

Source:Sam O. Hirota, Inc. 2018

**Preliminary Grading Cut and Fill Plan**

Hawaiian Memorial Park Cemetery Expansion Project Draft Environmental Impact Statement  
Kāneʻohe, Oʻahu, Hawaiʻi

**Figure 2.3**







Exhibit 2.1 shows a typical section view of such a keystone retaining wall. As shown on the section view, the retaining wall would have a subdrain installed at the base to assure seepage water does impact the wall structure. The footing of the wall would be constructed on a concrete or crushed stone pad minimizing further subsurface disruptions.

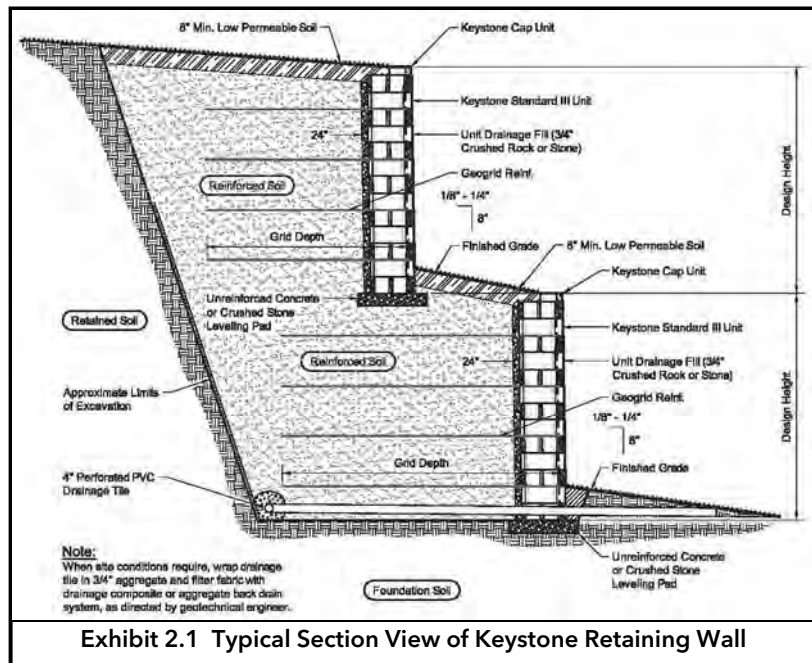
### **Roadways within Expansion Area**

The project would involve the construction of a new 24-foot-wide roadway system providing access to the future gravesites. Vehicular access to the expansion area would be a new roadway connection to the existing roadway serving the Ocean View Garden site as shown on Figure 2.2. The roadway, as shown in the Conceptual Site Plan, would meander through the site with a cul-de-sac at the end.

It would be designed to be similar to existing roadways throughout HMP, and constructed with asphaltic concrete pavement with rolled curbs (Exhibit 2.2). Roadway slopes would vary throughout the site, but are not intended to exceed a grade of 18%.

#### **2.2.2.1 Site Grading Design and Construction Methods**

Substantial earth moving and grading would be necessary to develop the cemetery expansion site. In general, the preliminary grading plan consists of major cuts at the west side of the development area and filling within the east side of the Petition Area. The preliminary grading plan includes cuts generally ranging from about 10 to 75 feet and fills generally ranging from about 10 to 30 feet.



**Exhibit 2.1 Typical Section View of Keystone Retaining Wall**



**Exhibit 2.2 Typical View of Roadway Design  
(Ocean View Garden)**

The Petition Area is located in a high rainfall environment throughout the year, therefore, the in-situ soils will constantly be in a very moist to wet condition. Due to the subsoil's anticipated relatively high moisture content, substantial aeration of the soils is required to achieve a 90% relative compaction normally required. This field method of reducing soil moisture content may not be feasible at all times due to the high rainfall frequency experienced at the Petition Area.

As a result, the compaction requirements for general fill placement would be reduced in order to aid in the earthwork construction using the high moisture tropical soils. A reduced compaction requirement of 85% relative compaction may be used to facilitate placement of fills and to reduce the potential of inducing pumping conditions. The following methods would be implemented in site preparation activities to address these conditions.

### **Site Preparation**

At the onset of earthwork, grading limits would be cleared and grubbed thoroughly. Vegetation, debris and other unsuitable materials would be removed and disposed of properly off-site or in a designated area. Clearing and grubbing work would be performed incrementally in phases developed during the project's design phase. Soft and yielding areas encountered during clearing and grubbing below areas designated to receive fill and improvements (e.g. roadway) would be over-excavated to expose firm material.

The resulting excavation would be backfilled with well-compacted fill. Excavated soft soils would not be re-used as fill materials and would be properly disposed of. Where shrinkage cracks are observed after the subgrade compaction, the subgrade soil would be prepared again. Saturation and subsequent yielding of the exposed subgrade due to inclement weather and poor drainage may require over-excavating the soft areas, and replacing these areas with engineered fill.

### **Fill and Backfill Material**

Earthwork would likely involve four main types of materials: 1) wet onsite soils; 2) excavated basalt rock materials; 3) boulder fills; and 4) imported fill materials. On-site soils may be re-used as a source of general fill material, provided they are free of vegetation, deleterious materials, and rock fragments greater than 12 inches in maximum dimension. Fill materials within the upper 6 feet of finished grades would contain rock fragments no greater than 6 inches in dimension. Drying or aerating the excavated materials may be necessary prior to their use as general fill due to wet conditions in this environment.

Excavated rock materials less than 12 inches in size may be used as general fill material, and can be processed and crushed to a relatively well-graded granular material. Excavated rock materials and boulders less than 2 feet in size may also be used as fill material provided that their usage does not complicate trenching operations. Imported fill materials would consist of non-expansive, select granular materials such as crushed basalt or coral. Select granular fill would be well-graded from coarse to fine with particles no larger than 3 inches in dimension.



### Excavations and Cut/Fill Slopes

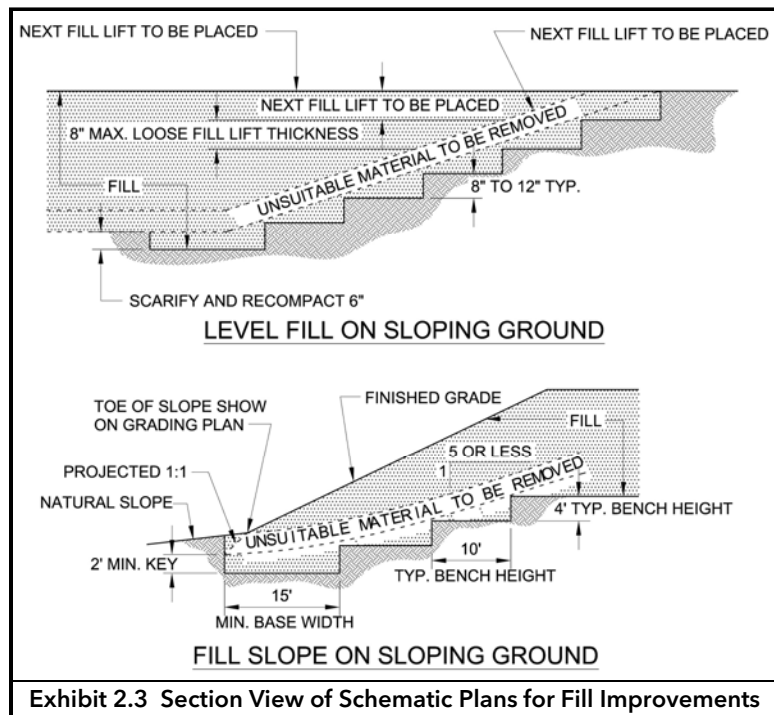
Excavation work may encounter stiff to hard residual and saprolitic soils and the underlying basalt rock formation. In addition, some of the excavations may encounter boulders, clusters of cobbles, and hard basalt rock formation. It is anticipated that most of the materials may be excavated using normal heavy excavation equipment. However, deep excavations, boulder excavations, and excavations into the underlying basalt rock formation may require the use of hoe rams.

Cut slopes at the Petition Area would generally expose stiff to hard residual and saprolitic soils based upon sample borings and the anticipated basalt rock formation underlying the area. Cut slopes of on-site soils may be designed with a slope inclination of a 2 to 1 ratio (horizontal to vertical) or flatter, and cut slopes into the basalt formation may be cut at an inclination of 1.5 to 1 ratio or flatter (Exhibit 2.3).

Fill slopes would be designed with a slope inclination of 2 to 1 ratio or flatter. Slope benches would be up to a maximum 30-foot vertical height intervals. Fills placed on slopes steeper than 5 to 1 ratio should be keyed and benched into the existing slope to provide stability of the new fill embankment against sliding.

Filling operations would start at the lowest point and continue up in level horizontal compacted layers. At the toe of large fill segments, a keyway would be constructed with the fill material to a minimum depth of 2 to 4 feet below the toe of the proposed fill slope and extending a minimum of 15 feet into the new fill slope. The floor of the key would be sloped back under the base of the fill at an inclination of about 10 to 1 ratio to bond the new fill into the existing slope.

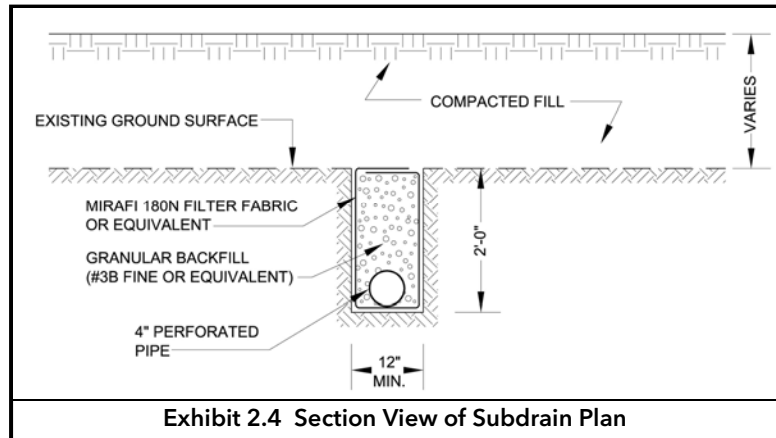
Fill slopes would be constructed by overfilling and cutting back to the design slope ratio to obtain a well-compacted slope face. Surface water would be diverted away from the tops of slopes. Slope planting with vegetation would be implemented as soon as possible to reduce the potential for erosion of the finished slopes.





### **Subdrains**

Based upon the climate and topography of the area, seepage conditions may be present in localized areas. The accumulation of water along the base of the fill could affect the performance of the fill. Therefore, subdrains would be installed in the base of the fills to drain at the toe. In general, the subdrains would follow the existing drainage paths on the site. Subdrains would generally consist of 4-inch or larger diameter perforated pipes with perforations facing down as shown on Exhibit 2.4.



In the area of the seep subsurface drains are proposed to ensure that the natural movement of groundwater through the poorly permeable residual soils in this area continues, thereby supporting the long-term health of the seep. Three subsurface drains would be constructed under the fill material, aligned approximately perpendicular to proposed retaining walls, and installed at depths to intercept and convey the flow of groundwater to the existing shallow well and seep. The exact locations, alignments, and depths would be determined during the project's design phase. Figure 2.4 shows the preliminary routes and locations of these subsurface drains that would serve the seep area.

### **Ground Settlement**

Ground settlements are anticipated when new fills are placed over the existing ground to raise the site to the proposed finished elevations. These settlements would affect the construction schedule progress and earthwork quantity estimates. The anticipated ground settlements are primarily the result of the following two processes:

1. Compression of the fill material under its own weight, especially since the fill materials are placed at a lower degree of compaction; and
2. Consolidation of the in-situ soils induced by the new fill loads, especially where new fills are placed over soft and/or loose materials along the bottom of gullies.

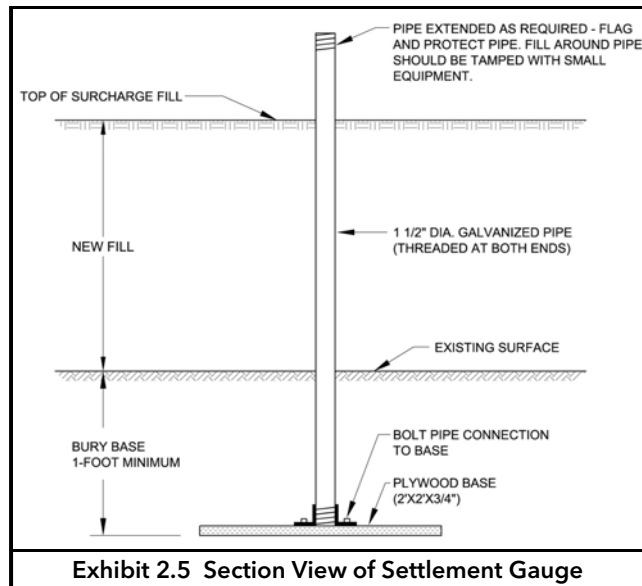
Geolabs, Inc. estimated ground settlements on the order of about 10 to 15 inches may occur for new fills up to 30 feet in thickness. Significant ground settlements may occur when new fills are placed over soft ground conditions. Therefore, soft and/or loose soils encountered below fill areas would be removed as much as practicable prior to the placement of the new fills. Because of anticipated ground settlements, planned embankments are planned to be over-filled by the appropriate amount, and the finish subgrades would be adjusted during construction to account for anticipated fill settlements.



In order to reduce the effects of the anticipated settlements on improvements constructed on fills, a settlement waiting period would be implemented prior to construction of improvements on the fills. The settlement waiting period may be on the order of about 4 to 8 months depending on the fill thickness.

It is difficult to accurately predict the exact time required for the filled ground to settle, since the settlement rates will be affected by variations in the properties and thickness of the compressible subsoil structure, and the history of the subsoil deposition. Therefore, the actual settlement rates would be monitored under a

settlement monitoring program established during construction. To monitor the actual settlement rate, settlement gauges would be installed in areas where fills are planned. Exhibit 2.5 shows an example of this gauge. The actual number and location of the settlement gauges would be evaluated during the design phase.



### 2.2.2.2 Drainage Design Improvements

Grading improvements planned for the cemetery's expansion will significantly alter the site, and drainage improvements have been incorporated into plans to address this change and improve existing drainage conditions. Offsite runoff currently entering the Petition Area from surrounding mauka areas would remain unchanged since no changes would occur beyond the Petition Area. In general, drainage improvements would be designed to allow storm water runoff to continue discharging from the upper mauka lands through the Petition Area, and into catchment structures constructed on the makai end of the site. Figure 2.5 shows drainage improvements planned as part of the grading plan developed for the project.

Project improvements would increase impervious area due to new roadways and cemetery memorial plaques by about 3.5 acres. Construction of new roadways is estimated to be about 2 acres, and memorial plaques are estimated to encompass about 1.5 acres. The remainder of the cemetery expansion area would be grassed and landscaped. The Cultural Preserve would remain undeveloped, along with undeveloped mountainous terrain mauka of the Petition Area. With a drainage basin serving this Petition area of about 92.3 acres, drainage improvements have been planned to address an increase in impervious area by about 3.8 percent.



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Drainage analysis used in developing site improvements were based upon both the 10-year, 1-hour (Q10) and the 100-year, 1-hour (Q100) storm events, and are discussed in greater detail in Chapter 4. Presently, a volume of water of 350,465 cubic feet (cf) during the 10-year and 548,194 cf during the 100-year storm events are generated within this drainage basin. Cemetery expansion plans and drainage improvements proposed would reduce the stormwater discharge flow rate and result volume of water by 5.5 percent. A projected volume of 331,810 (reduction of 18,665) cf during the 10-year and 519,014 (reduction of 29,180) cf during the 100-year storm events would result with the project. This decrease in runoff volume with the drainage improvements are due to several factors.

1. Providing a well landscaped, stable surface for stormwater to infiltrate would decrease the overall volume of water leaving the site. Cemetery construction would reduce the slope grades over a large open portion of the site, and improve the permeability of the site with turf grass and landscaping. This would reduce the average runoff coefficient to 0.25-0.30 from a current runoff coefficient of 0.35.
2. The slopes across the site would be reduced, lowering the velocity of the stormwater runoff, and increase the time stormwater would be concentrated within the Petition Area. These factors result in a 4 percent reduction of runoff rates for the 10-year and 100-year storms by 4.2 and 7.9 cubic feet per second (cfs), respectively.

Preliminary plans incorporate measures and BMPs from the City Department of Planning and Permitting's (DPP) new administrative rules on water quality under Title 20, Chapter 3 *Rules Relating to Water Quality*, amended August 16, 2017. The project's later design phase would include further analysis of site conditions and the appropriate design of drainage improvements. This would include inlet and outlet structures, junction-structures, slope of pipes, and open channel sections designed to enhance engineering efficiency and management of stormwater runoff. Drainage systems design would meet the requirements of the City's Rules Relating to Storm Drainage Standards, August 2017. Drainage improvements would include post-construction stormwater design components that include:

1. Appropriate low-impact development (LID) strategies and source control best management practices (BMPs).
2. On-site detention of the water quality volume (WQV) or biofiltration measures, such as biofiltration swale or infiltration basin, for the remaining amount of the WQV not retained on-site.
3. Vegetative buffers to support storm water infiltration.

As shown on Figure 2.5, new roadways would be graded to direct runoff into drain inlets adjacent to roadways. The runoff from the drain inlets would be piped through drain lines to convey stormwater to the lower areas within the site, where detention basins would be constructed to detain stormwater. Detention basins would consist of shallow man-made impoundments designed for the temporary storage of stormwater runoff by detaining the peak runoff, and to allow sediment and pollutants to settle and infiltrate into the ground. Water would drain from these basins through outlet structures, which would direct flow into pipes outletting adjacent to the exiting catchment structures at Lipalu and Ohaha Streets.



Sediment basins would be constructed prior to grading operations in order to handle sediment laden runoff as a result of land disturbance during construction activities. A portion of these basins, along the lower portion of the site, would then remain as a post-construction LID improvements.

### **Detention Basins**

It is projected that an additional 12,700 cubic feet (cf) of stormwater would be generated for the approximately 33.6-acre of disturbed area within the cemetery expansion site. This increase in stormwater would be detained and allowed to infiltrate within permanent detention basins proposed. These basins could retain a temporary pool of water that is designed to drain between storm events. Detention basins would reduce the volume of stormwater discharge from the site by an additional 3 percent for the 100-year, 1-hour storm event. As previously shown on Figure 2.5, a total of three detention basins are proposed, and are summarized below.

1. **Detention Basin A.** A smaller detention basin (Basin A) of about 1,500 square feet in size is located on the western end of the cemetery expansion. This basin is intended to detain stormwater runoff for the area along the edge of the Ocean View Garden site and western edge of the cemetery expansion.
2. **Detention Basin B.** This detention basin is about 4,500 square feet in size, and located in the northwest area of the cemetery expansion site. This basin is intended to generally collect stormwater runoff from this western area where the hillside would be excavated. This basin would have a drain connecting to the existing drainage culvert behind residences at Ohaha Place.
3. **Detention Basin C.** This detention basin is about 5,000 square feet in size, and located in the central area of the cemetery expansion site near the end of Lipalu Street. This basin is intended to generally collect stormwater runoff from the central area of the site. This basin would have a drain connecting to the existing drainage culvert behind residences at Lipalu Street.

Detention basins would be designed to have an invert slope between 1 to 2 percent, interior side slopes (length per unit height) no steeper than a 3 to 1 ratio unless approved by a licensed geotechnical engineer, a minimum length to width ratio of 2 to 1, and a maximum depth of 6 feet. Outlets would be designed to be no smaller than 4 inches in diameter allowing a basin to drain completely within 48 hours when full and 24 to 36 hours when half full. An emergency spillway would also be designed to allow the basin to safely overtop when experiencing a larger storm event.

### **Vegetative Buffers**

Cemetery expansion would create several acres of vegetated landscape with turf grass creating a natural vegetated buffer strip over the expansion site. These vegetated areas would improve present site conditions creating pervious areas that can better accommodate sheet flow surface runoff from the site, and allow storm water runoff to infiltrate and remove pollutants. Currently, several areas of the site consist of bare soil due to the lack of ground cover attributable to the thick canopy of

trees and overgrowth of vegetation minimizing sunlight from reaching the ground and inhibiting ground cover growth.

### 2.2.2.3 Rockfall Mitigation Design Measures

It appears that some mauka portions of the project area may be exposed to potential falling rock hazards from the adjacent slopes of the Oneawa hillside. Potential Rockfall Source Areas (PRSA) were identified for the upper mountain slopes by Geolabs, Inc., and these conditions are discussed in greater detail in Chapter 3. These areas are identified as Potential Rockfall Source Area No. 1 (PRSA-1) and Potential Rockfall Source Area No. 2 (PRSA-2), as shown on the Figure 2.6.

In summary, the greater risk for potential rockfall encroachment involves the sub-valley at the far northeastern portion of the Petition Area where the Cultural Preserve is proposed. Figure 2.6 graphically shows this affected section. This portion of the Petition Area may have at least a moderate potential for dangerous rockfall activity due to the large number and large size of existing boulder deposits encountered on the lower elevation slopes within the proposed Cultural Preserve.

A generally low to moderate potential for falling rock encroachment occurs within the central portion of the cemetery expansion area, as shown on Figure 2.6. The generally lower risk and hazard is due to the reduced number and size of existing rock outcroppings within this upslope area. Existing rock outcroppings appear to have a lower density, are smaller in size, possess limited relief (height protrusion above the surrounding ground surfaces), and have less extensive reach in terms of outcropping elevation span on the hillside.

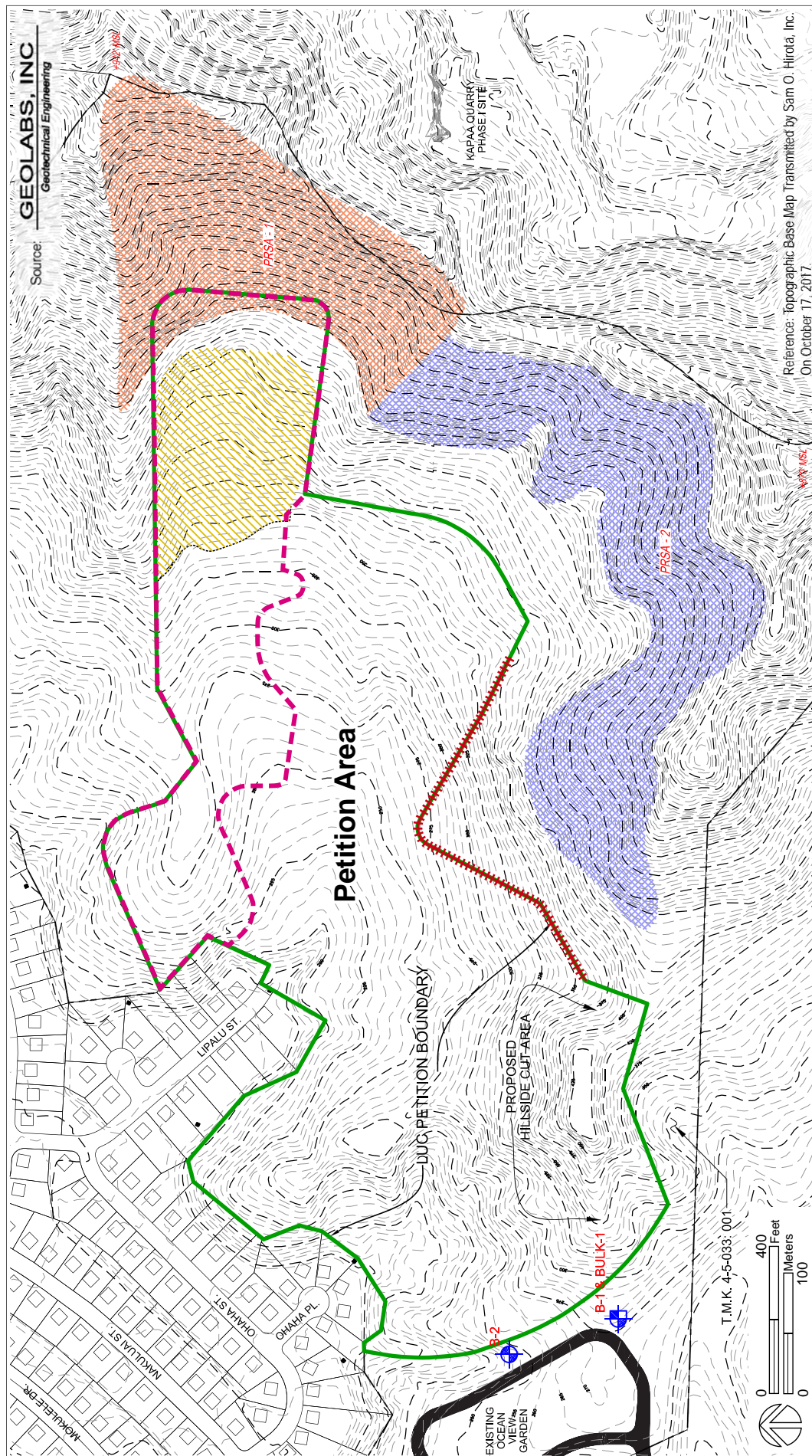
No rockfall potential occurs along the western end of the cemetery expansion from the Ocean View Garden end toward the central cemetery expansion area as shown on Figure 2.6.

### **Predicted Rockfall Encroachment**

Rockfall mitigation is typically recommended at locations where the statistical probability of rockfall encroachment calculated by a Colorado Rockfall Simulation Program computer modeling program is greater than 10 percent of total simulated rockfall passing a given point. This computer program is a widely accepted engineering tool used to estimate potential rockfall activity by simulating the activity. The program evaluates the potential passage of falling rock into the Petition Area from the natural hillside above.

Rockfall protection criterion is defined as the probable interception and catchment of 90 percent of probable rockfall hazards assessed by the computer rockfall simulation analysis. Because the analyses are based on statistics and probability, a 100 percent criterion is impractical to achieve. Therefore, if statistical rockfall encroachment is 10 percent or less, a hazardous rockfall condition is considered a remote risk, and rockfall protections may not be warranted, unless direct field observation or other information supports a higher probability of encroachment.





**Figure 2.6**

## Potential Rockfall Hazard Areas

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Cultural Preserve Area. A potential moderate rockfall hazard is present encompassing the lower elevation basin slopes within a portion of the proposed Cultural Preserve. Approximately 86% of simulated rockfall, involving boulders of 3 and 5 feet in dimension, could enter and come to a rest within the proposed Cultural Preserve down to about the 340-foot elevation (see Figure 2.6). No simulated rockfall passes below that elevation.

Rockfall mitigation and protection controls would not be necessary for this portion of the Petition Area because the Cultural Preserve would generally remain in a natural condition with some landscape restoration (revegetation with native plants). To address the potential rockfall hazard within the mauka portion of the Cultural Preserve, rockfall hazard warning signage would be posted at appropriate entry locations to alert persons of the potential for falling rock hazards in that area.

Central Cemetery Expansion Area. A generally low to moderate potential rockfall hazard is present encompassing the steep mountain up slopes and the lower elevation basin slopes within the central portion of the cemetery expansion area. Approximately 64% to 66% of simulated rockfall could enter and come to a rest within the cemetery area generally down to between the 275-foot and 350-foot elevation. However, this rockfall potential may be reduced to 10 percent by constructing a catchment ditch along the upslope boundary of the cemetery expansion area.

Remaining Cemetery Expansion Area. There is limited potential for rockfall encroachment along the remainder of the cemetery expansion boundary situated between the central cemetery expansion area and the Cultural Preserve. The rockfall simulation analysis indicated either no rockfall or a probability of less than 10 percent entering this eastern section generally within the 370-foot to 400-foot elevation area. Therefore, rockfall mitigation controls should not be required for the upslope boundary of this eastern section of the of the cemetery expansion area. Field investigations didn't support a higher probability of rockfall encroachment.

### **Landslide and Debris Flow Hazard**

Based on Geolabs, Inc.'s site reconnaissance, a number of converging drainages emanate from the adjacent upland slopes and flow through the Petition Area. The drainages could be capable of transmitting appreciable storm water runoff with potential of a rapid increase in discharge during storm conditions (flash-flood conditions).

No record or documentation of previous debris flow or landslide activity at the Petition Area is known, and Geolabs, Inc. observed no overt visible evidence of significant debris flow deposits or evidence of recent ground scour. However, the potential for the transmission of debris with storm water runoff from upland slopes should be considered due to the large area of steep forested slopes that have considerable forest debris on the ground. In addition, local areas of exposed soil and gravel/cobble talus were encountered within the steep upland drainage chutes adjacent to the proposed cemetery expansion. These loose alluvial/colluvial deposits have some potential to be scoured and entrained in heavy storm water runoff from the upper slopes.



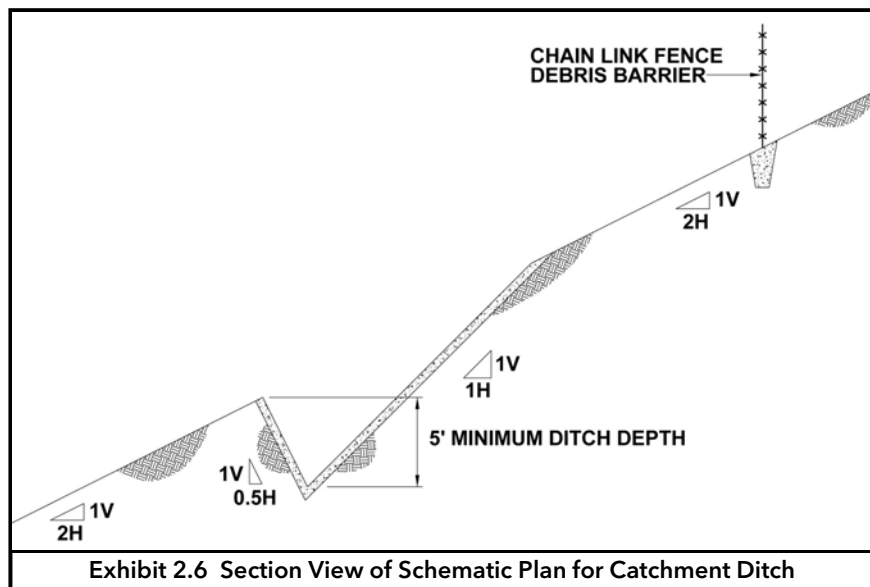
A surface drainage interception system consisting of an interceptor ditch network with appropriate debris barriers and discharge outlets is proposed to reduce the potential for storm water runoff encroachment. It also appears that the existing natural flatter ground topography at the foot of the steep upper terrain combined with the existing dense vegetation could provide some natural buffer, and reduce the risk for debris laden runoff from reaching the proposed drainage interception system.

### **Preliminary Rockfall Mitigative Design Measures**

Based on Geolabs, Inc.'s assessment of the potential rockfall hazard conditions, an approximately 1,000-linear feet of concrete lined rockfall catchment ditch along a portion of the upslope cemetery expansion boundary is proposed as a design mitigative measure. The location of this rockfall catchment ditch was previously shown on Figure 2.6. Based on the CRSP analysis, a 5-foot deep "V"-shaped concrete lined catchment ditch would be effective at containing falling rock, and reducing the potential for rockfall encroachment to an acceptable level. Exhibit 2.6 shows a schematic section of this catchment ditch.

The proposed catchment ditch would be designed to perform double duty both as a rock catchment and drainage interception structure along the upslope cemetery expansion boundary. To reduce the potential for large quantities of organic debris entering the ditch, including branches and other forest area debris, a chain link fence would be installed along and upslope from the catchment ditch (Exhibit 2.6). This would reduce the amount of debris that could accumulate in the ditch, and potentially reduce the rock catchment capacity. If possible, a vegetation free clear zone would also be created on the order of about 10 feet in width upslope from the ditch and encompassing the chain link debris barrier fence.

Periodic inspection of the rock catchment ditch, with possible periodic clearing of accumulated debris, would be conducted to maintain the rock catchment ditch's capacity. This rockfall catchment ditch should provide a significantly high level of safety against rockfall hazard based on past applications of similar mitigation methods.



#### 2.2.2.4 Short-Term Construction Best Management Practices

The proposed cemetery expansion is defined as a Category 5 project under the City DPP's new rules related to water quality (City Administrative Rules). Category 5 projects involve more than 1 acre of disturbance triggering grading, grubbing, stockpiling, and National Pollutant Discharge Elimination System (NPDES) permits. Projects also require the preparation of an Erosion and Sediment Control Plan (ESCP), which contains the following information: 1) project site information detailing existing and finish grading and drainage conditions; 2) BMPs addressing erosion and sediment control during construction; 3) BMP monitoring; and 4) inspection reporting until the project site is stabilized.

It is anticipated the main grading work for the Proposed Project would be done in one phase, in maximum 5-acre increments, and would take between 12 to 16 months to complete. This timeframe anticipates a moderate settlement waiting period (4 to 8 months) would need to be implemented. General BMPs would typically include the following, however, more detailed and site specific BMPs would be developed during the project's design phase.

1. Measures before construction:
  - a. Existing ground cover will not be destroyed, removed or disturbed more than 20 calendar days prior to start of construction.
  - b. Erosion and sediment control measures will be in place and functional before earthwork may begin, and will be maintained throughout the construction period. Temporary measures may be removed at the beginning of the work day, but shall be replaced at the end of the work day.
2. Measures during construction:
  - a. Clearing shall be held to the minimum necessary for grading, equipment operation, and site work.
  - b. Construction shall be sequenced to minimize the exposure time of cleared surface areas.
  - c. Areas of one phase, maximum of 5 acres in size, shall be stabilized before another phase can be initiated.
  - d. Slope management and protection is required for slopes exceeding 15 percent.
  - e. Stabilization shall be accomplished by protecting areas of disturbed soils from rainfall and runoff by use of structural controls such as PVC sheets, geotextile filter fabric, berms or sediment basins, or vegetative controls such as grass seedling or hydromulch. In addition, buffer strips 10 feet wide, at the toe of all slopes, and upstream diversion of storm water are required.
  - f. All control measures shall be checked and repaired as necessary, e.g., weekly in dry periods and within 24 hours after any heavy rainfall event. During periods of prolonged rainfall, daily checking shall be conducted.



3. Measures during adverse weather conditions:
  - a. The contractor shall listen to weather reports daily while conducting work.
  - b. If an emergency weather warning is issued, work shall cease. All equipment and materials shall be secured against wind, rainfall and flooding, and the work area cleared of construction debris to the extent practicable. Work shall not resume until conditions improve and weather warnings are rescinded.
  - c. Prior to recommencement of work activities following an event, the Contractor shall inspect all BMPs, including silt fence, sandbag barriers, and stabilized construction entrance, to ensure that they are not damaged, and that all BMP's are properly installed and functioning.
  - d. Construction materials and debris that is dispersed due to wind or rainfall shall be collected by the Contractor and reused or disposed of in compliance with State and County regulations.

### **Sediment Basins**

Sediment basins, in the form of depressions or excavated basins, would be used during construction to collect and detain runoff, allowing suspended soil particles to settle. They would generally be between 3 to 8 feet deep, and have controlled outlets and overflow spillways, so water is not permanently contained. These basins would be sized to handle the volume of runoff from a 2-year, 24-hour storm event, or 3,600 cubic feet per acre area that would be drained.

Some of these basins would be converted to detention basins to serve as a permanent BMP after construction is complete. The planned conversion of these basins are part of the post-development low impact development strategy proposed to be implemented.

### **2.2.3 Cemetery Operations**

With the cemetery expansion, the Petitioner would manage the expanded HMP site. Management responsibilities would continue to involve administrative activities, such as selling of burial plots, maintenance of the grounds and facilities, and assisting with the planning and implementation of funeral services for families.

The full range of funeral planning services would continue to be provided by existing staff, and no additional administrative staff would be necessary. An additional seven maintenance personnel would be added over time to take care of the acreage added to cemetery inventory. Existing buildings and facilities at HMP would continue to be used for administration and funeral planning services, and would be sufficient for operations. Therefore, these facilities, along with the small number of added maintenance personnel would be sufficient to manage additional burial plots created under the proposed project. HMP would also assume funeral planning responsibilities and services currently provided by HMPM, beginning in 2019, in advance of completion of cemetery expansion improvements.

Maintenance of the cemetery expansion area would continue to be funded by proceeds from HMP's existing Perpetual Care Trust account. This account exists to ensure adequate funds are available for existing and future upkeep of the cemetery. A portion of the sale of each burial plot is deposited in this trust account, with account earnings used to pay for maintenance activities. HMP's trust account is audited annually by the State Department of Commerce and Consumer Affairs to ensure they are financially sound to manage and operate the cemetery. HMP has not had issues with their financial ability to manage and operate. After construction, additional maintenance personnel are anticipated to be hired to ensure the cemetery expansion area is properly maintained.

The burial process occurring as part of the cemetery expansion area would follow the process used in existing portions of HMP. At the time of interment, the burial plot owner would authorize the plot to be opened by HMP. Owners may elect to have caskets, urns, or a combination of the two buried in a plot. A single plot can accommodate up to two caskets, one casket and two urns, or at maximum four urns.

Casketed remains at HMP must be placed within a concrete outer burial vault. This vault limits transmission of seepage and associated decay products into the surrounding environment. For single casketed burials, HMP would typically excavate plots to a depth of 6 feet. Plots would be excavated to a depth of 9 feet if an owner intends for the future interment of a second casket. Regardless of the number of remains interred, the casket would first be lowered into the concrete burial vault situated in the excavated plot. A vault cover would then be lowered and placed over the open top of the vault. HMP would then fill and cover the grave site with soil. The soil would be tamped with any remaining sod placed back on the burial site.

Passive recreational activities now occurring within the HMP property by the public would continue at the same level in the future. Area residents typically use the site for walking (exercise) during the mornings and afternoons (about 30 to 40 persons total daily). With the veteran's cemetery, there is more than enough open space for persons to comfortably walk, and the expanded cemetery area would not attract more persons for such activities.

#### **2.2.4 Cultural Preserve**

A 14.5-acre area within the Petition Area would be established as a Cultural Preserve. This Cultural Preserve would allow for cultural practices along with the restoration, preservation, management, and maintenance of cultural sites present within this area. This area contains a range of significant resources within its boundaries, including, but not limited to Kawa'ewa'e Heiau, other historic sites, plants used for cultural practices, and is the site of wahi pana (storied places or landscapes).

A preservation plan would be developed by the Petitioner in partnership with the Ko'olaupoko Hawaiian Civic Club regarding the stewardship and management of the Cultural Preserve. The preservation plan would determine the best treatment strategies for resources within the Cultural

Preserve, the reserve's management, and its operation. The preservation plan would ensure the long-term maintenance and security of Kawa'ewa'e Heiau and this area.

Elements of the preservation plan could include: 1) restoration work and maintenance for Kawa'ewa'e Heiau and other historic sites; 2) removal of non-native and invasive vegetation and replacement with native vegetation; 3) native Hawaiian traditional cultural practices, cultural and educational programs, and environmental stewardship. The preservation plan would be managed by the Ko'olaupoko Hawaiian Civic Club in coordination with the Petitioner.

Consideration of native Hawaiian burials is also planned to be incorporated into the Preserve as part of the preservation plan. A portion of the Cultural Preserve would be used for new burials following traditional native Hawaiian protocols. Deceased individuals buried within the Cultural Preserve would not be subject to HMP requirements necessitating burial caskets in concrete vaults. Traditional native Hawaiian protocols for burials would follow the "clean burial" process that involves partial cremation approved under State law enacted in 2015. Under this process, concrete vaults would not be required, as compared with traditional casket burials. New native Hawaiian burials would need to be coordinated with HMP for proper recordation in compliance with State DOH regulations of burials. The preservation plan would address management and burial plot design for these burials.

Other restoration and cultural practice activities within the preserve would occur during daylight hours, similar to HMP hours, and is not expected to occur on a daily basis. It is anticipated that activities could generally occur from one to three days a week, and primarily on weekends when volunteers and participants are available. Typically, about 5 to 10 persons would be present conducting activities. However, there could be periodic occasions where larger programs or events are held consisting of about 20 to 30 persons (e.g. educational program or ceremony). Larger events would occur periodically and are anticipated to be predominantly held on weekends. Various activities would typically not occur during the weekday morning or afternoon peak commuter period. Persons would park within open areas along roadways of the expanded cemetery site to access this preserve.

Cultural practitioners would have vehicular access to the Cultural Preserve via the main entrance through HMP, and from a grassed or other designated pedestrian path planned to extend from the expanded cemetery's internal roads. This access would potentially provide a more convenient, generally level, and accessible pedestrian path to the Cultural Preserve and heiau. A preliminary route is shown on the project's Conceptual Plan (Figure 2.2) along with the Grading Plan (Figure 2.3). However, the exact location and route of the access would be determined as part of final grading plans developed for the cemetery expansion.



Another option is to allow continued access from the end of Lipalu Street. However, access to the heiau from this location would not be improved because that area above the street's end would serve as an open space buffer from the cemetery. Thus, this access may potentially be more difficult (slope) due to filling planned further mauka for cemetery expansion, and would be an inconvenient (unimproved) route for practitioners to use in the long-term. In addition, access would need to be gated at this location to restrict unauthorized access.

### **2.2.5 Conservation Easement**

The 156.5 acres of the 164.4 acre parcel (less 7.9-acre Ocean View Garden) would be placed in a conservation easement with the Hawaiian Islands Land Trust (HILT). A conservation easement is a legal agreement between a landowner and a third party that permanently limits uses of the land in order to protect its conservation values. Establishing this conservation easement would restrict any other future development on the 156.5-acre property, except for the proposed expansion of the cemetery and Cultural Preserve.

HILT is a nationally accredited non-profit organization that protects over 18,000 acres of land in Hawai'i with scenic views, agricultural resources, wildlife habitat, water resources, cultural and historical sites, and outdoor recreational opportunities. HILT was established in 2011 as a merger of four land trusts on the islands of Hawai'i, Maui, O'ahu, and Kaua'i. The organization supports landowners by holding and monitoring perpetual conservation easements, and by providing other support services and counsel through their network of relationships with government agencies and other conservation partners.

## **2.3 PROJECT PHASING AND ESTIMATED COSTS**

Petitioner intends to commence design and construction of the backbone infrastructure for development of the entire Petition Area in a single integrated system as soon as all entitlements have been obtained. With obtainment of entitlements projected for 2019, design work for improvements would commence with construction projected to start in 2020. Construction would consist of site grading activities, installation of roadway infrastructure and utilities, and landscaping of areas.

Site grading and infrastructure construction would likely occur in phases, possibly in successive 5-acre increments, allowing for the ground to settle from fill activities. Full construction completion would be completed within 10 years after entitlements are obtained as all site and infrastructure improvements for the cemetery expansion area should be completed within about 1.5 years (in 2021). Sales of burial plots would begin in 2021, and could be completed within 20 years, or by 2040. However, the sales of burial plots would be based upon demand, but is expected to serve the public's needs for several decades based upon the projected increasing elderly population.

The project would be financed by the cash flow of Dignity Memorial's parent company. Debt or financing would not be required to implement the project. Development costs for the cemetery construction are estimated at \$29.3 million (in 2018 dollars) as shown below.

<b>Table 2.9. Preliminary Development Cost Estimate</b>		
	<b>Activity</b>	<b>Total Cost (2018 Dollars)</b>
<b>Site Preparation</b>		
	Mobilization	\$100,000
	Erosion Control	\$250,000
	Clearing and Grubbing	\$850,000
<i>Site Preparation Subtotal</i>		<i>\$1,200,000</i>
<b>Site Work</b>		
	Excavation	\$10,000,000
	Fill	\$11,250,000
	Retaining Walls	\$1,100,000
	24' wide AC Roadways (including roll curb and base course)	\$1,520,000
	Rockfall Mitigation	\$720,000
	Storm Drainage	\$600,000
	Subdrainage System	\$150,000
	Irrigation System	\$100,000
<i>Site Work Subtotal</i>		<i>\$25,440,000</i>
<b><i>Site Improvements Subtotal</i></b>		<b><i>\$26,640,000</i></b>
<b><i>Contingency (10%)</i></b>		<b><i>\$2,664,000</i></b>
<b>Preliminary Cost Total</b>		<b>29,304,000</b>

## **2.4 LISTING OF PERMITS AND APPROVALS**

A listing of required discretionary land use approvals and ministerial permits for this project is provided.

### **State of Hawai‘i Permits**

#### Land Use Commission

- State Land Use District Boundary Amendment

#### Department of Health

- National Pollutant Discharge Elimination System (NPDES) Permit - Construction Activities
- Construction Noise Permit, if required

#### Department of Land and Natural Resources, Historic Preservation Division

- Chapter 6E, HRS, Historic Preservation Review

### **City and County of Honolulu Permits**

#### Board of Water Supply

- Water System Facilities Charges

#### Department of Planning and Permitting

- Grading Permit

## **2.5 ALTERNATIVES CONSIDERED**

This section discusses alternatives to the Proposed Action that were identified and considered, but eventually eliminated from further consideration, including the following:

1. No Action Alternative: This alternative involves not implementing improvements associated with the Proposed Action. This alternative represents a baseline of future environmental conditions without the Proposed Action, and was used to assess and evaluate probable impacts or changes resulting from the Proposed Action.
2. Postponing the Proposed Action: This alternative involves postponing the Proposed Action due to the need for further study to assess the project’s environmental effects.
3. Expanded Cemetery Development: This alternative involves utilizing the entire 164-acre property (Parcel 1) for developing additional cemetery space along with the Cultural Preserve.
4. Eliminate Cultural Preserve: This alternative involves only developing the cemetery expansion area. The 14.5 acre Cultural Preserve would be eliminated from the Petition Area and improvements planned.
5. 2007 Cemetery Expansion Plan: This alternative involves implementing the prior 2007 cemetery expansion plan proposed for the 164-acre Parcel 1.



6. Cemetery Expansion on Adjacent Site: This alternative involves only expanding the HMP cemetery on an adjacent State-owned property (Tax Map Key (1) 4-5-035: 002).
7. Other O‘ahu Alternative Locations. This alternative involves creating a new cemetery at a different location on the island of O‘ahu, such as in the ‘Ewa district.

### **2.5.1 No Action Alternative**

The No Action Alternative assumes cemetery expansion improvements and the Cultural Preserve are not implemented. Current cemetery operations would continue in HMP’s existing 80 acre cemetery area. Under this alternative, the inventory of available burial plots on O‘ahu would continue to be purchased and diminished while demand for burial plots increases due to factors discussed in Section 2.1. The Petition Area would remain unimproved with historic and cultural resources remaining in their existing locations.

The No Action Alternative was eliminated from consideration because it would not meet the need and objectives of the project. Although the No Action Alternative was eliminated, it represents a baseline of future environmental conditions without the Proposed Action. This baseline was used to assess and evaluate probable impacts or changes resulting from the Proposed Action.

An important purpose and objective for this project is to provide additional burial space due to the increasing demand and projected shortfall of available burial space in the future, which would not be achieved under this alternative. The CBRE market study analysis indicates that by 2040, there would be demand for between 145,030 to 165,800 burial spaces that would greatly exceed the 85,100 to 109,100 new burial spaces that could be provided on O‘ahu. Forgoing the project under this alternative would allow this shortfall to continue, resulting in constrained disposition opportunities for O‘ahu families. There is thus significant long-term demand for more burial space that would not be addressed under this alternative.

Remaining burial spaces at HMP are also expected to be sold by 2023. Without an expansion of this cemetery, this future situation would result in heritage issues for families wishing to be interred near other family members or relatives already interred at HMP or at the Hawai‘i State Veterans Cemetery. The heritage factor contributes significantly to HMP’s desirability as a location to meet future needs of residents.

The No Action Alternative does not support the project’s purpose of supporting cultural practices because the Cultural Preserve would not be established. Kawa‘ewa‘e Heiau and the surrounding cultural landscape would remain in a degraded condition with continued difficult access. This would inhibit restoration and maintenance of the heiau and other sites. Management of this area would continue to be difficult without recognized preserve boundaries, established responsibilities, etc. that would have occurred under the Cultural Preserve’s preservation plan. Also, new native Hawaiian burials following traditional practices and protocols would be prevented in this location.

Finally, a conservation easement would not be established for this property that would have supported the long-term stewardship of the remaining 156.5 acres of this property by the Hawaiian Islands Land Trust. Such an easement would have restricted future urban development of the area and prevented unauthorized or unpermitted activities. The remaining 156.5 acres of undeveloped area of this property could now be potentially sold, and possibly result in other urban development (e.g. residences), recreational, or other economic use by a future landowner.

### **2.5.2 Postponing the Proposed Action**

The Proposed Action would be postponed under this alternative to allow the Petitioner additional time to conduct further studies to evaluate the project's impact or address unresolved issues. This alternative assumes further study or project planning would be needed for existing or newly identified areas of concern or unresolved issues. In theory, postponing the project to allow time for further study would provide a better understanding of the project's environmental impact and mitigation measures that may be needed.

This alternative was eliminated from consideration because delaying the Proposed Action for additional studies is not necessary, and there are no unresolved issues with the project. Additional areas of analysis, including updated and new technical studies, have been conducted for the Proposed Action, and are discussed in this document. No additional studies or detailed analysis of issues areas are needed at this time that would justify postponing the project. This environmental review process already allows for issues and concerns to be addressed.

This project was previously proposed in 2006 and a Final EIS was completed in 2008. Since then, several changes have occurred to the project and actions have been taken to address prior issues. This includes the City and County amending the *Ko'olau Poko Sustainable Communities Plan* in August 2017 to include the cemetery expansion area within the Community Growth Boundary. Therefore, the Proposed Action is now consistent with the City's sustainable communities plan. Other elements have been incorporated into the Proposed Action to address prior concerns. This includes proposing a smaller cemetery expansion area, establishing a Cultural Preserve to support cultural practices, and creating a conservation easement to restrict future development of the remaining area of the property and increase stewardship of the area.

A summary of how other prior issues have been addressed under the current Proposed Action is provided below.

1. **Drainage Issues.** Parties concerned with the 2008 project believed the 100-year, 1-hour storm event rather than the 10-year event should have been incorporated into the engineering assessment of the project's impact to site drainage conditions. Incorporating the 100-year, 1-hour event would have resulted in a more conservative understanding of site drainage conditions and development of mitigation measures that are comparatively more robust.

- The preliminary engineering report completed for the current project evaluated the 100-year, 1-hour storm event as part of preliminary engineering and design development of drainage improvements to address this concern.
2. In 2008, the State LUC determined that the need for the amount of burial space proposed in the prior cemetery proposal was not demonstrated. Demand for burial space then proposed was supported by a market analysis that qualitatively evaluated the demand for burial space relative to state demographic characteristics and disposition method statistics.  
A more robust market analysis was conducted by CBRE for the current project. This analysis incorporated information on the availability of existing and proposed O‘ahu burial space to quantitatively evaluate whether sufficient demand would exist to absorb the burial spaces proposed.
  3. Concerns with the prior project were raised about chemicals associated with burials impacting underlying groundwater resources.  
An updated water quality study included groundwater sampling from a well within the Petition Area and testing for chemicals, such as formaldehyde, associated with casket burials. The results showed no significant effect on the groundwater from formaldehyde. This updated and more extensive water quality study also addresses Kāwā Stream, water quality, and pollutants. A new groundwater study conducted also evaluated soil borings and water testing of the well to evaluate groundwater conditions, which are discussed in this document.

### **2.5.3 Expanded Cemetery Development**

This alternative involves expanding the cemetery across the entire Parcel 1 property (156-acre). The expanded cemetery development would not include the Cultural Preserve (14.5 acres), which would remain the same size as under the Proposed Action. A significantly greater amount of burial space would be created through this alternative in the range of about 120,000 to 125,000 burial spaces. The number of burial spaces created would more than adequately address the future potential demand well beyond 20-years.

Although this alternative better supports the project need for additional burial spaces, it was eliminated from further consideration because it poses greater potential environmental impacts than the Proposed Action and would not be consistent with the City’s *Ko‘olau Poko Sustainable Communities Plan*.

Additional cemetery expansion areas would need to extend further northeast across upland areas of Parcel 1 and inland (mauka) towards the ridgeline of Oneawa Hills. These areas are at a steeper elevation and would require a significant amount of additional grading work (cut and fill) to establish slopes needed for safe pedestrian access across burial areas. These changes would significantly alter the present hillside topography and views. Drainage improvements could be incorporated in preliminary design plans for such an expanded area that could reduce surface runoff flow rate and volumes, and improve water quality by reducing current erosion and pollutants



being discharged. There would more impacts to archaeological sites within this expanded area, such as those identified under the previous 2008 Final EIS. The expanded cemetery area would also be closer to residences along Namoku Street and at the Poha Nani senior living center, likely generating further community concerns and potential opposition.

This alternative would not be consistent with the City's recent update to the community plan for this area. Under Section 3.1.3.4 (Cemeteries, Natural Gulches...) of the plan, specific policies added as part of the update placed restrictions on HMP's expansion. This included having a 2,000 foot buffer between the cemetery expansion and the Pohai Nani residential building, and establishing a conservation easement covering remaining areas outside the Petition Area. This expanded cemetery alternative would thus require amending such policies of the community plan.

## **2.5.4 Eliminate the Cultural Preserve**

Under this alternative, the 14.5 acre Cultural Preserve would be eliminated from project plans described under the Proposed Action. As a result, the Petition Area would decrease from 53.45 acres to about 39 acres, and only consist of cemetery expansion. Only those cultural landscape restoration activities and native Hawaiian cultural practices that are allowed within the State's Conservation District without a permit would occur under this alternative.

Other activities are not included under this alternative because they would require a permit or other discretionary approval from the State. For example, use of the site for new burials following traditional native Hawaiian protocols would not be permitted because that is considered cemetery use and is not permitted within the State Conservation District. A summary of those resulting cultural activities that would be allowed without a permit follows:

1. Collection of plants for cultural practices that results in negligible ground disturbance.
2. Removal of invasive species, not exceeding one acre.
3. Maintenance and minor repair of historic sites that involves mostly cosmetic work or like-to-like replacement of component parts, and results in negligible change or impact to the land and cultural resource.
4. Removal of dead or diseased trees.
5. Basic land management, such as routine weed control, tree pruning, etc. that involves no grubbing or grading permit.
6. Planting of native and endemic plants in an area of less than one acre.

This alternative was eliminated from consideration because it inhibits the practice of certain traditional cultural activities and impedes other cultural landscape restoration initiatives. The alternative does not adequately support the project's objective and need to support cultural practices and activities. New burials following traditional native Hawaiian protocols and practices could not occur as this activity is considered a "cemetery" land use similar to the cemetery expansion proposed for HMP. This use is not allowed under the property's current Conservation District designation, and would require a State land use district boundary amendment to the Urban District. The cemetery area used for such native Hawaiian burial activities would also require

compliance with State Department of Health regulations under Title 11, Chapter 22, HAR. Compliance with such requirements would need to be documented and recorded by HMP that is an authorized cemetery authority under these regulations.

The alternative was also eliminated because cultural landscape restoration and other traditional cultural activities could not be readily conducted, and permits would be needed from the State to conduct certain activities. Under Title 13, Chapter 5 (Conservation District), HAR, replacing non-native vegetation with native plants for areas exceeding one acre requires a permit from the State Department of Land and Natural Resources (DLNR). Other activities either involving more than an acre or expanded work may require different levels of permits. The need for such approvals makes it difficult for organization's stewarding this area to conduct landscape or other restoration work and activities. This situation does not sufficiently support the project's purpose and need.

### **2.5.5 2007 Cemetery Expansion Plan**

The cemetery expansion plan proposed in 2007 would be implemented under this alternative. The project area associated with the prior plan totaled approximately 56.5 acres. The concept plan involved development of 35.6 acres of additional cemetery space and reservation of 9.5 acres for the preservation of historic sites and cultural resources. The remaining 11.4 acres of the area would be graded, revegetated, and kept in open space. Figure 2.7 shows the prior cemetery expansion plan. This plan could create about 35,000 to 40,000 burial spaces that would provide additional supply to adequately address the future potential demand.

This alternative was eliminated from further consideration because it would not be consistent with the City's recent update of the *Ko'olau Poko Sustainable Communities Plan*, and would have greater community concerns and impacts than the Proposed Action. Under Section 3.1.3.4 of the community plan, specific policies place restrictions on HMP's expansion. Policies include having a 2,000 foot buffer between the cemetery expansion and the Pohai Nani residential building, and establishing a conservation easement covering remaining areas outside the Petition Area. The cemetery expansion further northeast shown on Figure 2.7 would extend into this buffer area. Furthermore, portions of the cemetery expansion would need to occur within the proposed conservation easement. Therefore, implementation of this alternative would require amending such policies of the community plan.

Many of the same community concerns voiced regarding the 2007 plan would occur under this alternative. Several prior issues of concern could be addressed, such as drainage improvements and effects, with technical studies. However, the expanded cemetery area would likely generate further community concerns and potential opposition to such use being located near their residences. There would also be more impacts to archaeological sites within this expanded area.



**Concept Plan: Revised Proposed Action**

Hawaiian Memorial Park Cemetery Expansion  
 Kāne'ohe, O'ahu



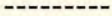




Prepared for: Hawaiian Memorial Park Life Plan Ltd.

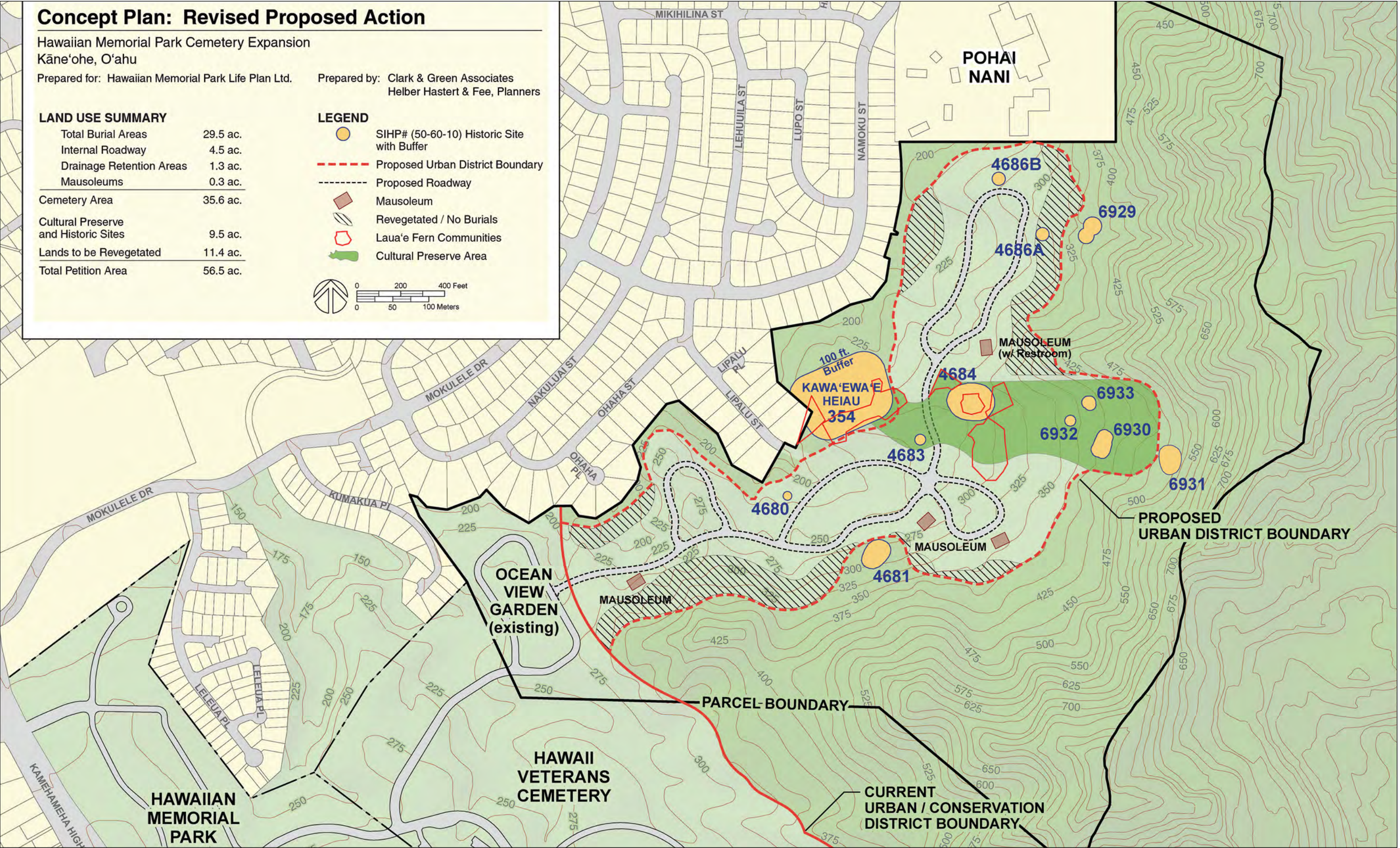
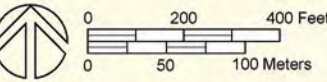
Prepared by: Clark & Green Associates  
 Helber Hastert & Fee, Planners

**LAND USE SUMMARY**

Total Burial Areas	29.5 ac.
Internal Roadway	4.5 ac.
Drainage Retention Areas	1.3 ac.
Mausoleums	0.3 ac.
Cemetery Area	35.6 ac.
Cultural Preserve and Historic Sites	9.5 ac.
Lands to be Revegetated	11.4 ac.
Total Petition Area	56.5 ac.

**LEGEND**

-  SIHP# (50-60-10) Historic Site with Buffer
-  Proposed Urban District Boundary
-  Proposed Roadway
-  Mausoleum
-  Revegetated / No Burials
-  Laua'e Fern Communities
-  Cultural Preserve Area



2007 Cemetery Expansion Plan

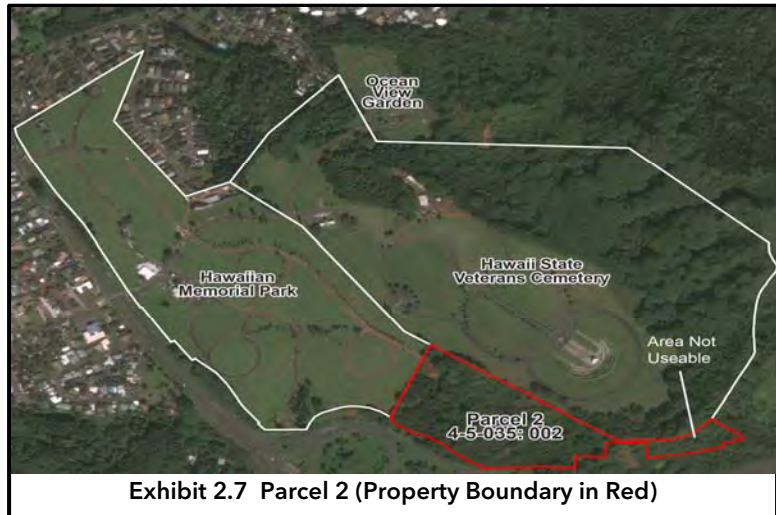
Figure 2.7



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## **2.5.6 Cemetery Expansion on Adjacent Site**

Under this alternative, cemetery expansion improvements would be implemented on a 21-acre property located adjacently south of the existing HMP cemetery. This property is designated Tax Map Key (1) 4-5-035: 002 (Parcel 2) and is shown in Exhibit 2.7. Parcel 2 is owned by the State Department of Transportation, Highways Division. This state-owned property encompasses a small hillside and basin areas comprising the western most flank of Oneawa Hills. This alternative is being presented because some community members have suggested it to be reasonable. They have mistakenly implied that HMP owns the property.



This alternative was eliminated from consideration because Parcel 2 is not owned by HMP and is therefore not suitable for use as a cemetery. HMP would need to purchase the property from the State to develop it for cemetery use. Although some portion of this property could be sold by the State, the majority of the property would need to be reserved by the State in the event future improvements are required to the adjacent Honolulu-bound on-ramp and the H-3 Freeway.

In addition, only a portion of the 21-acre property could be practically used for cemetery expansion. As shown on Exhibit 2.7, about 2.5 acres on the eastern end of the property is not useable being situated along the H-3 Freeway and separated from HMP by the Hawai'i State Veterans Cemetery. Areas along the freeway and on-ramp would also not be available in order to provide adequate right-of-way for these highway facilities. Therefore, only about half of the site (10 acres) could be potentially used. This remaining area is too small to adequately serve the purpose for the project in providing future burial space given the investment needed, and when compared to the Proposed Action.

Finally, the Cultural Preserve would not be implemented under this alternative, and would thus not support the project's purpose and objectives relative to cultural practices and long-term stewardship of Parcel 1 under a conservation easement. The issues associated with the Eliminate the Cultural Preserve alternative making that not practicable would thus also apply to this alternative.

## 2.5.7 Other O‘ahu Alternative Locations

This alternative involves developing a new cemetery in another location on the island of O‘ahu, such as within other regions where future urban growth on O‘ahu is planned. O‘ahu’s *General Plan* (DGP, 1992, amended October 3, 2002) policies and objectives for the island’s future urban development targets the ‘Ewa district and the secondary urban center at Kapolei as priority areas for development of residential, commercial, employment, and public facility uses. Therefore, an alternative location for a new cemetery could be on a property in the Ewa district. The only existing cemetery in this district is the historic ‘Ewa Plantation Community Cemetery, which is inactive.

This alternative location was eliminated from further consideration because the Petitioner does not own property in the ‘Ewa district. Project implementation in this district would require the Petitioner to find available vacant land and then purchase new property which would be cost prohibitive relative to the Proposed Action. Existing land use plans for Kapolei and ‘Ewa have been established after many decades of master planning, and cemeteries are not proposed within these areas. Other developments could have included cemeteries in their plans, but chose not to do so because of other land use priorities, such as residential housing, commercial development, etc.

This alternative would also require amending the *‘Ewa Development Plan* (adopted 1997, amended July 10, 2013) to add a new cemetery land use, similar to amendments needed to the *Ko‘olau Poko Sustainable Communities Plan* to ensure the development is consistent with the community plan. Amending the development plan would require displacing another already designated and approved land use, and would require a fairly substantial area of about 30 to 50 acres. The feasibility for such a change amending the *‘Ewa Development Plan* is low, comparatively difficult given plans already being implemented by government agencies and major landowners, and would take several years given the plan has recently already been updated.

Creating a new cemetery in the ‘Ewa District would also lead to heritage issues for O‘ahu families with ties to HMP and the Veterans Cemetery. A new cemetery in ‘Ewa would start with no tradition or heritage connection for families. Those wishing to be interred near family members or relatives already buried at existing areas of HMP would be separated with a new cemetery at ‘Ewa.

Finally, the Cultural Preserve would not be implemented under this alternative, and would thus not support the project’s purpose and objectives relative to cultural practices and long-term stewardship of Parcel 1 under a conservation easement. The issues associated with the Eliminate the Cultural Preserve alternative making that not practicable would thus also apply to this alternative.