARK CITY



PARK CITY MOUNTAIN RESORT

**FLAGSTAFF PROJECT
BOUNDARY**



DEER VALLEY RESORT

DEVELOPABLE AREAS

**UNITED PARK CITY
MINES COMPANY
FLAGSTAFF MOUNTAIN
PROJECT**

**MINE HAZARDS
REPORT**

FIGURE 1



NOT TO SCALE

UNITED PARK CITY MINES COMPANY

FLAGSTAFF MOUNTAIN PROJECT

MINING HAZARDS REPORT

FIGURE 2



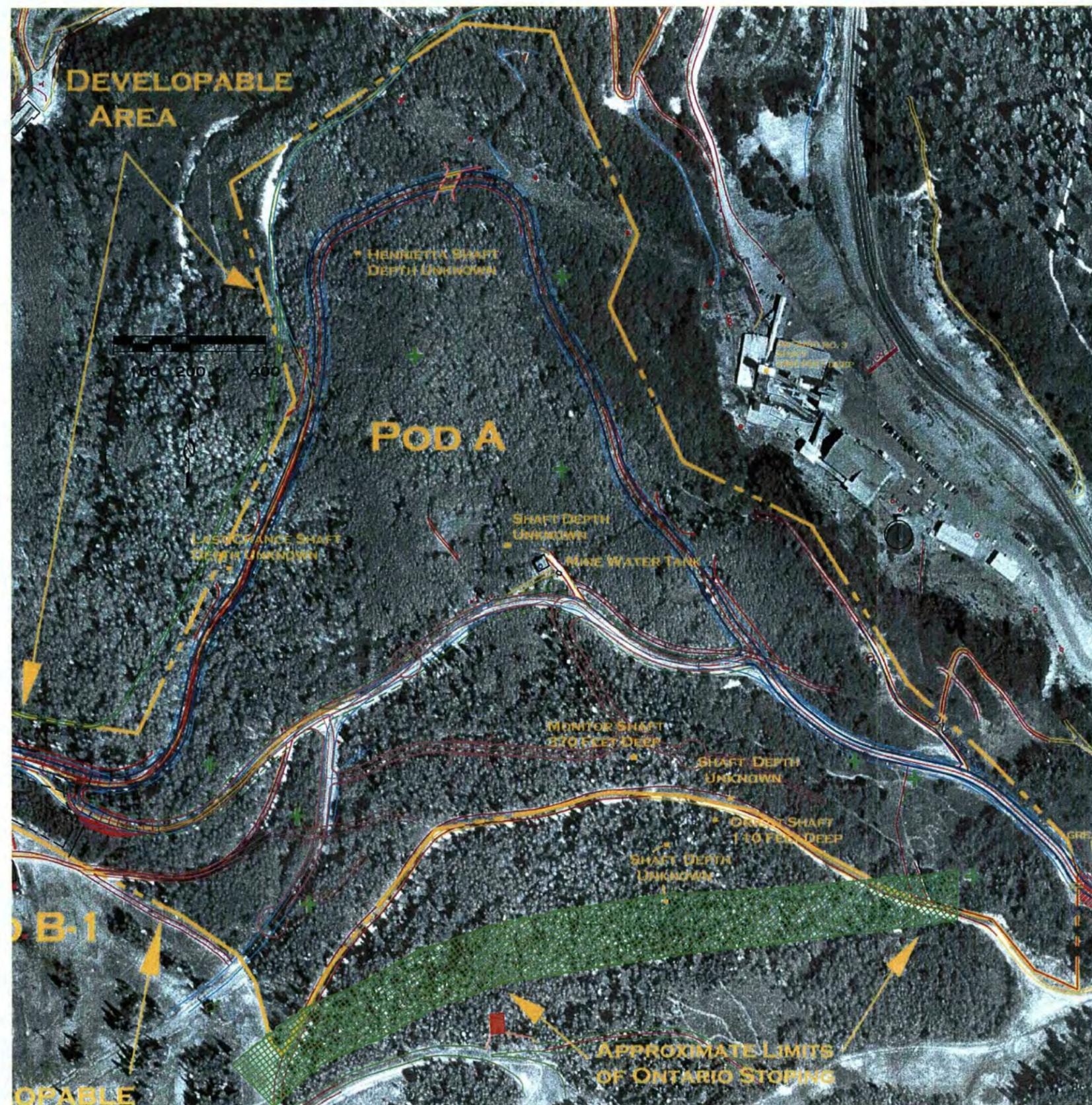
SCALE AS SHOWN

UNITED PARK CITY MINES COMPANY

FLAGSTAFF MOUNTAIN PROJECT

MINING HAZARDS REPORT

FIGURE 3



- + DISCOVERY PIT
- MINE OPENING



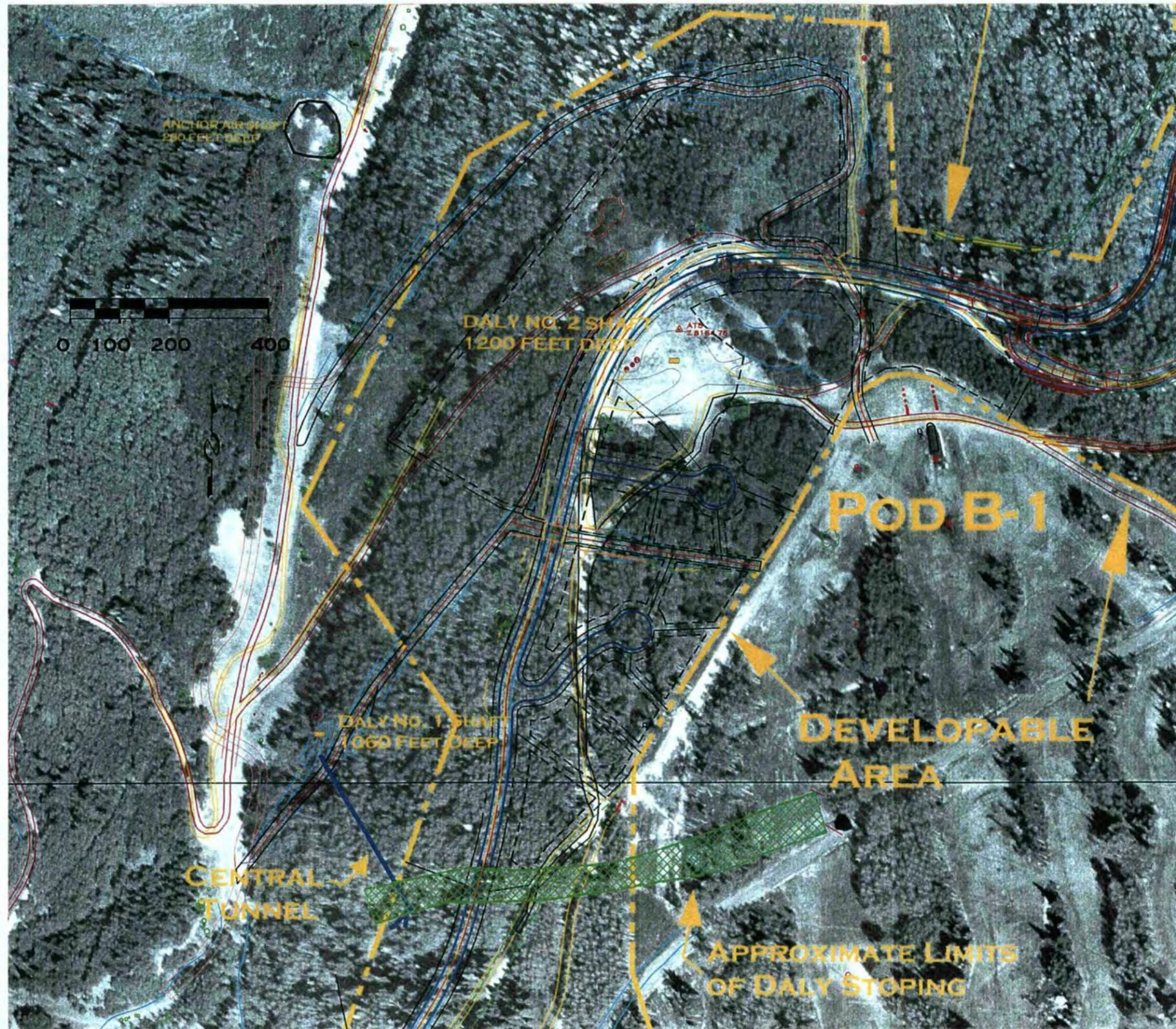
SCALE AS SHOWN

UNITED PARK CITY MINES COMPANY

FLAGSTAFF MOUNTAIN PROJECT

MINING HAZARDS REPORT

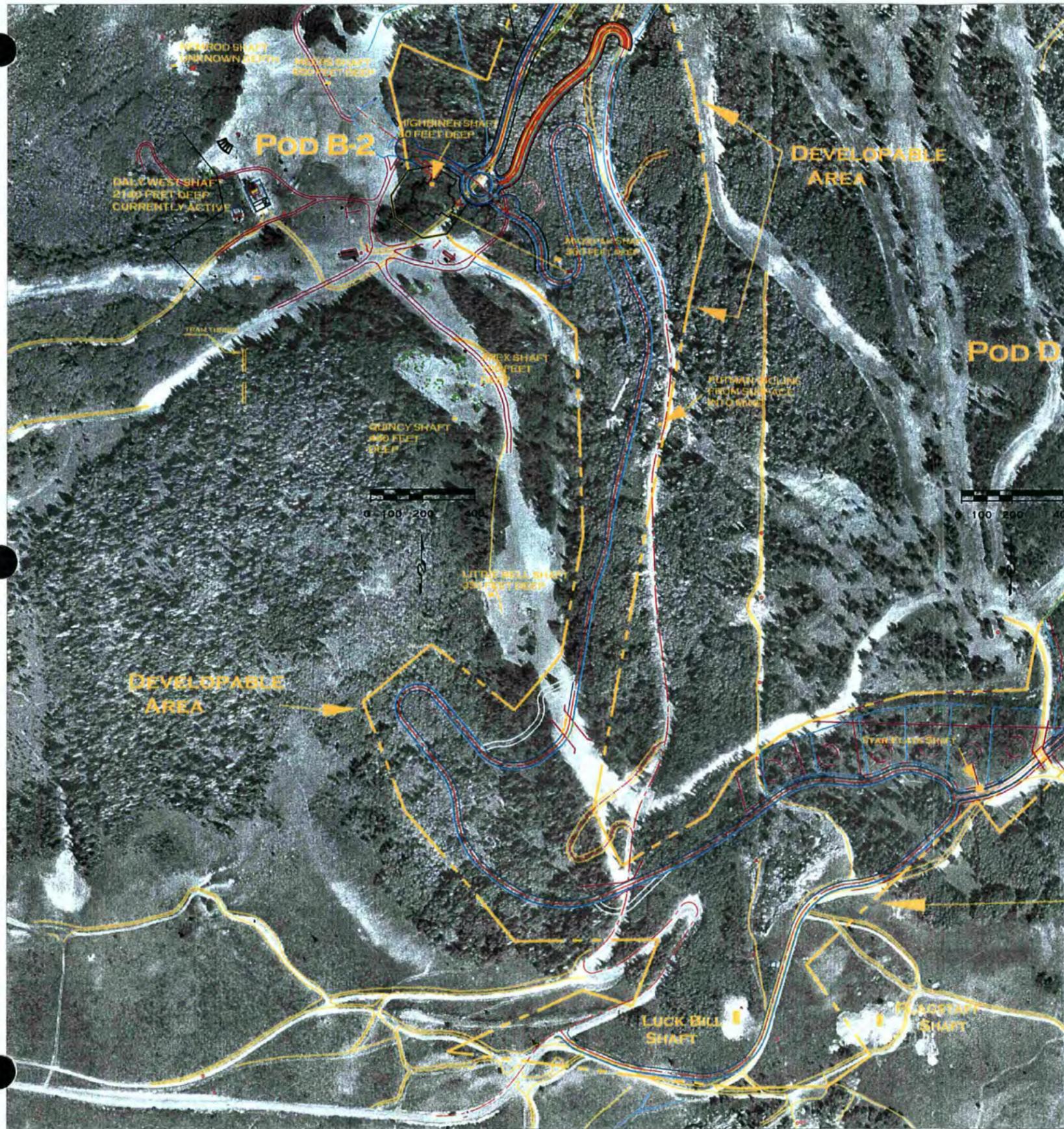
FIGURE 4



- + DISCOVERY
- MINE OPENING



SCALE AS SHOWN



UNITED PARK CITY MINES COMPANY

FLAGSTAFF MOUNTAIN PROJECT

MINING HAZARDS REPORT

FIGURE 5

- + DISCOVERY
- MINE OPENING



AREA LOCATION
NOT TO SCALE



SCALE AS SHOWN

UNITED PARK CITY MINES COMPANY

FLAGSTAFF MOUNTAIN PROJECT

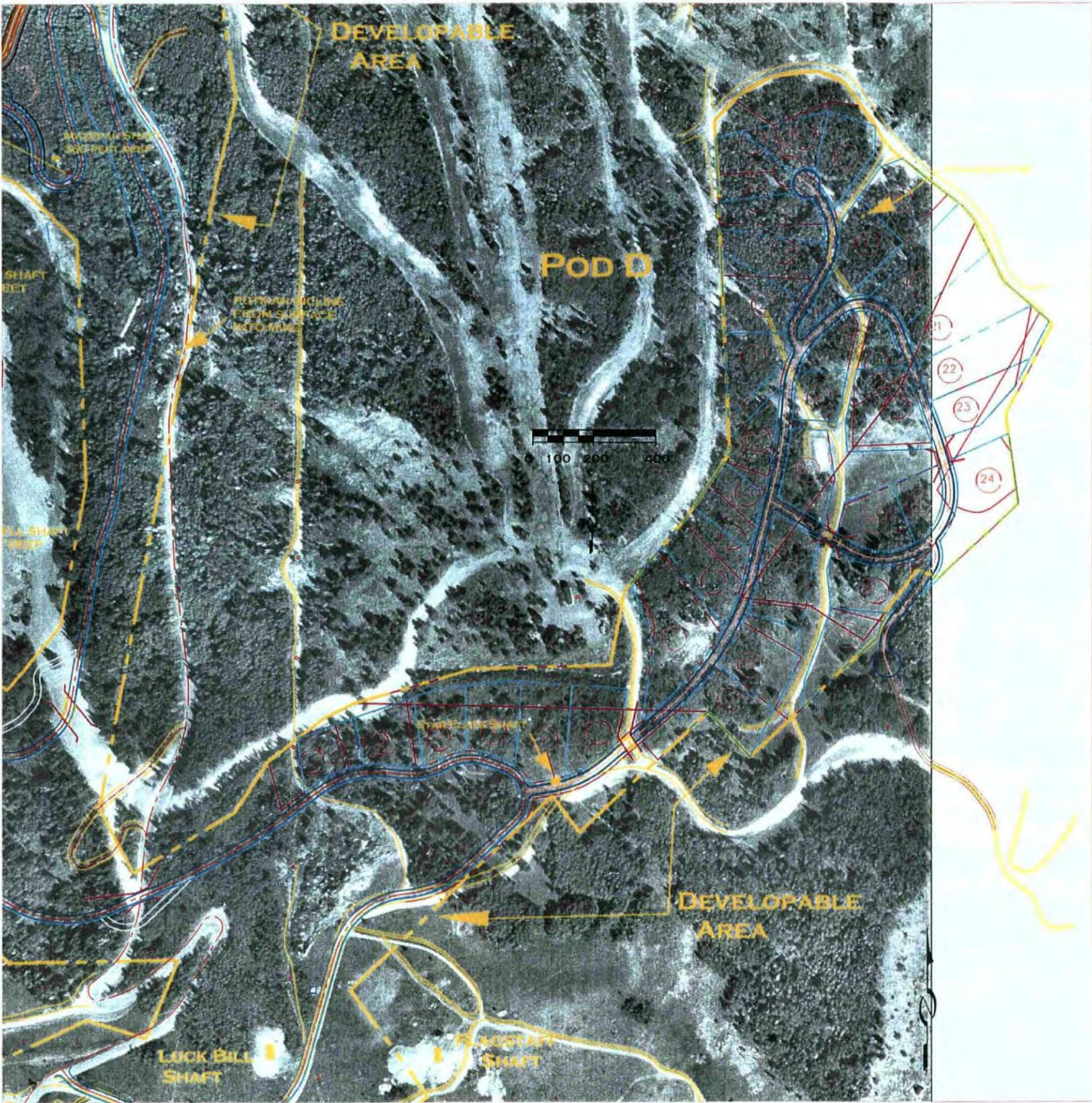
MINING HAZARDS REPORT

FIGURE 6

- + DISCOVERY
- MINE OPENING



SCALE AS SHOWN



APPENDIX 1

PHYSICAL MINE HAZARDS MITIGATION PLAN

Prepared for

FLAGSTAFF MOUNTAIN RESORT

Prepared by

HDR Engineering, Inc.

Table of Contents

1.0 INTRODUCTION AND PURPOSE 1

2.0 DEFINITIONS 1

3.0 PROJECT RESOURCES..... 2

 3.1 CONTACTS 2

 3.2 REFERENCE INFORMATION..... 2

4.0 INVENTORY AND EVALUATION OF PHYSICAL HAZARDS 4

 4.1 INVENTORY OF MINE SITES 4

 4.2 EVALUATION OF MINES SITES 5

 4.3 EXCLUSIONS AND LIMITATIONS..... 5

5.0 SUMMARY AND RECOMMENDATIONS 5

 5.1 SUMMARY 5

 5.2 RECOMMENDATIONS..... 5

 5.2.1 Immediate Implementation 6

 5.2.2 Mine Closures 6

 5.2.3 On-Going Basis 6

 5.2.4 Before Development of a Parcel..... 6

List of Tables

TABLE 1 - SUMMARY OF MINE SITES

List of Figures

FIGURE 1 - INVENTORY MAP

Appendices

- APPENDIX A - SUMMARY SHEETS FOR EACH MINE SITE
- APPENDIX B - PROPOSED LAND USE MAPS
- APPENDIX C - PREVIOUS INVESTIGATIONS
- APPENDIX D - STANDARD MINE CLOSURE DIAGRAMS

1.0 INTRODUCTION AND PURPOSE

The purpose of this report is to inventory potential physical hazards resulting from historic mine activities at the Flagstaff Mountain Resort in Park City, Utah. The Flagstaff Mountain Resort comprises approximately 1,750 acres and was annexed into Park City Municipal Corporation through an agreement dated June 24, 1999 between United Park City Mines Company, (UPCMC or "DEVELOPER"), Deer Valley Resort Company, and the Park City Municipal Corporation.

The mine sites were inventoried in June, July, and August of 1999 and were summarized in a Mine Hazard Inventory and Evaluation report dated November 1999. This report covers only the physical hazards associated with the mine sites and is based on the field work performed in the summer of 1999.

The methodology for inventorying and evaluating the mine sites is described in the text of this report, while the evaluation and recommended mitigation measures are provided on a summary sheet for each mine site in Appendix A. A mine site is defined as an area where significant mining activities took place, excluding discovery holes and prospects.

2.0 DEFINITIONS

When used in this report, the following terms are defined as:

Air shaft – A vertical opening for the purposes of providing air to an underground mine working.

Adit – A horizontal opening in the side of a mountain or hill providing access to a mineral deposit. An adit is generally open at one end while a tunnel is open at both ends.

Decline/Incline - A sloping underground opening for access from one level to another level or from the surface to a level.

Discovery hole - A small hole or shaft located on a mining claim which was never actively mined, excluded from inventory.

Level - A horizontal tunnel or underground working at a relatively constant elevation.

Mine dump - A pile of waste rock on the surface.

Mine site – An area where significant mine activities took place, excluding discovery holes and prospects.

Portal - The surface entrance to a tunnel or adit.

Proposed Land Use – Proposed land use included in annexation agreement dated June 24, 1999 and included in Appendix D (RD-MPD = Residential Development; E-MPD = Estate; ROS-MPD = Recreational Open Space).

Prospect - A mining property which has not been developed.

Shaft - A vertical for access to an orebody.

Subsidence hole - A subsidence hole is a surface depression which may indicate the presence of underground mine cavities and which may be unstable.

Stope - An underground excavation off a tunnel or shaft for extracting ore.

Tailings - Material rejected from a mill after most of the recoverable valuable minerals have been extracted.

Tunnel - A horizontal underground opening, generally open to the atmosphere at both ends.

Waste rock - Unprocessed rock or ore that has been excavated and brought to the surface.

3.0 PROJECT RESOURCES

3.1 Contacts

The following people were consulted in preparation of this report and are listed here for future consultations, if necessary:

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3.2 Reference Information

Key investigations, maps, and reports reviewed in preparation of this report are listed below. Some of the reports are included in Appendix C.

Investigations/Reports:

- Landslide Evaluation and Building Setback, Empire Canyon, Summit County, Utah, 1999.
- Geologic and Geotechnical Investigation Silver Ridge Subdivision, Summit County, Utah, 1999.
- Report on Daly #2 Surface Cave, 1983.
- Mine Hazard Elimination Study for the Park City Area (Draft), 1981-1994.
- Report of Soils and Foundation Investigation, Bench Parcel Deer Valley Residential Development near Park City, Utah, 1981.
- Discussions Pending Soils and Foundation Investigation Supplement Bench Parcel, Lots 20 through 24 Deer Valley Resort Development Near Park City, Utah, 1981.
- Deer Valley Resort Environmental Impact Statement, Ground Water Recharge, 1981.

- Summit Project Park City Area, Section 0300 Specific Site Requirements Draft Report, 1993.
- Mine Waste Sampling at Proposed Ski-Run Site. Deer Valley Area, Park City, Utah, 1990.
- Historic Preservation Plan for Flagstaff Mountain Resort, 1999.

Maps:

- Aerial Photograph dated 1999
- Geologic Map of the Park City District, Utah, 1902-1904.
- USGS Topographic Maps, 1955 and 1975.
- 1999 Hiking & Biking Trail Map

4.0 INVENTORY AND EVALUATION OF PHYSICAL HAZARDS

4.1 Inventory of Mine Sites

The Flagstaff Resort encompasses 1,750 acres of mostly dense vegetation and reconnaissance of the entire area is not feasible, therefore mine sites in the Flagstaff Resort were inventoried by:

- Discussions with UPCMC geologist Kerry Gee
- Review of mine maps, USGS maps, topographic maps, and aerial photography listed in Section 3.2
- Review of previous investigations or reports listed in Section 3.2
- Discussions with Deer Valley personnel
- Discussions and field reconnaissance with UPCMC trails maintenance personnel
- Field reconnaissance on established trails and known mining areas in June, July, and August 1999

If evidence of mining was present from any of the above sources, the mine site was added to the inventory. Each mine site was assigned a unique identification number and the status summarized in a one to two page summary in Appendix A. Some documented mine sites could not be located in the field due to overgrown vegetation or lack of specific location information. Other mine sites could be located but no physical evidence of the mine remains. In some cases, several mine sites were summarized together due to their proximity in the field.

The approximate locations of the mine sites are shown on Figure 1 and physical hazards are summarized in Table 1 (both are located after Section 5.0). Mine sites were not surveyed nor marked in the field as a part of the inventory, however surveying or signage was recommended in some cases. Existing trails were mapped on Figure 1 to show where field reconnaissance occurred and to facilitate locating mine sites in the field. The trails were mapped using the 1999 Hiking & Biking Trail Map, the UPCMC Trails Master Plan, and hand drawn maps by UPCMC's trails maintenance personnel. Locations of the trails and the mine sites are approximate and none were surveyed.

4.2 Evaluation of Mines Sites

Each mine site in the inventory was evaluated by:

- Field examination
- Documentation of site characteristics and potential physical hazards
- Photographing
- Review of previous investigations for the mine
- Recommending mitigation measures/further actions
- Incorporating all data in a one to two page summary in Appendix A

4.3 Exclusions and Limitations

This inventory is limited to underground mine workings of which evidence exists on a map or report or on the ground surface near a trail or roadway. Specific mine sites excluded from the inventory in the Flagstaff Resort were the Judge Portal (#19), the Alliance Tunnel (#1), the American Flag (#3), the Empire Slide (#13), and Ontario Shafts (#29, #30, and #31) at the direction of UPCM.

No attempt was made to inventory all discovery holes, prospect pits, or mine grades on the property, although some were noted in the inventory if they were in the vicinity of a mine site and deeper than 5 feet. Discovery holes and prospect pits are holes that were never actively mined. They are generally small and do not have an associated mine dump of significant size.

Structures, metal, and debris were noted only if they were in the immediate vicinity of a mine site. Most structures are associated with the Judge Mine and the Ontario which are not included in this report. Structures were not evaluated for their stability nor for the presence of asbestos, lead based paints, PCB's or other environmental hazards. It is HDR's understanding that historic structures are being inventoried in a separate study that includes an analysis of their structural stability. Potential environmental hazards associated with mine waste rock are also being addressed in separate reports.

5.0 SUMMARY AND RECOMMENDATIONS

5.1 Summary

Approximately 50 mine sites were inventoried across the Flagstaff Resort. Each mine site was assigned a unique identification number. Summaries for each mine site are included in Appendix A and in Table 1. Approximate locations of each mine site are shown on Figure 1. Physical hazards include shafts, tunnels, stopes, exposed or rusted metal/debris, confined spaces, and dilapidated buildings or structures. Although the mine dumps are generally steep and could pose a hazard for falling, the slopes were not generally steeper than surrounding natural grades and therefore were not noted as a physical hazard.

5.2 Recommendations

Specific recommendations for mitigation measures or further actions are included for each mine site in the summary sheets in Appendix A. Recommended mitigation measures vary based on the

proposed land use, frequency and type of public contact, and accessibility. Maps showing the proposed land used in the annexation agreement are included in Appendix B. In some cases, signage was recommended for shafts or holes instead of filling to avoid disturbing large areas of established vegetation or removing a large number of trees.

5.2.1 Immediate Implementation

Recommended further actions for implementation as soon as practical for the protection of recreationalists using the property are (see Appendix A for specific sites):

- Closure of tunnel or shaft openings to public
- Subsidence filling
- Covering exposed and/or rusted metal/debris
- Signage and/or physical barriers
- Review of Mine Hazard Inventory and Evaluation Report by Utah Abandoned Mine Reclamation Program, and Park City Municipal Corporation.

5.2.2 Mine Closures

Standard closure diagrams for mine shafts and tunnels from the Utah Division of Oil, Gas, and Mining, textbooks, and previous reports are included in Appendix D. Note that some closures incorporate measures to protect bat habitat. This report does not address environmental issues associated with the mine sites, however, it can be noted that there are no threatened or endangered bat species in Summit County according to the U.S. Fish and Wildlife Service internet database as of June 2000.

5.2.3 On-Going Basis

Recommendations for implementation on an on-going basis are:

- Annual monitoring at all mine sites located for subsidence or other indication of caving in of underground cavities, evidence of vandalism, integrity of tunnel or shaft closure, fence or barrier repair needs, and presence of adequate signage. This monitoring could be performed during routine maintenance activities.
- Annual reconnaissance of the entire Flagstaff property as new trails or roads or buildings, etc. are developed for evidence of additional mine sites and addition of the sites to this inventory. This reconnaissance could be performed during routine maintenance activities.

5.2.4 Before Development of a Parcel

Every effort has been made to identify as many mine sites as possible, especially near trails. However, a consultation with the UPCMC geologist and field reconnaissance is still recommended before construction of buildings or other structures on any Flagstaff property to confirm the presence or absence of underground mining activities. Specific recommendations for implementation before development of any parcel in Flagstaff are:

- Check the Mine Hazard Inventory for existence of known mine sites and for consistency with proposed land use.
- Consult UPCMC Geologist, Kerry Gee.
- Perform field reconnaissance of parcel to confirm presence or absence of mines.
- If foundations or structures are proposed near a potential mine hazard, survey location of underground cavity, prepare a map of the parcel showing locations of hazard in relation to proposed structures, and consult a geotechnical engineer to determine if an unsafe structural condition exists. Closely examine excavations during construction for evidence of fill and voids that may indicate the presence of underground mine workings.

TABLE 1 MINE SITE INVENTORY SUMMARY

ID No.	Name	Potential Physical Hazards
1	Alliance Tunnel	Not Evaluated
2	Ameers Shaft	No evidence found
3	American Flag	Not Evaluated
4	Anchor Air Shaft	Shaft
5	Anchor/Judge Shaft	Rusty cable, tunnel, shaft
6	Raise to surface from Ontario	Not Located
7	Apex Shaft (With #27)	Shaft
8	Banner Shaft	Inaccessibe location
9	Daly #1 Shaft/ Federal Tunnel	Tunnel, shaft, stopes
10	Daly #2 Shaft	Rusted debris, shaft
11	Daly West Shaf/Central Tunnel	Dilapidated structures, shafts
12	West Ontario	Shafts
13	Empire Canyon Slide	Not Evaluated
14	Federal Tunnel (With #9)	Tunnel, shaft, stopes
15	Flagstaff Shaft	Scrap metal, downed fence
16	Garvey Shaft	No evidence found
17	Great Eastern Tunnel (With #8)	Inaccessibe location
18	Highbiner Shaft (With #11)	Dilapidated structures, shafts
19	Judge Portal/Tunnel	Not Evaluated
20	Last Chance Shaft	Not Located
21	Little Bell Shaft	Dilapidated structure, shaft
22	Lucky Bill	Shaft
23	Meers Shaft (With #11)	Dilapidated structures, shafts
24	Monitor shaft	Unmarked holes, shafts
25	Naildriver Shaft	Debris, shaft
26	Nemrod Shaft	Large depression, shaft
27	New Quincy Shaft	Shaft
28	New York Shaft	Debris, shaft
29	Ontario #1 Shaft	Not Evaluated
30	Ontario #2 Shaft	Not Evaluated
31	Ontario #3 Shaft	Not Evaluated
32	Orient Shaft (With #24)	Unmarked holes, shafts
33	Putman Decline/Incline	No evidence found
34	Thaynes Tunnel (with #5)	Rusty cable, tunnel, shaft
35	Tram Tunnel	No evidence found
36	Unnamed Shaft #1 (With #24)	Unmarked holes, shafts
37	Unnamed Shaft #2 (With #24)	Unmarked holes, shafts
38	Unnamed Shaft #3 (With #24)	Unmarked holes, shafts
39	Unnamed Shaft #4	Not Located
40	Wabash Shaft	Shaft is concrete plugged
41	White Pine Shaft	Debris, shaft
42	Unnamed	Not Located
43	Unnamed	Not Located
44	Unnamed	Not Located
45	Unnamed	None
46	Unnamed	Open tunnel
47	Unnamed	Open tunnel
48	Diamond Shaft	Shaft
49	Bed Springs	Unmarked holes

APPENDIX A
SUMMARY SHEETS FOR EACH MINE SITE

#1 Alliance Tunnel

- Not evaluated

#2 Ameers Shaft

- No evidence remaining
- Located in ski run under north side of lift tower just below Guardsman Road

#3 American Flag

- Not evaluated.

#4 Anchor Airshaft

Site Characteristics:

- Mine waste rock pile 20' high x 70' long x 36' wide
- 1:1 slopes
- 280' deep shaft, capped and no evidence of subsidence



Potential Physical Hazards:

- Shaft – to new structures

Proposed Use:

Recreational, lift proposed nearby

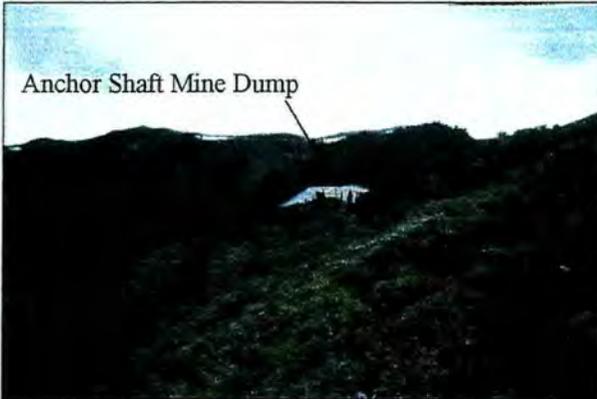
Adjacent Trails (Existing):

Daly Road, Ore Cart trail

Recommended Further Action:

- Annual monitoring for physical hazards
- If construction is proposed, follow recommendations in Report

#5 Anchor or Judge Shaft and #34 Thaynes Tunnel



View from Diamond Shaft



Ski Run on South Side

Site Characteristics:

- Large waste rock pile, 420 ft. by 490 ft. on top
- 1:1 slope
- Miscellaneous debris, i.e. scrap lumber, rusted cable on surface and within dump
- Ski run on pile.
- Trail follows toe of slope.
- Disturbed area 200' NW of toe of slope in woods near trail. (see photo lower left)
- 2500' capped shaft, covered
- Thaynes Tunnel closed and no evidence of subsidence



Potential Physical Hazards:

- Exposed rusty cable
- Tunnel - to new structures
- Shaft - to new structure

Proposed use: Recreational

Adjacent Trails (Existing): T.G. Trail

Recommended Further Action:

- Cover or remove rusted cable and other debris
- If construction is proposed, follow recommendations in report
- Annual monitoring for physical hazards

#6 Raise to Surface from Ontario

- Located in trees near ski run according to UPCM Geologist
- No evidence remaining

Proposed Use:

- Residential

Recommended Further Action:

- Survey and Site Reconnaissance

#7 Apex

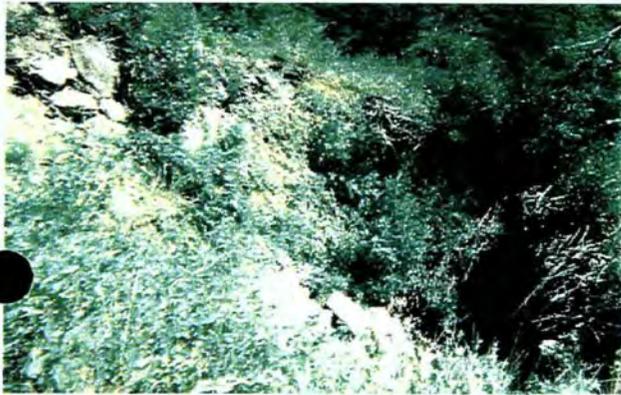
- With #27 New Quincy

#8 Banner Shaft and #17 Great Eastern Tunnel



Site Characteristics:

- Water flowing from 20 ft. wide opening in steep drainage
- 80' deep shaft, filled but some evidence of subsidence
- Grown over and inaccessible, several fallen trees and debris covering opening



Potential Physical Hazards:

None due to inaccessibility

Proposed Use:

Recreational

Adjacent Trails (Existing):

None

Recommended Further Action:

- Annual monitoring for physical hazards
- If construction is proposed, follow recommendations in report



#9 Daly No. 1



Site Characteristics:

- 2-3 acre disturbed area
- Pile of bricks on east side with scrap metal nearby
- Old shaft pile 10' high x 10' wide x 50' long
- Shaft 1060' deep, filled and no evidence of subsidence
- Federal tunnel filled no evidence of subsidence



Potential Physical Hazards:

- Tunnel – to new structures
- Shaft – to new structures
- Slopes close to surface – to new structures

Proposed Use: Recreational

Adjacent Trails (Existing): Daly Road, Shovel Trail

Recommended Further Action:

- Annual monitoring for physical hazards
- If construction is proposed, follow recommendations in report

#10 Daly No. 2



Site Characteristics:

- Approximately 350' by 135' waste rock pile
- 1:1 to 2:1 slopes, west sideslope nearly vertical
- 8 ft. diameter Corrugated metal pipes, 42 ft. in length
- Misc. debris, i.e. lumber, pipes, boulders
- Retaining wall on south side
- Disturbed area 200 ft west of site
- Rock pile 200 ft. north of site
- Approach road built on pile
- 1400' Shaft, filled and no evidence of subsidence (caved in 1983)



Potential Physical Hazards:

- Rusted steel bars and debris
- Shaft – to new structures

Proposed Use: Residential

Adjacent Trails (Existing): Tour De Suds

Previous Investigations:

- Mine Hazard Elimination Study, 1982
- Report of Daly #2 Surface Care
- Compliance Engineering Co., 1983 (see Appendix C)

Recommended Further Action:

- Remove or cover rusted steel and debris
- Annual monitoring for physical hazards
- When construction is proposed, perform site reconnaissance, survey, and consult UPCM geologist and geotechnical engineer

#11 Daly West, #23 Meers, #18 Highbiner



Site Characteristics:

- Waste rock pile 750' x 600' on top
- Substation (fenced)
- 3' high by 50' long stone retaining wall
- 25' by 50' metal building and 75' tall steel elevator shaft structure. Both fenced
- Small oil stains on ground
- 10' by 20' plastic lined secondary storage area for fuel
small oil stain
- Debris: metal, coiled chain link fencing
- 15' high A-frame wooden structure
- 50' long old rail
- 10' by 10' wooden shed
- Outhouse
- 10' by 10' concrete bunker, partially under ground
- Concrete foundation
- 20' by 50' old dilapidated concrete building
- Trails cross bottom and top of slope
- Meers (600' deep) and Highbiner (60' deep) shafts covered by mine dump waste rock
- Old flywheel, wooden cart, and miscellaneous debris at base of mine dump
- Daly Shaft 2140' deep and still active



#11 Daly West, #23 Meers, #18 Highbiner (continued)

Potential Physical Hazards:

- Dilapidated structures
- Daly Shaft open (fenced)
- Meers and Highbiner Shafts- to new structures

Proposed Use:

Residentially zoned, proposed Daly Lodge site

Adjacent Trails (Existing): Ore Cart and Sam's Trail

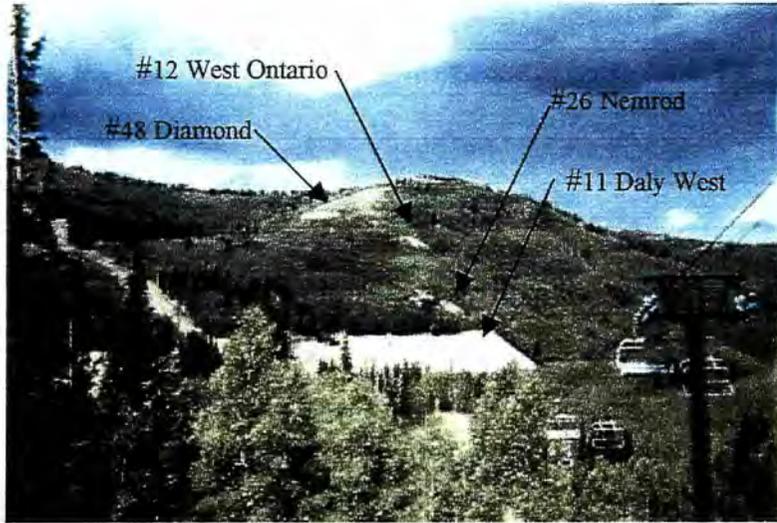
Previous Investigations:

- Mine Hazard Elimination Study (1982)
- Mine Waste Rock Testing, Empire Canyon Development. AGECE, September 10, 1993

Recommended Further Action:

- Before construction, perform site survey and consult geotechnical engineer and UPCM geologist as recommended in report to identify structural hazards associated with shafts
- Annual monitoring of fence surrounding Daly Shaft and sign conditions
- Fencing, removal, stabilization or other security measures for dilapidated structures

Site: #12 West Ontario



Site Characteristics:

- Waste rock pile 200' x 50'
- Brick and concrete foundation
- Depression 20' dia. 10' deep on west side, potential shaft
- Depression 8' dia. 5' deep on east side, potential shaft
- Scrap lumber
- 2 disturbed terraces above pile, 100-200' long each

Potential Physical Hazards:

- Shafts

Proposed Use:

Recreational

Adjacent Trails (Existing):

TG 2 trail

Recommended Further Action:

- Signage and physical barrier or fill depressions
- Annual Monitoring
- If construction proposed, follow the recommendations in the report

#13 Empire Canyon Slide

➤ Not Evaluated

#14 Federal Tunnel

➤ With #9 Daly No. 1

#15 Flagstaff



Site Characteristics:

- Waste rock pile 200' x 50' long
- 1000' shaft with concrete plug and fence (fence needs repair)
- 30' diameter depression on the east side
- Several piles in the northeast corner
- Road cuts through site
- Miscellaneous debris, i.e., scrap metal, iron cable

Potential Physical Hazards:

- Scrap metal
- Downed fence

Proposed Use:

Recreational

Adjacent Trails (Existing):

Gravel road

Previous Investigations:

Mine Hazard Elimination Study, 1982. See Appendix C

Recommended Further Action:

- Repair fence and remove or cover scrap metal
- Annual monitoring for physical hazards
- If construction is proposed, follow the recommendations in the report

#16 Garvey Shaft

- 53' deep filled shaft
- No remaining evidence, located in ski run under Northside Lift

#17 Great Eastern Tunnel

- With #8 Banner shaft

#18 Highbiner Shaft

- With #11 Daly West Shaft

#19 Judge Portal/ Tunnel

- Not Evaluated

#20 Last Chance Shaft

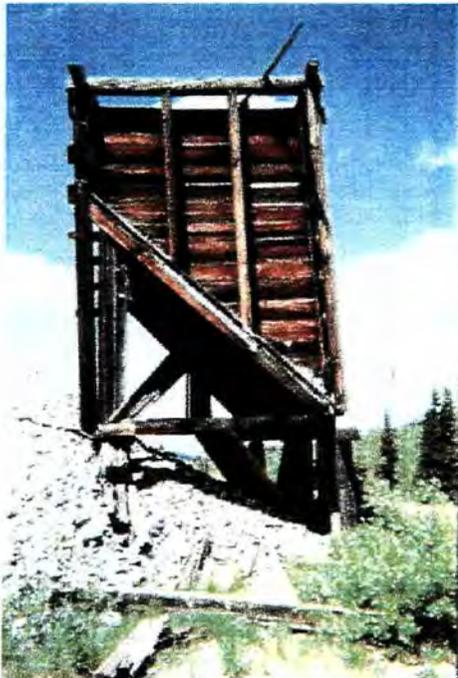
- No evidence/ could not locate

#21 Little Bell



Site Characteristics:

- Rock pile 100 ft long by 40 ft. high
- 1:1 to 2:1 sideslopes
- Wooden structure 25' x 12' x 25' high
- 350' filled shaft, no evidence of subsidence



Potential Physical Hazards:

- Dilapidated wooden structure
- Shaft- hazard to new structures

Proposed Use: Recreational

Adjacent Trails (Existing): In ski run

Recommended Further Action:

- Stabilize structure or signage indicating 'Do Not Enter'
- Annual monitoring
- If construction proposed, follow the recommendations in report

#22 Lucky Bill



Site Characteristics:

- 3 main waste rock piles, 40 feet west of road
- 500' deep filled shaft, no evidence of subsidence

Potential Physical Hazards:

Shaft – to new structures

Proposed Use:

Recreational

Adjacent Trails (Existing):

Gravel Road

Previous Investigations:

Mine Hazard Elimination Study, 1982. See Appendix E

Recommended Further Action:

- Annual monitoring for physical hazards
- If construction is proposed, follow the recommendations in the report

#24 Monitor Shaft

#38 Unnamed Shaft #3

#32 Orient Shaft

#36 Unnamed Shaft #1

#37 Unnamed Shaft #2

Site Characteristics:

- Miscellaneous grown over shafts, disturbed areas, and rock piles in area including, 20 ft. diameter 25 ft. deep depression with filled with debris (rocks, tree limbs) and grown over mound to the west
- 10 ft. diameter 10 ft. deep grown over
- 15 ft. diameter 10' deep grown over depression
- 10 ft. deep 10 ft diameter depression 10 ft north of road



Potential Physical Hazards

Unmarked holes and shafts

Proposed Use:

Residential

Adjacent Trails (Existing):

None

Recommend Further Action:

- Contact HDR Engineering or UPCM to locate holes and place physical barriers around them
- Before construction, perform site reconnaissance, survey site, and consult Geotechnical Engineer and UPCM Geologist
- Annual monitoring for physical hazards

#25 Naildriver



Site Characteristics:

- Dump 100 ft. long 60 ft. wide on top
- 2:1 sideslopes
- Pile of bricks south side east of trail with a cast iron T-pipe
- Long steel ribbon segments, mine cart, other debris present
- 2980' deep shaft with concrete plugs, no evidence of subsidence

Potential Physical Hazards:

- Debris
- Shaft - to new structures

Proposed Use:

Recreational

Adjacent Trails (Existing):

Unnamed trail on top of dump

Previous Investigations:

Mine Hazard Elimination Study, 1982 (See Appendix E)

Recommended Further Action:

- Remove or cover debris
- Annual monitoring for physical hazards
- If construction is proposed, follow the recommendations in report

#26 Nemrod Shaft



Site Characteristics:

- 200 ft. long by 50 ft. wide pile
- 20 ft. deep depression near SW corner of pile

Potential Physical Hazards:

Large depression

Proposed Use:

Recreational, near a proposed residential area

Adjacent Trails (Existing): None.

Recommended Further Action:

- Place Signage and physical barrier around depression or fill
- Annual monitoring
- If construction is proposed, follow the recommendations in the report

#27 New Quincy Shaft and #7 Apex Shaft



Site Characteristics

- Rock pile approximately 500 ft. long by 100 ft. wide on top
- 2:1 to 1:1 side slopes
- Difficult to determine extent of waste rock pile
- Misc. debris, i.e. rusty sheet metal, wooden frame supports
- 5' x 5' wench on concrete footings
- Apex shaft 100' deep and filled, no evidence of subsidence
- New Quincy Shaft, 440' deep and filled, no evidence of subsidence
- Difficult to differentiate between two mines

Potential Physical Hazards

- Shaft to new structures

Proposed Use: Recreational

Adjacent Trails (Existing): Ski runs

Recommended Further Action:

- Annual monitoring
- If construction is proposed, follow the recommendations in report



#28 New York Shaft



Site Characteristics:

- Rock pile 150 ft. long 75 ft. wide on top
- 2:1 side slopes
- Some vegetation on slopes
- 1040' deep shaft with concrete plug
- 15 ft. diameter 8 ft. deep depression in southeast corner
- 2, 10 by 10 foot concrete footings in southeast corner
- Pile of bricks with sheet metal in south end east of access road
- 8 ft. diameter 10' deep hole in northeast corner
- Rusty cable

Potential Physical Hazards:

- Shaft
- Debris

Adjacent Trails (Existing): None

Previous Investigations:

Mine Hazard Elimination Study, 1982(see Appendix C)

Proposed Use: Recreational

Recommended Further Action:

- Remove or cover debris
- Place signage or physical barrier around shaft
- Annual monitoring
- If construction is proposed, perform site reconnaissance, survey, and consult UPCM Geologist for report to identify structural hazards.

#29 Ontario No. 1 Shaft

- Not Evaluated, part of the Silver Mine Adventure
- 600' deep filled shaft

#30 Ontario No. 2 Shaft

- Not Evaluated, part of the Silver Mine Adventure
- 1500' deep filled shaft. See Appendix C for previous investigation

#31 Ontario No. 3 Shaft

- Not Evaluated, part of the Silver Mine Adventure
- 2450' deep active shaft

#32 Orient Shaft

- With #24 Monitor Shaft

#33 Putman Decline/ Incline

Site Characteristics:

- Ruby Lift Tower build over or near decline
- No evidence remaining



#34 Thaynes Tunnel

- With # 5 Anchor/Judge Shaft

#35 Tram Tunnel

Site Characteristics:

- Located in ski run 200' north of Empire Express lift according to UPCM Geologist
- No further evidence



#36 Unnamed Shaft No. 1

- With #24 Monitor Shaft

#37 Unnamed Shaft No. 2

- With #24 Monitor Shaft

#38 Unnamed Shaft No. 3

- With #24 Monitor Shaft

#39 Unnamed Shaft No. 4

- No evidence/ could not locate
- Residential land use
- If construction is proposed, perform site reconnaissance on site survey and contact geotechnical engineer and UPCM geologist

#40 Wabash Shaft

- Located in the middle of Deer Valley maintenance complex
- Concrete plug place in shaft (810' deep) in 1981
- See Appendix C for previous investigation
- Annual monitoring for physical hazards

#41 White Pine Shaft



White Pine



Depression

Site Characteristics:

- Waste rock pile 120' x 90'
- Depression containing rusty pipes
- Flowing water in south west corner adjacent to mine
- Misc. debris, i.e. sheet metal

Potential Physical Hazards:

- Debris

Proposed Use:

Recreational

Adjacent Trails (Existing):

Unnamed

Recommended Further Action:

- Remove or cover debris
- Place signage and physical barrier around depression or fill
- Annual monitoring
- If construction proposed, follow recommendation in Report

#42 Unnamed Shaft

- No evidence/could not locate in field. Mine was indicated on Geologic Map of Park City District, Utah

#43 Unnamed Shaft

- No evidence/could not locate in field. Mine was indicated on Geologic Map of Park City District, Utah

#44 Unnamed Shaft

- No evidence/could not locate in field. Mine was indicated on Geologic Map of Park City District, Utah

#45 Unnamed



Site Characteristics:

- Caved in tunnel opening
- Small mine dump 100' wide by 50' tall

Potential Physical Hazards:

- None.

Adjacent Trails (Existing):

Shovel and Sam's

Proposed Use:

Recreational

Recommended Further Action:

- Annual monitoring
- If construction proposed, follow the recommendations in the report

#46 Unnamed



Site Characteristics:

Small tunnel located just off Sam's trail

Potential Physical Hazards:

Open tunnel

Adjacent Trails (Existing):

Sam's

Proposed Use:

Recreational

Recommended Further Action:

- Close tunnel to public
- Annual monitoring for physical hazards
- If construction proposed, follow the recommendations in the report

#47 Unnamed Tunnel



Site Characteristics:

- Located adjacent to ski run near Anchor Shaft
- 100' by 100' mine dump with 1:1 slopes
- Open 5' diameter tunnel at top of mine dump

Potential Physical Hazards:

- Mine tunnel

Proposed Use:

Recreational

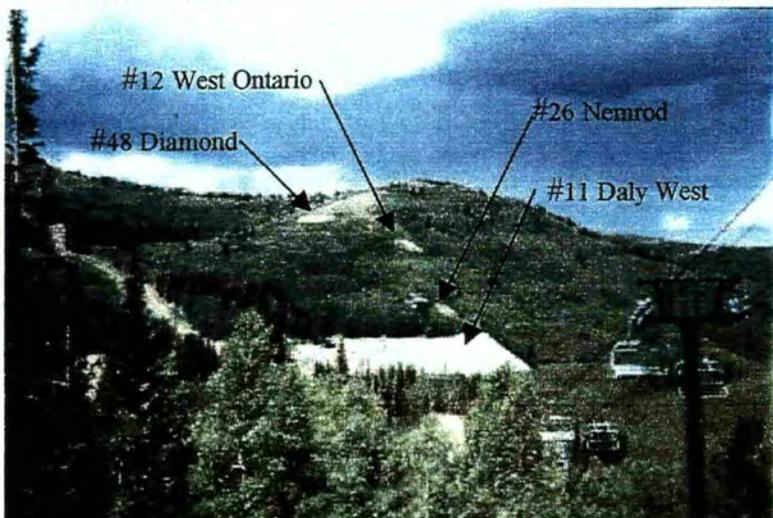
Adjacent Trails:

TG

Recommended Further Actions:

- Close tunnel by filling
- Annual monitoring for physical hazards
- If construction is proposed, follow the recommendations in report

Site: #48 Diamond Shaft



Site Characteristics:

- Waste rock pile 200' x 100' x 50' high
- 1:1 to 2:1 slopes
- Collapsed wooden structure
- Filled shaft, no evidence of subsidence

Potential Physical Hazards:

- Shafts- hazard to new structures

Proposed Use:

Recreational

Adjacent Trails (Existing):

None

Recommended Further Action:

- Annual monitoring
- If construction proposed, follow the recommendations in the report

#49 Bed Springs



Site Characteristics:

Miscellaneous mine features along 300 - 400' of trail including: bedsprings, caved in tunnel opening with timber frame, foundation, and several small discovery holes

Potential Physical Hazards:

Discovery holes



Proposed Use:

Recreational, close to proposed residential area

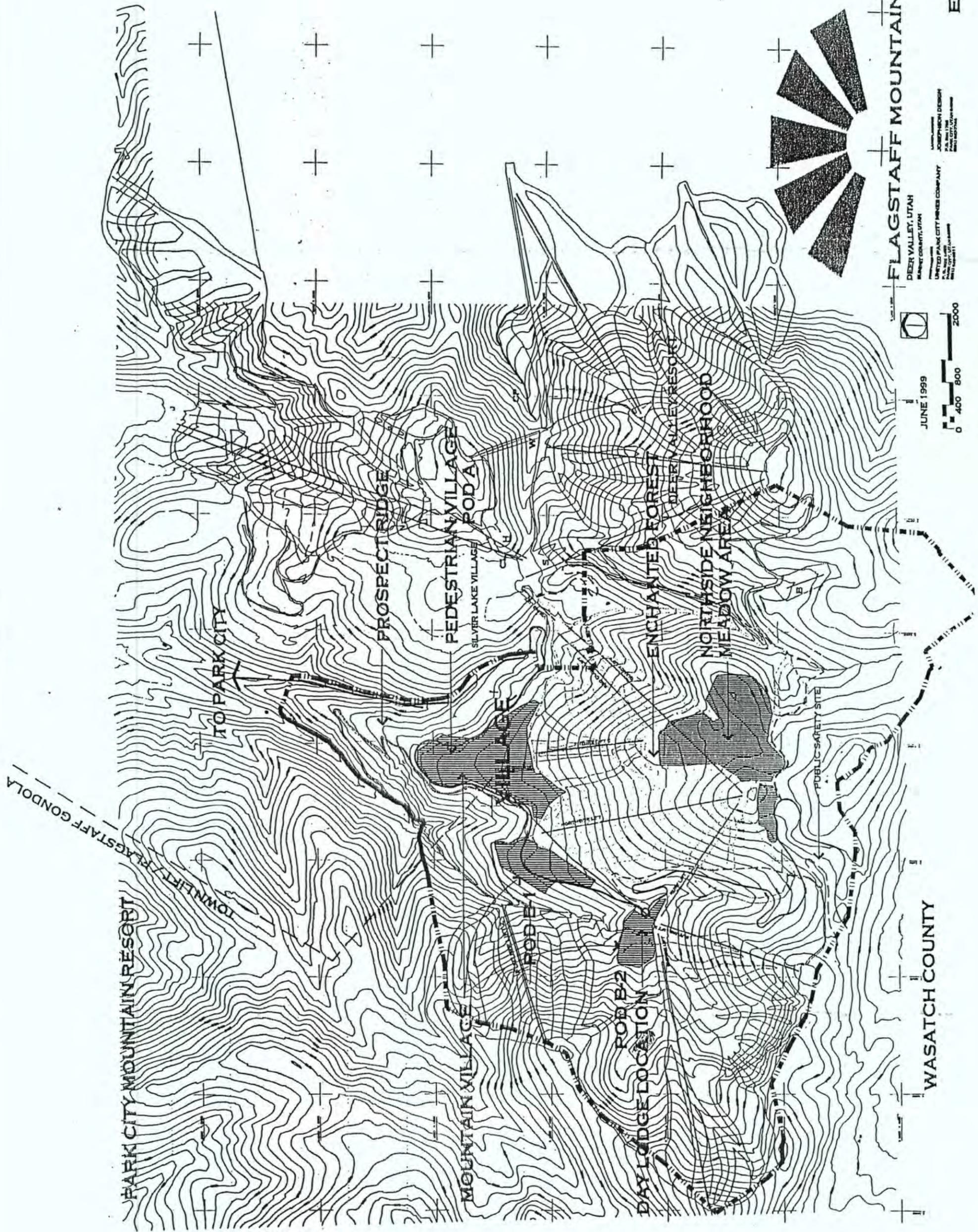
Adjacent Trails (Existing):

"Bed Springs"

Recommended Further Action:

- Place signage at discovery holes, contact HDR Engineering to locate holes
- Monitor annually for physical hazards

**APPENDIX B
PROPOSED LAND USE MAPS**



FLAGSTAFF MOUNTAIN RESORT

DEER VALLEY, UTAH
MINNETONKA, UTAH

JOSEPHSON DESIGN
P.O. BOX 1708
SALT LAKE CITY, UTAH 84110



JUNE 1999



EXHIBIT A



FLAGSTAFF MOUNTAIN RESORT
DEVELOPMENT PODS
"ZONING MAP"
FOR: UPCMC

STAFF:
S. DECKERT
D. CARDWELL

REVISED:
(35) 648-9487



PAGE
1
OF

**APPENDIX C
PREVIOUS INVESTIGATIONS**

COMPLIANCE ENGINEERING COMPANY

REPORT ON DALY # 2 SURFACE CAVE

INTRODUCTION

On or about August 4th a hole appeared in the center of the Daly #2 shaft dump. United Park had filled this shaft by dozing dump material into the collar of the shaft. The Deer Valley Resort called in Compliance Engineering to investigate the incident and to propose corrective measures.

The hole widened and it became obvious that larger openings than the shaft must be involved. The records show that levels were cut off the shaft at 100 foot intervals. There does not seem to have been any stopping (mining of ore underground) above the 500 level.

The most probable explanation of the origin of the cave is that it began at in depth and worked its way upward along the fissure on which the ore occurred, crossing the shaft at some unknown depth.

Caving continued for over a week. Large pieces reverberated down the shaft, making it dangerous to stand near the lip and observe the caving or to consider going down into the opening.

INSPECTION

An armored "bird cage" suspended from a crane or cherry picker appeared to be the most feasible way of making an inspection. During the mobilization of this equipment the caving seemed to slow down a bit. However by the time the cherry picker was rigged on the dump, caving had begun again, although the larger pieces no longer reverberated along the walls as they were falling.

RESULTS

The inspection was made on Friday, August 19th by Dave Bovee and James McKenzie of Centennial Development Company. Bovee is a shaft superintendent and manager of his own shaft sinking company with experience all over the U.S. McKenzie is an registered engineer (mining) and design and estimating engineer for Centennial, a mine construction and shaft sinking company in Salt Lake with experience all over the U.S. Both men have had extensive experience in grouting.

The bird cage was able to go only 15 feet below the surface which was deep enough to observe that the hole through which the muck had been falling to unknown depths had plugged off. The sketch accompanying this report shows the situation at the bottom. At the end of the day caving was still continuing, particularly on the south side under the old hoist foundations and on the east side where a fissure trending northeast was exposed in the wall.

RECOMMENDATIONS

The problem can be split into three phases. First, the hazard to the public must be eliminated as rapidly as possible. The fence built around the periphery is adequate but experience has shown that no matter how good a fence is and how well it is patrolled certain individuals are attracted to seeing what is on the other side. Secondly, the area must be stabilized so that if caving from another point underneath eats its way upward to the surface in a manner similar to the present incident it would not break through to the surface. Finally, if the area is to be used as the lower terminal for a lift, an extensive grouting program will be necessary. Our specific recommendations follow:

(1) Immediate hazard elimination

The open hole should be filled as rapidly as possible. In our opinion the Daly West dump material

will be satisfactory, and since it is the closest it will be the cheapest source. The contractor should not be allowed to send his trucks out on the dump because of the hazard involved to the driver and truck and also to prevent damage to the rock around the opening. The weight and pounding of the trucks could weaken the rock which is important to the stability of the area.

The contractor should be required to install a hopper at about the fence line feeding a belt discharging at the lip of the hole. The belt should be supported on timber pads to distribute the weight as much as possible.

When the hole is filled bench marks should be placed on top of the muck and located accurately with respect to bench mark outside the fence line, and these checked periodically to measure subsidence.

(2) Stabilization of the area

Next spring, if the measurements show the fill has stabilized, holes should be drilled around the periphery to a depth of 100 feet and any voids filled with mine tailings mixed with water as in standard mine sand fills.

In addition, some information might be gained by instrumenting the area and by seismic work. One member of the mining faculty at the U of U has been particularly successful in instrumenting the dumps at Bingham. The operators there say he has been able to predict movement in the dumps 24 hours in advance. Also seismic work might show voids near enough to the surface to be suspect. The U.S. Bureau of Mines has had a program going for years on this kind of mine opening detection. Their knowledge and help would be useful.

(3) Long term preservation of the surface

If it is necessary to utilize the surface in the general area for lift terminals, parking lots or

other open type structures it will be necessary to grout the remaining bedrock to insure the necessary structural integrity. Grouting is an established technique used in mines and underground construction of all types, and particularly in dam construction. Unfortunately it is expensive and unpredictable. In the opinion of Bovee, McKenzie and Quigley, a grouting job at Daly #2 might cost \$100,000. The cap rock under the dump might take grout and again the grout might be carried away in channels and have no effect on the rock surrounding the grout holes. One small test might help the decision, but the most prudent course would be to lay out the resort facilities so that the Daly #2 area is not utilized.

SUMMARY

We regret that the unstable condition of the cave, the lack of maps and the nature of the bedrock make it impossible for us to predict future conditions in the immediate area. We urge you to contract immediately to place fill in the area. This will not only stabilize the Daly #2, but it will also help prevent the possibility of another cave spreading laterally from the present bottom and creating a wider unsafe area at the surface.

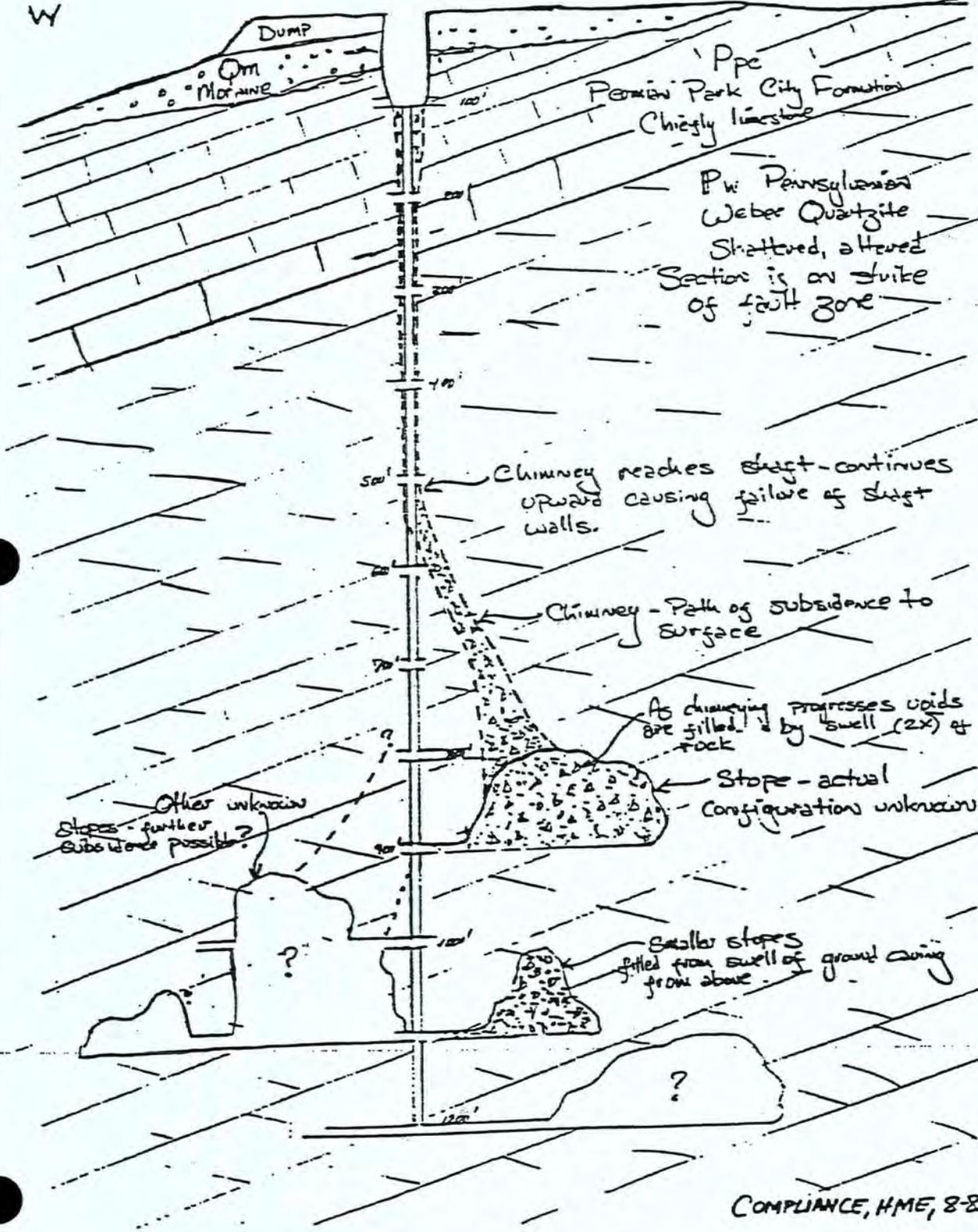
James Quigley, Chairman

DALY #2 Hypothetical Rendering of possible source of subsidence at surface through chimneying from slope

100'

W

E



WELL No 2 SINKHOLE

OBSERVATION ON AUGUST 19, 1983

50' ±

S

N.

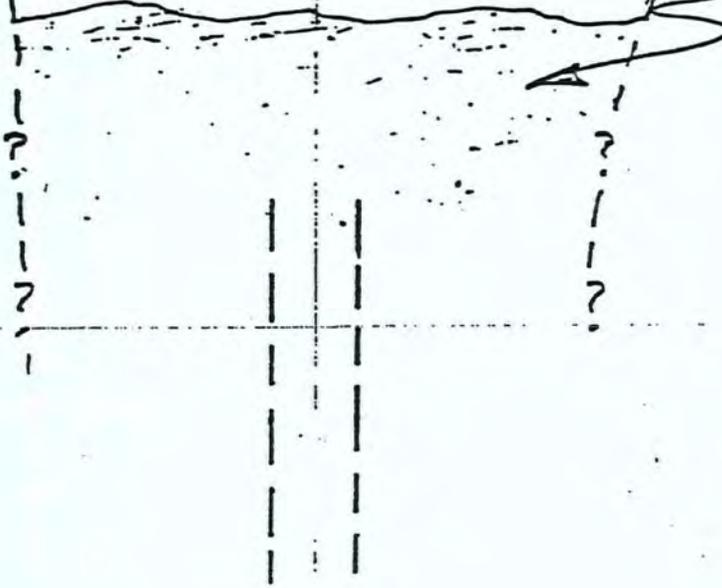
95' ±

30'-35' ±

15'-20'

5'-10'

CAUSED MATERIAL

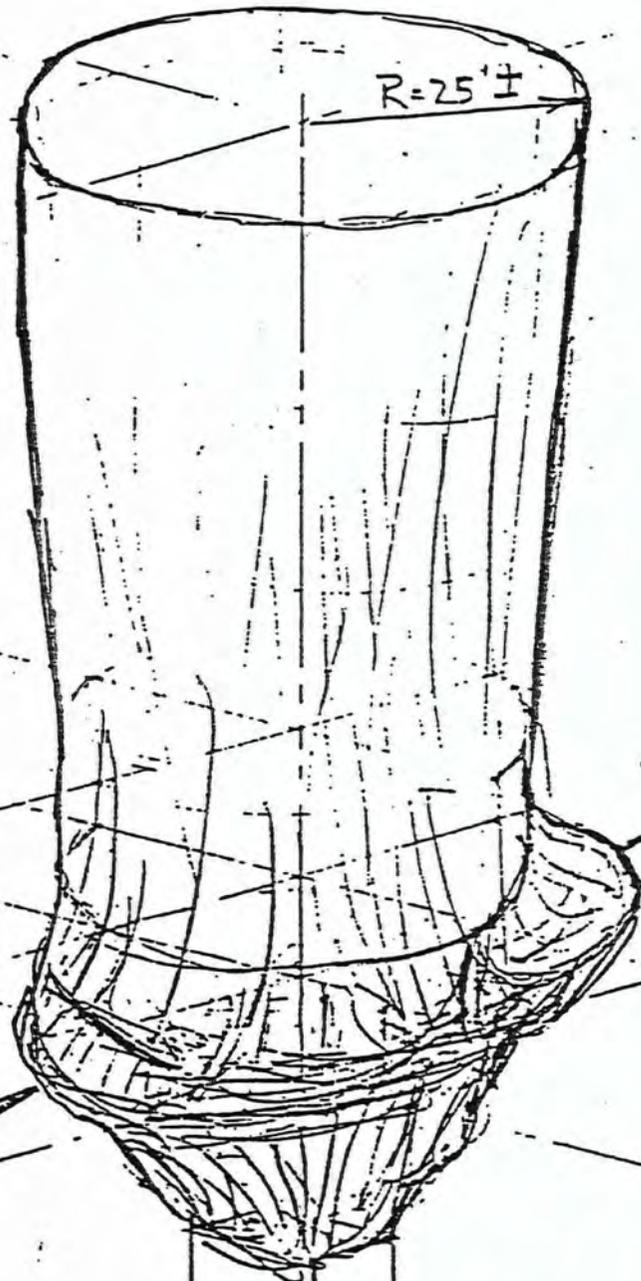
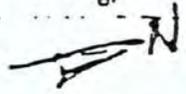


NORTH SOUTH PROFILE

DLLY No 2 SINKHOLE
OBSERVATION ON AUGUST 19, 1983

SHEET

OF



$R=25' \pm$

15'-20' UNDERCUT
ON NORTH SIDE

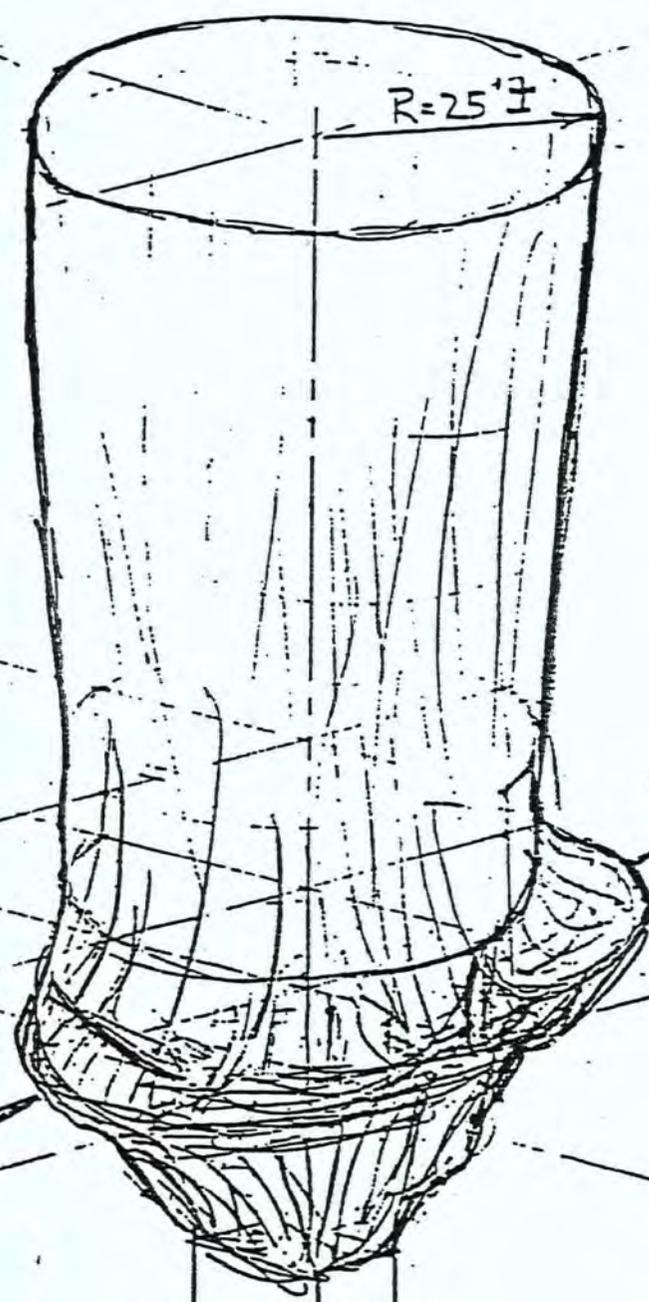
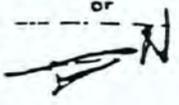
10' UNDERCUT
ON SOUTH SIDE

Volume to fill:
5,000 to 7,500 yds.³

DILLY NO 2 SINKHOLE
OBSERVATION ON AUGUST 19, 1983

SHEET

OF



10' UNDERCUT
ON SOUTH SIDE

15-20' UNDERCUT
ON NORTH SIDE

Volume to fill:
5,000 to 7,500 yds.³



Applied Geotechnical Engineering Consultants, Inc.

September 10, 1993

Fabian and Clendenin
215 South State Street, 12th Floor
Salt Lake City, Utah 84111

Attention: Rosemary J. Beless

Subject: Mine Waste Rock Testing
Empire Canyon Development
Park City, Utah
Project No. 28493

Dear Ms. Beless:

Applied Geotechnical Engineering Consultants, Inc. was requested to perform laboratory tests on samples of mine waste rock and imported rock at the Daly West Mine located in Section 29, Township 2 South, Range 4 East, Salt Lake Base and Meridian in Summit County, Utah. The mine waste rock and import materials were tested to determine their suitability for use as pavement base and subbase materials. Three types of materials were sampled and tested. These materials are 1) mine waste rock which consists predominantly of fine to coarse gravel, 2) mine waste rock which consists of silty gravel with sand, and 3) imported fine to coarse gravel. The first two materials consist predominantly of limestones with some quartzite and igneous rock. The last material consists predominantly of quartzite.

The two coarser samples were tested for gradation, sodium sulfate soundness (weathering) and L.A. abrasion (wear). The sample which contains a considerable amount of silt and sand size particles was tested for Proctor and California Bearing Ratio (pavement support capacity).

Results of the sodium sulfate soundness and L.A. abrasion tests were as follows:

<u>Material Source</u>	<u>L.A. Abrasion % loss</u>	<u>Sodium Sulfate Soundness, % loss</u>
Daly/West Mine	25.1	5.4
Import	25.2	1.8

The gradation of the material as sampled is listed in the following table.

Sieve Size	Percent Passing					
	3"	2-1/2"	2"	1-1/2"	1"	3/4"
Daly West Mine	100	94	79	48	12	3
Import Material	100	96	85	41	10	3

A qualitative examination of the rock used in the sodium sulfate soundness test after testing follows.

Sieve Size, in.	Particles Exhibiting Distress								Total No. of Particles Before Test
	Splitting		Crumbling		Cracking		Flaking		
	No.	%	No.	%	No.	%	No.	%	
Daly West Mine Sample									
2 1/2 - 1 1/2	2	8	0	0	0	0	4	15	26
1 1/2 - 3/4	0	0	1	2	0	0	3	7	41
Import Material									
2 1/2 - 1 1/2	1	4	0	0	3	11	0	0	27
1 1/2 - 3/4	0	0	0	0	2	4	0	0	46

Results of the compaction and gradation tests performed on waste rock containing silt and sand size particles are presented on Figure 1 and results of the California Bearing Ratio test are presented on Figure 2.

Based on the test results, the mine waste rock and import have good to excellent qualities for use as pavement materials. UDOT requires that the aggregate L.A. abrasion be less than 40 to 50 percent and that the soundness loss be less than 16 pounds. The coarser materials could be processed to provide aggregate for asphaltic and Portland cement concretes and base course. Our experience with these type of materials indicates that the import quartzite materials would be somewhat more abrasive to the crusher and conveyor systems which would be used to process the materials. This would result in somewhat higher production costs for the quartzite materials when compared to the limestone.

The mine waste rock which contains a considerable amount of fines could be used as embankment and/or subbase material. A California Bearing Ratio of 19 percent was obtained for this material when compacted to approximately 95 percent of the maximum dry density as determined by ASTM D-698.

Page 3

Fabian and Clendenin
September 10, 1993

If you have any questions, or if we can be of further service, please call.

Sincerely,

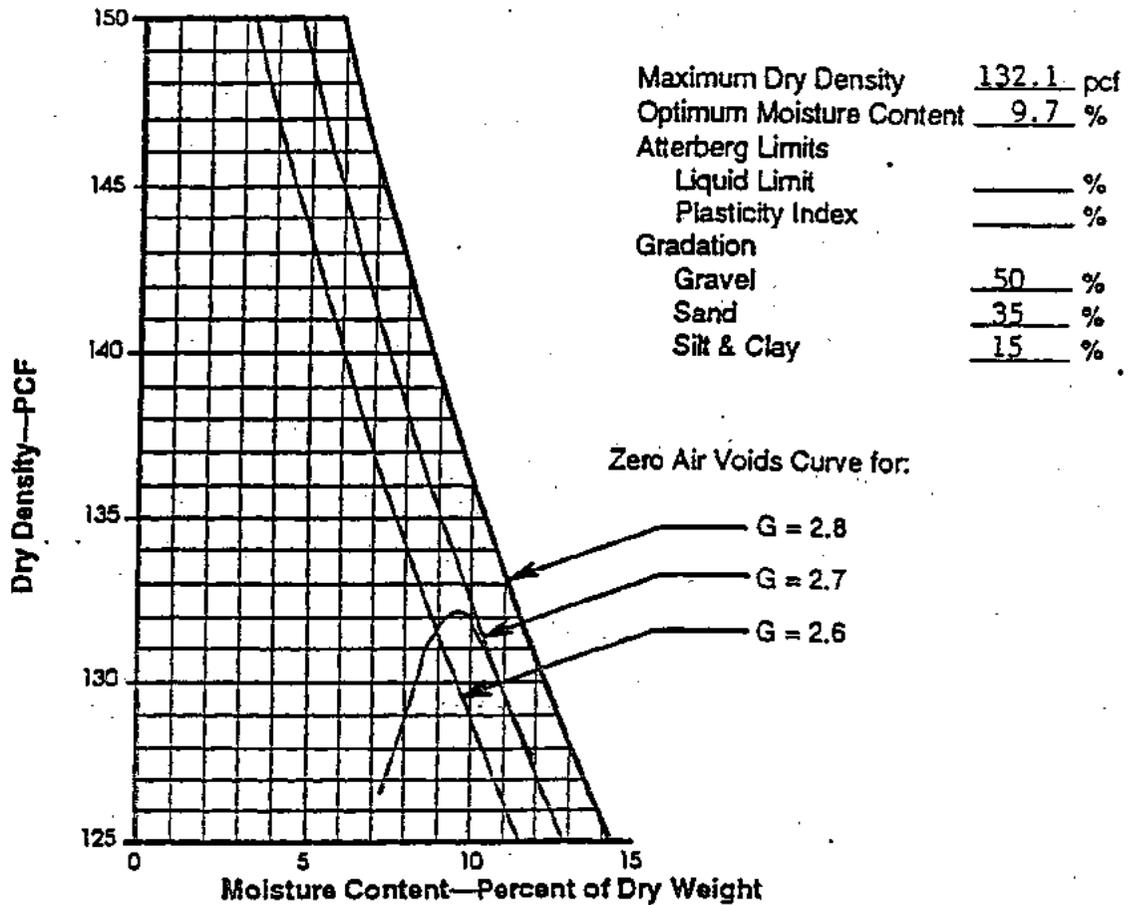
APPLIED GEOTECHNICAL ENGINEERING CONSULTANTS, INC.

Douglas R. Hawkes

Douglas R. Hawkes, P.E., P.G.

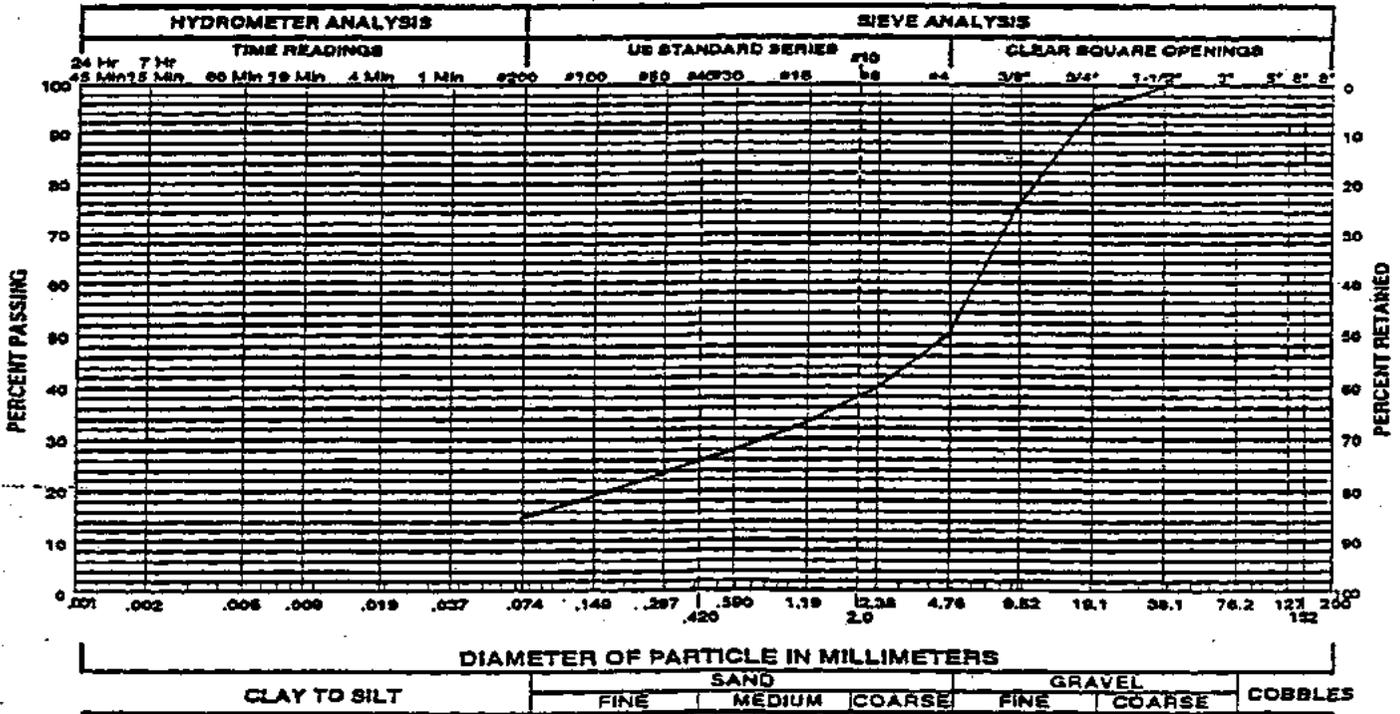
Rev. by JEN, P.E.
DRH/cs

Applied Geotechnical Engineering Consultants, Inc.



Compaction Test Procedure ASTM D-698

Sample of: Mine Waste (Silty gravel w/Sand) From: Daly West Mine



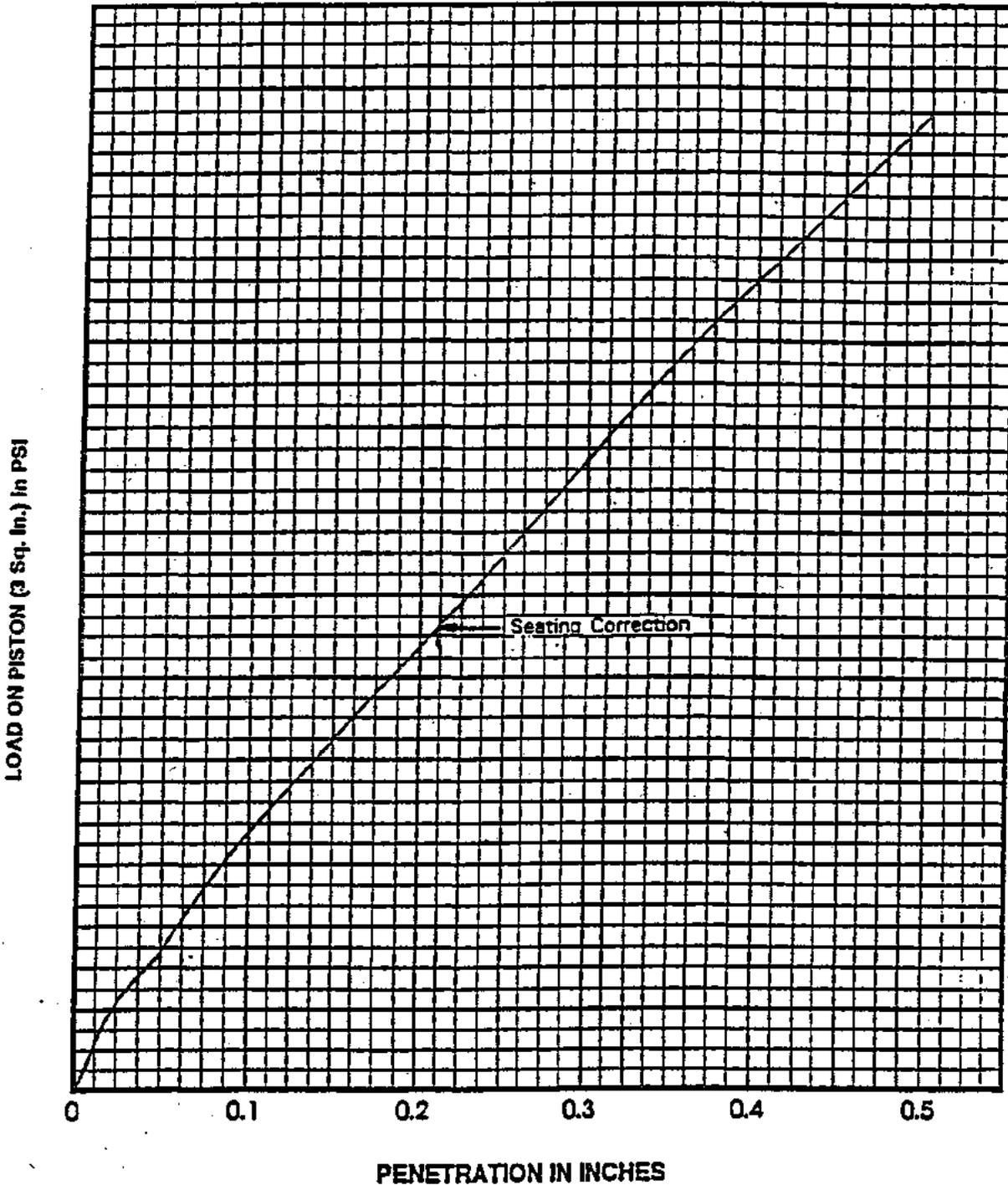
GRADATION &

Project No. 28493

COMPACTION TEST RESULTS

Figure 1

Applied Geotechnical Engineering Consultants, Inc.



Sample of Mine Waste (Silty gravel with Sand)
 Location Daly West Mine
 Method of sample preparation Remolded to 95% of ASTM D-698 maximum at optimum
 Sample penetration after soaking 67 hours moisture
 Dry density before soaking 132.1 pcf; after soaking 132.1 pcf
 Moisture Content:
 Molded 9.7 % Top 1-inch after soak 11.0 %
 Average after soak 10.1 %
 Swell 0 %
 Bearing Ratio of Sample 19 % with a surcharge of 25 lb.



STATE OF UTAH
 NATURAL RESOURCES & ENERGY
 Utah Geological & Mineral Survey

RECEIVED

JAN 13 1982

MINE HAZARD ELIM.

Scott M. Matheson, Governor
 Temple A. Reynolds, Executive Director
 Genevieve Atwood, State Geologist

606 Black Hawk Way • Salt Lake City, UT 84108 • 801-581-6831 PARK CITY CORPORATION

January 13, 1982

Ms. Jennifer Harrington
 Park City Planning Commission
 Marsac Building
 Park City, UT 84060

Dear Ms. Harrington:

At your request I have examined the Mine Hazards Elimination Study for Deer Valley. The report appears to be comprehensive and to indicate that the potential hazards from underground openings have been addressed adequately.

Sincerely,

Bruce N. Kaliser

BNK/ay

Board/Kenneth R. Poulson, Chairman
 Laurence H. Lattman
 Peter E. Matthies



Robert W. Bernick • Benton Boyd
 Natalie A. Malinckrodt
 Elliot Rich

SUMMARY OF HAZARDS, DEER VALLEY RESORT AREA

<u>Hazard Number</u>	<u>Name</u>	<u>Type Hazard</u>	<u>Original Depth/Length</u>	<u>Olympus Coordinates</u>
1.	Ontario #4	Vertical Shaft	250'	25,290 E 20,180 N
2.	Unknown	Vertical Shaft	50'	26,600 E 20,300 N
3.	Constellation	Vertical Shaft	250'	27,600 E 21,300 N
4.	Unknown	Vertical Shaft	40'-60'	25,900 E 16,900 N
5.	Unknown	Vertical Shaft	40'-60'	24,350 E 16,600 N
6.	Unknown	Adit	20'-50'	22,750 E 15,500 N
7.	Unknown	Expl. pit	8'	22,250 E 14,500 N
8 & 9.	see below			
10.	Flagstaff	Vertical Shaft	1000'	22,450 E 11,400 N
11.	New York	Vertical Shaft	1040'	26,700 E 14,200 N
12.	Naildriver	Vertical Shaft	980'	27,200 E 14,100 N
13.	Parley's Park	Vertical Shaft	1000'	26,500 E 16,420 N
13-b.	Unknown	Vertical Shaft	40'-100+'	26,520 E 16,490 N
14.	Lady of the Lake	Vertical Shaft	300+'	27,460 E 16,410 N
15.	Clara	Vertical Shaft	65'	28,400 E 15,900 N
16.	deleted, non-hazard			
17.	Hawkeye McHenry	Vertical Shaft	1000'	31,600 E 16,500 N
18.	Wabash	Vertical Shaft	820'	26,500 E 15,570 N
19.	B.P.O.E.	Vertical Shaft	35'	26,500 E 19,600 N
20.	Unknown	Inclined Adit	50'-100'	25,850 E 20,700 N
addendum-workings adjacent to D.V.R.-not on Resort property				
8.	Quincy	Vertical Shaft	500+'	21,300 E 13,700 N
9.	Little Bell	Vertical Shaft	500+'	21,400 E 12,900 N
21.	Lucky Bill	Vertical Shaft	500+'	22,400 E 11,220 N
22.	Daly	Vertical Shaft	1060'	21,300 E 15,300 N
23.	Daly #2	Vertical Shaft	1400'	22,100 E 16,200 N
24.	Park City Con.	Vertical Shaft	900'	30,250 E 22,350 N
25.	Queen Esther	Vertical Shaft	350'	31,180 E 26,200 N
26.	Ontario #2	Vertical Shaft	1500'	25,300 E 17,200 N

NAME: Flagstaff Shaft

NATURE: Vertical shaft, 1000' depth, open but capped with concrete before 1980 study. Small openings sloughing at edge of cap. Old chain-link fence is deteriorated.

OLYMPUS COORDINATES: 22,450 E 11,400 N

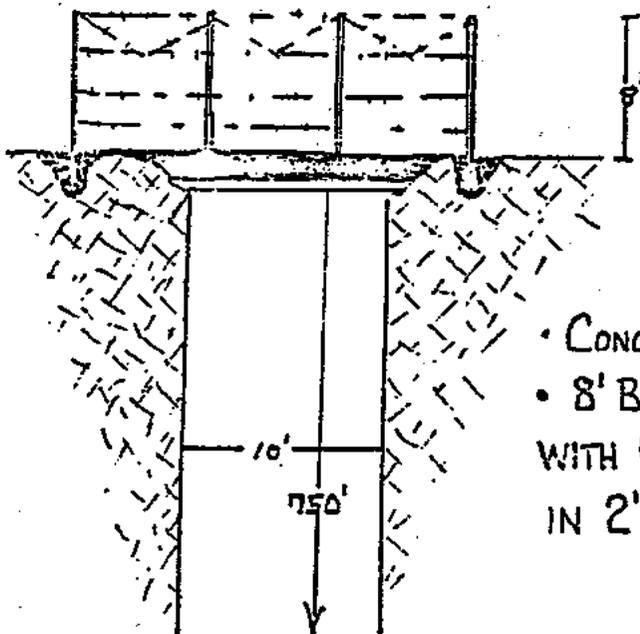
DEER VALLEY PARCEL: None

DESCRIPTION OF LOCATION: At 9080 on county line just west of Flagstaff Mtn. Summit.

STATUS OF MITIGATION, 12/15/81: Concrete cap was widened over openings and a new fence constructed in 1980. both are intact but should be inspected annually.

SPECIAL CONSIDERATIONS: Annual inspection of fence and cap.

HAZARD #10 FLAGSTAFF SHAFT



- CONCRETE CAP WAS PATCHED
- 8' BARBED WIRE FENCE BUILT WITH 4"X4" REDWOOD POSTS SET IN 2' OF CONCRETE.

NAME: New York Shaft

NATURE: Collapsed vertical shaft, originally 1040' deep, remaining cone 20' deep.
Some continued sloughing indicated.

OLYMPUS COORDINATES: 26.700 E 14.200 N

DEER VALLEY PARCEL: None

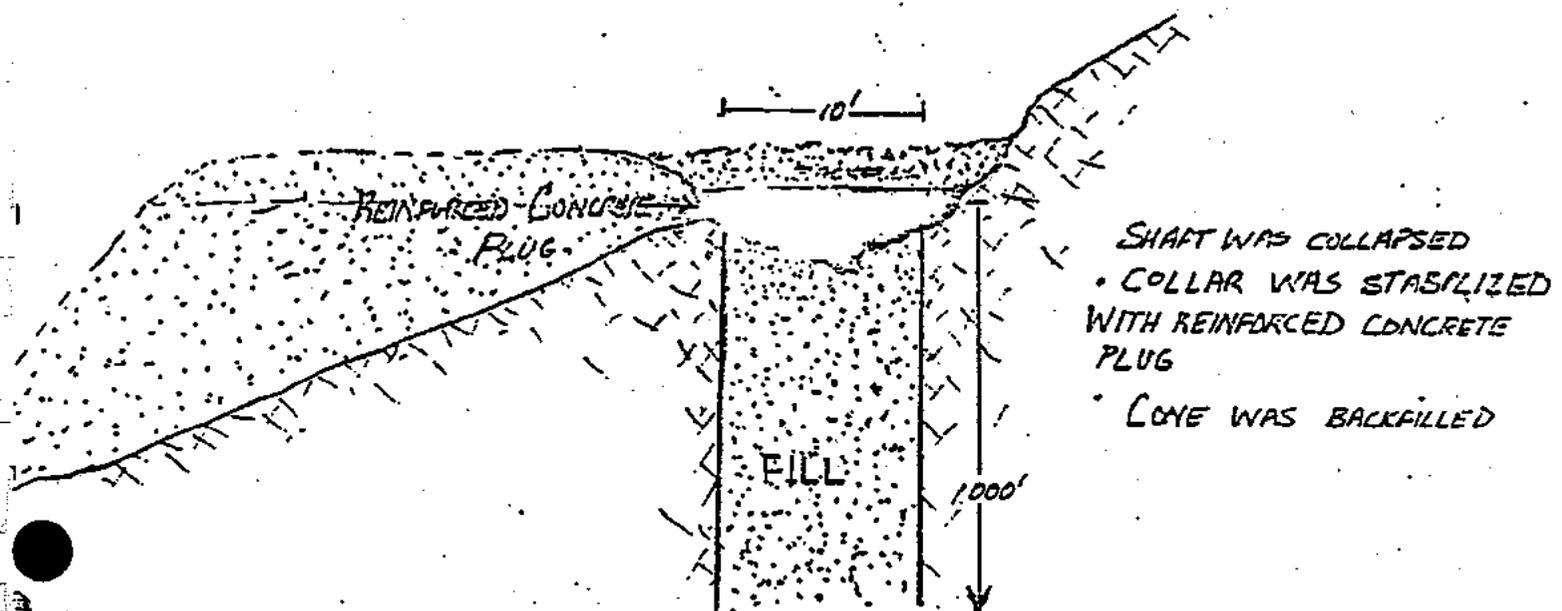
DESCRIPTION OF LOCATION: At 8280' on NW slopes of Bald Mtn., 800' E. of
upper Ontario Canyon drainage, approx. 1000' S.
of new maintenance building.

STATUS OF MITIGATION, 12/15/81: A reinforced concrete plug was poured in
the cone in 1980 and then backfilled. There
is no indication of further sloughing or sub-
sidence.

SPECIAL CONSIDERATIONS: Only in the event of construction.

HAZARD # II

THE NEW YORK SHAFT



NAME: Naildriver Shaft

NATURE: Collapsed vertical shaft, originally 980' deep. Appears to have recently subsided at surface. Hazardous pit was 60' deep by 60' across in 1980.

OLYMPUS COORDINATES: 27,200 E 14,100 N

DEER VALLEY PARCEL: None

DESCRIPTION OF LOCATION: At 8480' on NW slopes of Bald Mtn., 700' E. of upper Ontario canyon drainage, facing NW on steep-slope.

STATUS OF MITIGATION, 12/15/81: The base of the cone was stabilized in two steps in autumn of 1980 and spring of 1981 with two independent reinforced concrete slabs as per attached drawings. Pit was backfilled

SPECIAL CONSIDERATIONS: in summer of 1981 and shows no indication of subsidence since first plug in 1980.

Only in the event of construction at site.

NAME: Wabash Shaft

NATURE: Collapsed vertical shaft, originally 820', remaining cone is 20' deep.

OLYMPUS COORDINATES: 26,500 E 15,570 N

DEER VALLEY PARCEL: Maintenance parcel

DESCRIPTION OF LOCATION: At center of 'Wabash flat' in Ontario Canyon, just west of new maintenance building.

STATUS OF MITIGATION, 12/15/81: The shaft was stabilized in autumn of 1981 using two independent slabs of reinforced concrete. The upper slab incorporated pre-stressed beams for added structural strength. See attached drawing.

SPECIAL CONSIDERATIONS:

Stabilization measures were formulated so as to render this former shaft site competent for construction.

NAME: Lucky Bill

NATURE: Vertical shaft, was bulldozed shut before 1980 study, still closed.
Original depth unknown. Not currently a hazard.

OLYMPUS COORDINATES: 22.400 E 11.220 N

DEER VALLEY PARCEL:

DESCRIPTION OF LOCATION: At 8890' just east of Empire Pass on west side of
Flagstaff Mtn. 500' north of Wasatch Co. line,
500 west of Flagstaff shaft.

STATUS OF MITIGATION, 12/15/81: Bulldozed shut before 1980 with no further
sign of subsidence. Occasional inspection ad-
visable.

SPECIAL CONSIDERATIONS: Only in the event of construction or further sub-
sidence.

NAME: Daly and Daly #2 Shafts

NATURE: Closed vertical shafts. Daly was 1060' deep and #2 1,400'. Both shafts are currently closed at surface and do not represent an imminent hazard.

STAMPUS COORDINATES:

21,300	15,300
22,100	16,200

 E N

DEER VALLEY PARCEL: None, Possibly on future Flagstaff ski area

DESCRIPTION OF LOCATION: Both shafts are on the east side of Empire Canyon, below the current U-224 alignment. The Daly is at 8140' just 100' east of main drainage, the #2 is at 8180' on a broad ridge 1000' north of current U-224 Alignment.

STATUS OF MITIGATION, 12/15/81: Alignment.

Both shafts are currently closed, with evidence of closure by bulldozer. Both should be occasionally inspected.

SPECIAL CONSIDERATIONS:

Only in event of construction at site or further subsidence.

NAME: Queen Esther Shaft

NATURE: Closed vertical shaft, original depth approx. 350'. Remaining surface pit was 10' deep.

OLYMPUS COORDINATES: 31,180 E 26,200 N

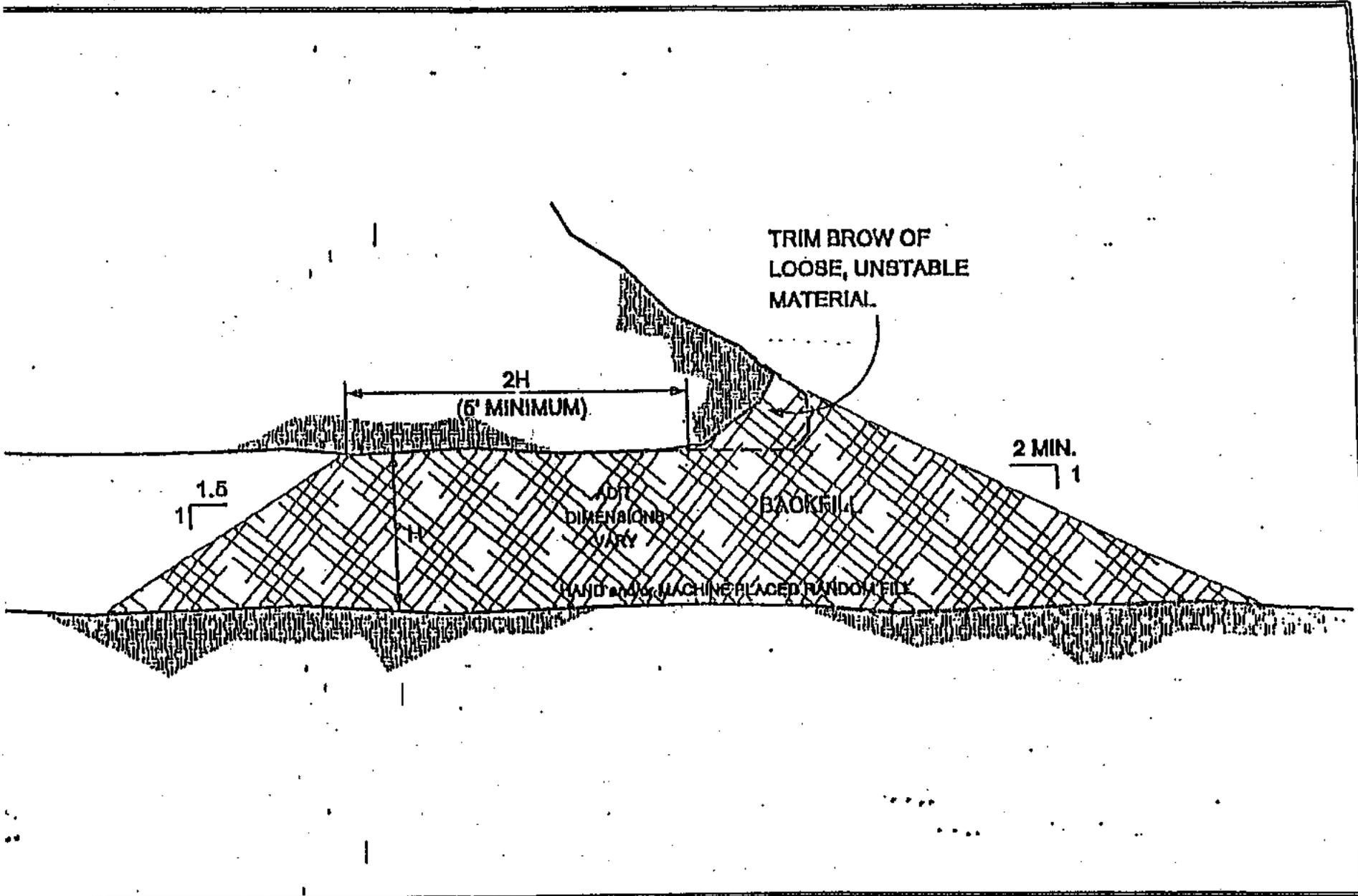
DEER VALLEY PARCEL: None, on Queen Esther Village parcel, off of building site.

DESCRIPTION OF LOCATION: Against east side of north Deer Valley, above former catchment basin. At 7160', 200' northeast of Heber road elbow.

STATUS OF MITIGATION, 12/15/81: A concrete slab measuring 12' across was poured in the collar the summer of 1981 and backfilled. There is no sign of further subsidence.

SPECIAL CONSIDERATIONS: Only in the event of construction at the site. Current P.U.D. does not indicate construction at shaft site.

APPENDIX D
STANDARD MINE CLOSURE DIAGRAMS

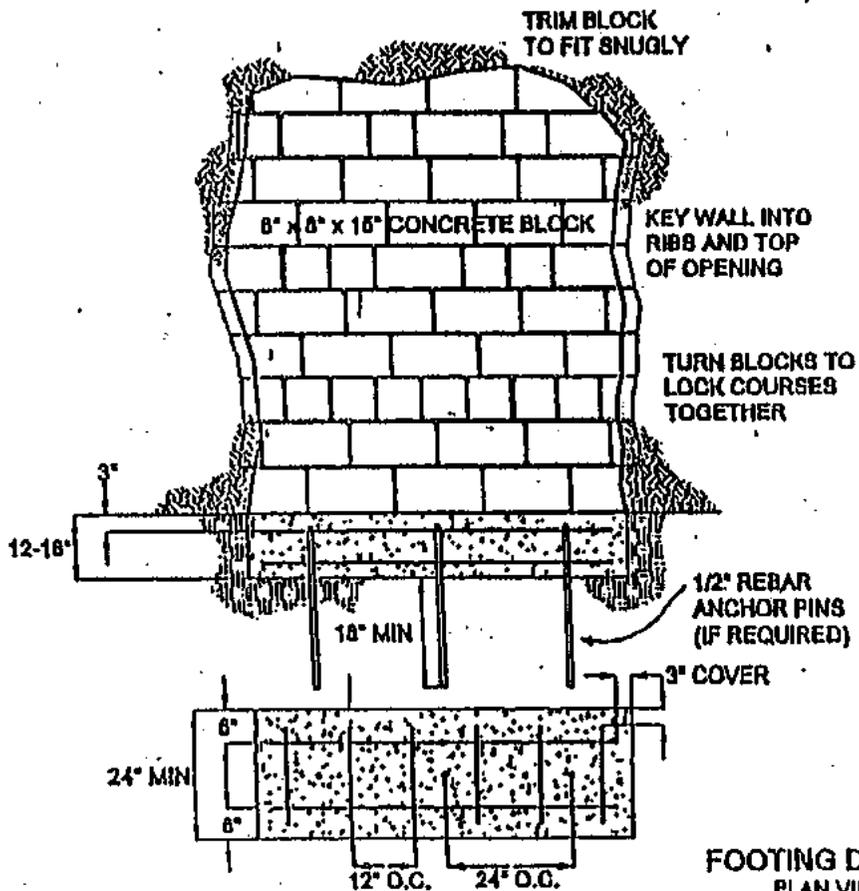



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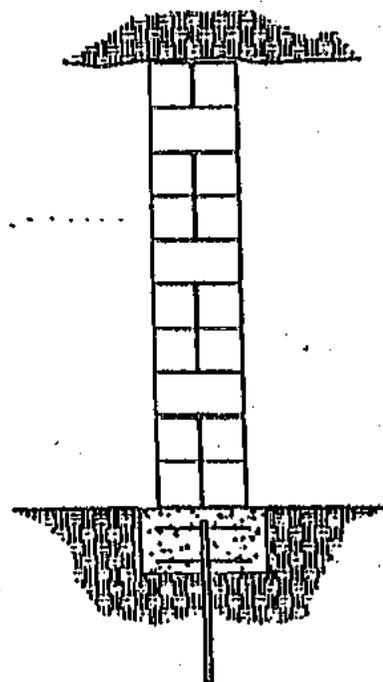
FIVEMILE PASS/WEST DIP
PROJECT
 AMR/045/904

ADIT BACKFILL CLOSURE	
Scale: as noted	Drawn by: JCR
Refer to Spec Section 0250	Sheet C1 of C14

TYPICAL ELEVATION

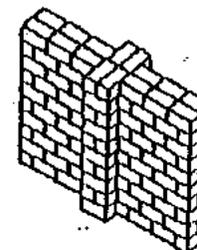


TYPICAL SECTION



CONCRETE FOOTER AND REBAR ANCHOR PINS MAY BE OMITTED WITH OWNER'S APPROVAL WHERE THE GILL IS COMPETENT ROCK

PILASTER DETAIL



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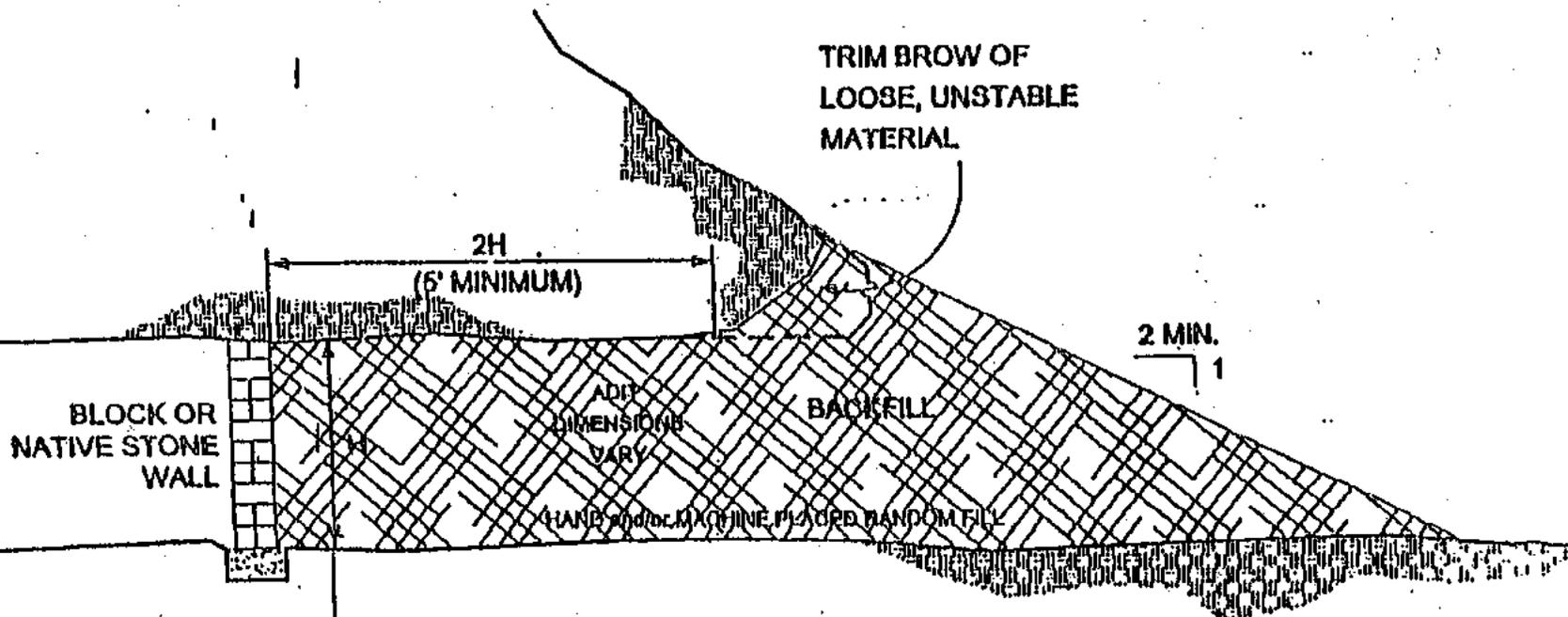
BLOCK WALL CLOSURE

Scale: as noted

Drawn by: JCR

Refer to Spec Section 0250

Sheet C3 of C14



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FIVEMILE PASS/WEST DIP
 PROJECT
 AMR/045/904

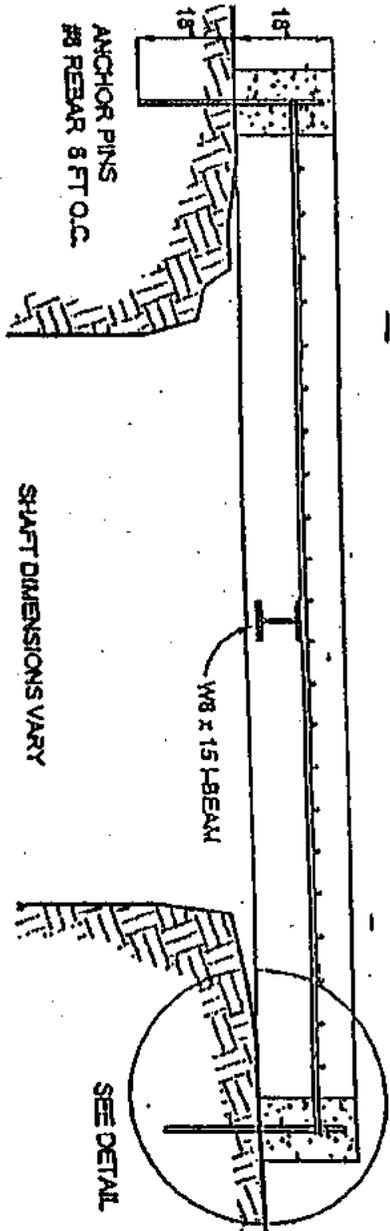
WALL AND BACKFILL CLOSURE

Scale: as noted

Drawn by: JCR

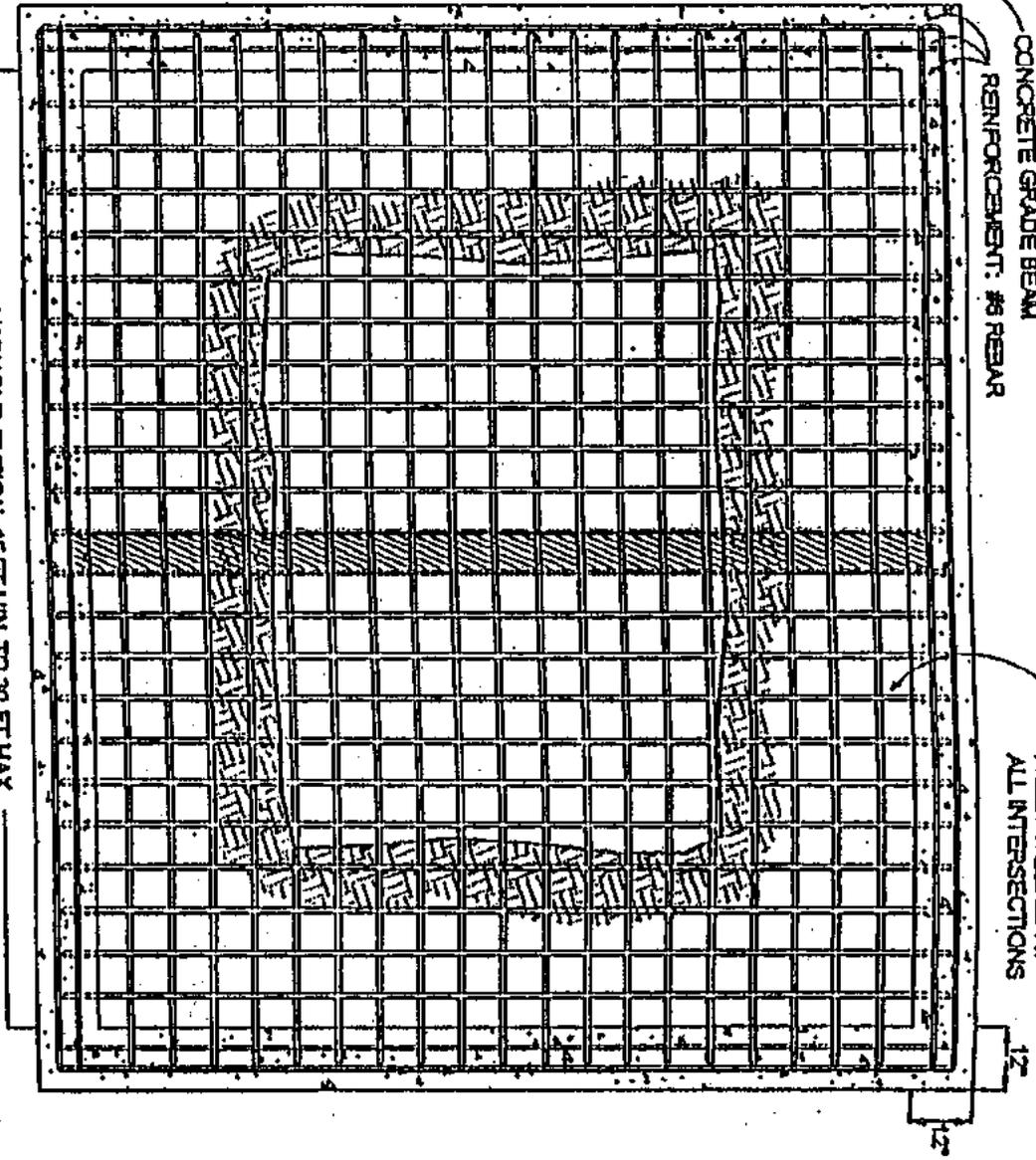
Refer to Specs Section 0250

Sheet C5 of C14



TYPICAL SECTION

VARIABLE, TYPICAL 15 FT MIN. TO 30 FT MAX



TYPICAL PLAN

CONCRETE GRADE BEAM REINFORCEMENT: #8 REBAR

GRATE: #8 REBAR 8 FT O.C. FILET WELDED AT ALL INTERSECTIONS

I-BEAM



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PROJECT
AMRU045/904

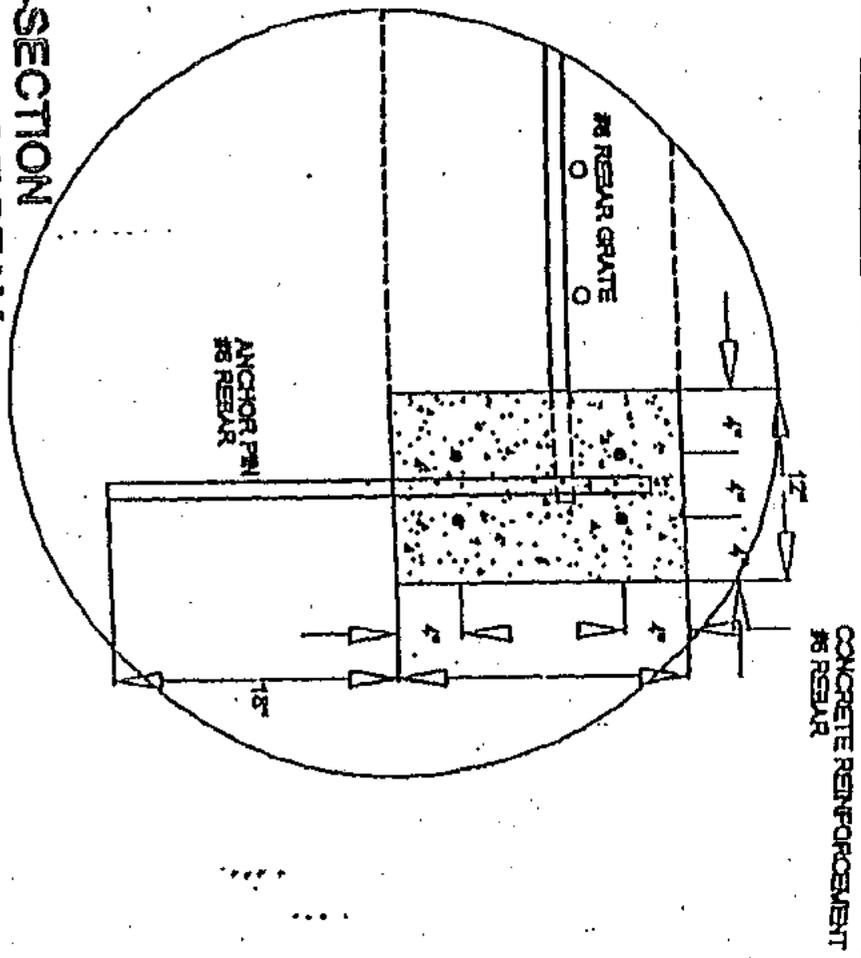
REBAR SHAFT GRATE CLOSURE (WITH I-BEAM)

Scale: as noted

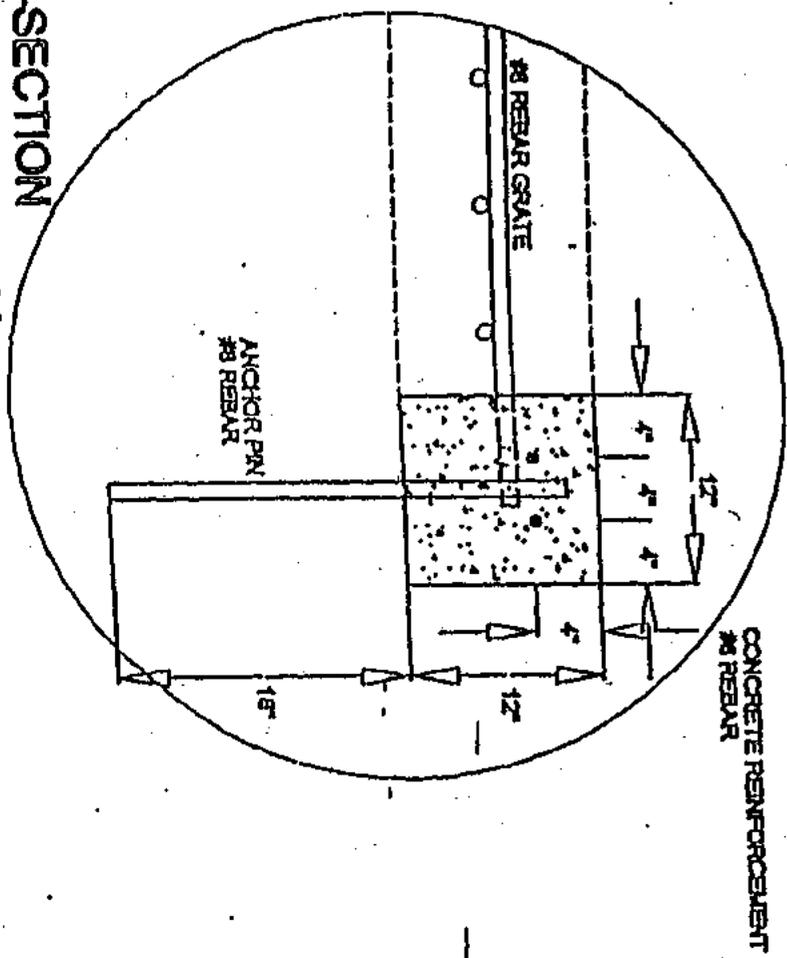
Drawn by: JCR

Refer to Spec Section 0253

Sheet C11 of C14



CROSS-SECTION
12" X 18" GRADE BEAM



CROSS-SECTION
12" X 12" GRADE BEAM

REDAR SHAFT GRATE GRADE BEAM DETAILS

Scale: as noted

Drawn by: JCR

Refer to Spec Section 0253

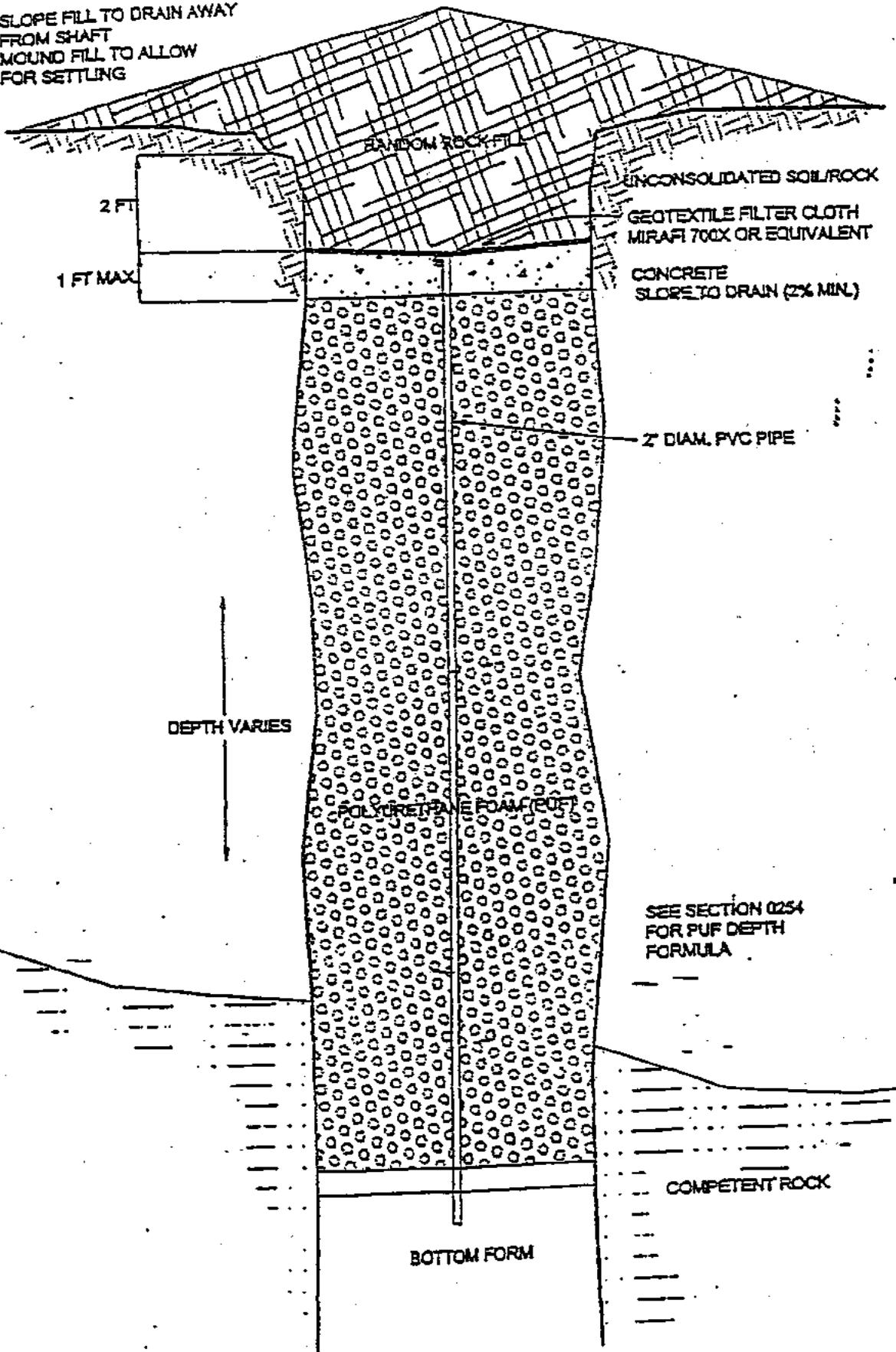
Sheet C13 of C14



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FIVEMILE PASS/WEST DIP
PROJECT
AMR/045/904

SLOPE FILL TO DRAIN AWAY FROM SHAFT
MOUND FILL TO ALLOW FOR SETTLING



2 FT
1 FT MAX

RANDOM ROCK FILL

UNCONSOLIDATED SOIL/ROCK

GEOTEXTILE FILTER CLOTH
MIRAFI 700X OR EQUIVALENT

CONCRETE
SLOPE TO DRAIN (2% MIN.)

2" DIAM. PVC PIPE

DEPTH VARIES

POLYURETHANE FOAM

SEE SECTION 0254
FOR PUF DEPTH
FORMULA

COMPETENT ROCK

BOTTOM FORM

POLYURETHANE FOAM SHAFT PLUG CLOSURE
Scale: as noted
Refer to Spec Section 0254

Drawn by: JCR

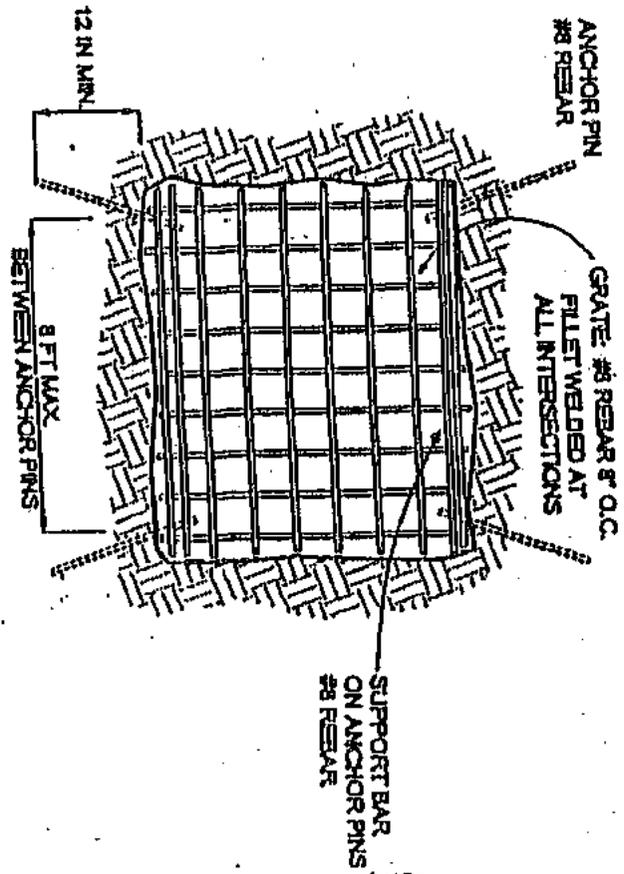
Sheet C14 of C14

FIVEMILE PASS/WEST DIP PROJECT
AMR/045/204

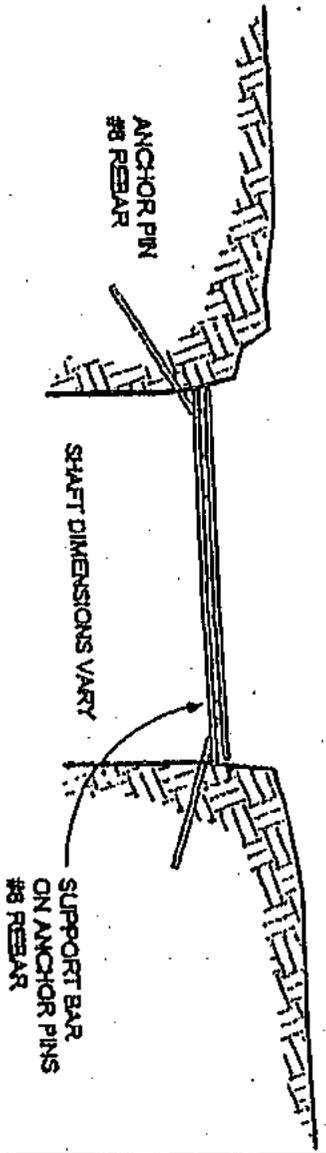
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Abandoned Mine Reclamation Program



TYPICAL PLAN



TYPICAL SECTION



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Oil, Gas & Mining
Abandoned Mine Reclamation Program

FIVEMILE PASS/WEST DIP
PROJECT
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REBAR SHAFT GRATE CLOSURE (PINNED)

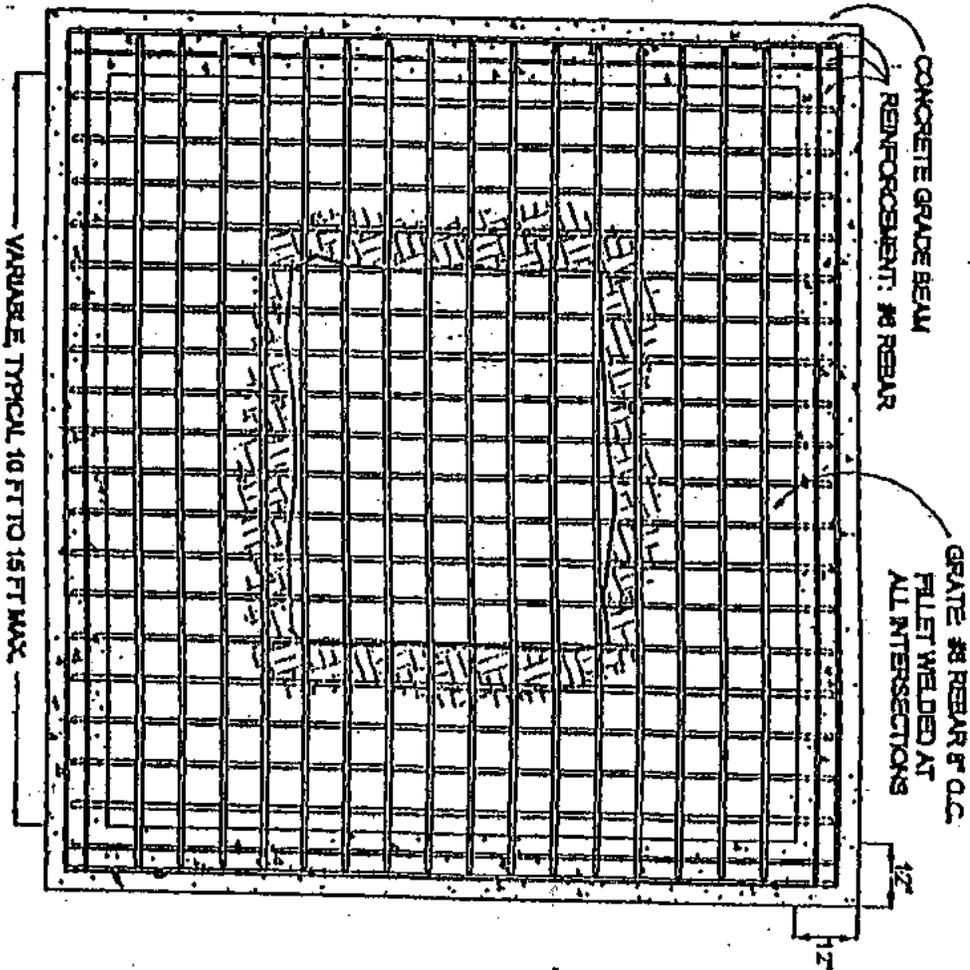
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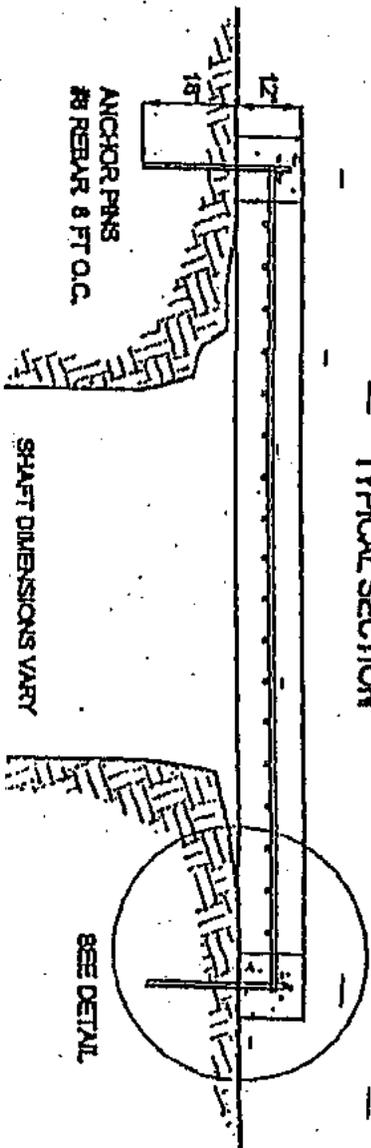
Refer to Spec Section 0253

Sheet C12 of C14

TYPICAL PLAN



TYPICAL SECTION



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Abandoned Mine Reclamation Program

FIVEMILE PASS/WEST DIP
PROJECT
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REBAR SHAFT GRATE CLOSURE

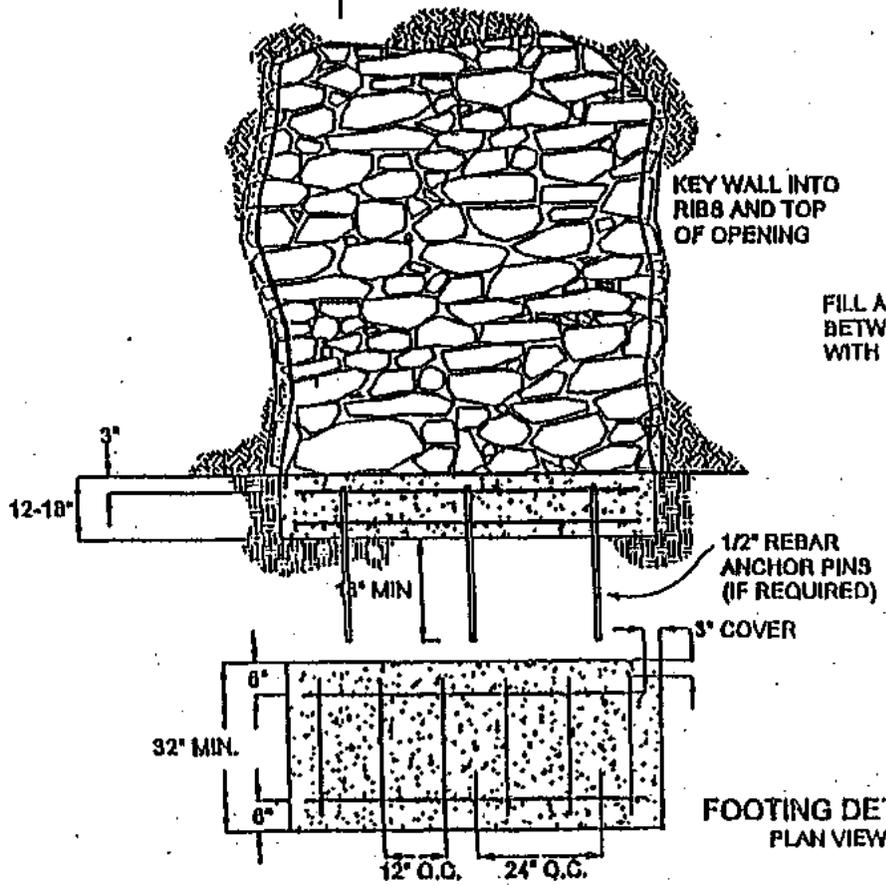
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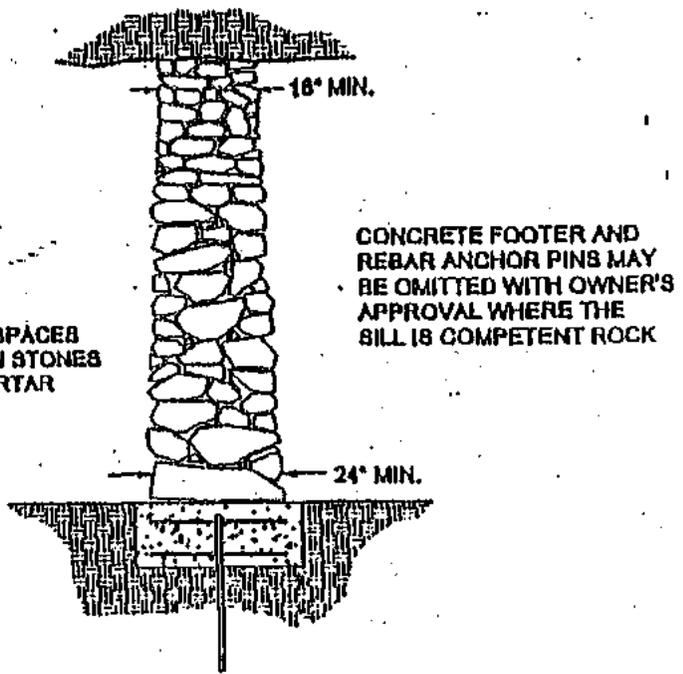
Refer to Spec Section 0253

Sheet C10 of C14

TYPICAL ELEVATION



TYPICAL SECTION



FOOTING DETAIL PLAN VIEW



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Abandoned Mine Reclamation Program

FIVEMILE PASS/WEST DIP
PROJECT
AMR/045/904

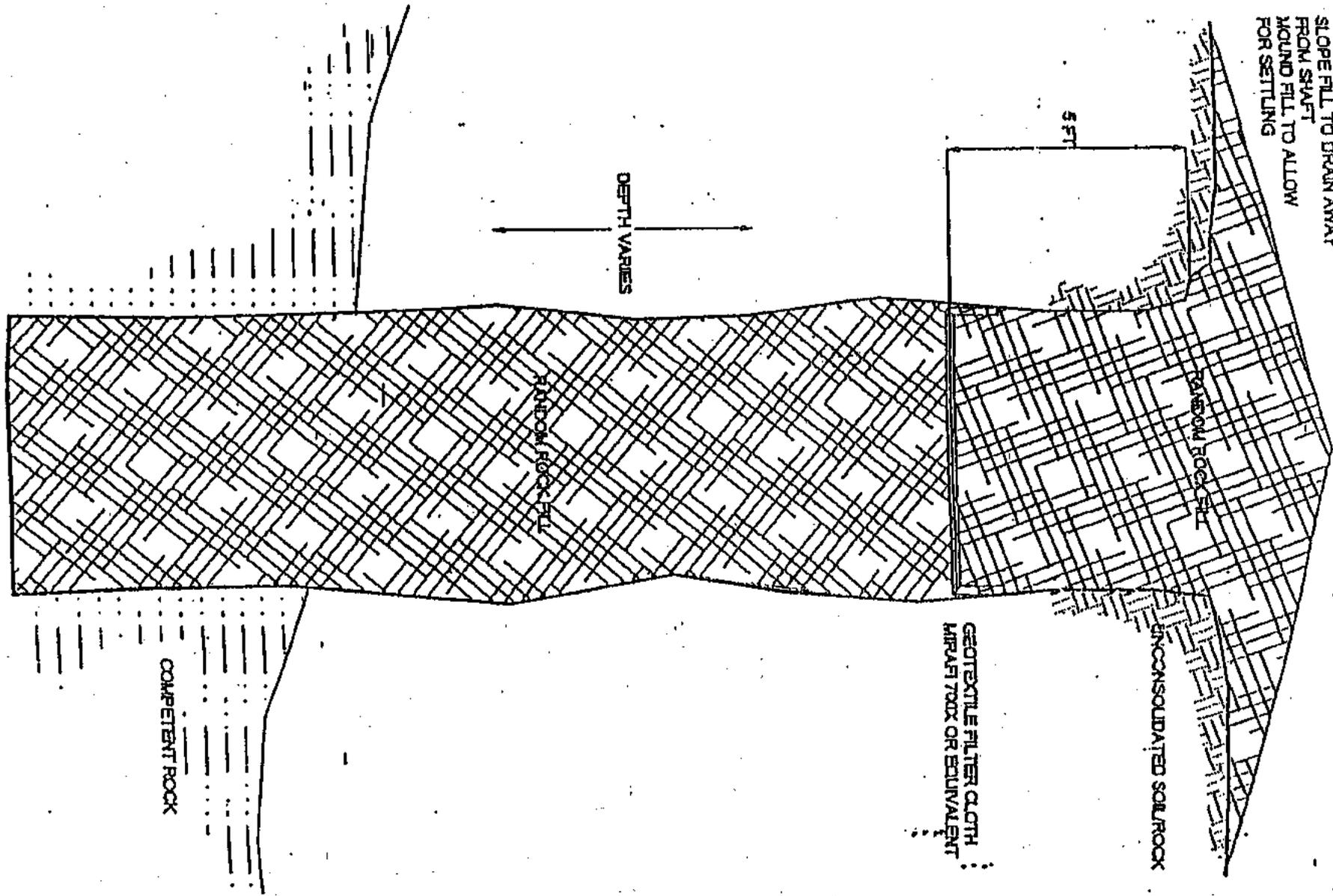
NATIVE STONE WALL CLOSURE

Scale: as noted

Drawn by: JCR

Refer to Spec Section 0250

Sheet C4 of C14



UTAH
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 Oil, Gas & Mining
 Abandoned Mine Reclamation Program

FIVEMILE PASS/WEST DIP
PROJECT
 AMIU/045/904

SHAFT BACKFILL CLOSURE

Scale: as noted

Drawn by: JCR

Refer to Spec Section 0250

Sheet C2 of C14

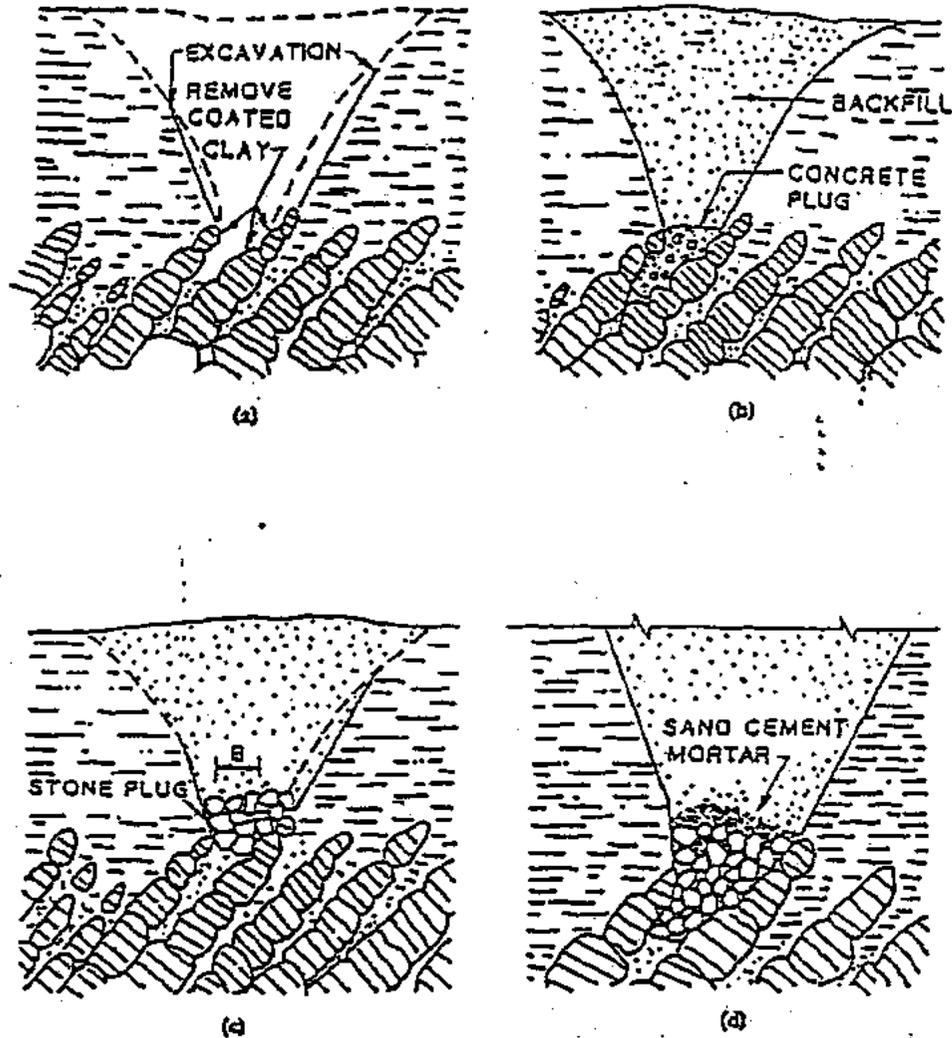


FIG. 6.1. Sinkhole Throat Filling: a. Cleaning the Narrowing Rock Throat of a Sinkhole and Removing the Clay Coating on the Rock; b. Non-reinforced Concrete Plug, Height, $H = 1.5$ Times the Width, B of the Narrowest Point of the Throat; c. Rock Fill Plug, with the Diameter of the Deeper Rock Pieces Greater than Approximately One-half of the Throat Width, B ; d. Partially Grouted Rock Fill Using Rock Smaller than One-half the Throat Width, B

When there is considerable downward infiltration, blocking downward seepage at one point can aggravate ravelling and erosion and new sinkhole activity nearby. A rock fill plug (Fig. 6.1c and d) is an acceptable alternate. Rock blocks or boulders wider than about half the rock opening width

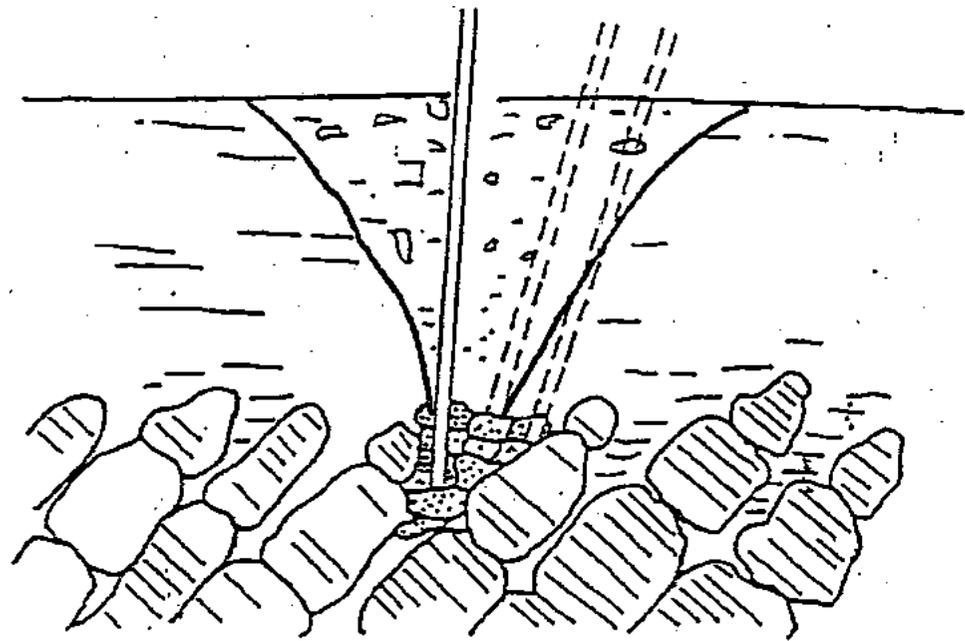


FIG. 6.2. Compaction Grout Plug in a Deep Narrow Sinkhole Throat

openings. Fill concrete or pourable fill (fluid low-strength concrete) are stable under both static and vibrating loading, but are more expensive.

When the working space for sinkhole filling is restricted, such as between buildings or under an existing structure, it is often expedient to utilize compaction grouting for the plug, followed by low-pressure grouting of the remainder of the opening, so as to minimize ground settlement. The fill grout includes the greatest sand content that is compatible with pumping in order to limit its shrinkage.

The grout pressures for filling an erosion dome (or the soil debris that cannot be removed) is controlled to avoid heave of the ground surface from the pressure. A typical safe pressure is approximately 1 lb per sq in. for each foot (23 KPa for each meter) of depth below the ground surface. Larger pressures may be possible, but must be accompanied by careful level measurements of the ground surface. Grouting is stopped at the first sign of heave, or when the grout pressure rises above the limiting pressure during continuous pumping.

When the infilling of a sinkhole throat is too stiff to displace with high pressure, a more effective, but expensive technique, *jet grouting*, may be successful, as described by Kauschinger and Welsh (1989). This process involves pumping a fluid grout into the soil with a rotating high pressure jet. The jet erodes soil and cuts stiff clays and soft erodible rock into gravel to small boulder-sized pieces. Pressures of 4,000 to 7,000 psi (30 to 50 MPa)

SINKHOLES: FOUNDATIONS IN KARST TERRAIN

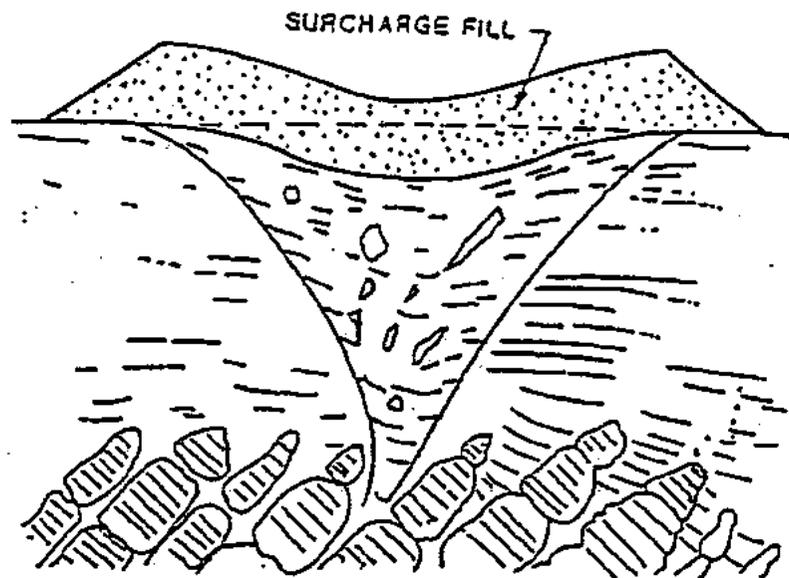


FIG. 6.3. Preloading Shallow Organic Debris and Soft Clay in a Filled Sinkhole or Solution Depression.

experience demonstrates that the risk is very small, there are additional measures in site preparation that may reduce the risk further, although it may be difficult to justify them economically.

If a dome is suspected or positively identified, it can be treated in the same way as a sinkhole. Alternatively, a hole can be drilled through its roof and the cavity filled with high slump fill concrete or similar materials (Fig. 6.4). Filling without a positive seal in the throat at the soil-rock interface will not always prevent future enlargement of the cavity, although the rate of erosion will be greatly reduced. However, in most cases, it will be stopped unless there is some severe environmental change in the future.

A second approach has been to *precollapse* the erosion domes during site preparation. Three methods have been used. The oldest is to utilize explosives. This has sometimes been successful, if the residual soil or deposited soil overburden has little or no cohesion. The procedure requires experience. Typically, holes are drilled on a grid pattern with spacings from as little as 10 ft (3 m) and as great as 30 ft (9 m). Explosives are placed in each hole, often alternating an explosive charge with decking of an inert material, such as sand. Too much explosive can lift and loosen the soil mass; too little will not be effective. The domes collapse and become filled with loose soil. The surrounding intact soils may be somewhat densified by the concussion; however, they are sometimes loosened if the explosive charge is too large. Surface water infiltration may be increased and a new dome may eventually form at the point of detonation because the soil has been dis-

SINKHOLES: FOUNDATIONS IN KARST TERRAIN

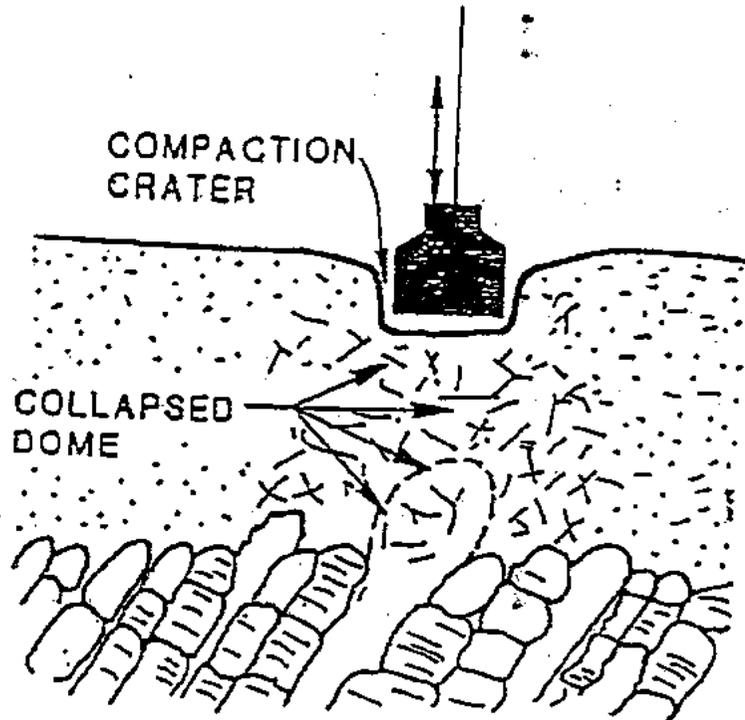


FIG. 6.5. Intentional Preconstruction Collapse of an Erosion Dome in Soil Overburden by High-impact Compaction.

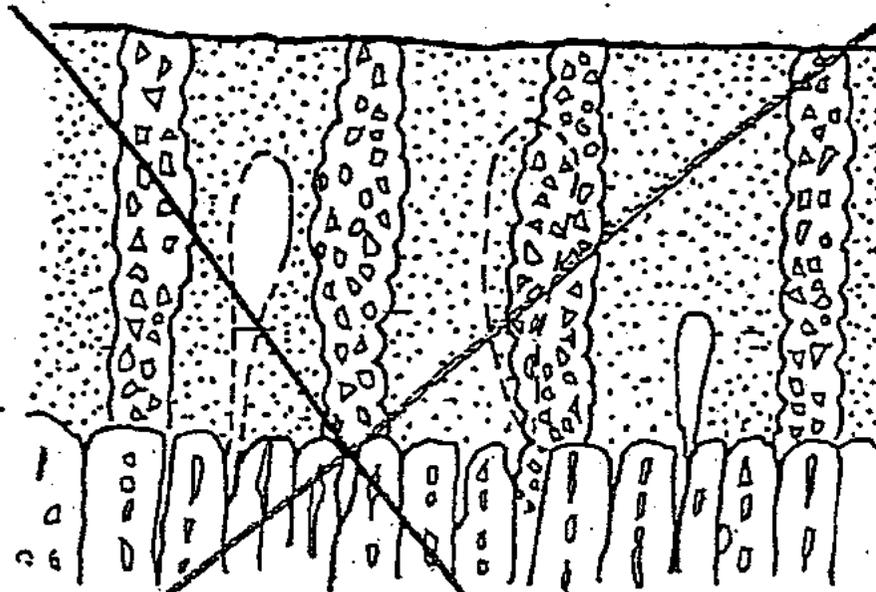
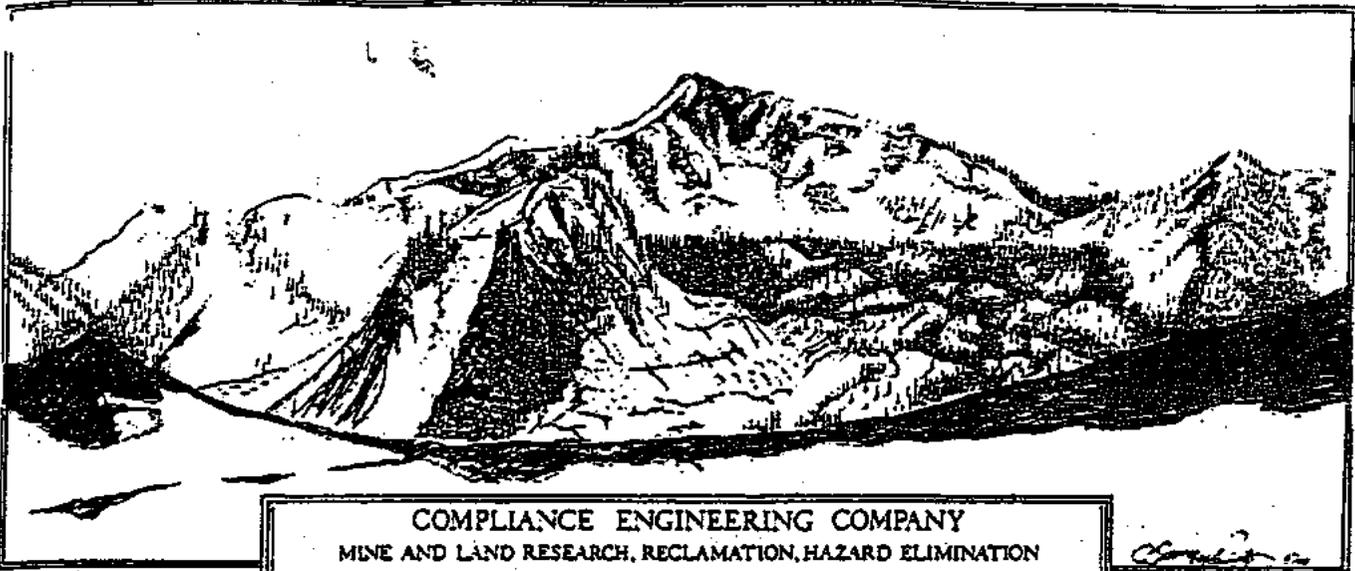


FIG. 6.6. Stone Columns Inducing Dome Collapse, Providing Drainage, and increasing the Soil Density in a Sandy Overburden

Vertical and horizontal
lines are drawn
to show the
direction of
the soil
columns.

REPORT

RESIDUAL HAZARDOUS MINE WORKINGS AND MITIGATION PROGRAM,
DEER VALLEY RESORT VICINITY, PARK CITY, UTAH, DECEMBER 15th, 1981



COMPLIANCE ENGINEERING COMPANY
MINE AND LAND RESEARCH, RECLAMATION, HAZARD ELIMINATION

Suite 1725
Beneficial Life Tower
Salt Lake City, Utah 84111
(801) 533-8484

December 23, 1981

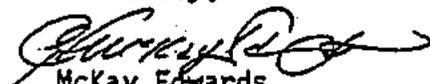
Ms. Arlene B. Loble
Manager, Park City
P.C. Planning Commission
Marsac Building, P.C., Utah 84060

Ms. Loble:

Please find enclosed Mine Hazards Elimination study for the Deer Valley Resort and immediate vicinity. This report incorporates our initial study dated August 4, 1980, but has been updated to December 15, 1981 to include subsequent mitigation measures and further research. After reviewing the report you or your staff may well have further questions which we will be available to answer.

I hope that this information will be of use to the Town.

Sincerely,



McKay Edwards

HME/sr

cc: Town of Park City

-Ms. Arlene B. Loble
Ms. Jennifer Harrington
Mr. William C. Liggety
-Mr. Ron Ivie
-Mr. Robert W. Kammerle
Mr. John Miller
-Mr. Bill Gordon
-Mr. Reed Clausen
-Mr. John Cesar
-Mr. J. J. Johnson
-Mr. Clark Wilson

Deer Valley Resort

Dames and Moore

United Park City Mines Co.

Noranda Mining, Ontario

J. J. Johnson Assoc.

Naildriver Mng. Co.

NAME: Unknown

NATURE: Vertical shaft, 50' deep, open. Narrow dimensions-exploratory not production shaft.

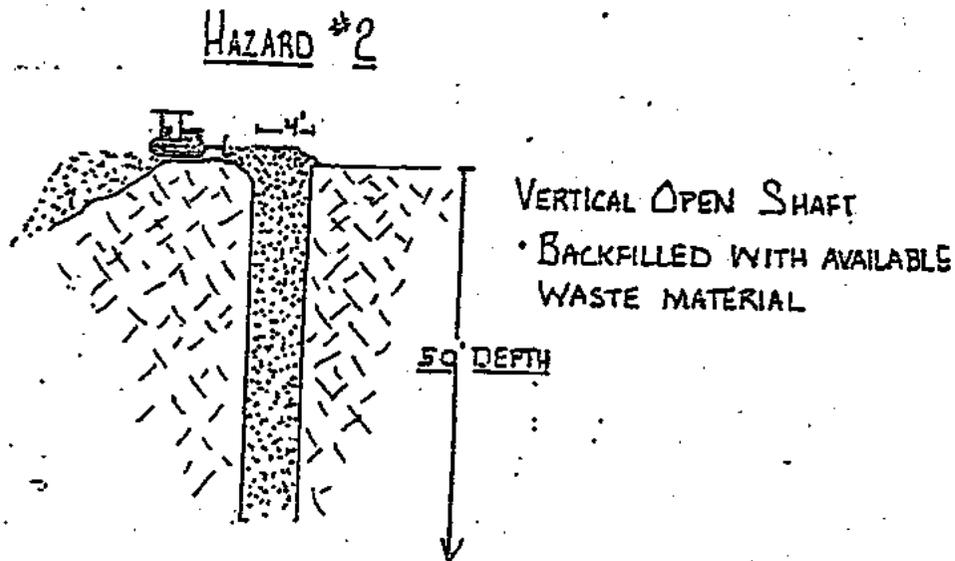
OLYMPUS COORDINATES: 26,600 E 20,300 N

DEER VALLEY PARCEL: North Silver Lake Community

DESCRIPTION OF LOCATION: At 7840 ft. on broad ridgetop between N. Silver Lake Drive (as projected) and westernmost Bald Eagle ski run.

STATUS OF MITIGATION, 12/15/81: This shaft was completely backfilled in 1980 and is still closed. Due to the size of this shaft and the lack of workings from it, there is little possibility of future hazard.

SPECIAL CONSIDERATIONS: Only in the event of construction



NAME: Constellation Shaft

NATURE: Collapsed vertical shaft, originally 250' deep, residual cone was 15'x15'x15'.

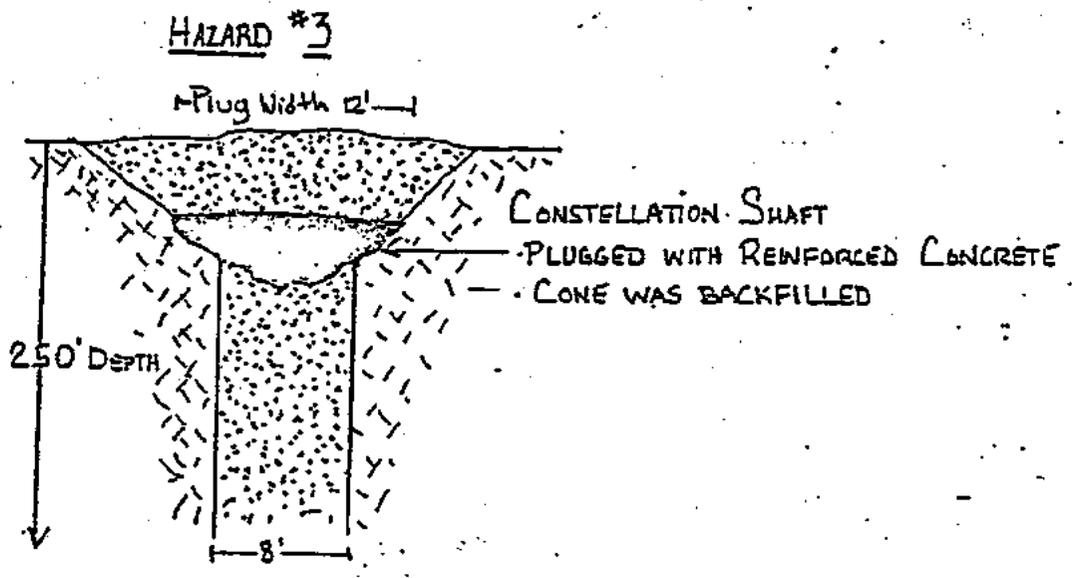
OLYMPUS COORDINATES: 27,600 E 21,300 N

DEER VALLEY PARCEL: American Flag

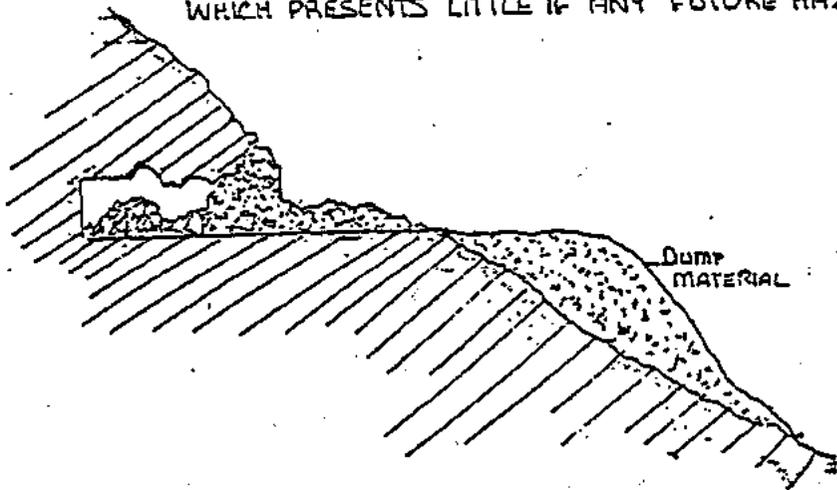
DESCRIPTION OF LOCATION: At South end of American Flag subdivision, 200' south of entrance road in trees.

STATUS OF MITIGATION, 12/15/81: This collapsed shaft was stabilized at the collar with a reinforced concrete plug in 1980, and has shown no further subsidence.

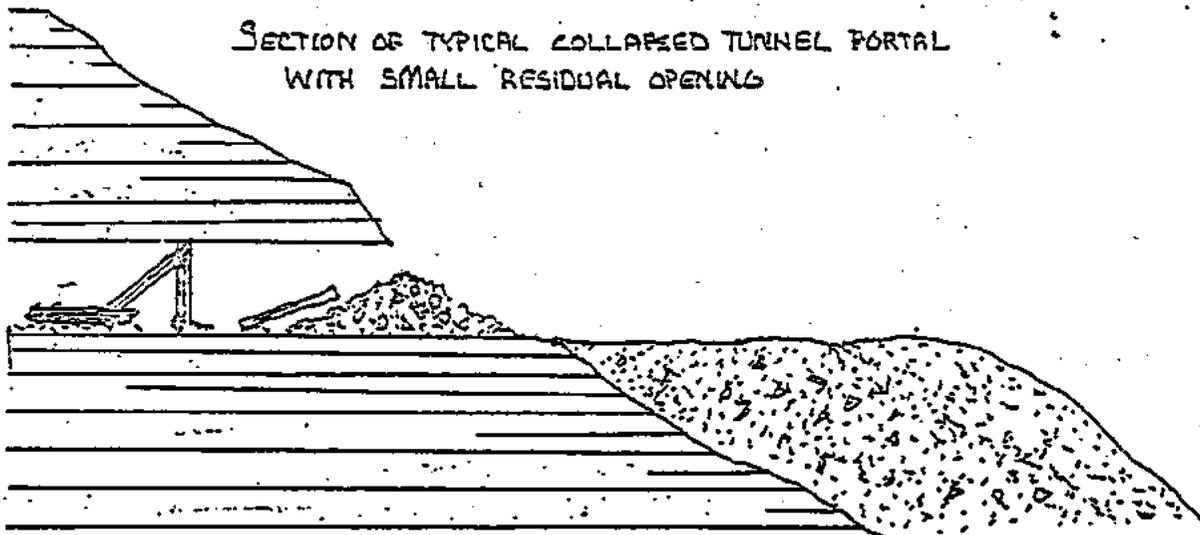
SPECIAL CONSIDERATIONS: Adjacent lot owner should be advised as to location of former shaft for construction purposes.



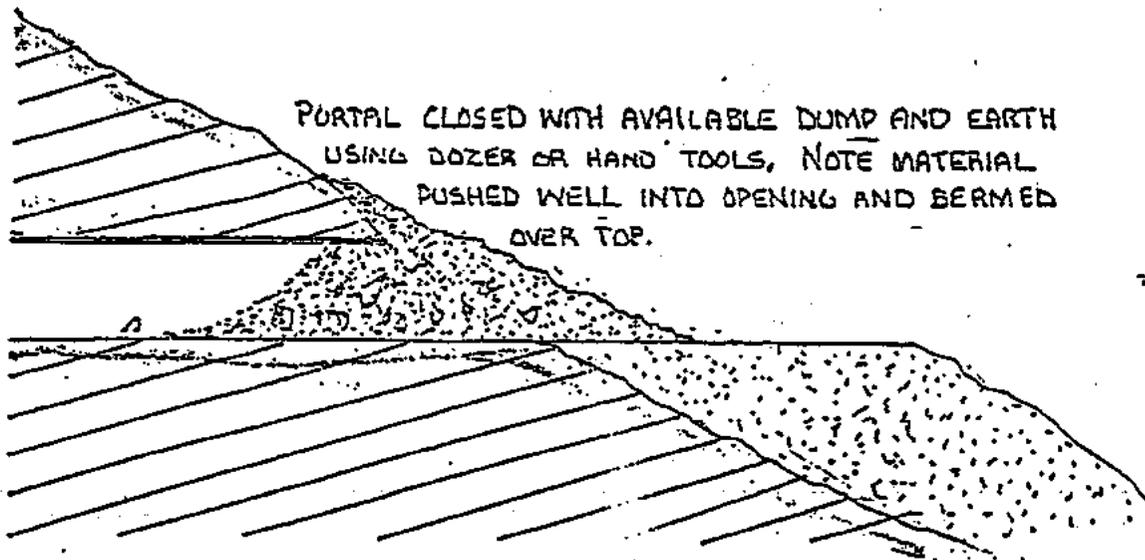
COMMON REMNANT OF SMALL ADIT
WHICH PRESENTS LITTLE IF ANY FUTURE HAZARD



SECTION OF TYPICAL COLLAPSED TUNNEL PORTAL
WITH SMALL RESIDUAL OPENING



PORTAL CLOSED WITH AVAILABLE DUMP AND EARTH
USING DOZER OR HAND TOOLS, NOTE MATERIAL
PUSHED WELL INTO OPENING AND BERMED
OVER TOP.



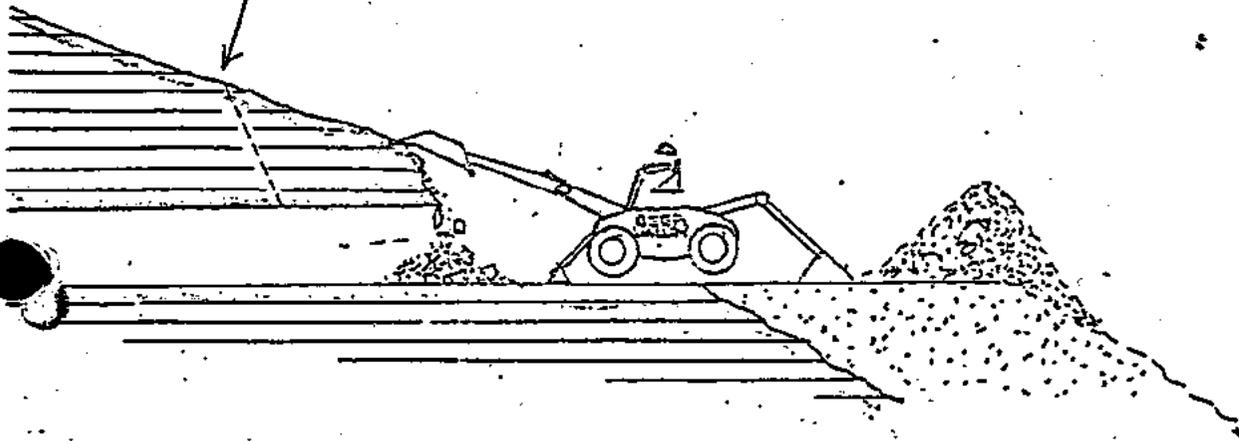
Construction: If a road or structure is planned at the location of a tunnel or adit certain steps should be taken to stabilize the area. The object of these steps is to eliminate any sub-surface cavity within a reasonable distance of the surface. A "reasonable distance" will depend upon the size of the cavity, the competence of the rock, and the load of the structure or road.

A backhoe should excavate the top or "back" of the tunnel off and temporarily store the material elsewhere. This will result in an increasingly deeper trench since the tunnel is level and the ground sloping. Eventually the machine should encounter too large a face above the tunnel to excavate further. Beyond this point the ground can be assumed structurally competent.

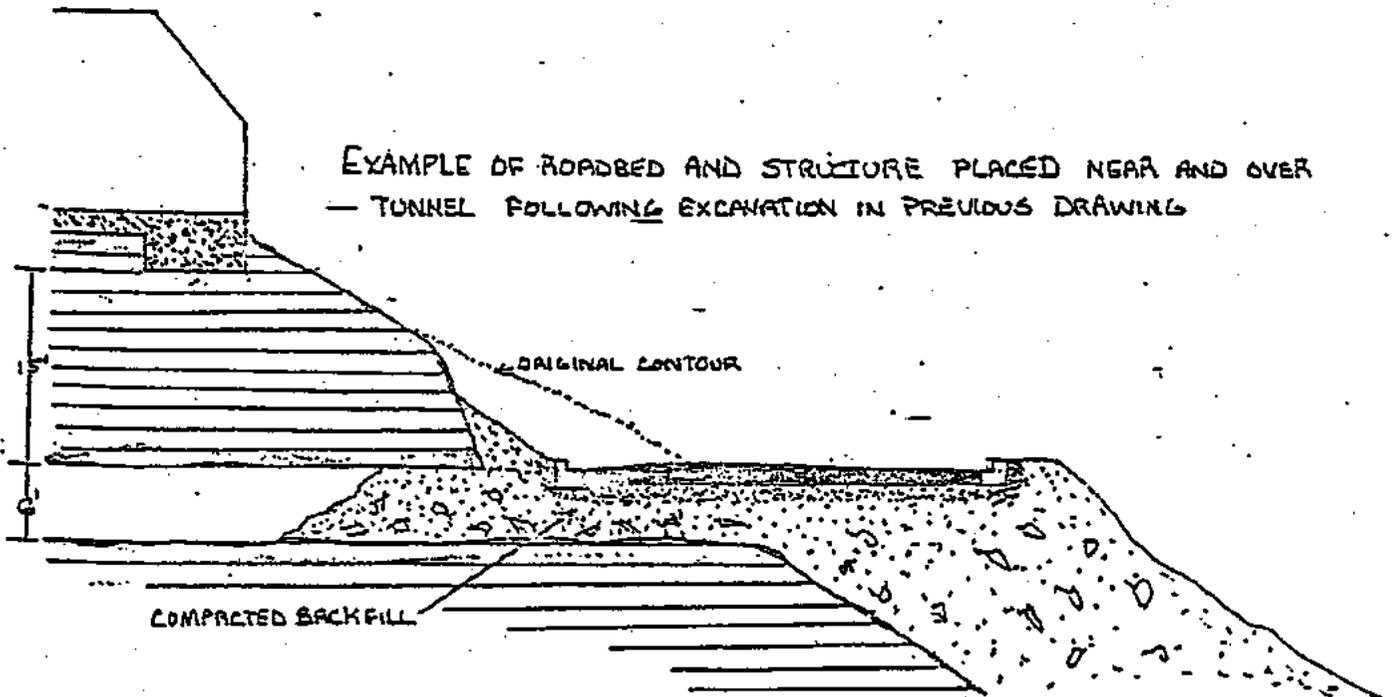
Earth should then be pushed into the remaining opening as far as possible. The remaining trench can be refilled and compacted.

EXCAVATION OF TUNNEL OR ADIT TO ELIMINATE CAVITY IN ANTICIPATION OF CONSTRUCTION

EXTENT OF EXCAVATION IS DETERMINED BY THICKNESS AND COMPETENCE OF GROUND IN CONJUNCTION WITH NATURE AND LOCATION OF STRUCTURE



EXAMPLE OF ROADBED AND STRUCTURE PLACED NEAR AND OVER TUNNEL FOLLOWING EXCAVATION IN PREVIOUS DRAWING



**UPDATE TO THE MINE SOIL
AND PHYSICAL MINE HAZARD
MITIGATION PLAN**

Prepared for
FLAGSTAFF MOUNTAIN RESORT

Prepared by
Kerry C. Gee
United Park City Mines Company

January 2004

Table of Contents

Introduction and Scope	3
History	3
Site Characterization	5
Results of Sampling	6
Remediation	7
Repository	7
Post Removal Site Control.....	10
Current and Remaining Work	10
Contamination Related to Mine Feature Mitigation.....	11
Remediation Construction Mitigation	12
Dust Control	12
Roadway Dirt.....	12
Parking	13
Traffic Control	13
Noise	13

List of Figures:

Figure 1	Developable Area
Figure 1A	Sample Parcels
Figure 2	Sample Area Designations
Figure 3	Sample Results
Figure 4	Repository Area

List of Appendices included by reference only:

Appendix A	Letter From Kerry C. Gee to Jim Christiansen of EPA presenting Sample Results Report and Requesting Comfort Letter.
Appendix B	Report of Remediation Activities in Pod A
Appendix C	Report of Remediation Activities in Pod B-1
Appendix D	Flagstaff Mountain Resort, Report of Remediation activities for Pod B2 Parcels DW-5, DW-6, DW-7 and DW-8.
Appendix E	Letter Report from Applied Geotechnical Engineering Consultants reporting on Mine

Hazard mitigation activities.

- Appendix F Letter to Jim Christiansen from Kerry C. Gee
Requesting 2nd comfort letter and response.
- Appendix G Draft Administrative Order on Consent to
conduct CERCLA removal action in Empire
Canyon.
- Appendix H Draft Remedial Design Memorandum for Empire
Canyon Removal Action.
- Appendix I Draft Remediation Plan for Development Pod B-2
East.

List of Exhibits by reference only:

- Exhibit I Legal Description for Daly West Repository With
Draft Survey Plat.

Introduction and Scope

In September of 2000, United Park City Mines Company (United Park) published a report titled "Mine Soil Hazard Mitigation Plan for the Flagstaff Mountain Resort. The purpose of this report was to address methodologies used to identify and mitigate hazards posed by historical mining uses in Empire Canyon and particularly within the Flagstaff Project.

That report did not address actual contamination issues within the project, as not a great deal of information was available at the time. Since that time, United Park has completed extensive sampling and remediation activities to properly address mine soils hazard mitigation.

This report will address data collection and remediation efforts that occurred within the developable areas as they existed in the fall of 2000. It will provide the history and details of a program designed to assure that the health of future residents within the Flagstaff Project is protected by eliminating exposures of elevated concentrations of lead and arsenic in the soils.

This is the third revision prepared in recent months. Previous revisions have submitted as attachments or appendices various reports that present data and mitigation efforts associated with the cleanup of contaminated soils in the Flagstaff Mountain Resort project.

History

The Empire Canyon area has a very extensive mining history. This area contains some of the more productive mining areas in the Park City Mining District. The Anchor or Judge, the Daly West, the Daly and portions of the Ontario Mine are located within Empire Canyon. All were major producers of silver. The history of mining in the canyon dates back more than 125 years.

Mining activity essentially ceased in the early 1980's at the Ontario Mine. Since that time, the area has become the focus of recreational type developments, which include residential developments. It is this residential use along with other environmental studies that have triggered interest in potential contamination as the result of historic mining activities.

In early 2000, United Park working with a potential development partner established an environmental protocol that was intended to guide the

remediation of potentially contaminated soils within the Flagstaff Project. The protocol was designed to address the procedures and methodologies that would be implemented should there be any potentially contaminated materials or unknown materials encountered during the Flagstaff Project construction efforts. The protocol was prepared and finalized the summer of 2000. It was submitted to the U. S. Environmental Protection Agency, the Utah Division of Environmental Quality and the Upper Silver Creek Watershed Stakeholders Group in early July of 2000.

A Watershed Stakeholder meeting was scheduled for August 1, 2000. Soils issues in Flagstaff were a topic of discussion during the meeting and more specifically in the soil subgroup for undeveloped lands. This subgroup consists of representatives from EPA, UDEQ, Park City, BLM and United Park. During this meeting, EPA and UDEQ informed United Park that they collectively rejected the protocol approach¹ to dealing with potentially contaminated soils within the developable areas. They represented that the protocol would not necessarily be protective of human health and outlined a program that they would support and considered protective of human health. They recommended the program based on their experience in dealing with similar issues. Their program would essentially provide for the removal of contaminated materials from the potential residential areas and the issuance of a Comfort Letter from the EPA. This program will be discussed in more detail later in this report.

In January of 2000, a meeting between United Park and EPA determined the cleanup levels for lead and arsenic at which it is considered safe for residential use. Lead and arsenic are considered to be drivers for mining areas similar to those in Park City. It is widely accepted that if levels for lead and arsenic are achieved that levels for other metals are achieved as well. The level for lead was set at below 500 ppm. The level for arsenic was set at 100 ppm.

In January of 2002 and early 2001 and 2003, United Park requested comfort letters from the EPA for a majority of the properties in the Developable Area.

In 1997, Empire Canyon became a CERCLIS site. This basically means that Empire Canyon is in the first stages of evaluation under federal CERCLA laws. Areas in the canyon bottom that contain contaminated

¹ The Protocol was a management tool developed to address mine related contamination issues. It sets forth procedures to follow when contamination is encountered. EPA's program was, at their own admission, ultra conservative but would provide the best assurance that mine related contaminated soils were identified. Removing the soils from the development parcels is by far the best approach to dealing with them.

soils were initially identified. In May of 2000, the USCWSG conducted a surface water sampling program for upper Silver Creek which included Empire Canyon. The results of this investigation indicated that Empire Canyon could potentially contribute high quantities of zinc to the surface waters in Silver Creek.

In May of 2002, United Park City Mines Company entered into an Administrative Order on Consent (AOC) with the EPA to perform certain studies to determine the extent and nature of contamination and do an Engineering Evaluation/Cost Analysis (EE/CA). This EE/CA would determine the best and most practical method of remediation of contamination in the Canyon lying westerly of the developable areas. This EE/CA process concluded on August 19, 2003 with a public hearing to accept input on the proposed plan from the general public. Following this public hearing, another AOC has been negotiated and signed between United Park and the EPA to conduct remediation activities. This AOC has been submitted to Park City. EPA has produced an Action Memorandum that finalized the EE/CA and directed that remediation be performed as a Non-time Critical Removal Action under CERCLA. This memorandum has also been delivered to Park City

Included in the AOC are performance requirements that United Park must meet or face substantial financial penalties. Many of these requirements revolve around the preparation of reports the most substantial of which is a Work Plan. This work plan is in draft form and attached as Appendix AA. Certain aspects of this work plan are discussed below.

Site Characterization

During the August 1, 2000 Watershed Undeveloped Land Subgroup meeting, EPA and UDEQ outlined a plan to characterize the developable area. Essentially, the area defined at the time, as the Developable Area would be divided into areas that are residential in nature and those that are not residential in nature. The residential areas would be further divided into parcels one half acre in size or smaller. The non-residential areas with the Developable Area could consist of parcels not to exceed five acres in size. The sample parcels would be drawn in such a manner that they would not reflect the proposed development areas as these may change during the course of planning.

A composite sample consisting of five discrete samples would be taken of each parcel regardless of whether or not its intended use is residential or non-residential. Every feature such as a road, discovery or mine dump

would be sampled independent of the rest of the parcel. Each feature on a parcel was to be sampled independent of any other features. Because of this, it is possible that there could potentially be multiple samples of features as well a sample of the one half or five-acre parcel on which they reside.

The portions of the developable area that were considered to be residential in nature were Pod A, Pod B-1, Pod B-2 and Pod D. The developable area is roughly 248 acres in size and is shown in Figure 1. There were over 289 individual parcels that made up the roughly 248 acres within the developable area (See Figure 1A). In addition to these parcels there were an additional 92 features of various types sampled as well.

To help identify each parcel and to maintain control throughout the sampling process, the Developable Area was initially divided into 11 smaller areas. Each of these areas was given an identifier. Each parcel within these eleven areas was then given a unique number with the larger parcel identifier. Figure 2 represents the 11 larger parcels.

Sampling was conducted in October of 2000. A total of 8 experienced field personnel worked for 4 days to complete the sampling. Two samplers from UDEQ also participated in the sampling effort. Samples were collected in plastic zip-lock bags and taken to the laboratory for analysis.

The data is reported in a report entitled "Flagstaff Mountain Resort, Report of Sampling Activities in the Area Proposed for Development". This report is incorporated by reference only into this update. It is summarized in a short letter report to the EPA, which is attached to this update as Appendix A, which has previously been delivered to Park City.

Results of Sampling

The initial sampling effort was completed in mid October of 2000. With follow-up sampling in the summer of 2001. The additional areas were in the area of Pod D and in two locations, there were parcels that were inadvertently not sampled.

The data from the sampling effort was analyzed and placed on drawings of the Developable Area. The parcels were then grouped into other parcels based on whether or not they exceeded the criteria or there was a feature on the parcel that exceeded the criteria. Parcels that were clean or met the criteria were given a "C" designation (for Clean), parcels that

exceeded the criteria were given a "D" designation (Dirty) and the parcels that contained features that exceeded the criteria were given a "P" designation (Pile). The results of this exercise indicated that there were 7 large result parcels that did not exceed the criteria of 500 ppm lead and 100 ppm arsenic and had the "C" designation. There were 10 parcels that exceeded the criteria and had a "D" designation. There were 6 parcels on which only a feature exceeded the criteria and were given a "P" designation.

Once the area outlines were determined, they were given to a civil engineer and metes and bound descriptions were prepared for each area containing a "C", "D" or "P" designation. The overall results are shown in Figure 3.

Remediation

Remediation commenced during the spring of 2002. The first phase of remediation of the residential parcels was coincident with the first phase of the development in the area of Pod B-1.

The approach to remediation was to basically remove any contaminated materials from the residential areas. Materials were taken to the Daly West mine dump and incorporated into the dump materials. It was then capped and revegetated. A portable x-ray fluorescence machine was used to help guide remediation. Once the removal of any material was complete, samples were taken to verify that the complete removal of any contaminated material had occurred. Attached as Appendices B, C, D and E are the final reports of the remediation activities on each of the development Pods. Within these reports, are detailed accounts of remediation and post remediation sampling efforts.

Repository

Contaminated material encountered during remediation has primarily been topsoil. Mine rock mixed with topsoil was encountered in the area of the Daly No. 2 mine area. All of this material was taken to the Daly West mine pile where it was placed in 1-foot lifts where possible and machine compacted. The material has had clean topsoil spread on the surface and revegetated with seed mixes containing native plant species.

Figure 4 is a map showing the location of the existing repository. A legal description of the repository area is attached as Exhibit 1.

This repository actually consists of two that are contiguous to and part of the Daly West mine dump. One is below a roadway that connects the Daly West/Empire Day Lodge area with the road in Empire Canyon. The other is located above this roadway extends up the slope of the mine dump for about 150 feet. The upper area is about 14,400 square feet in size. It is anticipated that this area could hold about 15,000 yards of material. If the upper area is filled, horizontal bench areas or terraces will be cut into the hillside to key the fill to the slope. The lower area is about 26,000 square feet in size.

Sampling conducted during the EE/CA indicates that the material generated during the remediation will contain elevated levels of lead and zinc ranging from 27 to 171,000 ppm and arsenic concentrations that range between 63 and 29,200 ppm. These higher ranges were specific hand samples. Sampling indicates that the material will contain concentrations of lead and zinc well below 7,500 ppm. Arsenic concentrations are generally well below 500 ppm.

A location for a repository for the material generated from the Removal Action as well as any remaining Flagstaff Remediation has not been designated. However, locations at the Daly West mine as well as Richardson Flat are under consideration. Due to its permanent location in the headwaters of Park City, the Daly West mine dump site location may not be in the best interest of the community and United Park agrees. Final determination of the preferred repository site shall be approved by the City.

Should the repository be ultimately located at the Daly West mine, it is anticipated, at this time, that it could be closed by the end of the summer construction season in 2006. The repository will be surveyed and a legal metes and bounds description developed for the repository. This information will be incorporated into a notice or deed restriction that will be of public record. This language will describe the location of the repository, construction information that will include a characterization of the material in the repository as well as contact information for any inquiries. There will also be a provision for updating any information regarding the repository in the public record. A zoning change and Conditional Use Permit may be required. Post closure site control issues will be addressed in a plan that is consistent with the Non Time Critical Removal completed for the Empire Canyon CERCLIS site.

Should the repository not be finally located near the Daly West mine, there will be a legal metes and bounds description of the Mine Dump at the Daly West mine prepared. This information will be incorporated into a deed restriction or notice that is made part of the public record. This language will describe the location characteristics of the mine dump as

well as any contact information. The Post Removal Site Control Plan prepared for the Non Time Critical Removal Action will be implemented for the site. Any future development anticipated for the area will require the notification and involvement of the regulatory agencies, Park City, as well as the potential land developer.

Once the final location of the Repository is agreed upon by Park City and United Park, the EPA will be asked to approve the location. Once this has occurred, the final closure method language for the area with or without the repository will be developed at that time.

As outlined in the January 13, 2004 letter from City Manager Tom Bakaly to UPCM's James Tadeson, the City will support the use of Richardson Flats as a consolidation area for mine related materials. In the event the USEPA publishes a "Record of Decision" for Richardson Flats that allows such designated use, UPCM will agree to accept soils generated from within the City limits that are determined to be impacted with mine materials that are Bevill Exempt for as long as UPCM keeps the consolidation area open. As stipulated in the correspondence, PCMC will comply with any administrative requirements required by UPCM, UDEQ, USEPA or Summit County in order to use the consolidation area. UPCM agrees that materials generated by PCMC will be exempt from dumping (tipping) fees, but that PCMC will be responsible for compliance with all other provisions of the administrative requirements. Such requirements will include, but not be limited to, provisions governing:

- Reserved capacity within the consolidation area to accommodate UPCM's deposit of Daly West and other UPCM mine materials;
- Quantity, quality, and type of material delivered, and timing of delivery;
- Standards of assessment required for acceptance of delivered mine materials to ensure Bevill Exempt qualification;
- Responsibility for placing (location, spreading & compaction) of materials;
- Compliance with all applicable laws and USEPA regulations;
- Reimbursement from those entities bringing material to Richardson Flats for reasonable administrative and field incurred costs.

It is anticipated that the Empire Canyon remediation work will begin about July 1, 2004 and be completed by the end of the fall of 2006. This is an estimated time only; actual times or specific dates cannot be determined at this time because construction planning is dependant upon many variables including weather, runoff conditions and other construction activity in the canyon

Post Removal Site Control

As part of a Work Plan or Technical Design Plan for the remediation efforts conducted under the Non-time Critical Removal Action ordered under the AOC for Empire Canyon, several additional plans are included. These plans include a health and safety plan, a sampling plan if needed and a post removal site control plan. This post removal site control plan, to the extent possible, is currently being prepared as part of the Work Plan mentioned above. This will ultimately include any institutional controls for any Repository. Any cost for institutional controls will be borne by the Master Owners Association.

The draft Work Plan is to be submitted within 30 days after the signing of the AOC and is attached.

Current and Remaining Work

During the summer of 2003, remediation was completed on Parcel D-9 that is the west portion of pod B-2. Topsoil that was stockpiled on some contaminated soil was removed. These features were removed but before confirmation sampling could take place, topsoil was placed on the parcel for storage. As of this writing, the soil has been removed and the parcel has been sampled indicating that no contamination remains.

There still remain three parcels to be remediated. Table 1 outlines these parcels and provides a projected date when remediation is anticipated to be complete. Parcel P-6 has a small dump from the Mazepah shaft and Parcel D-10 is a small parcel next to the Empire Canyon Day Lodge. In addition Parcel P-2 contains the wooden water tank. This is a feature that is contaminated and it is suspected that the builders used mine waste to level the pad for the water tank. Grubbing and/or demolition permits are required to be obtained from the City.

The current plan is to mitigate and remediate the Mazepah shaft this year. Parcel P-2, the tank site, will be remediated when the tank is demolished. Parcel D-10 will be remediated coincident with development. A plan to address the remediation of this parcel is included as Appendix I and incorporated herein by reference only.

Parcel Number	Development Area	Projected Completion Date
P2	Pod A, near EMV building B-2	Tank to be demolished in January 2004. Site to be

		cleaned up in July, 2004 weather permitting.
P6	Mazepah Shaft. Near the Day Lodge	To be mitigated Summer of 2004. (Weather permitting.)
D3	Above the Ontario Mine and below Pod A	Cleaned up anticipated summer of 2005.
D10	Adjacent to Day Lodge, near sales center.	Not until coincident with development. Anticipated summer of 2006.

Table 1

Once these remaining parcels are cleaned up, United Park will have verification sampling performed and presented by independent consultants. This is the same procedure as in the past. United Park will notify Park City that remediation has occurred and that sampling is underway. The report (s) generated will be provided to Park City. United Park will also work with the EPA to obtain comfort letters for these remaining parcels. United Park will then provide this information to Park City.

Contamination Related to Mine Feature Mitigation

In various areas throughout the Developable Area, there are scattered several mine features. These generally are small exploration pits or discovery shafts less than 30 feet deep. There are 3 known shafts that are deeper than this. These shafts are the Orient, Mazepah and Monitor. United Park has a program to mitigate potential mine hazards. Attached as Appendix E is a letter report prepared by Applied Geotechnical Engineering Consultants that address the methodology applied to mitigate the mine features.

Several potential mine hazards have not yet been mitigated. Three are located in the southeastern lobe of Pod A on the property owned and currently being developed by East West Partners. United Park is currently working with East-West to address these potential hazards. There are two that are in the southwestern area of Pod A. These will be addressed this construction season in a manner consistent with those already mitigated. The Mazepah Shaft is located in the area just up hill from the Ruby Chair Lift near the Empire Day Lodge and will be addressed this construction season. There are also two located in Pod D. These will be addressed coincident with the development in the area.

Some of these features such as the Orient and Mazepah shafts present serious potential ground stability issues unless properly addressed.

Geotechnical engineers and developer representatives will be available to advise and direct mitigation efforts.

During the mitigation of these features, soil contamination is monitored to assure that if there is contamination; it is dealt with properly. If contamination is encountered, it will be placed in the repository.

Remediation Construction Mitigation

During the remedial construction activities, close attention will be paid to issues such as dust control, roadway dirt, runoff control, parking, traffic control and noise. These aspects of the remediation construction for both the remaining Flagstaff or Empire Pass project remediation and the Empire Canyon Removal Action will abide by the Construction Mitigation Plan (CMP) for Empire Pass where applicable. Not all elements of the CMP are applicable to remediation construction but certain aspects are identical.

Dust Control

Dust control will be provided by a water truck where needed. In the past, excavation work such as the work that remains to remediate soils in both the Flagstaff Project and in Empire canyon has not generated much dust during the spring season. Roads will be wetted to prevent dust and the actual excavation and loading procedure will be wetted to suppress dust. The project manager will determine the need for dust suppression. Any dust control measures needed for the Non Time Critical Removal Action for Empire Canyon are described in the Work Plan for that action.

Roadway Dirt

Wash stations will be established for vehicles leaving dirt roads and entering onto pavement. Decontamination for construction vehicles and equipment will be at a different location as they are leaving contaminated areas.

Runoff Control

Storm water Best Management Practices and revegetation efforts will be implemented to control runoff.

Parking

Parking for the remediation construction will be minimal and occur near where remediation construction is occurring. Parking along roadways will not be permitted.

Traffic Control

Traffic Control appears to not be applicable unless materials are moved to a repository in a location other than the Daly West. In that case, the trucking of these materials will comply with the certain elements Construction Mitigation Plan for the Flagstaff Resort development and follow the most direct and practical route to Richardson Flat. However, trails may be closed temporarily if construction occurs in close proximity to the trails.

Noise

Noise is not likely to be an issue as the areas to be remediated are, for the most part, remote. Construction activities will most likely occur during normal hours and will not generally exceed those established by Park City. There may be occasions where anticipated storms may require that work extend beyond those hours in order to bring construction activity to a point where erosion will not be a problem.

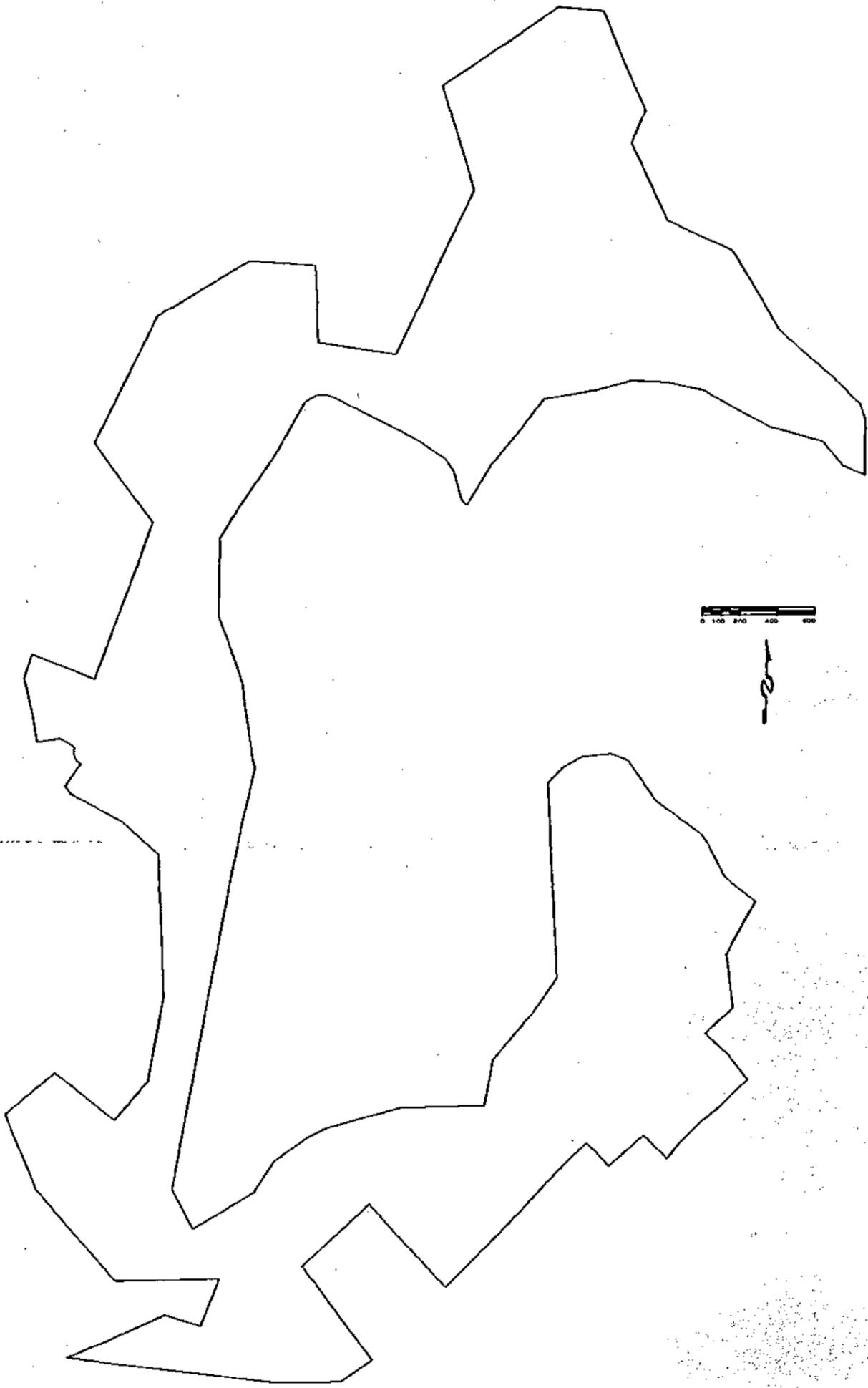


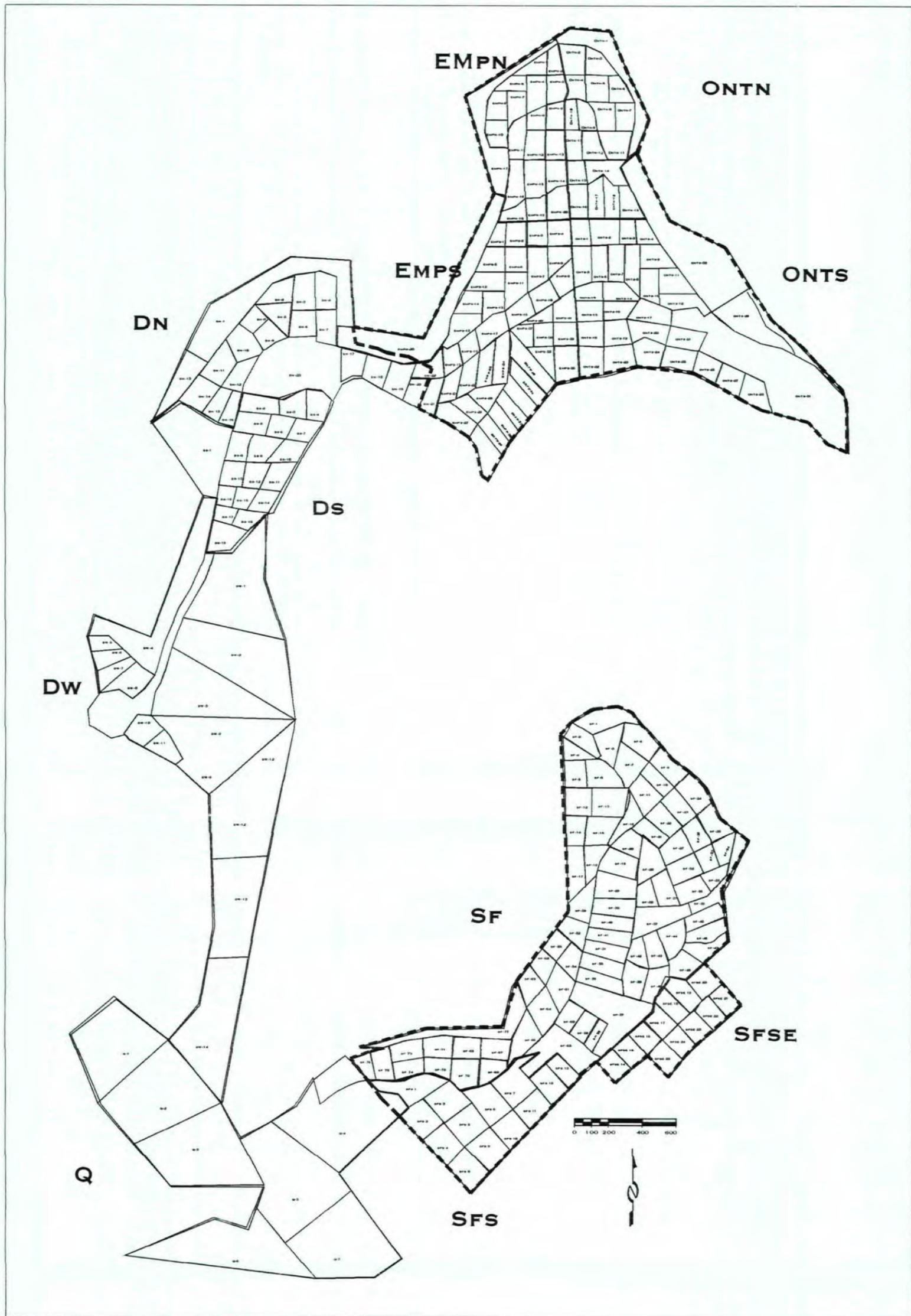
FIGURE 1

DEVELOPABLE AREA - FALL 2000

**UNITED PARK CITY
MINES COMPANY**

FLAGSTAFF MOUNTAIN PROJECT

SCALE AS SHOWN



**UNITED PARK CITY
MINES COMPANY**

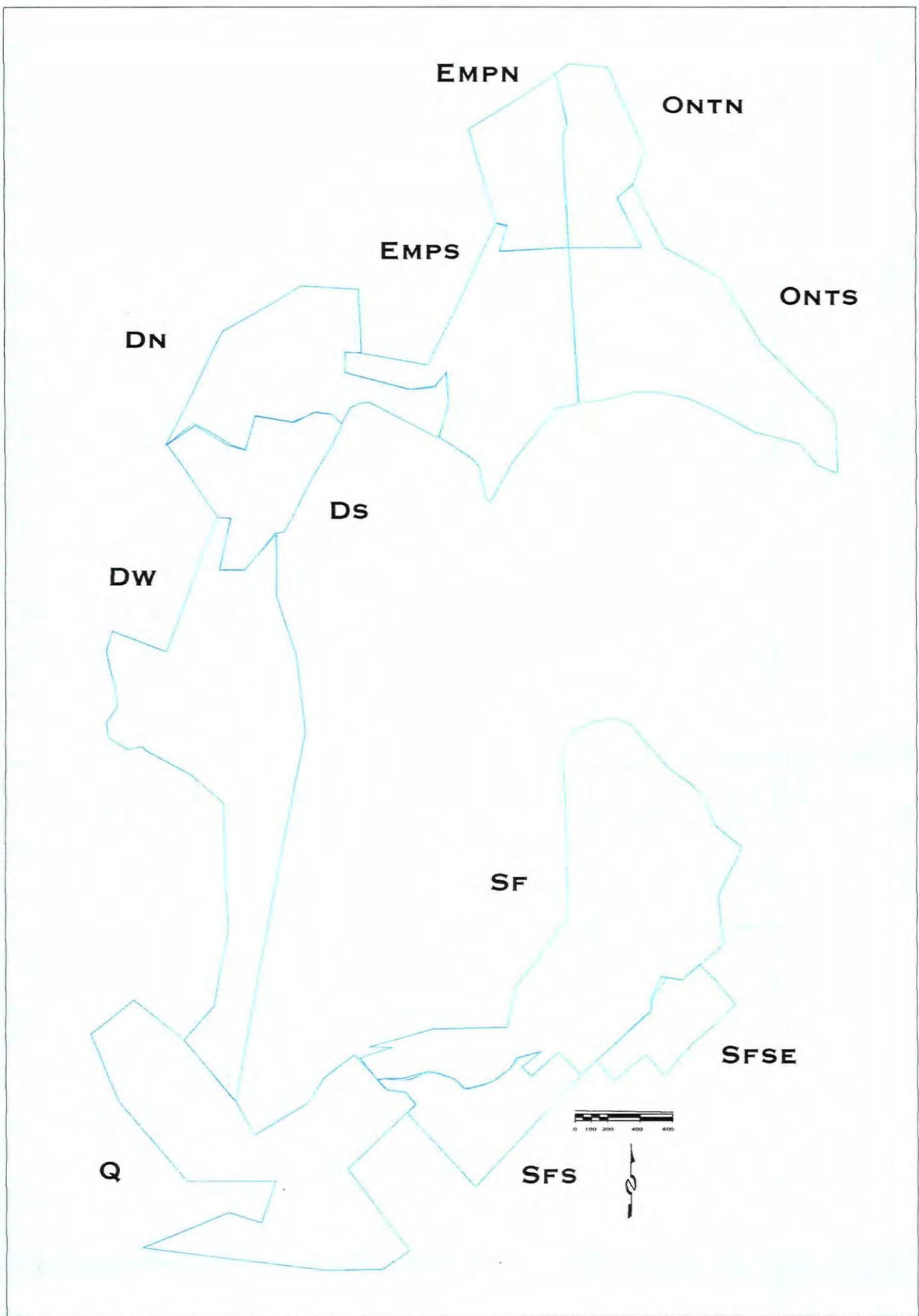
**MINE SOILS
MITIGATION REPORT**

FIGURE 1A



**FLAGSTAFF MOUNTAIN
PROJECT**

SCALE AS SHOWN



**UNITED PARK CITY
MINES COMPANY**

**MINE SOILS
MITIGATION REPORT**

FIGURE 2



**FLAGSTAFF MOUNTAIN
PROJECT**

SCALE AS SHOWN

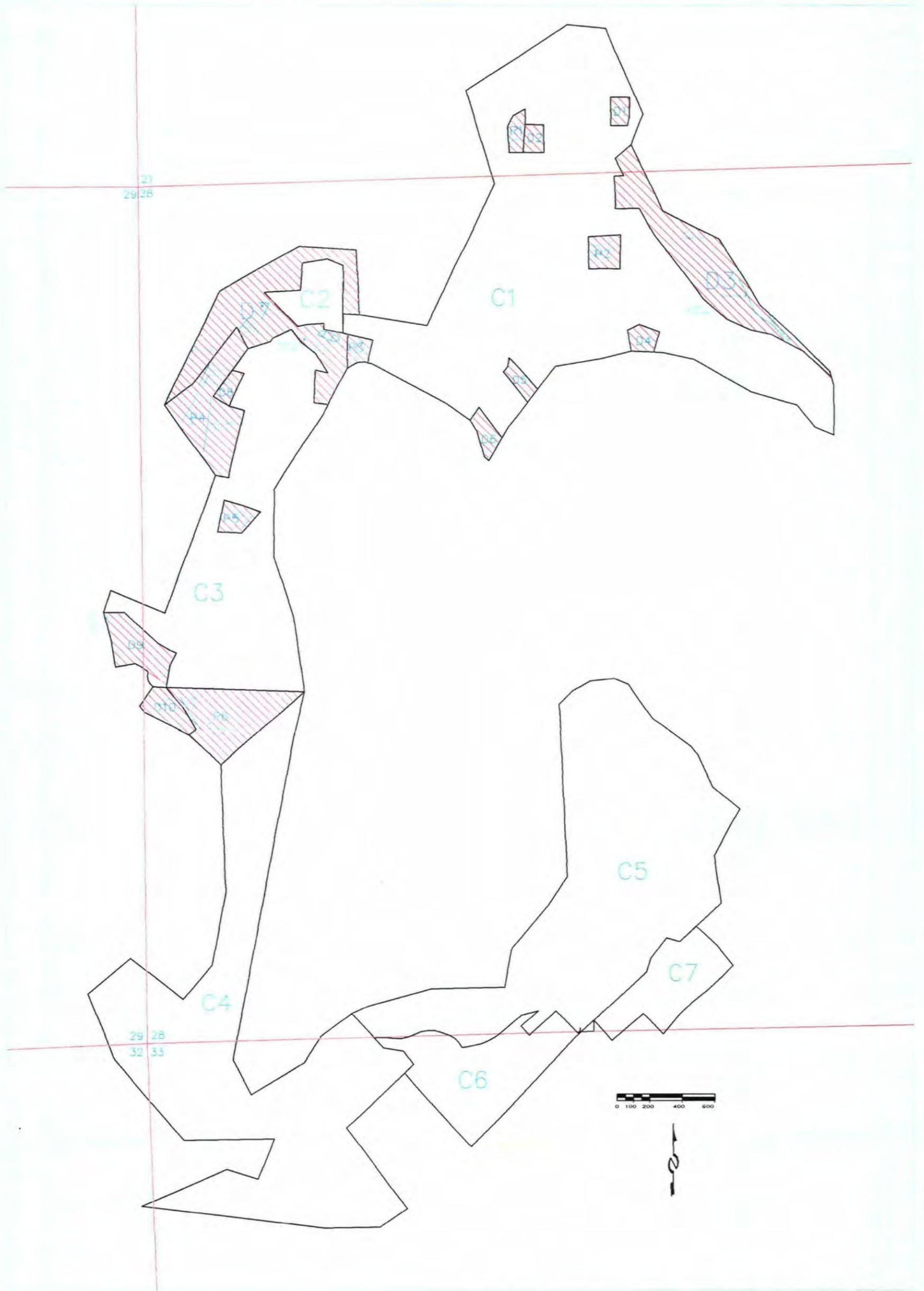


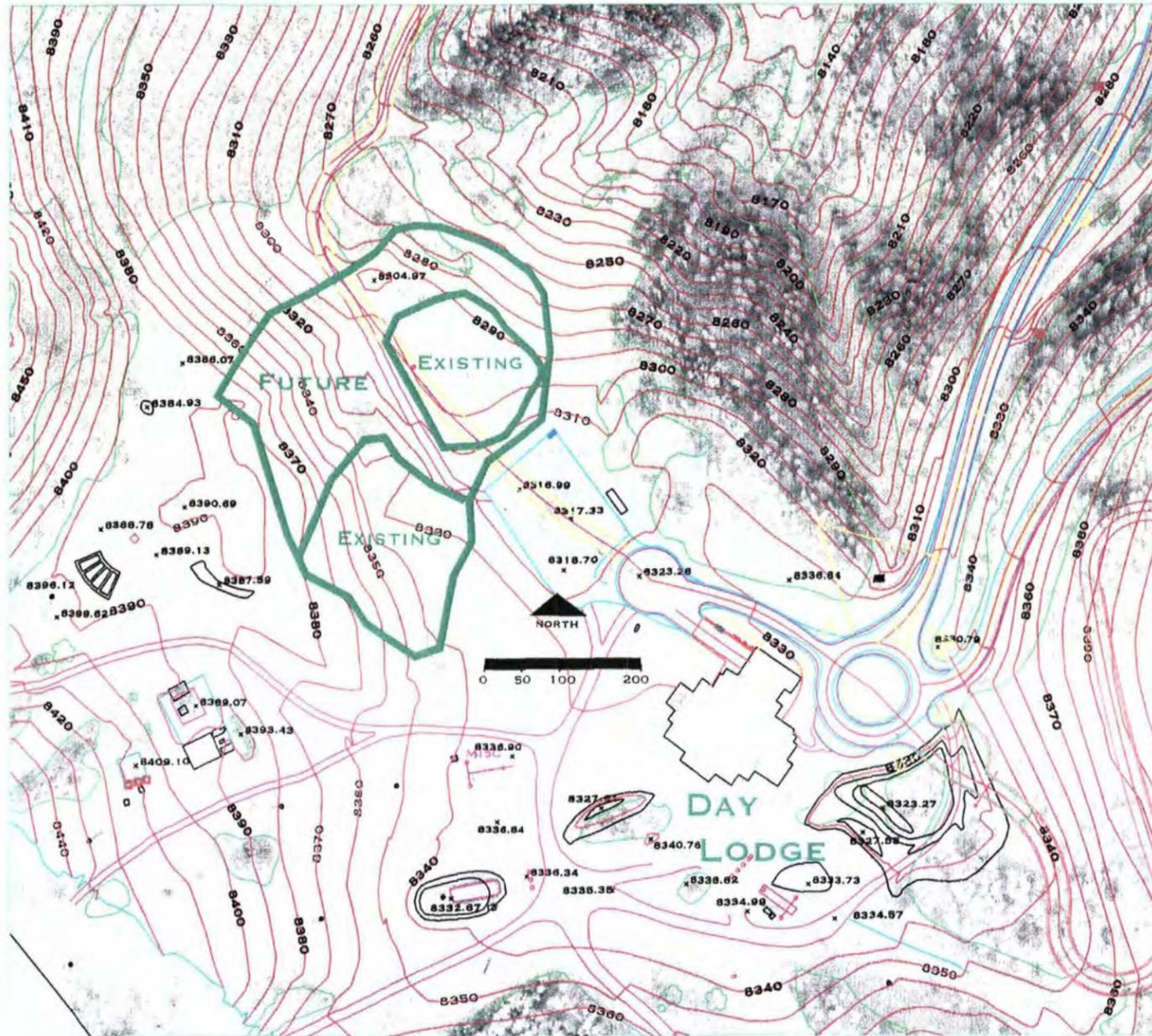
FIGURE 3
OVERALL RESULTS

C - CLEAN PARCEL **D** - DIRTY PARCEL
P - DIRTY PILE PARCEL

UNITED PARK CITY
MINES COMPANY

FLAGSTAFF MOUNTAIN PROJECT

SCALE AS SHOWN



UNITED PARK CITY MINES COMPANY

MINE SOILS MITIGATION REPORT

FIGURE 4



FLAGSTAFF MOUNTAIN
PROJECT

SCALE AS SHOWN

**DRAFT
REMOVAL ACTION WORK PLAN
FOR
EMPIRE CANYON**

EPA ID No. 0002005981

**February 9, 2004
Revised February 17, 2004**

**Prepared for:
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**DRAFT
REMOVAL ACTION WORK PLAN
FOR
EMPIRE CANYON**

EPA ID No. 0002005981

February 9, 2004

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TABLE OF CONTENTS

Table of Contents.....	i
List of Figures.....	iii
List of Appendices.....	iii
1.0 Introduction	1
1.1 PURPOSE.....	2
1.2 SCOPE OF REMOVAL ACTION	2
1.2.1 <i>Drainage Channels</i>	3
1.2.2 <i>Recreational Trails</i>	3
1.2.3 <i>Mine Waste Rock Piles</i>	3
2.0 Site Description.....	3
2.1 SURROUNDING LAND USE AND SITE ACCESS	4
2.2 SITE CHARACTERISTICS.....	5
2.3 PREVIOUS ACTIONS.....	5
3.0 Site Management	6
3.1 MANAGEMENT RESPONSIBILITIES	6
3.2 SITE CONTROL AND ACCESS	6
4.0 Applicable or Relevant and Appropriate Requirements	7
5.0 Removal Action Procedures	8
5.1 DUST CONTROL.....	8
5.2 STORMWATER CONTROLS	9
5.3 DECONTAMINATION	10
5.4 HEALTH AND SAFETY PLAN	10
5.4.1 <i>Worker Safety</i>	10
5.4.2 <i>Traffic Control</i>	11
6.0 Schedule	11
6.1 PHASE I.....	11
6.2 PHASE II.....	12
6.3 PHASE III.....	12
7.0 Non-Time Critical Removal Activities.....	12
7.1 STREAM CHANNEL RECONSTRUCTION	13
7.1.1 <i>Excavation/ Channel Reconstruction</i>	13
7.1.2 <i>Clay Soil Installation</i>	14
7.1.3 <i>Channel Bed Surface Installation</i>	14
7.1.4 <i>Check Dams and Other Erosion Control/Velocity Dissipation Structure Installation</i>	14
7.2 MINE WASTE REMEDIATION	15
7.2.1 <i>Surface Preparation and Grading</i>	15
7.3 MINE DUMPS.....	15
7.4 RECREATIONAL TRAILS.....	16
8.0 Mine Waste Repository.....	17
8.1 DALY WEST	17
8.2 ALTERNATIVE REPOSITORY LOCATION.....	18

9.0	Specifications	18
9.1	TOPSOIL	18
9.0	Specifications	18
9.1	TOPSOIL	18
9.2	LOW-PERMEABILITY CLAY RICH COVER SOIL	19
9.3	CLAY	19
9.4	CHANNEL AND RIP-RAP MATERIAL	20
9.4.1	<i>Channel Material</i>	20
9.4.2	<i>Rip-Rap and Check Dam Material</i>	20
9.5	CLEARING, GRUBBING AND SITE PREPARATION	21
9.6	GRADING	21
9.7	REVEGETATION	22
9.7.1	<i>Seedbed</i>	22
9.7.2	<i>Seed Mix</i>	22
9.7.3	<i>Planting</i>	22
10.0	Monitoring	23
11.0	Institutional Controls	24
11.1	SHORT-TERM ICS	24
11.2	LONG-TERM ICS	24
12.0	References	25

LIST OF FIGURES

- Figure 1 Remedial Design Areas
- Figure 2 Channel Remediation – Typical Details
- Figure 3 Waste Rock Pile Remediation – Typical Details
- Figure 4 Trail remediation – Typical Details
- Figure 5 Repository – Typical Details

LIST OF APPENDICES

- Appendix A Site Management Contact Information
- Appendix B Seed Mix Specifications
- Appendix C Health and Safety Plan
- Appendix D Channel Sizing Calculations
- Appendix E EPA Action Memorandum 11-6-2003

1.0 INTRODUCTION

This Removal Action Work Plan (Work Plan) describes proposed removal action activities for the Empire Canyon Site (Site), EPA ID No. 0002005981, located approximately one mile south of Park City, Utah. The Work Plan is required under the Administrative Order on Consent [CERCLA-08-2004-003] (AOC), dated December 12, 2003, between EPA and United Park City Mines Company (United Park), the owner of the Site.

This Work Plan is based upon an Engineering Evaluation/Cost Analysis (EE/CA) (RMC, 2003) satisfying the requirements of the Action Memorandum issued by EPA with respect to the Site. The EE/CA was prepared to characterize the Site environmental conditions, evaluate potential exposures to human health and the environment, and determine the need for and scope of response measures. Five removal alternatives were examined according to NCP criteria in the EE/CA and a combination of two of the alternatives were proposed for EPA approval. The Action Memorandum prepared by EPA (November 6, 2003), documents approval of removal action alternatives selected in the EE/CA. This Work Plan has been prepared in accordance with the National Contingency Plan (NCP, 40 CFR 300), promulgated under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as well as relevant EPA guidance documents.

The Site is located within the Upper Silver Creek Watershed, which is the subject of a stakeholder-based investigation and cleanup effort. The removal action activities described in this Work Plan are the result of a collaborative effort within the Upper Silver Creek Watershed Group (USCWSG). Stakeholders in the USCWSG consist of local, state and federal government agencies, as well as citizen group representatives and private entities.

1.1 Purpose

The removal action is being conducted to achieve two response action objectives identified in the EE/CA and adopted in the Action Memorandum: 1) to isolate surface water from mine wastes in Empire Canyon, consistent with Best Management Practices and 2) minimize the potential for human exposure to elevated lead and arsenic concentrations in Site soils. These objectives will be achieved through the implementation of the preferred removal action alternative adopted by EPA in the Action Memorandum, in satisfaction of United Park's obligations under the AOC. This Work Plan describes in detail how the preferred removal action alternative adopted in the Action Memorandum will be designed, constructed, and otherwise implemented. The removal action will be conducted in the areas shown on Figure 1.

This Work Plan has been prepared in compliance with the AOC, Action Memorandum, and the EE/CA. The NCP requires that fund-financed removal actions under CERCLA Section 104 and removal actions pursuant to CERCLA Section 106 attain applicable or relevant and appropriate requirements (ARARs) under federal environmental, state environmental, or siting laws "to the extent practicable" considering the urgency of the situation and the scope of the removal action (See 40 C.F.R. Part 300.415(j)). The ARARs adopted by EPA in the Action Memorandum, to the extent applicable or relevant and appropriate, have been taken into account in the development of this Work Plan.

1.2 Scope of Removal Action

The removal action will consist of three primary activities: (1) excavation and reconstruction of certain drainage channels; (2) covering or re-routing of certain public recreational trails and paths; and (3) covering or improving mine rock waste piles. Mine wastes excavated during the course of the removal action will be relocated to a mine waste repository in accordance with the Action Memorandum and the AOC.

1.2.1 Drainage Channels

Mine wastes in areas identified as potentially having adverse impacts on surface water will be excavated. Approximately 4,500 linear feet of drainage channel will be addressed using a combination of methods, including placement of clean fill and rip-rap and installation of culverts where appropriate. Mine waste materials excavated during implementation of the removal action must be isolated and contained in a manner that is protective of human health and the environment. Excavated material will be relocated to a consolidation area, as discussed in Section 8.0 below.

1.2.2 Recreational Trails

Approximately 2,500 linear feet of recreational trails will either be covered with clean fill or re-routed away from mine wastes. United Park City Mines Company will notify Park City of any trail closures. Park City will review any permanent or temporary re-routing.

1.2.3 Mine Waste Rock Piles

Mine waste rock piles in Empire Canyon will be re-contoured, covered with clean fill, and revegetated to the extent practical. Some of the mine dumps, such as the Judge and Alliance, may not be completely covered due to a number of factors including the size, slope, accessibility, and location. At these locations the dump slope is too steep and there is very little room to re-contour the mine wastes. At a minimum, however, the level surface of all mine waste rock piles at these locations will be covered and revegetated.

2.0 SITE DESCRIPTION

The Empire Canyon Site is an historic ore mining and processing area located near Park City, Summit County, Utah. Empire Canyon is located south of Park City (Figure 1). Surface water flow from Empire Canyon occurs in a small ephemeral channel (DERR,

2001). The Site is situated on the eastern slope of the Wasatch Range, approximately 25 miles east of Salt Lake City. Park City rests at the downstream end of Empire Canyon.

The geographic coordinates for the Site are 40° 38'40" north latitude and 111 degrees 29' 38.5" west longitude (Thiros, 2000). There were several mines, a concentrator, assay office, trams and other mine workings in the canyon up to the drainage divide (Figure 1).

The immediate area around the Site consists of steep canyon walls with mine/mill wastes and mine overburden present in several locations, which slope directly into the Empire Canyon drainage. The terraces or flat spots in the canyon are the locations of former mining facilities and a municipal drinking water tank. There is also a proposal to construct a culinary water treatment plant near this tank.

Waste rock piles from the mine operations are located along the canyon walls as well as in the Empire channel. Several worn trails parallel the channel and traverse the mill and mine sites. The canyon is a popular area for residents and visitors to hike and mountain bike.

2.1 Surrounding Land Use and Site Access

Current Site land use activities are primarily limited to dispersed recreational activities that vary with the season. Spring, summer and fall use of the Site is primarily composed of hiking and bicycling. Winter use of the Site includes downhill and cross-country skiing, snowshoeing. Portions of the Deer Valley ski resort are located in Empire Canyon. No fences or signs are present to limit access to the Site but the canyon is gated to restrict vehicle traffic. Hiking and mountain bike riding are activities, which are allowed as a regular practice; however these activities are generally confined to designated trails. Much of the area is part of ski resort development, which allows skiers access during the winter months. During that time the Site is effectively capped with several feet of snow.

2.2 Site Characteristics

A detailed description of the Site characteristics can be found in Section 3.0 of the Site Characterization Report for Empire Canyon, Appendix A of the EE/CA (RMC, 2003), which summarizes previous investigations by the Utah Division of Environmental Response & Remediation (UDERR), the USCWSG and United Park.

2.3 Previous Actions

In addition to past Site investigations described in the EE/CA, numerous other environmentally-based actions have occurred in the Empire Canyon area. United Park is currently developing several parcels of land in the Empire Canyon area in its Flagstaff Development. In conjunction with EPA, UDERR, and the USCWSG United Park conducted extensive sampling of soils within the development area, resulting in a determination that much of the development area was already free from mining impacts. In addition, sampling conducted by UDERR, USCWG and United Park showed that this area was not affecting water quality in Empire Canyon. EPA has excluded this area from the EE/CA and Removal Action processes and provided comfort letters to United Park for the development area. Any environmental issues present in this area were, or are, being addressed voluntarily by United Park in conjunction with the USCWSG.

United Park has previously conducted a number of response actions in the Empire Canyon drainage. This work includes reshaping and recontouring of mine dumps, consolidation of mine wastes into larger dumps, and re-routing of surface water in culverts through high volume mine waste areas. This work was coordinated with EPA (EPA, 2003).

3.0 SITE MANAGEMENT

Site management during implementation of the removal action addresses site control, access, and management responsibilities during construction activities.

3.1 Management Responsibilities

The removal action will be managed by United Park's designated Project Coordinator: Kerry Gee, Vice President. Environmental consultants at Resource Management Consultants, Inc. (RMC) and civil engineers, land planners and surveyors from Alliance Engineering in Park City, Utah, will assist Mr. Gee. The EPA Project Manager will be Jim Christiansen. Appendix A contains the contact information for the removal action. A contractor to conduct the work has not been selected at this time. The work may be completed by United Park personnel or out-sourced to a qualified and experienced contractor. All personnel and contractors working with contaminated materials will have appropriate health and safety training including OSHA certification as required by 29 CFR 1910.120.

3.2 Site Control and Access

Empire Canyon is a year round recreational area with skiing in the winter and hiking and mountain biking in the summer. Site control and access will be the responsibility of the United Park Project Coordinator or designated representative. Removal work will be conducted during the summer hiking and biking trails in or near the construction area will be re-routed or temporarily closed. The project coordinator will ensure that no unauthorized visitors enter the construction area and will also ensure that the requirements in Section 3.1 are met. Signs will be posted alerting the general public of the removal work and alternate travel paths.

4.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The Action Memorandum provides ARARs should be considered, to the extent practical, in developing removal action construction methods and procedures. Fugitive dusts and National Ambient Air Quality Standards (NAAQS) for lead will be controlled and monitored during construction activities at the Site.

United Park will prepare a construction site Stormwater Pollution Prevention Plan (SPPP) prior to implementing removal activities described in this Work Plan. Alliance Engineering will assist United Park in evaluating construction methods and materials to ensure that work performed during this removal action meets or exceeds applicable design standards. United Park will implement Best Management Practices (BMPs) to control fugitive dusts and protect the quality of stormwater. A post-closure monitoring program will be implemented within 30 days of completion of the work described in this Work Plan.

No waste materials generated through the removal action activities will be disposed of off-Site at a regulated landfill. Excess excavation materials from the Site will remain on-Site, unless EPA, United Park, and PCMC otherwise agree. As discussed in Section 8.0 hereto, any repository located at the Daly West mine dump will be constructed in accordance with the specifications and procedures outlined in this Work Plan. In the alternative, some or all of the excavated mine waste from Empire Canyon may be disposed of at the Richardson Flat Tailings Impoundment (Richardson Flat) (*see* AOC). Relocation of mine wastes at Richardson Flat, if it occurs, will be in compliance with applicable legal requirements. Final design and covers of any mine waste relocated to Richardson Flat will be addressed, and will be in accordance with, the requirements adopted in the anticipated Record of Decision for Richardson Flat (forthcoming).

There are no identified wetlands in the proposed work area; however, United Park will comply with the appropriate federal regulations if wetlands are encountered. There are no expected impacts to historic or archeological resources within the proposed work area.

Although there are no aquatic resources in Empire Canyon, this proposed work will improve Silver Creek water quality and therefore improve aquatic resources. Removal and reconstruction work in the Empire Canyon ephemeral channel will result in short-term impacts and long-term improvements for the channel to carry and convey snowmelt and stormwater off the watershed. United Park will mitigate short-term impacts by implementing storm water BMPs. There are no known federal or state listed threatened or endangered species present or using the Site (EE/CA, RMC 2003). The list of ARARs contained in the Action Memorandum were all considered in developing this Work Plan. Siting requirements were not considered applicable given the existing location of the Daly West mine dump.

5.0 REMOVAL ACTION PROCEDURES

This section describes general procedures that will be used to protect human health and the environment during implementation of the removal action, in accordance with the ARARs adopted in the Action Memorandum.

5.1 Dust Control

Fugitive dusts will be controlled to comply with ARARs for the Site. There are two categories of fugitive dust for this removal action, 1) general fugitive dusts from construction activities and 2) fugitive dusts containing lead. Based on previous experience with construction work in Empire Canyon, most fugitive dusts are generated on haul roads. Typically, very little fugitive dust is generated during excavation and loading activities. United Park will implement Best Management Practices (BMP's) to control fugitive dusts. Fugitive dust BMP's will include the following:

1. The Project Coordinator (or designated representative) will be responsible for the observation of Site conditions and presence of fugitive dusts.
2. All trucks leaving and entering the contaminated areas within the Site will be covered or wetted down.

3. Water and chemical dust suppressants may be used at the discretion of the Project Coordinator to control fugitive dust.
4. The Project Coordinator may halt work until Site conditions improve where fugitive dusts are apparent.

During excavation of mine wastes passive air monitoring will be conducted by placing clean five gallon plastic containers upwind and downwind of the work area. The containers will be mounted on posts approximately five feet off the ground. Dust in the containers will be collected at the end of work activities each day and analyzed by a portable field X-Ray Fluorescence (XRF) analyzer for lead. If downwind concentrations exceed upwind concentrations by a factor of ten or more United Park will then institute a more sophisticated air-monitoring program. Personnel air monitoring samplers will be placed on excavating equipment and at locations upwind and downwind of the excavation area. Filters from the samplers will be collected and analyzed daily. Results of the filter analyses will be compared to National Ambient Air Quality Standards (NAAQS) for lead. If the standards are exceeded for the previous day, United Park will institute BMP's. If the standards are exceeded for the quarterly reporting period, United Park will comply with the appropriate reporting requirements.

5.2 Stormwater Controls

United Park will modify the existing Utah Pollution Discharge Elimination System (UPDES) Stormwater Permit for Industrial Activity (UPDES Stormwater Permit #UTR100978) to meet the UPDES Stormwater Permit for Construction Activities requirements. Modification to the existing permit will include a description of the removal action activities. The plan will be prepared prior to implementing the removal action. The plan will address stormwater run-on and run-off associated with the removal action activities.

5.3 Decontamination

Mine wastes will be excavated and direct loaded onto trucks, which will stay on existing non-contaminated roads during this process. Care will be taken during the loading that mine wastes are not spilled over the sides. Trucks will be loaded "light," meaning that no mine wastes will be over the top edge of the truck bed. All mine waste loads will be covered or wetted down prior to leaving the loading area. The trucks will be visually inspected prior to leaving the loading area to ensure that mine wastes are not present on the outside of the vehicle. If mine wastes are present they will be removed prior to the vehicle leaving the loading area.

All remediation equipment is anticipated to remain on-Site for the duration of the project. If equipment is moved off-Site, mine wastes will first be removed from the equipment. Prior to handling clean materials equipment will be decontaminated. During excavation of contaminated materials fugitive dust will be controlled by wetting down the material. Haul trucks will be wetted down or covered prior to movement of contaminated materials from the excavation zone to the repository.

5.4 Health and Safety Plan

This Section details the elements of the Health and Safety Plan (HASP)

5.4.1 Worker Safety

All work conducted during the implementation of this work plan and during post construction monitoring will follow the United Park City Mines Company Health & Safety Policy found in Appendix B. United Park representatives will ensure that all site workers understand and follow the health and safety policy. All personnel and contractors working with contaminated materials will have appropriate health and safety training including OSHA certification as required by 29 CFR 1910.120.

5.4.2 Traffic Control

During Phases I and II of the remediation in Empire Canyon construction, vehicles will be routed primarily through the Ontario No. 3 mine access to Empire Canyon. Some vehicles may also use the Daly West mine dump access to the canyon. There should be little if any movement of materials or equipment through the Daly Avenue access during these phases. There may be, on occasion, some equipment or materials that may need to be brought into the lower reach of the canyon through Daly Avenue because the other access routes are either obstructed or because Daly Avenue is the only route to safely access the site during Phases I and II. Remediation activities during Phase III will occur in the lower reach of the canyon and, to the extent possible, United Park will limit remediation equipment and materials traffic through Daly Avenue.

Should material generated during this Removal Action need to be taken to another location such as Richardson Flat, traffic safety measures consistent with local requirements will be implemented.

6.0 SCHEDULE

The removal activities described in this work plan will be initiated after approval of the Action Memorandum and this work plan. It is expected that the initial work will begin in the spring or summer of 2004. Figure 1 shows the location of the reclamation activities described in this section. The work is divided into the following phases:

6.1 Phase I

Initial work conducted under this task in the fall of 2003 was comprised of preparing staging areas for both clean materials and contaminated materials, staging materials and other site preparation activities. In early summer of 2004 Phase I work will be comprised of stream channel reclamation from the toe of the Daly West mine dump down to the

confluence of the stream channel and the Flagstaff stormwater drain. Additional work in Phase I will include removal of wastes in the lower Walker & Webster Gulch and lower Little Bell Draw channels. Channel restoration work will be conducted in Daly Draw and installation of a culvert from the mouth of Daly Draw to the Empire Canyon channel. Trails on mine dumps in the upper reach of the canyon will also be remediated during this phase.

6.2 Phase II

In 2005, removal work will include channel reclamation from the Flagstaff stormwater drainage culvert to the "iron gate" located downstream of the Park City Municipal Corporation (PCMC) water tank. Mine wastes will be removed from the channel and the channel reconstructed with clay rich soils and riprap as needed. Installation of culverts in channels will occur in the area of the Judge Tunnel water tank. The Judge/Alliance mine dump will also be recontoured, to the extent practical, covered with clay rich soils and topsoil and revegetated. The trail across the top of the Judge/Alliance dump will be remediated and re-routed away from the power sub-station.

6.3 Phase III

Phase III is anticipated to begin in the late fall of 2005 or early summer of 2006. Work in this phase will be comprised of stream channel remediation from the "iron gate" down to the decant pond located near the mouth of the canyon. Mine wastes will be removed from the channel and the channel reconstructed with clay rich soils and riprap as needed. Final revegetation efforts on previously remediated areas may also be conducted during this phase.

7.0 NON-TIME CRITICAL REMOVAL ACTIVITIES

This section details the Non-Time Critical removal activities to be undertaken as part of the Empire Canyon removal action.

7.1 Stream Channel Reconstruction

Where required, stream channels will be reconstructed to reduce the potential for surface water to come into contact with mine waste and to prevent the infiltration of surface water into the ground. Channel segments to be reconstructed are detailed in Figure 1. Channel reconstruction will consist of waste material excavation, installation of a clay-rich soil liner, channel bed surface and associated velocity dissipation/erosion control structures. Channel reconstruction will be done during mid-to late summer and fall, when the ephemeral channels are typically dry. The channel/undisturbed ground interface will be recontoured to merge with the original adjacent ground configuration. Typical details for channel construction are provided in Figure 2. Prior to construction activities, United Park will prepare a Storm Water Pollution and Prevention Plan for the anticipated construction activities.

7.1.1 Excavation/ Channel Reconstruction

Materials will be excavated from the channels as required to shape the channels and to remove impacted materials. Excavated materials may be screened to remove large rocks (+6 inch diameter). Such large rock material will be evaluated for reuse as rip-rip in the reconstructed channels. Evaluation may consist of visual and/or analytical testing to ensure that mine wastes are not placed in the reconstructed channel. Contaminated materials may be placed in a temporary staging area prior to transport to a repository.

Channel reconstruction will consist of shaping and configuring the excavated channel to accommodate the maximum size channel permitted by existing topographic features. Stormwater hydrologic calculations for Empire Canyon are presented in Appendix D. The initial channel cross-section will be over-excavated to accommodate the placement of six inches of compacted clay rich soils, channel materials comprised of clay soil and well-graded stony material and, where required, rip-rap or check dams. Channel side-slopes will be configured not to exceed a side slope of 2:1 (horizontal:vertical). The top

of the channel slope will be merged into existing topography where possible without exceeding the 2:1 slope. Areas that exceed 2:1 slopes due to topographical constraints will be protected with rip-rap material. Channel side slope sub-grades will be confirmed prior to installing the clay soils and subsequent channel materials. The side slopes of the channel will be contoured to provide a smooth transition to the adjacent existing topography. All imported materials and construction methods will meet or exceed procedural specifications noted in Section 9.0.

7.1.2 Clay Soil Installation

The clay rich soil material will be placed in channel beds from the bucket of a trackhoe or equivalent equipment. Compaction will be completed with a trackhoe sheepsfoot or equivalent equipment.

7.1.3 Channel Bed Surface Installation

In general, channel materials that will overlay the clay soil base will consist of well-graded six-inch minus rocky soils. Where velocities exceed five-feet per second (5 fps), rip-rap and/or check dams will be used to preserve the integrity of the clay rich liner. The channel surface material will be placed by a trackhoe or equivalent equipment. Compaction of the channel bed surface will be accomplished with a trackhoe sheepsfoot or equivalent equipment.

7.1.4 Check Dams and Other Erosion Control/Velocity Dissipation Structure Installation

Check dams and other erosion control/velocity dissipation structures will be keyed approximately one foot into the walls and bed of the recontoured stream channel during construction. The tops of the check dams will be notched to direct water flow through the dams and to reduce the possibility of water eroding the dam/soil interface. A typical check dam detail is provided in Figure 2.

Areas adjacent to reconstructed channels that are disturbed as part of the reconstruction process will be reclaimed. This reclamation may include grading and revegetation.

7.2 Mine Waste Remediation

Remediation of mine wastes will occur in two primary areas: 1) mine dumps and 2) along recreational trails. Remediation will generally consist of covering any contaminated material. The trails that will be impacted are those that cross the Daly West mine dump area, the lower Empire Canyon/Alliance tunnel mine dump area and the uppermost Anchor or Daly/Judge mine dump. Trail use may be interrupted during this work. Approximately fifty percent of the Daly West mine dump has been covered to date. The remainder of the dump will be covered in this removal action.

7.2.1 Surface Preparation and Grading

Mine waste surfaces to be reclaimed will be cleared and grubbed of all vegetation prior to reclamation activities. Surfaces will be recontoured for three primary reasons: 1) drainage control, 2) merging waste areas with existing topography, and 3) slope stabilization. Where possible, mine dump faces will be regraded so as not to exceed a slope of 2:1. Mine dumps exceeding a slope of 2:1 that cannot be regraded to achieve a stable slope will not be covered with clean cover or topsoil.

7.3 Mine Dumps

Mine dumps will be prepared prior to reclamation as described in Section 9.0. Where possible the shape and slope will be reconfigured to allow for optimal revegetation and drainage. A typical detail for mine dump reclamation is provided in Figure 3.

Upgradient diversion channels will be used to isolate surface water runoff where possible. Long, regraded slopes will be configured with diversion benches to reduce the travel path of overland surface water flows. These diversion benches will consist of a

negatively sloped bench approximately ten feet wide. Each of the diversion benches will contain a channel to divert water from the bench. The channel will be lined with rip-rap material or constructed in a manner that will limit erosion of the cover and topsoil materials. Runoff diversion benches will be determined in the field on an individual, as-needed basis during regrading.

Where appropriate and practical, mine dumps will be covered with a minimum of twelve inches of clay-rich cover soils, placed in lifts of six inches. Each lift will be compacted, prior to the placement of the overlying material, with a sheep-foot or equivalent equipment. A final six-inches of topsoil will be placed over the cover soils prior to revegetation. All reclaimed mine dumps will be revegetated.

7.4 Recreational Trails

Recreational trails requiring remediation will be covered with at least twelve inches of low permeability cover soil. A typical detail for recreational trail remediation is presented in Figure 4. Cover soils used in trail remediation will be screened to remove the greater than two inch component of the cover soil. Cover soil will be emplaced in two six-inch lifts. Each lift will be compacted, prior to the placement of the overlaying material, with a sheepsfoot or equivalent equipment. Areas outside of the main footprint of the trail will be covered with topsoil and revegetated.

To prevent the erosion of trail material and to protect adjacent revegetation the boundary of the trail footprint may be demarcated by rip-rap material. This material may be temporary serving to keep trail users from impacting revegetated areas, and may be removed after vegetation is established.

As mentioned above, the trails to be remediated will be those in the lower section of the canyon near the Alliance and Judge mine tunnels, trails near the Daly West Mine and trails near the Anchor or Judge mine shaft. The use of these trails will be temporarily interrupted during this phase of the construction. Proper notification will be conducted in

cooperation with the local trail organization. Proper signage will be installed to ensure public safety during this construction. It is not anticipated that trail use will be significantly interrupted. The largest interruption of use will occur when the main stream channel is being excavated. The roadway adjacent to the stream channel will be used by excavation equipment for access to the channel. Every effort will be made to ensure proper notification for hikers and to ensure public safety.

8.0 MINE WASTE REPOSITORY

Mine wastes excavated during the course of the removal action will be relocated to a mine waste repository in accordance with the Action Memorandum and the AOC.

8.1 Daly West

Daly West was initially identified as the preferred mine waste repository location. It is anticipated that most of the excavated mine wastes will be deposited at the Daly West mine dump. Mine waste materials coming from the excavations are of similar origin as the mine wastes present at the Daly West mine dump.

In the event that the Daly West mine dump is used to consolidate Empire Canyon mine wastes, the waste materials will be placed directly on existing mine materials and compacted in six-inch lifts. The wastes will then be covered with twelve inches of clayey soils, which shall be placed in six-inch lifts and compacted. Six inches of topsoil will be placed over the twelve inches of clayey soil and revegetated with the seed mix specified in Appendix B.

Benches will be installed as needed to either place more waste in the repository or to reduce overall final slope lengths. Prior to covering, the final waste surface will be graded to no less than a 2:1 slope, where practical. Diversion benches may be ten feet wide and will be of a negative slope to break the travel path of surface water runoff and direct it off of the repository slope. Each of the diversion benches will contain a channel to divert

water from the bench. If required, the channel will be lined with rip-rap material to limit erosion of the clay cover and topsoil material. Slopes and grades will be confirmed using conventional survey methods.

8.2 Alternative Repository Location

PCMC has raised some concerns about the use of Daly West as a permanent mine waste repository. PCMC and United Park are currently working together to develop a mutually agreeable alternative plan that would address PCMC concerns and allow for the consolidation of mine wastes excavated during the course of the removal action. United Park and PCMC anticipate that an acceptable plan will be agreed upon prior to the time when field conditions would allow construction to commence. If such a plan is successfully developed, United Park will submit this alternative plan for EPA consideration and approval.

One alternative plan under consideration is the relocation of the mine waste repository to Richardson Flat. Any such relocation of mine wastes from Empire Canyon to Richardson Flat would be in compliance with applicable legal requirements. Final design and covers of any mine waste relocated to Richardson Flat will be addressed, and will be in accordance with, the requirements adopted in the anticipated Record of Decision for Richardson Flat (forthcoming).

9.0 SPECIFICATIONS

This section details material and construction specifications for Site activities during Site remediation.

9.1 Topsoil

To ensure that revegetation efforts are successful, topsoil used on the project will be generated from land development activities within Empire Canyon. Prior to placement

over the cover soils the topsoil will be screened to remove particles greater than six inches. Topsoil will be imported from the adjacent Flagstaff Mountain Resort project and will only come from clean parcels as defined in the EPA comfort letters (EPA, 2002 & 2003) and the Flagstaff Mountain Resort, Report of Sampling Activities with the Property Proposed for Development (RMC, 2001). If materials are imported from other locations samples will be collected and analyzed for lead and arsenic. Sample frequency will be every 5,000 cyds, samples will be a 5 subsample composite and action levels will those used on the Flagstaff project.

Topsoil will be compacted sufficiently to ensure a firm seedbed for reseeding purposes. The final topsoil surface will be scarified as needed prior to revegetation.

9.2 Low-Permeability Clay Rich Cover Soil

To allow for the uniform placement and compaction of the cover soils, cover soils will be low permeability, rich, high clay content soils, screened to remove rocks greater than three inches. Clay rich soils from the Flagstaff Project will be used as cover material using the same criteria outlined in Section 5.1 for quality control.

Cover soils will be emplaced in six-inch lifts and will be compacted with a sheep-foot compactor or equivalent equipment. Compaction methods may include rolling and/or vibrating. Cover soils will be inspected and approved by United Park or its representatives prior to topsoil placement.

The final cover subgrade surface will be uniform to allow for the placement of a consistent topsoil layer.

9.3 Clay

Clay rich material to be used for channel reconstruction and repository construction will be screened to less than three inches prior to placement, providing an improved seal.

Such clay rich material will be inspected and approved by United Park or its representative prior to placement.

Clay rich materials will be emplaced in six-inch lifts and compacted to a maximum of ninety (90) percent dry density. Compaction methods may include a sheep-foot, rolling/vibrating or other heavy equipment.

9.4 Channel and Rip-Rap Material

Channel material will be used to protect the clay rich liner material in reconstructed channels. Rip-rap material will be used for erosion control and velocity dissipation structures such as check dams. Rip-rap materials will be imported from the Flagstaff Project using the same criteria outlined in Section 5.1 and the excavated channel in Empire Canyon. The excavated materials from Empire Canyon may be screened to sizes appropriate for rip-rap and analyzed with the portable XRF to determine if any mine waste contamination is present above action levels used for the Flagstaff Project.

9.4.1 Channel Material

Channel material will consist of a well-graded rock and soil material sufficient to dissipate stream energy and protect the underlying soils.

9.4.2 Rip-Rap and Check Dam Material

Rip-rap material will consist of rock materials sufficient to reduce stream energy and to prevent erosion to the extent possible. Rip-Rap material will be used to protect the integrity of the channel in high velocity channel segments. Rip-rap material will be inspected by United Park or its representative prior to delivery and placement at the check dam site.

Check dam material gradation will include sufficient amounts of road base type material to fill voids between the larger rocks and increase the sediment trapping properties of the check dam. Check dam material preparation will include the mixing of materials prior to delivery to the channel. Mixing techniques used must ensure that large voids in the material are avoided. Check dam material mixing will include a combination of pick up/dumping and end rolling mixing with a blade. Prior to delivery and placement United Park or its representative will inspect the check dam material.

9.5 Clearing, Grubbing and Site Preparation

If needed, excavation and construction areas will be cleared prior to excavation and the placement of materials. Clearing and grubbing will include the removal of organic matter such as plants, trees and woody material as well as any other material from the Site. Large non-organic materials such as boulders that interfere with grading will be removed from the areas as required.

Site preparation will include the preparation of a smooth, consistent surface prior to the placement of materials.

9.6 Grading

Grading will be performed prior to the placement of materials. Surfaces will be graded prior to the importation of cover materials. High areas and depressions will be smoothed prior to the placement of imported materials such as clay, cover soil and topsoil. Surfaces and subgrades will be graded to approximate final configurations and shapes prior to cover and topsoil placement. Subgrades and final graded surfaces will be confirmed by conventional survey techniques. Dust control will be conducted during grading activities.

Final surfaces, grades and erosion control structures will not be considered complete until approved by United Park or its representative.

9.7 Revegetation

Reseeding will be conducted on all areas receiving topsoil.

9.7.1 Seedbed

The seedbed will consist of topsoil placed during remedial activities. Topsoil will be lightly compacted and scarified as necessary. A seedbed roughened prior to seeding is preferred.

9.7.2 Seed Mix

The seed mix will include a mixture of deep-rooted annual and perennial native grass and forb species. The annual species will provide rapid germination to aid in short term revegetation. The short-term revegetation will decrease the runoff potential of the slope and will keep the imported soil in place. The perennial species will provide longer term, more stable revegetation.

9.7.3 Planting

Reseeding by broadcast seeding methods will be used and will occur in the fall. The seed mixture, specific for the Site, can be found in Appendix B. Seed is to be broadcasted with a "whirlybird" type hand seeder, except where an ATV with a mounted broadcast seeder can be readily operated without hazard.

The application rate is to be about 25 lbs/ acre. This rate will provide over 100 seeds per square foot of surface and the seed should be readily visible on the ground at this density. Personnel spreading seed will check the seeding density to ensure that enough seed is being applied. Where possible the seed mix will be applied using a mechanical spreader. Seed application in the other areas will most likely have to be done by hand.

United Park or its representative will monitor revegetation progress. If needed, additional seeds or fertilizer will be applied to assure the adequate establishment of vegetation.

10.0 MONITORING

Monitoring will be conducted during remedial efforts and after remediation is completed on the Site.

During remediation, monitoring will ensure that the Site Health & Safety Plan is complied with by all Site visitors and workers, public safety is protected, and the remediation is completed according to the specifications described in this Work Plan.

Post-construction monitoring will be conducted to evaluate the effectiveness of the remediation. United Park or its representative will be responsible for monitoring during remedial activities and for a period of five years following final remediation of the site.

During construction, monitoring activities will ensure that:

1. All imported materials and construction methods meet design specifications.
2. Fugitive dust from contaminated materials is minimized to the extent practical.
3. Compliance with applicable local, state and federal permits and requirements is achieved.

United Park will submit a plan to EPA for post construction monitoring activities within thirty (30) days of Notice of Completion of Work. The plan will, at a minimum, address the following components:

1. Annual evaluations of revegetated areas for five years to determine success of the reseeded efforts.
2. Annual examination of the cover integrity and vegetation on the waste repository to ensure that they remain effective.

3. Annual evaluation of the remediated stream channels for five years for structural integrity. During spring runoff water chemistry samples will be collected to determine effectiveness of the remediation. Sample locations will be downgradient of the Daly West mine dump, upgradient of the Judge Tunnel, upgradient of the city water tank, and upgradient of the stormwater detention basin at the mouth of Empire Canyon.
4. Annual inspection of the cover soils on remediated trails to ensure that the cover remains intact.

If the annual monitoring discovers significant problems within the remedial components, United Park will repair the component and take measures to mitigate the cause of the problem.

11.0 INSTITUTIONAL CONTROLS

Institutional controls will include long and short-term actions.

11.1 Short-term ICs

Short-term institutional controls will include the following:

1. United Park will establish written site-access agreements with all underground utility companies who may encounter mine waste materials either left under roads or in the mine dumps.
2. Signs will inform visitors of certain hazards (e.g., presence of mine wastes on reclaimed mine dumps).

11.2 Long-term ICs

Long-term institutional controls will include the following:

1. Revegetation and water quality monitoring will be as described in Section 10.0.
2. Deed restrictions limiting land use at the Daly West mine dump shall be implemented should this location be determined to be the location of a repository. In this event, a lot of record will be created encompassing the repository that shall be owned by United Park and its successors or assigns. Should the repository be located elsewhere, United Park will prepare a legal metes and bounds description of the Mine Dump at the Daly West location. This information will be incorporated into a deed restriction or notice that is made part of the public record. This language will describe the location characteristics of the mine dump as well as any contact information.

12.0 REFERENCES

Environmental Protection Agency, 2002, Comfort Letter for Flagstaff Properties.

Environmental Protection Agency, 2003, Comfort Letter for Flagstaff Properties.

Environmental Protection Agency, 2003, Action Memorandum Non-time Critical Removal Action.

Resource Management Consultants, Inc (RMC), 2003, the Engineering Evaluation/Cost Analysis (EE/CA), Empire Canyon Site, Summit County, Utah EPA ID No. 002005981.

RMC, 2001, Flagstaff Mountain Resort, Report of Sampling Activities with the Property Proposed for Development.

Appendix A

Site Management Contact Information

SITE MANAGEMENT CONTACT INFORMATION

United Park City Mines Co.

Project Coordinator:	Kerry Gee	(office) (mobile)	435-649-8011 801-694-0382
Project Consultant:	Jim Fricke (RMC)	(office) (mobile)	801-255-2626 801-541-6328
Construction Quality Assurance:	John Demkowicz (Alliance Engineering)	(office)	435-649-9467

EPA

On-Scene Coordinator	Jim Christiansen	800-227-8917
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Appendix B

Seed Mixture Specifications

Seed Mixture Specifications

Mix No. 1	No. Seed/lb	PLS Correction	Seed Mix/per acre, lbs	Seed/lb in mix
Sherman Big Bluegrass	1,100,000	968,000	4	74,462
Paiute Orchardgrass	427,000	375,760	3	57,809
Pryor Slender Wheatgrass	100,000	88,000	4	20,308
Durar hard Fescue	600,000	528,000	4	40,615
Small burnet	55,000	48,400	3	7,446
Sanfoin	19,000	16,720	4	3,858
Empire Birdsfoot Trefoil	470,000	413,600	3	31,815
Totals	2,771,000	2,438,480	25	236,314

Appendix C

Health and Safety Policy

**United Park Health and Safety Policy
Empire Canyon Site
Park City, Utah**

Site ID Number: UT0002005981

Prepared for:

United Park City Mines Company
P.O. Box 1450
Park City, Utah 84060

Prepared by:

Resource Management Consultants, Inc
8138 South State Street, Ste. 2A
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January 2004

1.0	INTRODUCTION	1
1.1	Site Description	1
1.2	Site Activities.....	1
2.0	PROJECT MANAGEMENT.....	2
2.1	Project Manager.....	2
2.2	Health and Safety Manager.....	2
2.3	Site Manager.....	2
2.4	Supervisor.....	2
3.0	TRAINING.....	2
3.1	Off-Site Training	2
3.2	On-Site Training	3
3.3	Weekly Health and Safety Meetings - Construction.....	3
3.4	CPR and First Aid Training Requirements - Construction	3
4.0	MEDICAL SURVEILLANCE.....	3
4.1	Medical Surveillance - General	3
4.2	Medical Surveillance - Construction	3
5.0	HEALTH AND SAFETY PROTECTION	4
5.1	Substance Hazards.....	4
5.2	Safety Hazards.....	4
5.3	Personal Protection Equipment - Construction.....	4
5.4	Personal Air Monitoring - Construction.....	4
5.4.1	Work Practices to Reduce Employee Exposure - Construction.....	5
5.5	Exposure to Elements	5
5.5.1	Heat Stress	5
5.5.1.1	Heat Rash.....	5
5.5.1.2	Heat Cramps	6
5.5.1.3	Heat Exhaustion.....	6
5.5.1.4	Heatstroke.....	6
5.5.2	Cold Stress.....	6
5.5.2.1	Hypothermia	6
5.5.2.2	Frostbite	7
5.5.3	Wind Exposure	7
5.5.4	Logs and Reports.....	7
6.0	SITE CONTROL.....	8
6.1	Investigation	8
6.1.1	Work Zone.....	8
6.1.2	Cleaning/Maintenance Area	8
6.2	Construction.....	8
6.2.1	Work Zone.....	8
6.2.2	Cleaning/Maintenance Area	8
6.3	General Maintenance.....	9
6.4	Equipment Safety.....	9
6.5	Electrical Safety.....	9
6.6	Miscellaneous Site Safety Rules.....	9
7.0	DECONTAMINATION.....	10
7.1	Field Personnel	10
7.2	Equipment.....	10
8.0	EMERGENCY RESPONSE.....	10
8.1	Emergency Route to Hospital.....	10
8.2	Incident Command System.....	10
8.3	Response Procedures	11
8.3.1	Major and Minor Personal Injury	11
8.3.2	Fire or Explosion	11
8.4	Notification and Documentation Procedures	12
8.5	On-Site Emergency Equipment.....	12

Figures
Emergency Route to Hospital

Appendix
Emergency Contact Phone Numbers

1.0 INTRODUCTION

This Health and Safety Policy (HASP) is intended to protect all employees, general contractors, subcontractors, and/or visitors conducting or observing any activities under the direction of United Park City Mines Company (United Park). This HASP is intended to apply to activities taking place at the Empire Canyon Site (hereafter referred to as the Site), and covers both investigation and construction. The policy is intended to minimize potential exposures and/or accidents that may occur, and details the actions to be taken during an emergency. The HASP will establish required procedures intended to minimize exposures of United Park personnel, contractors, visitors and the surrounding community. Guidelines contained herein that are appropriate to the activities taking place at the Site will be observed at all times.

All personnel will be required to understand and observe the provisions of this plan. Any tasks associated with investigation or remediation activities on the Site must be performed in accordance with this policy, designed to ensure that employees are adequately protected from any potential chemical and/or physical hazards present at the Site. To help ensure safety compliance, all field participants and observers must read this plan and sign a certification stating that they agree to comply with the conditions of the policy. All activities conducted will be in accordance with 29 CFR part 1910, *OSHA standards for general industry*.

1.1 Site Description

The Site covers approximately 1500 acres in a small mountain canyon in Summit County, Utah, located one mile south of Park City, Utah. The Site includes two seasonal drainages and historic mining related features such as waste rock piles and mining related structures. The Site is currently used for recreational activities such as biking, hiking and skiing. Mining does not occur onsite.

United Park and contractor personnel will be conducting removal activities described in the Removal Action Workplan in and around the Site. During the course of this work investigation, there exists a potential for personnel to have limited contact with impacted materials contained on the Site. The Site consists of mining related features such as waste rock piles and mine buildings surrounded by undisturbed areas.

1.2 Site Activities

This HASP is intended to address the risks associated with sampling and construction activities, which will take place at the Site. During the course of investigation by United Park, personnel will be required to visit the Site in order to collect soil and water samples for chemical analysis. Personnel will also visit the Site to survey and perform other miscellaneous tasks. The procedures contained in this HASP are intended to protect those personnel from potential hazards while carrying out their duties, and provide them with information necessary in the event of an emergency.

2.0 PROJECT MANAGEMENT

Efficient implementation of this policy requires that the roles, responsibilities and scope of authority for key personnel be identified. United Park shall identify individuals responsible the following positions:

2.1 Project Manager

The Project Manager is responsible for implementation of the work plan and compliance with the HASP.

2.2 Health and Safety Manager

The Health and Safety Manager will have a thorough working knowledge of state and federal occupational safety and health regulations in addition to thorough knowledge and understanding of this policy. The Health and Safety Manager will have the authority to temporarily suspend site operations in order to ensure site safety and resume normal operations once the appropriate measures have been taken. The Health and Safety Manager will report directly to the Project Manager.

2.3 Site Manager

The Site Manager will be present during the majority of site activities and will be responsible for general site activities, supervision and enforcement of this HASP. The Site Manager will report directly to the Health and Safety Manager.

2.4 Supervisor

The Supervisor(s) will be present during all on-site activities and will report directly to the Site Manager.

Note: The aforementioned personnel may be increased, or personnel may share responsibilities dependent upon specific site conditions.

3.0 TRAINING

3.1 Off-Site Training

All full-time, part-time and short-duration workers must hold current certification of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) 40-hour training. Visitors must hold current certification of OSHA/HAZWOPER 40-hour training and shall be escorted at all times by an experienced and trained Site Manager.

3.2 On-Site Training

An informational training program implemented by United Park will cover on-site training.

3.3 Weekly Health and Safety Meetings - Construction

During any construction or excavation activities, the site Health and Safety Manager will conduct mandatory weekly safety meetings for all site personnel. The meetings will provide time for refresher courses, and new site conditions will be examined as they are encountered.

3.4 CPR and First Aid Training Requirements - Construction

During any construction or excavation activities, a minimum of one worker per work crew or shift shall have a current certificate of training in first aid and CPR. These workers must have appropriate training and medical surveillance to enter the Site.

4.0 MEDICAL SURVEILLANCE

4.1 Medical Surveillance - General

Medical surveillance will be obtained if personnel:

- Receive, or may have received, a possible overexposure to on-site contaminants;
- Received an injury requiring hospital or medical attention;
- Experience an unexplained or serious illness.

4.2 Medical Surveillance - Construction

A yearly physical examination shall be provided for field personnel involved with excavation of any tailings material in excess of 500 yd³. The examination shall emphasize skin, renal, hepatic, immunological, neurological, and hematological systems, and shall include tests for liver and kidney function. If construction personnel are exposed to tailings materials on-site for thirty (30) days or more, they will participate in a medical examination program according to OSHA's lead (29 CFR 1926.65) standard.

5.0 HEALTH AND SAFETY PROTECTION

5.1 Substance Hazards

Lead, arsenic and cadmium are known to exist on the Site, and personnel should be briefed on exposure and health hazards. It is not anticipated that exposures to these substances will exceed OSHA's Personal Exposure Limit (PEL). The following table lists the primary hazards associated with significant exposure to each substance.

Lead	Toxic on inhalation and ingestion.
Arsenic	Toxic on inhalation and ingestion; skin irritant; known human carcinogen.
Cadmium	Toxic on inhalation and ingestion; suspected human carcinogen through inhalation only.

5.2 Safety Hazards

Investigation activities may expose field personnel to potential physical hazards including, but not limited to:

- Holes and ditches
- Uneven terrain
- Slippery surfaces
- Electrical equipment
- Mobile equipment
- Overhead hazards
- Underground hazards

5.3 Personal Protection Equipment - Construction

The minimum level of protection used during any construction activities is level D, requiring the following items:

- Hardhat;
- Steel-toed boots;
- Safety glasses;
- Cotton coveralls;
- Work gloves;
- Sampling gloves;
- Hearing protection, when needed.

5.4 Personal Air Monitoring - Construction

During construction activities involving contact of tailings material, personal air monitoring will be conducted to verify and document exposures to lead, arsenic, and cadmium on this project do not exceed the OSHA PEL's. Personal air monitoring will only occur when tailings are contacted in excess of 500 yd³. If monitoring reveals exposures above an OSHA PEL, then field personnel will be upgraded to level C protection.

5.4.1 Work Practices to Reduce Employee Exposure - Construction

While performing any construction/excavation activities, work practices shall be instituted to ensure worker exposure remains below the applicable PEL. Work practices will include wetting down excavation-sites as needed throughout any excavation operation. The site safety officer will be responsible to monitor the dust control operations when needed.

5.5 Exposure to Elements

5.5.1 Heat Stress

The potential for heat stress depends on the type of protective gear being worn, the ambient temperature, and the amount of activity. Personnel will report any cases of dizziness, excessive sweating, increased respiratory rate, or pulse and are to leave the work area immediately if these conditions are noted. Work cycle lengths will be based initially on subjective input from personnel, and will be reduced and a monitoring program will be initiated if the above are noted. Work cycles will also be reduced if a pulse rate of greater than 110 is noticed during rest. Personnel with elevated rates will not return to work until the pulse has lowered to their resting rate.

Workers exhibiting signs of heat stress will have their oral temperature measured at the beginning of a rest period before liquid intake. If oral temperature exceeds 99.6° F, the next work cycle will be shortened by one-third without changing the rest period. If the oral temperature still exceeds 99.6° F at the beginning of the next rest period, the next work cycle will be shortened by another one-third. If the oral temperature exceeds 100.6° F, the worker will not be allowed to wear semi-permeable or impermeable clothing. If an employee is overcome with heatstroke or becomes unconscious, the 9-1-1 service will be called. First-aid procedures will be used for heat related conditions, as necessary. Some of the signs and symptoms of heat stress are as follows:

5.5.1.1 Heat Rash

Symptoms of Heat Rash include:

- Profuse tiny raised vesicles on the skin
- Pricking sensations during heat exposure

5.5.1.2 Heat Cramps

Symptoms of Heat Cramps include:

- Painful spasms of muscles used during work
- Onset during or after work hours

5.5.1.3 Heat Exhaustion

Symptoms of Heat Exhaustion include:

- Fatigue
- Nausea
- Headache
- Giddiness
- Clammy and moist skin
- Pale complexion
- Upon standing, fainting possible, with rapid, thready pulse and low blood pressure

5.5.1.4 Heatstroke

Symptoms of Heatstroke include:

- Hot dry skin usually red, mottled or cyanotic
- Confusion, loss of consciousness, and convulsions

Note: Heat stroke may be fatal if treatment is delayed

5.5.2 Cold Stress

During on-site activities, workers may be exposed to cold temperatures. Exposure to cold temperatures increases the likelihood and potential for disorders or conditions that could result in injury or illness. Factors leading to hypothermia and frostbite include ambient temperature, wind velocity, exposure time and insufficient cold-weather protective gear. Signs of excess cold exposure include uncontrollable fits of shivering, slurred speech, memory lapses, immobile hands, stumbling, drowsiness, and exhaustion. Treatment for these symptoms are to get the victim out of the wind and cold, remove wet clothing, supply a warm drink, and keep victim warm with blankets or clothing.

5.5.2.1 Hypothermia

The first symptoms of this condition are uncontrollable shivering and the sensation of cold, irregular heart beat, weakened pulse, and change in blood pressure. Severe shaking

of rigid muscles may be caused by a burst of body energy and changes in the body's chemistry. Vague or slow slurred speech, memory lapses, incoherence, and drowsiness are some of the additional symptoms. Symptoms noticed before complete collapse are cool skin, slow and irregular breathing, low blood pressure, apparent exhaustion, and fatigue even after rest. As the core body temperature drops, the victim may become listless and confused, and may make little or no attempt to keep warm. Pain in the extremities can be the first warning of dangerous exposure to cold. If the body core temperature drops to about 85° F, a significant and dangerous drop in the blood pressure, pulse rate, and respiration can occur. In extreme cases, death will occur.

5.5.2.2 Frostbite

Frostbite can occur, in absence of hypothermia, when the extremities do not receive sufficient heat from central body stores. This can occur because of inadequate circulation and/or insulation. Frostbite occurs when there is freezing of fluids around the cells of the body tissues due to extremely low temperatures. Damage may result, including loss of tissue around the areas of the nose, cheeks, ears, fingers, and toes. This damage can be serious enough to require amputation or result in permanent loss of movement. The potential for both heat and cold related disorders or conditions can occur in many common situations. Cold early morning temperatures can give way to warm daily temperatures, resulting in heavy perspiration within protective clothing. As temperatures cool again in the evening, the potential for cold related disorders or conditions can occur. Managers should be aware of the potential for this occurrence and should monitor workers accordingly.

5.5.3 Wind Exposure

Extreme low temperatures may not be the only element necessary to create the potential for cold exposure disorders or conditions; strong wind accompanied by cold temperatures can lead to these types of disorders or conditions. The windchill factor is the cooling effect of any combination of temperature and wind velocity or air movement. The windchill factor should be considered when planning for exposure to low temperatures and wind.

5.5.4 Logs and Reports

United Park will maintain all records required by OSHA, Worker's Compensation Insurance and similar regulations. This will include the maintenance of accident logs, the OSHA annual summary report and the posting of all prescribed notices.

6.0 SITE CONTROL

Site control will be implemented for both investigation and construction activities as needed.

6.1 Investigation

6.1.1 *Work Zone*

Various work zones are located throughout the Site. Due to the dispersed nature of the work areas and the current land uses it is not possible to demarcate the whole area as a work zone. Individual work zones will be identified on an as-needed basis. These areas will be restricted to appropriately trained personnel, and any non-approved personnel will immediately be escorted off-site.

6.1.2 *Cleaning/Maintenance Area*

At the entrance(s) of the work zones, an area will be provided for removal of gross contamination from both hand tools and personnel. United Park personnel and/or representatives will remove gross contamination from their boots and coveralls. Facilities will be provided for personnel to wash their hands and face as needed. At a minimum, facilities will include fresh water, soap, towels and waste receptacle.

6.2 Construction

6.2.1 *Work Zone*

All construction activities carried out at the Site will occur within the individual work zones, which will demarcated by fencing when possible. The work areas may pose a potential hazard and will therefore be restricted to trained workers with the appropriate personal protective equipment. Any excavation-sites will be demarcated by yellow barrier tape, if not backfilled prior to the end of each workday. An area that has been backfilled will be considered as lacking hazards, unless exposed utilities, etc. create a hazard. Such hazards will be demarcated with barrier tape.

6.2.2 *Cleaning/Maintenance Area*

At the entrance(s) of the work zones, an area will be provided for removal of gross contamination from both equipment and personnel. United Park personnel and/or representatives having contact with any tailings material will be required to remove gross contamination from their vehicles, equipment, boots and coveralls prior to leaving the Site. At a minimum, facilities will be provided including pressurized water, scrub tools for vehicles and equipment, and fresh water, soap, towels and waste receptacle.

6.3 General Maintenance

General cleaning maintenance is key in helping to maintain acceptable exposure levels for lead, arsenic, and cadmium. General cleaning/maintenance will be required for all equipment and facilities used by on-site as well as off-site personnel. This will include, but is not limited to a change and/or shower facility, office areas, and lunch facilities.

6.4 Equipment Safety

All mobile equipment with limited visibility to the rear shall be equipped with audible back-up alarms. If mobile equipment is operated at night, it shall be equipped with head lights and taillights. All equipment will be maintained in good condition. When the operator leaves the cab of mobile equipment, emergency brakes shall be set and any hydraulics released. If a truck is parked on an incline, it shall have the tires chocked.

When refueling, engines on all equipment shall be shut off. All mobile equipment will be supplied with a fire extinguisher with a rating of not less than 5-B rating, and the service truck will be supplied with a fire extinguisher with a rating of not less than 20-B rating.

6.5 Electrical Safety

Electrical power tools will continuously be inspected for damage. Electric tools with frayed cords or broken housings will be tagged and taken out of service.

If tools are used in wet conditions, they must be listed or labeled as double insulated. All extension cords will be of the three-wire ground type and be connected to a ground fault circuit interrupter (GFCI). If extension cords are not plugged into a permanently mounted GFCI, then the extension cord must be supplied with a waterproof GFCI. Extension cords that are spliced, worn, or frayed are not to be used. Extension cords must have the manufacturers rating on the cord and it must be legible; if it is not legible the cord must be taken out of service.

6.6 Miscellaneous Site Safety Rules

Miscellaneous Site Safety Rules include the following:

- Smoking, eating, chewing, applying cosmetics, etc. is not allowed on-site.
- A minimum of two personnel shall be on-site at all times.
- No horseplay is permitted at any time
- Vehicles used to transport personnel shall have seats firmly secured and adequate for the number of persons to be carried.
- Seat belts and anchors meeting the requirements of 49 CFR part 571 (department of transportation, federal motor vehicle safety standards) shall be installed in all motor vehicles.

7.0 DECONTAMINATION

7.1 Field Personnel

Decontamination procedures for field personnel shall be:

- Gross contamination removal from clothing and boots prior to leaving the Site.
- Wash hands and face at facility provided
- Containment of dirty coveralls.
- Launder coveralls at commercial laundry.

7.2 Equipment

The decontamination procedures for equipment contacting tailings shall be:

- Clean vehicles (inside and out) as needed prior to leaving the Site.
- Construction equipment, backhoes, loaders, dump trucks, hand tools, trailers hoses, etc contacting any tailings material will be cleaned of gross excavated soil material before leaving the Site and pressure washed upon culmination of scheduled work.
- Sampling equipment and hand tools not contacting tailings material will be cleaned of gross contamination prior to leaving the Site.

8.0 EMERGENCY RESPONSE

Accidents or potentially hazardous conditions will be handled in a manner to minimize the health risk to personnel. Accidents and hazardous conditions will be reported to the site safety officer. Prior to the start-up of this project, methods of communication will be established in order to summon emergency services in a timely manner. Supervisory personnel and the Site Safety Officer will be trained in first aid/CPR.

8.1 Emergency Route to Hospital

The emergency route to local medical facilities is shown in Figure 1 and emergency contacts with phone numbers are listed in Appendix A

8.2 Incident Command System

The Incident Command System used on this project will utilize different senior response officials depending on the nature of the incident. Front line supervisors are the initial "Senior Official" until the Project Manager or the Health and Safety Manager arrives. When emergency officials arrive, they shall become the "Senior Official".

8.3 Response Procedures

All United Park personnel will be trained in general procedures in the event of an emergency. Prior to beginning any work, personnel will be required to review the emergency procedures of this plan and ensure that all necessary equipment is ready for use in the event of an emergency. Visitors to the Site should also be briefed on these procedures.

Common forms of emergency include, but are not limited to fires, explosions, spills, sudden changes in weather, and personal illness or injury. The following emergency response procedures have been developed to help ensure a timely and efficient response to emergency situations that may arise.

8.3.1 Major and Minor Personal Injury

If field personnel are injured, the incident scene will be evaluated for immediate hazards and actions taken to eliminate those hazards. Once the incident scene is safe, the "Senior Official" will make an evaluation of the injured person. Seriously injured personnel should not be moved unless their life is in immediate danger and until a person trained in first-aid and CPR has made an assessment.

If the victim is conscious, first-aid may only be administered with the injured person's permission. If the victim is unconscious or unable to respond, then no permission is required to provide standard first aid. If no outside emergency services are needed, the "Senior Official" will arrange for the injured person to be transported to the predetermined medical facility.

If it is determined that emergency medical services are needed, the emergency services listed in Appendix A will be contacted as soon as possible. Calling for help is often the most important action to be taken. If you are the only person with the injured employee and urgent care is needed, provide initial critical care and then contact the outside emergency services. Return to care for the victim as soon as possible.

First-aid or other appropriate actions can be administered by the initial "Senior Official" or by the victim. For injuries requiring medical treatment such as a laceration requiring stitches or a sprained ankle, the "Senior Official" shall arrange transportation to the emergency facility as noted in Figure 1. For major injuries, the "Senior Official" may administer first-aid. The "Senior Official" rendering assistance will not place themselves in a situation of unacceptable risk.

8.3.2 Fire or Explosion

In the event of a fire or explosion, the local fire department will be notified immediately. The "Senior Official" will notify the emergency services and inform them of the location, nature and identification of any hazardous materials on-site.

During the beginning stages, the closest person to the incident will take measures to extinguish the fire using a fire extinguisher or water hose. If the fire progresses beyond the beginning stages, the "Senior Official" will evacuate workers and any other occupants on the property from the immediate area and allow local fire officials to attend to the situation.

8.4 Notification and Documentation Procedures

As soon as practical following an accident/incident, the accident/incident will be documented using the appropriate report forms and the site safety officer will be notified.

8.5 On-Site Emergency Equipment

The following emergency equipment will be maintained at all work sites.

- Cellular Telephone;
- First-aid kit;
- Fire extinguisher; and
- Emergency eye wash solution.

Appendix A – Emergency Contact Phone Numbers

Organization	Telephone
Any Emergency	911
Ambulance:	911
Local Police:	435-645-5500
Fire:	911
State Police:	801-576-8606
Hospital (Primary)	435-649-7640
Hospital (Secondary)	435-655-0055
Poison Control Center:	801-581-2151
Regional EPA:	800-227-8917
EPA Emergency Response Team:	800-227-8914
National Response Center:	800-424-8802
Center for Disease Control:	404-639-3311
Chemtrec:	800-262-8200
Spill Center:	978-897-6461
Site Emergency Operations Center:	801-355-2350
DOE Emergency Operations Center (National Center):	202-586-5000

Appendix D

Channel Sizing Calculations

Empire Canyon Drainage Basin

Post Development
Time of Concentration

Sheet Flow

Description	Subarea A - upper reach
Manning's n	0.4000
Flow Length	300.0000 ft
Two Yr, 24 hr Rainfall	1.8000 in
Land Slope	0.8333 ft/ft
Computed Sheet flow time	> 0.2585 hrs

Shallow Concentrated Flow

Description	Subarea A-middle reach
Surface	Unpaved
Flow Length	3956.9324 ft
Watercourse Slope	0.2140 ft/ft
Velocity	7.4638 fps
Computed Shallow flow time	> 0.1473 hrs

Channel Flow

Description	Subarea A-lower reach
Flow Area	0.5000 ft ²
Wetted Perimeter	24.0000 in
Flow Length	7870.7001 ft
Channel Slope	0.2000 ft/ft
Manning's n	0.0660
Hydraulic radius	3.0000 in
Velocity	3.9959 fps
Computed Channel flow time	> 0.5471 hrs

Total Time of Concentration

> 0.9529 hrs = 57.17 min

EMPIRE CANYON

POST DEVELOPMENT

Composite Runoff Curve Number Calculator

Description	Area (ac)	Curve Number
Sub Basin A	1307.0600	55
Brush/ Grass	105.5000	74
Extg Imprv.	10.5800	89
Planned Lots	28.5900	80
Planned Hardscp	14.8500	97
Total Area	-----> 1466.5800	57.5247 <----- Weighted CN

**PRE-DEVELOPMENT
HEC-1 CALCULATIONS**

Table 2-2a.—Runoff curve numbers for urban areas¹

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area ²	A	B	C	D
<i>Fully developed urban areas (vegetation established)</i>					
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)*		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
<i>Developing urban areas</i>					
Newly graded areas (pervious areas only, no vegetation)*		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

¹Average runoff condition, and $I_a = 0.25$.

²The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system; impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.

³CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.

⁴Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.

⁵Composite CN's to use for the design of temporary erosion control during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2c.—Runoff curve numbers for other agricultural lands¹

Cover description		Curve numbers for hydrologic soil group—			
		A	B	C	D
Cover type	Hydrologic condition				
Pasture, grassland, or range—continuous forage for grazing. ²	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element. ³	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods—grass combination (orchard or tree farm). ⁴	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods. ⁴	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

¹Average runoff condition, and $I_n = 0.25$.

²*Poor*: < 50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: > 75% ground cover and lightly or only occasionally grazed.

³*Poor*: < 50% ground cover.
Fair: 50 to 75% ground cover.
Good: > 75% ground cover.

⁴Actual curve number is less than 30; use CN = 30 for runoff computations.

⁵CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

Poor: Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Empire Canyon Drainage Basin

Pre-Development

Time of Concentration

Sheet Flow

Description	Subarea A - upper reach
Manning's n	0.4000
Flow Length	300.0000 ft
Two Yr, 24 hr Rainfall	1.8000 in
Land Slope	0.8333 ft/ft
Computed Sheet flow time	> 0.2585 hrs

Shallow Concentrated Flow

Description	Subarea A-middle reach
Surface	Unpaved
Flow Length	3956.9324 ft
Watercourse Slope	0.2140 ft/ft
Velocity	7.4638 fps
Computed Shallow flow time	> 0.1473 hrs

Channel Flow

Description	Subarea A-lower reach
Flow Area	0.5000 ft2
Watted Perimeter	24.0000 in
Flow Length	7870.7001 ft
Channel Slope	0.2000 ft/ft
Manning's n	0.0740
Hydraulic radius	3.0000 in
Velocity	3.5639 fps
Computed Channel flow time	> 0.6135 hrs

Total Time of Concentration

> 1.0193 hrs = 61.16 min

EMPIRE CANYON

PRE-DEVELOPMENT

Composite Runoff Curve Number Calculator

Description	Area (ac)	Curve Number
Sub Basin A	1348.0000	55
Brush/ Grass	107.0000	74
Extg Imprv.	11.5800	89
Total Area ----->	1466.5800	56.6547 <----- Weighted CN

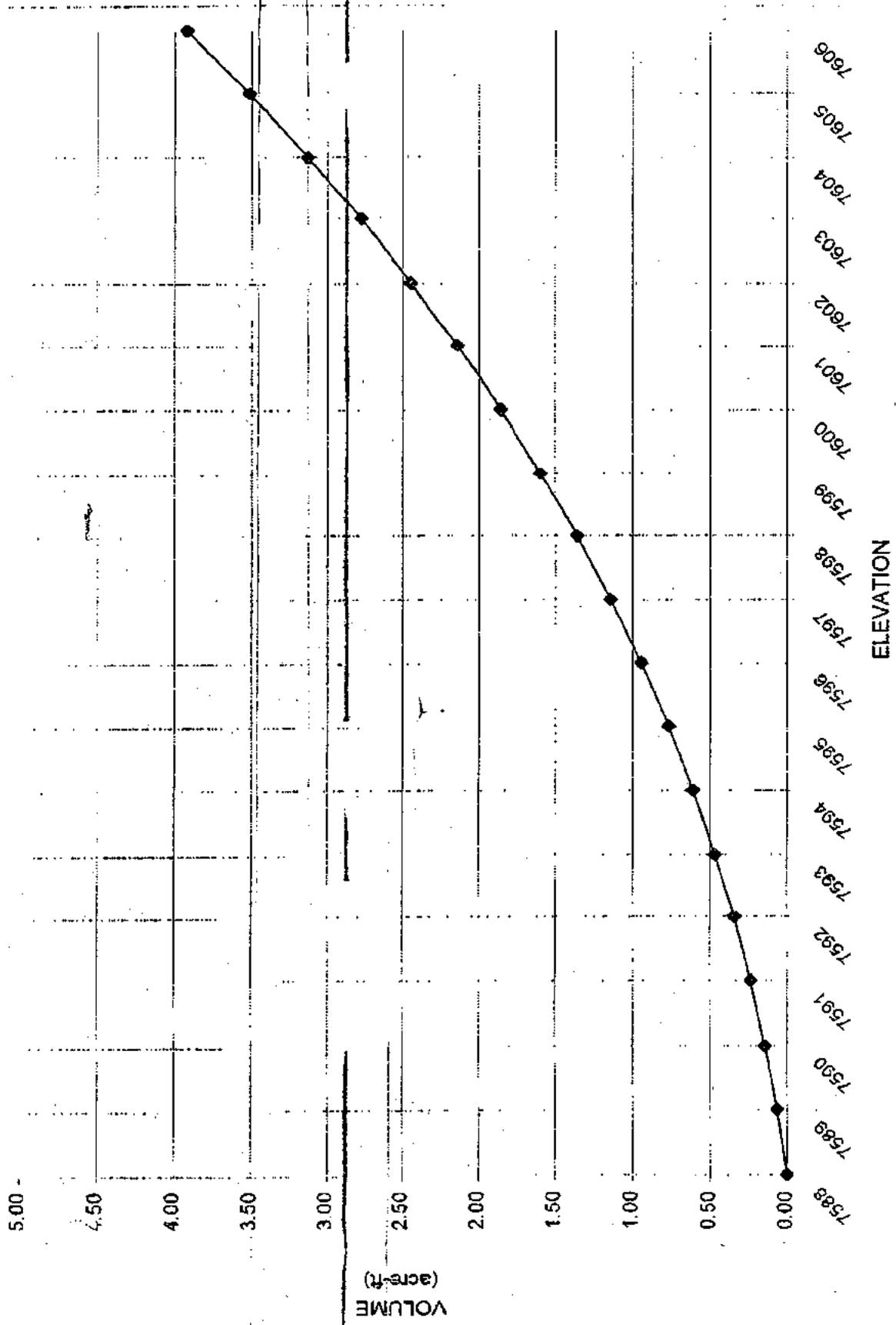
**DETENTION POND
& OUTLET STRUCTURE
DISCHARGE CALCULATIONS**

EMP. CANYON DETENTION BASIN

STAGE STORAGE CURVE

Elevation	CUM VOL (cf)	CUM VOL (acre-ft)
7588	0	0.00
7589	2,783	0.0639
7590	6,172	0.1417
7591	10,215	0.2345
7592	14,937	0.3429
7593	20,364	0.4675
7594	26,524	0.6089
7595	33,450	0.7679
7596	41,182	0.9454
7597	49,763	1.1424
7598	59,220	1.3595
7599	69,591	1.5976
7600	80,917	1.8576
7601	93,231	2.1403
7602	106,574	2.4466
7603	120,970	2.7771
7604	136,460	3.1327
7605	153,083	3.5143
7606	170,868	3.9226

STAGE STORAGE CURVE

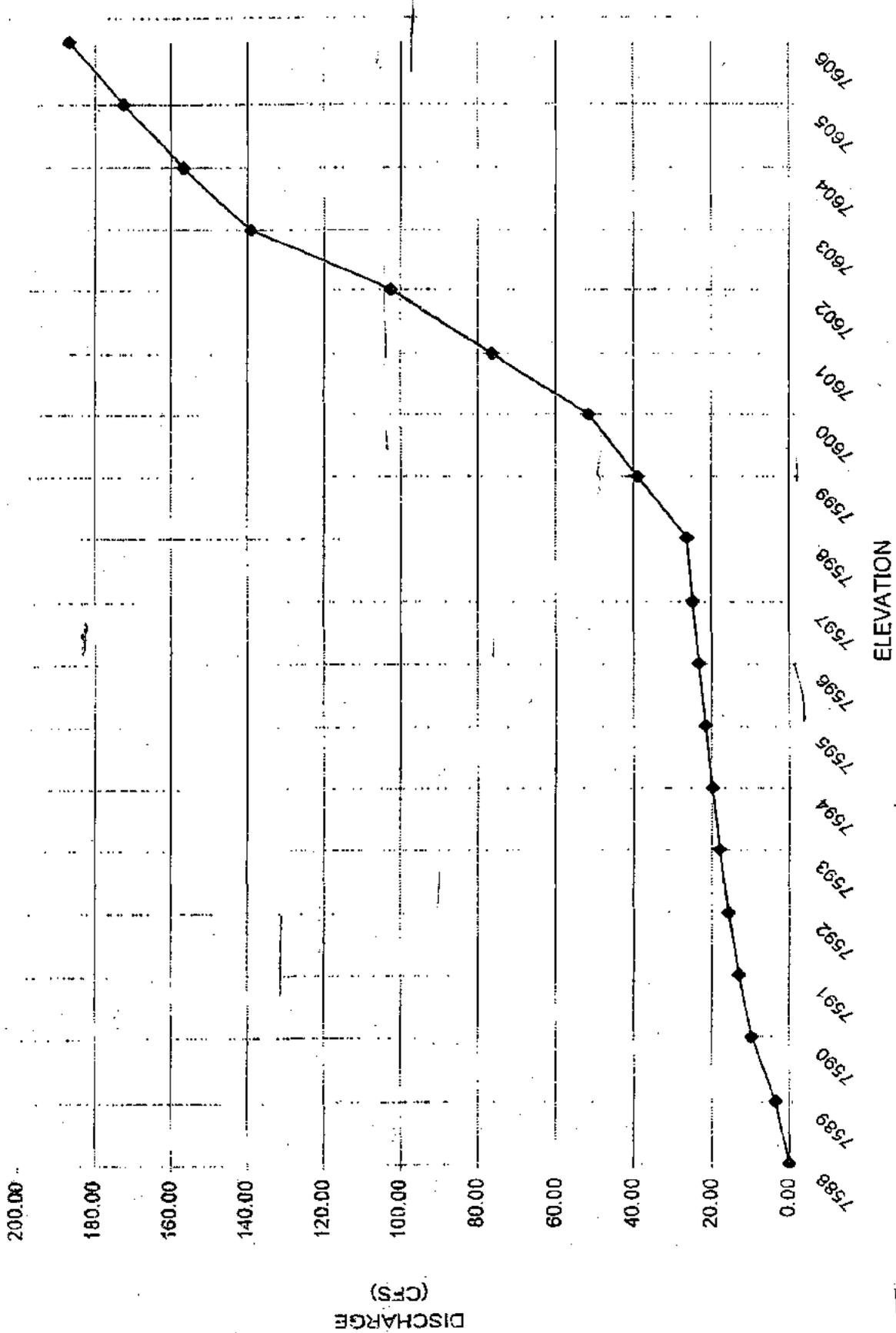


EMPIRE CANYON DETENTION BASIN

OUTLET STAGE DISCHARGE CURVE

Elevation	H	<u>Discharge</u>		
		18" (cfs)	48" (cfs)	16" + 48" (cfs)
7588		0.00		0.00
7589		3.48		3.48
7590		9.67		9.67
7591		12.98		12.98
7592		15.59		15.59
7593		17.83		17.83
7594		19.82		19.82
7595		21.63		21.63
7596		23.39		23.39
7597		24.85		24.85
7598		26.31	0.00	26.31
7599		27.70	11.25	38.95
7600		29.01	22.50	51.51
7601		30.28	46.00	76.28
7602		31.49	71.00	102.49
7603		32.65	106.50	139.15
7604		33.78	122.98	156.76
7605		34.87	137.50	172.37
7606		35.93	150.62	186.55

STAGE DISCHARGE CURVE



Appendix E

EPA Action Memorandum 11-6-2003



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8
999 18TH STREET - SUITE 300
DENVER, CO 80202-2466
<http://www.epa.gov/region08>

NOV - 6 2003

Ref: 8EPR-SR

ACTION MEMORANDUM

SUBJECT: Request for a Non-Time-Critical Removal Action at Empire Canyon Site

FROM: Jim Christiansen, Remedial Project Manager
Superfund Remedial Program

THROUGH: Bert Garcia, Supervisor
Superfund Remedial Program, Unit B

Dale Vodehnal, Director
Superfund Remedial Program

Carol Rushin, Assistant Regional Administrator
Office of Enforcement, Compliance, and Environmental Justice

Mark - Dale for

TO: Max Dodson, Assistant Regional Administrator
Office of Ecosystems Protection & Remediation

Site ID: 08CP

Category of Removal: Non-Time Critical, PRP-Funded, PRP Lead

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of a PRP Lead non-time critical removal action (NTCRA) at the Empire Canyon Site ("the Site") in Park City, Utah. The Empire Canyon Site is located within the Upper Silver Creek Watershed, which is the subject of a stakeholder-based investigation and cleanup effort. This NTCRA is one of several actions intended to address contamination issues in the watershed. The NTCRA will be voluntarily funded and performed by United Park City Mines (UPCM). EPA and UPCM are currently negotiating an Administrative Order on Consent (AOC) for performance of the cleanup work.



II. SITE CONDITIONS AND BACKGROUND

A. Site Description and History

The Empire Canyon Site is a historic ore mining and processing area located near Park City, Summit County, Utah. Empire Canyon is located south of Park City. The Site is situated on the eastern slope of the Wasatch Range, approximately 25 miles east of Salt Lake City. Park City rests at the downstream end of Empire Canyon.

The immediate area around the Site consists of steep canyon walls with mine/mill wastes and mine overburden present in several locations, which slope directly into the Empire Canyon drainage. The terraces or flat spots in the canyon are the locations of former mining facilities and a municipal drinking water tank. There were several mines, a concentrator, assay office, trams and other mine workings in the canyon up to the drainage divide.

Waste rock piles from the mine operations are located along the canyon walls as well as in the Empire channel. Several worn trails parallel the channel and traverse the mill and mine sites. The canyon is a popular area for residents and visitors to hike and mountain bike. The Empire Canyon drainage originates approximately one mile to the south near the Summit/Wasatch County line. Flow originating in the canyon occurs in a small ephemeral channel. This water forms the headwaters of Silver Creek, which is a tributary of the Weber River.

Empire Canyon is situated between, and within, the Deer Valley and Park City Ski Resorts.

1. Removal site evaluation

The Empire Canyon Site was initially investigated in 1996. The Utah Department of Environmental Quality (UDEQ) conducted a Preliminary Assessment (PA) of the Site and prepared a work plan for a subsequent Site Inspection (SI). The PA noted that mine waste and elevated levels of heavy metals were present at the Site and that additional investigation was warranted. The SI was not immediately completed.

In 1999, EPA and other stakeholders, under the name of the Upper Silver Creek Watershed Stakeholder's Group (USCWSG), began a collaborative watershed investigation in the Park City area. At that time, six sites in the area were already listed on CERCLIS, including the Empire Canyon Site, and a holistic, watershed approach was deemed necessary. The intent was to investigate and address collective impacts from historic mining in the Park City area. One significant environmental impact was the listing of Silver Creek on the Clean Water Act Section 303(d) list of impaired water bodies due to elevated levels of zinc and cadmium. As part of this effort, the Stakeholder's Group conducted water and

sediment sampling in Silver Creek to pinpoint significant sources of loading. This work showed that Empire Canyon was a significant source of metals to Silver Creek and that more detailed investigation was required in the area. It was also known that there was significant recreational use of the Empire Canyon area.

Subsequent to this report, UDEQ conducted an Expanded Site Inspection (ESI). The ESI investigated the Empire Canyon Site in detail and showed which areas of the canyon were of concern. Based upon the PA, ESI, and watershed investigations, EPA determined that a non-time critical removal action would be appropriate for Empire Canyon, primarily to address impacts to surface water. An Engineering Evaluation/Cost Analysis (EE/CA) Approval Memo was signed in early 2002. This approval memorandum documented that the use of removal authority was appropriate for Empire Canyon. United Park City Mines voluntarily entered into an AOC with EPA to conduct an EE/CA for the Site on May 14, 2002. The EE/CA was completed on June 10, 2003 and will be deemed completed upon signing of this Action Memorandum.

2. Site Characteristics

A detailed description of Site characteristics is presented in the EE/CA.

3. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant.

As stated previously, several historic mining operations existed in the Empire Canyon drainage. Waste rock and tailings from these operations were deposited at various locations in the canyon. Sampling has shown the waste rock and tailings contain elevated levels of several heavy metals, including lead, arsenic, zinc, and cadmium. Sampling of surface waters, sediments, and soils in and below Empire Canyon have shown that heavy metals have been released from mine waste to surface water, ground water, and soils.

4. National Priority List (NPL) Status

Empire Canyon is not listed on the NPL. EPA currently does not anticipate listing the Site on the NPL.

B. Other Actions to Date

In addition to past investigations described above, numerous other environmentally-based actions have occurred in the Empire Canyon area. Several are described below:

- Flagstaff Exclusion area.

UPCM is currently in the process of developing several parcels of land in and near Empire Canyon, herein referred to as the Flagstaff Development. The Flagstaff Development will include several residential properties. To determine if there were any mining impacts in this area, UPCM, in conjunction with EPA, UDEQ, and the USCWSG, conducted detailed sampling of the Flagstaff Development. This sampling showed that mine waste and heavy metals were present in very limited areas within the development area, but that most areas were free from impacts. Further, investigations showed that this area had little or no impact to surface water in Empire Canyon. UPCM prepared detailed sampling reports for UDEQ and EPA, and based upon this information, EPA specifically excluded this area from the boundaries of the Empire Canyon Site and issued UPCM comfort letters for the development area. The EE/CA, AOCs, and this Action Memorandum specifically exclude this area from the Empire Canyon Site. Any environmental issues present in this area were, or are, being handled voluntarily by UPCM in conjunction with the USCWSG.

- Judge Tunnel.

The Judge Tunnel is a drain tunnel which underlies much of Empire Canyon. It is part of an interconnected system of tunnels, shafts, and other underground mine features that are present in the mountains above Park City. Much, if not most, of the water that infiltrates into the ground in Empire Canyon may enter the Judge Tunnel system, where it eventually is discharged in the lower reaches of the canyon. Park City Municipal Corporation (PCMC) collects this water and uses it for drinking water. There have been numerous investigations related to Judge Tunnel, evaluating all aspects of its use as drinking water. Based upon these investigations, PCMC has already taken several steps to ensure the safety of the water, and other steps are currently being planned or considered. These steps include construction of a water treatment plant and obtaining a Utah Pollutant Discharge Elimination System (UPDES) permit for any water discharged to Silver Creek. Because of this separate, but coordinated, effort for Judge Tunnel, EPA sees no need for intensive investigations into deep ground water impacts in Empire Canyon.

- Previous cleanups by UPCM.

For various reasons, UPCM has voluntarily addressed several areas of mine waste in the Empire Canyon drainage. This work includes reshaping and recontouring of mine dumps, consolidation of some contaminated soils and mine waste into larger mine dumps, and rerouting of surface water. This work was coordinated with EPA.

- Residential impacts in lower Empire Canyon.

As part of the ESI, UDEQ collected samples from private residences located in

the lower portions of Empire Canyon. The purpose of the samples was to determine if residential soils were impacted by contamination that may have originated from former mining operations in Empire Canyon. The samples showed that there were impacts to soils at the properties, specifically elevated levels of lead and arsenic. However, because there are likely several areas of Park City that have elevated levels of heavy metals in soils, and because it is difficult to determine which of many potential sources caused impacts at any particular property, EPA has chosen to address residential soil impacts collectively as part of the USCWSG work. Thus, while it is possible that the residential soil impacts in lower Empire Canyon are the result of sources within the Empire Canyon Site, these impacts are not addressed in this Action Memo and will be addressed through other investigations and actions.

C. State and Local Authorities Roles

The UDEQ was very involved in the USCWSG and in the investigation of Empire Canyon. UDEQ was the lead agency for the PA and ESI. UDEQ was involved in the oversight of the EE/CA sampling and will also be involved in the performance of the alternative selected in this Action Memorandum through a direct agreement with UPCM. Representatives of Park City and Summit County are members of the USCWSG and were very involved in the investigations and decision making for the Site.

III. THREATS TO PUBLIC HEALTH OR WELFARE, THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Conditions at the Site present an imminent and substantial endangerment to human health and meet the criteria for initiating a Removal Action under 40 C.F.R. Section 300.415(b)(2) of the National Contingency Plan (NCP). The following factors from Section 300.415(b)(2) of the NCP form the basis for EPA's determination of the threat presented and the appropriate action to be taken:

i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.

Heavy metals, particularly zinc and cadmium, migrate from mine waste in Empire Canyon into Silver Creek. These metals are present in both water and sediment at concentrations that may impact both fish and the aquatic food chain and contribute to exceedances of water quality standards in Silver Creek.

(ii) Actual or potential contamination of drinking water supplies or sensitive ecosystems.

Flow from Empire Canyon enters Silver Creek, which feeds several wetlands at lower elevations. Wetlands are considered an extremely sensitive and vital ecosystem.

(iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate.

Mine waste is present at multiple surface locations in Empire Canyon, including in areas that are frequently in contact with surface water and snowmelt. Sampling has shown that heavy metals are leached from the mine waste and migrate into flowing surface waters. Sediments are also impacted and may migrate during heavy runoff or storm events.

IV. ENDANGERMENT DETERMINATION

The actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health or welfare or the environment. Contaminants are verified to be present at levels which present unacceptable risk to the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Action

1. Objectives and Scope

The primary objective of the removal action is to significantly reduce heavy metal loading to surface water from sources in Empire Canyon. This load reduction will be achieved through isolation of surface water from mine wastes in Empire Canyon through a variety of mechanisms. The secondary objective of the removal action is to minimize the potential for human exposure to elevated lead and arsenic concentrations in soils within the Empire Canyon Site. This objective will be achieved through consolidating and covering select areas of mine waste and through surface reclamation.

2. Primary proposed action

Mine waste in areas identified as adversely impacting surface water will be excavated. The channels will be reconstructed using clean rip-rap material and/or culverts. Some segments of the channels may also be lined with a clay liner to keep water on the surface. Several recreational trails in contact with contaminated soils or mine waste may be covered, and some areas of trails may also be rerouted. The Daly West mine dump will be re-contoured and covered with clean material. In certain areas, surface water flow in the vicinity of the Daly West mine dump will be re-routed to minimize contact with waste rock. A cut-off ditch will be constructed on the up-gradient side of the dump. Surface water from the Empire, Daly Draw and Walker Webster channels will be directed into an underground culvert and isolated from waste rock.

Mine waste removed from channels and trails will be consolidated in one or more locations in Empire Canyon and managed on-site. The preferred location is the Daly West Dump, which is currently being evaluated for suitability. Other locations will be considered as necessary. If waste is moved off-site for disposal, actions will comply with the Off-Site Rule.

Approximately 4,500 linear feet of channel will be remediated in lower Empire Canyon. Approximately 2,500 feet of recreational trail may be remediated throughout Empire Canyon. In addition, remedial activities will be conducted in areas containing significant amounts of impacted waste rock (e.g., Alliance mine dump and Daly West). These areas will be regraded and capped with clean material. The Site will be monitored for five years to ensure that the remediation is effective in improving the environmental quality of the Site. Institutional controls will be implemented as required for the protection of Site workers and recreational users.

A Post-Removal Site Control Plan, as required in the AOC, will set forth long-term management plans and responsibilities for Empire Canyon once the removal action is complete.

3. Contingency Actions

There are no contingency actions identified for the Site.

4. Funding Limitations

There are no known funding limitations restricting response actions for the Site. However, response actions may be phased over multiple construction seasons.

5. EE/CA.

An EE/CA was prepared by UPCM for this removal. A public comment period on the recommended alternative was held from July 23, 2003 to August 21, 2003. A public meeting was held on August 19, 2003. Park City Municipal Corporation offered several comments and concerns which have been addressed or will be addressed during development of the removal work plan. No other adverse comments were received. The preferred alternative of the EE/CA is the response action recommended in this Action Memorandum. The EE/CA is part of the Administrative Record for the Site.

6. ARARs

This removal action will attain, to the extent practicable, Federal and/or State ARARs, whichever is more stringent. A list of ARARs is included in Appendix A.

7. Project Schedule.

Some preliminary work has already been completed. Work specified in this Action Memorandum is expected to begin during spring 2004, contingent upon execution of an AOC, and is expected to last approximately two construction seasons.

B. Estimated Costs

The response action is estimated to cost approximately \$1,200,000.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If no removal action is taken or if the action is delayed, loading of heavy metals during spring runoff will continue. It is important to address Empire Canyon immediately, as it forms the headwaters of Silver Creek. Cleanups in lower portions of the watershed cannot commence until contamination in upper portions, such as Empire Canyon, is addressed and the potential for recontamination is removed. It is likely that water quality standards in Silver Creek will not be attained through remediation of Empire Canyon alone, but it is also likely that water quality standards cannot be attained consistently unless and until Empire Canyon is remediated.

VII. OUTSTANDING POLICY ISSUES

There are no known outstanding policy issues regarding this removal action.

VIII. ENFORCEMENT

An enforcement confidential summary is included as Appendix B.

IX. RECOMMENDATION

This decision document represents the selected Removal Action for the Empire Canyon Site, Park City, Utah and was developed in accordance with CERCLA, as amended, and is consistent with the NCP. This decision is based on the Administrative Record for the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed PRP-lead Removal Action.

Approve: Max H. Dodson
Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protections and Remediation

Date: NOV - 6 2003

Disapprove: _____
Max H. Dodson
Assistant Regional Administrator
Office of Ecosystems Protections and Remediation

Date: _____

Attachments: Appendix A - List of ARARs
Appendix B - Enforcement Summary (Confidential)

Appendix A
 Applicable, Relevant and Appropriate Requirements (ARARs)
 for the Clean Air Act, Non-Title Critical Removal Action

Requirement	Citation	Description/Prerequisite Determination	Comment	
Chemical Species ARARs				
Definitions and General Requirements of Utah Water Quality Act	UAC R317-1	Provides definitions and general requirements for waste discharges to waters of the State of Utah.	Relevant and Appropriate	No known point source discharges at Site, but certain discharges or water courses will be considered. Flow is ephemeral and present only for a few months per year.
Utah Surface Water Quality Standards	UAC R317-2-6 UAC R317-2-13 UAC R317-2-14	Establishes use designations for Silver Creek and headwaters (as tributary to Weber River).	Relevant and Appropriate	No known point source discharges at Site, but certain discharges or water courses will be considered. Flow at site is ephemeral and present only for a few months per year.
National Ambient Air Quality Standards	40 CFR Part 50	Establishes ambient air quality standards for certain criteria pollutants to protect public health and welfare.	Relevant and Appropriate	Emissions associated with proposed removal action will not constitute a major source. Attainment and maintenance of NAAQS pursuant to new source review are not applicable. However, standards relating to lead are relevant and appropriate.
Resource Conservation and Recovery Act (RCRA) Subtitle C	40 CFR Part 264	Provides regulation of hazardous waste.	Relevant and Appropriate	Although Subtitle C is not generally applicable to mining related wastes, may be relevant and appropriate if excavated soils are disposed of off-site and fail EPA's Toxicity Characteristic Leachability Procedure.

**Appendix
Applicable State and Appropriate Requirements (AR/ARs)
Final EIS on Site Non-Time Critical Removal Action**

Requirement	Citation	Description/Prerequisite	Determination	Comment
Action Specific AR/ARs				
Air Emissions; Fugitive Emissions and Fugitive Dust	UAC R307-205-2 UAC R307-205-3 UAC R307-205-5 UAC R307-205-6	Construction and demolition activities, roads and aggregate materials must be managed to minimize fugitive dust. Applies to all activities that generate fugitive dust.	Applicable	UPCM will implement best management practices to address dust control at the Site.
Utah Storm Water Rules	UAC R317-8-3.9	Establishes state storm water requirements.	Applicable	UPCM will implement best management practices to address storm water management at Site.
General Earthwork & Construction	UAC R315-8-2.10	Establishes requirements for a construction QA program to ensure that constructed units meet or exceed design criteria.	Relevant and Appropriate for repositories including Bevill exempt waste	UPCM will implement the construction QA program during the removal action.
General Earthwork & Construction	UAC R307-102-1	Emission of air contamination in sufficient quantities is prohibited.	Applicable	
Remediation and Repository Closure	UAC R311-211-6	Provides cleanup standards evaluation criteria for corrective actions at CERCLA sites within Utah.	Relevant and appropriate	Will be used for removal and disposal of CERCLA hazardous substances in receiving facilities
Solid Waste Treatment and Disposal	UAC R312-301-6	Applies to solid waste disposal.	Relevant and appropriate	Appropriate for on-site repositories

**Appendix
Applicable or Relevant and Appropriate Requirements (ARARs)
Empire Canyon Site Non-Hazardous Remedial Action**

Requirement	Citation	Description/Prerequisite	Determination	Comment
Solid Waste Facility Location Standards	UAC R315-302	Applies to disposal of solid waste in landfills, land treatment disposal sites, and piles.	Applicable	Applies to on-site repositories
Discharge to Surface Water	40 CFR § 122.26(b)(14)	Construction activities that disturb five or more acres. Requires preparation of stormwater pollution prevention plan.	Applicable	
Off-Site Management of CERCLA Wastes (Off-Site Rule)	40 CFR §300/440	Applies to any CERCLA action involving off-site transfer of any hazardous substance or pollutant and contaminant. EPA Regional Office will determine suitability of off-site facility.	Applicable	Applicable only if material is moved off-site.
Location Specific ARARs				
Protection of Wetlands	33 USC §1344 and 40 CFR Part 230 and Executive Order 11990	Prohibits discharge of dredged or fill materials into waters of the U.S.	Applicable	Potentially applicable depending on work. Measures will be developed to avoid, restore, or mitigate impacts to wetlands, if any.
Historic Sites, Building, and Antiquities Act	16 USC §§461-467	Requires protection of landmarks list on National Registry.	Applicable	No expected impacts.

Appendix
Applicable, Relevant and Appropriate Requirements (ARARs)
Empire Canyon Site Non-Game Categorical Removal Action

Requirement	Citation	Description/Prerequisite Determination	Applicable	Comments
National Historic Preservation Act	16 USC §470	Requires protection of district, site, building, structure, or object eligible for inclusion of national register of historic places.	Applicable	No expected impacts.
Archeological and Historic Preservation Act	16 USC §469	Requires preservation of significant historical and archeological data.	Applicable	No expected impacts.
Fish and Wildlife Coordination Act	16 USC §1531 et seq	Requires that actions taken in areas that may affect streams and rivers be undertaken in a manner that protects fish and wildlife.	Applicable	Actions will improve Silver Creek; no fish habitat in Empire Canyon; USFWS consulted
Endangered Species Act	16 USC §1531 and 50 CFR Part 200 and 402	Requires protection of endangered and threatened species.	Applicable	USFWS has been consulted regarding such species
Migratory Bird Treaty Act	16 USC §703 et seq	Requires protection of migratory non-game birds.	Applicable	USFWS has been consulted regarding such birds
Floodplain Management	Executive Order No. 11988	Pertains to floodplain management and construction requirements in such areas.	Applicable	Applicable to soil removed or repositories located within floodplain.

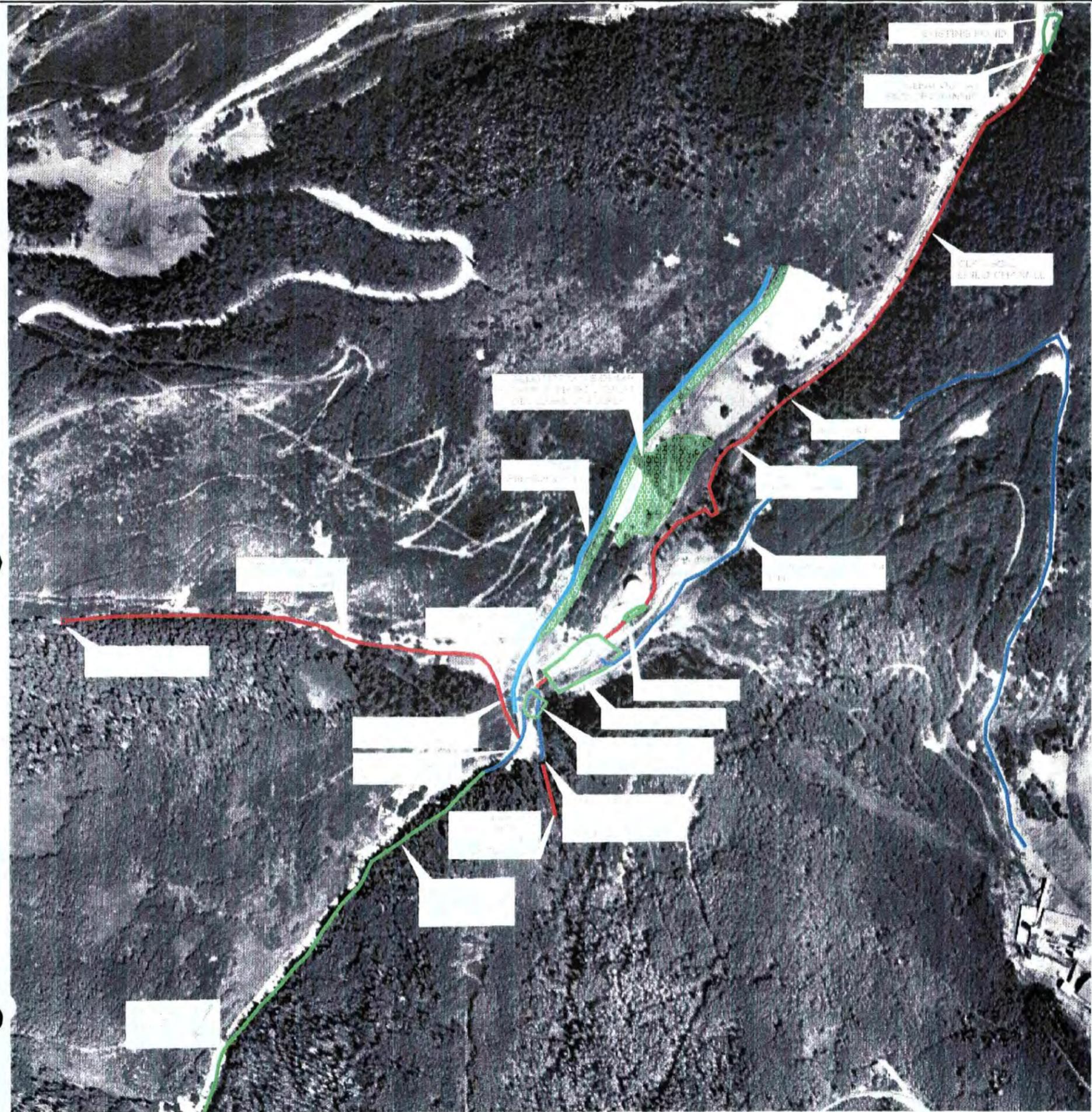
**Appendix
 Applicable, Relevant and Appropriate Requirements (ARARs)
 Empire Clayon Site Non-Time Critical Removal Action**

Requirement	Citation	Description/Prerequisite Determination	Determination	Comment
Resource Conservation and Recovery Act (RCRA) Subtitle D	40 CFR Part 257	Facilities where treatment, storage, or disposal of solid waste will be conducted considering certain location standards which include restrictions on proximity to airports, floodplains, wetlands, fault areas, scenic impact zones, and unstable areas.	Applicable	Any on-site repository or to any existing off-site facility that receives CERCLA hazardous substances.

Appendix B (Confidential)

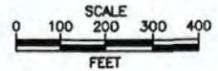
ENFORCEMENT SUMMARY

While no formal PRP search was conducted by EPA, UPCM is the landowner of the Site and may be responsible for conducting former mining operations in Empire Canyon. UPCM elected to voluntarily enter an AOC to conduct the EE/CA for the Site, and negotiations are underway with UPCM to conduct the cleanup. No other PRPs have been identified for the Site.



LEGEND

- CLAY SOIL LINED CHANNEL
- UNDERGROUND CULVERT
- TRAIL REMEDIATION
- OTHER FEATURES

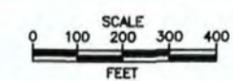


UNITED PARK CITY MINES	
FIGURE 1 EMPIRE CANYON REMEDIAL DESIGN AREAS SHEET 1 OF 2	
RESOURCE MANAGEMENT CONSULTANTS 8138 SOUTH STATE ST. SUITE 2A MIDVALE, UT 84047 801-255-2826	DECEMBER 2003 tech-memo-aerial-2



LEGEND

- CLAY SOIL LINED CHANNEL
- UNDERGROUND CULVERT
- TRAIL REMEDIATION
- OTHER FEATURES

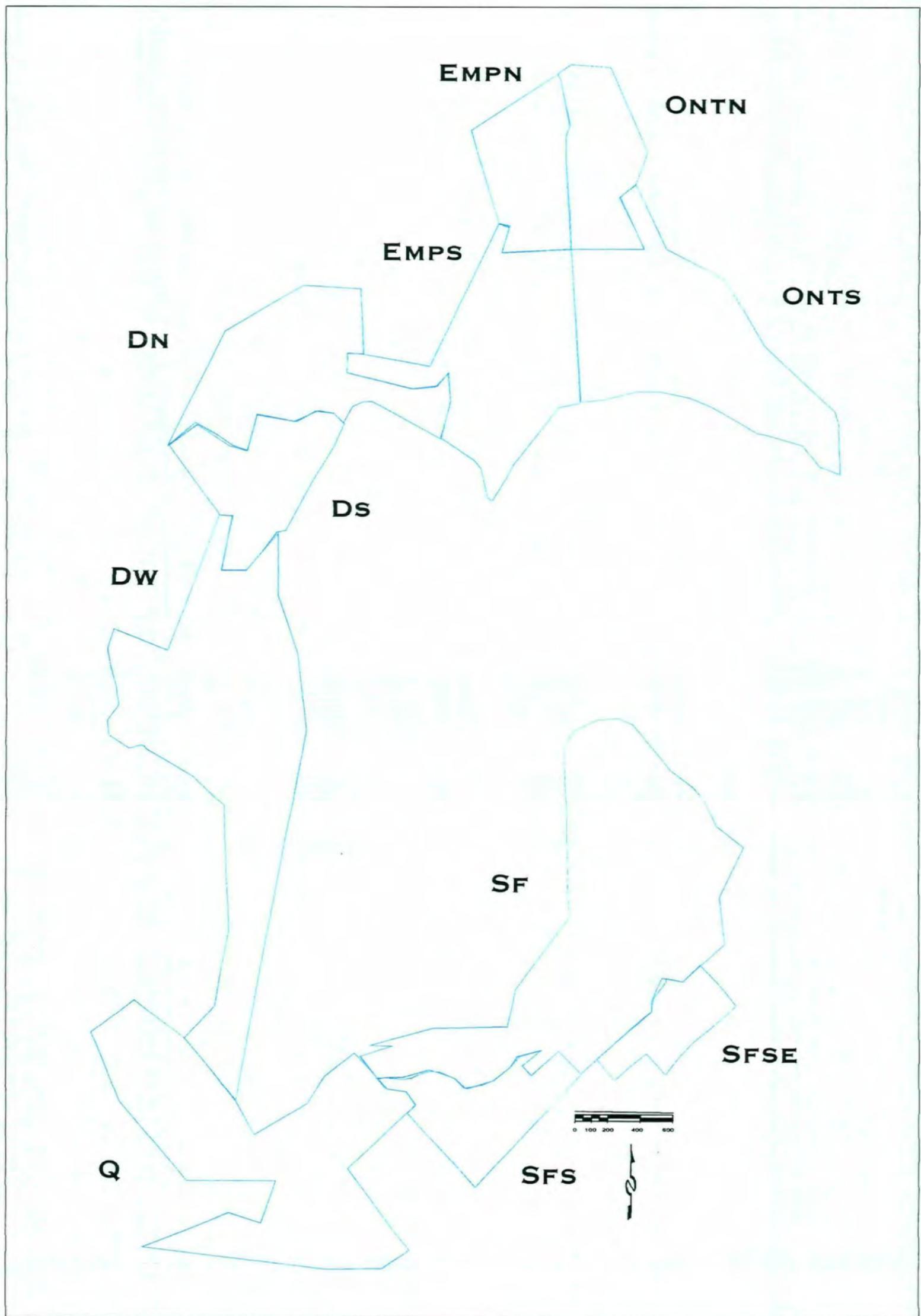


UNITED PARK CITY MINES

FIGURE 1
EMPIRE CANYON
REMEDIAL DESIGN AREAS
SHEET 2 OF 2

RESOURCE MANAGEMENT CONSULTANTS
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SUITE 2A
MIDVALE, UT 84047
801-255-2626

DECEMBER 2003
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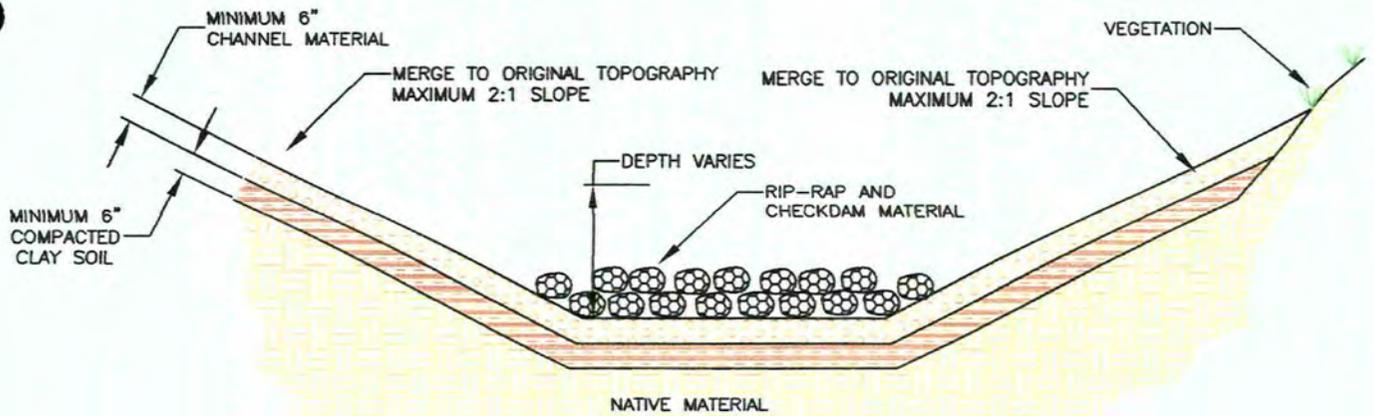


**UNITED PARK CITY
MINES COMPANY**

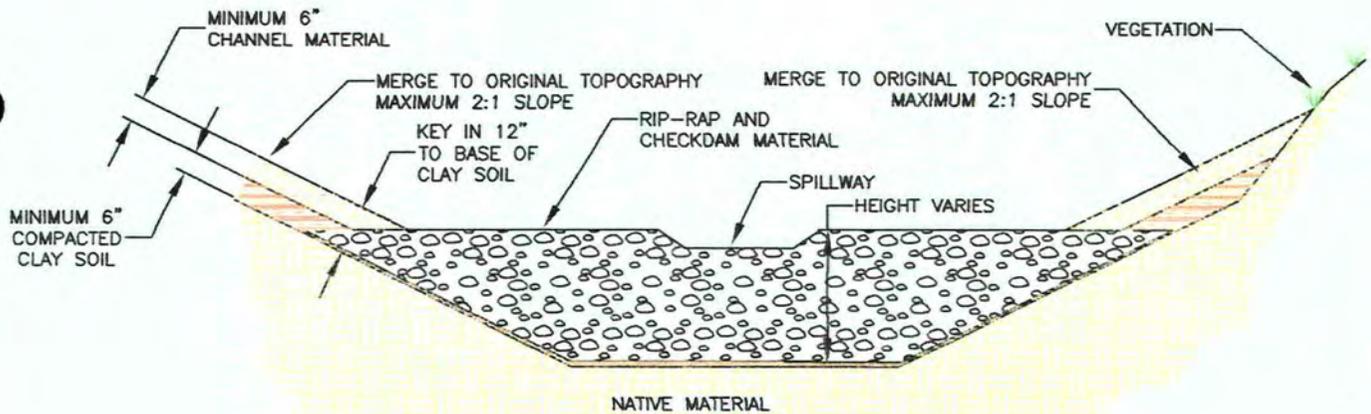
**MINE SOILS
MITIGATION REPORT
FIGURE 2**



**FLAGSTAFF MOUNTAIN
PROJECT**



CHANNEL REMEDIATION TYPICAL DETAILS



CHANNEL WITH CHECK DAM TYPICAL DETAILS

United Park City Mines

FIGURE 2
CHANNEL REMEDIATION
TYPICAL DETAILS

RESOURCE MANAGEMENT CONSULTANTS

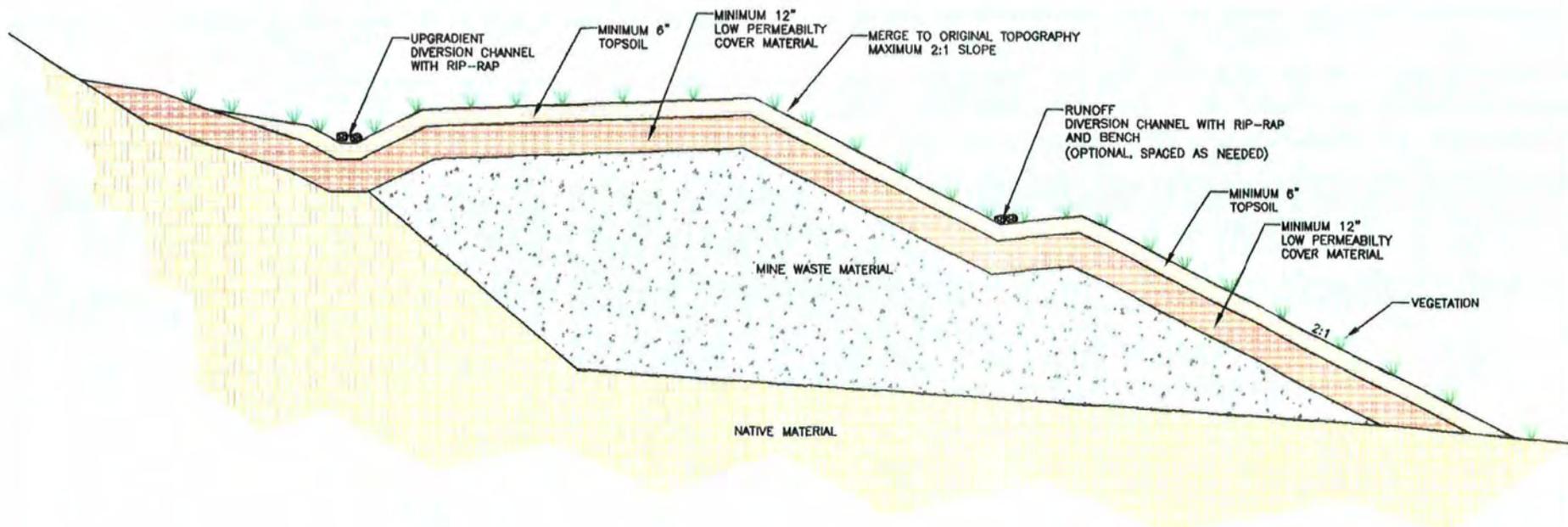


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SEPTEMBER 2004

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NOT TO SCALE



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FIGURE 3
WASTE ROCK PILE REMEDIATION
TYPICAL DETAILS

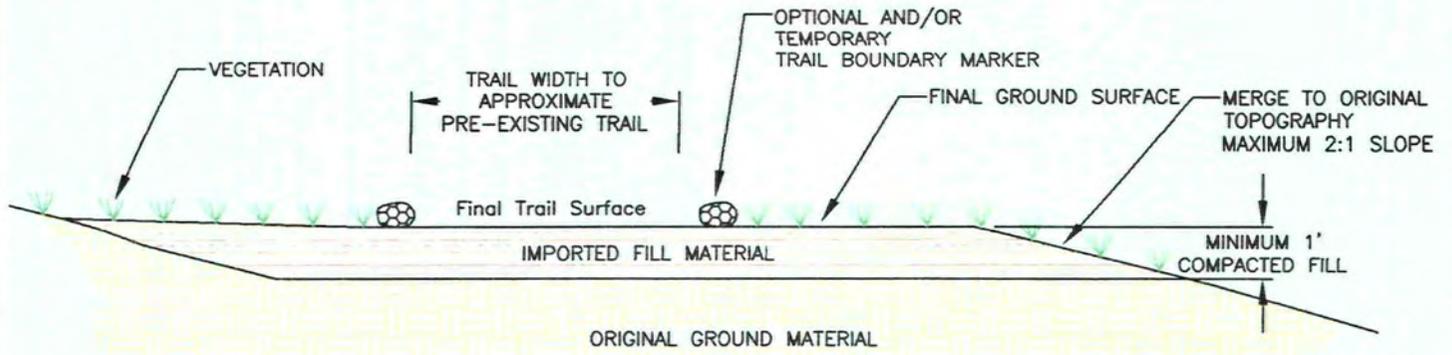
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NOT TO SCALE

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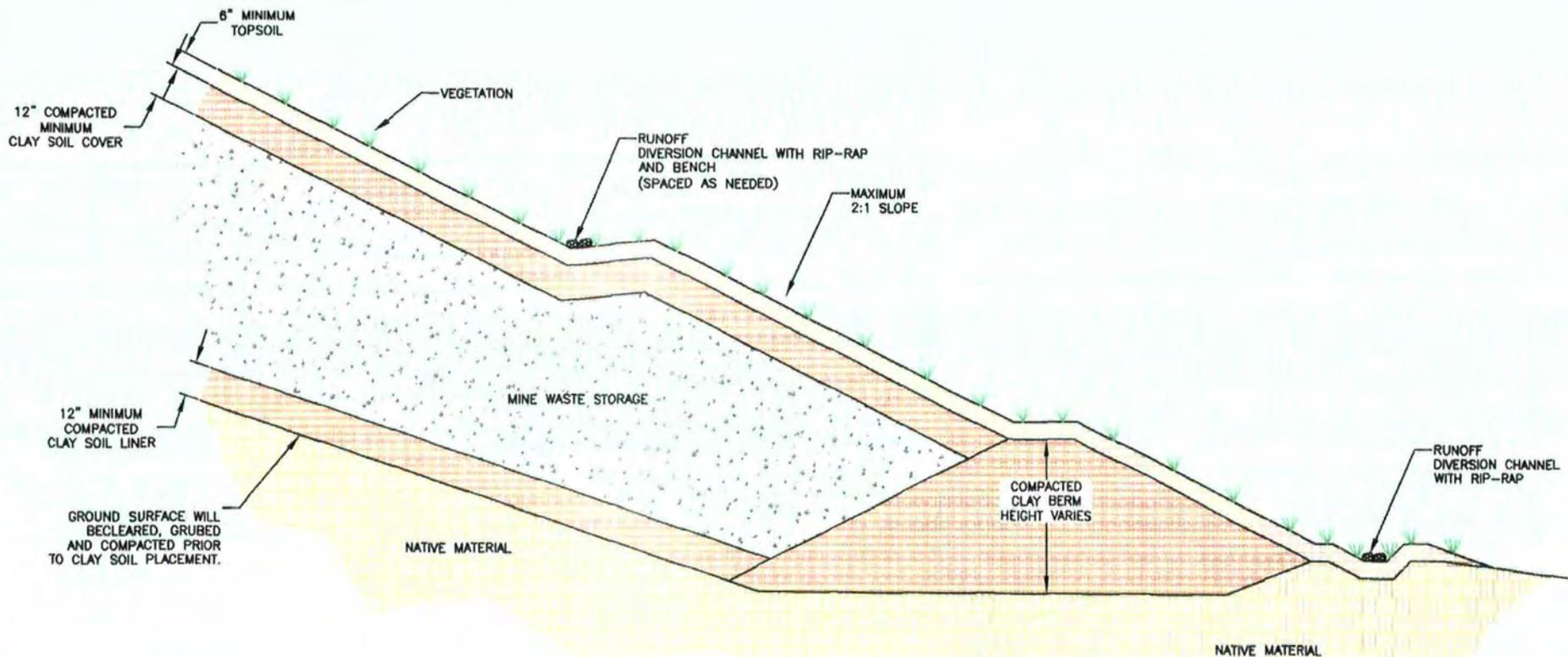
FIGURE 4 TRAIL REMEDIATION TYPICAL DETAILS

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FIGURE 5
REPOSITORY
TYPICAL DETAILS

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JANUARY 2004
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FLAGSTAFF, A PLANNED COMMUNITY
DEER VALLEY, UTAH

DESIGN GUIDELINES
EXHIBIT 2

MAY 2001
REVISED AND APPROVED DECEMBER 2001

PREPARED FOR:
FLAGSTAFF MOUNTAIN PARTNERS
P.O. BOX 1450
PARK CITY, UTAH



**FLAGSTAFF, A PLANNED COMMUNITY
PARK CITY, UTAH**

DESIGN GUIDELINES

Exhibit 2

Flagstaff Mountain Partners
May 2001
Revised and Approved December 2001



TABLE OF CONTENTS

Chapter 1 Introduction	1-1
1.1 Vision Statement	1-1
1.2 Scope and Organization of Guidelines	1-2
1.2.1 Scope	1-2
1.2.2 Organization	1-2
Chapter 2 Architectural Character	2-1
2.1 Introduction	2-1
2.2 Architectural Theme	2-1
2.3 Conclusion	2-5
Chapter 3 Design Guidelines	3-1
3.1 Introduction	3-1
3.2 Building Size	3-1
3.2.1 Building Form and Massing	3-1
3.2.2 Building Height	3-2
3.3 Foundation Walls	3-3
3.4 Building Walls	3-4
3.4.1 General	3-4
3.4.2 Dimensional Guidelines	3-4
3.4.3 Materials	3-4
3.4.4 Colors	3-6
3.4.5 Trim	3-6
3.5 Windows and Exterior Doors	3-7
3.5.1 General	3-7
3.5.2 Window Sizes, Shapes, and Types	3-7
3.5.3 Window Materials and Colors	3-8
3.5.4 Window Glazing	3-8
3.5.5 Exterior Door Sizes, Shapes, and Types	3-8
3.5.6 Exterior Door Materials and Colors	3-9
3.5.7 Exterior Door Glazing	3-10
3.5.8 Exterior Door Hardware	3-10
3.6 Balconies, Guardrails, and Handrails	3-10
3.6.1 Materials and Designs	3-10

TABLE OF CONTENTS

3.7	Roofs	3-11
3.7.1	General	3-11
3.7.2	Pitch	3-11
3.7.3	Materials	3-11
3.7.4	Dormers	3-12
3.7.5	Snowguards, Gutters, and Downspouts	3-12
3.7.6	Miscellaneous Equipment	3-13
3.7.7	Skylights/Solar Panels	3-13
3.8	Fireplaces and Chimneys	3-13
3.8.1	Fireplace Requirements	3-13
3.8.2	Chimney Sizes and Shapes	3-14
3.8.3	Materials	3-14
3.8.4	Chimney Caps	3-14
Chapter 4 Site Planning Design Guidelines		4-1
4.1	Site Planning	4-1
4.2	Approximate Building Locations	4-1
4.2.1	Approximate Building Location - Single-Family Lots	4-2
4.2.2	Combination of Lots	4-3
4.2.3	Encroachments	4-3
4.3	Site Development	4-4
4.3.1	Landscape Areas	4-4
4.3.2	Grading and Drainage	4-5
4.3.3	Outdoor Spaces	4-7
4.3.4	Retaining Walls, Landscape Walls, and Fences	4-8
4.3.5	Landscaping and Plant Materials	4-9
4.3.6	Visual Integrity of the Natural Landscaping	4-11
4.3.7	Ski Run Edge	4-11
4.3.8	Tree Removal and Selective Thinning	4-12
4.3.9	Wildfire Safety Measures	4-12
4.3.10	Driveways	4-12
4.3.11	Parking Requirements	4-13
4.3.12	Exterior Service Areas/Satellite Dishes	4-14
4.3.13	Easements and Utilities	4-14
4.3.14	Signage	4-15
4.3.15	Miscellaneous	4-15
4.3.16	Lighting	4-16
4.3.17	Domestic Pets and Wildlife Measures	4-17
Chapter 5 Construction Guidelines		5-1
5.1	Approximate Building Location and Fencing Req.	5-1
5.2	OSHA Compliance	5-1

TABLE OF CONTENTS

5.3	Construction Site Plan and Construction Trailers	5-2
5.4	Construction Trash Receptacles and Debris Removal	5-2
5.5	Sanitary Facilities	5-3
5.6	Construction Access	5-3
5.7	Vehicles and Parking Areas	5-3
5.8	Conservation of Native Landscape	5-3
5.9	Erosion Control	5-3
5.10	Excavation Materials and Blasting	5-4
5.11	Dust and Noise Control	5-4
5.12	Material Deliveries	5-5
5.13	Firearms	5-5
5.14	Alcohol and Controlled Substances	5-5
5.15	Fires and Flammable Materials	5-5
5.16	Pets	5-5
5.17	Preservation of Property	5-5
5.18	Protection of Subdivision Improvements and Restoration of Property	5-6
5.19	Daily Operation	5-6
5.20	Site Visitations	5-6
5.21	Construction Insurance Requirements	5-6
5.22	Vehicular Access	5-7
Chapter 6	Design Review Procedures	6-1
6.1	Pre-Design Conference	6-1
6.2	Preliminary Design Submittal	6-1
6.3	Preliminary Design Review	6-2
6.4	Final Design Submittal	6-3
6.5	Deferral of Material or Color Selection	6-4
6.6	Site Inspection	6-4
6.7	Final Design Review	6-4
6.8	Resubmittal of Plans	6-5
6.9	Pre-Construction Conference	6-5
6.10	Commencement of Construction	6-5
6.11	Inspections of Work in Progress	6-5
6.12	Subsequent Changes	6-6
6.13	Final Release	6-6
6.14	Non-Waiver	6-6
6.15	Right of Waiver	6-6
6.16	Exemptions	6-7
6.17	Design Review Fee	6-7

TABLE OF CONTENTS

Appendix A - Height and Area Matrix	A-1
Appendix B - Planting List	B-1





CHAPTER 1

INTRODUCTION

"The Best Architecture is that which meets the expectations of the land."
- Henry David Thoreau

1.1 Vision Statement

Flagstaff Mountain Resort will be a sophisticated addition to the Deer Valley Resort Community. While the "spirit" and architectural image of Deer Valley is kept intact by the Deer Valley Design Guidelines, design themes unique to Flagstaff Mountain Resort offer the chance to refine the existing design guidelines, reinforce the spirit of the overall mountain community and its natural resources, and introduce new recommendations to develop a "sense of place". These Design Guidelines are meant to strengthen the overall image of Deer Valley by offering clear direction for the development of the Flagstaff Mountain Resort. They encourage diversity of design while maintaining a harmonious balance within this distinctive mountain setting.

The unified design theme presented in these Design Guidelines will reinforce the existing tradition of Deer Valley, preventing unplanned development from diluting the quality and character of its neighborhoods. In addition, property values will be enhanced through the recommendations offered herein and through the commitment to keeping Flagstaff Mountain Resort as natural and inviting as possible using timeless, regional design principles.

1.2 Scope and Organization of Guidelines

1.2.1 Scope

All new projects within the Flagstaff Mountain Resort shall comply with these Design Guidelines. The Flagstaff Mountain Design Review Committee (DRC) will review all projects for compliance with these design guidelines prior to submittal to the appropriate jurisdiction, with Park City Municipal Corporation (PCMC) as the final authority in matters of site development, landscaping, and architectural character.

As stated within the Deer Valley Design Guidelines, this document is meant to ensure that the "spirit" of Deer Valley isn't undermined by arbitrary, unthoughtful design, as this "spirit" is absolutely critical to the success of the area and the individual neighborhoods.

This Design Guideline document is one of several studies that have been prepared to support the Flagstaff Mountain Resort's Large Scale Master Plan Development (LSMPD) application. As LSMPDs are programmatic in nature and subject to refinement at subsequent Master Planned Development (MPD) or Conditional Use Permit (CUP) stages, correspondingly, the contents of this study should be viewed as conceptual in nature and subject to change as specific plans are developed. However, details developed at the MPD or CUP stage will not require a modification of these guidelines provided they comply with the Goals and Objectives of this study.

1.2.2 Organization

The General Architectural Character and the Design Guidelines chapters set forth the design standards for structures including height, color, and materials. The Site Planning and Development Guidelines chapter sets forth guidelines and standards for all site work relating to grading, landscaping, and siting of structures and outdoor areas.

This document may be amended from time to time by the DRC. It is the applicant's responsibility to obtain and review copies of current guidelines and all applicable sections of the Covenants, Conditions, and Restrictions (CC&R's) for the Flagstaff Mountain Resort.





CHAPTER 2

GENERAL ARCHITECTURAL CHARACTER

2.1 Introduction

Flagstaff Mountain Resort provides the opportunity for a natural expansion of the Deer Valley Resort Community. While Flagstaff Mountain Resort will be perceived as a part of Deer Valley, it can also have a distinct image and character unto itself. Maintaining and even improving the quality and underlying architectural image of Deer Valley is of primary importance. From that strong starting point, Flagstaff Mountain Resort can present its own identity and richness of architectural expression.

2.2 Architectural Theme

Flagstaff Mountain Resort, which is contiguous with Deer Valley and lying just to the west of Silver Lake, is seen as a natural extension of the existing resort area. As such, the architecture should be a direct outgrowth of Deer Valley, and be in harmony with the Design Guidelines of Deer Valley. Within that context, however, Flagstaff Mountain Resort can present a focused design style or architectural theme that will define its special character. In essence, the architectural theme of Flagstaff Mountain Resort will evolve from the best of Deer Valley...architecture that blends with the natural landscape, maintains a sensitive "human" scale, and uses carefully crafted details with indigenous materials such as timber and stone. Flagstaff Mountain Resort will also reflect a subtle recall to the heritage of its past as a focus of turn of the century activities.



Fig 2-1: Architecture should blend with the natural landscape and maintain human scale.

The following design considerations should be incorporated within Flagstaff Mountain Resort:

Form - The close relationship to Deer Valley dictates that the form of the buildings within Flagstaff Mountain Resort is the most important design factor. The majority of the buildings within Flagstaff Mountain should have a profile that steps with the ter-

rain contours of the site. Vertical expression is acceptable within certain areas of the Resort. Buildings shall appear to have grown out of the site through the use of terrain integrated foundation walls and terraces. The foundation walls should serve as a podium for the larger structure, allowing a strong base and transition back to natural grades. Major roof forms should be medium in pitch from 4:12 to 12:12. Generally, buildings should have one simple dominant roof, typically with a gable form. Secondary roofs can join into side walls or cover smaller building forms. Roof forms should be used to shed snow away from building entries, patios, decks and other areas of activity.

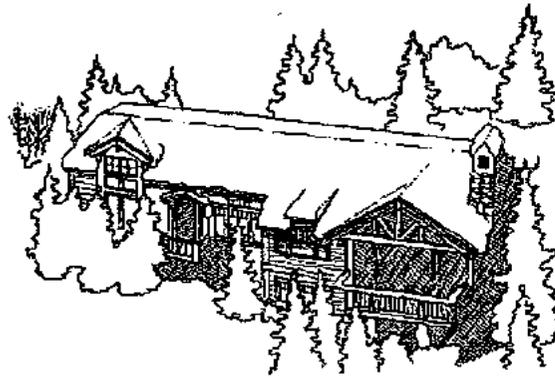


Fig 2-2: Buildings should maintain relatively low, horizontal profiles which step with their sites.

The overall form of buildings shall include one dominant mass...generally rectangular. Secondary forms can then become additive to create an interesting composition of simple elements that step with the terrain.

Structural Expression - The architectural theme of Flagstaff Mountain Resort emphasizes a direct expression of structural enclosure...whether through the massing of walls or the use of heavy framing. Often the materials of the expressed structure become the visual detail and finish surfaces of the architecture...such as stone bearing walls or log trusses. The key to success for this type of architectural design is an honest expression of structural components; mass walls should read as gravity bearing walls with deep window and door reveals, while truss and beam framing should be visually integral to the primary structure and not used merely as additive decoration. Historical precedent for this honest expression of structural framing can be found in many of the turn of the century buildings located throughout the west.



Fig 2-3: Direct expression of structural enclosure using framing.

One of the best opportunities to express the architectural structure is in exposed roof framing...particularly over entryways, porches, and gable ends. Many of the residences and lodges of Deer Valley have accomplished this quite successfully. The intermixing of heavy timber with round logs can be used in the framing if care is given to the scale and connection details. Massive log columns can be used to provide an image of strength and a playful connection to the natural setting.

Exterior Materials - The palette of materials for Flagstaff Mountain Resort relates directly to Deer Valley. In certain situations it may be necessary to have buildings clad in fire retardant materials based on the recommendations of the Planning Staff, Fire Marshall and other officials. In general, however, materials and their uses should be as follows:

a) Exterior Walls - The primary wall materials are to be stone and wood. Stucco may be used as a secondary wall material.

b) Stone - The Design Review Committee has selected a palette of allowable stone. The Committee is open to other submittals for consideration. Cobble stones and river rock will not be permitted in Flagstaff Mountain Resort.



Fig 2-4: The material palette for Flagstaff Mountain includes stone, stained wood, and limited areas of stucco at secondary walls.

c) Wood may be used in a variety of ways:

- Vertical board and batt siding which takes its precedent in Deer Valley and in the historic mine structures.
- Horizontal boards which have a dimensional thickness and width exceeding 1" x 6".
- Logs...stacked as peeled round logs, hewn into rectangular logs, or used as primary framing elements.
- Cedar shingles primarily used as accents on gable ends or dormers.
- Stucco may be used as an expression of mass wall, but not more than 50% of any building may be stucco.

d) Roof material - Roofs shall be approved thermoplastic, polyurethane, or cementitious shakes resembling cedar in color and texture, tile, slate or cementitious slate, or a natural patina metal such as copper or terne metal. Especially when metal roofs are used, special design consideration must be given to the potential danger of snow shedding on pedestrian areas, building entries, and parking and drop-off areas. The color range for roof materials is further described in Section 3.4.4.

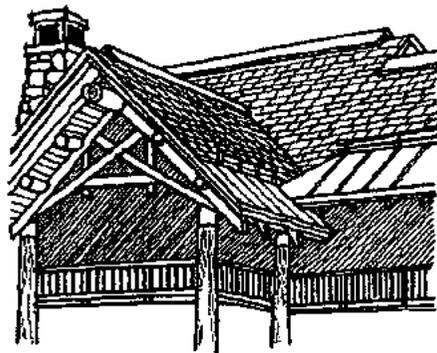


Fig 2-5: Acceptable roof materials include cedar and cementitious shakes.

Design Expression - Proportion, scale, use of materials, and crafted detail form the basis for the Flagstaff Mountain Resort design expression. Important elements of the design theme include the following:

- a) Entries into buildings shall be very inviting and designed to avoid the danger of snow shedding from overhead roofs. Entry portals and enclosures shall exhibit a high level of artistry in the detailing of structural connections, doors, windows, and trim.

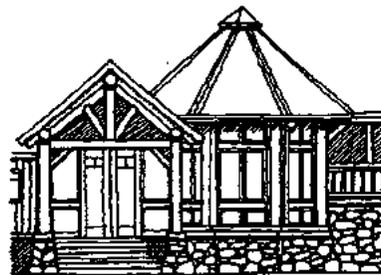


Fig 2-6: Entries should be inviting, with detailed structure, doors, and windows.



Fig 2-7: Principles of proportion, scale and use of materials.

- b) Stone shall be used to define or enclose a component of the building such as a floor level change or an additive three dimensional form. Stone shall not be consistently used as merely a skirting strip around the base of the building.
- c) Window proportions shall be based on a vertical or square unit, whether set into a wall or grouped together in horizontal openings. The precedent for vertical or square windows, often double hung, is found in Deer Valley as well as the earlier mine structures.

- d) Roof expression - Roofs shall provide a comfortable overhang, not exaggerated, but enough to give a sense of shelter and enclosure. Gable rake fascias should be relatively wide and made up of two or three boards. Structural expression of roof framing shall be pronounced.
- e) Interlocking forms and materials - The additive forms of the architecture can allow interlocking compositions of forms. This can be enhanced by carefully placed recesses and openings for windows, balconies, and doors.



Fig 2-8: Large viewing windows shall be recessed under overhangs.

- f) Mass walls in stone or stucco shall be punctuated by deeply recessed openings for doors and windows to express the mass and depth of the wall and to create interesting shadow patterns.
- g) Large viewing windows shall be set back under roof overhangs or other recesses in the structure to place the windows in shadow and thus avoid reflection and glare.
- h) Chimneys shall have a tall slender proportion, reminiscent of turn of the century structures, preferably built of stone or stucco. Tapered slopes are encouraged as they add scale and interest.

2.3 Conclusion

The recall to nature available at each building site, along with the proper application of the tenets of architectural character contained herein, will transform Flagstaff Mountain Resort into a real neighborhood extension of the Deer Valley Resort Community. Structures within Flagstaff Mountain Resort will expand upon the existing architecture of the area and reinforce the underlying image of the entire valley.





CHAPTER 3

FLAGSTAFF MOUNTAIN DESIGN GUIDELINES

3.1 Introduction

As a natural extension of Deer Valley, the Flagstaff Mountain Resort offers the chance to reflect the heritage of the mountain and build upon its design principles. The Flagstaff Mountain Resort Design Guidelines, therefore, are a direct outgrowth of the document which guides construction within Deer Valley. They establish this distinct mountain neighborhood as one of the “premier” living places within the mountains, stressing the recall to the natural landscape, and the use of indigenous materials.

Within these parameters, however, the Flagstaff Mountain Resort Design Guidelines refine those already written for Deer Valley. While the overall image of the neighborhood remains the same through the use of similar forms, materials, and order, recommendations at the detail level—such as proportions of materials, treatment of details, and allowances for special materials—have been included to establish a unique “sense of place” for Flagstaff Mountain Resort, distinct from that of Deer Valley.

3.2 Building Size

Buildings within the Flagstaff Mountain Resort will follow the height and area requirements described in Appendix A. The close proximity of Flagstaff Mountain Resort to Deer Valley dictates that it present a unified, coherent image compatible with its neighbor.

3.2.1 Building Form and Massing

All buildings shall be designed with generally rectangular masses using simple, additive forms. These fragmented forms shall be stepped both vertically and horizontally with the terrain to embrace the natural site topography (see Section 3.2.2).

Single-family residences shall be residential in scale, with one- to two-story masses prevailing, and low, horizontal forms which remain below treetop level. Massing and scale for multi-family structures may reflect their appropriate functions, but should step with the topography. All buildings will be designed with massing to reflect their interior spaces, and clear definition of base, middle and top is required on all structures as well (see Section 3.4 to follow).

3.2.2 Building Height



Fig 3-1: Single-family homes shall be designed with simple, additive forms and low, horizontal profiles.

The basis for allowable building height varies between single family residential and multi-family structures and where these uses occur on site. Chimneys, cupolas, and other special roof forms are excluded from both sets of requirements but are subject to a case by case review. Certain lots may contain more restrictive criteria, due to unusually sensitive locations within Flagstaff Mountain Resort; Appendix "A" contains a list of these lots.

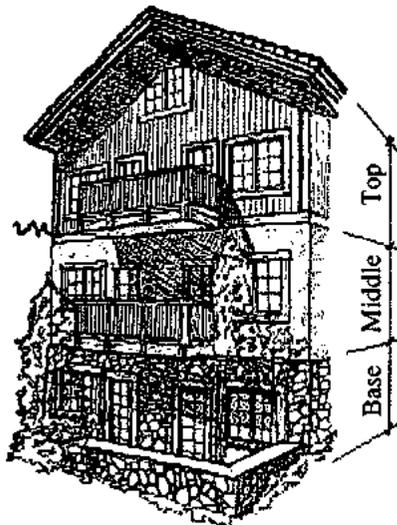
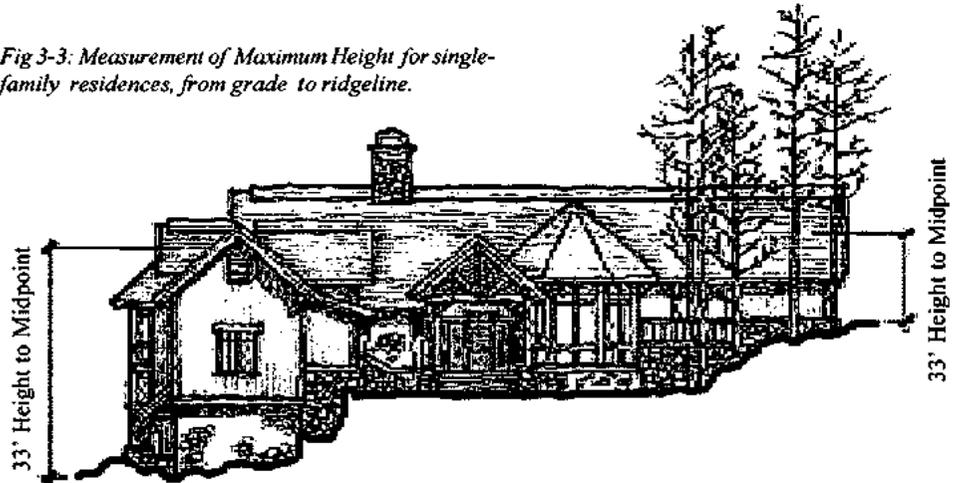


Fig 3-2: Clear definition of base, middle, and top.

Single-family residences shall not exceed a Maximum Height of 33 feet from existing grade.

Multi-family residences and townhouses shall be established as part of the Small Scale Master Planned Development. The intent of the height guidelines is to present a fragmented, human-scaled roofscape – one which steps with the contours of the mountain and recalls the natural setting. Within this framework, the DRC may approve exceptions, within the parameters it is allowed to by Park City, on a case-by-case basis if it feels the intent is met.

Fig 3-3: Measurement of Maximum Height for single-family residences, from grade to ridgeline.



3.3 Foundation Walls

For the purposes of these Guidelines, foundation walls are those walls which seem to "grow" out of the ground. On sloped sites, they are the walls which form the lower-level walkout. On level sites, they are the building walls at the lowest level above grade. In either location, they are to be expressed as "anchors" to tie buildings to their sites. Durable materials, such as stone veneer, shall be used to protect the lower portions of structures from impact and snow damage. Wood and other materials susceptible to moisture damage shall not be used to cover foundation walls. Foundation walls should "marry" the building to its site.

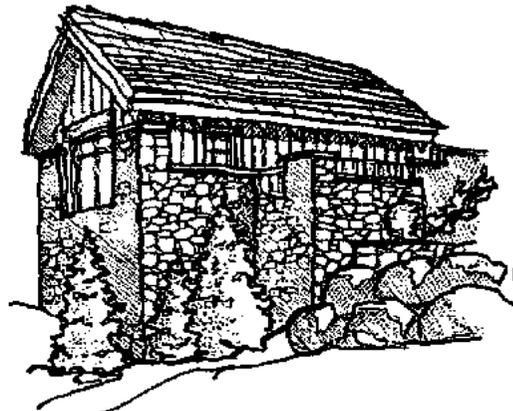


Fig 3-4: Foundation walls should visually tie a structure to its site.

3.4 Building Walls

3.4.1 General

Building walls within Flagstaff Mountain Resort are to be expressed as mass or frame walls, related to the structural nature of the buildings they are enclosing. Building walls occur above foundation walls and—unlike foundation walls—express the more subtle “middle” of structures in planar, more neutral materials. While mass walls typically express load-bearing surfaces with modestly-sized openings, frame walls relate more directly to the structural system by expressing the post-and-beam or truss construction of the building.

3.4.2 Dimensional Guidelines

To reinforce the additive nature of the structures within the Flagstaff Mountain Resort, no walls over 40 feet long are permitted at single-family residences without significant offset (4-foot minimum). Structures greater than 60 feet in length have special requirements imposed by the Park City Land Management Code. These involve visually breaking up the facade. Please consult the Land Management Code for details.

3.4.3 Materials

The choice of materials used on exterior walls offers the opportunity to convey the sense of a unified vision for Flagstaff Mountain Resort. This is most successfully accomplished when a limited palette of similar materials is used. To this end, no more than three primary building materials are permitted on any single structure within the development. In addition, acceptable materials within these Guidelines are typically unit materials, or those which combine many pieces of a similar material to present uniform, but richly-textured surfaces. Primary building materials are defined as those which occur on portions of buildings exceeding 250 SF in surface area for single-family residences and 500 SF for other structures. Approved primary materials are listed below. Materials which occur on surfaces 250 SF or less (or 500 SF or less) in area are defined as secondary building materials, and may include materials not listed below. However, all materials are subject to review by the DRC, and must gain approval prior to construction.

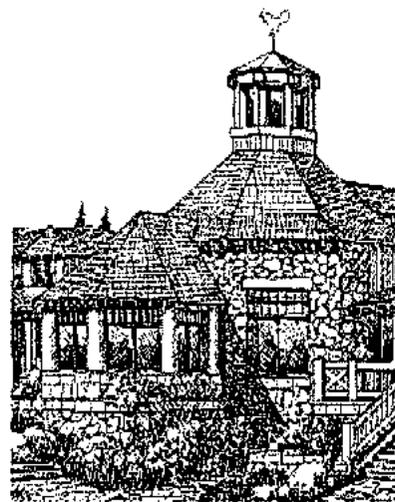


Fig 3-5: Mass walls (background) versus frame walls (foreground).

“Bearing” mass walls of stone veneer shall be used on the foundation walls of buildings, to convey permanence and a link to the site. Veneer walls must use an approved stone type. Use of cultured or artificial stone is discouraged.

Battered walls may be used when they consistently and successfully convey the sense of bearing—poorly battered walls are less successful than no battering at all. Where used, battered walls shall taper at a uniform slope (12:1 pitch minimum, with no changes in pitch), to present a consistent language for the structure. For instance, buildings may feature battered stone piers with standard veneer walls, a mix of battered and standard veneer walls, or no battering at all. Whatever the combination used, random battering should be avoided.

Stucco may be used as a secondary base material, to give buildings a sense of mass. As such, stucco surfaces are limited to 50% of the total vertical wall area. Stucco walls include traditional portland-cement based stucco placed directly over concrete or stud walls, or exterior insulation and finish systems (EIFS), which include layers of rigid insulation. While traditional systems are generally more weather- and impact-resistant, EIFS may offer more design creativity due to its inherent thickness, and is very resistant if designed and installed properly. When used, EIFS which incorporates high-impact insulation should be located within 12 feet of grade, to prevent low-impact systems from being used where contact from maintenance equipment, snow removal equipment, and the like are prone to damage them. In addition, EIFS should be designed to take advantage of its inherent thickness, and provided with stucco finish coats with maximum depth and texture.



Fig 3-6: Random field quarry stone.

Heavy timbers, natural round logs, or rectangular hewn logs shall be sized to reflect their natural surroundings, including the sizes of trees in the area. Timbers shall be 5 inches minimum thickness by 6 inches minimum depth, while logs shall have an *average* diameter of 12” minimum. Rectangular hewn logs shall be 10” minimum in any direction.

Wood siding, either vertical or horizontal, should be used on building walls, to convey the “middles” of buildings. Vertical board and batten siding may be used, provided the boards are 1x 10 minimum and the battens are 1x 2 minimum. Boards and battens shall be rough-sawn, in wood species resistant to exterior weathering, such as douglas fir or engleman spruce. Cedar shingles may be used on accent walls such as

gable ends, but must be located within protected locations. Shingles used as siding shall have 8" maximum weather exposure.

Reflective materials or finishes are not allowed. All materials must have natural weathering properties which will render them non-reflective within one year after construction completion. Examples of such materials include copper or Cor-ten steel. If copper is used a patina must be applied to eliminate the shiny penny look.

Other acceptable materials for use as secondary building materials include wrought iron, painted steel, and similar ornamental materials. They should be used at accent areas only, and in a manner consistent with the architectural language of the building and the overall character of Flagstaff Mountain Resort. While the DRC has final approval over all secondary building materials, single-family residences will have less latitude with respect to material deviations than multi-family structures. All secondary building materials must comply with the 250 SF/500 SF maximums previously described.

3.4.4 Colors

Building colors for single-family residences and multi-family buildings shall be chosen to blend the buildings to their surroundings. To this end, earth tones and other low-intensity colors taken directly from the site should be the predominant colors, generally in shades slightly darker than their natural counterparts. Colors inherent to their materials, such as natural stones, naturally-weathering woods, and clear-finish logs, are the most durable, and generally offer the textures desirable within Flagstaff Mountain Resort. However, semi-transparent stained woods and colored stuccos are permitted as well. Materials such as stone and wood shall not be painted or covered in opaque stains. Vibrant colors are more appropriate at lower levels to engage pedestrian interest, while upper levels should be comprised of more "quiet" facades. Bright colors should also reflect the natural environment of Flagstaff Mountain Resort, with golds, reds, oranges, and shades of blue used most often. Colors foreign to the mountain setting should be avoided.

3.4.5 Trim

Trim colors on single-family residences and multi-family buildings should be in concert with their field colors, in shades slightly lighter or darker. This is typically accomplished through selection of colors having the same or similar hues, but using different shades or tints. As noted earlier, vibrant trim colors are more appropriate at lower levels to engage pedestrian interest than at upper levels, where more "quiet" facades are desirable.

3.5 Windows and Exterior Doors

3.5.1 General

In the tradition of the early antecedents for Flagstaff Mountain Resort, windows and exterior doors are to be expressed as relatively deep reveals within mass walls of stone or stucco. Within frame walls, they should be expressed as infill material between structural members, with the surfaces recessed from the members to reinforce the notion of field versus frame. Trim shall be incorporated into the designs of windows and doors, either as bucks within stone or log walls, or surface trim on planar materials such as stucco or wood siding. Fenestration should not be treated as punch-outs within a wall surface, and should be proportioned appropriately for the material surrounding it.

3.5.2 Window Sizes, Shapes and Types

Window sizes shall be appropriate to their materials. Windows, in general, should be square or vertical proportions and supported by deep, rough-sawn wood, cut stone, or cast concrete lintels. Lintels shall be wider than the windows they span, in proportion to the distance they span; however, lintel overhangs shall not be less than 2". Large view windows shall occur in frame walls only, and shall be recessed under exaggerated roof overhangs or porch soffits to minimize reflections from off-site. They should be scaled for the surrounding structure which supports them—windows between large log members, for instance, will be considerably larger than those between smaller timbers. Window sizes should also relate to their locations on a structure, with a clear hierarchy of sizes from base to middle to top.



Fig 3-8: Windows should relate to their adjacent building materials.

All fenestration shall be generally rectangular in shape, with special shapes permitted in unique locations such as entries, special window boxes, or the like. Small, individual windows in mass surfaces should relate to large view windows in window walls through the use of consistent proportions, modular elements, or similar lite designs. The intent of these Guidelines is to present a community of relatively "quiet" facades, with special windows occurring only in special places.

Approved window types include picture, fixed, double-hung, awning, casement or sliding windows. Jalousie or similar multiple-opening type units are not permitted. Pivoting or hopper windows will be approved on a case-by-case basis. All fenestration shall be supplied with tradi-

tional mullion, muntin, and lite patterns, whether using true divided lites or designer lites. Within these parameters, custom designs are encouraged for window designs. The intent of the door and window guidelines is to recall the heritage of Flagstaff Mountain Resort through the thoughtful design of fenestration, while allowing for relatively unobstructed views of the mountain setting and encouraging design freedom.

3.5.3 Window Materials and Colors

Windows within Flagstaff Mountain Resort shall be clad in maintenance-free metals such as copper, or aluminum or steel with baked enamel finish. Copper cladding may be left to patina naturally, provided it loses its reflective properties within one year after construction completion. Baked enamel colors for aluminum or steel cladding shall be similar to trim colors, and in similar hues to field colors or stained wood colors. Baked enamel finishes must be able to withstand the intense ultraviolet radiation found at higher elevations, and should come with prolonged fade-resistant warranties.

Shutters are permitted around windows if they are operable. Their design and placement should be consistent and should not take on a random or haphazard appearance. Design freedom is encouraged within the parameters of these Guidelines, and within the context of the other architectural elements on the building, including handrail designs, ornamental iron and similar detailing. Wood shutters should be stained to match wood windows or trim, or painted to match baked enamel colors.

3.5.4 Window Glazing

Due to the extreme mountain environment, all window glazing used within Flagstaff Mountain Resort should be insulated (double-glazed minimum), with at least a single low-emissivity ("low-e") coating on one of the glazings. Glazing shall be non-reflective (no mirrored coatings permitted), to minimize off-site glare. Large vision panels within window walls should be tempered – extremely large panels are required by Code to be fitted with tempered glass.

3.5.5 Exterior Door Sizes, Shapes and Types

Door sizes should be appropriate to their materials, with more rustic, "heavy" doors used in stone and stucco, and "lighter" more open doors used in window wall assemblies. Doors in log or stone walls shall be relatively tall and narrow, and supported by deep, rough-sawn wood or cut stone lintels. Lintels shall be wider than the doors they span (see requirements for window lintels). Large, predominantly glazed view doors shall occur in frame walls only, and shall be recessed to minimize reflections from off-site. Like windows, they should be scaled for the surrounding structure which supports them – doors between large log

members will be considerably larger than those between smaller timbers. The largest doors on a building should generally be reserved for its primary entry, where an oversized, finely-crafted portal is most appropriate.

All doors shall be generally rectangular in shape, with special shapes permitted in unique locations such as entries. Double doors are encouraged at grand entrances, or as elements within window wall assemblies. Design freedom is particularly encouraged at retail fronts, where doors may be especially large and should be crafted of the finest materials to entice pedestrians into the shops.

Approved door types include standard swing, pivot swing, sliding, and terrace. All doors shall be supplied with traditional mullion, muntin, and lite patterns, whether using true divided lites or designer lites. Within these parameters, custom designs are encouraged for door designs, particularly at primary entries and shopfronts.

3.5.6 Exterior Door Materials and Colors

Exterior doors within Flagstaff Mountain Resort shall be wood or wood-clad in maintenance-free metals such as copper, or aluminum or steel with baked enamel finish. Copper cladding may be left to patina naturally, provided it loses its reflective properties within one year after construction completion. Baked enamel colors for aluminum or steel cladding shall be similar to trim colors, and in similar hues to field colors or stained wood colors.

Baked enamel finishes on doors must be able to withstand the intense ultraviolet radiation found at higher elevations, and should come with prolonged fade-resistant warranties. Doors constructed of solid wood may be built of panels, planks or timbers, and be hewn, distressed, or similarly finished—design freedom is strongly encouraged.

Shutters are not permitted around doors within the community.

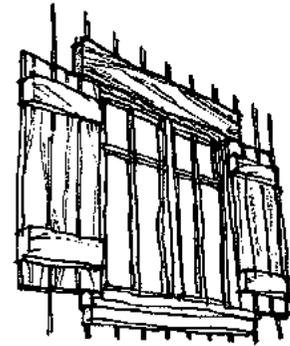


Fig 3-9: Design operable shutters consistent with the architectural image.

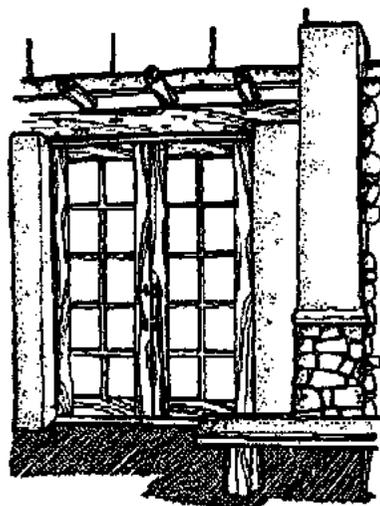


Fig 3-10: Custom entry designs are encouraged at retail fronts.

3.5.7 Exterior Door Glazing

Due to the extreme mountain environment, all exterior door glazing used within Flagstaff Mountain Resort should be insulated (double-glazed minimum). Exterior doors with significant areas of glazing should also incorporate at least a single low-emissivity ("low-e") coating on one of the glazings. Glazing shall be non-reflective (no mirrored coatings permitted), to minimize off-site glare. Tempered glass shall be used where required by Code.

3.5.8 Exterior Door Hardware

Variations in designs and materials used for exterior door hardware are encouraged to bring a level of fine detail to buildings within the development. Approved materials include brass, copper, wrought iron, wood, and aluminum or steel. Aluminum and steel should be prefinished to avoid reflective "hot spots" on doors. Industrial, highly-reflective finishes such as brushed or polished metals are not permitted on single-family residences.

3.6 Balconies, Guardrails and Handrails

3.6.1 Materials and Designs

Custom balcony and railing materials and designs offer the opportunity for truly creative expression within these Guidelines, and unique design solutions are encouraged. Approved materials for primary elements include small (6" diameter or less) turned or slip-peeled logs, plain- or rough-sawn 2x or 3x wood members, or 2" x 2" and larger metal pipes or tubes. Primary elements at balconies include guardrails, handrails, vertical posts, and support brackets. Secondary elements such as pickets shall be constructed of "lighter," more transparent materials such as small wood or metal members, 1 1/2" x 1 1/2" or smaller. Wood members, whether used at primary or secondary elements, shall be constructed of naturally weather-resistant species such as cedar or redwood. Glass and plastic are not acceptable materials for use on balconies.

Floors of drainable balconies—or those with waterproof membranes below the finished floor materials—may be finished in wood, concrete pavers, or stone, over the waterproofed substrates. Non-drainable balconies—or those which are exposed from above and below—should be constructed of redwood or cedar. Wood used in balconies, guardrails and handrails shall be clear-finished or stained with semi-transparent stain—painted or other opaque finishes are not permitted.

3.7 Roofs

3.7.1 General

In keeping with the intent of the Deer Valley Design Guidelines, primary roofs within Flagstaff Mountain Resort are to be predominantly single or double gabled, with hips and sheds permitted at smaller, secondary roofs. Primary roofs are defined as roofs which cover more than 250 SF of roof area for single-family residences and 500 SF for other structures, while secondary roofs are those roofs which cover 250 SF/500 SF of roof area or less. Clipped gables, conical, and flat roofs will be treated on a case-by-case basis, and are permitted with prior approval from the DRC, as secondary roofs only. The overall image for the development takes its cue from the simple, fragmented, gabled roof forms of Deer Valley; it is the intent of these Guidelines to maintain and strengthen this image by limiting the palette of roof forms permitted within Flagstaff Mountain.

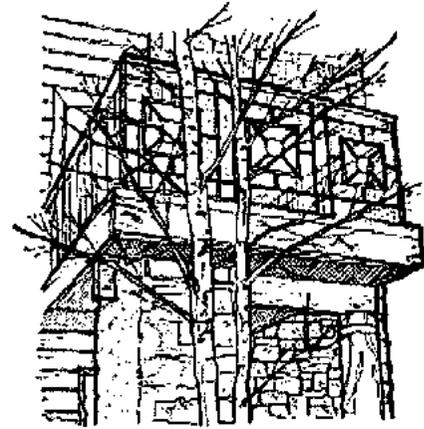


Fig 3-11: Custom balcony designs can add interest and detail to Empire Canyon.

To avoid A-frame-like structures within the mountain community, no roofs are permitted within 7 feet of nearest grade. Either cold roof or super insulated roof construction may be used. Roof framing shall be expressed wherever possible, particularly through exposed ridge beams, outriggers, rafter tails, and fascia boards.

3.7.2 Pitch

Approved roof pitches for primary roofs are between 4 ½ :12 to 12:12, inclusive. Roofs sharing the same ridge must share the same pitch—“flying” shed dormers and the like are not permitted. Pitch breaks are permitted when they occur at architecturally appropriate locations such as plate lines or changes in plane.

3.7.3 Materials

Primary roofs within the Flagstaff Mountain Resort will be covered with a limited palette of unit materials to present a coherent image for the mountain neighborhood. Approved materials for primary roofs include slate, asphalt, concrete tile, composite shakes and shingles which resemble cedar, cementitious shakes, and metal shingles. Shakes and shingles shall have 6”-8” exposure and be in colors which appear as cedar stained or left to weather naturally. Cementitious shakes must be similar in

appearance to cedar shakes, in similar exposures and colors as well. Metal shingles may be of copper (16 oz/SF minimum weight), corten steel, or terne metal. Secondary roofs may be covered with copper, corten steel, or terne metal in corrugated, rolled, or standing seam profiles.

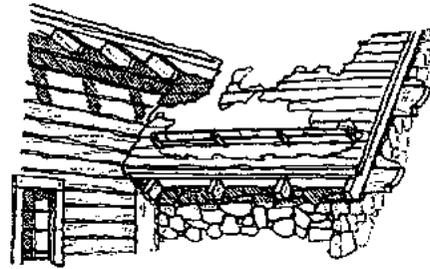


Fig 3-12: Building eaves should express exposed structure at rafters and outriggers.

3.7.4 Dormers

Dormers are considered secondary roof elements, and as such are permitted some latitude in terms of form, pitch and material. Dormers may be gables, hips, or sheds, with 4 ½ :12 to 12:12 pitch. When designed as an extension of upper-level walls, they shall be constructed in the more traditional manner, above broken eaves on both sides of the dormers, as opposed to continuous eaves up and over the dormers.

3.7.5 Snowguards, Gutters, and Downspouts

Snowguards should be used wherever significant amounts of snow may accumulate over occupied areas, such as entries, patios, decks, balconies, or parking areas. Pitched roofs which face north are particularly susceptible to snow and ice accumulation, as are lower roofs to the north of—and therefore in the shadow of—their higher neighbors. In these cases several rows of snowguards may be necessary. Snow and ice accumulation on metal roofs—which heat quickly during sunny winter days—is especially dangerous to unsuspecting persons or equipment. Metal roofs which face south or are located significantly higher than adjacent, lower roofs should be equipped with snowguards to prevent injury to people or damage to lower roofs.



Fig 3-13: Dormers add large-scale texture to the overall roofscape.

Outdoor gathering areas which face south and are not completely covered are exposed to water drip from the roofs above them. These locations are ideal candidates for gutters and downspouts. Where roofs are in constant shadow or have northern exposures, gutters and downspouts used in conjunction with heat tape are often effective. Gutters used below snowguards should be designed to take the load of the accumulated snow and ice which snowguards frequently release.

Approved materials for gutters and downspouts include aluminum or steel with baked finish, and copper or lead-coated copper. Gutter sections may be traditional or half-round. Snow guards shall be constructed

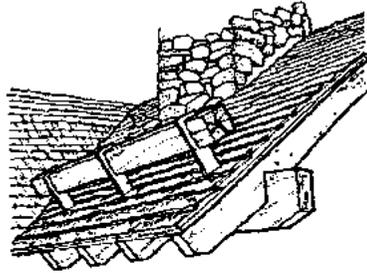


Fig 3-14: Timber snowguards relate to other structural members on the roof.

of painted plate steel vertical supports (painted black, or to match roof or building trim color) with timber or log horizontal members which relate to nearby structural members. All exposed steel shall be painted.

3.7.6 Miscellaneous Equipment

All miscellaneous rooftop equipment, including roof vents, antennas and satellite dishes, shall be painted to blend with the adjacent roofs. Major pieces of equipment on commercial buildings shall be strategically located to conceal them from view, or hidden in cupolas or other structures – exposed equipment is not permitted. All flashings shall be copper to match those found on exterior walls.

All miscellaneous rooftop equipment, including roof vents, antennas and satellite dishes, shall be painted to blend with the adjacent roofs. Major pieces of equipment on commercial buildings shall be strategically located to conceal them from view, or hidden in cupolas or other structures – exposed equipment is not permitted. All flashings shall be copper to match those found on exterior walls.

3.7.7 Skylights/Solar Panels

Skylights and solar panels are permitted within Flagstaff Mountain Resort only under extremely limited conditions. No skylight or solar panel may be viewed from any other property or roadway. No skylight may be lighted internally.

3.8 Fireplaces and Chimneys

3.8.1 Fireplace Requirements

The use of wood burning fireplaces or devices is very limited at Flagstaff mountain Resort. Only one wood burning device is permitted in each single family home. Only one wood burning device is permitted in each lodge, multi-family building, or hotel. No wood burning devices are allowed in the individual condominium or townhome units. Fireplaces shall be designed to meet all applicable Codes, including those which regulate wood-burning within Deer Valley. Exposed flues and vents for gas-operated fireplaces or other equipment such as furnaces should be hidden from primary views, and painted to blend with the nearest building materials. Gas burn fireplaces have no quantity restriction.

3.8.2 Chimney Sizes and Shapes

All flues 6" diameter or greater shall be designed with chimneys. The sizes of chimneys should be in scale with the architecture of the building – not small enough to be lost in the massiveness of the structure, but not large enough to overwhelm the structure. Chimneys should be designed with relatively slender proportions, with heights greater than widths, and in rectangular or tapered profiles. Heights of wood-burning chimneys relative to their nearest rooflines shall comply with applicable Codes. Heights of gas-burning chimneys or boiler flues shall be designed to proportionally match their wood-burning counterparts, to lend authenticity and consistency to the overall roofscape.



Fig 3-15: Custom chimney caps can add interest to the roofscape.

3.8.3 Materials

Chimneys within Flagstaff Mountain Resort shall be covered in stone veneer (to match building veneer), copper, steel, or stucco.

3.8.4 Chimney Caps

Chimneys may terminate in decorative caps of stone or metal. Creative designs, such as arched openings within caps, barrel or pitched metal roofs, and the like are encouraged to lend interest to the building roofscape. When flat or pitched stone caps are used, they shall have a minimum thickness of 4". All chimney caps shall be designed to screen spark arrestors and other utilitarian equipment as much as possible.





CHAPTER 4

SITE PLANNING AND DEVELOPMENT GUIDELINES

4.1 Site Planning

Site planning is a critical element of successfully integrating buildings and improvements with the natural landscape. The Approximate Building Locations have been identified in order to assist owners with the site planning process. The Approximate Building Location identifies the best location that maximizes site attributes and minimizes potentially adverse impacts on sensitive portions of the site. The Approximate Building Locations are indicated on Individual Lot Diagrams that have been prepared for each building.

A well-prepared site plan must be done in concert with architectural design and, in doing so, must respond to building siting and orientation, views, grading, access and other design issues. A creative site plan will find a balance between preserving and enhancing the natural features of the site, while at the same time addressing the design objectives of the owner.

To produce a high quality, environmentally-sound extension of the Deer Valley/Park City community, which preserves and enhances the mountain setting, the site design, and landscape of each single-family or multi-family lot shall be carefully planned according to the standards set out herein.

4.2 Approximate Building Locations

Approximate Building Locations are areas designated on the Approximate Building Location Exhibit, provided by the developer, within which all improvements on the lot except utility connections, driveways and ski trails, must take place.

Approximate Building Locations were determined based on the specific characteristics of each lot and on planning and design objectives for Flagstaff Mountain Resort, specifically:

- Optimizing views;
- Protecting view corridors from other properties and/or common use areas.
- Protecting sensitive environments;
- Protecting and utilizing distinctive natural features, i.e. rocks, vegetation and topography;
- Minimizing grading and removal of vegetation;

- Blending man-made improvements into the topography and forests;
- Maintaining existing drainage patterns; and
- Overall, preserving the dominance of the natural setting by fitting buildings into the existing landscape.

4.2.1 Approximate Building Locations – Single-Family Lots

An Approximate Building Location has been established for every residential homesite at Flagstaff Mountain Resort. The Approximate Building Location is indicated on the Approximate Building Location Exhibit for Flagstaff Mountain Resort and on individual lot diagrams provided by the developer. All buildings must be located entirely within the area defined by the Approximate Building Location. As such, the Approximate Building Location represents a very important consideration in the design of a home. Owners are encouraged to meet with the Design Review Committee (DRC) early in the design process in order to understand their site and the Approximate Building Location.

Approximate Building Locations were determined based on overall planning and design objectives for Flagstaff Mountain Resort and the site-specific characteristics of each homesite. The objectives that were used to define the Approximate Building Locations included identifying the portion of each site that would allow the design of a home to maximize views and solar orientation, establishing separation between homes, preserving existing vegetation, and optimizing other site attributes.

Owners are strongly encouraged to design their home and related improvements to comply with the Approximate Building Location on their lot. The Flagstaff Mountain Resort Design Guidelines allow for certain elements of a building to encroach outside of the envelope only under special circumstances that the Design Review Committee determines on a case by case basis.

A well-prepared site plan must be developed in concert with building design. Buildings and improvements should be sited to blend with the surrounding landscape and not dominate natural site characteristics.

Buildings should be designed as an integral element of existing terrain and vegetation. Buildings and improvements should be located and designed to minimize site grading and tree loss.

In order to respond to site characteristics, consideration should be given to homes designed as a composition of smaller building forms clustered around outdoor spaces such as courtyards, porches and verandas.

Buildings on sloping lots should be designed to step with existing contours.

Buildings should be located to allow for convenient driveway access.

All portions of a home, including all accessory buildings, garages, decks, patios, terraces, pools, retaining walls, site walls and fences, and similar features shall be located within the Approximate Building Location.

Driveway access (including grading and retaining walls necessary for site access) and landscape improvements may be located outside of the building envelope.

Unless necessary for driveway access, the removal of trees outside of the building envelope is prohibited without specific approval by the DRC.

Outside the Approximate Building Locations, the Lot is to remain in an essentially natural condition, maintained to blend with all adjoining predominantly natural areas. Good forestry practices including tree thinning, new plantings of approved vegetation types and clearing of fire hazards are permitted, as described herein and subject to DRC approval.

4.2.2 Combination of Lots

When the owner of a single family lot combines two or more lots, the DRC will designate a new Approximate Building Location, size and building height based on the new lot lines and the criteria listed above. The combination of lots may require approval by Park City.

4.2.3 Encroachments

It is the intention of these regulations that all structures and site improvements such as driveway turnarounds, parking areas, patios, pools and accessory buildings be located within the Approximate Building Locations; however, it is also recognized that each Approximate Building Location presents its own unique design challenges, and owners and their architects and planners may develop design solutions involving encroachments outside of the Approximate Building Location area that may be appropriate in certain cases. In order to respond to such cases, the DRC has the authority to approve minor encroachments only outside of the Approximate Building Locations, and to approve both minor and major encroachments outside of the Approximate Building Locations.

All proposals for construction that encroach outside of the Approximate Building Locations or proposals to change the location shall be evaluated by the DRC and all decisions regarding such proposals shall be

made solely at the discretion of the DRC. It shall be the responsibility of the owner and the owner's design team to demonstrate to the DRC that the proposed encroachment or change to the location of an Approximate Building Location is consistent with the planning and design objectives for Flagstaff Mountain Resort. In some cases, the DRC may be required to obtain approval from Park City. Should an approval be necessary and be granted by Park City, the DRC still has the authority to deny the request.

Minor encroachments outside of the Approximate Building Locations that may be approved by the DRC if certain criteria are met include:

- Minor encroachments of non-habitable space, such as balconies, porches, service areas, pools, spas and garages not exceeding eight feet (8') outside of the prescribed Approximate Building Locations.
- Roof overhangs located outside the prescribed Approximate Building Locations at grade patios.

Proposed minor encroachments as outlined above will be carefully studied by the DRC for their conformance to the planning and design objectives for Flagstaff Mountain Resort, with particular attention given to visual impact on neighboring Approximate Building Locations and on protecting view corridors.

4.3 Site Development

4.3.1 Landscape Areas

Areas outside the Approximate Building Location are to be left in their natural state other than trails, walkways, roadways, driveways and utility corridors. Any areas disturbed by construction are to be restored with plant material that is consistent with the adjacent undisturbed area.

Within the Approximate Building Location, landscape design and plant materials may be used to establish privacy. Manicured lawns in very limited areas, as well as gardens, windbreaks and spatial definition are allowed. However, the landscape design must provide a comfortable transition back to the native landscape at the perimeter of the approximate building locations. Permanent underground irrigation systems for lawns and flower gardens are permitted within the Approximate Building Location. Temporary irrigation methods are prohibited, except as allowed in the Guidelines for re-vegetation of disturbed areas.

Landscaping within the Approximate Building Location may include the use of permanent irrigation and shade to create "micro-climates"

that will support a wide variety of plant materials. As such, ornamental plants, planting beds, gardens and other formal landscape designs may be introduced within the Approximate Building Location. Landscaping within the Approximate Building Location should be designed in order to define outdoor spaces and entries, frame desirable views, screen undesirable views, buffer prevailing winds, provide seasonal shade, and add color and interest to courtyards and other outdoor spaces. Consideration should also be given to the size, color and texture of plant materials. Recommended plant materials for the Approximate Building Locations are listed in Appendix B "Planting List". These plants are not necessarily native to the alpine regions of Park City and do require supplemental water for peak performance.

Unless otherwise approved by the DRC, all formal landscaping shall be located within the Approximate Building Location and generally be concealed from view from adjacent roadways.

Ornamental plants and other formal plant materials should be located immediately adjacent to the home in courtyards, entries or other defined spaces not immediately visible from adjacent lots or roadways. The transition between formal landscape areas within the Approximate Building Location and the native landscape area shall be accomplished with a defined edge that clearly contains formal landscape improvements. A defined edge may be established with the use of patio walls, retaining walls, stone edging or planting beds.

In order to minimize the use of water and to reinforce the integration of buildings and improvements with the natural environment, the introduction of formal manicured lawns is discouraged. When used, manicured lawns should be confined to the Approximate Building Location and should be located within courtyards or otherwise screened by buildings, walls or plant materials in order to minimize visibility from adjacent lots or roadways.

Permanent underground irrigation systems are permitted within the Approximate Building Location. The use of moisture sensors, drip irrigation and pop-up heads that conserve water are encouraged. Back flow preventors are required and manual valves are permitted.

4.3.2 Grading and Drainage

Grading will be designed as a combination of cuts, fills and retaining walls that protect stands of trees and blend into and/or appear to be extensions of existing natural land forms. Slopes will not exceed 2:1, unless it can be demonstrated that a steeper slope will not erode. Whenever possible, natural slopes are to be used instead of structures. Cut

and fill slopes are to be re-vegetated with native plant materials and blended into the surrounding environment.

A professional architect, professional civil engineer or professional landscape architect, licensed in the State of Utah, shall prepare a full set of drawings, including grading and drainage plans and sedimentation and erosion control plans for the design of all projects within Flagstaff Mountain Resort.

Approximate Building Locations have been sited in part to minimize the need for grading. When necessary, site grading should comply with the following guidelines:

- Site grading shall be limited to no more than what is necessary to accommodate the development of a building, patios, driveways, and sidewalks. Excessive re-contouring of a site, or overlot grading, is not permitted.
- Grading should be confined to the building envelope, unless otherwise approved by the DRC.
- Grading shall be designed to blend with the natural contours of the site by feathering cuts and fills into existing terrain.
- In order to minimize impacts on existing vegetation and excessive site disturbance, the use of retaining walls is encouraged in lieu of re-grading large areas of a site. At their discretion, the DRC may require the use of retaining walls in lieu of grading in order to preserve significant vegetation or site characteristics. Refer to the Section 4.3.4 for additional guidelines on retaining walls.
- When cut and fill slopes are necessary, they should be as steep as possible to minimize site disturbance while still allowing for re-vegetation. Generally, a 2:1 slope is recommended in order to ensure adequate re-vegetation. If soil characteristics are appropriate, steeper slopes may be approved by the DRC.
- Grading, landscaping or site improvements shall not interfere with the functional aspect of natural drainage courses and easements.
- All drainage and utility easements disturbed by construction shall be re-vegetated.
- Owners are responsible for controlling drainage resulting from the development of their Approximate Building Locations. No drainage shall be directed onto other lots or tracts, unless located within a designated drainage easement.
- Roadway drainage shall be accommodated by a culvert under the driveway. Culvert ends shall be cut to match finished grade and faced with stone to match stone used on the main residence. Culverts and stone facing are the responsibility of the homeowner.

Drainage Systems

In general, natural drainage courses will be protected and existing drainage patterns maintained. New drainage ways are to be designed to appear and function like natural drainage ways. Exceptions to these policies may be granted by the DRC, provided they are not visible from off-site or neighboring properties.

Drainage Structures

Headwalls, ditches and similar drainage structures visible from off-site are to be built of or veneered with an approved stone and are to be similar to other stone used on the site. Ends of metal or concrete pipes are to be concealed.

4.3.3 Outdoor Spaces

Outdoor living spaces can provide an effective transition between a home and the outdoors, and also reinforce the visual connection of a building and its site. Terraces, verandas, patios, porches, courtyards and other similar outdoor spaces should be an integral element of the home design. Porches or other similar covered outdoor spaces are an important element of the design style and all homes at Flagstaff Mountain Resort must include such features.

A number of factors should be considered relative to the design and location of outdoor spaces. How and when the space will be used is a primary consideration. For example, outdoor spaces that are designed with an eastern exposure will be protected from prevailing winds. During the summer, outdoor spaces with southern exposure will be most comfortable during the morning and evening due to the hot midday sun. Outdoor spaces with northern exposure represent a viable alternative to avoiding the midday heat.

Porches and other covered outdoor spaces shall be confined to the building envelope. The DRC may approve terraces, patios, courtyards and other uncovered outdoor spaces located outside the building envelope.

Materials used for patios, courtyards and on-grade decks shall be consistent with materials used on the main residence.

The most appropriate manner for creating porches and covered outdoor spaces is to extend the roof over the outdoor space. In such cases, the use of a double-pitched roof should be considered. Porches and covered outdoor spaces may also be created by trellises and other similar roof features, using the same materials used in the roof framing.

Outdoor spaces on sloping sites should be terraced in order to minimize the need for retaining walls or site grading. When retaining walls are

required, they shall be constructed of the same stone used on the main residence.

The transition between outdoor living spaces and the native landscape areas should be defined by a hard edge such as patio walls, retaining walls, stone edging or planting beds.

Privacy fences and walls used to define courtyards and other outdoor spaces should be designed as an architectural extension of the main residence and in all cases materials used should be consistent with the main residence.

Paths, outdoor stairs and terraces are to be designed to blend with the natural topography and vegetation, and with retaining walls, fences or building foundations. Materials will be stone, chipped stone or gravel and/or wood, as approved by the DRC.

4.3.4 Retaining Walls, Landscape Walls, and Fences

An underlying goal for Flagstaff Mountain Resort is to create a sense of continuity and openness throughout the community. For this reason, the introduction of landscape walls and fences is limited to establishing privacy around outdoor spaces, providing an edge between formal landscaped areas and the native landscape area, and creating outdoor spaces such as courtyards. Approximate Building Locations have been sited in part to minimize the need for retaining walls. When necessary, walls and fences should comply with the guidelines below:

- Perimeter lot fencing or the arbitrary fencing of building envelope areas is not permitted.
- Unless otherwise approved by the DRC, all retaining walls, landscape walls and fences shall be located within the Approximate Building Location.
- The design of landscape walls and fences should be integrated with the design of the residence, shall not exceed 6 feet in height, and shall be constructed of materials consistent with materials used on the main residence.
- All retaining walls shall be constructed of stone or stone veneer consistent with stone used on the home or on retaining walls along roadways located adjacent to the site.
- Retaining walls shall not exceed 6 feet in height. Retaining cuts greater than 6 feet shall utilize stepped walls and shall be designed to allow for the introduction of landscape materials between walls. In certain cases, the DRC may approve retaining walls in excess of 6

feet when it is demonstrated that higher walls will result in a more sensitive design solution. In this case, such modification will be recommended to and approved by the City.

- When feasible, retaining walls should be designed as architectural extensions of the residence to visually tie the building to the ground.

Site walls are to be built of approved boulders or laid stone, logs or treated and stained timbers, used in traditional patterns, reinforced and/or backed with concrete where required. Railroad tie walls will not be permitted. Walls that are visible from off-site adjacent to outdoor living areas are not to exceed 4 feet in height. Stepped-back or terraced wall structures with ample planting pockets are to be used where grade changes exceed 4 feet. Higher walls at driveways which may be approved by the DRC can be constructed where necessary due to site topography when they would significantly reduce overall impacts on the site. Any walls in excess of 4 feet in height are to be designed by a structural engineer. The tops of walls will be shaped to blend with natural contours. Ends of walls should not be abrupt, but are to be designed to make natural-looking transitions into the existing land forms and vegetation. Walls are to be designed with a batter.

4.3.5 Landscaping and Plant Materials

The underlying goal of landscape design at Flagstaff Mountain Resort is to integrate homes and related improvements with their sites and to establish a common natural landscape element throughout the community. This goal will be achieved in a number of different ways. For example, plant materials should be selected with appropriate color, texture and form that will visually tie buildings and improvements with the surrounding landscape. The preservation of existing plant materials will be an inherent goal during the design of all homes and site improvements. Areas around approximate building locations that have been disturbed by site development or home construction will be restored to reflect the characteristics of the natural landscape surrounding Flagstaff Mountain Resort and all areas surrounding the Approximate Building Locations will be enhanced with the introduction of new plant materials that are indigenous to the surrounding area.

All landscape plans should address two distinctive areas - an Approximate Building Location and the native landscape area. The design goals for each of these areas is different and as such, each of these areas requires different design solutions. A wide variety of landscape improvements and materials are permitted within the building envelope, while plant materials and improvements in the native landscape area are relatively limited. Landscape improvements in both of these areas should be designed to minimize the need for irrigation.

It is the intention of these Guidelines that over time the restoration and enhancement of all areas surrounding individual Approximate Building Locations will establish a common natural landscape feature that will visually link the Flagstaff Mountain Resort community.

The landscape design of each lot shall blend with its overall mountain setting. New plantings are to be used to protect important viewsheds, help to define use areas on the lot, and screen outdoor service areas and other improvements from adjacent lots and off-site views. Landscape improvements shall incorporate, rehabilitate and enhance existing vegetation, utilize indigenous species and minimize areas of intensive irrigation. The following guidelines apply to all landscape zones.

- New trees and shrub plantings are to be a mix of sizes that will blend naturally into the surrounding vegetation:
 - Deciduous trees: 50% of mix: minimum 2 inch caliper; 50% of mix: minimum 3 inch caliper.
 - Evergreen trees: 50% of mix: minimum 10 foot heights; 50% of mix: minimum 14 foot height.
 - Shrubs: minimum 5 gallon containers.
- The use of large specimen trees is preferred in areas close to the house to help blend the building with the site.
- At disturbed areas where extensive reforestation is planned, a planting mix that includes smaller tree and shrub materials can be used.
- Landscape materials shall be located in an informal natural manner. Planting of trees or shrubs in straight lines, circles or other unnatural patterns should be avoided.
- In order to create a natural appearance and to avoid monotony, different sizes of landscape materials shall be used.
- Temporary irrigation shall be required for all landscape improvements. Temporary systems shall be removed after two growing seasons or after plant materials have been established.
- Ground covers, wildflower sod and seeding is to be done using approved plant material and standard local practices (see Appendix B).
- Areas immediately adjacent to building improvements that are not visible from off-site may use a greater variety of plant material, including introduced and non-native plants.
- Building improvements shall be designed around existing major tree stands on the lot. Tree protection and fertilization measures are to be taken on all large trees (12" caliper or more) within 30 feet of construction activity, including trees outside of the Approximate Building Locations.
- Tree wells constructed of approved stone are to be used when adding fill under the drip line of major trees to be saved. A blanket of

porous stone and a network of aeration lines are to be installed at the existing grade to allow air to reach the roots and to prevent over-compaction.

- Manicured or groomed yards, terraces and pools are restricted to areas confined by buildings, walls, plantings or other defined edges and are to be permitted only within the Approximate Building Locations.
- Plant materials used for erosion control are to establish rapid surface stabilization. The DRC may also require that other stabilization measures such as jute matting be employed.
- Developing the outdoor living areas with naturalized landscapes (plantings that are left to naturalize with little or no maintenance) will help to reduce the apparent impact from wildlife. Concentrations of the more "ornamental" plantings in areas close to the house that are easier to maintain will be encouraged.
- Riparian and wetland areas are to be protected from disturbance during construction.
- Automatic irrigation systems are required at all re-vegetation areas (excluding the 30-foot wildfire safety zones). These systems may be abandoned when plantings have been clearly established after a minimum of two growing seasons.

4.3.6 Visual Integrity of the Natural Landscape

Special consideration must be taken to preserve the natural landscape's visual integrity and prominent physical site features. Landscape plantings shall be used to integrate buildings into the surrounding terrain and screen them from off-site views.

Large specimen plant material is to be used to replace the natural landscape lost during construction and to reduce the apparent height of the building as viewed from off site. The landscape within the Approximate Building Locations is to be at the same scale as the natural existing material at the time of installation.

4.3.7 Ski Run Edge

The following landscape standards apply to Approximate Building Locations adjacent to the ski runs at Flagstaff Mountain Resort.

- The introduction of all plant materials on lots adjacent to ski runs is subject to the approval of the DRC.
- The native landscape area of each Approximate Building Location should interface with the rough or natural landscape area of the ski runs to create a uniform edge treatment. Upon completion of landscape improvements, the property line between the ski runs and individual lots shall not be discernible.

- Consideration should be given to clustering plant materials to create a natural landscape transition between the Approximate Building Locations and the ski runs.
- The use of mature landscape materials along the ski run edge that exceed minimum size requirements is encouraged.

4.3.8 Tree Removal and Selective Thinning

The DRC may approve tree removal and/or selective tree thinning outside the Approximate Building Locations for view corridors or solar exposure, provided it does not increase the visual impacts on adjacent lots or off-site visibility of the house. Unauthorized removal or cutting of trees is subject to fines of up to \$1,000 per tree.

4.3.9 Wildfire Safety Measures

Portions of Flagstaff Mountain Resort are located in wildfire hazard areas. A number of measures have been implemented that reduce the risk of wildfire in Flagstaff Mountain Resort. For example, all homes are required to have interior and exterior eave sprinkler systems. Existing and proposed ski runs and roadways provide natural fire breaks. Nonetheless, it is important that homeowners be aware of the possibility of wildfire and also that the threat of wildfire can be greatly reduced with thoughtful planning and preventative landscape maintenance.

The goal of fire-safe landscaping is to reduce the amount of potential fire fuel immediately surrounding a home. Along with the use of low fuel loading plant material, a 30-foot safety zone in all directions around a home is recommended. The following actions are recommended within this zone:

- Dispose of slash and debris left from thinning and periodically mow dry grasses and vegetation.
- Stack firewood away from the home.
- Maintain an irrigated area.
- Remove dead limbs, leaves, needles and other materials. This should also be done in areas out of the safety zone.

4.3.10 Driveways

Individual Lot Diagrams provided by the developer identify recommended site access to each Approximate Building Location. In certain cases, Approximate Building Locations will share a common driveway easement. Unless otherwise approved by the DRC, access to each Approximate Building Location shall generally conform with access as indicated on the Individual Lot Diagrams.

Driveways should be designed to align with roadways at not less than a 75-degree angle.

Unless approved by the DRC, single family, and planned unit development lots shall be limited to one access point off of the adjacent roadway.

Adequate snow storage areas should be provided adjacent to driveways and parking areas.

Bollard design shall be consistent with the examples indicated in these Guidelines and shall include low-level down-lighting consistent with lighting guidelines outlined below.

Individual home mail delivery is not available and as such, mailboxes are not necessary. When proposed, delivery boxes shall be incorporated into the design of the entry/identification bollard.

Single-family driveways shall be 12 feet wide maximum, except where they provide a turnaround at a garage and/or off-street parking. Multi-family driveway widths will be reviewed on a case-by-case basis. Parking and turnaround areas must be located within the Approximate Building Locations. Driveway access points are limited to one per lot. All driveways are to follow alignments that minimize grading, tree cutting or other disruption of the site. The driveway-parking-garage layouts shall minimize the visibility of the garage doors and off-street parking from the street and the major views from adjoining property.

Driveways are to be built of asphalt paving, unit pavers, or other hard surface material, generally without curbs. The first 20 feet of the driveway shall be asphalt to match Flagstaff Mountain Resort roads. After the first 20 feet, the driveway may introduce a different material, provided there is a smooth transition from one material to another. Colors of finish paving materials are to be selected to blend the new construction into the surrounding earth colors. No grey or white concrete can be used. Heated driveways are required if the slope is 15%. Maximum gradient on driveways shall not exceed 15%, excluding the first and last 20 feet of the driveway, which will have a maximum gradient of 5%.

4.3.11 Parking Requirements

The number of parking stalls per project is stated in Appendix A, as required by the Park City Land Management Code.

Minimum size of spaces both indoor and outdoor is 9 feet x 18 feet.

Garages may be physically separated from the main residence, but in all cases shall be compatible with the architecture and materials of the main residence.

On-street parking is not allowed anywhere within Flagstaff Mountain Resort.

4.3.12 Exterior Service Areas/Satellite Dishes

Trash disposal, outdoor work areas and outside equipment, including metering devices, transformers, air conditioning units and satellite dishes, are to be completely screened from off-site views and, as appropriate, made inaccessible to wildlife, by using architectural features integrated into the building design and/or the form, materials and colors of the site walls.

Wall-mounted utility meters and connections shall be enclosed, incorporated into the design of each building, or screened from view by walls or landscaping.

An application, application fee and proposed location for all satellite dishes must be received by the DRC for review and approval prior to satellite dish installation.

Satellite dishes 24" in diameter or less may be approved, subject to review by the DRC. Such devices shall be located out of view from other Approximate Building Locations, roadways and ski trails. In order to reduce their visibility, satellite dishes shall be colored to blend with the site or building.

4.3.13 Easements and Utilities

Utility easements have been established throughout Flagstaff Mountain Resort in order to facilitate the installation and maintenance of utilities. Owners are responsible for providing utility service lines to their homes and for controlling drainage resulting from the development of their lots.

All utility lines that serve individual units shall be located underground.

When feasible, utility service lines should be located under or along side driveways in order to minimize site disturbance.

All drainage and utility easements disturbed by construction shall be re-vegetated.

Site utilities are to be installed underground on alignments that minimize grading, tree cutting and other disruptions to the site. Utility boxes, including any meters, are to be located and/or screened to be imperceptible from off-site.

4.3.14 Signage

An identification sign/address marker for the Lot will be installed and maintained by Flagstaff Mountain Resort Master Homeowners Association. The Owner may relocate the sign to accommodate the final driveway location and may modify the design to incorporate additional information such as names and/or logos. The identification sign must be within 20 feet of the intersection of the driveway and the road.

No real estate "for sale" signs are permitted on individual units within Flagstaff Mountain Resort. "For sale" signs are permitted on multi-family structures during construction and sales periods only. These signs shall be reviewed by the DRC.

One temporary construction sign not to exceed 6 square feet is permitted during the construction of a home. The design and information indicated on construction signs shall conform with examples provided by the developer. Such signs may be free-standing or mounted to a construction trailer, but in all cases shall be located within the property boundaries and be visible from the adjacent roadway. Temporary construction signs require approval of the DRC and shall be removed prior to the issuance of a Temporary or Final Certificate of Occupancy. Temporary construction signs will be addressed on a case by case basis for all multi-family construction sites.

Approximate Building Location identification signs are required on individual lots. These signs shall be illuminated and shall be a minimum of one square foot and a maximum of four square feet. The signs shall be incorporated into an entry bollard design.

4.3.15 Miscellaneous

Stone, if used in the landscape, is to be similar to the approved stone used in residences and selected and placed to blend in naturalistic ways with the site.

The DRC may approve pools, dog runs or similar elements. These are to be located within the designated Approximate Building Locations and completely screened from off-site view.

In keeping with the overall landscape theme of integrating building and improvements with the existing natural landscape, the introduction of landscape water features is not permitted. Small decorative fountains are permitted within courtyards or other outdoor spaces.

The construction of tennis courts is not permitted within Flagstaff Mountain Resort.

All artwork, as determined by the DRC, to be displayed outside of a residence requires review and approval by the DRC. Such artwork shall be located within the building envelope and not be directly visible from adjacent lots or roadways. The DRC reserves the exclusive right to approve or deny an applicant's request to display artwork outside of the residence. No artwork shall be installed, erected, displayed or placed on a lot without express written approval of the DRC.

4.3.16 Lighting

The clarity of the night sky at Deer Valley is a primary value to be preserved. Light pollution is a threat to the clear skies that are central to the heritage of the West. Therefore, exterior night lighting is to be kept to an absolute minimum, and all lights should be activated for short term use. Any permitted fixtures shall be horizontal cut-off fixtures with downward light controlled within the minimum necessary area. Horizontal cut-off fixtures are those in which the light source is screened from view. Light sources shall not be visible from anywhere outside the Approximate Building Locations. The following types of lighting are prohibited:

- "Security" yard lights.
- Landscape and plant or tree lighting. (Exception: Lighting of the primary walkways as necessary for safety.)
- Architectural lighting of buildings. (Exception: Christmas lighting as approved by the DRC.)

Night lighting is to be minimized and used essentially to meet the requirements of safety and easy identification of entrances, driveways and buildings. Elsewhere, low intensity lanterns or indirect light sources and cut-off fixtures are to be used. Lights following the driveway at regular spacing are not permitted. In some cases, the DRC may approve the placement of lights at key places along the driveway for safety purposes, provided they meet these design requirements. Guardrails with reflectors can be used to help mark the driveway. Light sources are to be incandescent, halogen or other "white" light; not sodium vapor or other colored light, except for temporary Christmas decorations. Lanterns are to use low intensity (25W or less) light sources with translucent or frosted glass lens. Clear glass may be acceptable with low voltage bulbs subject to the DRC review of off-site visibility. Except for low level lighting of a

driveway, lighting is to be located within the Approximate Building Locations.

Exterior light sources and brightly-illuminated surfaces visible from off the property are to be avoided. Flood lighting for emergency purposes only is permitted, provided the sources are not visible from off-site. "Moonlighting" and up-lighting of trees and vegetation or structures are not permitted.

All exterior lighting requires approval by the DRC. Appropriate uses of exterior lighting include low-level landscape lighting to define walkways, patios or other outdoor features immediately surrounding a home. All exterior lighting shall be designed to minimize impacts on adjacent properties and, with the exception of entry/identification bollard lighting, shall be located within the building envelope.

In order to reduce glare and provide general ambient light, all light sources shall be concealed within the building or light fixture.

No exterior lighting in which the direct source is visible from a neighboring property or which produces excessive glare to pedestrian or vehicular traffic shall be permitted.

4.3.17 Domestic Pets and Wildlife Measures

Dog runs must be approved by the DRC, but otherwise are an appropriate use as described in the Guidelines. Dog runs may be up to 200 SF in size. However, they must be located within the approximate building location contiguous to the main residence. If used, chain link fencing shall be in a color that blends with the main residence and not be visible from adjacent properties, the road, ski runs, or common open space.

All dog runs and enclosures, when permitted by the DRC, shall include a restrictive roof or fenced top over said enclosures to protect dogs from predatory wildlife. Proper garbage disposal is required to prevent wildlife from destroying property and/or posing a threat to residents and their pets.





CHAPTER 5

CONSTRUCTION REGULATIONS

The preservation of the natural areas of Flagstaff Mountain Resort are critical to the community. In order to ensure that the natural area of each homesite is preserved to the maximum extent possible and the nuisances inherent to any construction process are kept to a minimum, the following regulations shall be strictly enforced during the construction period of all improvements at Flagstaff Mountain Resort. The Owner of a lot or parcel shall be responsible for violations of the Design Guidelines, including construction regulations contained therein, by any contractor, subcontractor, agent, or employee performing any activities on behalf of the Owner within Flagstaff Mountain Resort, whether located on the homesite or elsewhere within Flagstaff Mountain Resort.

5.1 Approximate Building Location and Fencing Requirements

The Approximate Building Location, which is the limit of development on each homesite, is also the area within which all construction activities related to the improvements must be confined. To this end, the approved area of disturbance must be staked and fenced in with a minimum four-foot high construction fence during the full duration of construction. Construction fencing enclosing the Approximate Building Location must extend for the full street frontage so no contractors or suppliers park in the natural area.

When a utility trench does not follow the driveway, the trench area must have a construction fence no wider than 8 feet along the route, on each side, and be fully revegetated wherever the natural area is disturbed.

5.2 OSHA Compliance

All applicable Occupational Safety and Health Act (OSHA) regulations and guidelines must be observed at all times.

5.3 Construction Site Plan and Construction Trailers

As part of the Final Design Submittal, a construction site plan must be prepared and approved which indicates construction access, parking areas off the street, sanitary facilities, concrete wash out area, trash drum, material storage, and approved access drives for construction activities on any homesite.

Upon approval of the building permit and not sooner than two weeks prior to commencement of construction, a construction trailer or portable field office may be located on the building site within the Approximate Building Location, clear of all setbacks. The type, size and color of any portable office must be approved by a representative of the Design Review Committee as part of the construction site plan. The field office may not be placed on site earlier than two weeks prior to the actual onset of continuous construction activity. At the same time, the provision of temporary power and telephone may be installed. A construction trailer may not remain on site for a period of time exceeding six months without written approval of the Design Review Committee.

5.4 Construction Trash Receptacles and Debris Removal

Owners and builders shall clean up all trash and debris at the end of each day; an approved trash receptacle must remain on the site at all times for this purpose to contain all lightweight materials or packaging. The receptacle must be positioned on the site alongside the access drive, clear of side and rear setbacks, adjacent road right(s)-of-way and neighboring properties. Trash receptacles must be emptied on a timely basis to avoid overflow of refuse; disposal shall be at a suitable off-site facility. Owners and builders are prohibited from dumping, burying, or burning trash anywhere on the homesite or in Flagstaff Mountain Resort. Heavy debris, such as broken stone, wood scrap, or the like must be removed from the site immediately upon completion of the work of each trade that has generated the debris.

All concrete washout, from both trucks and mixers, must occur within a contained area of the Approximate Building Location of the homesite in a location where it will be ultimately concealed by structure or covered by backfill. Concrete washout in road rights-of-way, setbacks or on adjacent properties is strictly prohibited.

During the construction period, each construction site shall be kept neat and shall be properly policed to prevent it from becoming a public eyesore, nuisance, or detriment to other homesites or open space. Any clean-up costs incurred by the Design Review Committee or the Association in enforcing these requirements shall be payable by the Owner. Dirt, mud, or debris resulting from activity on each construction site shall be promptly removed from public or private roads, open spaces and driveways or other portions of Flagstaff Mountain Resort.

5.5 Sanitary Facilities

Each Owner or builder shall be responsible for providing adequate sanitary facilities for construction workers. Portable toilets must be located within the Approximate Building Location, clear of all setbacks and in a discreet location approved on site by the Design Review Committee.

5.6 Construction Access

The access drive approved by the Design Review Committee will be the only construction access to any homesite.

5.7 Vehicles and Parking Areas

Construction crews shall not park on, or otherwise use, undeveloped portions of homesites or open space. All vehicles shall be parked within an agreed upon area by the Design Review Committee. During very busy construction periods involving multiple trades such that all construction vehicles cannot be confined to the site proper, the overflow vehicles may be temporarily parked along the shoulder of the roadway; in locations and for time periods solely as approved by the Design Review Committee. During these periods, the road must allow continual unconstrained access by normal traffic and emergency vehicles, including fire trucks. Where parking on the shoulder occurs, all damage to the shoulder and landscape must be repaired by the contractor continually and not left for the end of construction. Vehicles may not be parked on neighboring homesites, in nearby driveways or on open space. Changing oil or other vehicle maintenance is prohibited.

5.8 Conservation of Native Landscape

Trees and all natural areas which are to be preserved must be marked and protected by flagging, fencing, or barriers. The Design Review Committee shall have the right to flag major terrain features or plants which are to be fenced for protection. Any trees or branches removed during construction must be promptly cleaned up and removed from the construction site.

5.9 Erosion Control

During construction, measures must be taken to eliminate erosion. The following outlines the required, in-the-field construction methods that must be performed by the contractor. All measures utilized must comply with Summit County, and Park City ordinances, as well as applicable state and federal statutes, regulations and permits, with which all contractors should familiarize themselves.

- Temporary run-off channels must be built to drain construction zones. In areas draining two acres or less, channels must have silt screens installed at appropriate locations. Silt screens should be stretched across and anchored to the bottom of the channels with hay bales placed on the upstream side of the fabric. Where watershed above the site exceeds two acres, temporary earthen berms or ditches for channeling must be used in conjunction with silt screens.
- All storm drain inlet structures must be protected by a filter berm until the area is stabilized with vegetation or the base course of pavement is installed.
- Weather permitting, all embankments constructed as part of cut/fill operations will be seeded and mulched within one week of final grading completion. Note: this is work that is better performed in the fall.
- Weather permitting, all building site areas must be seeded and mulched within one week of final grading completion.

5.10 Excavation Materials and Blasting

If any blasting is to occur, the Design Review Committee must be notified two weeks in advance and appropriate approvals must be obtained from Park City. Blasting may only be done by licensed demolition personnel, with all requisite insurance coverages as mandated by county and state statutes, specific to their blasting activity at Flagstaff Mountain Resort. The Design Review Committee shall have the authority to require in writing documentation of anticipated seismic effects, with confirmation such effects will not be injurious to other persons or properties, public or private, and that all appropriate protection measures have been utilized. The Design Review Committee may require additional insurance to cover potential damages from blasting to subdivision improvements and common areas.

All excess material resulting from blasting, as well as all other excess excavation materials, must be promptly removed from Flagstaff Mountain Resort.

5.11 Dust and Noise Control

The contractor shall be responsible for controlling dust and noise from the construction site, including the removal of dirt and mud from public or private roads that is the result of construction activity on the site.

The sounds of radios or any other audio equipment used by construction personnel must not be audible beyond the property perimeter of any homesite; repeated violations of this provision will precipitate a total prohibition of any on-site use of radios or audio equipment during construction.

5.12 Material Deliveries

All building materials, equipment and machinery required to construct a residence on any homesite at Flagstaff Mountain Resort must be delivered to and remain within the Approximate Building Location of each homesite, clear of all setbacks. This includes all building materials, earth-moving equipment, trailers, generators, mixers, cranes and any other equipment or machinery that will remain at Flagstaff Mountain Resort overnight. Material delivery vehicles may not drive across adjacent homesites or common area parcels to access a construction site.

5.13 Firearms

The possession or discharge of any type of firearm by construction personnel on any construction site, homesite, common area parcel or right-of-way at Flagstaff Mountain Resort is prohibited.

5.14 Alcohol and Controlled Substances

The consumption of alcohol or use of any controlled substance by construction personnel on any construction site, homesite, common area parcel or right-of-way at Flagstaff Mountain Resort is prohibited.

5.15 Fires and Flammable Materials

Careless disposition of cigarettes and other flammable materials, as well as the build-up of potentially flammable materials constituting a fire hazard, are prohibited. At least two 20-pound ABC-Rated Dry Chemical Fire Extinguishers shall be present and available in a conspicuous place on the construction site at all times.

No on-site fires are allowed.

5.16 Pets

No pets, particularly dogs, may be brought into Flagstaff Mountain Resort by members of any construction crew.

5.17 Preservation of Property

The use of or transit over any other homesite, common area, ski run, trail or other amenity is prohibited. Similarly, the use of or transit over the natural area or setbacks outside the Approximate Building Location of any homesite is prohibited. Construction personnel shall refrain from parking, eating, or depositing rubbish or scrap materials (including concrete washout) on any neighboring homesite, common area parcel, or right-of-way.

5.18 Protection of Subdivision Improvements and Restoration of Property

Each Owner shall be responsible for the protection of all subdivision improvements, roadways, common areas, ski run, trail, or improvements of any other homesite which may be damaged by the activities of such Owner's contractor, subcontractor, agents, or employees.

Upon completion of construction, each Owner and builder shall clean his construction site and repair all property which has been damaged, including but not limited to, restoring grades, planting shrubs and trees as approved or required by the Design Review Committee, and repair of streets, driveways, pathways, drains, culverts, ditches, signs, lighting and fencing.

In addition, the Owner and general contractor shall be held financially responsible for site restoration/ revegetation and refuse removal necessitated on any and all adjacent properties as a result of trespass or negligence by their employees or sub-contracted agents.

5.19 Daily Operation

Daily working hours for each construction site shall be per Park City Municipal Corporation codes and ordinances. Noisy activity is prohibited on Sunday of each week, particularly during the summer period of high occupancy. These hours may be revised at the discretion of the DRC or Park City.

5.20 Site Visitations

Due to the inherent danger associated with an active construction site, visitors to any site should be limited to those persons with official business relating to the construction activity, such as construction workers and tradesmen, building officials, security staff, Design Review observers, sales personnel, and the Owner. Construction personnel should not invite or bring family members or friends, especially children, to the job site.

5.21 Construction Insurance Requirements

All contractors and sub-contractors must post evidence of insurance with their homesite Owner, prior to entering the construction premises. Confirmation shall be evidenced in the form of a valid Certificate of Insurance naming the homesite Owner, Flagstaff Mountain Partners and the Flagstaff Mountain Resort Community Association, Inc. as additionally insured. The required insurance must provide coverage not less than the applicable limits of coverage relating to comprehensive general liability, automobile liability and workmen's compensation. The minimum limits of liability

shall not be less than \$1,000,000 each for general liability and automobile liability. General liability coverage shall contain provisions for contractual liability and broad form property damage. The certificate shall provide for 30-day notice to the certificate holders in the event of cancellation or material change in the limits of coverage.

5.22 Vehicular Access

Prior to the start of construction activity at Flagstaff Mountain Resort, each general contractor shall meet with security staff and prepare a "contractor's vehicle pass list" and the supporting information relating to the description and identification of construction/employee vehicles. The Design Review Committee or the security staff may require proof of acceptable insurance as a condition of entry.





CHAPTER 6

DESIGN REVIEW PROCEDURES

Site sensitive, site-specific design shall be fundamental at Flagstaff Mountain Resort. Design drawings should evolve from the careful and thorough analysis of a site's specific setting and features. Therefore, owners and/or their designers should refrain from approaching a site with a predetermined design expecting to "make it fit" with little regard to natural constraints. Flagstaff Mountain Resort has established this review procedure to assist the applicant through the design process in its appropriate sequence.

The design team shall consist of an architect, structural engineer, and landscape architect, all registered within the State of Utah. Plans and specifications shall be submitted to the Design Review Committee in accordance with the following conference and submittal requirements and review procedures.

6.1 Pre-Design Conference

Prior to preparing preliminary plans for any proposed improvement, it is mandatory that the owner and the architect meet with a representative of the Design Review Committee to discuss proposed plans and to resolve any questions regarding building requirements at Flagstaff Mountain Resort. This informal review is to offer guidance prior to initiating preliminary design, and should occur on site. In some cases this may occur by conference call at the discretion of the Design Review Committee.

The parameters and directives identified at each Pre-Design Conference remain valid for one year only. If the submittal of a preliminary design does not occur within twelve months of a Pre-Design Conference, a supplementary Pre-Design Conference may be required to review any changes in site conditions or revisions to the Design Guidelines which may have transpired.

6.2 Preliminary Design Submittal

A Preliminary Design Submittal must follow within twelve months following the Pre-Design Conference. No Preliminary Design submittal will be reviewed by the DRC unless it includes all of the following exhibits:

- A. Site plan (scale at 1" = 10'-0" or 1/8" = 1'-0") showing the entire property, location of the proposed Approximate Building Location, the building outline, driveway, terraces, patios, underground parking, parking area, existing and proposed topography, proposed finished floor elevations, all trees, all clusters of native shrubs, and special terrain features to be preserved.
- B. Survey (scale at 1" = 10'-0" or 1/8" = 1'-0") by a registered land surveyor or licensed civil engineer showing homesite boundaries and dimensions, topography (2 foot contours or less), major terrain features, all trees, edge of pavement or curb, and utility locations.
- C. Floor plans (scale 1/4" or 1/8" = 1'-0") showing proposed finished floor elevations.
- D. All exterior elevations (scale 1/4" or 1/8" = 1'-0") showing both existing and proposed grade lines, plate heights, ridge heights, roof pitch and a preliminary indication of all exterior materials and colors.
- E. A scale architectural model including topography (minimum 2 foot contours) of the entire site is required. Landscaping must be shown to illustrate its relationship to the design.
- F. Any other drawings, materials or samples requested by the Design Review Committee.

The submittal shall consist of five sets of prints, which shall be retained by the Design Review Committee.

6.3 Preliminary Design Review

The Design Review Committee will review the plans and respond in writing no later than 30 days after a submittal is complete.

Results of reviews will not be discussed over the telephone by members of the Design Review Committee with an owner or his architect or builder.

Any response an owner may wish to make regarding the results of an design review must be addressed to the Design Review Committee in writing.

The Design Review Committee's approval of a preliminary design is valid for twelve months.

6.4 Final Design Submittal

A Final Design Submittal must follow within twelve months of the Design Review Committee's granting of approval for a preliminary design. When the final design is complete, its submittal for consideration must include the following exhibits, and review by the Committee will not commence until the submittal is complete. Note that this process does not supersede review by Park City Municipal Corporation. Park City's review is in addition to review by the DRC.

- A. Site plan (scale at 1" = 10'-0" or 1/8" = 1'-0") showing the entire property, the Approximate Building Location, the residence and all other buildings, driveway, culverts, drainage channels, parking area, existing and proposed topography, finished floor elevations, all protected plants or special terrain features to be preserved, trees to be removed, all utility sources and connections, and site walls.
- B. Floor plans (scale 1/4" = 1'-0" or 1/8" = 1'-0") showing finished floor elevations.
- C. Roof plan (scale 1/4" = 1'-0" or 1/8" = 1'-0") showing all roof pitches.
- D. Building section (scale 1/4" = 1'-0" or 1/8" = 1'-0" or larger) indicating existing and proposed grade lines.
- E. All exterior elevations (scale 1/4" = 1'-0" or 1/8" = 1'-0") showing both existing and proposed grade lines, plat heights, roof pitch and an indication of exterior materials and colors.
- F. A materials sample board and literature as requested by the Design Review Committee depicting and describing all exterior materials.
- G. Complete landscape plan (scale 1" = 10'-0" or 1/8" = 1'-0") showing size and type of all proposed plants, irrigation system, all decorative materials or borders, and all retained plants.
- H. On-site staking of all building corners and other improvements, if requested by the Design Review Committee.
- I. Construction site plan as described in paragraph 5.3.

The submittal shall consist of three sets of prints, which shall be retained by the Design Review Committee.

A Final Design Submittal must be received at the designated address of the Design Review Committee (see Section 7.2 of these Standards) by noon of the Friday preceding a scheduled meeting of the Design Review Committee, in order to be included on the agenda for consideration.

6.5 Deferral of Material or Color Selection

An applicant may wish to delay the confirmation of landscaping intentions and final color or stonework selections until some point after the start of construction, in order to better visualize landscape considerations, or to test an assortment of potential colors with actual material intended for use.

6.6 Site Inspection

As soon as the submission of final plans is complete, a representative of the Design Review Committee will inspect the homesite to determine that the conditions as depicted in the final submittal are accurate and complete.

6.7 Final Design Review

The Design Review Committee will review the plans and respond in writing no later than 30 days after a submittal is complete.

Results of reviews will not be discussed over the telephone by members of the Design Review Committee with an owner or his architect or builder, and no owner, architect or builder shall have the right to attend any meeting of the DRC unless specifically requested by the DRC. Any response an owner may wish to make regarding the results of a Design Review must be addressed to the DRC in writing.

The DRC's approval of the final design is valid for twelve months.

6.8 Resubmittal of Plans

In the event of any disapproval by the Design Review Committee of either a Preliminary or Final Submittal, a resubmission of plans should follow the same procedure as an original submittal. An additional Design Review fee shall accompany each such submittal as required by the Design Review Committee.

Design approvals for each review step remain valid for one year only. Therefore, if an application lags the fulfillment of a preceding review phase by more than twelve months,

that prerequisite step must be repeated, unless waived by the Design Review Committee.

6.9 Pre-Construction Conference

Prior to commencing construction, the builder must meet with a representative of the Design Review Committee to review construction procedures and coordinate his activities in Flagstaff Mountain Resort.

6.10 Commencement of Construction

Upon receipt of final approval from the Design Review Committee, and having satisfied all Park City review processes, the owner shall have satisfied all conditions and may commence the construction of any work pursuant to the approved plans within one year from the date of such approval.

If the owner fails to begin construction within this time period, any approval given shall be deemed revoked.

The owner shall, in any event, complete the construction of any improvement on his homesite within one year after commencing construction thereof, except and for so long as such completion is rendered impossible or would result in greater hardship to the owner due to labor strikes, fires, national emergencies or natural calamities.

6.11 Inspections of Work in Progress

The Design Review Committee may inspect all work in progress and give notice of noncompliance. Absence of such inspection or notification during the construction period does not constitute an approval by the Design Review Committee of work in progress or compliance with this Design Guideline. Any such inspection shall not be construed as an acceptance of any improvements or conditions, or as a waiver of any provision of the Design Guidelines or of any condition of approval established by the DRC.

6.12 Subsequent Changes

Additional construction or other improvements to a residence or homesite, changes during construction or after completion of an approved structure, including landscaping and color modification, must be submitted to the Design Review Committee for approval prior to making such changes or additions.

6.13 Final Release

Upon completion of any residence or other improvement, the owner shall give written notice of completion to the Design Review Committee.

Within 10 days of such notification, a representative of the Design Review Committee shall inspect the residence or other improvement for compliance. If all improvements comply with these Design Guidelines, the Design Review Committee shall issue a written approval to the owner constituting a final release of the improvements by the Design Review Committee, said release to be issued within 30 days of the Final Inspection. If it is found that the work was not done in strict compliance with approved plans or any portion of these Design Guidelines, the Design Review Committee may issue a written notice of noncompliance to the owner, specifying the particulars of noncompliance, said notice to be issued within 30 days of the Final Inspection.

The owner shall have 30 days from the date of notice of noncompliance within which to remedy the noncompliance portions of his improvements. If, by the end of this period the owner has failed to remedy the noncompliance, the Design Review Committee may take action to remove the noncompliance improvements as provided for in this Design Guideline, including, without limitation, injunctive relief or the imposition of a fine.

6.14 Non-Waiver

The approval by the Design Review Committee of any plans, drawings or specifications for any work done or proposed shall not be deemed to constitute a waiver of any right to withhold approval of any similar plan, drawing or specification subsequently or additionally submitted for approval. Failure to enforce any of these Design Guidelines shall not constitute a waiver of same.

6.15 Right of Waiver

The Design Review Committee reserves the right to waive or vary any of the procedures set forth herein at its discretion for cause.

6.16 Exemptions

Utility and maintenance buildings, structures, and cabinets located on non-residential tracts are exempted from these Design Guidelines. However, the Design Review Committee will endeavor to attain as high a level of conformance with these standards as is practical for these facilities.

6.17 Design Review Fee

A Design Review fee will be charged as determined by the Design Review Committee. Additional Design Review fees may be charged due to resubmittals, remodels, or other special circumstances. The full Design Review fee will be paid at the time of the Preliminary Submittal. Please consult with the Design Review Committee for the latest fee structure.



APPENDIX A

(to be completed after Park City approval process is complete)

PLANTING LIST

Revised 2004

TREES

Abies concolor
Abies lasiocarpa
Acer glabrum
Acer grandidentatum
Alnus tebuifolia
Amelanchier utahensis
Cercocarpus montanus
Juniperus virginiana
Pinus edulis
Pinus flexilis
Pinus nigra
Pinus sylvestris
Populus tremuloides
Prunus virginiana
Pseudotsuga menziesii
Sambucus racemosa
Thuja plicata

White Fir
Subalpine Fir
Rocky Mountain Maple
Bigtooth Maple
Thinleaf Alder
Utah Serviceberry
Mountain Mahogany
Juniper
Pinyon Pine
Limber Pine
Austrian Black Pine
Scotch Pine
Aspen
Chokecherry
Douglas Fir
Elderberry
Western Red Cedar

SHRUBS

Amelanchier alnifolia
Arctostaphylos uva-ursi
Artemisia spp.
Cornus stolonifera
Cotoneaster spp.
Cowania mexicana
Euonymus spp.
Mahonia spp.
Pachyistima myrsinites
Parthenocissus quinquefolia
Potentilla spp.
Purshia tridentata
Rhus
Ribes alpinum
Rosa woodsii
Spiraea spp.
Symphoricarpos albus
Viburnum spp.
Weigela
Yucca spp.

Service Berry
Kinnikinnick
Sage
Redtwig Dogwood
Cotoneaster
Cliff Rose
Burning Bush
Oregon Grape
Oregon Boxwood
Virginia Creeper
Cinquefoil
Bitterbrush
Sumac
Alpine Currant, Gooseberry
Wood's Wild Rose
Spiraea
Common Snowberry
Viburnum
Weigela
Yucca

RECEIVED

NOV 16 2004

PARK CITY
PLANNING DEPT.

PLANTING LIST - continued

PROHIBITED PLANT MATERIAL

Purple-Leaf Plum/Cherry

White or Weeping Birch

Red Maple

Silver Maple

Golden Rain Tree

Siberian Elm

Tree-of-Heaven

Loosestrife

River Birch

Mulberry

Cottonwood



FLAGSTAFF MOUNTAIN RESORT
A PLANNED RESORT COMMUNITY
DEER VALLEY, UTAH

TRANSIT AND PARKING MANAGEMENT PLANS
EXHIBITS 3 AND 4

MAY 2001
REVISED AND APPROVED DECEMBER 2001

PREPARED FOR:
FLAGSTAFF MOUNTAIN PARTNERS
P.O. BOX 1450
PARK CITY, UTAH

FLAGSTAFF MOUNTAIN RESORT

TRANSIT AND PARKING MANAGEMENT PLANS

Exhibits 3 and 4

May 2001

Revised and Approved December 2001

Prepared for:

Flagstaff Mountain Partners
P. O. Box 1450
Park City, Utah 84060

TABLE OF CONTENTS

SECTION 1. GOALS AND OBJECTIVES	1
SECTION 2. STUDY SETTING	2
SECTION 3. EXISTING CONDITIONS	5
SECTION 4. VISITOR USE	7
SECTION 5. KEY ISSUES	8
SECTION 6. TRAVEL DEMAND	9
SECTION 7. TRANSIT ALTERNATIVES	12
SECTION 8. RECOMMENDED TRANSIT SYSTEM	17
SECTION 9. PARKING MANAGEMENT	21
SECTION 10. CONCLUSIONS	26
TRAVEL DEMAND APPENDIX	28

SECTION 1. GOALS AND OBJECTIVES

This study is one of several reports that have been prepared to support the Flagstaff Mountain Resort's Large Scale Master Plan Development (LSMPD) application. LSMPDs are programmatic in nature and are subject to refinement at subsequent Master Plan Development (MPD) application or Conditional Use Permit (CUP) stages. Correspondingly, the contents of this report should be viewed as conceptual in nature and subject to change as specific plans are developed. Details developed at the MPD and CUP stage will not require a modification of this plan provided that they comply with the Goals and Objectives of this plan.

In accordance with the Development Agreement between United Park City Mines Company ("UPK"), Deer Valley Resort ("Deer Valley"), and Park City Municipal Corporation ("Park City") (June 24, 1999), this Transit and Parking Management Plan was developed to include specific transit and parking operation plans for approval by the Park City Municipal Corporation. The Development Agreement requires:

- That the Applicant provide regular circulation van and shuttle service to and from key destination areas in Park City and the Salt Lake International Airport
- A goal to reduce the amount of parking required under the Park City Parking Code by 25% for Pods A, B-1, & B-2

The transportation study considers the anticipated level of travel demand for the development and formulates proposed transit and parking plans to meet the following objectives:

- To reduce the number of Resort-generated automobile trips on the primary access State Road 224 (Marsac Avenue) through the introduction of a transit system and control of employee and commercial traffic.
- To minimize the potential of more traffic and parking congestion during peak periods in Old Town by making transit available to guests and by provision of commercial services on site.
- To set forth policies to market transit to out of state guests before they arrive in Utah so that they will avoid bringing automobiles to the development.
- To reduce surface parking throughout the Resort in order to enhance the aesthetic quality of the development.
- Reduce the number of parking spaces required under the current Park City Parking Code by 25% for all multi-family and commercial units.

Construction traffic will be addressed in subsequent individual management plans prepared in support of future MPD and CUP applications. Such plans may include specific conditions of approval.

SECTION 2. STUDY SETTING

Study Area

Park City, Utah is located in Summit County, in the Wasatch Mountains east of Salt Lake City. It plays home to three world-class ski resorts and numerous winter and summer activities. According to the Governor's Office of Planning and Budget, the Summit County population grew from 10,400 in 1980 to 27,095 in 2000. Park City's population was estimated at 6,656 and is anticipated to grow to 9,124 persons by the year 2010.¹

The incorporated area of Park City encompasses roughly 10 square miles. Park City is very accessible from Interstates 80 and 40, which travel west-east and north-south respectively. The proposed Flagstaff Mountain Development will be accessed through Utah State Road 224 or Marsac Avenue, and Royal Street, a local road that is located within the boundaries of Park City and the Deer Valley Ski Resort. Figure 1 illustrates the location of the development and Park City in relation to surrounding areas. The terrain of Park City consists of mountainous geographic conditions that preclude large new roadways from being introduced to carry larger traffic volumes as growth continues.

Description of the Proposed Land Use

Flagstaff Mountain Resort (the "Resort") is an assemblage of mining claims totaling approximately 1,655 acres of land (the "Annexation Area") located at the southwestern corner of Summit County, Utah. The Annexation Area is bordered by Deer Valley Resort ("Deer Valley") to the east and State Highway 224 (Marsac Avenue) to the northeast. The southern boundary coincides with the Summit/Wasatch County line. The Park City Mountain Resort ("PCMR") borders the Annexation Area to the west and northwest. The Resort was annexed into the corporate limits of Park City on June 24, 1999.

The proposed areas of development will be restricted to:

- "Mountain Village" consisting of three Development Pods ("A", "B-1" and "B-2") limited to a maximum of 84 acres, and
- "Northside Neighborhood" (Development Pod "D") limited to a maximum of 63 acres.

The maximum density allowed within the Mountain Village is 705 Unit Equivalents configured in no more than 470 residential units. The residential units may be multi-family units, hotel room units, or PUD units.

In addition to the above-described 470 residential units, the Mountain Village may also contain a maximum of

- 16 single-family home sites and
- 75,000 square feet of Resort support commercial uses.

¹ Utah Governor's Office of Planning and Budget Population Estimates

FIGURE 1

The Northside Neighborhood may contain a maximum of 38 single-family home sites of which 30 are currently entitled and eight are subject to further requirements under the Development Agreement.

The Annexation Area is situated on the northern slope of Flagstaff Mountain between Ontario Canyon and Walker and Webster Gulch, and includes Empire Canyon.

The majority of the Annexation Area is located on a generally north-south-oriented ridge bounded on the east by Ontario Canyon and on the west by Empire Canyon. Elevations range from 7,370 to 9,580 feet above sea level. Slope aspects generally face north and west with some steeper slopes fronting both west and east.

With the exception of canyon bottoms, several high mountain meadows and land developed by Deer Valley as ski area, the Annexation Area is vegetated with a mix of aspen, conifer and mountain shrubs each with its own mix of under story.

While similar to the greater Park City area in general climatic conditions, the Resort relates more closely with the conditions experienced at upper Deer Valley and upper Park City Mountain Resort (PCMR). An average of 45 inches of precipitation falls annually, the majority in the form of snowfall between late fall and early spring. This equates to approximately 350 inches of total annual snowfall resulting in an average snow pack in late March of approximately 70 inches.

The Resort is located in the Flagstaff Mountain portion of Deer Valley and is immediately adjacent to PCMR. Current uses include skiing, snowshoeing, and snowmobiling in the winter and hiking, biking and horseback riding in the summer. Adjacent to the Resort, Deer Valley uses include hotel lodging facilities, resort support commercial, multi-family residential units and single-family home sites.

Uses proposed for the Resort include support commercial, multi-family residential units, PUD residential units and single-family home sites. With the exception of snowmobiling, which will be discontinued, recreational uses will remain similar to the current uses described above.

SECTION 3. EXISTING CONDITIONS

Traffic Volumes

The Utah Department of Transportation (UDOT) publishes Average Daily Traffic (ADT) volumes for State roads. Field counts are recorded every three years and are projected on an annual basis. State Routes that serve Park City include SR-224 and SR-248. Traffic volumes critical to the Flagstaff Development are those on SR-224 south of the new round-about at Marsac Avenue and Deer Valley Drive. Based on UDOT data, volumes on Marsac Avenue near the round-about were 8,555 in 1998. It is likely that number has been increasing roughly 6% per year based on projections. During 1999, the ADT on SR-224 ranged from 2,625, at the Wasatch/ Summit County line near one of the project boundaries, to 24,475, at the intersection of SR- 224 and SR-248.

Salt Lake City International Airport to Park City

Howard Needles Tammen and Bergdorf, Inc. (HNTB) conducted a survey of Salt Lake City International Airport ground transportation trips during a week in March 1995. This survey identified methods of ground transportation for all travelers from the airport to destinations in Utah and found that 15% of all persons leaving the airport used some form of transportation other than privately owned or rental automobiles.¹ Party size for ski area destinations averaged 2.0 persons per ground shuttle or taxi.

A number of ground transportation carriers who operate out of the airport currently serve the Park City area. *The Park City Short-Range Transit Plan*, prepared by LSC, Inc. in 1997, indicates that Park City has a high rate of ground transportation/transit use among visitors. Many skier and non-skier visitors use private transit systems for arrivals and departures into and out of Park City (25.9% of skier visitors, 37.1% of non-skier visitors).²

This may be due to:

- Availability of transit opportunities to and from the Salt Lake Airport, and
- Park City Transit, the City's transit system, which significantly lessens dependence on the automobile.

Park City Local Transit Service

Park City operates eight bus routes, including service to neighboring Silver Lake in upper Deer Valley, which is proximate to the site of the proposed project. In 1996, the Silver Lake Route provided seasonal service every thirty minutes and carried an average of 150 riders per day during the winter season. Updated ridership counts through the last five years were fairly consistent with this productivity level. Ridership was made up of employees and visitors who used the municipal bus service to travel to and from Deer Valley and the Old Town/PCMR area.

¹ SLCIA 1995 Air Passenger Survey, HNTB analysis, pp 3-13.

² Park City Short-Range Transit Plan, Leigh, Scott and Cleary, Inc. p.19.

Local taxicabs and shuttles are widely used by Park City visitors for local trips. A recent survey by Fehr & Peers indicated that seven companies offer taxi service throughout the Park City area. Trip purpose is primarily recreational. The 1996-97 Utah Skier Survey indicated that charter bus and limousine trips make up almost 15% of all ski-related trips among non-residents who are staying within Summit County.³ Many persons who use shuttles from the airport are likely to remain transit captive, and may avoid renting cars throughout the duration of their stay because a more convenient alternative mode choice is available to them.

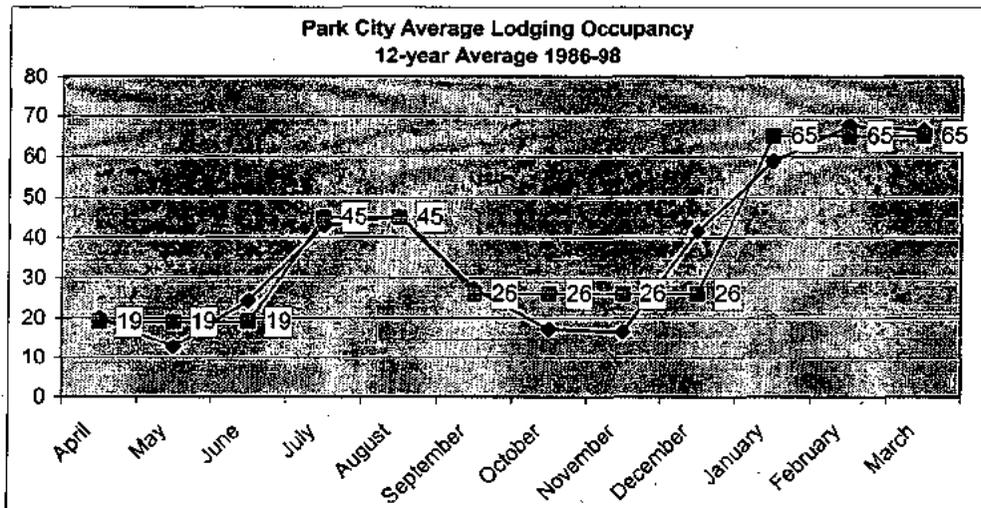
³ 1996-1997 Utah Skier Survey, Wickstrom and Associates.

SECTION 4. VISITOR USE

Visitor Data

Park City enjoys a high number of visitors in both the summer and winter seasons. The Convention and Visitors Bureau estimated that approximately 2.4 million visitors came to Park City during the annual year. About 1.4 million of those visited from October through March. The remaining 1 million visited during April through September.

A 12-year average lodging occupancy for all of Park City, as reported by the Park City Convention and Visitors Bureau, indicates a rate of 65% total occupancy in the high range and 29% in the low range for reporting hotels (see chart below). The twelve-year average compares with the recent reporting of 2000 figures, which indicate 68% during the peak season and 25% during the off-season.



Projected Flagstaff Occupancy Rates

Developments such as Flagstaff Mountain are expected to have low to mid range occupancies with some winter weekday peaking. Occupancies similar to those observed in Deer Valley¹ and Telluride, Colorado² were assumed in the estimation of typical winter weekday travel demand for this project. These occupancy figures range from 65% for multi-family rental pool units (all units were assumed as rental) to 45% occupancy for PUDs and single-family homes. These observed occupancy ranges are thought to be conservative with regard to actual occupancy rates that will occur following build out of the project.

¹ Deer Valley Resort Long Term Skier Projections and Planning Report, March 1999

² Kirkham Michael, Refined Transportation Analysis for Flagstaff Mountain Resort, Page 14.

SECTION 5. KEY ISSUES

Automobile and Commercial Traffic

One of the principle concerns with the Flagstaff Mountain Resort has always been the potential for increased traffic on Marsac Avenue, which will carry a majority of the traffic volume to the development. The Development Agreement requires road improvements in order to handle increased traffic volumes, which include limited roadway widening and a runaway truck lane. The developers of the project have established a policy to provide safe and effective transit systems for employees, owners and guests. The broader solution to traffic mitigation also includes limiting the amount of parking provided on site, and control of delivery traffic as discussed in Section 10 of this report.

Transit for Guests and Employees

A well-planned transit system is integral to proper movement of visitors and employees, not only to lessen the volume of traffic on Marsac Avenue, but also to reduce the amount of parking provided on the site, and to provide alternatives to motorists in the event of hazardous winter driving conditions. Lessening the amount of daily traffic can also help to minimize the amount of maintenance required for continued safety of the roadway.

Minimizing Surface Parking and Limiting Parking On-Site

Additional concerns include reduction of the amount of parking typically required by the Park City Code by 25%. This would apply to multi-family unit dwellings and commercial units. Reductions in the number of parking spaces are a vital element of overall traffic mitigation for the project. If the number of cars accommodated on the site is reduced, then trips are likely to remain on site, be foregone completely, or be taken via transit. Implementation of a parking program relies on 1) a strong marketing component for airport taxi shuttle services to achieve the recommended rate of transit capture at the Salt Lake Airport, and 2) an on-site available transit service which is clean, convenient, reliable, and a more opportune alternative to the automobile.

SECTION 6. TRAVEL DEMAND

A four step planning process was used in order to identify the most effective transit system for the Resort. These steps included:

- **Development of Trip Generation Estimates** (See Appendix)
- **Projections for Transit Demand** (See this Section and Appendix)
- **Identification of Possible Alternatives** (Section 7)
- **Recommendation of the Most Feasible Alternative** (Section 8)

The nature of the Resort development involves second homes which will be occupied once or twice per year. At least 50% of the units are unlikely to be in the rental pool at all. The estimated total number of external vehicle trips per day that will result from the development was measured by calculating typical ITE trip generation rates at 65% occupancy for multi-family units and 45% for single family and PUDs. The traffic calculations for the Resort were based on typical winter weekday occupancy levels. External vehicle trips were divided into different trip purposes (the foundation for these trip purpose assumptions are included in the appendix). Once trip purpose was determined, vehicle occupancy was assumed, from which total person trips were calculated. (Again, the foundation for all assumptions is detailed in the appendix). The total number of person trips by destination was used to calculate the potential for transit capture, and the estimated reduction of traffic impact on the roadway.

Resort transit demand needs were identified for feasible destinations by Resort guests, which included the airport, commercial areas of Park City including Old Town and the other Ski Resorts, as well as destinations outside of the Park City limits to Kimball Junction. The demand for trips to Salt Lake City International Airport was estimated based upon the maximum number of guests staying in the Resort, divided by an average 5.6-day stay¹, and assuming one trip to and from the airport, or about 15% of the overall trip guest rate. It was also assumed that of the external recreational trips guests of the Resort would make, about 50% of those would target Old Town/PCMR, and 35% would be to destinations outside of this area. Trip uses were assigned as mandatory (work-related), recreational (entertainment or non-work related), or other uses (non-work related travel) as further explained in the Appendix. Recreational trips were more likely to be feasible for transit as opposed to mandatory trips.

Table 2 provides the person trip demand for guest travel to each of the three broad destinations, which was derived from trip generation rates and assumptions regarding the number of employees versus the number of guests.

	Total Trips	Mandatory	Recreational	Other
Airport ²	771	0	0	771
Old Town/PCMR	2,570	0	2,570	0
Other Destinations	1,799	578	934	287
All Destinations	5,140	578	3,504	1,058

¹ Deer Valley Resort Long Term Skier Projections and Planning Report, March 1999.

² Airport Destination based on 5.6-day average stay (DV) at 2,160 maximum persons.

Airport Trips

Because the airport component of the transportation concept is the most important link to reducing trips, the projected number of guests was overestimated to ensure proper levels of service could be met during peak periods. Guests were assumed to stay an average of 5.6 nights; the number of total person trips entering and leaving the Resort on a peak day would be 771 total trips ($2,160 \text{ guests} / 5.6 \text{ nights} = 385 \text{ one way trips} \times 2 = 771 \text{ total daily trips}$). A study for Park City determined that 25.9% of persons would use transit as their source of transportation.³ For purposes of this plan, it is assumed that at least 26% of all persons would use transit if it were available and properly marketed, as based on travel patterns that are typical of Park City.

	Rental/Private	Shuttle	Total
Number of Airport Trips by Mode	571 (74%)	200 (26%)	771

Flagstaff Mountain Resort to Old Town/Park City Mountain Resort Area

Old Town/PCMR will be a major entertainment and activity center for Resort guests and is estimated to attract roughly 50% of total guest trips. The following assumptions were made about guests traveling to the Old Town/PCMR area.

Twenty percent of all guests are assumed to be "transit captive" because so many are arriving from the airport without a vehicle and will likely use transit throughout the duration of their stay. An additional 40% of all trips were added to the transit captive trips because of parking considerations in Old Town and at the Resort, assuming that the transit system which is approved is convenient and safe. Actually achieving this level of transit use among guests will require extensive marketing on the part of the Resort.

The projected daily peak trip distributions by mode for guests traveling into Park City are shown in Table 4 below.

	Private Auto	Transit	Total
Total Trips	1,028 (40%)	1,542 (60%)	2,570

Other

Remaining guest traffic is assumed to be made up of persons traveling to locations outside of the Old Town/PCMR area, for example going to a grocery store in Park City which is outside of the "Old Town" area. Trip numbers in Table 5 assume that one of eight guests travels outside of the Resort on a daily basis to ski at another resort or to

³ Park City Short-Range Transit Plan, Leigh, Scott and Cleary, Inc. p. 19.

visit another attraction outside of the Park City area. This is based on the assumption that 25% of all recreational trips and 100% of all mandatory trips are destined outside of the Old Town area. Because of the dispersed nature of other locations, it is unlikely that guests with access to a private vehicle would use transit. This market is unlikely to be feasible for a specialized transit system operated by Flagstaff Mountain. There are outside services that currently operate to other ski resorts that could fill the niche for this service.

TABLE 4
ESTIMATED GUEST VEHICLE TRIP DISTRIBUTIONS OUTSIDE PARK CITY

	Private Auto	Transit	Total
Total Trip	1439 (80%)	360 (20%)	1,799

Internal Trip Demand

Commercial uses such as shopping, dining, and entertainment will be the primary generator of trips within the Resort area. There will be 75,000 square feet of commercial space at the Resort, in the form of restaurants, spas, clothing and convenience stores. It was assumed that a majority of guests would walk to and from the commercial development. However, the Resort should be prepared to handle 300-400 vehicle trips daily for those areas located outside of proximity of the commercial destinations.

SECTION 7. TRANSIT ALTERNATIVES

The process of identifying possible service alternatives to meet projected transit demand goals is the third step in developing a transit system for the Resort. The estimates for transit demand were used to determine the types of vehicles and frequencies for the transit systems that potentially could serve the Resort. Transit should operate consistently though the development all year. The Resort is anticipated to have little or no occupancy during the summer months. However transit service will be made available during the summer months for airport and local destination travel throughout Park City. A total of 240 seasonal days were used in estimating costs for the service.

System Criteria

The possible range of transit services involves evaluation of three possible destination areas: airport, the city limits of Park City, and the Snyderville Basin. The Park City Planning Commission and the staff have set a requirement that employees should have an available transit system in order to minimize additional safety risks on the roadway and further mitigate other traffic impacts.

The following criteria were considered:

- **Terrain and Safety** Marsac Avenue offers the most expeditious route to the primary destination of transit use. However travel should generally be limited to Royal Street and Deer Valley Drive under most conditions. While large equipment routinely travels down Marsac, the Planning Commission has instructed Staff to include the diversion of downhill Flagstaff construction traffic to Royal Street. High occupancy buses should use Royal Street for downhill travel as well. The equipment and routes used for the transit program should be suitable enough to climb steep grades in adverse slick weather conditions.
- **Traffic Mitigation** The transit system should be able to serve riders very effectively while reducing the number of total projected vehicle trips on a typical weekday (3,026) by a minimum of 10%.
- **Capacity** Adequate capacity must be provided during peak periods to allow all riders to board a vehicle within 15 minutes from the time they wish to begin their journey. The number of seats available in the anticipated peak hours for guests should be increased by 60% to reflect the need to serve a higher number of riders in the peak hour.
- **Airport Use** Luggage racks should be installed on all small vehicles or vans so that they can be rotated for various uses within the fleet.
- **Fares** A No Fare system would be employed. This recommendation is made in recognition of the fact that the shuttle passengers are already inconvenienced enough by the lack of parking in Old Town and the need to wait for the transit vehicle.
- **Peak and Off-Peak Hour Services** For any fixed route options that are to be explored, during off-peak periods, a maximum service frequency of 30 minutes is

- assumed and a peak hour frequency of 15 minutes is assumed. This frequency is sufficient enough to minimize the inconvenience to visitors and guests.
- **ADA Accessibility** Wheelchair lifts would be required on vehicles and should be factored into the costs of all vans and buses. When not in use for wheelchairs, flip-down seats should be available.
 - **Travel Time** Since the primary goal of the transit system is to reduce the amount of traffic on Ontario Canyon and Marsac Drive, routes would use the connection through Silver Lake Village during peak hour service. This would represent an approximate 30-minute travel time from Flagstaff per one-way trip from the Mountain Village to the Park City Ski Area, depending on the time of day.
 - **Peer Groups** The Resort will cater to affluent clientele who will seek transit services to destinations within a several mile range of their residential location. Peer group transit operations in other resort communities were researched to determine service levels for comparable properties. The most notable peer group example was found in Beaver Creek, Colorado. The service acts as a luxury taxi service and as a complement to the existing fixed route service. The most notable objective of the service is to provide a transit alternative for guests who are located in terrain that normally could not be accessed safely by a large transit bus. The service operates from 6:00 am to 2:30 a.m., seven days per week. Peak system hours are from 4 p.m. through 9 p.m., (when skiers are returning back to their units and venturing out again, and the fixed route service shuts down at 5:30 p.m.) An average occupancy of 7 persons or more during peak hours is realized. The fleet consists of Chevrolet Suburbans along with several 20-passenger luxury minibuses.
 - **Shuttle Bus/Van Stops** will be located at centrally located points throughout other Resort residential and commercial areas. These stops will be designed as pullouts in the roadway and, at a minimum, will consist of well-signed locations adjacent to public entrances. Regularly scheduled shuttles will function to and from the employee parking lots. Park City Transit stops will be accommodated if Park City Transit agrees to include service to the Resort in their regular service area. Bus stop standards will be included in Resort design.

Scenario A Fixed Route/Demand Response

A combined fixed-route and demand response service was evaluated to determine the extent to which it could meet demands of the development. The service would supply approximately 218 service hours per day in the form of combination fixed route and demand response services. Four elements of the system were reviewed to evaluate guest destinations, as well as employee travel needs. Scenarios were designed to carry the designated number of passengers outlined in the travel demand section of the report. The purpose of the evaluation was to design the levels of service appropriate to the ridership goal.

- **Fixed Route Service to Old Town and Park City Ski Area** – This service would operate between 8:00 a.m. and midnight during the ski season. It would serve

Silver Lake Village and Deer Valley by way of Royal Street and Deer Valley Drive respectively. The service would link into Old Town by way of the Transit Center and would continue to the Park City Ski Area. A one-way trip is estimated to take approximately 45 minutes. In order to meet the projected demand goal of 1,542 passengers, the service would supply 20-minute frequency in the mornings before 3 p.m. and 15-minute service between 3 p.m. and 10 p.m. 40-minute frequency would be supplied with two buses from 10:00 until midnight. Average vehicle occupancy of 14 passengers per service hour was assumed, which is slightly higher than the average Silver Lake occupancy of 10 riders per hour. Fixed route service could reduce trips; however, it is unlikely that it will perform to Resort Standards and be a marketable tool for the guest. It is not anticipated to be a preferable alternative to demand response transit.

- **Airport /Flagstaff Mountain Demand Response Shuttle** – This service would operate as a van demand response shuttle service between the airport and Flagstaff Mountain. The service would operate between 8:00 a.m. and midnight and would allow exceptions for early flight times. Average vehicle occupancy of 2.7 passengers per service hour was assumed. The service would be designed to carry 200 passengers per day, which is a predicted peak daily estimate. Four vehicles would be required to run the service.
- **Employee Shuttle Service** - The employee shuttle service would initially be a fixed route loop which would operate as subscription service for local employees. Scheduled service would operate between 7 a.m. and 2 a.m. through Bonanza Drive to the Park City Ski Area and the Intermodal Center. This shuttle service would operate with two 20-passenger buses and two spare demand response buses on a 15-minute frequency during the peak hour. The route will be revised to accommodate subscription service employees who live within the town and in the location of new affordable housing before implementation. The Resort is still evaluating where affordable housing will be located. In the event that affordable housing is located at Quinn's Junction, an appropriate level of service, in combination with new City regional services, will be adjusted to meet the transit needs of employees.
- **Demand Response Service to Outlying Areas** – A demand response service was analyzed for travel to outlying areas. Because of the probability that ridership will not exceed that which normally could occur in an automobile or hired van, this service is not proposed as part of this plan. The service was evaluated to operate as a van demand response shuttle service between the Snyderville Basin and Flagstaff Mountain. The scenario was proposed for service between 8:00 a.m. and 10 p.m. An average vehicle occupancy of only 2 passengers could be assumed based on projected demand and the likelihood that passengers will use van or limo service that is already available. An effort should be made to accommodate guests on a case-by-case basis with promotion of local limousine services that are available in the event that they arrive at the Resort without a car. This can be achieved through advanced marketing of available options.

Scenario B Demand Response Option

A demand response service was evaluated to determine whether it would effectively meet transit demands of the development. A more labor-intensive service, it would supply approximately 297 service hours per day to Old Town, PCMR, and the airport. This option was the same option proposed in Scenario A, only fixed route was replaced with demand response.

- **Demand Response Service to Old Town and Park City Ski Area** – This service would operate between 8:00 a.m. and midnight during the ski season. It would serve Silver Lake Village, Old Town, and the Park City Ski Area. The service would operate on a curb-to-curb basis. Approximately 1,542 passengers would be carried by the service. Average vehicle occupancy of 7 persons per service hour was assumed. The average ridership was estimated at 4 passengers per vehicle during the off hours and almost 8.5 passengers per vehicle during peak hours. Use of a mix of 20-passenger minibuses and vans was assumed.

Old Town Gondola

If deemed feasible, the Development Agreement requires the Flagstaff Mountain Partners to construct a gondola from Old Town to Flagstaff Mountain. The proposed alignment would replace the existing Town Lift with a new gondola that would extend service from Old Town to the PCMR angle station to Flagstaff. There currently is discussion of the Angle Station to Flagstaff Mountain portion of the project, which does not include the segment into Old Town.

The Old Town Gondola would be a detachable gondola operating in two different segments sharing a common angle station. The gondola system would include the Old Town and Flagstaff Gondola segments. The Old Town segment would have the capacity to transport 1,800 passengers per hour during the day, and 300 passengers per hour at night. The gondola would have a slope length of 6,540 feet and a vertical length of 1,190 feet.¹

The Flagstaff segment would have the capacity to transport 600 persons per hour during the day, with a nighttime capacity of 300 persons per hour. The Flagstaff segment would have a slope length of 4,464 feet and a vertical length of 1,133 feet.²

Benefits and Disadvantages of Proposed Gondola

Benefits of building the proposed gondola include:

- The possibility for non-guest skiers to obtain direct access to both local ski resorts,
- A transit amenity for Resort guests traveling to Main Street, and
- Access for guests staying at the Resort to PCMR

¹ *Refined Transportation Analysis*, Kirkham Michael Consulting Engineers, 1999, p.5

² *Refined Transportation Analysis*, Kirkham Michael Consulting Engineers, 1999, p.6

Whereas there are benefits to the project in terms of its charm as a guest amenity, there are other issues that need to be considered regarding the practicality of the project. The initial capital costs would approach \$10 million and operating expenses would approximate \$1.4 million annually. The estimated total trip time from the Mountain Village to Old Town would be ten minutes, which is similar to the time it takes to travel from the Resort to Main Street in a transit van or auto.

Other considerations include:

- Lack of parking near the Old Town Gondola station to accommodate incoming passengers seeking access to the Gondola, thereby limiting gondola use and potentially creating new parking problems.
- The high construction and operating costs of the Gondola project compared to the operation and maintenance of an on-demand transit system.
- The non-central location of the Old Town Gondola station that will force riders to walk to their final destination, thereby limiting Resort guest use.
- Minimal overall benefit to either Deer Valley or PCMR, thereby limiting their participation in construction and operating costs.
- Lack of employee housing in the area of the Old Town Gondola station, thereby limiting employee use of the Gondola.

Assessment of Gondola Project

The gondola could be useful in supplying those recreational trips by Resort guests who wish to visit Main Street or who wish to ski at the PCMR. If the development were configured in such a way that guests staying within walking distance of the gondola could use it, at least one third of all the recreational trips could be served as evidenced by a similar example in Telluride, Colorado. Demand response transit systems would supply more direct service and less effort by the traveler in the same amount of time. The number of riders could be higher or lower depending on the future planning efforts of both resorts to accommodate day skiers.

SECTION 8. RECOMMENDED TRANSIT SYSTEM

Evaluation

- **Customer Service** - Scenario B is preferred over Scenario A because of the fact that smaller equipment, appropriate to the terrain and safety considerations of the operating environment is preferred.
- **Traffic Mitigation** - Scenario A mitigates overall project traffic by a minimum of 25% reducing the overall level of traffic impact by approximately 729 cars. The demand response transit assumes lower occupancy and more trips, yielding reduction of resort generated auto traffic by 20%.
- **Costs** - The sheets included in the appendix of this report evaluate the winter service only and are not indicative of total expenditures. However, Scenario A results in \$371,250 less operating expenses per year, and \$240,000 less capital expenses per year.

The fixed-route scenario is preferable to demand response in terms of normal operating statistics. It has the capacity to carry more passengers per hour and to remove more autos per hour from the road for less cost. However, the fixed route option does not provide the level of comfort and individual service that is required by the guests that would stay in Flagstaff, as is evidenced by the low ridership of transit to and from Silver Lake. The inconvenience of the fixed route system combined with the long travel time would cause Flagstaff visitors to use their cars or private transit and thereby render the fixed route system ineffective, even though it is well designed to do so under normal circumstances. The transit option that is proposed most closely resembles a luxury taxi shuttle service that is capable of providing a high level of service to approximately 7-10 passengers per trip during the peak hour. The concept has been demonstrated quite successfully in other areas. It is recommended that Service Scenario B should be implemented as described.

Summer Service

The Resort occupancy will be less than 25% in the summer months and, therefore, it is not anticipated that an internal system, nor a resort shuttle from the airport will be needed because there likely will be sufficient parking on site. Additionally, the weather will be more opportune for driving than normal. However, a demand response van service with three vans will operate on the same schedule as the winter service for the purposes of taking guests to golf courses and recreational trailheads as specified in the Development Agreement. The service will operate during the summer months of June, July and August. A total of three vans will be utilized to serve travel needs between the hours of 8 a.m. and midnight.

Internal Transit System

Based on travel demand estimates outlined in Section 6 of this report, a total of 3,279 trips will be internal to the Resort. Whereas a majority of these trips will be pedestrian or by golf cart, some limited shuttling will be necessary on-site. The shuttling will be done

via demand response transit vehicles that can accommodate between 300 and 400 trips per day. A total of three vehicles will be needed. The shuttle will operate between 7:00 a.m. and midnight. A separate trails system plan has been submitted as a requirement of the Development Agreement. Site Maps of the Resort, including a full map of circulation paths through the development and the village core, will be supplied to each unit owner or guest at check in.

Vehicle Fleet

The following chart outlines the vehicle requirements for the proposed services.

Service	Number of Vehicles	Type of Vehicle	Type of Service Offered
Airport – SLC	6	Vans	Demand Response
Old Town/PMR	15	Luxury 20- pax minibus	Demand Response
Internal Guest Shuttles	3	Vans	Demand Response
Employee Shuttle	2	20-passenger mini-bus	Fixed Route/ Demand Response during Off Peak
Total	26	-	-

It is important to remember that the above proposed service fleet vehicle numbers are based on full occupancy of the Resort at full build-out. The initial fleet size will likely be smaller than Table 7 indicates. As the Resort is built out, more vehicles will be added to the Resort fleet. Exhibit B shows the commitment to supply vehicles based on build out of residential units.

The proposed transit system will offer convenient, safe, and efficient personalized transit opportunities to Resort guests. Initial capital costs and ongoing operational expense of the transit system will be absorbed initially by the developer and ultimately by the Homeowners' Association.

Traffic Mitigation and Auto Trip Reduction

The primary benefit of the plan is the reduction of Resort-generated vehicle trips on the Park City road system. The numbers in Table 8 are determined by comparing trip generation estimates as applied to respective destinations (Salt Lake International Airport, Old Town/PCMR and Other Destinations), and comparing typical vehicle occupancies that would be realized for auto trips as compared with transit trips.

- Salt Lake International Airport**
 If a transit system were not available, of the 771 estimated trips to the airport, 386 would be by automobile, assuming 2.0-vehicle occupancy (771/2). However, assuming 74% of person trips (571) used a private automobile with an occupancy of 2.0 persons (285), and 26% (66) used a transit system vehicle with an occupancy of 2.7 persons, the total airport vehicle trip number would be 359, a reduction of 27 vehicles.

- **Old Town/PCMR**
Guest travel will result in an average of 2,570 trips. If no transit is in place, about 2570/2.2 or 1,168 cars will result. Transit replaces 1,542 trips with in 219 vehicles, leaving 467 trips to occur in automobiles. **This reduces traffic by 482 cars.**

- Other Destinations**
 The "Other Destinations" category includes recreational trips to destinations in the Park City area other than Old Town and Park City Mountain Resort areas. Assuming a vehicle occupancy factor of 2.2 persons. In addition, this category includes mandatory trips such as those to the grocery store, doctor, etc. that assume a vehicle occupancy factor of 1.2. For the purposes of Table 12, average vehicle occupancy of 1.7 has been assumed for all trips included in the "Other Destinations" category. Based upon this vehicle occupancy assumption, the estimated 1,799 person trip number equates to 1,058 automobiles. No trip reduction was assumed, as no transit service is proposed.
- Employee Transit**
 There will be an additional 414 vehicle trips that occur in the form of employee and delivery traffic. An estimated 150 person trips will be removed which equates to a 125-car reduction.

Table 8 illustrates that the proposed transit system will result in a reduction of roughly 25% of all traffic.

Another benefit of this Plan is the reduction of demand for parking spaces in the Old Town/PCMR area. By transferring approximately 1,542 guest person trips bound for Old Town/PCMR from private automobiles onto the transit system, the reduction of parking demand in the Old Town/PCMR could be significant as evidenced by the reductions shown below.

	Airport	Old Town/ PCMR	Other Destinations	Employees	Total ¹
Total Vehicle Trips	386	1,168	1,058	414	3,026
Projected Total Vehicle Trips with Transit	359	686	1,058	289	2,392
Vehicle Trip Reduction as a result of Transit	27	482	0	125	634 (20%)

¹ Totals may not add due to rounding.

SECTION 9. PARKING MANAGEMENT

Parking Management Goals

The goal of Park City is to minimize the overall amount of parking and surface parking, in order to promote aesthetic enhancement of the project, and to ensure the success of the Flagstaff Mountain Transit System. Surface parking should be limited in order to maintain vegetation and the natural feel of the site. The Resort's goal is to provide adequate parking for the guests, visitors and service providers of the Resort while meeting the requirements of the Development Agreement.

Virtually all parking on-site will be provided underground, thereby reducing view shed impacts. By moving some of the employee parking off-site, the Resort will be able to achieve its required parking needs while meeting Park City's goal of reducing the overall number of parking spaces.

Regulatory Setting

Chapter 13 of the Land Management Code has been used to calculate the parking requirements. This section estimates the general requirements for calculating residential and commercial land uses and maps out the strategies to achieve those reductions. It is anticipated that the Resort will include multifamily condominium units, Planned Unit Developments (PUDs), single-family home sites and retail uses including restaurants and other commercial space which will be targeted for reduction. The following table illustrates current requirements as well as the calculation for the 25% reduction as applied uniformly throughout the project.

Land Use	Unit	Number⁴	PC Code Requirement	75% Requirement
Condo/Townhouse	Dwellings	410	893 ⁵	670
Employee Housing	Dwellings	23	35 ³	26
Commercial	Square Feet	75,000	375 ⁶	281
Total^{1,2}			1,303	977

¹ PUDs are not included because units will have their own garage parking.

² Single Family Units are not included because units will have their own garage parking.

³ Based on 800 ft² units and a parking requirement of 1.5 spaces per dwelling unit.

⁴ Based on Table 1 of FMR Transit Plan, except for "Commercial" where hotel retail space is included.

⁵ Based on the sum of 187 Units <2500 ft² with parking requirement of 2 spaces/unit (374) and 173 Units >2500 ft² with parking requirement of 3 spaces/unit (519).

⁶ Based on 1 parking space required per 200 ft² of leasable commercial space.

The single-family units and PUDs will be governed by the parking code and will not be restricted by shared parking requirements such as the commercial and multi-family

dwelling space. As described in the Development Agreement, a total of 410 residential dwelling units will be built in the form of condominiums and town homes.

It is anticipated that the condominiums will be a mix of 2 and 3 bedroom units, averaging over 2,000 square feet in size. The total number of residential units, including 60 PUD units and the 410-condo/town homes, will be 470. On-site employee housing units do not count toward the overall density of the Resort. The approved maximum density of the Resort support commercial uses is 75,000 square feet.

Parking Demand

Anticipated Residential Occupancies and Parking Demand

Park City Chamber of Commerce statistics reveal that the average winter season occupancy in Park City is 65%. This Plan assumes 100% occupancy to demonstrate a "worst-case" scenario of maximum parking required by the Resort. Final space counts will not exceed the overall 25% reduction goal. Proper marketing of the transit system described in the preceding section of this report is a very important component of achieving minimized parking standards.

On-Site Parking

- **Condominiums/Town homes**

As a component of the sales and marketability of the Resort, a certain number of buyers will typically desire at least 2-3 spaces per unit, which yield parking requirements similar to that of the Park City Code. However, the Flagstaff Mountain Transit plan calls for an average rate of 20% transit use from the airport, which reduces the overall number of spaces needed. Further reductions can be achieved by limiting the amount of parking provided on the mountain for the smaller units. It is likely that an average of 1.5 dedicated parking spaces per unit can be assigned to those units of less than 2,500 square feet. Units of 2,500 square feet or more in size, could be assigned 2-3 parking spaces per unit for a total designated parking requirement which will likely be comparable or less than that of the Land Management Code. Two hundred eighty-one spaces have been dedicated for the 2 bedroom units and an average of 2 spaces have been apportioned to the 3 bedroom units, yielding an overall requirement of 670 spaces.

- **On-Site Employee Housing**

In accordance with the Development Agreement, the Resort must provide 91 affordable employee-housing units, 25% of which must be provided on-site, or 23 units. It is not anticipated that a parking reduction will be achieved for this land use because of the nature of the travel needs and the low existing requirement of only 1.5 spaces per unit.

- **Commercial Space**

The Resort will include 75,000 square feet of commercial space in the form of restaurants, clothing and convenience shops, and other commercial uses. One third of the commercial area is likely to be specialty retail, which will cater mostly to the guest and resident needs of the Resort.

Therefore the traffic for the shops and restaurants is expected to be largely internal. A 25% reduction for the retail is achieved largely because the Resort commercial space is serving an on-site community who will ski to the destinations, walk, or access the shops with shuttle services.

It is likely that one quality restaurant and two café/deli spaces will be included in the program. It is likely that the restaurants will cater to on-mountain guests, and, therefore, will not require a significant amount of parking. It is anticipated that the 25% reduction could be achieved if overflow spaces for special events and peak loads are included. Approximately fifty reserved spaces of employee parking will be provided for commercial uses. Another 75-100 spaces of parking will be provided off-site in order to meet reductions. Additional parking will also be provided for overflow conditions at the Ontario #3 Mine Site, which can be used on special occasions and accessed by internal ground shuttle when necessary.

- ***Deliveries and Service Providers***

Research indicates that parking for residents, guests, and visitors occurs during the hours of early evening and late morning. Parking for housekeeping, maintenance and deliveries is usually required during normal daytime work hours (off-peak parking hours). Two types of service providers are envisioned at the Resort: short duration stops (1-60 minutes) and longer term visits (1-8 hours). Therefore, parking demand for service uses will be accommodated in two ways: i) in available underground Resort "Visitor parking spaces," and ii) in short term surface parking "pull out" areas located near the service entrance of hotel and condominium buildings. These short-term spaces will be properly signed to restrict general public parking or to allow a maximum parking time of 15 minutes.

- ***Construction Parking***

Construction parking will be regulated in accordance with the Flagstaff Mountain Resort Construction Mitigation Plan, and will be addressed in subsequent MPD and CUP applications. Construction parking will not be allowed in areas designated for the Resort guests and service vehicles other than during periods of low demand by Resort visitors.

- ***PUDs, and Single Family Units***

As mentioned in other sections of this report, the PUD and Single Family units are not considered in parking demand calculations. Each of these housing types will include garage parking as part of their design and development and are not subject to a parking reduction. They will follow the requirements of the Park City Parking Code in their regulation.

The following table illustrates the land uses in which applicable reductions have been realized and the anticipated reductions for the Resort.

	75% of PC Requirement	Resort Requirement
Condo/Townhouse		
187 Units < 2500 ft ²	281	281
173 Units > 2500 ft ²	389	346
Temporary Surface Parking		30
On-Site Employee On-Site	27	35
Off-Site Overflow		
UPK		50
Commercial	282	237
Total	979	979

Off-Site Parking

Employee and Overflow Parking

- As part of the redevelopment of the Ontario #3 Mine Site, approximately 50 additional spaces will be designated on this property. The final count will depend on the actual future uses of the site. Its existing infrastructure will be utilized to provide parking for visitors in peak overflow conditions such as the Sundance Film Festival. An employee shuttle bus, which runs on a regular schedule, along with an on-demand guest shuttle system, will transport users of this off-site parking area to and from the Resort. Parking at the Ontario #3 Mine Site will be above ground.

Enforcement Program

It is envisioned that Flagstaff will employ several employees who are dedicated to the efforts surrounding management of transportation services, which include vehicle maintenance, transit services and scheduling, customer service, and traffic services which will include towing and enforcement of parking violations. Parking areas and roadways will be inspected a minimum of twice daily and as needed to ensure adequate clearance and conformity with all policies. Guests shall receive a copy of parking policies upon check-in. During special events that result in overflow conditions and excessive parking demand, use of flagging personnel or automated signs will direct guests to appropriate parking.

General Policies

Due to the Resort atmosphere and type of clientele attracted to the Resort, certain levels of service must be provided on-site. In addition to the guest, visitor, and employee parking requirements of the Resort, other parking-related needs will be accommodated

in the development plan. The Resort will provide locations for such parking needs as special services, limousine pick up and drop off, and valet parking. Additional parking-related needs of the Resort are outlined below.

- *Guest Registration* temporary parking will be integrated into the building design. Spaces will be provided near the main building entrances with posted time limits. Two spaces per 100 units will be provided.
- *Drive Through Areas* for guest registration/drop-off/pick-up will also be integrated into building design. These areas will be located near the main lobby door, and provide for two-way traffic.
- *Valet Parking* staging areas will be integrated into building designs and will be made available to guests for overflow parking situations.

Through careful planning and utilization of the site, the parking requirements of the Resort can meet the 25% reduction goal of the Development Agreement. To provide adequate parking on-site for residents, visitors and guests, some of the employee and overflow parking for the commercial uses will be moved off-site as stated above. Whereas individual land use requirements may vary slightly from 25% reductions individually, the overall reduction goal for the Resort will be achieved.

SECTION 10. CONCLUSIONS

This Plan proposes a combined demand response service, which will act as an amenity for Resort guests to travel between Park City metro area locations for a variety of trip purposes including, the downtown area and the Salt Lake City airport.

Summer service would consist of external van service to golf courses and destinations in Park City during June, July and August. The summer months would not include the internal van service or service from the airport because occupancy levels will likely not exceed 20%.

The winter service would include a 15-bus demand shuttle system, a 6-vehicle demand response system that would operate to and from the airport, and a 3-bus internal on-demand guest shuttle. A 2-bus employee system would circulate locally. The operating hours are 8 a.m. to midnight, with some time exceptions for demand response trips to the airport and internal emergencies. The fleet will be a mix of 20-passenger buses and vans. A demand response system of vehicles was evaluated for guest travel outside of the downtown area, but it did not pose the same benefits as the other system components, and did little to reduce traffic. It is, therefore, not a recommended part of the system.

An internal van system for the Resort is proposed for the winter. Because the Resort is so pedestrian oriented, the need for internal trips by car will be limited. The proposed internal shuttle system serves two main purposes

- Visitor access to commercial areas and internal guest mobility.
- Two 20-passenger buses will handle employee demand. Guest shuttle requests to travel throughout the Resort or to the overflow parking area will be served by the on-demand shuttle system.

Additionally, this Plan describes the following beneficial traffic and parking results:

- The transit services outlined in this plan will reduce traffic by approximately 20%

Parking demand in Old Town is reduced by roughly 400 cars over the course of a day through Resort guest use of the proposed transit system.

Reduction of parking at the Resort is achieved through reductions in the number of spaces assigned to larger units and some reduction of the commercial requirements. Overflow parking at the United Park City Mines Company's Ontario #3 Building Site will be provided to accommodate 50 spaces and will be used for special events such as the Sundance film festival.

APPENDIX

TO RESORT TRANSIT AND PARKING PLAN

TRAVEL DEMAND APPENDIX

Trip Generation

Travel demand estimation involves making assumptions about various land uses and their impact on travel demand and trip generation.

Trip generation rates are based on national data (*ITE Trip Generation Manual, Sixth Edition*) and are calibrated and checked against external traffic counts at similar facilities. Internal trips for purposes such as ski-in ski-out, and delivery from on-site commercial facilities were included in the vehicle trip estimate. Further, retail and restaurant uses were assumed to generate external trips due to commercial deliveries and some employee trips. Occupancy reductions were applied to different land uses as based on prior studies of occupancy at similar facilities. The applied rates were taken from studies observed in Telluride Colorado, which observed 45% rates for single family and townhouse units, and 65% for condominium units. Additional reductions were made to the trip rates to account for ski-in ski out potential for every unit within the development to account for commercial and shopping services that could be achieved on-site.

The assumptions described above are necessary to ensure that transit trip rates and usage are consistent with the *Flagstaff Mountain Traffic Study, July 2000* as previously developed by Fehr & Peers, which can be provided for additional reference regarding external traffic impacts and assumptions.

Appendix Table 1 illustrates the Resort vehicle trip generation for each land use and type of trip, internal or external. This table assumes a trip generation scenario without a Resort transit system.

Land Use:	Unit	Number	Internal Trips	External Trips	Total Trips
Specialty Retail and Restaurant Residential	Square Feet	75,000	2,288	763	3,051
Condo/Townhouse PUD	Dwellings	410	780	1,708	2488
	Dwellings	60	90	197	287
Single Family Unit	Dwellings	54	41	218	259
On-site Employee Housing	Dwellings	23	80	140	220
Total Vehicle Trips			3,279	3,026	6,305

Total Vehicle Trips by Resort Guest/Employee

The primary focus of the transit system for the Resort is to provide an amenity for Resort guests and to supply employees with a viable means of transportation so that they can conveniently reach their work destinations in a safe and effective manner. Since employee trips are included in the total vehicle trip generation of the Resort, it is necessary to separate estimated employee trips from estimated guest trips.

The Resort is expected to employ 150 persons who will service commercial and guest service components of the Resort. Another 200-service delivery or commercial personnel are expected to generate at least 1.2 trips per person on a typical day. This would mean that 8%-14% of the total external trips result from service related traffic. The remaining trips were assumed to be guest trips. Guest trips were determined by the total trips minus the employee trips.

Land Use:	Unit	Number	Total Trips	Employee Trips	Guest Trips
Resort Support	Sq. Ft.	75,000	763	92	671
Commercial					
Residential Condo/ Townhouse	Dwellings	410	1,708	142 ¹	1,566
PUD	Dwellings	60	197	25	172
Single Family Unit	Dwellings	54	218	23	195
Employee Housing	Dwellings	23	140	140	0
TOTAL VEHICLE TRIPS			3,026	422	2,604

Vehicle Trips by Purpose

For purposes of forecasting transit demand vs. auto use, three trip purposes were established for the unique nature of this Resort. While these trip purposes are semantic definitions for the types of trips occurring at the Resort, it was assumed that unique vehicle occupancy factors could be assigned to each trip purpose. Table 3 illustrates the three trip purpose types and the associated percentage of vehicle trip occurrence for each purpose.

The percentages of trips which are assigned to each purpose in Table 3 were estimated based on best engineering judgment applied to national trip purpose information. According to data from the National Personal Transportation Survey (1990), as summarized in the National Cooperative Research Board Report 365 (*Travel Estimation Techniques for Urban Planning*), trip purposes of home-based work, home-based other, and non-home based were used to estimate Mandatory, Recreational, and Other trip purposes for the Resort.

- **Mandatory trips** are trips defined as travel to and from work, grocery store, doctor visits, errands, or emergencies. Mandatory trips, also referred to as Home-based work trips, represent approximately 97 % of employee vehicle trips (mandatory

¹ 100 Additional employees including 10 employees at Specialty Retail at 2 vehicle trips per employee.

nature of work) and 19% of Resort guest vehicle trips due to the vacation nature of the Resort. Average vehicle occupancy rates of 1.2 persons per vehicle were assumed.

- Recreation trips represent the bulk of travel for the Resort guests and include trips to and from skiing, dining, and other recreational opportunities. Recreation trips, also referred to as Home-based other trips, represent approximately 1 % of employee vehicle trips and 61 % of Resort guest vehicle trips. Average vehicle occupancy rates of 2.2 persons per vehicle were assumed.
- Other trips include travel to and from the airport, local residents visiting guests of the Resort, or any other trips not classified as mandatory or recreational. Other trips, also referred to as Non-home based trips, represent approximately 2 % of employee vehicle trips and 20 % of Resort guest vehicle trips. Average vehicle occupancy rates of 2.0 were assumed.

	TOTAL TRIPS	MANDATORY	RECREATIONAL	OTHER
Employees				
Percent	100%	96.7%	1.3%	2.0%
Value	422	408	5	9
Guests				
Percent	100%	18.5%	61.2%	20.3%
Value	2,604	482	1,593	529
Total External Vehicle Trips				
Percent	100%	29.4%	52.8%	17.7%
Value	3,026	890	1598	538

Converting Vehicle Trips to Person Trips

In order to estimate transit demand, vehicle trips, as estimated in the *Traffic Study*, need to be converted to person trips using vehicle occupancy factors. Various trip purposes have different vehicle occupancy factors. For example, trips to and from work are generally done in single-occupant vehicles and therefore have low vehicle occupancies. Family outings to ski areas or restaurants, although not specifically supported by national data, are assumed to have higher vehicle occupancies. Table 4 shows the vehicle occupancy factor applied to each trip purpose for Resort guests.

Description	Total Trips	Mandatory	Recreational	Other
Vehicle Trips ²	2,604	482	1,593	529
Vehicle Occupancy ³	NA	1.2	2.2	2.0
Person Trips	5,140	578	3,504	1,058

² Numbers in columns may not total correctly due to rounding in calculations beginning Table 3.

³ Based on National Vehicle Occupancy Info for Suburban Development and HTNB Salt Lake City Airport Study.

Seasonal Allocations and Adjustment

The total numbers of trips shown in the above tables are based on 65% to 45% anticipated average weekday occupancy. During a typical winter season, it is assumed that occupancy rates would mirror those of Deer Valley and Telluride, Colorado. The 60 % occupancy rate is fairly typical among other upscale mountain developments. For example, Mountain Village in Telluride, Colorado reported similar winter season occupancy of 59 % for the 1999-2000 ski season.

Insert Exhibit A Here

**Insert Exhibit B Here
(Flagstaff Mountain Partners needs to update to 26 vehicles according
to the schedule.)**

**(Insert Transit Analysis)
(2 sheets Scenario A & B)**



FLAGSTAFF MOUNTAIN RESORT
A PLANNED RESORT COMMUNITY
DEER VALLEY, UTAH

OPEN SPACE MANAGEMENT PLAN
EXHIBIT 5

MAY 2001
REVISED AND APPROVED DECEMBER 2001

PREPARED FOR:
FLAGSTAFF MOUNTAIN PARTNERS
P.O. BOX 1450
PARK CITY, UTAH

**FLAGSTAFF MOUNTAIN RESORT
OPEN SPACE MANAGEMENT PLAN**

Exhibit 5

**May 2001
Revised and Approved December 2001**

Prepared for

**Flagstaff Mountain Partners
P. O. Box 1450
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Prepared by

**SWCA, INC.
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TABLE OF CONTENTS

Executive Summary	1
1.0 Introduction	2
1.1 Flagstaff Mountain Resort	2
1.2 Open Space Planning goals and Objectives	3
2.0 Inventory of Existing Conditions	5
2.1 Existing Conditions	5
2.2 Regional Open Space Planning Efforts	5
2.2.1 Park City	5
2.2.2 Summit County	6
2.2.3 Wasatch County	6
2.2.4 Non-Profit Organizations	7
3.0 Opportunities and Constraints	8
3.1 Physiography	8
3.2 Viewsheds	8
3.3 Historic Sites	8
3.4 Wetlands	9
3.5 Wildlife Habitat	9
3.6 Recreation Access	9
3.7 Existing Uses	9
3.8 Proposed Uses	10
4.0 Master Plan	11
4.1 Designated Recreational Open Space	11
4.1.1 Developed Recreational Open Space	11
4.1.1.1 Centennial Draw Wildlife	11
4.2.1 Undeveloped Recreational Open Space	12
4.1.2.1 Prospect Ridge Viewshed	12
4.2 Designated Protected open Space	12
4.2.1 Lady Morgan Pond	12
4.2.2 Flagstaff Mine	13
4.2.3 Little Bell Mine Site	13
4.2.4 Quincy Mine Site	13
4.2.5 Daly West Mine Site	13
4.2.6 Judge Mine Complex	14
4.3 Phasing of Plan Implementation	14
4.4 Management Authority	14
5.0 Related Planning Documents	15
5.1 Flagstaff Mountain Resort Trails Master Plan	15
5.2 Flagstaff mountain Resort Wildlife Management Plan	15
5.3 Deer Valley open Space Plan	15

APPENDIX A **17**
Figure 1 Location of Project Area
Figure 2 Open Space

EXECUTIVE SUMMARY

This Open Space Management Plan outlines the goals and objectives of open space planning for the proposed Flagstaff Mountain Resort located in Park City, Summit County, Utah (Figure 1). It presents an inventory of existing conditions and describes other open space planning efforts in the surrounding region. The plan also describes the opportunities and constraints related to open space at Flagstaff Mountain Resort. These factors include the physiography, viewshed considerations, historic sites, wetlands, wildlife habitat, recreation, as well as the existing and proposed uses associated with various portions of the Plan Area.

This plan describes two types of open space present at Flagstaff Mountain Resort: Recreational Open Space (ROS) and Protected Open Space (POS). Recreational Open Space is further divided into Developed and Undeveloped Recreational Open Space (DROS and UROS, respectively). DROS consists of lands currently managed and likely to be owned and managed in the future by Deer Valley Resort for the purpose of lift-served downhill skiing. UROS comprises the portion of the Plan Area that has not been modified for this purpose but does contain a preponderance of hiking and/or mountain biking trails. Figure 2 shows the distribution of DROS and UROS within the Plan Area.

A special case of DROS occurs in an area proposed for future ski lift and run development. The Centennial Draw Wildlife Management Area (Figure 2) includes a known elk calving site in Deer Valley's Pod Z, proposed for development in 2008. This plan outlines certain development/management constraints designed to minimize potential impacts to elk in this area. A special case of UROS occurs on Prospect Ridge (Figure 2). This area has been identified as a sensitive viewshed for Old Town Park City. This plan outlines specific management practices designed to maintain the visual character (as specified in the Development Agreement) of this area.

Protected Open Space (POS) refers to portions of the Plan Area that will be preserved for their outstanding natural and/or cultural resource characteristics. To ensure the protection of its outstanding natural resource values, the Lady Morgan sub-watershed (Figure 2) has been designated POS. The wide variety of natural, undisturbed habitats in this sub-watershed confers a high degree of biological diversity to this area. Management prescriptions designed to maintain the unique characteristics and natural dynamics of Lady Morgan Pond are specified. Another type of POS within the Plan Area is associated with specific cultural resource sites. These include a number of mining sites considered sensitive due to their historic value, vulnerability to vandalism, and/or the hazard they pose to an uninformed public (Figure 2). Brief descriptions of these sites and why they qualify for POS are provided in this plan. More detailed management considerations for these sites are provided in the Flagstaff Mountain Resort Historic Preservation Plan (Exhibit 6 to this LSMPD).

1.0 INTRODUCTION

1.1 Flagstaff Mountain Resort

This study is one of several reports that have been prepared to support the Flagstaff Mountain Resort's Large Scale Master Plan Development (LSMPD) application. As LSMPDs are programmatic in nature and subject to refinement at subsequent Master Plan Development (MPD) application and Condition Use Permit (CUP) stages, correspondingly, the contents of this report should be viewed as conceptual in nature and subject to change as specific plans are developed. Details developed at MPDs and CUPs stage will not require a modification of this plan provided that they comply with the Goals and Objectives of this Plan.

The Flagstaff Mountain Resort (Flagstaff Mountain) Plan Area is a 1,600-acre parcel of land located in the southwest corner of Summit County, Utah. Ranging from elevations of 7,800 to 9,000 feet above sea level, it forms the western portion of Deer Valley Resort, a four-season resort facility that specializes in alpine skiing in the winter; hiking, mountain biking, and horseback riding in the summer. Four distinct sites will be developed by Flagstaff Mountain Partners (FMP) as additional year-round residential communities within the boundary of the existing ski area. These sites, or development pods, are depicted along with the overall Plan Area in Figure 1. The proposed development pods include the Mountain Village area (Pods A and B-1), the Daly West area (Pod B-2), and the Northside Neighborhood (Pod D). These pods conform to those sites identified in the Annexation Resolution: Development Agreement for Flagstaff Mountain, Bonanza Flat, Richardson Flat, the 20-acre Quinn's Junction Parcel, and Iron Mountain (Park City Municipal Corporation Ordinance no. 99-30) hereafter referred to as the Development Agreement.

Within the Plan Area, native vegetation comprises a mosaic of quaking aspen and coniferous (primarily Engelmann spruce, subalpine fir, and Douglas fir) forests, Gambel oak, and mountain shrub communities. A few natural meadows occur in the area and are characterized by a variety of native grasses and wildflowers. Wet areas are dominated by willows, sedges, and rushes. Rock outcrops occur on the eastern boundary of Pod D and along the ridgeline at the head of Empire Canyon.

Some of the most notable features of the Plan Area are, however, of human origin. Large piles of mine waste rock, or overburden, are located in the Flagstaff Mountain Plan Area. These features consist predominantly of un-vegetated grayish-white crushed rock associated with the former Flagstaff, Little Bell, Quincy, Anchor, and Daly West Mines. Ski lifts and runs are another notable human-made feature of the Plan Area. Within the Flagstaff Mountain portion of Deer Valley Resort, there are six existing ski lifts and approximately 36 ski runs, many of which have been cut through forest stands, graded, and seeded with non-native grasses and forbs. Four additional lifts are currently planned for Flagstaff Mountain. One of these will serve the ski-in/ski-out

needs of Pod A, one will access existing terrain between the Red Cloud and Northside Lifts (Ski Pod D), and the other two (Ski Pods X and Z) will access new intermediate and advanced ski terrain in Empire Canyon.

1.2 Open Space Planning Goals and Objectives

The overall goal of this plan is to ensure the preservation and maintenance of Flagstaff Mountain's open space for public enjoyment and the protection of ecological values. There are two general types of open space in the Plan Area: Recreational Open Space (ROS) and Protected Open Space (POS). The purpose of ROS is to establish and preserve districts for land uses requiring large areas of undeveloped open land; permit, preserve, and encourage recreational use of these lands; and preserve and enhance environmentally sensitive lands such as wetlands, steep slopes, ridge lines, meadows, stream corridors, and forests.

The primary purpose of POS is to promote useable, public, non-improved, non-commercial, connected, and contiguous open space for community benefit; promote the preservation of undisturbed open lands; prohibit construction on ridge lines and steep slopes, or in wetlands, watersheds, and viewsheds; promote the preservation of historic sites; and preserve the vegetation and habitat of natural areas. More detailed descriptions of the Recreational and Protected Open Space classes are provided below.

Given that the Flagstaff Mountain Plan Area is largely contained within the boundaries of Deer Valley Resort, it should be apparent that ROS comprises the bulk of the Plan Area (approximately 1450 acres or 91 percent of the Plan Area). With this in mind, it should be noted that the entire Plan Area outside of the development pods is currently zoned as Recreational Open Space (ROS-MPD) under Park City's zoning ordinance. The areas proposed as Protected Open Space (POS) within this plan will be rezoned at the completion of the Mountain Village MPD. In addition the Centennial Draw (Ski Pod Z) area will also be zoned POS. The remaining ROS-MPD zone will be managed in accordance with the recommendations of this document.

To that end, there are two types of Recreational Open Space at Flagstaff Mountain: developed and undeveloped. Developed Recreational Open Space (DROS) consists of areas served by ski lifts and contains a preponderance of graded and/or cut ski runs and summer trails. Typical vegetation consists of islands of native forest cover interlaced with ski trails that have been seeded with a limited variety of exotic grasses and forbs. These areas are designed for and receive the bulk of recreational use in the Plan Area. Some currently undeveloped areas have been proposed for ski lift/run development to occur over the next eight years. These areas have been identified as DROS for the purpose of this plan. One of these areas, Centennial Draw, is a known elk calving ground and, as such, is subject to special management considerations described in Section 4.2.2, below. DROS comprises approximately 987 acres or 62 percent of the Plan Area (Figure 2). The general management objectives for DROS include

maintaining high quality, safe, attractive, publicly accessible recreational facilities on a year-round basis.

Undeveloped Recreational Open Space (UROS) may be skied in the winter and typically contains some summer trails, but it has not been heavily modified for these purposes. Consequently, it is dominated by naturally occurring, unfragmented stands of native vegetation. Summer trails in UROS tend to either be remnants of the mining era or have developed from small, volunteer efforts, or from the repeated human use of existing game trails. Where the main purpose of DROS is to provide year-round public recreation opportunities, UROS serves a wider variety of functions. In terms of recreation, UROS is typically used for backcountry skiing or snowshoeing in the winter and hiking or horseback riding in the summer. Some UROS contains trails suitable for mountain biking but only on a limited basis relative to DROS. In some areas, UROS is also important in maintaining scenic viewsheds and wildlife habitats. There are two areas designated as UROS within Flagstaff Mountain Resort (Figure 2). Together, these areas comprise approximately 464 acres or 29 percent of the Plan Area. The general management objectives for UROS are to continue to allow human access and use while maintaining the scenic qualities and habitat values of these areas.

One type of Protected Open Space is so designated because it has outstanding and/or unique natural resource values. Accordingly, the management objective of these lands is to preserve and maintain the biological integrity of these resource values. Thus, while non-motorized winter recreational activities are permissible in and adjacent to designated POS, development of recreational facilities such as cut ski runs or developed summer trails are prohibited. Interpretive signage may be used in or adjacent to POS to help limit access, minimize disturbance, and inform the public of the importance of the area's natural resource values. Designated POS makes up approximately 66 acres or four percent of the Plan Area.

Another type of POS applies to certain cultural resource sites. Several of the Plan Area's historic mine buildings and associated structures are designated as POS. It should be noted, however, that this designation only applies to the historic structure and its immediate surroundings, not a substantial land area as in the case of natural resource POS. Accordingly, the acreages of these sites are not included in the figures presented above.

The management objective of cultural resource POS is to preserve and maintain the cultural integrity of a given site. These areas are typically adjacent to existing trails and many have been damaged as a result of this easy public access. Again, interpretive signage may be used in these areas to dissuade further disturbance, warn the public of the dangers associated with deteriorating buildings, and inform people about the context and importance of the site's cultural resource values.

2.0 INVENTORY OF EXISTING CONDITIONS & INFORMATION

2.1 Existing Conditions

At present, the majority of the Flagstaff Mountain Plan Area is considered open space—but it has not always been so. During the peak of the mining era, the Plan Area could more appropriately have been called an industrial zone. At that time, the area was almost completely deforested and characterized by high levels of human activity and the presence of large buildings and elaborate ore conveyances. Streams were diverted for use in the mining or milling process, there was frequent use of high explosives, and the large overburden piles that now characterize the area were created.

Following the mining era, the area reverted back to defacto open space and the forests began to regrow. During this time, many of the mine buildings and appurtenant facilities were destroyed or removed and the shafts and adits were sealed. The streams, while disturbed, were again allowed to make their way down Empire and Ontario Canyons.

With the creation of Deer Valley Resort in 1981, the focus shifted from natural rehabilitation to ski area development. Access roads were built (or restored from those created during the mining era), ski lifts were installed, runs were cut and graded, and the area once again became filled, at least on a seasonal basis, with people. Recreation continues to be the dominant use of the area today. Thus, while the Plan Area remains open space, much of this open space is characterized by the visual impacts of forest fragmentation associated with roads, lift alignments, and ski runs. Other areas, as yet undeveloped by the ski industry, are characterized by second-growth forest and other native habitats and remain essentially wild with vestiges of the bygone industrial era interspersed throughout. Many of these areas comprise important wildlife habitat, contain significant cultural resources, and/or are important components of the local viewshed. Because they contain few developed trails or other facilities, these areas provide an opportunity for solitude and wildlife study in close proximity to the developed areas of Park City and Deer Valley.

2.2 Regional Open Space Planning Efforts

2.2.1 Park City

The 11-member Citizens Open Space Advisory Committee (COSAC) was formed by the Park City Council in 1998 when Park City voters passed a \$10 million bond issue to preserve open space in the area. In order to be considered for acquisition by COSAC, property must meet some of the following criteria:

- The land offers or protects a critical viewshed;
- The land directs or checks the location, timing, and pace of surrounding development;

- The land is contiguous with other open space parcels (i.e., it contributes to a "green belt" around the city);
- The land provides open space along Park City's entry corridors (SR 224 or SR 248).

In addition to fee simple acquisition of key properties, COSAC works with the owners of identified open spaces to enact legal easements and deed restrictions that will ensure the protection of the land in perpetuity. Any parcels obtained by COSAC will continue to remain undeveloped and will be dedicated to the public for scenic beauty, passive recreation, and continued access by non-motorized means.

2.2.2 Summit County

Summit County requires that, for any type of residential development project within the Snyderville Basin, a minimum of sixty percent of a parcel, inclusive of the developable and non-developable lands, must be reserved for open space whenever density is increased beyond the "base" zoned density described in the County's Development Potential Matrix.

Summit County mandates that, where required, open space within developments be located in areas that will protect the most important attributes of a site and the key focal points that are important qualities of the character of the area. These attributes may include scenic viewsheds, slopes that are less than 30 percent, significant wildlife habitat, agricultural lands and antiquities, open space corridors/connections through the development, and other such features. Modified open spaces such as ski trails and golf courses may be included in a development's open space calculation if they meet the County's objectives of preserving these attributes. Required parks may be included in the open space requirement. Open spaces should be contiguous within a development site and when feasible and appropriate, connect with open spaces on adjacent parcels.

Open spaces that are required to be set aside to meet the requirements of Summit County's open space policies shall be preserved in perpetuity. Preserving these areas may be accomplished either by conveying the parcel to the County, granting a conservation easement to the Utah Land Trust or another appropriate entity, conveying the parcel to a homeowner's association, recording a deed restriction to the benefit of the public to limit the use of the property, or an appropriate combination of the above.

2.2.3 Wasatch County

Wasatch County requires a minimum of 20 to 30 percent open space (depending on location) for each new subdivision that it approves for development. While this is the minimum required per County Code, larger percentages are typically pursued on a case by case basis. During the master planning process, Wasatch County typically solicits developers to donate significant tracts of land and/or create conservation easements to

ensure the preservation of open space as part of their development. The County also prohibits building on slopes greater than 30 percent and requires the creation of parks and other recreational areas (trails, etc.) as part of their master planning process.

2.2.4 Non-Profit Organizations

A variety of non-profit organizations including Utah Open Lands and its local affiliate, Conserving Our Open Lands (COOL), the Citizens Open Space Advisory Committee, and the Swaner Nature Preserve are actively involved in open space protection and planning in Summit County north of the Flagstaff Mountain Plan Area.

Utah Open Lands provides land owners with a variety of estate and tax-planning tools that have allowed this group to preserve more than 19,000 acres of open space in northern Utah. Under its "Historic Farms and Ranches Campaign," Utah Open Lands is currently negotiating the preservation of more than 12,000 acres of wildlife habitat, heritage, and ranch lands in western Summit County. In 1998, COOL formed to assist Utah Open Lands in raising money for the group's Summit County efforts. The money that COOL raises in Summit County is used within the county and will augment Utah Open Lands' Summit County land protection projects and educational programs.

The Swaner Nature Preserve was founded in 1993 as a 20-acre memorial park dedicated to Leland Swaner, a Summit County developer and rancher. The park now consists of nearly 940 acres of montane wetland, meadow, and sagebrush habitats in the heart of Snyderville Basin. The Preserve is currently pursuing acquisition of an additional 120 acres of land on its northeast corner following which it will commence planning the development of an education center and interpretive trail system.

3.0 OPPORTUNITIES & CONSTRAINTS

There are a variety of important physical, biological, and human factors that determine the primary purpose for a given piece of land within the Plan Area. These factors are often interrelated and overlapping in the opportunities and constraints they confer to that land. Physiography, viewsheds, historic sites, wetlands, wildlife habitat, recreation, existing and proposed uses comprise a few of these factors and are described in greater detail below.

3.1 Physiography

Much of the Plan Area consists of moderately steep, north-facing slopes that provide ideal opportunities for downhill skiing. Most of these areas have or will be developed by Deer Valley Resort for this purpose. As mentioned above, these areas are considered DROS.

Areas containing steep, rocky, and/or heavily vegetated south- or west-facing slopes as well as areas lying beyond practical lift-served terrain are less well-suited for alpine skiing and more appropriate for other forms of recreation such as hiking, biking, or horseback riding. These areas are designated UROS. Other amenities associated with designated UROS include the preservation of wildlife habitat and the protection of scenic viewsheds.

Areas characterized by relatively flat terrain are better suited for commercial and residential development. Accordingly, Development Pods A, B-1, B-2, and D are situated on flat or mildly sloping ground surrounded by recreational open space.

3.2 Viewsheds

An important consideration in whether and how to develop a given parcel is the effect the proposed development would have on views in the surrounding areas. Such visual impacts have been an issue with respect to development of Prospect Ridge, the northern portion of the Plan Area visible from downtown Park City. Preliminary visual impact analyses have been completed for the Mountain Village.

3.3 Historic Sites

There are several historic mine sites within the Flagstaff Mountain Plan Area. An historic preservation plan has been prepared for the Plan Area which provides an inventory of these sites and a detailed management plan outlining the interpretive opportunities as well as any legal or safety constraints associated with them.

3.4 Wetlands

Any development activities which result in the placement of dredge or fill material in over 0.10 acre of wetlands or other waters of the U.S. require notification of the Army Corps of Engineers and a permit under Section 404 of the Clean Water Act. A wetland delineation report has been prepared for the Plan Area by Natural Resources Consulting, Inc. and was submitted to the Army Corps' Utah Regulatory Office in February, 2000. While this report did identify a limited number of wetlands within the Plan Area, none of these were contained in areas planned for residential development. Given that the development pods contain no jurisdictional waters of the U.S., construction of Flagstaff Mountain Resort will have no significant effect on these resources. Wetlands were, however, identified in Centennial Draw, an area proposed for development as a ski pod (Pod Z) in 2008. Depending on the final design of this ski pod, the clearing and/or grading of ski runs in this area may require acquisition of a 404 permit.

3.5 Wildlife Habitat

Much of the Plan Area, particularly those areas that have not been developed for downhill skiing, provide high quality wildlife habitat. A variety of native vegetation types including aspen, conifer, and mixed forests, mountain shrublands, meadows, and wetlands provide habitat for a diversity of seasonal and year-round wildlife species. Opportunities for wildlife watching are one of the attractive amenities of the Flagstaff Mountain Plan Area for casual recreationists as well as future homeowners. Depending upon site-specific conditions, a desire to preserve and maintain wildlife habitat values within the Plan Area could constrain certain aspects of development. Please refer to the Wildlife Management Plan for more information on this important resource.

3.6 Recreation Access

During the winter, recreation consists primarily of alpine skiing and access is controlled by Deer Valley Resort (refer to Section 5.3, below). During the summer, recreation use consists of dispersed hiking, mountain biking, and horseback riding. Access to the property is open in the summer and recreationists are free to roam throughout the Plan Area, subject to rules and regulations established from time to time by Deer Valley Resort. A detailed assessment of recreation access, existing and future trails, and trail management may be found in the Trails Master Plan for Flagstaff Mountain Resort.

3.7 Existing Uses

With the exception of the recreational uses mentioned in Section 3.6, commercial uses are limited to snowmobile rentals during the winter and hiking and biking uses in the

summer. With the exception of snowmobile rentals (which are being discontinued as of the winter of 2001-2002), existing uses of the Plan Area will be preserved during and after development.

3.8 Proposed Uses

Beyond the proposed development pods, the Development Agreement gives Flagstaff the opportunity to develop a restaurant/club facility (AKA "Beno's Cabin") in the DROS. The facility is to be located within the ski terrain near to the Mountain Village. Proposed ski area expansion in the DROS area includes two ski pods (Pods X and Z) that will be developed over the next three to eight years, respectively. These proposed uses will provide additional skiing opportunities; however, they will also limit the distribution and abundance of forested wildlife habitats.

4.0 MASTER PLAN

4.1 Designated Recreational Open Space

4.1.1 Developed Recreational Open Space

Deer Valley Resort has developed ski lifts and ski runs throughout the majority of the Plan Area. Two currently undeveloped areas are proposed for ski lift and run development over the next eight years. Collectively, these areas fall under the category of DROS. Refer to Figure 2 (Appendix B) for a depiction of DROS within the Plan Area. Deer Valley will continue to have management responsibility for all DROS within the Plan Area.

4.1.1.1 Centennial Draw Wildlife Management Area

Centennial Draw, while part of DROS in proposed Ski Pod Z, has been identified as containing an elk calving area. Early planning efforts for the project identified this wildlife use and consequently provided for restrictions on ski run construction activities in Pod Z as set forth in the Development Agreement. In order to maintain the suitability of this site as a calving ground, the clearing and grading associated with the proposed ski run development will be minimized in the area delineated in Figure 2. The Development Agreement states that only two graded runs will be allowed in Pod Z. Forest thinning and other, limited vegetation removal may occur in the balance of Pod Z for skier safety and glade skiing. No more than two ski runs will be created in the delineated wildlife management area portion of this ski pod. In addition, Run 121 nearest the center of the drainage (north end of the ski pod) will be a gladed rather than conventionally cleared run. In order to preserve hiding cover for calves, no ground disturbance or removal of the shrub layer will be permitted in this area. Large tree islands containing suitably dense forest and shrub cover to hide calves will be maintained following lift development. Native herbaceous ground cover will be maintained in the cleared run. The process of approving the ski related development in this Pod and the balance of the project is an Administrative Conditional Use. Review of the ski related improvements shall require compliance with the goals and objectives of this plan.

While habitat conversion due to ski run development could reduce the extent of suitable calving habitat in Centennial Draw, as long as hiding cover is preserved elk should still use the site. A more important consideration during the calving period is human (and domestic dog) intrusion and disturbance. Elk calving can begin as early as April and extend into July. This area will, therefore, be closed to recreationists and their pets from the last day of skiing at the resort through June to minimize disturbance to calving elk.

4.1.2 Undeveloped Recreational Open Space

UROS forms the second largest type of open space within the Plan Area. While these areas may contain a variety of hiking, biking, and equestrian trails, these facilities do not dominate the character of the land. Native vegetation cover remains largely intact and forest stands do not exhibit the high level of fragmentation characteristic of DROS. Consequently, these areas tend to have greater visual appeal and higher quality wildlife habitats relative to DROS. While these areas will continue to experience summer trail construction and maintenance, the overall character of UROS within the Plan Area is unlikely to experience substantive change over time.

4.1.2.1 Prospect Ridge Viewshed

Prospect Ridge is considered a special area within the designated UROS (Figure 2). This area comprises a critical viewshed for Old Town Park City. Within 30 days of issuance of a MPD application or CUP Permit, FMP will grant to the City a conservation easement, with free public trail access (without encumbrances) over acreage located in this area contiguous with City-owned open space. This conservation easement will be to the reasonable satisfaction of the City and shall be first in priority in title.

4.2 Designated Protected Open Space

4.2.1 Lady Morgan Pond Area

With the exception of a few highly localized historic sites, the only designated POS parcel in the Plan Area is the Lady Morgan sub-watershed (Figure 2). This area contains the most extensive emergent marsh and depression wet meadow habitats and the only natural pond within the Plan Area. It contains aspen, conifer, and mixed forest communities as well as mountain shrub habitats. This diversity of habitats provides for high species diversity within this area. Also, the dense forest cover in close proximity to open water indicates that this area has potential to be another important elk calving ground. Accordingly, evidence of deer and elk bedding down in mountain shrub habitat north of the pond was observed in July, 2000. Vegetation management in this area shall occur solely for the purposes of maintaining health and diversity. The high biological diversity associated with this area warrants its designation and rezoning as POS.

According to the Development Agreement, use of the Lady Morgan area will be restricted, by conservation easements acceptable to Park City and by signs and monitoring (if necessary), to skiing (without cutting runs, glading, or thinning trees) and daytime recreational hiking. While an old road grade cuts through the upper portion of the Lady Morgan POS, no additional summer trails will be developed in this area. No construction activity or motorized vehicle use of any kind shall be allowed in the Lady Morgan POS except as allowed, with City staff approval, for forestry and wetlands

management. Mountain biking trails currently skirt the area and will continue to do so in the future. Installation of interpretive facilities at the edge of the POS will help to inform the public of the importance of the Lady Morgan sub-watershed to the overall biodiversity of the Plan Area.

4.2.2 Flagstaff Mine

While the Flagstaff Mine Site does not contain any remaining structures, the importance of this site to the history of mining in Utah warrants its designation as POS. For a detailed history of this site and its historical significance refer to the Flagstaff Mountain Resort Historic Preservation Plan (HPP). Management of this site will simply consist of installing interpretive signage to inform the public of the mine's role in the history of Park City and mining in Utah.

4.2.3 Little Bell Mine Site

The Little Bell Mine Site contains an old ore bin with both historic and aesthetic importance. Consequently, this site is considered POS. For a detailed history of this site and a discussion of historic preservation concerns regarding the ore bin in particular, refer to the Flagstaff Mountain Resort HPP. Management of this site is expected to involve stabilization of the ore bin and installation of interpretive signage explaining the role of the ore bin in the mining process.

4.2.4 Quincy Mine Site

The Quincy Mine Site contains an old hoist and a boiler that were used when the area was being actively mined. Just as with the ore bin at the Little Bell mine, these features have both historic and aesthetic significance and warrant designation of this site as POS. For a detailed history of this site and a discussion of the hoist and the boiler, refer to the Flagstaff Mountain Resort HPP. Management of this site will involve installation of interpretive signage explaining the role of the hoist and boiler in the mining process and cautionary signage warning the public of dangers associated with the mine shaft which, though filled, appears to be subsiding.

4.2.5 Daly West Mine Site

The Daly West Mine is characterized by a large, rusted steel headframe. In addition to its historical and aesthetic importance, this headframe is still in operation and provides maintenance access to the Anchor Tunnel. Consequently, this site is considered POS. Detailed information on the Daly West Mine may be found in the Flagstaff Mountain Resort HPP. Management of this site will involve installation of interpretive signage discussing historical and current use of the headframe.

4.2.6 Judge Mine Complex

As defined for the purposes of this Open Space Plan, the Judge Mine Complex consists of the Judge Drain Tunnel, the Judge Mining & Smelting Company office building, the Judge Mining & Smelting Company explosives bunker, a wooden house, the remains of the Daly-Judge Mill, and the Judge aerial tramway towers. The historical and aesthetic importance of the office building, remaining rail tracks, and the explosives bunker and the huge industrial operation for which these and the other facilities are the only vestige warrant designation of this area as POS. Detailed information on the historical context of this site may be found in the Flagstaff Mountain Resort HPP. Detailed stabilization, restoration, and management actions are also provided in the HPP. These facilities, particularly the office building and wooden house, have been severely vandalized. Thus, at a minimum, management will include installation of interpretive and cautionary signage designed to educate the public on the historical importance of these facilities and foster a sense of stewardship in order to minimize future vandalism.

4.3 Phasing of Plan Implementation

According to the Development Agreement, all land outside of the development pods will be zoned as Recreation Open Space. Upon issuance of the first MPD or CUP for any portion of the Project, FMP and Deer Valley Resort will execute a conservation easement, for the benefit of the City and a third party conservation trust (or similar entity), to limit their use of the Flagstaff Mountain ski terrain to construction, development, and operation of ski and mountain bike lifts, ski and mountain bike runs and trails, one skier day lodge, and other similar winter and summer recreational uses and services. Such conservation easements will prohibit any hotel, lodging, residential, or commercial construction or use on ROS-zoned land in Flagstaff Mountain. Such conservation easement will be to the reasonable satisfaction of the City and shall be first in priority in title.

With respect to the Prospect Ridge Viewshed area (Figure 2), within 30 days of issuance of a subsequent MPD or CUP, FMP will grant to the City a conservation easement, with free public trail access and no encumbrances, over acreage located on Prospect Ridge contiguous with City-owned open space. Such conservation easement will be to the reasonable satisfaction of the City and shall be first in priority in title.

4.4 Management Authority

Deer Valley Resort has management authority and responsibility for all ROS and POS lands within the Plan Area. During development, FMP will be responsible for managing the development pods and any open space within these areas. Following development, the respective Homeowners Association will assume management authority for open space within the development pods.

5.0 RELATED PLANNING DOCUMENTS

5.1 Flagstaff Mountain Resort Trails Master Plan

The Trails Master Plan identifies existing and proposed hiking, biking, and equestrian trails within the Plan Area. It outlines trail management and use considerations and restrictions. The Trails Plan interfaces with this Open Space Plan where trails pass adjacent to or through the Lady Morgan POS and the Centennial Draw Wildlife Management Area.

5.2 Flagstaff Mountain Resort Wildlife Management Plan

The Wildlife Management Plan was prepared to facilitate the preservation of wildlife habitat values within the Plan Area by minimizing habitat loss and human/wildlife conflicts. This plan identifies existing wildlife species and habitats that occur within the Flagstaff Mountain Resort Plan Area, and establishes management guidelines to help maintain the biotic integrity of the area while ensuring the long-term attractiveness and marketability of the proposed developments.

5.3 Deer Valley Open Space Plan

Deer Valley Resort has developed its own Open Space Management Plan for the portion of the ski area within the Flagstaff Mountain Resort property. The Deer Valley plan is considered part of the overall plan presented here. There are six components to the Deer Valley plan: A) General, B) Ski Area Development, C) Winter Skiing Operations, D) Summer Trail Use, E) Commercial Snowmobile Operation, and F) Wasatch County Homeowner Winter Snowmobile Access.

Under the "General" component of this plan, all of the area outside of the identified development pods is designated as Recreational Open Space under the Park City Land Management Code and use of the land is subject to the restrictions of that zone. No later than the issuance of the first MPD or CUP for Pods A - D, United Park City Mining Company (UPK) and Deer Valley are required to execute a conservation easement to limit the use of the Flagstaff Mountain ski terrain to construction, development, and operation of ski and mountain bike lifts, ski and mountain bike runs and trails, a skier day lodge, and other similar winter and summer recreational uses and services. This conservation easement will prohibit any commercial or residential development or use on the ROS-zoned land included in the annexation.

Ski area development restrictions outlined in this plan include the following:

- Only two graded ski runs shall be allowed in Ski Pod Z, with thinning and other limited vegetation removal for skier safety and glade skiing.

- The Lady Morgan Springs area is restricted to skiing without cutting runs, glading, or thinning trees, and summer daytime hiking.

Winter skiing operations and maintenance are the responsibility of Deer Valley Resort. During the winter skiing season (including preparation and shutdown activities immediately before the seasonal opening and closing of the resort, respectively), public access to the ski area is at the discretion of Deer Valley and public use of the property is subject to the operating policies of Deer Valley Resort.

There are two provisions contained in this component of the plan:

- The ski facilities shall be open to the general public and use thereof shall not be restricted to owners of property located within the Deer Valley or Flagstaff Mountain Resort developments or to members of any private club.
- All charges, fees, and costs paid by the general public for the use of the resort facilities shall not exceed those paid by owners of property located within the two resort developments.

The summer trail use component of Deer Valley's Open Space Plan provides a Trails Master Plan for the area. This component of the plan is described in the Flagstaff Mountain Resort Trails Master Plan and the reader is referred to that plan for a more complete description of the summer trail use component.

Commercial snowmobile operations currently utilize a designated route through the Plan Area to access state and private lands outside of the control of Deer Valley Resort. This route conflicts with FMP development plans and will be terminated accordingly.

Deer Valley and UPK have historically cooperated with the Utah Department of Transportation (UDOT) in providing a base parking area and snowmobile route through the Deer Valley ski area for use by property owners in Wasatch County in accessing cabins and/or lots outside the boundaries of Deer Valley ski resort. This route is the same as that referred to under the commercial snowmobile operations section, above. While the parking area and trailhead will ultimately be relocated, Deer Valley and FMP will continue to work with UDOT in providing winter access to Wasatch County landowners.

APPENDIX A

FIGURES

Figure 1. Location of Project Area
Figure 2. Open Space

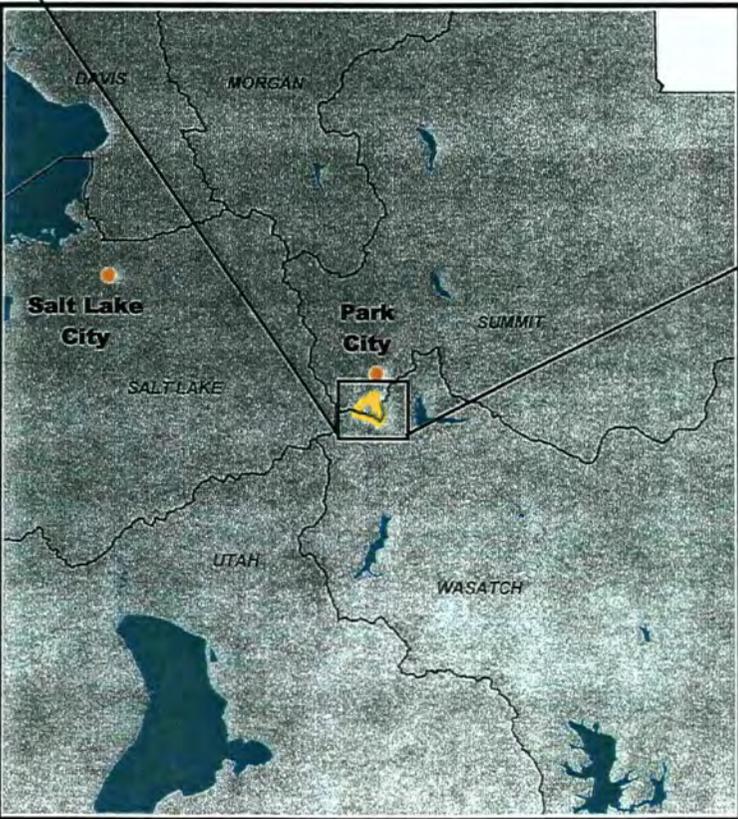
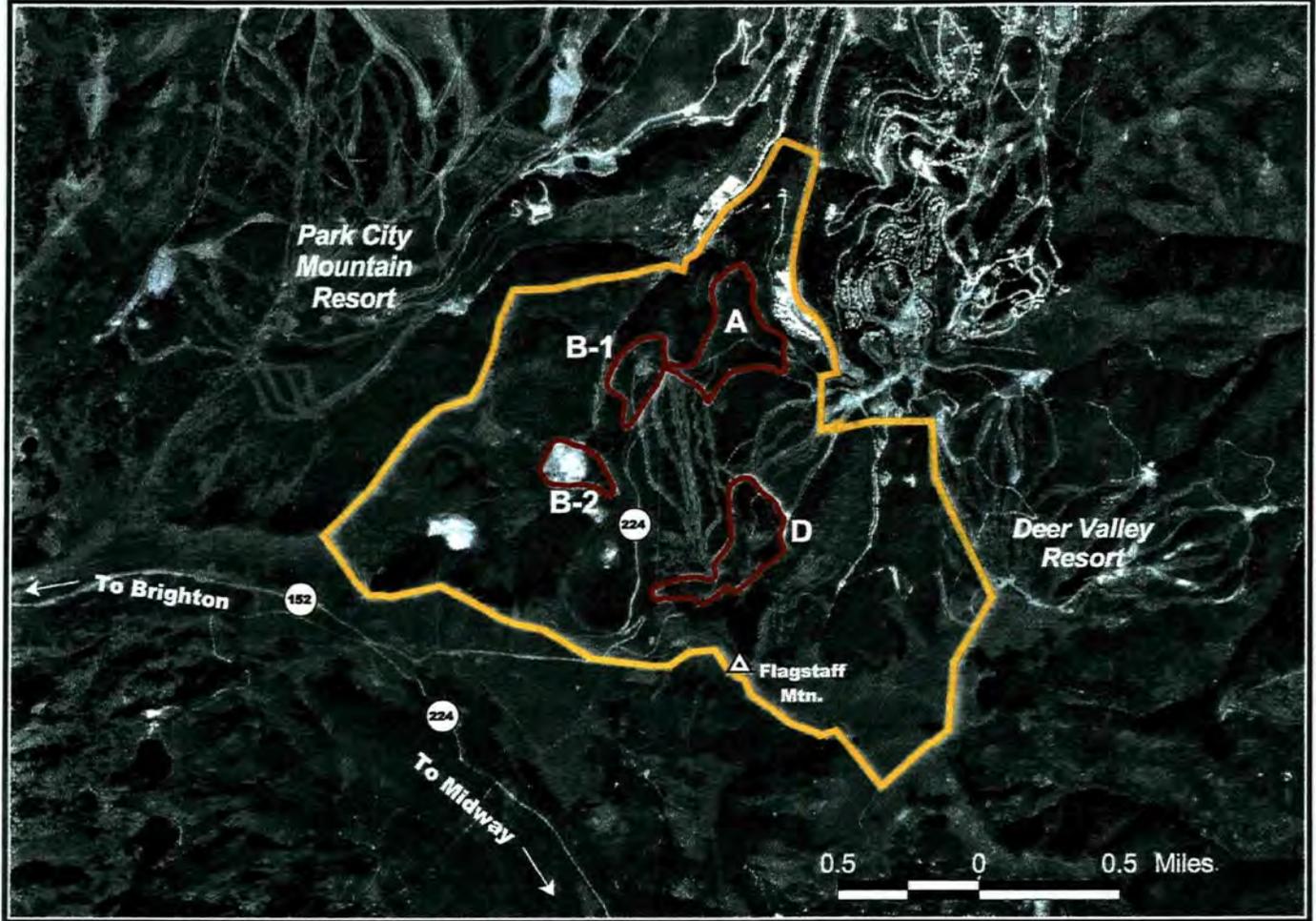


Figure 1. Location of Flagstaff Mountain Resort Plan Area, Summit County, Utah.

SWCA INC.



Figure 2. Open Space

Lift Lines

-  Ski Lift (Existing)
-  Ski Lift (Proposed)
-  Project Boundary

Open Space

-  Developed Recreational Open Space (DROS)
-  Developed Recreational Open Space (DROS)- Centennial Draw Wildlife Management Area
-  Lady Morgan Protected Open Space (POS)
-  Undeveloped Recreational Open Space (UROS)
-  Prospect Ridge Viewshed

Protected Open Space (POS)

-  Daly West Mine
-  Little Bell Mine
-  Quincy Mine
-  Judge Mine Complex
-  Flagstaff Mine



Scale 1: 24,000
0 0.1 0.2 0.3 Miles



Base maps taken from 7.5 minute USGS Brighton (1955, Photo Revised 1975), Heber City (1955), Park City West (1955), Park City East (1955), UT Quadrangles.

