

Linking historic integrity and natural resources through the design of a visitor center day use area located at Craters of the Moon National Monument

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College of Architecture,
Planning, and Landscape
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Linking historic integrity and natural resources through
the design of a visitor center day use area located at Craters
of the Moon National Monument

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Abstract

As time goes on many National State Parks and National Monuments are seeing landscape design changes to better suite their surrounding environment. Not only to reduce maintenance and to become more sustainable but to also develop a sense of place for the users overall visitor experience. To battle the current trends, many National State Parks and National Monuments are developing native outdoor spaces for visitors to enjoy and explore. This project serves to further examine the relationship between the visitor experience and the historical and cultural values of a Mission 66 visitor center located at Craters of the Moon National Monument. A final master plan will examine ways to implement various strategies to enhance the overall user experience amongst native vegetation.



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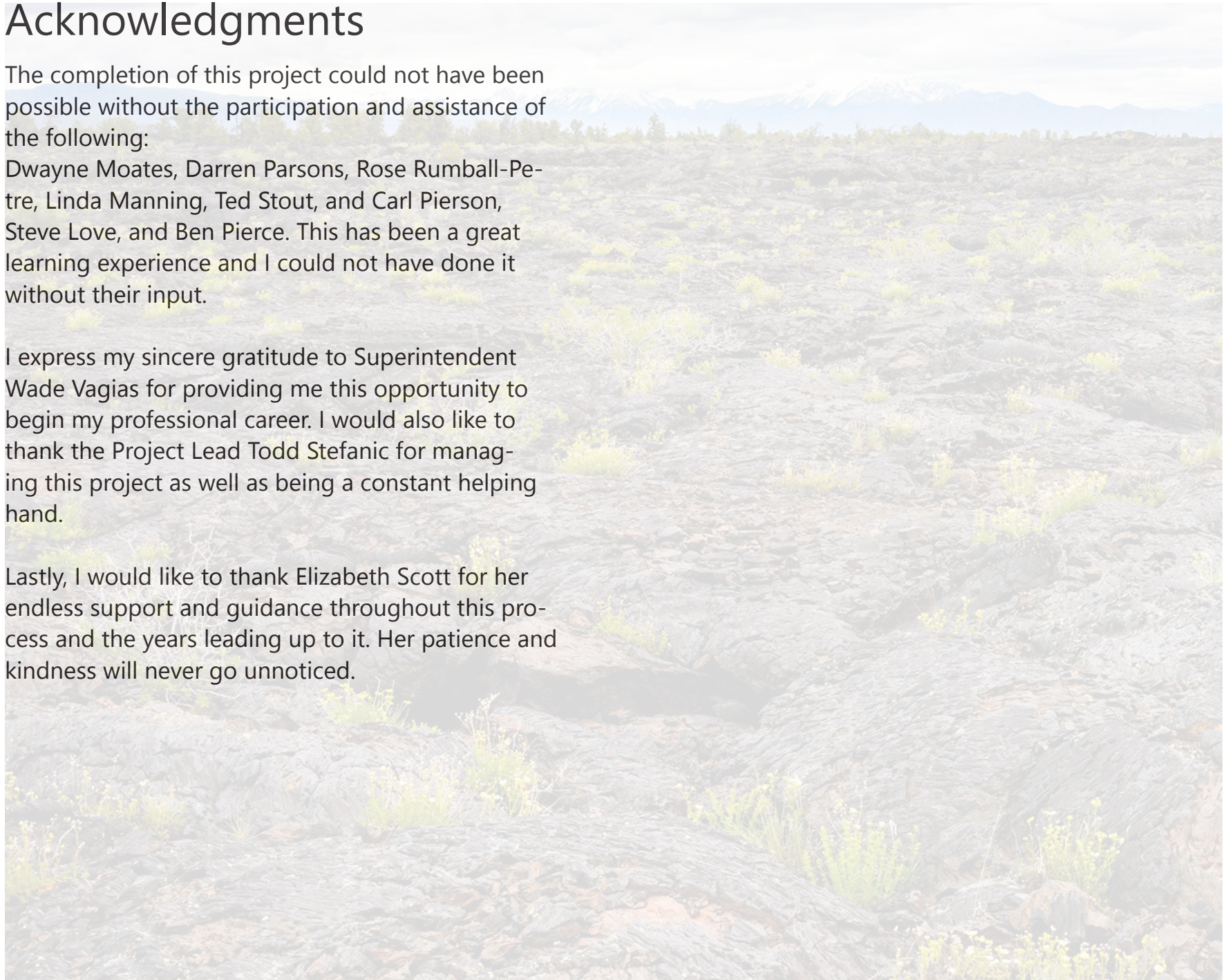


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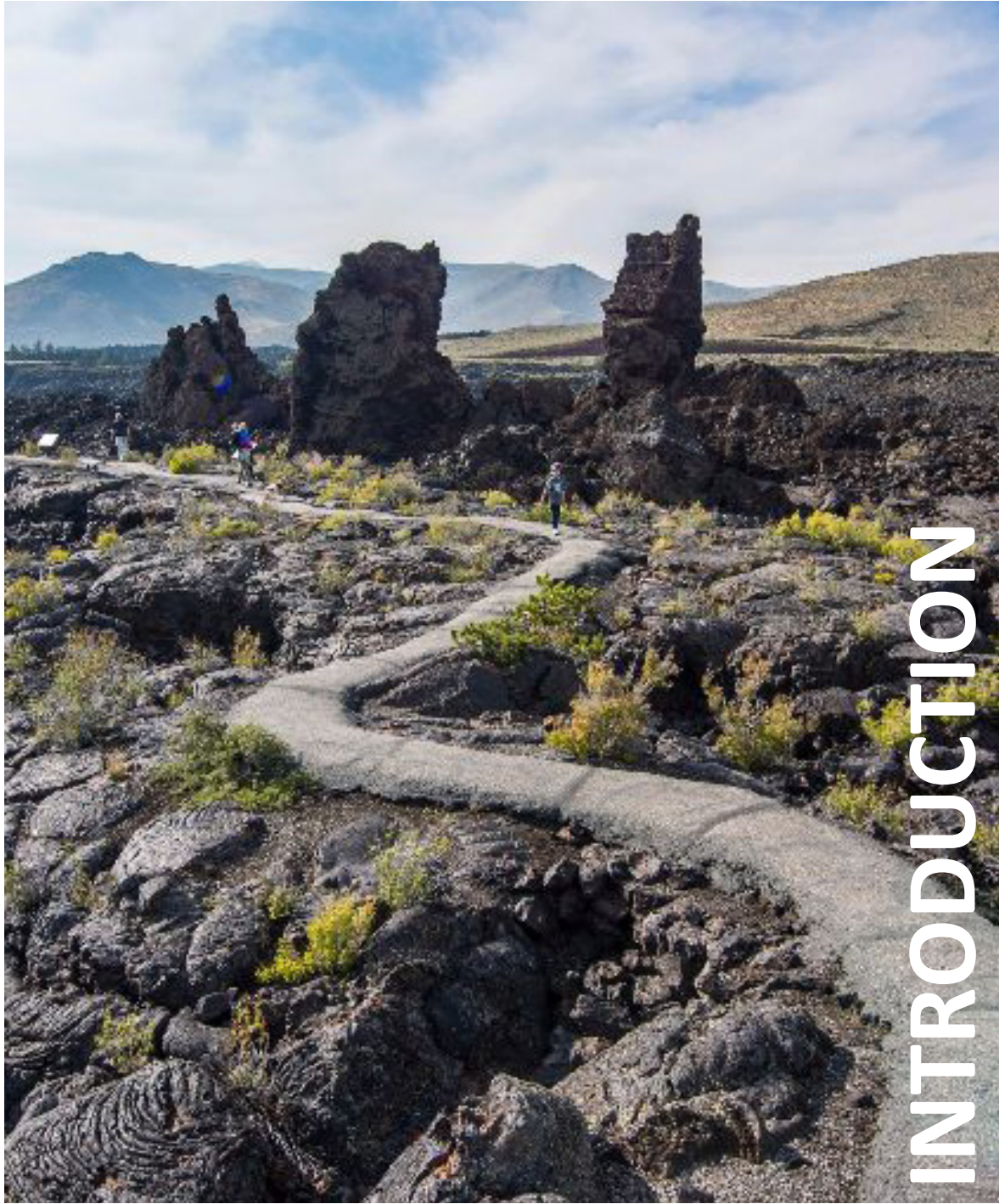
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Relevance/background

Craters of the Moon National Monument began its formation over 15,000 years ago. It has been part of and continues to be part of Idaho's cultural and historic rich background. The Monument lies between two signature landscapes well known in the region: Sawtooth National Forest and Yellowstone National Park. Compared to the stunning landscapes behind and ahead, arriving at Craters of the Moon can seem at first to be some kind of weird wasteland. The park is huge, bare, stark, and most of the year a brown and black color. What can a National Monument in this area have to offer? How and why can his large black hole be called a National Monument?

However, Craters of the Moon National Monument is actually a rich and multifaceted landscape. Its rich history of over a thousand years relates to the extensive research done throughout the immense landscape. "As research progresses, the interaction between nature and humans in the monument's volcanic environment sheds light on how the harsh landscape influenced human activity (Louter, 1995). The mile long views of lava and cinder cones create a feeling of being immersed into an entirely new universe. The Monuments visitor center acts as a significant starting point. Introductory material can be seen through interpretive displays, staff guidance, maps, audiovisual media, and pamphlets.

Currently, the visitor center at Craters of the Moon remains to have a lawn space that is a poor representative of the Monuments landscape as a whole. Investing in the visitor centers exterior could go a long way in neutralizing this impression. By making the exterior of the visitor center into a more accurate representation of the surrounding landscape it can further information and interpretation about the Monument's resources.

Although, the lawn space may seem like a small aesthetic concern next to other issues within the Monument, it does have the potential to enhance larger concerns. The visitor center is the gateway to the Monument and has the ability to change how visitors feel predisposed toward Craters before they have entered. Investing in the exterior landscape also enhances the ability to improve Monument's information and educational opportunities, incentives for visitors to pursue it, personal investment within, and visitor concerns for the Monuments resources.

Over the past several years, the staff of Craters of the Moon National Monument have been working hard to finalize several management and planning objectives. With that, Craters of the Moon has taken appropriate actions to become a nationally recognized Monument that abides by the Idaho State Historic Preservation Office guidelines of Mission 66 Architecture. Doing so, Craters of the Moon has seized the opportunity to redevelop the picnic area located to the right of the visitor center to better enhance the visitor experience, reduce

water and maintenance, and to become more aesthetically pleasing to the surrounding native vegetation.

Project scope

The scope of this project is to develop a low-impact and sustainable design for a picnic area located at Craters of the Moon National Monument's visitor center. The design should reduce water and maintenance needs by introducing a native landscape that better suites the surrounding environment. Although, the scope of this project is limited to the design, it is important to acknowledge other design features that are necessary for the visitor centers picnic area to thrive.

This project will provide a program and a well-developed schematic plan for the picnic area. In addition, it will also provide important section elevations and perspectives of the project site to help enhance the viewers understanding of how the project site can be used. This project will also include the viewer with a plant palette, a set of design features, and a set of design materials. This will not only help communicate the overall design but will provide insight on specific design features.

Research question

Can providing educational opportunities through interpretation at Craters of the Moon's picnic area mend the gap between Craters of the Moon's historic Mission 66 integrity and natural resources?

Project goals & objectives

Craters of the Moon superintendent and staff outlined issues the project attempts to address within the Craters of the Moon Project Proposal document. The end project should meet the long term management goals for Craters of the Moon, while also meeting visitor needs for comfortable resting, meeting, and relaxation areas close to the visitor center. The project should will specifically address:

- Visitor experience and existing functionality of the Picnic Area
- Reducing irrigation needs to the extent practicable
- Minimizing the daily and/or seasonal maintenance burden associated with the operation and upkeep of this area while providing a high quality visitor experience
- Reducing the use of non-native vegetation within the existing lawn area
- Develop an annotated list of furnishings, hardscape, softscape and plant materials needed to implement the preferred design prescription (Avery, 2009).

Methods

Three main research methods are used to conduct this project. A thorough exploration of literature and research on related subjects was undertaken to deliver background knowledge. The literature review served as a strong start to answer questions and focused research towards case reviews and precedent studies and design challenges. Case reviews and precedent studies included comprehensive research of many National State Parks and Monuments as well as helped answer many design questions. The research done also provided insight on design details to avoid in the future. The next research method conducted includes stakeholder meetings. Throughout this process many meetings occurred with a variety of Craters of the Moon staff as well as meetings with different NPS organizations. This helped further answer many questions and concerns but also provided insight on what challenges and opportunities existed on the site. These discussions ultimately directed the final product of this project.

Document organization

The introductory chapter is followed by a thorough literature review, an important case review and precedent studies. After these two main research methods are discussed comes the site analysis. This chapter carefully examines the site to provide site specific details. Following comes the design application of the project which includes details regarding stakeholder meetings as well as final designs of Craters of the Moon National Monuments visitor center picnic area.

Craters of the Moon Project History Timeline

PACIFIC NORTHWEST COOPERATIVE ECOSYSTEMS STUDIES UNIT

Cooperative Agreement P17AC01225

Throughout this process I have been able to meet with a variety of professionals to listen, discover, and to ultimately learn. Below lists a timeline of important dates that occurred throughout this process.

May 2017 - Project begins

June 15, 2017 - Visit to Craters of the Moon National Monument to present first set of preliminary concepts to staff. First tour of the project site and Craters of the Moon.

August 7, 2017 - Conference call with Craters of the Moon superintendent Wade Vagis and Linda Manning to review preliminary concepts - what concept(s) should be carried forward.

September 9, 2017 - Meeting with Idaho State Historic Preservation Office (SHPO) in Boise, ID to present conceptual concepts as well as precedent studies. A discussion followed about whether or not removing the remnant lawn would hinder Craters of the Moon's historic Mission 66 value. Ultimately, SHPO agreed that removing the lawn would NOT hinder the cultural and historic value.

September 29, 2017 - I personally visited University of Idaho Research and Extension Center in Aberdeen, ID to meet with Ben Pierce to receive a tour of the greenhouses and facilities. I gained valuable information concerning what plants would best thrive at Craters of the Moon.

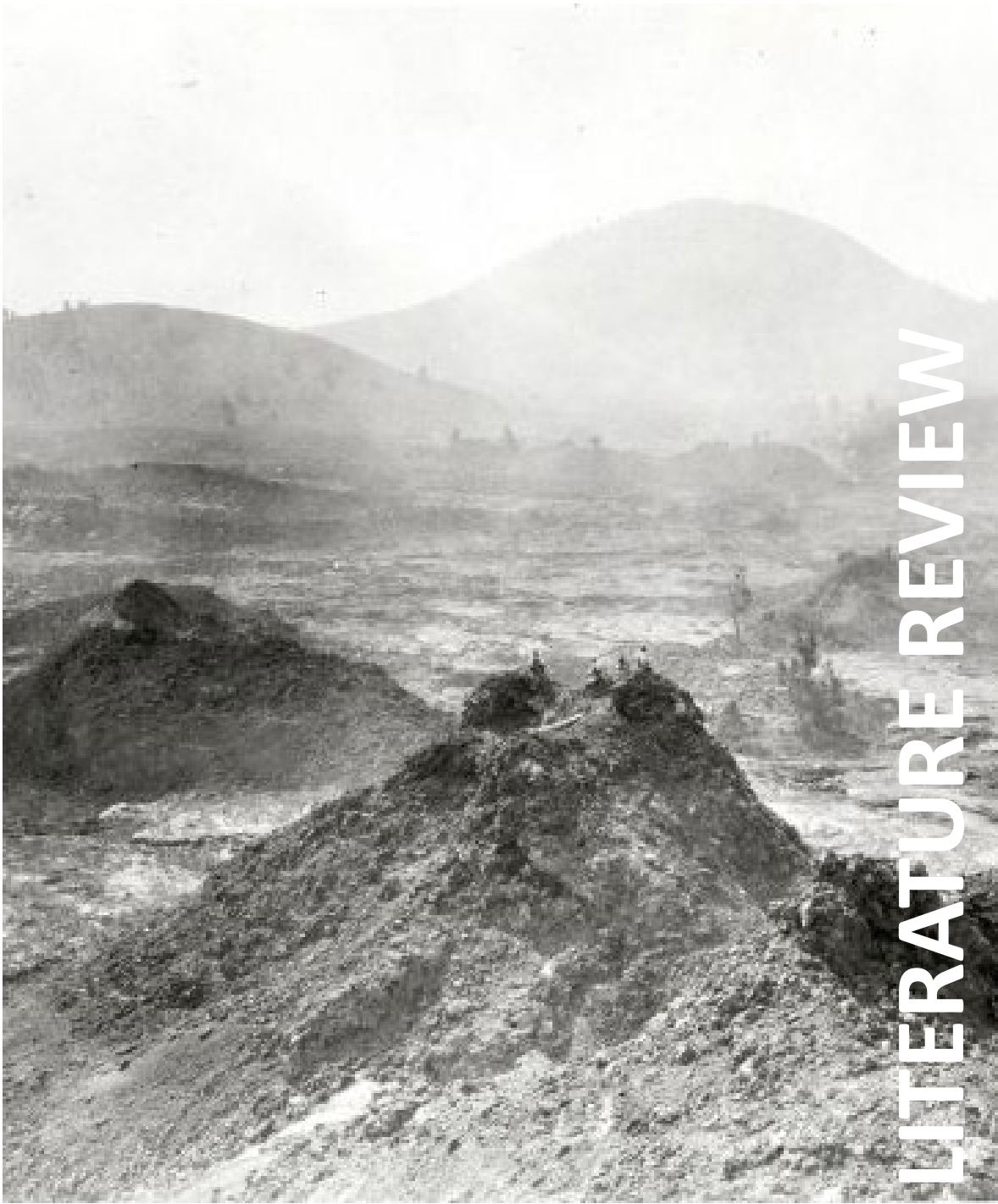
December 7, 2017 - Conference call with Wade Vagis to finalize conceptual concepts - which one to continue development in preparation for meeting with the Denver Service Center.

March 1, 2018 - Conference call with Wade Vagis and Denver Service Center to review the final design application.

March 27, 2018 - Final plant palette is finalized by Steve Love who works and grows plants at the University of Idaho Research and Extension Center in Aberdeen, ID.

May 2018 - Final document containing final concept, perspectives, design application, planting plan, and plant palette are sent to superintendent Wade Vagis and Denver Service Center (end of project).





Craters of the Moon History

Craters of the Moon was first established in 1924 when President Calvin Coolidge designated 22,651 acres of land in south-central Idaho. As of now, the Park encompasses over 75,000 acres of land that is full of lava flows, cinder cones, splatter cones, caves, rifts, other volcanic features, and tree molds (Avery, 2009).

Craters of the Moon may have been established in 1924 but due to very little funding, Craters didn't begin park construction until 1931 due to New Deal relief efforts (Avery, 2009). During this time, Craters of the Moon was developed under the rustic style that characterized the National Park's construction. This rustic style can be defined by the use of natural materials in order to enhance and preserve the natural character of a site. By 1934 the park had completed roads, trails, a custodian's residence which included four rooms, a comfort station, and a warehouse (Avery, 2009). All three of these structures resembled the rustic ear and were built in a 'log-cabin' like fashion that was designed to be unobtrusive. Unlike other parks, Craters of the Moon was not enhanced or preserved due to the rustic design (Avery, 2009).

By the end of the 1930's the rustic era began to fade as architects began to discover the richness in clean lines and innovative materials. Once World War II and travel restrictions ended, National Parks were seeing an increase in visitation (Avery, 2009). In fact, such a large increase that parks were struggling to accommodate. This encouraged the National Park Service to develop a new

program that would upgrade park's utilities, roads, trails, and facilities (Avery, 2009). This era is known as Mission 66.





Wright Brothers National Memorial Visitor Center



Cyclorama Building at Gettysburg

Mission 66 history

In 1955, the director of the National Park Service, Conrad Wirth, proposed a new program called Mission 66 that would modernize and enlarge park facilities by the National Park Service's fifteenth birthday in 1966 (Thompson Bzdek, 2010). Wirth negotiated funding for park updates which led President Eisenhower and Congress to support the NPS efforts (Thompson Bzdek, 2010). Wirth's experience of being a landscape architect and a man who had managed the National Park Service's CCC program in the 1930's "fostered his belief that modern planning and technology could solve preservation issues resulting from intensive public use of the parks"(Thompson Bzdek, 2010). When Wirth first took office he became the director of an agency that had suffered immensely from the effects of World War II. At

this time, funding was at an all-time low but visitation numbers were at an all-time high (Thompson Bzdek, 2010). Before World War II, visitors traveled by train or other uses of public transportation and would often stay for long periods of time (Kinsley, 2013). Post World War II, the vehicle provided shorter visits and more leisure time. These points determined the "foundational belief that development and construction of additional facilities were necessary to cater to the new levels of visitation while still conserving resources" (Kinsley, 2013).

Introducing Mission 66 led Wirth and his team to focus on how to develop an "efficient, streamlined agency that could facilitate the demands of the modern era" (Baker, 2006). Mission 66 marked the second era of new park

development. It introduced a new architectural style Park Service Modern which led to the development of a new building type-the visitor center (Baker, 2006). In 1958, Wirth wrote, "remember that we too are preserving more than a landscape. It is just as important to preserve the opportunity to enjoy" (Kinsley, 2013). Mission 66 focused on much more than reconstruction efforts but also saw the need for park planning and interpretive and educational opportunities. Park structures built during 1945 to 1955 contained few elements of modernism (Baker, 2006). Labor and resources were sparse post World War II which sparked a new park service construction methodology. Cultural, architectural and scientific "influence created an entirely different concept and approach to park construction, as well as other facets of park administration" (Baker, 2006). This new methodology of development overall was a way to help control the high numbers of visitors within the park (Kinsley, 2013).

Mission 66 architecture can be defined by materials like concrete, steel, and glass. These materials allowed for unique design elements that could be expressed structurally and aesthetically (Baker, 2006). Mission 66 structures also used pre-fabricated and pre-cast materials. Modern materials helped create a variety of different structures in various parks throughout the US. The structures "intended to be inconspicuous and low maintenance, were typically tinted in earth tones, and low in profile" (Baker, 2006). (FIGURE SOMETHING). These details allowed structures to be strategically placed

amongst parks to serve high visitation and environmental needs (Thompson Bzdek, 2010).

Mission 66 did not solely focus on the modern design of structures but also incorporated improvements to visitor amenities and housing which was important to the expansion of the National Park System (Baker, 2006). During this time of expansion the NPS also focused on agency identity and branding which led to the official recognition of the arrowhead logo. There was also more attention focused around interpretation. Interpretation efforts promoted major resources, resource protection and agency public relations (Baker, 2006). The Mission 66 era was, above all else, "a program to protect park resources while still providing an enjoyable experience for large numbers of visitors. New roads, trails, infrastructure, administration buildings and comfort stations were needed, as well as more better-trained park staff" (Kinsley, 2013).

The Mission 66 era remains to be one of the most influential time periods in National Park History to this date. It has shaped the way visitors use and navigate parks with the creation of the "visitor center, localizing use in less sensitive areas, 'day use' visitation, the growth of gateway communities, and the expansion of designated wilderness areas" (Baker, 2006). Once Mission 66 was formally concluded, Wirth stepped down as Director in 1964. Wirth's successor, George B. Hartzog, Jr. successfully carried out Mission 66 which officially ended in 1966 (Baker, 2006).

The Mission 66 visitor center

The visitor center became the most notable building to come from Mission 66 architecture. It represented the “most architecturally significant expression of the planning and design practices developed by the National Park Service” (Avery, 2009). Centers were meant to blend into the natural landscape with a horizontal shape, native colors and textures, and a flat or shallow roof form (Avery, 2009). The visitor center acted as a building to replace park museums and administration buildings. It became a concentrated building that included the information center, administrative offices, restrooms, exhibits, and audio visual presentations (Avery, 2009). Visitor Centers are usually placed at the park entrance which provides guests a familiar and constant place to gather, find out park resources and information on how to best navigate the park. More than one hundred visitor centers were built by the National Park Service during the Mission 66 era (Avery, 2009).

Mission 66 is guided by eight fundamental points outlined in the official Mission 66 report created by the National Park Service. The eight points follow as:

1. Provide services and accommodations for “modern recreational needs” to be achieved through “greater participation of private enterprise.”
2. “Provide government operated facilities needed to serve the public, to protect the park resources and to maintain the physical plant.”
3. Make the parks “more usable, more enjoyable, and more meaningful” and “improve protection of the parks through visitor cooperation.”
4. Increase operating funds and field staff.
5. Provide adequate employee housing.
6. Obtain additional lands and water rights necessary to protect the parks.
7. Create a national recreation plan to “produce a system of recreational developments by each level of government.”
8. Protect and preserve wilderness areas and encourage their appreciation and enjoyment (Kinsley, 2013).

Once these guidelines were established, fourteen guidelines were created in order to help park officials achieve these program goals. A main outcome from these guidelines stressed that park resources should be protected. According to the guidelines, the best possible way to protect park resources was to provide numerous visitor park facilities “for public use and appreciation of an area, and for prevention of over-use (Kinsley, 2013).

Visitor facilities would allow for parks to provide interpretive programs and information to “help the park visitor enjoy the area and to appreciate and understand it, which leads directly to improved protection through visitor cooperation in caring for park resources” (Kinsley, 2013). The guidelines carefully outline that the development of park facilities should not “encroach on important park features and that wilderness areas remain undeveloped (Kinsley, 2013).

Visitor center at Craters of the Moon

In 1957, Craters of the Moon began the shift from rustic log buildings to a modern and comprehensive feel by the help of the National Park Service. Craters of the Moon was one of the only parks in Region Four to receive Mission 66 funding to begin transformation. The National Park Service spent about \$1 million dollars at Craters of the Moon to develop mission 66 (Avery, 2009). During a one year span, Craters gained a visitor center located near the entrance, utility building, comfort station, one four-unit apartment building, one duplex, and three three-bedroom homes. The Park Service also took extra actions to level out the camp-sites, created nine parking spaces, installed a water and sewage systems, and paved the loop road (Avery, 2009). Craters of the Moon workers also acknowledged the need for an entry booth, fence, drinking fountain, twenty-five new fire pits for the campgrounds, thirty new picnic tables for a new picnic areas, as well as a secondary water and

sewage system. By 1959 the Park had successfully transformed into a typical Mission 66 design. This new design fit the natural volcanic landscape of Craters of the Moon much better than the rustic log design. In the document, “Craters of the Moon Visitor Center Picnic Area Rehabilitation: Background, History, and Analysis of Potential Preliminary Alternatives and Impacts”

“Completed in 1958, the new headquarters area was landscaped with native and nonnative xeric plants, including a seed mix with three grass species, as well as 10 types of shrubs and four types of trees, including limber pine, quaking aspen, and Douglas-fir, as well as three grasses. Two of the shrubs called for were substituted with native species.

“Cecil Doty considered landscaping essential to making the location ‘livable,’ since plants would furnish shade and wind breaks, so he designed a landscape with trees, shrubs and other vegetation. Workers added 1,302 cubic yards of topsoil to the rocky, volcanic soil of the complex area, and by May of 1958, they had planted 469 shrubs, ten Douglas fir, 150 limber pine and 77 Colorado quaking aspen. Some of these trees were intended to screen the staff housing from the highway, visitor center and campground. However, many soon died in the monument’s harsh climate” (Avery, 2009).

According to the 1992 General Management Plan for Craters of the Moon, it noted that in the 1990’s lawn areas located around employee housing, the visitor center, and parking began to be removed to be replaced by na-



tive xeric plantings. The decision to remove lawn areas largely had to do with the amount of water and maintenance lawn care required as well as the amount of mule deer it began to attract. According to the Preliminary Alternatives and Impacts report, the former superintendent spent an estimated \$40,000 per year to maintain the "golf course like" lawn in the 1970s and 1980s.

To date, the project site with some other minor areas of lawn located behind the employee housing is the only lawn left at Craters of the Moon. The visitor center remains in its original location at 7,913 square feet which includes the main administrative offices and acts as the main hub for visitor services. These services include an information desk, restrooms, auditorium, gift shop, and an exhibit area. The visitor center is constructed on a 4"

concrete slab and its walls are made of concrete masonry (Avery, 2009). The exterior walls are made of two earth-toned 4"x16" split-faced pumice blocks and are topped with a flat roof. The southern face of the building is occupied by four large steel-slashed windows that are encompassed by gray and beige porcelain panels. A 50' deep plaza constructed of 10' concrete squares separated by 2" x 4" redwood planks separates the building from a visitor parking lot. The plaza provides informational signage, artwork done by students who have visited the park, and is located near a native plant demonstration walk (Avery, 2009). This plaza space provides visitors a place to gather, learn, and a space for rangers to gather students/visiting groups before they begin to explore Craters of the Moon.

Craters of the Moon notable visitor center alterations

In 1997, restrooms located on the back north wall of the visitor center were demolished and replaced with larger, wider stalls to accommodate for handicapped accessibility. Staff of Craters of the Moon also remodeled the exhibit area and introduced a dropped ceiling (Avery, 2009).

The visitor center was originally a set of three rectangles that collectively covered 4,600 square feet. The east and west sides of the building originally included covered porches. The porches provided a shaded space for visitors to enjoy (Avery, 2009). In 1984, the porches were enclosed in glass which acted as a barrier from snow drifts blocking access to the building in winter months. In 2005, wings were added to the east and west sides of the building that provided storage, a library, additional office space, and auditorium space. During these additions the building added new wiring, heating, sprinkler system, double pane windows, and a galvanized steel roof replaced the original (Avery, 2009).

The main plaza of the visitor center remains in its original location but lawn areas to the east, west and south were replaced by native vegetation in the 1990s in order to conserve water and to reduce maintenance. The project site adjacent to the visitor center remains as on one of the last pieces of lawn (Avery, 2009).



Elements of the visitor experience

What is visitor experience? The term visitor experience has no standardized definition, although the phrase can commonly mean an encounter designed to convey a direct message or encourage a specific outcome it can also mean to broaden one's capacity for personal exploration and further growth. By designing with the intention for visitors to have an experience it allows one to be challenged on an "emotional, physical, intellectual, or even spiritual level" (Pine & Gilmore, 1998).

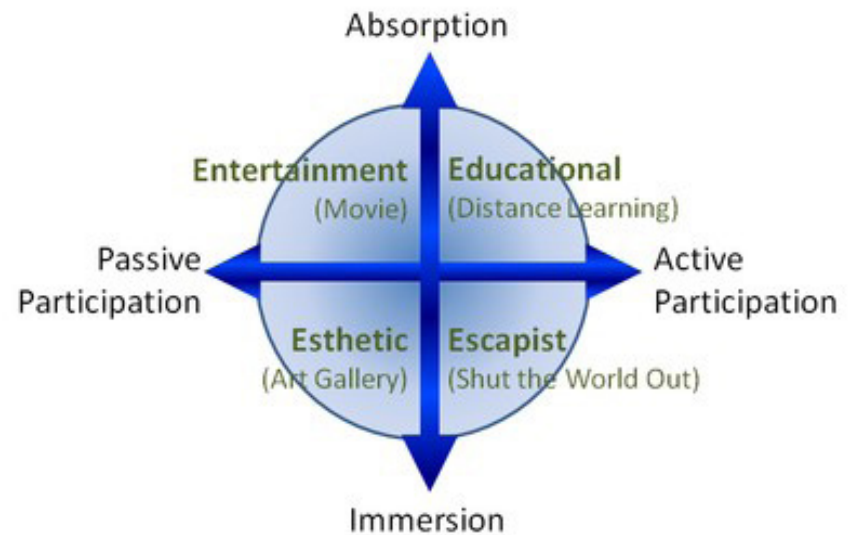
In the article "Welcome to the Experience Economy" written by Pine II and Gilmore, they say that experiences occur on two dimensions. Both dimensions play a vital role

in participation and connection. The first dimension includes active and passive participation. Active participants affect the performance or event while passive participants do not affect either at all (Pine & Gilmore, 1998). This dimension also recognizes a spectrum between active and passive extremes. For example, a crowd of concertgoers are not completely passive, they add to the visual and auditory outcome for other participants (Pine & Gilmore, 1998).

The second dimension focuses on absorption and immersion. Absorption is when a participant's attention is occupied by the event-bringing the experience into the mind. Immersion is when a participant becomes physically or virtually apart of the experience. For example, "people viewing the Kentucky Derby from the grand-

stand absorb the event taking place before them from a distance. Meanwhile, people standing right up against the rails in the infield are immersed in the sights, sounds, and smells of the race itself as well as the activities of the other revelers around them” (Pine & Gilmore, 1998). Like the first dimension, the second also recognizes a spectrum between absorption and immersion extremes (Pine & Gilmore, 1998).

There are four broad categories of experience that correspond with the two dimensions mentioned above. 1) entertainment experiences, 2) educational experiences, 3) escapist experiences, and 4) aesthetic experiences (Pine & Gilmore, 1998). Entertainment experiences generally involve passive participation and absorption. These experiences include activities such as watching television, listening to the radio, or attending a play. Educational experiences generally involve active participation and absorption. These experiences include activities such as attending a history class, learning a trade or taking a piano lesson. Escapist experiences generally involve active participation and immersion. These experiences include playing soccer, singing in a musical play, or shooting hoops at a basketball court. Aesthetic experiences generally involve passive participation and immersion. These experiences include visiting an art gallery, basking in a sunset, or enjoying a panoramic vista (Pine & Gilmore, 1998).



Above: This image showcases how the two elements of visitor experience and the four corresponding categories intertwined with each other as well as provides a corresponding activity.

Interpretation

The definition of interpretation can be defined best by the Philosopher Freeman Tilden. He described interpretation as an “educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than simply to communicate factual information” (Tilden, 1977). Tilden also believed that when visitors observe, all interpretation should expose the beauty, wonder, inspiration, and spiritual connotations (Tilden, 1977).

Susan Jacobson mentions how the audience for inter-

pretation is a moving target. She stated that “most people visit parks, forests, marine reserves, zoos, and nature centers for recreation, not necessarily to learn something” (Jacobson, 1999). When guests visit the zoo they often enjoy their surroundings and a nice picnic lunch before directly choosing to learn about the animals. Therefore, interpretive activities must be enjoyable, recreational, and entertaining to gain an audience (Jacobson, 1999).

In order to comply with different personalities and values within a varying target audience, interpreters stimulate activity on four levels: 1) contemplative, 2) didactic, 3) demonstrative, and 4) exploratory (Jacobson, 1999). Contemplative activities encourage participants to observe and meditate. Didactic activities tell a message or

story. Demonstrative activities portray an event or skill and exploratory activities inspire participants to make their own findings (Jacobson, 1999).

Often, interpretive strategies are expressed through guided tours, events, films, exhibits, reenactments, performances, public events, mass media, and most commonly, signage (Jacobson, 1999). The National Park Service follows a six-part policy for interpretive activities. These six goals support the NPS agency and parks while enriching the visitor experience and enjoyment.

Below left: A family enjoys a guided tour.

Below right: Children play with interactive signage.



1. Information and orientation: provide easy access to information needed for a safe and enjoyable park experience.
2. Understanding and appreciation: foster deeper understanding of resources and values of the park, its regional context, and the national park system.
3. Protection: offer a variety of opportunities to interact safely with and enjoy park resources while protecting the resources from overuse, damage, vandalism, and theft.
4. Participation and skill development: aid and motivate development of recreational skills.
5. Dialogue: provide means for the communication of thoughts and desires among the public, neighbors, and park managers.
6. Education: provide interested users and educational groups with information needed to develop a thorough understanding of a park resources, its regional context, and the entire national park system significance and values (Jacobson, 1999).

These six goals are used by resource management agencies to help people better understand the process of management objectives. By adding interpretation to private and public lands, it increases the visitor's enjoyment and support (Jacobson, 1999). Studies have credited interpretation with "successfully decreasing vandalism poaching of wildlife, and other destructive behavior such as littering, collecting ""souvenirs"" or riding bikes on hiking trails" (Jacobson, 1999). Interpretive approaches have also gained park and reserve compliance, in-

crease support for management practices, and most importantly, public safety (Jacobson, 1999).

Wayfinding

Wayfinding can be described as an active process. It requires mental engagement and active attention to the environment one attempting to navigate (Calori, 2007). A key objective of wayfinding is to "enable each person to form a mental map of a site or environment, so the clearer the physical layout of a site, the clearer the mental maps will be" (Calori, 2007). Passive and active elements can also be described in wayfinding. Together, passive and active information allow people to navigate larger surroundings, such as museums, the mall, or a friends place in an apartment building (Calori, 2007).



Above: indiwayfinding along one of the interpretive trails at Banff National State Park.

Signage

Signage is placed within the built environment to communicate information to people about their surrounding environment (Calori, 2007). Unlike other objects within the built environment like light fixtures or landscaping, signage is there to showcase meaningful information in hopes that people act upon. The purpose of signage can be depicted by two categories: 1) information, and 2) interpretation (Gross et al, 2006).

Examples of informational signs include street signs, orientation maps, danger signs and identifications signs. The main purpose of these signs is to identify, advertise, warn, and to guide visitors (Gross et al, 2006). Examples of interpretive signage include plaques that honor event(s) that took place at a historical site, signage that portrays information about animals at the zoo or aquarium (Calori, 2007). Interpretive signage “helps people interpret the meaning of an environment, or places within it, by providing information on its history, geography, inhabitant, artifacts, and more” (Calori, 2007). Often, interpretive signs will attract many users by adding multiple messages. This encourages all users to engage and learn about the information being presented (Gross et al, 2006). Due to varying interests the 3-30-3 rule was established by Gross, Zimmerman and Buchholz. This states that most visitors spend about 3 seconds looking at any given signage, some spend 30 seconds looking at the signage, and few spend 3 minutes reading the entire sign (Gross et al, 2006).



Above: Visitors explore interactive signage at Desert Botanical Garden in Phoenix.

Placemaking

Placemaking “creates a distinctive image for a site, and can be expressed in several ways (Calori, 2007). This strategy develops a narrative and character for the landscape. Identifying and establishing a unique identity and a sense of place helps theoretically create an environmental brand (Calori, 2007). Like other forms of signage, placemaking helps enrich the visitor experience through informational signage, interpretive signage, gathering spaces, and landmarks. Placemaking can often fall short and seem as though it is simply a sculpture or architecture without the clearly relaying the communication intent (Calori, 2007). Placemaking continues to strengthen the connection between people and the places they share by focusing on the physical, cultural, and social identities that define a place (Project for Public Spaces, n.d.).

Below: Children painting in the street at a park fair.



Sustainability:

Since 1916, the National Park Service has been “a world leader in protecting natural and cultural resources, preserving many of the country’s greatest treasures and in the process becoming a model for sustainable resource management – including sustainable management of facilities and operations to ensure a comprehensive approach to fulfilling an environmental stewardship mission” (National Park Service, n.d.). Due to the NPS overseeing over four hundred park units across the United States, individual parks have been left to implement sustainability in a direction they desire. There are several approaches or ways to organize this aspect of design which is outlined in the National Park Service document, Guiding Principles of Sustainable Design (GPSD). The document includes both natural and cultural resources, site design, input, waste flows, management planning, and the interpretive sustainability (United States Department of the Interior, 1993). Due to the scope, this project will focus on the reduction of water and maintenance use as well as how human comfort can be improved in outdoor spaces. Due to the GPSD being written in 1993 and how sustainability continues to become a more culturally widespread goal, the principals and goals outlined in the document have become widely accepted.

Interpretation at Craters of the Moon:

Due to Craters of the Moon's stark landscape, interpretation has always been and continues to be a priority. The first several decades included a small management group and an underfunded staff that tried to maintain the monuments educational needs (Louter, 1995). With the monuments Mission 66 expansion in 1957 came the start of an interpretation program that remained until David Clark became the monument's chief interpreter and developed an interpretive program in 1979 (Louter, 1995). Clark developed a document which "expressed the need to revise the program to match visitor use to personal and nonpersonal services, in order to provide the most effective interpretive programs" (Louter, 1995). In 1981, natural and cultural resources were included in the program document which stated five specific themes and objectives for interpretation:

- To encourage the understanding and appreciation of the geological, biological and ecological influences which make up Craters of the Moon. To stimulate an increasing awareness and interest in the visitor concerning all natural processes occurring in the monument and elsewhere
- To encourage understanding the role preservation plays in the maintenance and management of natural areas.
- To instill in the visitor a sense of caution when confronted with unfamiliar safety hazards.

- To give the visitor a better understanding of monument regulations and policies.
- To create an understanding and interest in the role that past human influences have had upon the monument and our culture (Louter, 1995).

Three slight changes have been made to the document over the past ten years. The first change was to note the geological processes located at Craters of the Moon were part of those that created the Snake River Plain. Secondly, was to emphasize the Park Service's concern for matters affecting the natural world and thirdly was to educate visitors about resource management concerns (Louter, 1995). Educating the visitor about resource management was important in order to "relate the concept of preservation and the role it plays in the management and maintenance of natural areas" (Louter, 1995).



Above: Naturalist hike in the North Crater Flow, ca. 1963



Sustainability and interpretation:

"Sustainable design, sustainable development, design with nature, environmentally sensitive design, holistic resource management – regardless of what it's called, "sustainability," the capability of natural and cultural systems to maintain themselves over time, is key" (United States Department of the Interior, 1993). That being said, communicating sustainability through interpretation creates the best outcome for shaping experiences and sharing values (United States Department of the Interior, 1993). By showcasing awareness for the environment, values can be instilled for the protection of the environment. When a sustainable design is complete it should not only seek to affect ones immediate behavior but

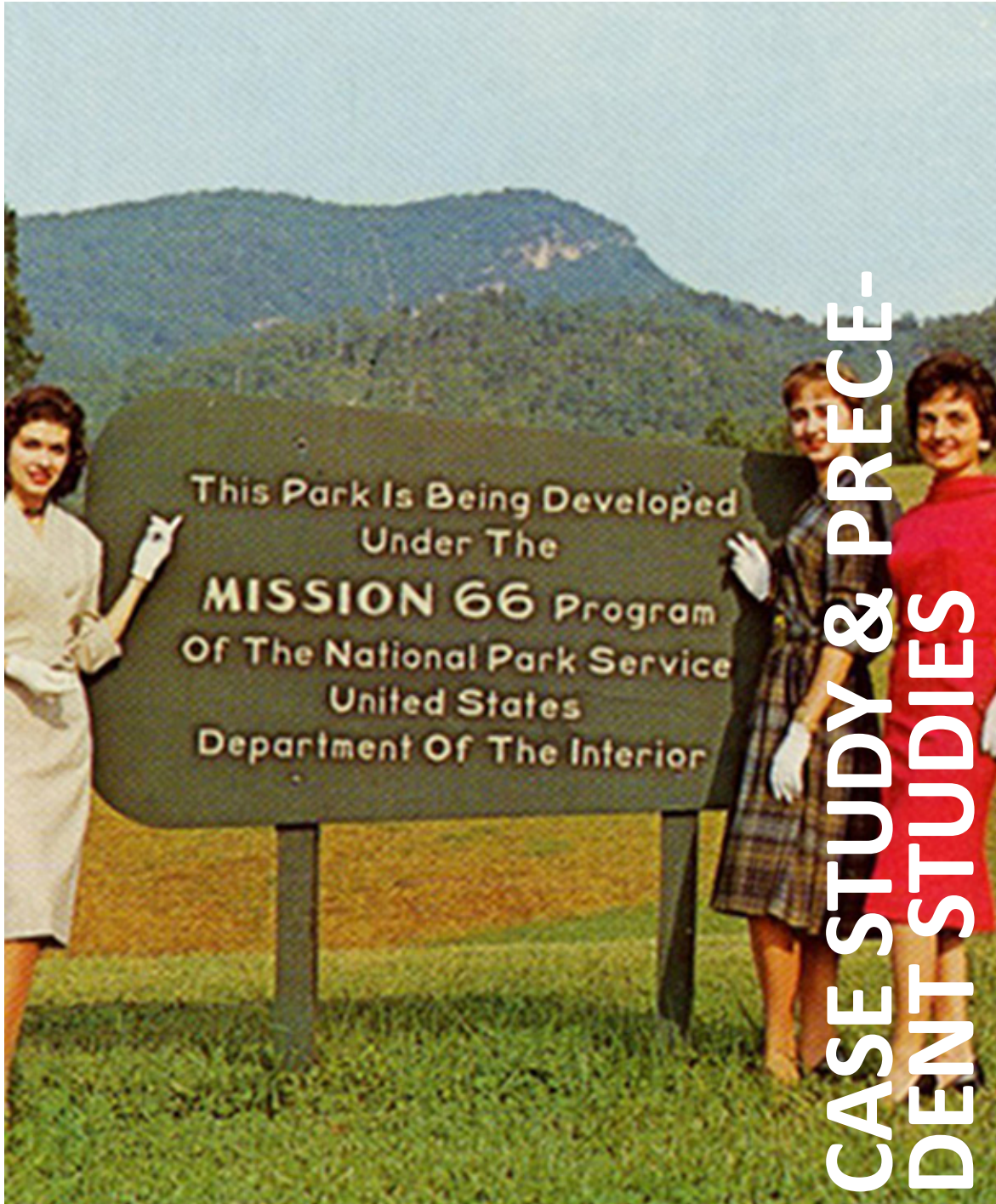
also the long-term attitudes and beliefs of visitors (United States Department of the Interior, 1993).

To achieve the message of sustainability through interpretation the Guiding Principals of Sustainability have outlined four major points that should be addressed. They follow as:

- Visitor experiences should be based on intimate and sensory involvement with actual natural and cultural resources. The local culture should be included. The experiences should be environmentally and culturally compatible and, through understanding and appreciation, should encourage the protection of those resources.

- Educational opportunities should include interpretation of the systems that sustain the development as well as programs about natural and cultural resource values of the setting.
- Site and facility design should contribute to the understanding and interpretation of the local natural and cultural environments.
- Interpretation should make the values of sustainability apparent to visitors in all daily aspects of operation, including services, retail operations, maintenance, utilities and waste handling. A good example should be set in all facets of operation.

The purpose of this section is not to propose a comprehensive sustainability plan for the project site but to address sustainability as it directly affects the physical planning of the site.



CASE STUDY & PRECEDENT STUDIES

President Study's

While there are many National Parks within the United States, there is no specific park that is identical to Craters of the Moon. This being the case, the president studies chosen highlights similar attributes and provide inspiration for site specific design elements such as creating an interpretive landscape, or a landscape that interprets a surrounding landscape. The main study provides a simple overview and a set of design implications.

The precedent studies include 17 National State Parks and Monuments within western arid climates. Although, these parks may have not been given a closer look their findings still provide substantial information about redefining historic and cultural landscapes. The precedent studies mainly focus on Mission 66 properties and whether or not they had lawn and if so to see if the lawn had been replaced with native or adapted vegetation.

The following pages include a chart with valuable information concerning 17 precedent studies. The chart provides where and when each visitor center is located and built, whether the visitor is Mission 66, if lawn remains or has been removed, and important information that should be noted.

It should be noted that all precedent studies were completed to the best abilities of what information was available.

The following pages will also provide images of a wide range of Visitor Center conditions and environments within these western arid climates.

NPS PROPERTY	LOCATION
Death Valley	Badwater, CA
Tuzigoot	Clarkdale, AZ
Petrified Forest	Petrified Forest
Devils Tower	Devils Tower, W
Zion	
Bryce	Salt Lake City, U

LOCATION	TYPE	VC HISTORY	LAWN	OTHER LANDSCAPE	NOTES
	NM	Furnace Creek VC is Park HQ. Center built in 1959-60, Mission 66 architecture. Original VC had lawn that was removed incrementally since 1960. Redesign of VC in 2010 kept small patches in Courtyard, and main lawn west of VC building Stovepipe Wells Ranger St about devoid of veg, typical of surrounding valley floor Scotty's Castle remains closed due to 2015 flooding. Historic structures and landscape are preserved, including lawn and pool.	Small patches still in courtyard and adjacent to VC at Furnace Ck. None at Stovepipe Wells, but lawn remains with cottonwoods, etc. at Scotty's Castle.	Native playa lscp of mainly spring mound mesquite (screwbean, honey), Atriplex, and various forbs with some invasives (ie, tamarisk)	Furnace Ck Inn and Golf Course privately owned and developed. Seem to be removing grass in courtyard since 2012-13 redevelopment of VC at Furnace Ck. Lawn west of bldg still present, but not irrigated?
	NM		None	Native sage steppe and cottonwood-mequite bosque	
NP, AZ	NP	Painted Desert VC and Complex, and Rainbow Forest Museum. Mission 66 architecture at PD; RF previously was Park HQ, very few lscp changes over 90 years. At PD, "...planting plans created by architects, ... never implemented or have since proven incompatible with climate conditions and the necessity for conservation of water and maintenance." (Van Fleet, 2011)	None	Native Colorado Plateau Desert	Sustainability webpage identifies current "policy" direction. More on history, see Van Fleet, Burton, and Belt Collins Rainbow Forest Historic Designed Landscape
NY	NM	Devils Tower Visitor Center –Non Mission 66	Lawn maintained over small area	Native grasslands and forest, evergreen mixed with grasses and forbes	A new visitor center is currently being designed
	NP	Kolob Canyon Visitor Center –Non Mission 66 Zion Visitor Center built in 1957 – Mission 66	None at present	Native at present	Zion Visitor Center built as a Green Building in 2000 to maintain energy efficiency
UT	NP	Original Bryce Canyon Lodge building built in 1925. Bryce Canyon VC Mission 66 built in 1959 at a new location off of the redesigned Rim road. Used as the current VC.	Lawn remains at current VC. Small patches of lawn remain around current cabins.	Native 1957-numerous Ponderosa pine and Mnt. Mahogany trees and Manzanita shrubs were planted at a parking lot. "This style would be rooted in a fundamental twofold philosophy, first, that natural landscape features be preserved and second, that all construction harmonize with nature." (UofA research and design team)	Proclaimed national monument in 1923 Renamed and redesignated Utah National Park in 1924 Renamed Bryce Canyon National Park in 1928 which doubled the size of the Park. Grazing became an issue around the Lodge and surrounding cabins due to tender grass -1930 Mission 66 acted as the catalyst for Bryce and Zion to become two different parks (1956). NPS employees move to new VC in 1959.



Kolob Visitor Center - Zion NP



Alan Bible Visitor Center - Lake Mead NRA

Yellowstone	
Chiracahua	Wilcox, AZ
Lake Mead	Boulder City, N
Canyon de Chelly	Chinle, AZ
Dinosaur	Jensen, UT / D

					<p>Bryce Canyon Lodge became a National Historic Landmark -1987</p> <p>1980-2006 Additions and alterations to the VC altered Mission 66 characteristics. Created a larger, two story building from the mission 66 building.</p> <p>*could not find any information about future removal of lawn or reviews of the lawn</p>
		<p>Bachelor Officers Quarters built in 1900s for the Army. Alterations were made to be used as VC/museum in 1969. Now known as the Albright VC located at Mammoth hot springs.</p> <p>Old Faithful Educational VC opened in 2010.</p> <p>Grant VC built in 1965 –Mission 66</p> <p>Fishing Bridge Museum and VC built in 1931 – National Historic Landmark</p> <p>Canyon Visitor Center –Mission 66 built in 1957</p>	<p>Lawn heavily remains around the Albright VC and surrounding buildings.</p>	<p>Native landscape with no lawn found at the Canyon VC, Grant VC, Fishing Bridge and surrounding buildings.</p> <p>Native landscape found at Old Faithful VC and surrounding buildings but retains small native grasses next to Myraid Creek,</p>	<p>The well-known architect Robert C. Reamer built numerous buildings for every major developed area in Yellowstone. Some of his work can still be found at Old Faithful, Yellowstone Lake, and Mammoth.</p> <p>Yellowstone became a National Park in 1872.</p>
	NM		None	Native	
IV	NRA	<p>Lake Mead Lodge (Boulder Beach) Constructed in 1941 – Mission 66 renovations 1966</p> <p>Temple Bar Development constructed in 1952 – Mission 66 renovations 1961</p> <p>Alan Bible Visitor Center built in 1966 under Mission 66 –Current VC</p>	<p>Grassy lawn completed in 1949 at Lake Mead Lodge. In 2012, Lake Mead Lodge was removed along with all lawn. No lawn at present.</p>	Native	<p>Before the Lodge was removed it was under consideration to be placed on the NRHP listing. Due to the buildings lack of maintenance, it was considered useless. The NPS consulted with SHPO to mitigate the 'adverse affect' which resulted in educational opportunities, a website, and an exhibit located where the lodge once stood.</p> <p>Temple Bar went under renovation in 2013 that led to qualification for LEED silver rating.</p>
	NM	Mission 66 Visitor Center completed in 1964.	No lawn at VC or campgrounds, but retained at Thunderbird Lodge, run by Navajo tribe	Native	In 2007 Canyon de Chelly started a First Annual Centennial Strategy, "by 2016 the park must reflect a dedicated partnership between the NPS, Navajo Nation, and local canyon community – a stewardship that embraces a diversity of culture, ideas, and visions for the next 100 years, but also is working towards common goals." (Travis Scott, 2007)
inosaur, CO	NM	<p>Quarry Visitor Center built in 1957 – Mission 66</p> <p>Quarry Exhibit Hall built in 1957 –Mission 66</p>	None	Native	Quarry VC was demolished in 2009 and relocated to a new location that better fit the park.



Canyon de Chelly Visitor Center - Canyon de Chelly NM



Quarry Visitor Center - Dinosaur NP

Arches	UT
El Morro	Ramah, NM
El Malpais	Grants, NM
Pecos	Pecos, NM
White Sands	NM

		Canyon Visitor Center located in Dinosaur, Co built in 1957 –Mission 66			Quarry Exhibit Hall closed in 2006 due to expanding soils that caused the foundation to crumble. 2010-2011 the foundation of the Hall was reconstructed –preserving the Mission 66 architecture. The Hall reopened in 2011.
	NP	Arches National Park Visitor Center built in 1960 –Mission 66 In 2008, the VC was “recycled and rehabilitated” into a completely new building. All character defining character was lost.	None	Native	Arches became a National Park in 1971 and since then has gone through multiple boundary changes. The latest boundary change happened in 1998 that now includes Lost Spring Canyon.
	NM	El Morro Visitor Center built in 1964 – Mission 66	None	Pine oak woodland, pinion-juniper woodland, transitional juniper-savannah, and grassland shrubland Native	The current levels of pinion and juniper throughout the Monument act as intense fuel load for wildfires as well as cause intensive grazing. Since 2001, little efforts have been made to reduce the fuel loads by cutting back in limited areas. In 2006, the Monument slowly began to remove large vegetation around the base of the rock. This process has occurred over several years to not “shock” the rock. “Most of the key landscape features and overall environment remains little changed from Ancestral Puebloan times.” (A.D 900
	NM	El Malpais Non Mission 66	None	Native – Lava	Very similar to Craters of the Moon – although it is not Mission 66 it is surrounded by lava fields and caves. El Malpais borders the El Malpais National Conservation area which is protected and managed by the BLM.
	NHP	Pecos National Historic Park Visitor Center built within the 1960's- Non Mission 66	None	Native	
	NM	White Sands National Monument Visitor Center and museum built in 1936 and opened in 1938.	None	Native	It took 35 years and multiple attempts to protect the dunes. The White Sands became a NM in 1933 under the Antiquities Act of 1906. Atomic bomb testing accrued 60 miles north of the sands in 1945.

Fort Union	Watrous, NM
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Arches Visitor Center - Arches NP



White Sands Visitor Center - White Sands NM

NM	Due to architectural conservation, Fort Union was given a temporary VC and employee housing in 1956 when the Park opened. A year later the Park received Mission 66 funding for a new "territorial style" VC which was completed in 1958.	A "short grass prairie" still remains around the VC as well as in the middle of the road loop entrance to the VC.	"The Park Service has planted a number of both native and non-native foundation plantings and shade trees in the area surrounding the Visitor Center. To the extent that these efforts recall similar efforts during the historic period" (Amy L. Freitag, 1994)	Before the Park opened it went under architectural conservation and stabilization of ruins that lasted around 38 years.
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Conclusion

The precedent studies presented in this section directly impact the design of Craters of the Moon's picnic lawn area. These precedent studies provide real world examples that show how effective or ineffective the design choices made are to the historic and cultural value of the property. The images above provide a strong representation of what visitor centers in western arid climates look like with surrounding native vegetation. Many design decisions from Mission 66 National State Parks or Monuments will be taken directly into the design phase of the picnic lawn area. Other design decisions that were not successful will be evaluated and will not be used in further design details.

Upon review, Furnace Creek visitor center located at Death Valley National Park will be further investigated to provide a case study.

Design implications

- Both historical and cultural values should be considered to create a sense of place
- Consider visitor center renovations to become more cost and energy effective
- Removing lawn at a Mission 66 visitor center has not diminished the historic and cultural value
- Consider educational opportunities for visitors
- Consider a balance between lawn and native vegetation



Case Study

Location: Death Valley National Park, California

Established: February 11, 1933

Project Type: Visitor Center

Project Designer: Cecil Doty

Death Valley's Furnace Creek Visitor Center complex was built in 1959 to exemplify the National Park Service's Mission 66 program (Architectural Resources Group, 2014). The complex consists of two main buildings and a central courtyard for visitors to enjoy. Due to the location, the complex sees hot dry summers with temperatures in the hundreds and cold winters with temperatures roughly in the low forty's. Although, weather has not stopped park visitation. In 2009, due to the cost of energy rising and the immense climate the Park began redesigning the complex to become more sustainable

while maintaining the mid-century modern look of Mission 66 (Architectural Resources Group, 2014). The two main buildings were slightly expanded to create more lobby/administrative space and to develop an exterior covered water station that includes multiple drinking fountains. The complex was also restored with new native plantings to reduce water use and old pedestrian walkways were replaced with new concrete paving to ensure accessibility for all users (Architectural Resources Group, 2014). This expansion was carefully redesigned to maintain and preserve the character-defining features of Mission 66. The Furnace Creek Visitor Center Complex had a grand reopening held in November, 2012.

Notable changes made to Furnace Creek Visitor Center Complex

- Shade structures placed in the courtyard
- New bathroom facilities
- An improved parking lot to better traffic flow and to provide shade
- Renovations of the theater where park films are held

Sustainable & Energy Efficient changes

- Triple-pane insulated windows
- An improved roof with redefining insulation
- Air-lock entry ways to limit cooling loss
- Updated heating and cooling system
- Updated insulation

Design implications

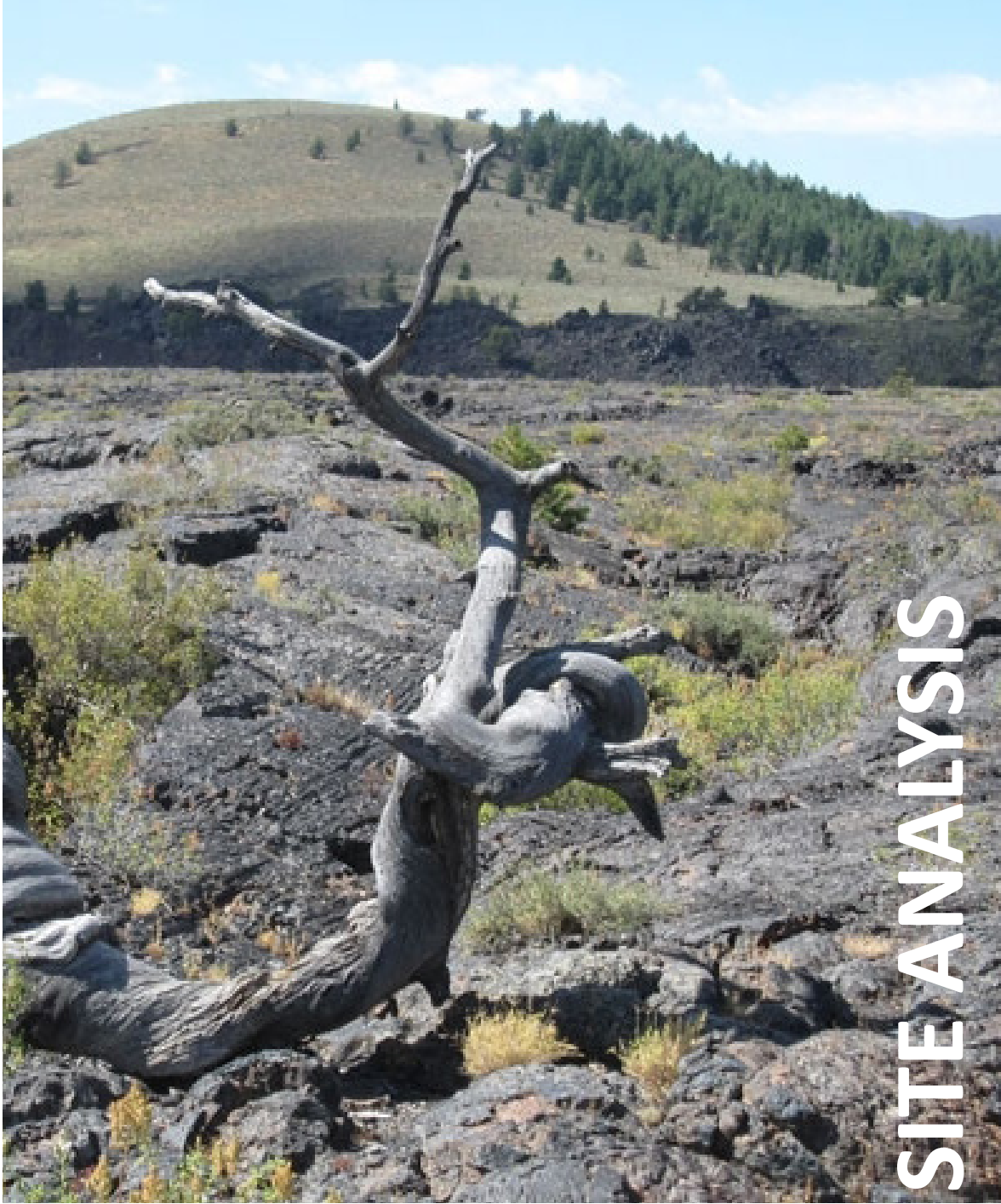
- Making alterations to a Mission 66 Visitor Center does not always hinder the historic and cultural value
- Shade structures in western arid climates can provide comfortable spaces outside
- A balance between lawn and native landscape does not always hinder the historic and cultural value
- Implement energy efficient strategies



Furnace Creek visitor center complex courtyard. It includes shade structures, a shaded walkway, and a pool for visitors. This image also portrays the balance between lawn and native vegetation.



This image portrays a different view of the courtyard. It pictures more shade structures, a shaded walkway, a shaded sitting area, and the pool.

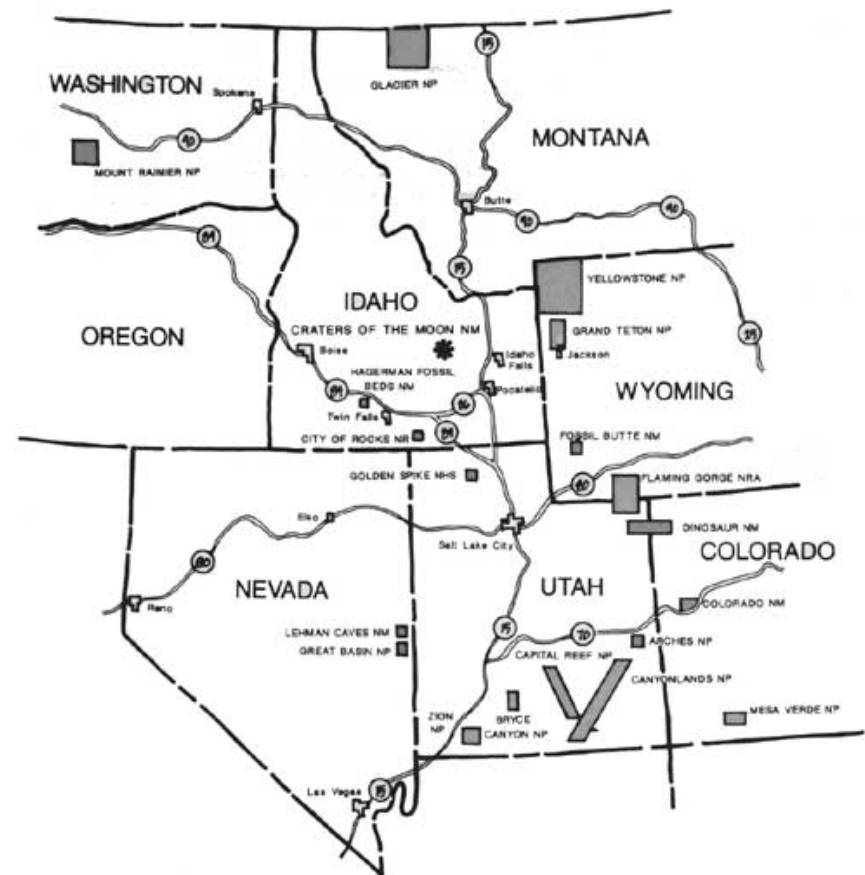


SITE ANALYSIS

Craters of the Moon National Monument Location

Craters of the Moon National Monument is located within Idaho's Snake River Plain. Its black and raw lava landscape began to take form over 15,000 years ago which spreads over sixty miles from north to south which is larger than the state of Rhode Island (Louter, 1995). The monument lies between two counties, Blaine County and Butte County. Blaine County contains the nearby town of Carey, ID and Butte County contains the small rural community of Arco, ID which is the closest town to the monument (Louter, 1995). Arco is roughly eighteen miles northeast and provides an array of nearby services. U.S Highway 20-26-93 connects Craters of the Moon to major population centers within Idaho like Idaho Falls, Twin Falls, Pocatello, and Boise (Louter, 1995). The highways also connects Crater's to major tourist destinations such as Yellowstone National Park and Sun Valley which includes Sawtooth National Park.

The image to the right portrays an overview of where Craters of the Moon is located in Idaho in comparison to other states, major cities, major highways, and other National States Parks and Monuments.



Location
Craters of the Moon
National Monument
United States Department of the Interior - National Park Service
DSC/Disc/90.131/20011

A closer look

The image to the right takes a closer look at the vast lava filled land in location to other nearby locations within Idaho. Craters of the moon visitor center named the Robert Limbert visitor center is roughly 18 miles from Arco, ID and 24 miles from Carey, ID.







Site specific

The current project area covers about 4,600 square feet immediately east of the Craters of the Moon Robert Limbert visitor center. The flat site has eight round concrete picnic tables, three Douglas-fir trees (*Pseudotsuga menziesii*), and one water birch (*Betula occidentalis*) which all lie within a dominantly Kentucky bluegrass

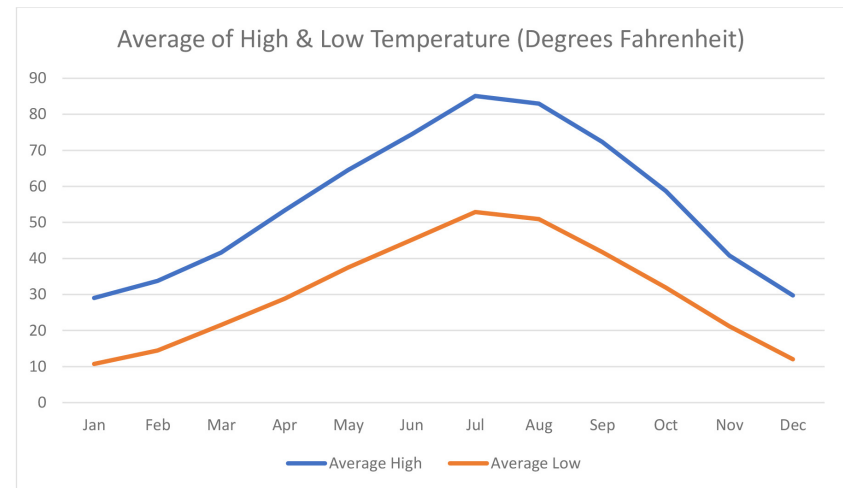
is currently no ADA access to picnic tables, although the picnic tables themselves are ADA compliant. A sidewalk runs along the west and south end of the site, next to a parking lot where buses frequently unload visitors. A 150' wall that runs along the northern edge of the picnic area separates the site from the administrative/maintenance parking and maintenance facilities.

The site is mainly used as a place for visitors to gather, picnic, relax, find shade, sit, stretch, etc. Many different groups use the site including RV and tent campers; local, national and international tourists; and cross-country motorcyclists and bicyclists. It also functions as a space for rangers to gather visiting student groups at certain times of year due to its location near the bus loading/unloading zone and visitor center.

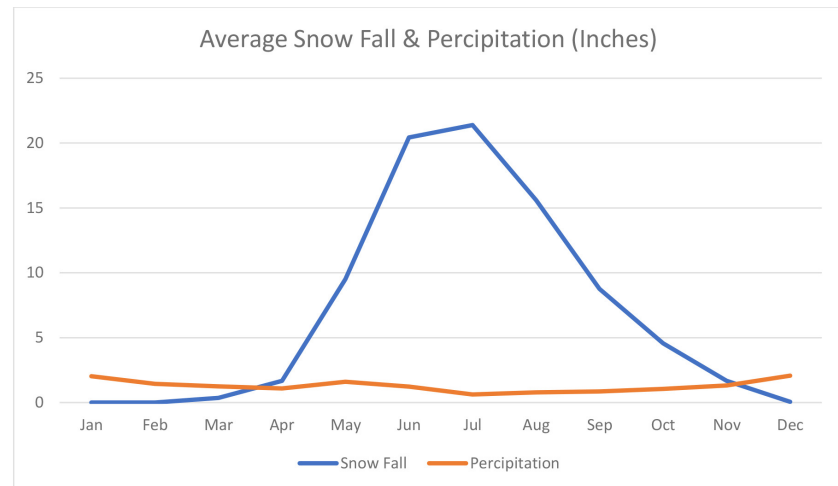
Park staff have noted undesirable uses of the lawn, including visitors using it as a place to walk their dogs, which is incompatible with its intended picnic use. Deer and other wildlife have been noted grazing on the lawn. This increases the potential for wildlife fatalities along US Route 20, which lies nearby to the north and west of the visitor center.

Climate

Due to Craters of the Moon's large size and varying elevations the overall weather and climate vary. The project site sees hot summers of temperatures up to the 90's which bakes the surrounding lava, which can create surface temperatures of 170 degrees Fahrenheit. The park also sees cold winters that can develop heavy snowfall that covers the black lava. Spring and fall tend to be milder with varying weather. Year round, Craters of the Moon can see strong dry winds that can reach up to 15 to 30 miles per hours. During the hot summer months, the project site is heavily utilized as a space to find shade, relax, and picnic. Park staff report that when picnic tables are full, guests resort to finding space on the lawn.



The chart above represents the monthly average high and low temperatures at Craters of the Moon from the winter of 1958 to June 2017. The data was taken from the WRCC website.



The chart above represents the monthly average snow fall and precipitation at Craters of the Moon from the winter of 1958 to June 2017. The data was taken from the WRCC website.

Project site soils

The soil textures located at Craters of the Moon vary in color, age, organic matter, and coarseness. In 1958 when the new Mission 66 visitor center was built the picnic lawn area became one of seven open green spaces within the park. To make this possible, workers added 1,302 cubic yards of topsoil to volcanic soil. Beginning in 1984 and continuing until 2005 all green spaces except the picnic lawn area were stripped of lawn and replaced with native vegetation. The picnic lawn area remains to be the last remnant lawn located at Craters of the Moon. Although the soil was not originally from the site, other areas around the Visitor Center that have been replanted with native plants show that the soil supports those species without any notable problems.

Project site irrigation

At 4,600 square feet, the project site uses about 109,000 gallons of water annually. About 50% of the water used for the site currently is used to help maintain proper chlorine residual in the potable water system. The project site is programmed to be watered each morning June through September at a time visitors are not present for roughly 15 minutes.

Flora and fauna

Craters of the Moon supports a very large and diverse set of plant communities. Over 750 different types of plant species can be found throughout the lava flows, cinder areas, kipukas, mountain and riparian areas. Al-

though, Craters of the Moons climate can seem harsh a wide variety of native plants thrive within the lava and rough climate. A vibrant flower that can be seen covering the rocky gravel each spring is the dwarf monkey flower (*Diplacus nanus*). Peak bloom for spring wildflowers generally occurs in mid-June across cinder gardens within the Monument. The Monument also obtains a variety of bushes like the big sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), Utah juniper (*Juniperus osteosperma*), and rubber rabbitbrush (*Ericameria nauseosa*). These can be seen all throughout the Monument.

A vast majority of the plants found at the project site and Craters of the Moon Headquarters have been personally planted for shade, windbreak, and buffer, to enhance the native landscape and to help reduce the amount of maintenance needed. Craters of the Moon visitor center also has a unique demonstration garden placed directly outside of the visitor center for guests to enjoy and learn about surrounding native vegetation. Vegetation located at or near the project site include the lodgepole pine (*Pinus contorta* var. *latifolia*), douglas-fir (*Pseudotsuga menziesii* var. *glauca*), the bellflower; harebell (*Campanula rotundifolia*), the quaking aspen (*Populus tremuloides*), and many more.

Due to the large stark land, a large range of animals call Craters of the Moon home. Spring through summer, birds and some rodents are seen most throughout the park. Turkey vultures are the most common, as are

mourning dove, northern flicker, common raven, bushy-tailed woodrat, coyote, mule deer, least chipmunk, and many more. It has been noted that mule deer come across the highway in the early morning to graze on the Kentucky blue grass located on site. This has caused a hazard for vehicles using highway 26. The plants and animals common on site will strongly be considered when designing the project site (National Park Service, 2018)



Common plant species (pictured above)

- Monkey flower
- Utah juniper
- Antelope bitterbrush
- Rubber rabbitbrush



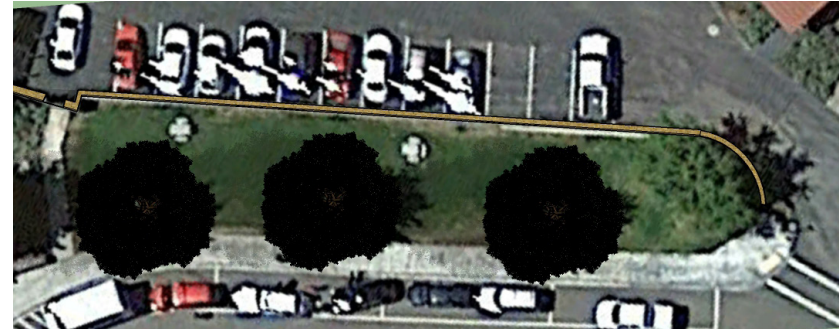
Common animal species (pictured above)

- Northern flicker
- Turkey vulture
- Bushy-tailed woodrat
- Mourning dove
- Mule deer
- Least Chipmunk

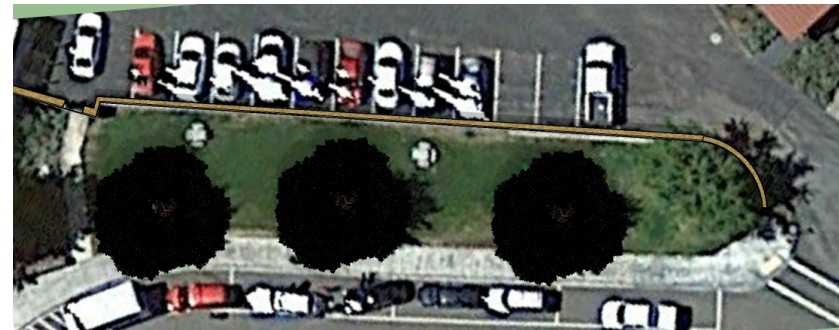
Shade analysis

During the summer months is when Craters of the Moon sees a vast majority of their guests. It is important to provide visitors with shade due to the dry hot summer temperatures. The images to the right portray how much shade the three large douglas firs cast on the project site at various times of the day. Due to the high rate of people that visit the park during the summer months, for this study, the summer solstice has been chosen. While the douglas firs provide adequate shade throughout the day, there are still gaps of open land that will not be shaded at all. This shade analysis will also provide valuable information on where to place native vegetation and picnic tables in the future deign development.

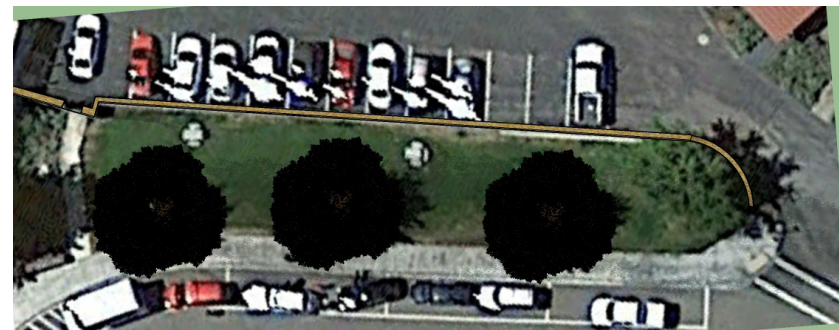
The western water birch will be removed to provide a possible group gathering area.



2017 Summer solstice at 9am.



2017 Summer solstice at noon.



2017 Summer s During the

Amenities and activities

There are numerous activities that Craters of the Moon National Monument currently offers. When guests first enter the monument, the visitor center is the first stop. The visitor center houses educational exhibits and materials and a small gift shop. Guests may also see a film, presentation, or find a scheduled ranger-led walk. The visitor center also provides in house restrooms as well as a water bottle filling station for guests to use before adventuring. Next guests come upon the entry to the seven mile loop road that provides endless opportunities to explore Craters of the Moon. This includes access to various trails, caves, and exciting short walks which includes views inside spatter cones, a short walk up an inferno cone, and tree molds. The seven mile loop road is the first step inside a vast stark land.

Craters of the Moon also offers overnight camping for tent or RV campers. There are 42 site available on a first come-first served basis. The campground is equipped with water, restrooms, charcoal grills, and picnic tables.



Above: A family hikes up inferno cone.



Above: Guests enjoy one of many campsites Craters has to offer.

User groups

Craters of the Moon National Monument sees more than 200,000 people explore the vast lava filled lands every year. Whether visitors stop in for a night while passing through or a family of five spends the weekend camping, the user groups vary. Due to the visitor center and loading and unloading zone being near the picnic lawn area, the project site can see a wide range of users. Below, the picnic lawn area user groups have been broken down into five main groups:

- Day visitor's - whether it's to eat lunch or find shade or just to enjoy company many users will take advantage of the picnic tables
- RV and tent campers -
- Tourists - Craters sees local, national, and international tourists year round
- Bikers - Craters will see people doing cross country tours on bicycles as well as motor bikes. It's been noted that they occasionally take refuge at craters for a stop or to stay a night
- Students - Occasionally, mainly two months out of the year, craters will use the space to gather kids for guided school field trips

The images to the right display how visitors use the site on hot summer afternoons.



Opportunities

- Site is flat, good for built structures adhering to ADA regulations
- Existing infrastructure located near site, new utilities will not be required
- The project site is in a high traffic area and will get the desired attention
- Native vegetation surrounds project site, introducing new native vegetation won't hinder the cultural and native landscape
- Three large douglas fir trees produce adequate shade on site
- Eight ADA accessible picnic tables remain on site to be reused

Constraints

- The narrow site creates a possible wind tunnel
- The site will no longer be able to be used to help maintain proper chlorine residual in the potable water system
- The narrow site may create it difficult to develop a large group gathering space





STAKEHOLDER MEETINGS

Stakeholder meetings

An important consideration in developing the design alternatives was the National Register application for the Robert Limbert Visitor Center. Ultimately, a decision was made that this last remnant of the original lawn was not a contributing or character defining feature of the Mission 66 architecture, and replacing it with native plantings would not negatively impact the application process. In general, lawns are considered anachronistic landscape types in the arid western regions, where water resources are scarce, and rather than prairie grasslands. This is true of the arid high desert environment of Craters of the Moon.

The following pages portray the conceptual process. During this process of developing conceptual designs, periodic stakeholder meetings occurred to discuss wants and needs, what staff members liked and disliked, and questions and concerns. Throughout these meetings goals and objectives stayed relatively the same but the design and layout of the site constantly changed. At the end of the process and meetings, the removal of the lawn was final. The last concept provided displays the final conceptual concept that inspired the final schematic

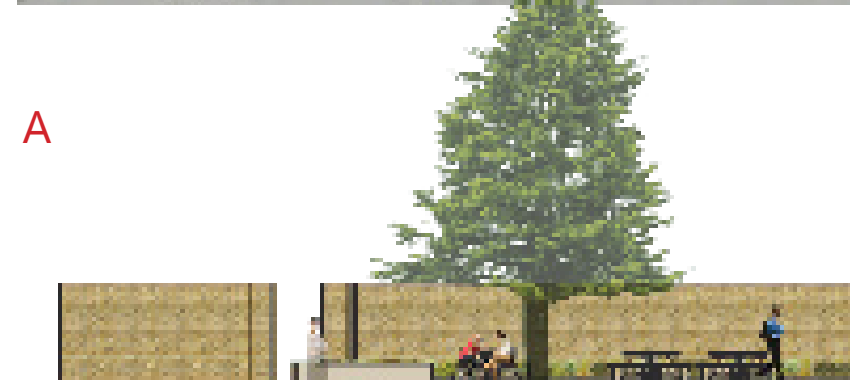
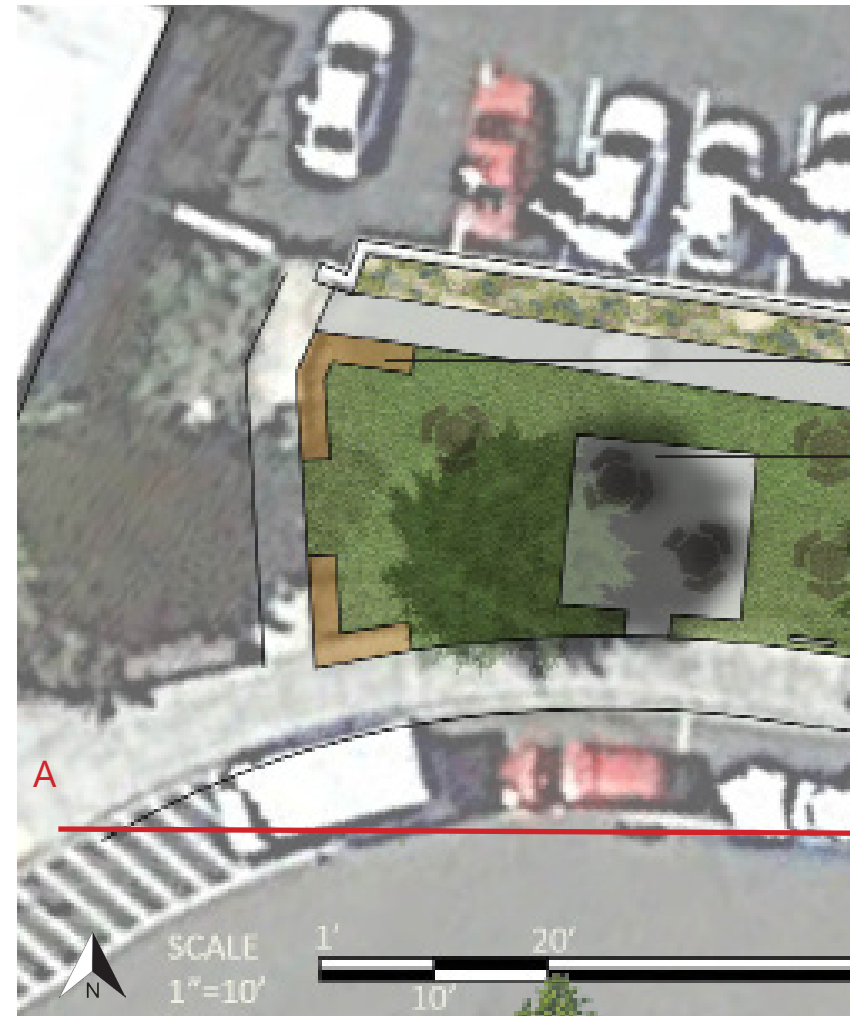
Preliminary concept 1:

PROGRAM:

- Reduce water use and maintenance use
- Introduce more seating options
- Introduce native vegetation
- Minor gathering spaces
- ADA Accessibility
- Introduce interpretive signage for educational opportunities

NARRATIVE:

Concept 1 demonstrates what the project site could look like with very simple alterations. Seating walls, ADA accessible pathways, picnic tables, and interpretive signage have been added to enhance the overall user experience. A drought tolerant lawn seed mix has been introduced to reduce the use of water and maintenance. The seating wall on the left edge of the site provides a wind barrier as well as more seating options. The seating wall, lawn space, and picnic table could be used as a minor gathering space for visiting student groups. The center circle provides additional seating as well as a 10' wide native planting with interpretive signage. This simple design provides space for every user to navigate the site as they please.





- SEATING WALL
- NATIVE PLANTING
- ADA ACCESSIBLE PICNIC SEATING
- PONY WALL
- PLANTER W/ INTERPRETIVE SIGNAGE
- SEATING WALL
- CONCRETE PAVER
- INTERPRETIVE SIGNAGE
- DROUGHT TOLERANT LAWN SEED MIX

50'



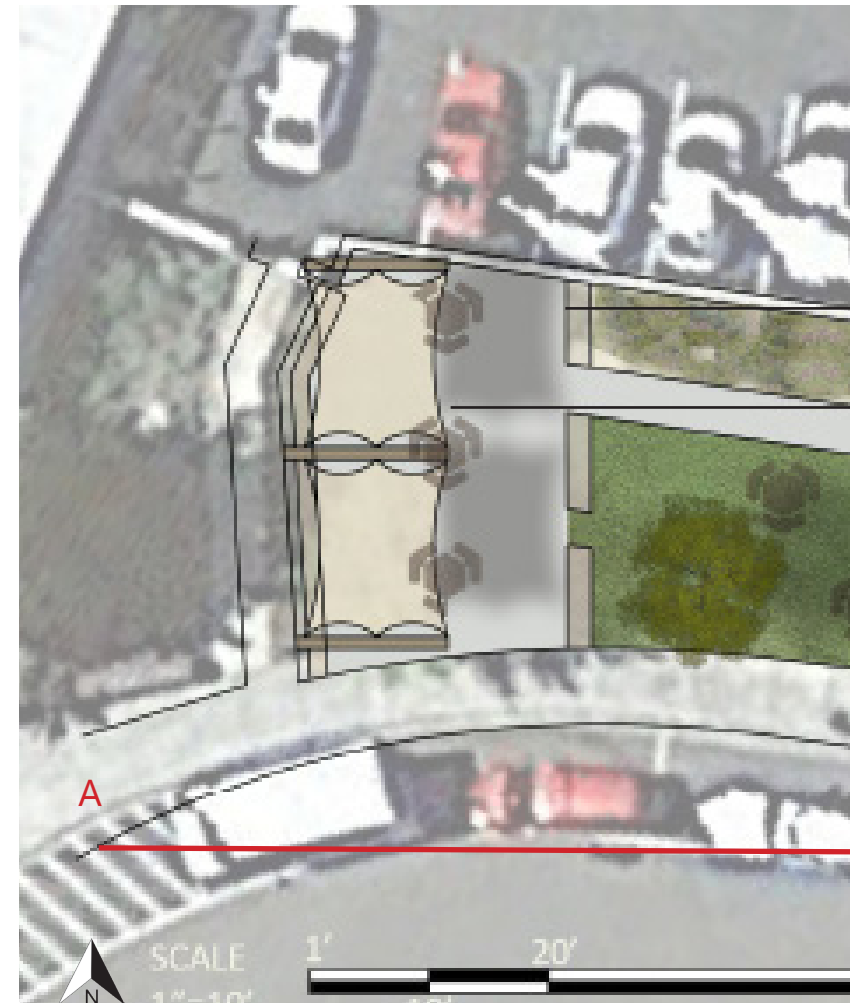
Preliminary concept 2:

PROGRAM:

- REDUCE WATER USE AND MAINTENANCE USE
- INTRODUCE MORE SEATING OPTIONS
- INTRODUCE NATIVE VEGETATION
- INTRODUCE MAJOR AND MINOR GATHERING SPACES
- ADA ACCESSIBILITY
- INTRODUCE A VARIETY OF PICNIC TABLES

NARRATIVE:

Concept 2 is an example of what a major gathering space could look like located at the west end of the project site. Defining a major gathering space located at the west end of the site allows visitors or student groups closer access to the facilities located within the Visitor Center. The pony wall, seating wall and shade structure on the west end also act as a strong wind buffer. The project site maintains two Douglas firs but incorporates three new shade trees to enhance the visual aesthetic. This concept consist of a variety of seating options, ADA accessible pathways and picnic tables, native vegetation, shade structures, and variety of shade trees, and a drought tolerant lawn.





- SEATING WALL
- NATIVE PLANTING
- MAJOR GROUP GATHERING SPACE W/ SHADE STRUCTURE
- TRAIL BENCH
- PONY WALL
- CONCRETE PAVER
- ADA ACCESSIBLE PICNIC SEATING
- NATIVE SHADE TREE
- DROUGHT TOLERANT LAWN SEED MIX



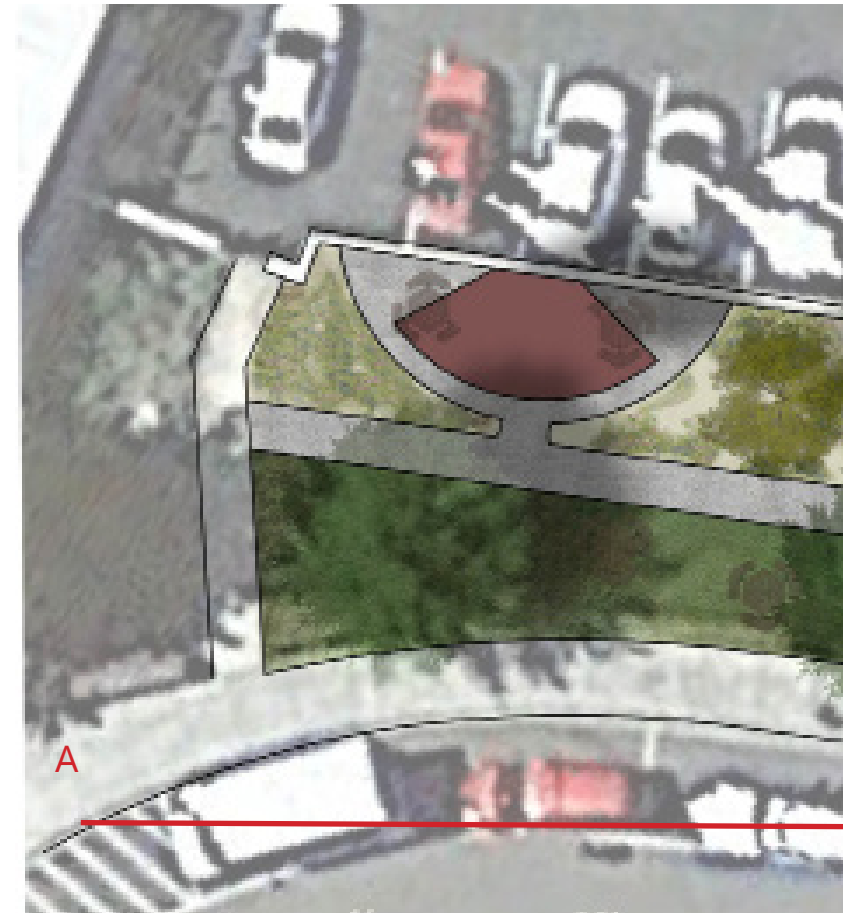
Preliminary concept 3A:

PROGRAM:

- Reduce water use and maintenance
- Introduce more seating options
- Introduce native vegetation
- Provide Minor gathering spaces
- ADA Accessibility
- Introduce interpretive signage for educational opportunities
- Introduce shade structures

NARRATIVE:

Concept 3-a splits the project site into two areas: native vegetation and a drought tolerant lawn. This allows users the choice of lawn space or a paved picnic pad. This variation of options allows for intimate and group settings, making the site very versatile. The site maintains the three Douglas firs but replaces the existing water birch with native vegetation. New native trees have been introduced to provide more shade and aesthetic interest. This concept introduces the use of cantilevered shade structures with removable fabric, native vegetation, ADA accessible pathways, an increase in picnic tables, and seating walls.





- SEATING WALL
- ADA MAJOR GATHERING SPACE W/ SHADE STRUCTURE
- NATIVE PLANTING
- ADA MINOR GATHERING SPACE W/ SHADE STRUCTURE
- D.G PAVER
- NATIVE SHADE TREE
- DROUGHT TOLERANT LAWN SEED MIX
- PONY WALL



Preliminary concept 3B:

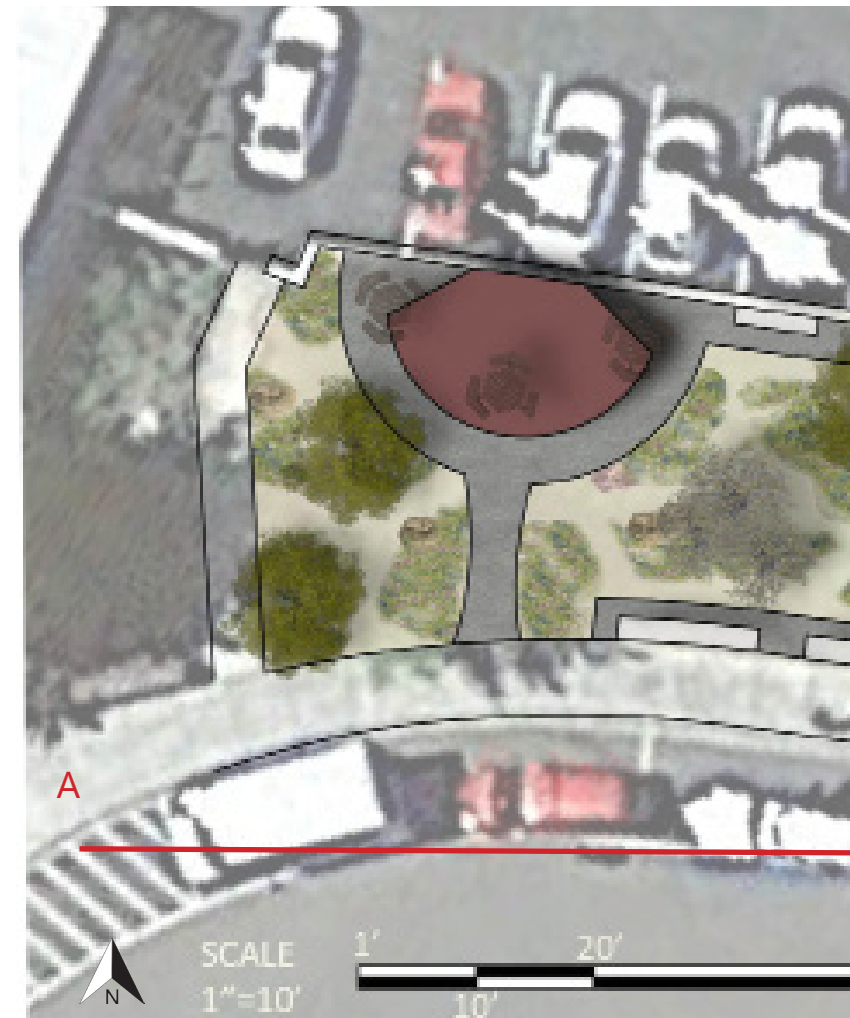
PROGRAM:

- ELIMINATE IRRIGATION
- MAINTAIN LOW MAINTENANCE
- INTRODUCE MORE SEATING OPTIONS
- INTRODUCE NATIVE VEGETATION
- PROVIDE MINOR AND MAJOR GATHERING SPACES
- ADA ACCESSIBILITY
- INTRODUCE INTERPRETIVE SIGNAGE FOR EDUCATIONAL OPPORTUNITIES
- INTRODUCE SHADE STRUCTURES

NARRATIVE:

Concept 3-b is an example of what concept 3-a could look like without lawn space and an increase in the size of major and minor gathering spaces. The native landscape throughout the site allows for visitors to immerse themselves within the vegetation. This provides hands-on learning experiences. With the minor and major picnic areas having ADA accessibility. The seating walls on the north, east, and south side of the site create more gathering spaces within the site. This concept introduces a variety of seating options, ADA accessible pathways, interpretive signage, native vegetation, shade structures, and a new variety of shade trees.

Although this concept introduces a range of different maintenance needs, it does however better serve the surrounding native landscape as well as enhance the overall user experience.





- ADA MAJOR GATHERING SPACE W/ SHADE STRUCTURE
- SEATING WALL
- SEATING WALL
- PONY WALL
- ADA MINOR GATHERING SPACE W/ SHADE STRUC-
- NATIVE PLANTING
- NATIVE SHADE TREE
- SEATING WALL
- D.G PAVER



Final preliminary concept

PROGRAM:

- ELIMINATE IRRIGATION
- MAINTAIN LOW MAINTENANCE
- INTRODUCE MORE SEATING OPTIONS
- INTRODUCE NATIVE VEGETATION
- PROVIDE MINOR AND MAJOR GATHERING SPACES
- ADA ACCESSIBILITY
- INTRODUCE INTERPRETIVE SIGNAGE FOR EDUCATIONAL OPPORTUNITIES

This final preliminary concept showcases how the project site that was once lawn has transformed into a native vegetation garden. The benches and variety of seating allows for intimate spaces but the connectivity of the site allows for visitors to feel comfortable meandering and to enjoy looking at the different types of native plants as well as to take time looking at interpretive signage. The West end of the site acts as an entry point for visitors coming from the Visitor Center. Users are greeted with large shrubs and grasses to screen any daily wind. Meandering to the center of the site, users will pass by a variety of individual seating options that is immersed within the native vegetation. The center of the site provides a main focal point to sit and enjoy interpretive signage. The east end of the site acts as a large gathering space that can roughly sit up to 30 people which includes the use of the seating walls. This gathering space provides adequate room for large families and school groups. All in all the native vegetation helped create intimate spaces as well as group spaces within the site.





- EXISTING WALL
- SEATING WALL
- PICNIC TABLE
- SEATING WALL
- PONY WALL
- SEATING WALL
- SEATING WALL W/SIGNAGE
- BRICK PAVER
- D.G PAVER
- ADA ACCESSIBLE PICNIC TABLE PAD
- ADA ACCESSIBLE GROUP PICNIC AREA
- SEATING WALL

Stakeholder conclusion

Throughout the process of meeting with different stakeholders it became apparent what was important to the overall design and what was not needed or wanted. The approval to remove all lawn from the Idaho States Historic Preservation office (SHPO) finalized the decision to remove all remnant lawn located on site. After the final preliminary concept was presented, one last stakeholders meeting occurred with Craters of the Moon staff to finalize wants and needs before moving forward. From this meeting the final preliminary concept was chosen to further development because of the desire to remove all lawn, the intimate spaces created by vegetation, large group gathering space, the amount of seating options, and the simple walkable pathway. Moving forward with future development a final set of goals and objectives were finalized:

- Utilize materials that are compatible with Mission 66 character
- Increase seating capacity
- Provides group seating and gathering space
- Provides opportunities for interpretive panels
- Improve definition of usable area for a variety of people
- Reduce the overall water and maintenance needs.



Final goals & objectives

1. Ensure the design of the visitor center picnic area is low-impact and conserves the natural resources of the monument
2. Provide a plant palette that is ecologically appropriate, thus more environmentally and economically sustainable
3. Ensure the landscape of the picnic area encourages interest in the monument as a whole
4. Ensure the overall design reduces water and maintenance use as well as promotes human comfort within outdoor spaces while maintaining Craters of the Moon's historic Mission 66 integrity
5. Ensure that the design of the visitor center picnic area supports the National Park Services overall mission to encourage sustainability





Robert Limbert
Visitor Center

Maintenance parking and facilities

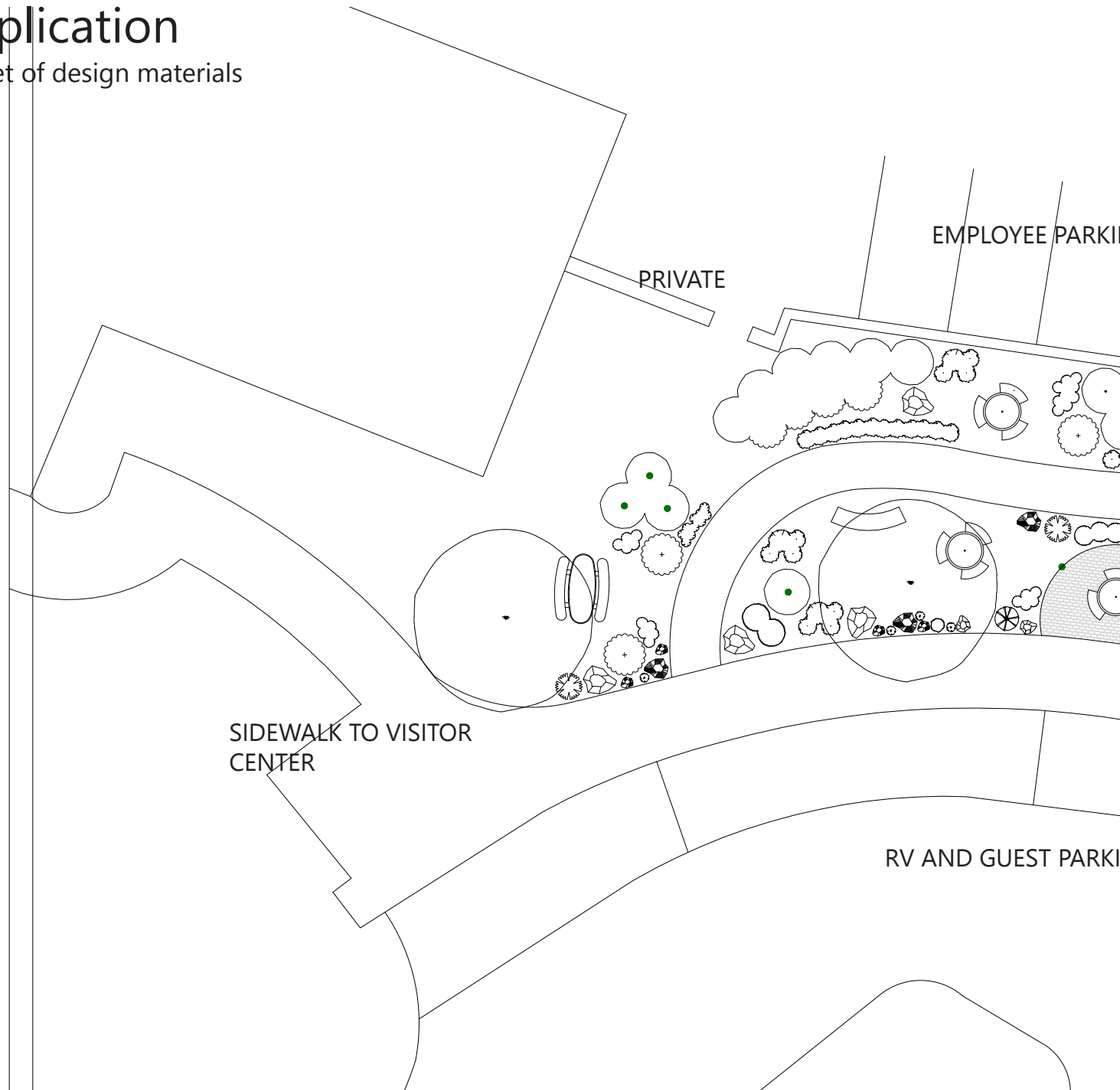
Staff housing and
offices

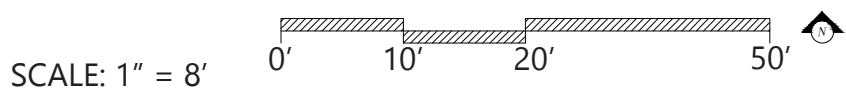
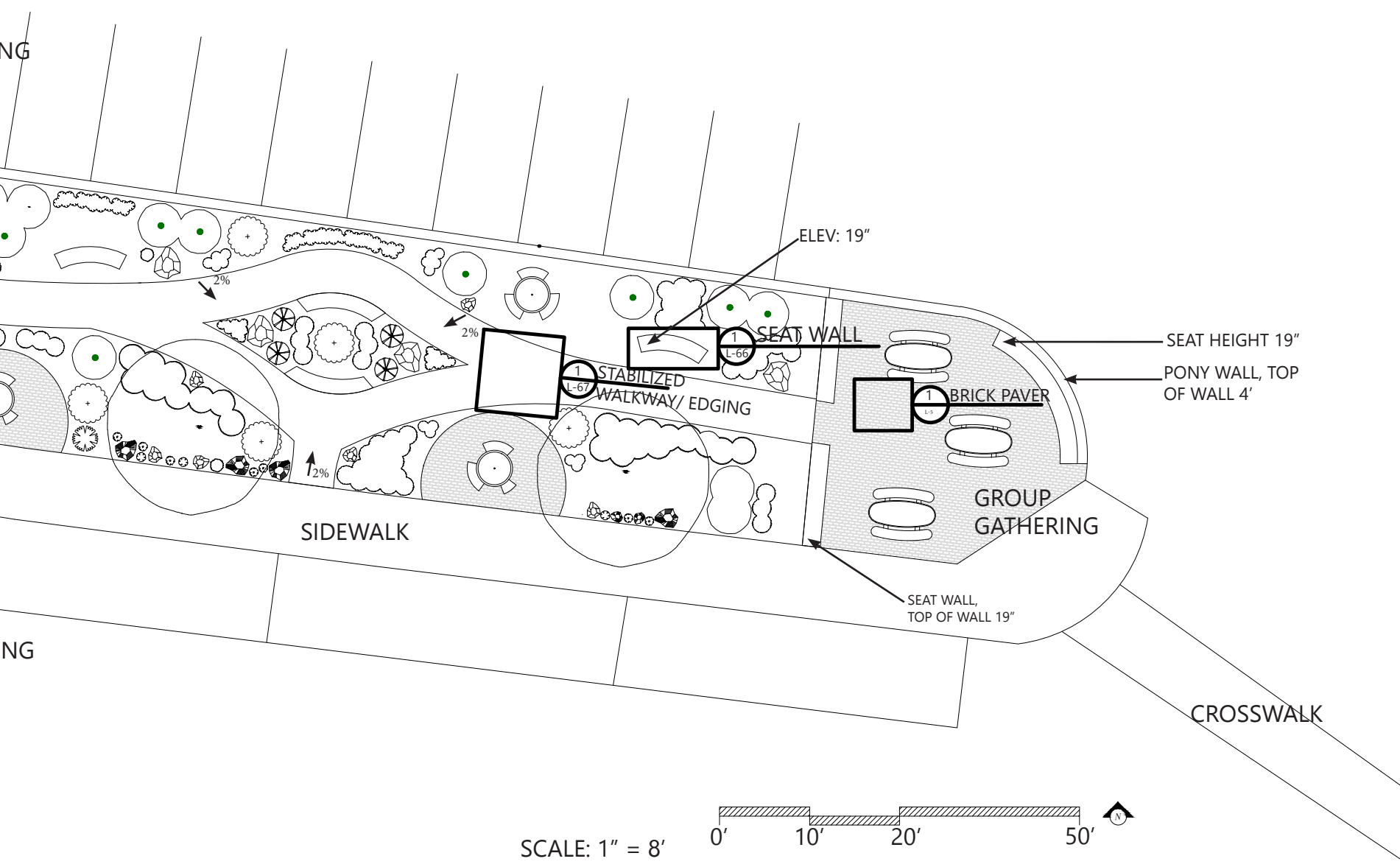
Picnic Area Lawn

RV and guest parking

Design details application

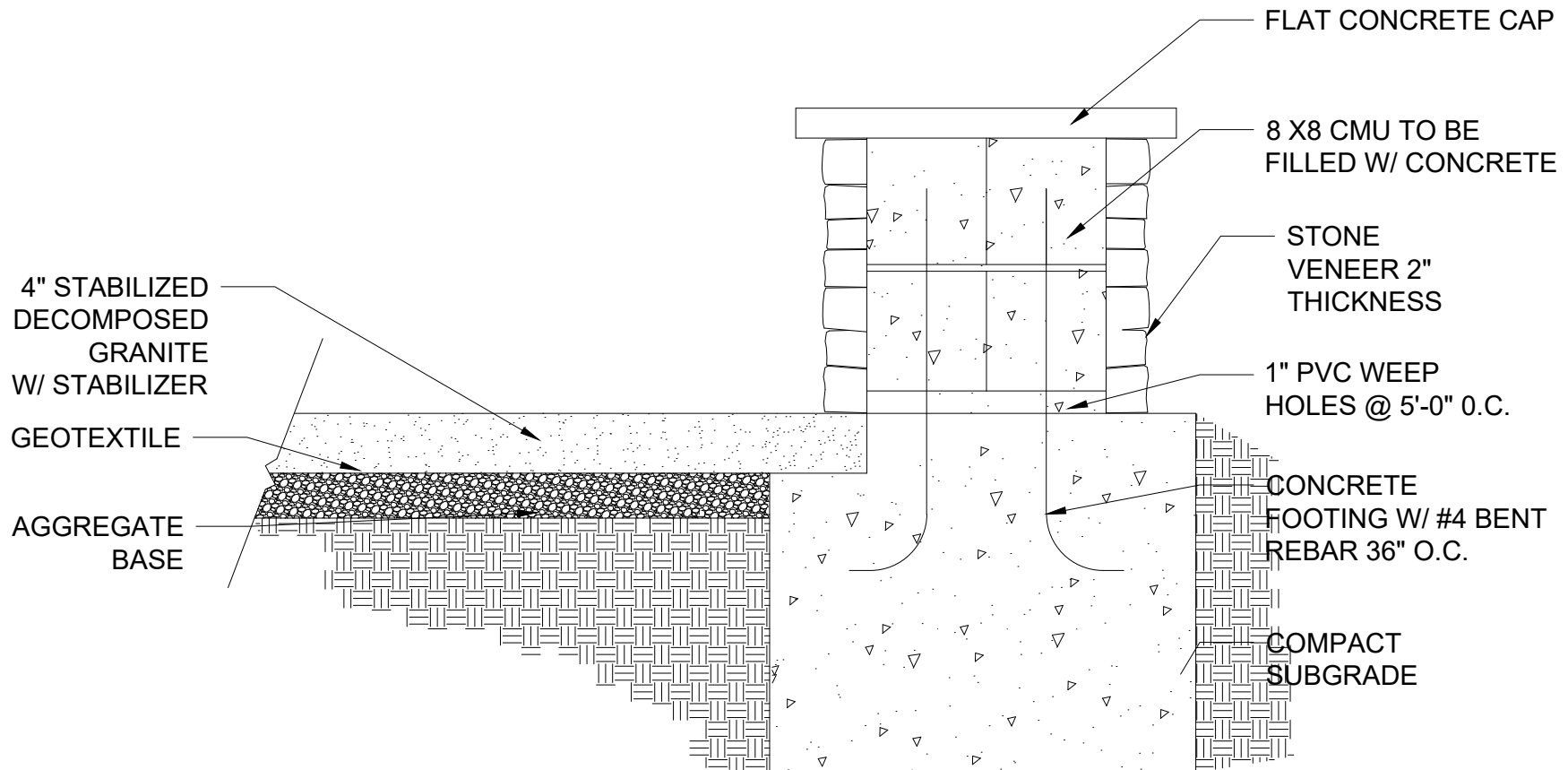
The following pages include a set of design materials specific for this project.





Design Materials: Seating wall

CONSTRUCTION NOTES:
MANUFACTURER NAME: UTAH SUNRISE
BUILDERS
PRODUCT NAME: SOUTHWEST STONE
EST. QUANTITY: 155 SQ. FEET



1
L - 7

STONE VENEER SEATING WALL

SCALE 1" = 8'

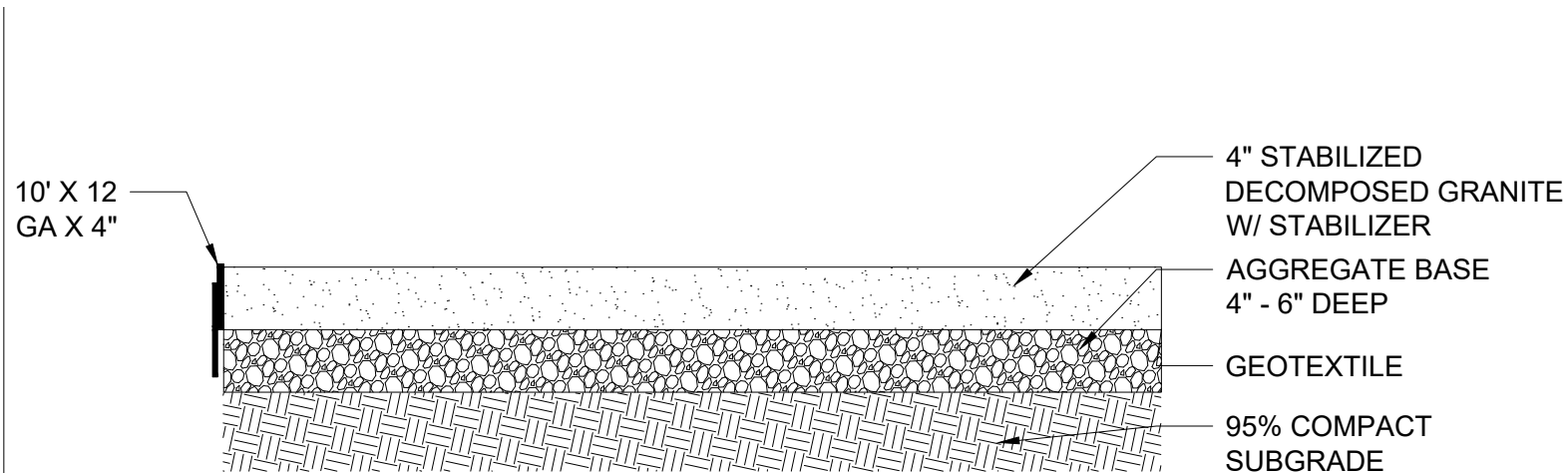
Design Materials: Stabilized Walkway and Edging

CONSTRUCTION NOTES:

MANUFACTURER NAME: KAFKA GRANITE LLC.
PRODUCT NAME: MAUVE GRANITE - WAX
POLYMER MIX
EST. QUANTITY: 1,050 SQ. FEET
PRODUCT AND QUANTITY ARE SUBJECT
TO CHANGE

CONSTRUCTION NOTES:

MANUFACTURER NAME: GREEN VALLEY
TURF CO.
PRODUCT NAME: CORTEN EDGING
EST. QUANTITY: 400 SQ. FEET
PRODUCT AND QUANTITY ARE SUBJECT
TO CHANGE



2
L-8

STABILIZED WALKWAY & CORTEN EDGING

SCALE: 1" = 8'

Design Materials: Brick Paver

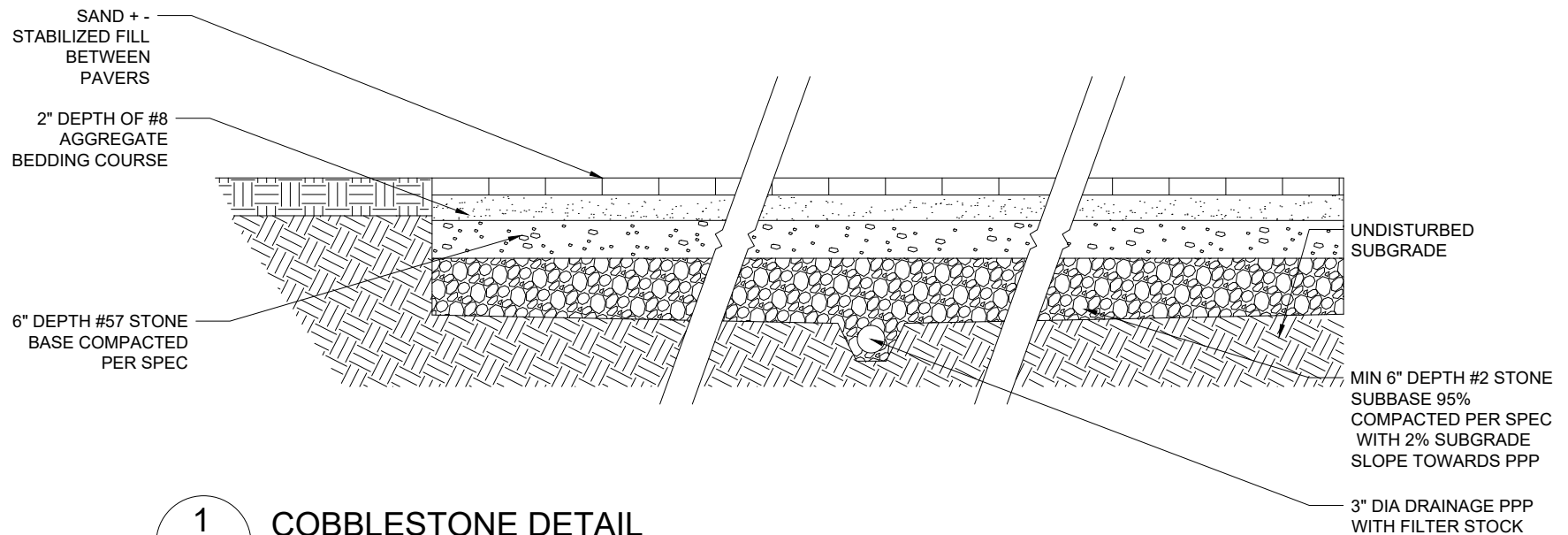
CONSTRUCTION NOTES:

MANUFACTURER NAME: MCNEAR BRICK AND BLOCK

PRODUCT NAME: GOLDEN TAN COBBLE

EST. QUANTITY: 850 SQ. FEET

PRODUCT AND QUANTITY ARE SUBJECT
















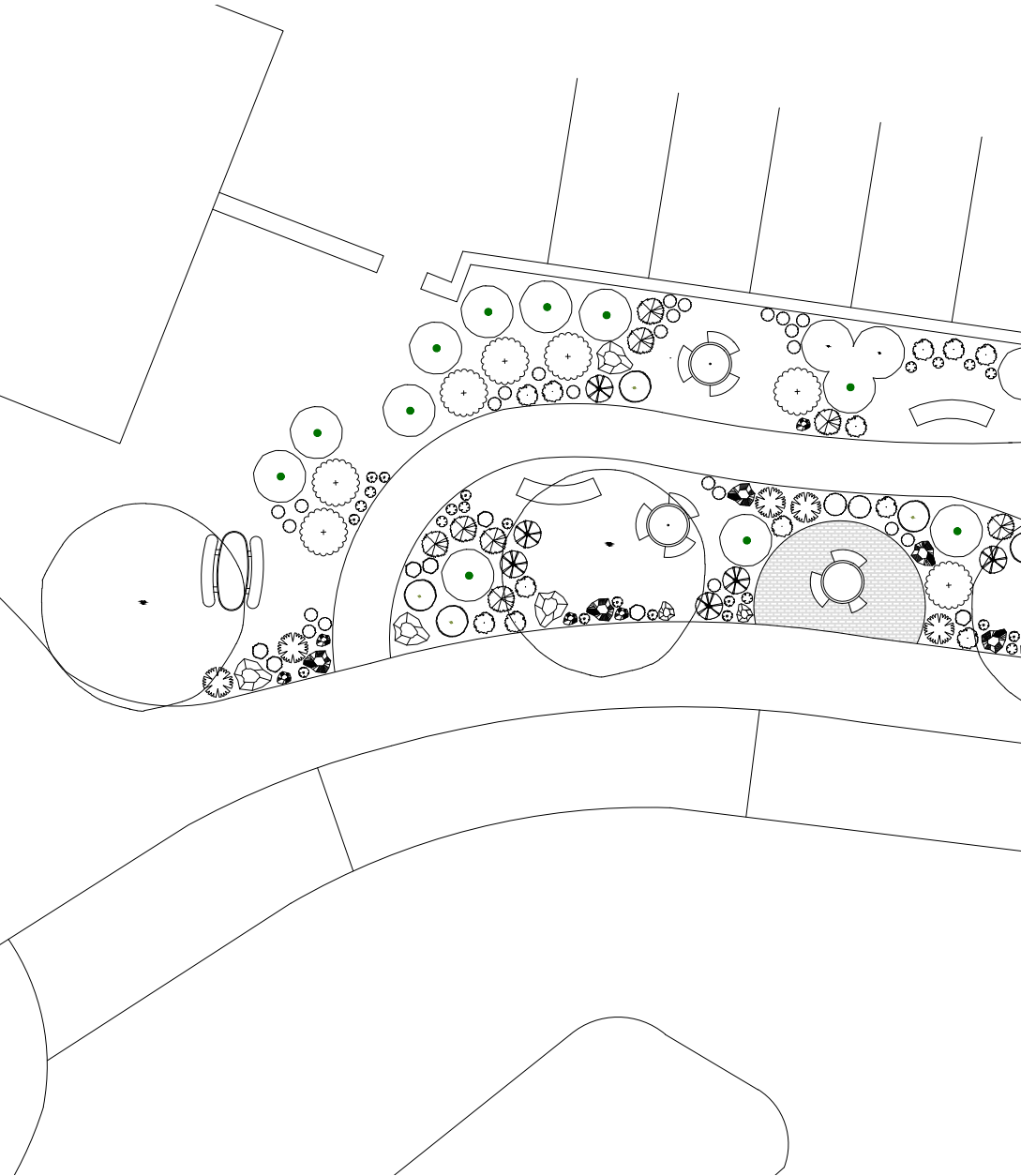
1
L-9

COBBLESTONE DETAIL

SCALE: 1" = 8'

Representative planting plan:

SYMBOL	QTY.	BOTANICAL NAME
	17	SPOROBOLUS AIROIDES
	14	ERIGERON SPECIOSUS
	18	LEYMUS CINERUS
	27	ERIGERON COMPOSITUS
	10	ERIOGONUM DOUGLASII
	4	PSEUDOTSUGA MENZIESII
	34	FESTUCA IDAHOENSIS
	20	PENSTEMON HUMILIS
	19	SPHAERALCEA MUNROANA
	17	ERICAMERIA NAUSEOSA
	8	DASIPHORA FRUTICOSA
	13	CHAMAEBATIARIA MILLEFOLIUM
	20	ARTEMISA FRIGIDA

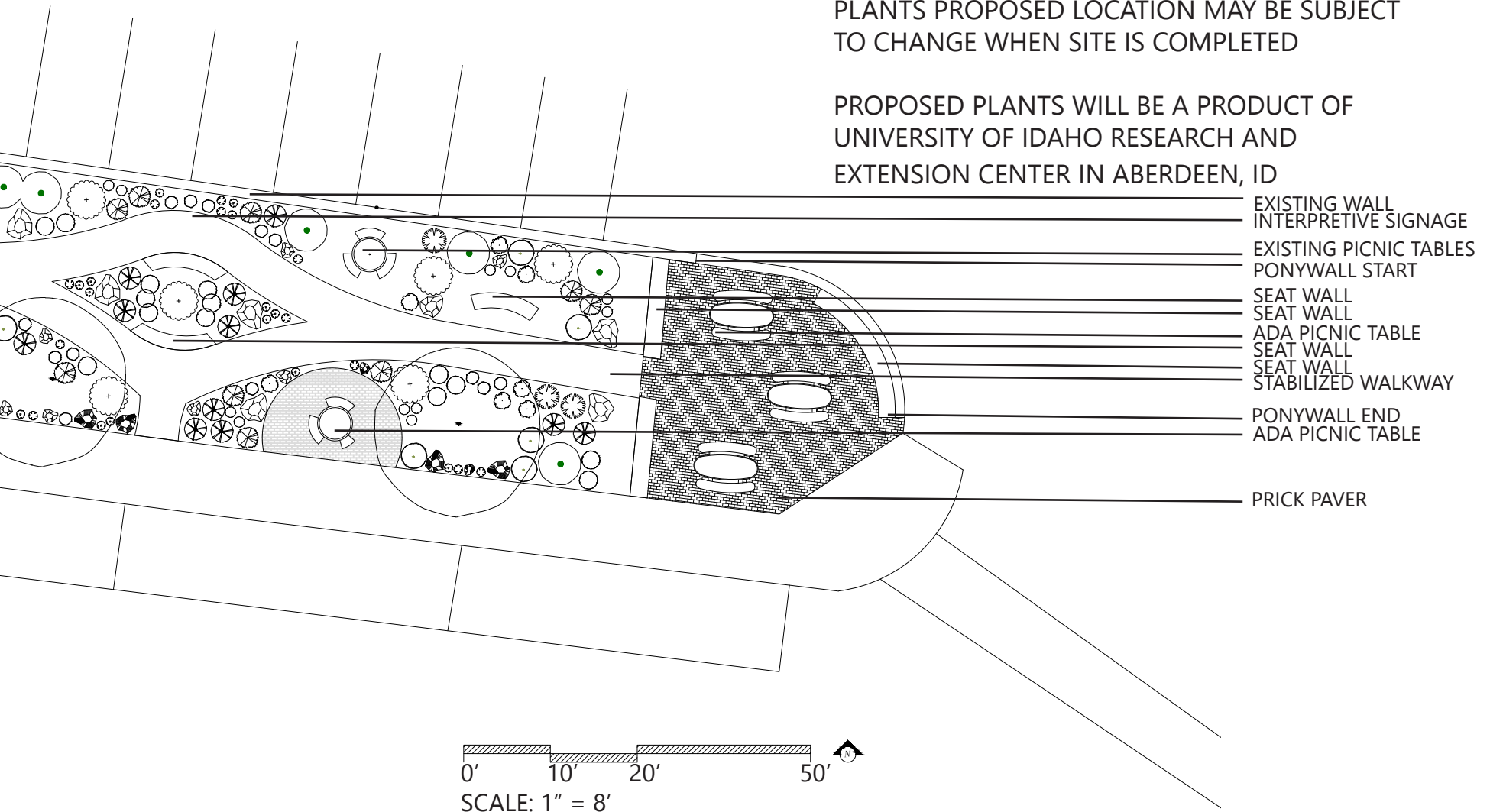


NOTES:
THIS PLANTING PLAN PORTRAYS A QUANTITY
ESTIMATE OF EACH PROPOSED PLANT

ACTUAL PLANT QUANTITIES MAY CHANGE BY
5 OR TEN PERCENT

PLANTS PROPOSED LOCATION MAY BE SUBJECT
TO CHANGE WHEN SITE IS COMPLETED

PROPOSED PLANTS WILL BE A PRODUCT OF
UNIVERSITY OF IDAHO RESEARCH AND
EXTENSION CENTER IN ABERDEEN, ID



Final schematic plan

Much like the final preliminary concept, the final schematic plan showcases a much larger space due to the native vegetation. The variety of seating created over three times the amount of options it did before and allows for intimate spaces as well as options for larger families or school groups. The west end of the site has been expanded to create more options for seating and remains a strong entry point for visitors coming from the visitor center. Meandering to the center of the site, users pass by a variety of seating options that is immersed within the native vegetation. The center of the site provides a main focal point that creates a simple divide between the site, allowing it to seem larger. The east end of the site acts as a large gathering space that can roughly sit up to 30 people which includes the use of seating walls. The gathering space provides adequate room for large families and school groups. This native landscape will not only provide a comfortable space for visitors to use but will also will create many opportunities for interpretive and sustainable signage.

Various places within the site create opportunities for interpretive signage. The perspectives following will provide examples.





- EXISTING WALL
- PONYWALL START
- ADA ACCESSIBLE PICNIC AREA
- SEATING WALL
- D.G PATHWAY
- SEATING WALL
- PONYWALL END
- SEATING WALL
- ADA PICNIC TABLE PAD
- PONY WALL END



SCALE: 1" = 8'

Central seating area

The central seating area acts as a main focal point of the site to provide seating and interpretive signage. It provides a divide between the site, making it feel larger. This perspective portrays the guests enjoying the beautiful summer vegetation. The following image portrays the central seating area in the fall.





Seating options

The site provides numerous seating options for visitors to enjoy. This perspective portrays multiple guests enjoying the variety of seating within the site. It also displays how the native vegetation creates different spaces within the site to provide a more intimate setting. The following page displays guests enjoying the variety of fall colors.

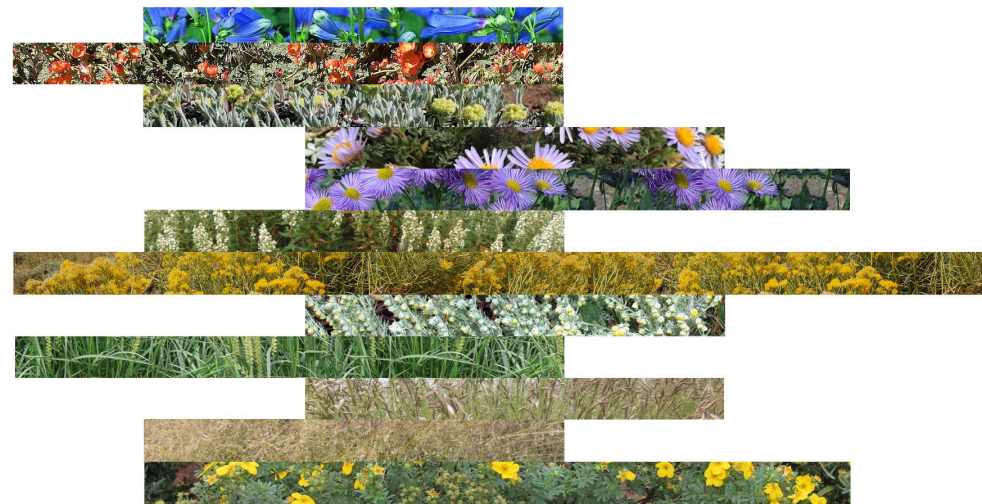




PLANT CALANDER

The following pages consist of a plant calendar (bottom image) and a plant palette. The plant calendar is a graphic that portrays when each plant is in bloom. With the help from professionals and investigative research, the plant palette was carefully chosen to best suite the surrounding native landscape at Craters of the Moon. All plants are native to the surrounding area or are native to Craters of the Moon to better suite the surrounding ecology. The plant palette was also carefully chosen to portray a wide rang of colors throughout the seasons.

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC



PREFERRED PLANT PALETTE

PENSTEMON HUMILIS

Low Penstemon



- SMALL-FLOWERED 10 - 15" TALL
- 8 - 12" WIDE
- BLOOMS APR - JUN
- THRIVES IN FULL SUN/PART SHADE

DASIPHORA FRUTICOSA

Shrubby Potentilla



- GROWS 34 - 30" TALL
- 30 - 40" WIDE
- BLOOMS MAY - SEP
- THRIVES IN FULL SUN/PART SHADE

ERIOGONUM DOUGLASII

Douglas Buckwheat



- LARGE-FLOWERED 6- 24" TALL
- 12 - 36" WIDE
- BLOOMS MAY - JUL
- THRIVES IN SUN & PART SHADE

CHAMAEBATIARIA MILLEFOLIUM

Southern Desert Fernbush



- GROWS 12 - 60" TALL
- 24 - 72" WIDE
- BLOOMS MAY - JUL
- THRIVES IN FULL SUN

PREFERRED PLANT PALETTE CONTINUED

ARTEMISA FRIGIDA
Wild Prairie Sagewort



- GROWS 4 - 14" TALL
- 6 - 12" WIDE
- BLOOMS JUL - AUG
- THRIVES IN SUN & PART SHADE

ERICAMERIA NAUSEOSA
Rabbitbrush (Dwarf Silver)



- MOUNDING 8 - 40" TALL
- 6 - 26" WIDE
- BLOOMS JULY - OCT
- THRIVES IN SUN & PART SHADE

SPHAERALCEA MUNROANA
Munro's Globemallow



- SHRUB LIKE 12 - 36" TALL
- 12 - 24" WIDE
- BLOOMS MAY - JUL
- THRIVES IN FULL SUN

ERIGERON COMPOSITUS
Cut-leaf Daisy



- CUSHION PLANT 1 - 5" TALL
- 2 - 5" WIDE
- BLOOMS MAY - AUG
- THRIVES IN SUN & PART SHADE

PREFERRED PLANT PALETTE CONTINUED

ERIGERON SPECIOSUS

Aspen Daisy



- SHRUB LIKE 6 - 24" TALL
- 6 - 24" WIDE
- BLOOMS JUN - SEP
- THRIVES IN SUN & PART SHADE

SPOROBOLUS AIROIDES

Alkali Sacaton



- LARGE-FLOWERED 6 - 24" TALL
- 6 - 12" WIDE
- BLOOMS APR - JUN
- THRIVES IN FULL SUN

FESTUCA IDAHOENSIS

Idaho Fescue

- GROWS 1 - 2' TALL
- 6" - 1' WIDE
- BLOOMS MAY - JULY
- THRIVES IN SUN & PART SHADE



LEYMUS CINEREUS

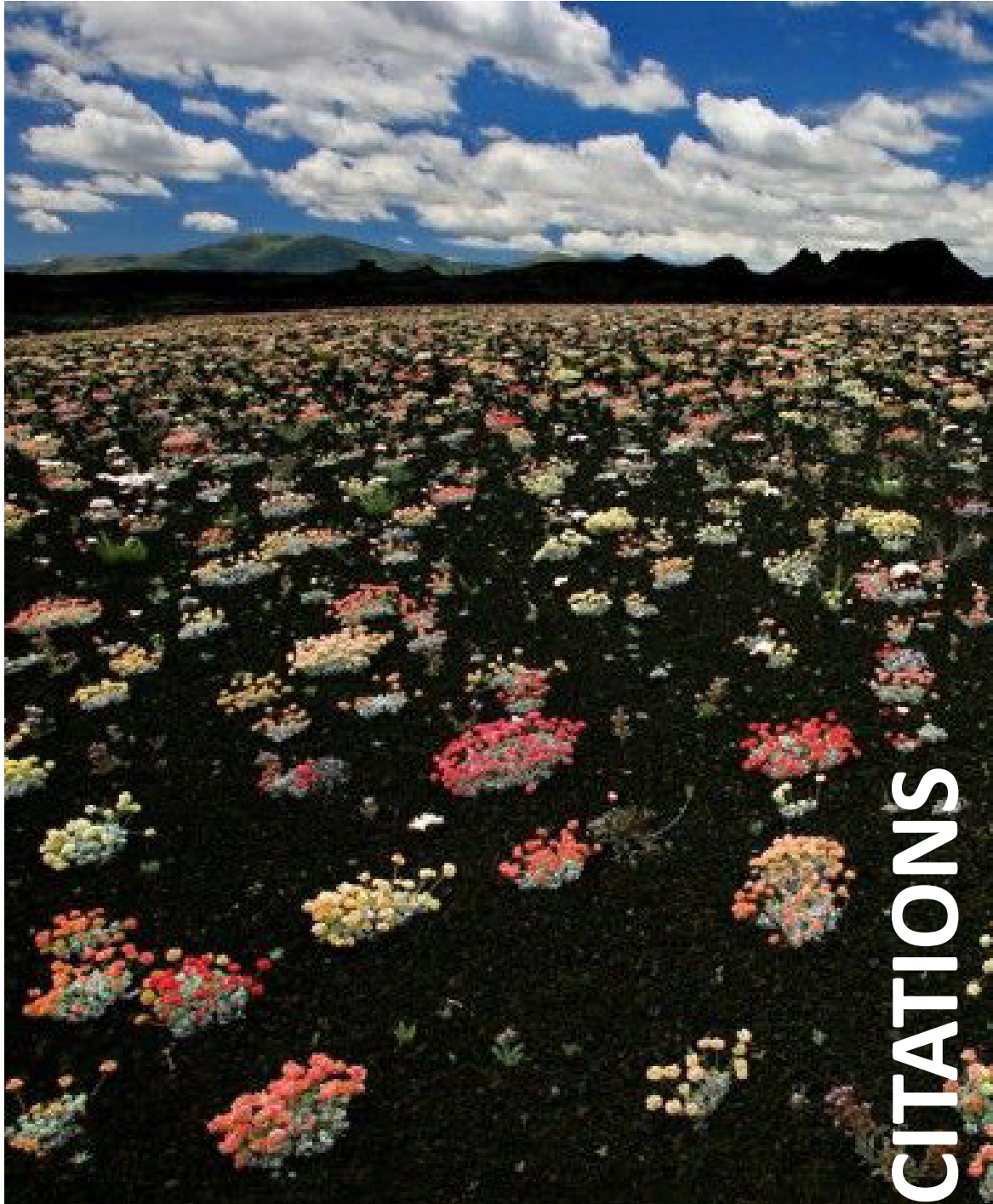
Basin Wildrye

- GROWS 3 - 6' TALL
- 2 - 5' WIDE
- BLOOMS APR - JULY
- THRIVES IN SUN & PART SHADE



FINAL THOUGHTS

Developing a low-impact and sustainable design for a picnic area located at Craters of the Moon has not only increased the capacity of the small lawn area but has also developed a seamless native landscape throughout Craters of the Moon National Monument. This has not taken away from Craters historic Mission 66 cultural or historic integrity but has enhanced it as well as the overall visitor experience. The overall design of the site reduces water, maintenance, and overall needs. With that being said, this project will remain to be a successful example of replacing lawn with native vegetation at a Mission 66 visitor center.



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death-valley-national-park

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Northern Flicker: https://www.allaboutbirds.org/guide/Northern_Flicker/id

Turkey Vulture: <http://www.audubon.org/field-guide/bird/turkey-vulture>

Bushy-tailed woodrat: <https://www.guwsmedical.info/mammals-5/distribution-qvs.html>

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Least Chipmunk: http://www.tringa.org/image/9912401170_Least_Chipmunk_07-02-2010_1

Inferno cone: <https://www.nps.gov/crmo/planyourvisit/stop-4-inferno-cone.htm>

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Craters of the Moon lawn: Photo curtesy of Arianne Millet. September 27, 2016

STAKEHOLDERS MEETING:

Stakeholder meetings intro photo: <http://ogden-insights.blogspot.com/2013/11/things-to-do-in-idaho-craters-of-moon.html> Craters camping: <http://mapio.net/pic/p-18746748/>

DESIGN APPLICATION

Design application intro photo: Photo taken by Carly Boise

Low Penstemon: <https://www.pinterest.com/pin/530158187362174659/?lp=true>

Shrubby Potentilla: <https://pflanzenbestimmung.info/dasiphora-fruticosa/>

Douglas Buckwheat: <http://science.halleyhosting.com/nature/cascade/3petal/buck/erigonum/douglasii-douglasii.htm>

Southern Desert Fernbush: <http://plantselect.org/plantstories/fernbush-fantastic-fernbush/>

Wild Prairie Sagewort: <http://nehiyawewin.ca/cree-medicine3/>

Rabbitbrush (Dwarf Silver): <http://www.plantsinusa.com/show/plant/Ericameria-Nauseosa/33096>

Munro's Globemallow: <https://en.wikipedia.org/wiki/Sphaeralcea>

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Idaho Fescue: <https://www.pinterest.com/pin/530158187362153476/>

Basin Wildrye: <https://www.pinterest.com/pin/389350330263366778/?lp=true>

CITATIONS:

Citations into photo: <http://www.fredmiranda.com/forum/topic/1146277>

