Appendix S

VEGETATION RESOURCES MANAGEMENT PLAN

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Easley Renewable Energy Project

Prepared for

Intersect Power

IP Easley, LLC

a subsidiary of Intersect Power, LLC

Submitted by

Aspen environmental group

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ATTACHMENTS

1. INTRODUCTION

IP Easley, LLC (Applicant or Proponent), a subsidiary of Intersect Power, LLC, proposes to construct, operate and decommission the Easley Renewable Energy Project (Easley or Project), a utility-scale solar photovoltaic (PV) electrical generating and storage facility, and associated infrastructure to generate and deliver renewable electricity to the statewide electricity transmission grid. The approximate 3,700-acre Project site is located in Riverside County near the Desert Center Area (see POD Appendix A, Figure 1). The Project would generate and store up to 650 megawatts (MW) of renewable electricity via arrays of solar photovoltaic (PV) panels, battery energy storage system (BESS), and appurtenant facilities. A 6.7-mile 500 kilovolt (kV) generation-tie (gen-tie) line would mainly traverse the adjacent Oberon Renewable Energy Project that is owned by Intersect Power and connect into its approved substation that is under construction (see POD [Plan of Development] Appendix A. Figure 2). From the Oberon Substation, the power generated by the Easley Project would be transmitted to the SCE Red Bluff Substation via the Oberon 500 kV gen-tie line which is expected to be fully energized by the end of 2023. For a complete Project Description and summary of the Project location, refer to the POD main text.

The Project includes both public and private lands (see POD Appendix A, Figure 2). Public lands within the Project solar application area managed by the U.S. Bureau of Land Management (BLM) are designated as Development Focus Area (DFA) by the Desert Renewable Energy Conservation Plan (DRECP) and associated Record of Decision (ROD), and thus, have been targeted for renewable energy development. Because the proposed Project is partially located on federal land under management of the BLM, the BLM is the lead agency under the National Environmental Policy Act (NEPA), 42 U.S.C. section 4321 et seq. Private lands within the Project solar application area are under the jurisdiction of Riverside County who will serve as the lead agency under the California Environmental Quality Act (CEQA).

Clean, renewable energy generation will have an overall benefit to plant and wildlife species on a local, regional, and global scale by replacing fossil fuel energy sources, reducing toxic emissions, and mitigating the effects of climate change on ecosystems.

1.1. Purpose

This Vegetation Resources Management Plan describes IP Easley, LLC's strategy to minimize adverse effects of the Project to native vegetation, soils, and habitat. This Plan addresses the revegetation of sites to be temporarily disturbed during construction or other Project activities; salvage of native cactus and ocotillo from BLM-administered lands prior to construction; and on-site vegetation management during Project O&M.

IP Easley, LLC, will reclaim, revegetate, or restore all temporarily disturbed areas, such as temporary access roads, construction work areas, temporary lay-down areas, and staging areas. Most of the Project's temporary disturbance will be within the solar facility, where disturbed areas will largely be beneath solar panels. In these areas, this Vegetation Management Plan is intended to minimize dust, erosion, weed invasion, and fire hazard throughout the solar facility to the extent feasible. The Project may implement wildlife passage fencing over a portion of the solar facility and as such, the Vegetation Resources Management Plan will also be implemented on those areas to ensure they support local, native vegetation. In addition, in the permanently fenced areas, this Plan is intended to prevent or minimize conditions that could attract wildlife into the site, where they could be at risk of injury or mortality due to Project activities. The goal is to vegetate all temporarily disturbed areas to approximate pre-disturbance conditions as closely as possible.

This Vegetation Resources Management Plan will be implemented concurrently with the Project's Integrated Weed Management Plan (IWMP) (see POD Appendix N), and the two plans are designed to supplement one another. Together, they describe the overall approach to vegetation and weed management, to be implemented over the life of the Project.

The Vegetation Resources Management Plan conforms with DRECP Conservation and Management Actions (CMAs) as follows:

- **CMA LUPA-BIO-7**: Restoration of Areas Disturbed by Construction Activities but Not Converted by Long-Term Disturbance, which requires restoration of disturbed project areas.
- **CMA LUPA-BIO-VEG-1**: General Vegetation Management (VEG), which requires that management of cactus, yucca, and other succulents follow BLM policy.
- **CMA LUPA-BIO-VEG-5**, which requires that BLM regulations and policies be followed for salvage and transplants of cactus, yucca, other succulents, and BLM sensitive plants.

The associated IWMP conforms with **CMA LUPA-BIO-10**: Standard Practices for Weed Management.

This Plan may be revised to conform to requirements of: (1) relevant provisions of the Project's Final Environmental Impact Report or Environmental Assessment, (2) any USFWS Biological Opinion (BO) or CDFW Consistency Determination or Incidental Take Permit (ITP) issued for the Project, (3) any revisions to relevant mitigation measures that may be adopted in the BLM Decision Record and/or by Riverside County, or (4) any further direction from the resource agencies.

2. VEGETATION COMMUNITIES

Two primary natural vegetation communities occur on the Project site: (1) creosote bush scrub and (2) desert dry wash woodland, a subtype of microphyll woodland. One distinct natural habitat type, desert pavement, occurs on the Project site. One vegetation community, desert dry wash woodland, is identified by BLM and CDFW as sensitive due to the association with alluvial processes (Ironwood, 2022). Vegetation communities on the Project site are summarized below and described in further detail and mapped in the Project's Biological Resources Technical Report (BRTR) (see POD Appendix G [Ironwood, 2022]).

- **Sonoran Creosote Bush Scrub.** Sonoran creosote bush scrub has rarity rank of S5 (Ironwood, 2022), being demonstrably secure, and is not designated as a sensitive plant community by BLM. It is synonymous with *Larrea tridentata* (creosote bush) -*Ambrosia dumosa* (burro bush) alliance (Ironwood, 2022) and *Lower Bajada and Fan Mojavean-Sonoran Desert Scrub* (NVCS). Sonoran creosote bush scrub covers most of the Project site and intergrades with desert dry wash woodland along desert washes. Within the Project site, this community occurs on sandy soils with a shallow clay pan.
- **Desert Dry Wash Woodland.** Desert dry wash woodland is a sensitive vegetation community recognized with a rarity rank of S4 (Ironwood, 2022). Desert dry wash woodland is characteristic of desert washes and is likely to be regulated by CDFW as jurisdictional state waters. This community is synonymous with blue palo verde (*Parkinsonia florida*) - ironwood (*Olneya tesota*) (microphyll) woodland alliance (Ironwood, 2022) and Sonoran - Coloradan Semi Desert Wash Woodland / Scrub (NVCS). This community is an open to relatively densely covered, drought-deciduous, microphyll (characterized by small compound leaves) riparian scrub woodland, often supported by braided wash channels that change following every surface flow event. It is dominated by an open tree layer of ironwood, blue palo verde, and smoke tree (*Psorothamnus spinosus*) of at least 2-3% cover (Ironwood, 2022). The understory is a modified creosote scrub with big galleta grass (*Hilaria rigida*) and desert lavender (Condea [=*Hyptis emoryi*] *emoryi*). Within the Project site, the desert dry wash woodland occurs on mostly the western portion of the Project site, with several ribbons of desert dry wash woodland interspersed between creosote bush scrub.
- **Desert Pavement.** Desert pavement is not descriptive of vegetation, but rather a geomorphic condition that results in tightly interlocking gravel and pebbles which develop over time on fluvially inactive upland areas within stabilized alluvial fans. It develops as gravel and rock deposits weather in place, causing rounding of pebbles, and as wind removes finer sediment (Ironwood, 2022). It has a state rarity rank of S4 and is synonymous to the rigid spineflower – hairy desert sunflower (*Chorizanthe rigida* –

Geraea canescens) desert pavement sparsely vegetated alliance (Ironwood, 2002; Sawyer et. al 2009). It is sparsely vegetated with an intermittent layer of cryptogamic crust. The ground surface is sandy and gravelly mixed alluvium with various rocks and gravel. The shrub layer of creosote bush is extremely sparse. The herb layer, though sparse within this community on the Project site, is slightly larger than the shrub layer, and is characterized by rigid spine flower and desert sunflower. Desert pavement is often interwoven between areas of creosote bush scrub and desert dry wash woodland where it occurs on the Project site, and primarily occurs on the western portion of the Project site. Other occasional plants in the herb layer include annual buckwheat (*Eriogonum* sp*.)* and brittle spineflower (*Chorizanthe brevicornu*).

- **Wetland and Riparian Vegetation.** Wetlands were mapped in two areas during the Spring 2022 surveys. One wetland, created from drainage from the aquaculture farm, is generally in the center of the Project site, on a private parcel. Most of the wetland is outside the Project area boundary. The second wetland is created from drainage from adjacent agriculture activity that allows water to drain through the wetland area into a pond area with no outlet. Both wetlands are dominated by herbaceous species, including softstem bulrush (*Schoenoplectus tabernaemontani*), cattail (*Typha latifolia*), and bearded sprangletop (*Diplachne fusca*). Two areas of invasive tamarisk (*Tamarix ramomissima*) riparian vegetation were mapped during the Spring 2022 surveys.

3. CACTUS AND SPECIAL-STATUS PLANT SALVAGE

Emory's crucifixion thorn, a California Rare Plant Rank (CRPR) 2B.2 plant, occurs on the site outside of the development area. It is rare, threatened, or endangered in California but more common elsewhere. It is fairly endangered in California with a moderate degree/immediacy of threat, with 20% to 80% of occurrences threatened. One individual is located at the northwest corner of the Project site in desert dry wash woodland (see POD Appendix G [Ironwood, 2022]), but will be avoided by the Project.

A total of five cactus species were observed within the Project site. These species are:

- barrel cactus (*Ferocactus cylindraceus*)
- beavertail cactus (*Opuntia basilaris*)
- cottontop cactus (*Echinocactus polycephalus*)
- Engelmann's hedgehog cactus (*Echinocereus engelmannii*)
- fishhook cactus (*Mammillaria tetrancistra*)

Additionally, ocotillo (*Fouquieria splendens* ssp. *splendens)* and four species of native trees were found within the Project site:

- desert ironwood (*Olneya tesota*)
- blue palo verde (*Parkinsonia florida*)
- honey mesquite (*Prosopis glandulosa*)
- smoke tree (*Psorothamnus spinosus*)

There were no BLM Sensitive Plants or CRPR 1 plants located on the Project site. One other CRPR 2 plant, glandular ditaxis (*Ditaxis claryana*), has potential to occur on the Project site.

A separate Emory's Crucifixion Thorn Salvage Plan will not be required, as the one individual occurrence is located outside the development area and will be avoided.

3.1. Pre-Construction Survey

Additional pre-construction surveys for biological resources will be conducted prior to any grading or clearing activity at Project work sites, including the solar facility site; gen-tie line work areas; all construction laydown, parking, and work areas; and all temporary and permanent access roads (See POD

Appendix B, BRTR Section 3 for survey methodology). During all pre-construction clearance surveys, any additional California Rare Plant Rank (CRPR) 1 or 2 plants, or yucca or cactus specimens (excluding cholla species) will be flagged, and their locations will be recorded using hand-held GPS units. These plants will be either salvaged from the site or, if specific work areas can be adjusted, their locations and a suitable buffer area will be avoided. The Project's Lead Biologist will be responsible for determining the buffer distance, flagging the avoidance area, and maintaining and inspecting the location throughout the construction phase of the Project.

One or more qualified botanists will conduct pre-construction surveys throughout all areas to be disturbed, either concurrently with the wildlife crew(s) or during separate survey(s). Survey season requirements are summarized in Table 1. All cacti and Emory's crucifixion thorn (*Castela emoryi*) can be identified year-round.

Table 1. Pre-Construction Cactus and Special-Status Plant Survey Schedule

Species	Pre-construction Survey Season	Locations
Cacti (excluding cholla species)	Year-round	Throughout Project site
Emory's crucifixion thorn	Year-round	Mapped location (Ironwood, 2022)
Glandular ditaxis	Year-round	Suitable habitat in Sonoran Desert scrub (Ironwood, 2022)

3.2. Replanting Locations

All plants salvaged from the solar facility sites and gen-tie route will be transplanted upon BLM approval onto either Project lands, such as revegetation areas on temporarily disturbed work sites that are not in high visibility areas that would be easy to locate and poach, or (at the direction of BLM) onto public lands in the vicinity that will have appropriate access for watering.

3.3. Cactus and Ocotillo Salvage

Any vegetation to be salvaged and removed from the site (such as cactus or yucca) would be subject to sale at appraised value, according to CFR 43:5420.0-6 (i.e., IP Easley, LLC, would be obligated to buy the plants from the public). If the plants are transplanted to public lands off site, as approved by BLM, then this resource is not subject to sale because BLM retains ownership.

BLM policy requires salvage and transplantation of yucca and cacti, with the exception of cholla (*Cylindropuntia* sp.). No *Yucca* species (e.g., Joshua tree or Mojave yucca) were located on the Project site. Excluding cholla species, five cactus species were located on the Project site, as described in Section 3 above.

3.3.1. Cactus Salvage Procedure

Cactus and ocotillo salvage will be completed using heavy equipment or hand tools, depending on plant size. Access to the plants and transport will be via pickup truck, SUV, or a similar vehicle. The work crew will drive on existing roads as near as possible to each recorded cactus or ocotillo location and will access plants on foot. Cactus and ocotillo salvage is summarized as follows (see Attachment A Cactus Salvage Guidelines for complete description):

1. To the extent feasible, plants will be salvaged during fall or winter to minimize transplantation stress during the early spring active growth season, or during extreme summer heat.
2. The north-facing side of each plant will be marked by securely tying a tag or colored flagging to the spines. In addition, each plant will be assigned a unique identification number, also affixed to the

plant in the north-facing orientation. For ocotillo, the numbered tag will be securely attached at least 3 feet above the ground and branches will be bundled and tied before digging.

3. For each plant to be salvaged, a digital photograph will be taken, and a brief plant-specific description and microsite description will be recorded, including short descriptions of root depth, depth of the stem in the soil, topography, hydrology, shade, and soil texture at the salvage site.
4. Each plant will be dug out carefully, to minimize root damage. Salvage crews will begin digging no closer than six (6) inches from the base of the plant, and farther from the base, depending on plant size. Ocotillo will be extracted with heavy equipment, digging around the individual's entire perimeter at a distance of at least 3 feet from the base of the plant at a depth of at least one foot. Equipment will then be used to lift the plant carefully as workers dig around the roots until the plant is free. Lateral roots should be cut only when necessary and should not be cut less than two feet long.
5. Plants will be carefully excavated to a depth necessary to maintain as many intact roots as possible.
6. The plants will be lifted out with a shovel, heavy gloves, tarps, or other equipment as needed for worker safety, to avoid damaging the plants and to keep as much soil around the roots as possible. Soil from under the salvaged plants will be collected to add to transplanting holes.
7. Any damaged roots (greater than the diameter of a pencil) will be trimmed, using tools disinfected in a 10 percent bleach solution. Undamaged roots will not be trimmed. Cutting tools will be disinfected between plants to avoid spreading pathogens.
8. Fungicide or sulfur will be applied to roots to decrease the risk of infection and to improve callusing.
9. Trimmed cactus roots should be allowed to callus (dry) before replanting, if possible. Ocotillo should be replanted as soon as possible, whether or not roots have been trimmed.
10. Smaller cacti can be packed loosely in boxes for transport. Ocotillo can be carried with straps. All salvaged plants will be transported in such a way as to minimize root damage. Ocotillo may be stacked in a truck. Cacti should only be stacked if their spines will not damage each other.
11. Cacti and ocotillo will be transported to the replanting location and replanted using data collected from the salvage site. Storage of cacti and ocotillo before re-planting will only occur when unavoidable. If plants must be stored before replanting, they must be kept shaded and their roots kept moist. Furthermore, the tops and south-facing sides of cacti that have been stored before replanting must be protected with shade. Cacti salvaged during spring or summer may be held over in the shade structure and protected from wind and heat until fall for transplantation.

3.3.2. Planting and Maintenance

Specific replanting locations will be identified within Project lands, such as revegetation areas on temporarily disturbed work sites, unless directed otherwise by BLM (see Section 3.2). Planting procedures are summarized as follows (see Attachment A, Cacti and Ocotillo Salvage Guidelines for complete description):

1. Each salvaged plant will be replanted in a microsite selected to resemble its salvage site, as described in the plant-specific notes from the salvage site. The location of each planting will be recorded with a hand-held GPS unit.
2. Salvaged plants will be replanted in the same north-south orientation as marked on each plant.
3. Cacti and ocotillo will be planted in holes slightly deeper and wider than the original root system. Soil collected from under plants at the time of salvage will be added to the planting hole, and rocks will be placed in the hole to support the weight of large plants to prevent root crushing. Holes will be backfilled slowly and carefully, readjusting the plant depth as necessary to keep the root/stem interface level with the surrounding area. All plants will be planted level with the surrounding area to

prevent root exposure or excessive water accumulation. All roots will be covered deeply enough to prevent exposure during irrigation and rainfall.

4. Soil will be tamped around the roots to secure the plant and to minimize air pockets around the roots. A small basin/berm will be formed around each plant or group of plants to hold irrigation or rainwater.
5. If cacti must be planted during spring or summer, shade structures or "vertical mulch" (branches cleared from the work sites) will be provided as shelter from sun and wind. *Mammillaria tetrancistra* will be partly shaded with rocks and branches.
6. Transplant locations for all salvaged plants will be recorded accurately.

All salvaged plants will be watered immediately after planting and every three days thereafter for nine days. After that time, ocotillos will be watered once per week in hot months and once every two weeks in cooler months. Cacti will be watered once every two weeks in hot months and once per month in cooler months. All watering schedules will be modified according to rainfall, if necessary.

3.3.3. Salvage Success Criteria and Monitoring

Transplanted plants will be monitored at least monthly through the first three months following transplantation to record qualitative observations including survival, any need for additional water, shade, wind shelter, or protection from animals or erosion. Subsequently, qualitative and quantitative monitoring will occur quarterly. Overall survival and any monitoring recommendations will be recorded at each monitoring visit and submitted to the Project's Lead Biologist for inclusion in annual monitoring reports; however, any pressing concerns will be addressed and submitted immediately. Following the initial three-month period, monitoring visits may be reduced to quarterly for three (3) years.

The cactus transplantation success criterion will be 75 percent survival after three (3) years. If this criterion is not met, IP Easley, LLC will implement one of the measures below, as remediation:

- Plant additional cacti or other salvaged plants if available, from an off-site location in the Chuckwalla Valley, if such plants become available through another project that may cause removal of cacti. If plants are unavailable from projects in Chuckwalla Valley, the California Botanical Garden, Riverside County, and BLM will be contacted for assistance. The additional plantings will offset any discrepancy between 3-year monitoring results and success criteria at a 2:1 ratio.
- Increase native vegetation cover and diversity at one or more Project or non-project disturbance sites, in consultation with Riverside County and BLM.

3.4. Special-Status Plant Salvage

No listed threatened or endangered plant species and no BLM-designated sensitive species were located on the Project site during botanical surveys conducted between 2019 and 2022 (See POD Appendix G, BRTR, Section 3.4). Emory's crucifixion thorn is the only CRPR 2 plant that has been observed on the Project site. It was observed in one location in desert dry wash woodland outside the development footprint and would be avoided.

The other CRPR 2 species potentially occurring on the Project site is *glandular ditaxis*, an annual that occurs in Sonoran Desert scrub habitats. As an annual species, it is not suitable for translocation. However, if found on the Project site, seeds would be salvaged, followed by post-construction seeding or long-term seed banking.

If CRPR 1 or 2 species are identified during pre-construction surveys, IP Easley, LLC will implement an experimental salvage effort (see Section 3.1), recognizing that probability of success is unknown. There will be no quantitative success criteria for the experimental salvage program. However, monitoring data

will be provided to Riverside County, BLM, and other resource agencies to help inform future mitigation planning for these species. IP Easley, LLC will contact the California Botanical Garden or another qualified institution to develop salvage plans for any such species, in coordination with Riverside County, BLM, and other resource agencies.

4. RECLAMATION/REVEGETATION

After construction, the temporary impacts of work at gen-tie tower sites and throughout the solar facility will be mitigated through revegetation to prevent further degradation of disturbed sites. Gen-tie spur and access roads would not be restored to pre-disturbance habitat values because they would be used for future O&M. For solar arrays, a native seed mix with a minimum vegetation height would be used to maintain panel clearance for fire abatement purposes. The temporary disturbance sites will be revegetated to stabilize soils; maximize the likelihood of vegetation recovery over time; and minimize soil erosion, dust generation, and weed invasions.

IP Easley, LLC, will contract with a qualified Restoration Ecologist to evaluate and prescribe specific reclamation measures at each work site. The Restoration Ecologist will coordinate with the Project Lead Biologist and with IP Easley, LLC, to ensure that the prescriptions are implemented as written.

4.1. Site Preparation

IP Easley, LLC, does not anticipate mass grading on the Project site. Therefore, this Plan does not include measures for topsoil salvage, storage, or replacement. Substation, battery energy storage system (BESS) containers, O&M facility, and internal and external road locations would require mowing, grubbing, grading and compaction. Inverter station locations would require light grubbing. The solar array areas would be mowed and/or trimming of woody vegetation to a height of 24 inches. Certain areas of the site with highly irregular topography that provide important hydrologic functions would be avoided by Project design. Other irregular areas would be roughly leveled or smoothed to provide for construction access and PV panel installation.

The site cut and fill would be approximately balanced, therefore minimal soil import/export would be necessary. On-site pre-assembly of trackers would take place in the staging area.

Site preparation measures prior to reclamation work will be determined on a site-by-site basis, based on the advantages and disadvantages of soil treatment or site preparation methods to restore natural contours, protect the site from erosion damage by wind or water, and maximize likelihood of vegetation recovery.

Post-construction soil decompaction can increase soil vulnerability to weeds or erosion, increase dust, or cause further damage to surviving rootstocks that may be present. The Restoration Ecologist (see Section 6) will evaluate soil compaction per California Native Plant Society (CNPS) Combined Vegetation Rapid Assessment and Relevé Protocol (CNPS, 2022). The protocol requires recording of soil texture and the history and level of disturbance. The Restoration Ecologist will prescribe either no treatment, limited treatment using hand tools, light harrowing or disking with a tractor, or deeper disking or ripping, depending on specific circumstances. Where soil decompaction is implemented, follow-up measures to control dust and erosion will also be prescribed.

Where construction disturbance causes alterations to natural channel morphology or runoff patterns, the Restoration Ecologist will prescribe recontouring or other measures such as hay bales, straw wattles, or other erosion control materials. Consistent with the Integrated Weed Management Plan, any such material to be used at any Project work site will be certified weed free (see POD Appendix N).

Where feasible, mulch used for erosion control will be produced from native vegetation cleared from the site itself. The Restoration Ecologist may recommend stockpiling the vegetation removed during construction, for replacement onto the site either as crushed mulch, or as "vertical mulch" to reduce sun and wind exposure to the soil surface and germinating plants.

4.2. Plant Materials

IP Easley, LLC, may re-seed temporarily disturbed areas with a native seed mix approved by Riverside County and BLM. The determination whether to re-seed and, if so, seeding rates (i.e., pounds per acre) will be made by the Restoration Ecologist, based on the nature of disturbance and condition of soils, and any evidence of re-sprouting rootstocks. All seed collection will be completed prior to construction and after obtaining all required BLM seed collection permits. The seed mix will consist of the following native species, if available, all of which are characteristic early-successional species in the Sonoran Desert.

- Big galleta grass (*Hilaria rigida*)
- Brittlebush (*Encelia farinosa or E. frutescens*)
- Cheesebush (*Ambrosia salsola*)
- Burrobush (*Ambrosia dumosa*)

On sites where construction-phase vegetation and soil disturbance are limited to mowing or "drive and crush", there will be no re-seeding unless these areas show inadequate natural recovery (e.g., re-sprouting rootstocks) or excessive soil compaction that may inhibit seed germination (see Section 4.1, Site Preparation).

Well in advance of scheduled seeding for each temporarily disturbed site, IP Easley, LLC, will arrange for adequate seed supplies, obtained from within the provisional seed transfer zone for each species (Shryock, D.F. DeFalco, L.A., and Esque, T. C., 2021). Documentation that the seed supply is certified weed free and 100% pure live seed would be submitted to BLM. Due to the unpredictable rainfall and drought conditions throughout the Sonoran Desert region, seed cannot be reliably collected or acquired in any given year. Immediately following the Notice to Proceed, the Restoration Ecologist or Lead Biologist will estimate the total number of acres to be reseeded and determine quantities of seed needed. After obtaining a commercial seed collection permit (if collecting on BLM-administered land), IP Easley, LLC, will collect seed from the Project site ideally prior to construction, or will contract with suppliers or collectors to acquire and store enough seed for all projected reseeding work. Seed collection will occur at the appropriate time for each species and seed storage specialists will store the seeds under existing regulations and standard handling practices. For common species, seeds will be obtained from provisional seed transfer zones or seeds may be purchased. The Restoration Ecologist will be responsible for maintaining a seed inventory, based on the sample format shown in Table 2.

Table 2. Sample Seed Inventory Management Format

Species (Latin and Common Names)	Location of Seed Source	On Hand (lb.)	On Order (lb.)	Quantity Needed for Upcoming Years (lb.)				
				Year 1	Year 2	Year 3	Year 4	Year 5

Total seeding rate will be no less than 10 pounds per acre. Specific proportions will be based upon seed availability and recommendations of the Restoration Ecologist. Depending on seed availability, other native species occurring on the site or nearby at similar exposure and elevation may be selected to replace or supplement those listed above. Any plant material used in revegetation will be locally native (Chuckwalla Valley), occurring on or near the Project site or part of the provisional seed transfer zone for that species. All seed to be used in revegetation will originate from the Sonoran Desert region of California,

between approximately sea level and 2,500 feet elevation and within the provisional seed transfer zone. Any seed from vendors or contracted collectors will be certified weed free. IP Easley, LLC may collect seed on-site from Project areas to be mowed or graded. The collection of adequate seed supplies will likely necessitate repeated visits to any given collection area, depending on seasonality and annual productivity of the target plants. If seed is purchased from a vendor or contract seed collector, IP Easley, LLC will require the supplier to provide the origin (i.e., location and elevation information) for each seed lot and will not purchase or use seed originating outside these geographic and elevational bounds. IP Easley, LLC will be responsible for acquiring adequate seed to implement this plan. Seed collections by IP Easley, LLC or its contractors or vendors will be made according to the following guidelines.

- Seed collection from plants to be removed or mowed for Project construction will be unrestricted.
- No seed will be collected from designated Wilderness Areas, ACECs, or critical habitat, except within any approved Project disturbance areas (i.e., gen-tie work sites).
- Any seed collection on public lands will be completed only under authorization from the BLM, including any additional stipulations included in the seed collection permit approval.
- No more than 40 percent of seeding plants in any collection area will be harvested and no more than 10 percent of mature seed on any single plant will be harvested (excluding Project disturbance areas).
- Access to collection areas will be via open, designated routes, or on foot; there will be no cross-county vehicle travel.
- Collectors will record and track seed lots, including collection date, collection location, elevation, dominant species at location, stand conditions, test data, bulk weight, and net weight (as pure live seed).
- Seed Storage facilities will be sufficient to maintain collected seed in a viable condition until needed for reseeding.

4.3. Seeding Methods and Schedule

The Project's temporary disturbance areas will generally be small, or inaccessible to equipment (such as seed drill or hydroseeding equipment). Therefore, seed will be broadcast using manually operated cyclone-type bucket spreaders, mechanical seed spreaders, blowers, or rubber-tired all-terrain vehicles equipped with mechanical broadcast spreaders. Seed in the spreader hoppers will be mixed to discourage separation of the component seed types. Where broadcast seeding is employed, seeded areas may be raked or harrowed to cover the seed, at the direction of the Project Restoration Ecologist.

Re-seeding will be scheduled outside of the spring and summer to minimize potential seed loss to granivorous birds and small mammals and maximize exposure to seasonal rainfall. Seeding will be done in late summer or early fall, to ensure that seed is in place prior to the onset of seasonal rain in late fall or early winter. Later seeding is likely to result in failed germination due to inadequate moisture availability. If rainfall is lacking after seeding, the areas may be watered using watering trucks or other suitable equipment to facilitate seed germination. Seeds would be watered at a frequency determined by the Project Restoration Ecologist, depending on plant species.

Due to the arid climate and variable rainfall, germination and establishment success of seeded plants is not predictable. During dry years, low germination success in the first year following re-seeding may be consistent with the goal of this plan (i.e., to prevent or minimize further site degradation), when fluvial soil erosion and high weed germination is less problematic than in high rainfall years. However, IP Easley, LLC, may need to take additional measures to minimize wind erosion and dust generation from sites where adequate plant cover does not re-establish (Section 4.5).

4.4. Reclamation / Revegetation Site Maintenance

Reclamation and revegetation sites will not be irrigated after initial watering of seeds. The sites will be monitored for weed presence and abundance, and weed control will be implemented as needed,

according to the Project Integrated Weed Management Plan (see POD Appendix N). Additional maintenance activities will consist of erosion control, soil stabilization, or other measures as needed, based on the results of monitoring.

4.5. Success Criteria

If the following success criteria have not been met within three years of initial revegetation, IP Easley , LLC will be responsible for implementing remediation measures as needed. Following remediation work, the site will be subject to the success criteria and monitoring period as required for the initial reclamation, revegetation, or restoration.

1. Total vegetation cover including herbaceous and woody species will be no less than 80 percent of total vegetation cover on nearby comparable sites that were not subject to Project disturbance. Project sites that were previously covered by native vegetation will be compared to the surrounding undisturbed native vegetation sites; Project sites previously disturbed by anthropogenic activities will be compared to nearby, similarly pre-disturbed sites.
2. Cover and density of non-native plant species within the temporarily disturbed areas will be no more than 25% of total cover or no more than the cover and density in comparable adjacent lands that have not been disturbed by the Project. Note that weed management according to the Integrated Weed Management Plan (see POD Appendix N) will be coordinated with reclamation and revegetation to achieve this standard.
3. Soil stability and potential for erosion or dust source will be comparable to adjacent lands that have not been disturbed by the Project.

4.6. Monitoring, Remediation, and Reporting

Reclamation/revegetation sites will be monitored qualitatively (to assess progress; identify needs for supplemental watering, if necessary; to help meet success criteria goals in the first phase of revegetation, irrigation, seeding; or other maintenance or management goals) and quantitatively (to compare sites against the quantitative success criteria).

Qualitative monitoring visits will be made at least monthly through the first three to six months depending on site conditions. Overall site conditions and any monitoring recommendations will be recorded at each monitoring visit and submitted to the Project's Lead Biologist for inclusion in annual monitoring reports. Following the initial three-month period, qualitative monitoring visits may be reduced to quarterly for no less than (3) years; however, monitoring may extend beyond the 3-year period until BLM-approved success criteria are met.

Each temporarily disturbed site will be quantitatively monitored annually to evaluate success, based on the success criteria stated above. Quantitative monitoring will be performed per California Native Plant Society (CNPS) Combined Vegetation Rapid Assessment and Relevé Protocol (CNPS, 2022). The CNPS Relevé Protocol uses demarcated plots, where all species within the plot are recorded along with estimated cover values.

Monitoring will continue for a period of no less than three (3) years or until the defined success criteria are achieved (up to 5 years). Remediation activities (such as additional seedling or planting, removal of non-native invasive species, or erosion control) will be instituted initially and during the 5-year period, if necessary, to ensure the success of the revegetation effort. If the site fails to meet the established performance criteria after an initial 3-year maintenance and monitoring period, monitoring and remedial activities will extend beyond the 3-year period until the criteria are met.

If a fire or flood damages a reclamation site within the initial 3-year monitoring period, IP Easley, LLC will be responsible for a one-time replacement. If a second fire or flood occurs, IP Easley, LLC will consult with Riverside County and/or BLM to determine the course of action that should be taken.

Throughout the construction and monitoring phases the Lead Biologist and Restoration Ecologist will be responsible for providing annual Vegetation Management Progress Reports to Riverside County and BLM for review and approval. Each annual report will include the following:

- Brief summary of Project construction, O&M, or decommissioning status, with a list of all temporarily disturbed sites treated or monitored during the preceding year.
- Summary of reclamation or revegetation progress and results since previous report, including a map or electronic shapefiles of all reclamation or revegetation activity since previous report.
- Seed inventory accounting of materials acquired or used since previous report; and materials needed for the coming 5-year period.
- Summary of monitoring observations, data, results, success, and completion status for all sites.
- Recommendations, as applicable, for remedial work such as reseeding, erosion control, weed treatment, or other maintenance activities.
- Representative site photographs.
- Notation of any other pertinent concerns (e.g., vehicle trespass, etc.).

5. OPERATIONS PHASE

Throughout the O&M phase, on-site vegetation management will consist of vegetation control (e.g., mowing) to prevent interference with solar panels and minimize fire hazard. The Lead Biologist will inspect vegetation annually throughout the Project area and along the gen-tie line to identify hazardous vegetation or barren areas that may be susceptible to erosion or other damage. All mowed or cut plant material that contains invasive weeds will be collected and transported to a licensed solid waste or composting facility. Mowed or cut native plant material may be used on site as mulch. Weed control during the Project O&M phase will be conducted as described in the Integrated Weed Management Plan (see POD Appendix N).

6. LEAD BIOLOGIST AND RESTORATION ECOLOGIST RESPONSIBILITIES

6.1. Lead Biologist

The Lead Biologist, to be designated by IP Easley, LLC and approved by the BLM and Riverside County, will be responsible for managing and implementing this Vegetation Management Plan, as follows:

- Ensure that no unauthorized off-road vehicle access occurs on the site during pre-construction surveys and special-status plant salvage, desert tortoise clearance, and other special-status species clearance or exclusion areas.
- Ensure that no off-road vehicle access occurs off site for plant salvage, seed collection, or other Project-related activities, except as specifically authorized according to final Project authorization.
- Schedule all pre-construction clearance surveys for all Project components, including seasonal surveys for all special-status plant and animal species in areas where they have been previously documented.
- Ensure that each person assigned to survey, salvage, transplant, collect seed, reseed, monitor, or any other aspect of this Plan is qualified for each task. Botanists conducting pre-construction surveys and seed collection must be skilled and qualified in locating and identifying target plant species within the Project area; workers responsible for salvage, transplant, seeding, and maintenance must be skilled and qualified in such practices.

- To avoid special-status plants, the Lead Biologist will designate and mark buffer areas surrounding each special-status plant location and will be responsible for monitoring the buffer sites throughout the construction phase of the Project.
- Review the qualifications and recommendations of the contracted Restoration Ecologist, and support coordination among the Restoration Ecologist, resource agencies, and IP Easley, LLC.
- Review plans and recommendations made by the Restoration Ecologist
- Review and approve plant materials, erosion control materials, and other materials to ensure they are certified weed-free.
- Communicate with IP Easley, LLC and resource agencies regarding reclamation and revegetation activities.
- Coordinate reclamation and revegetation activities with other Project activities during construction and maintenance.
- Be aware of mitigation and compliance requirements, such as implementing the Integrated Weed Management Plan.
- Conduct an annual inspection to identify accumulated dead vegetation, wildlife attractants, barren soils, or other areas susceptible to erosion or likely to become sources of dust.
- Coordinate with the Restoration Ecologist to implement identified site treatments as needed.
- Prepare and submit monitoring reports.

6.2. Restoration Ecologist

In coordination with the Lead Biologist, the Restoration Ecologist, to be designated by IP Easley, LLC, and approved by the BLM and Riverside County, will be responsible for site-specific reclamation activities and for supporting the Lead Biologist in managing and implementing this Vegetation Management Plan, as follows:

- Review all temporary disturbance sites to evaluate soil compaction, vegetation condition, and susceptibility to erosion, weed invasion, or dust sources. Specify site-specific treatments such as erosion control, soil treatment, decompaction, mulch application, or reseeding for each site.
- Estimate overall Project seed requirements; update estimates as needed; and coordinate with the Lead Biologist and IP Easley, LLC to obtain and maintain seed inventory.
- Oversee and manage site treatments, including soils, erosion control, reseeding, and other requirements.
- Oversee monitoring and evaluate success at each reclamation or revegetation site.
- Plan and direct follow-up remedial work, as needed, to meet success criteria.
- Prepare and submit annual reports to IP Easley, LLC and resource agencies, in coordination with the Lead Biologist.

7. LITERATURE CITED

Bainbridge, D.A. 2007. A Guide for Desert and Dryland Restoration: New Hope for Arid Lands. Island Press, Washington DC.

California Native Plant Society (CNPS). 2022. CNPS Combined Vegetation Rapid Assessment and Relevé Protocol; CDFW-CNPS Protocol for the Combined Vegetation Rapid Assessment and Relevé Field Form. November 4. Available at: https://www.cnps.org/plant-science/field-protocols-guidelines.

Ironwood Consulting, Inc. 2022. Biological Resources Technical Report: Easley Renewable Energy Project. Prepared for Aspen Environmental Group.

Shryock, D.F., DeFalco, L.A., and Esque, T.C., 2021, Empirical and provisional seed transfer zones for the Mojave Desert and surrounding regions (ver. 2.0, January 2021): U.S. Geological Survey data release, https://doi.org/10.5066/P9BQ6IYJ.

Attachment A

COMPLETE GUIDE TO CACTUS AND OCOTILLO SALVAGE, MAINTENANCE, AND MONITORING

Complete Guide to Cactus and Ocotillo Salvage, Maintenance, and Monitoring

This is the complete guide to cactus and ocotillo salvage, maintenance, and monitoring. For simplified instructions, please see the Ironwood Cactus Salvage and Maintenance Guide and/or the Ironwood Ocotillo Salvage and Maintenance Guide.

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INTRODUCTION

The purpose of this document is to guide the salvage, maintenance, and monitoring of cacti and ocotillo from construction projects within the Chuckwalla Valley. To the extent feasible, cacti and ocotillos should be salvaged during fall or winter to minimize transplant and stress during the spring and summer. Replanting locations for salvaged plants should be determined prior to salvage, as storage of bareroot plants substantially reduces survival. Replanting locations are highly recommended to have water truck access to ensure adequate irrigation for plant establishment and long-term survival.

The primary consideration at every step of salvage and transplanting is to AVOID ROOT DAMAGE. Cacti and ocotillo have different environmental tolerances and require different treatment. Please follow the proper protocol for the type of plant being salvaged.

All of these guidelines are subject to adaptation, and suggestions for improvement are strongly encouraged.

SUGGESTED TOOLS FOR SALVAGE:

- Straps for carrying ocotillo
- Poles or other tools for holding ocotillo stems while maneuvering plants
- Rope for tying ocotillo stems during transport/planting
- Long BBQ tongs for handling small cacti
- Leather gloves
- Assorted shovels and trowels
- Tarps/slings for carrying/transporting plants
- Metal tags with pre-determined unique identification numbers
- Wire for attaching tags
- Long needle-nosed pliers with wire cutter for attaching tags
- Buckets to collect soil from salvage holes
- Proper data collection application (e.g. ArcGIS Field Maps)

BEFORE EXTRACTION

1. Assessment
    - Don’t salvage plants that appear more than 50% dead.
    - Don’t salvage plants that are too large for the available equipment and/or personnel.
2. Tagging and recording
    - Using long needle-nosed pliers for protection, attach a numbered metal tag around the northernmost stem of the plant, or, in the case of a single-stemmed plant, place the tag on the north side of the plant (Figures 1, 2).
        - Allow enough wire to make a secure loop AND allow for plant growth (at least 1” of space between stem and wire, more for large cacti)
        - Place tags as high as possible on the plant while still providing a secure hold.
        - Maintaining north orientation is not crucial to ocotillos, but it is still recommended for large plants (>3m).
    - Record a brief plant and microsite description in appropriate database (i.e ArcGIS Field Maps)

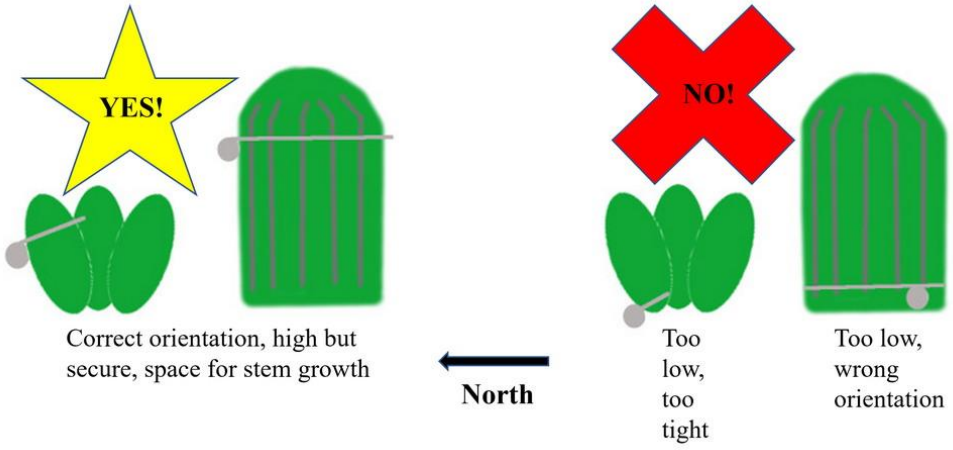

Figure 1. Cactus Tag Placement

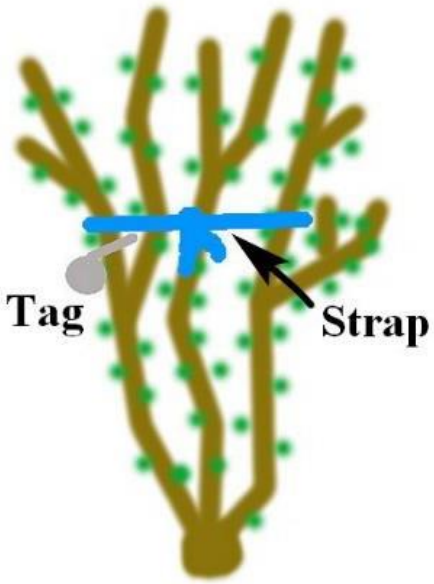

Figure 2. Ocotillo tag placement and stem bundling

EXTRACTION

- CACTI:
  - Dig around the perimeter of plants deep enough to get under the major roots and far enough from the base to keep as many intact roots as possible.
  - Large barrel cacti can be secured with a strap and tipped slowly onto tarps as they are extracted.
  - Collect soil under the salvaged plant for use during replanting.
- OCOTILLOS:
  - Ocotillos will be salvaged using heavy equipment (i.e. excavator) and a long-handled forklift, except for plants small enough to be salvaged with hand tools.
  - Use straps to secure stems for transport.
  - Excavate a perimeter trench at least one foot deep and at least three feet from the base of the plant.
  - Position the forklift handles under the lateral roots and slowly lift the plant, stopping the equipment as needed while another individual uses hand tools to free roots from the soil.
  - Collect soil under the salvaged plant for use during replanting.

- ROOT TREATMENT
    - AVOID ROOT DAMAGE AT ALL TIMES. Root damage is the main cause of salvaged plant mortality.
        - Do not pull roots.
        - Do not handle or carry plants by the roots.
    - Keep as many intact roots and as much associated soil as possible when extracting and transporting plants.

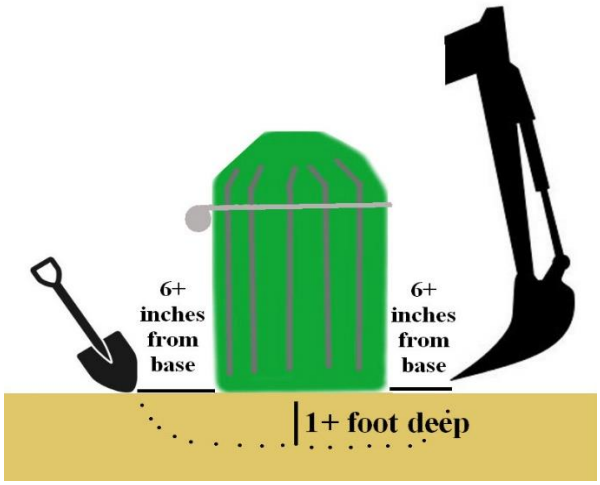

Figure 3. Extracting cacti.

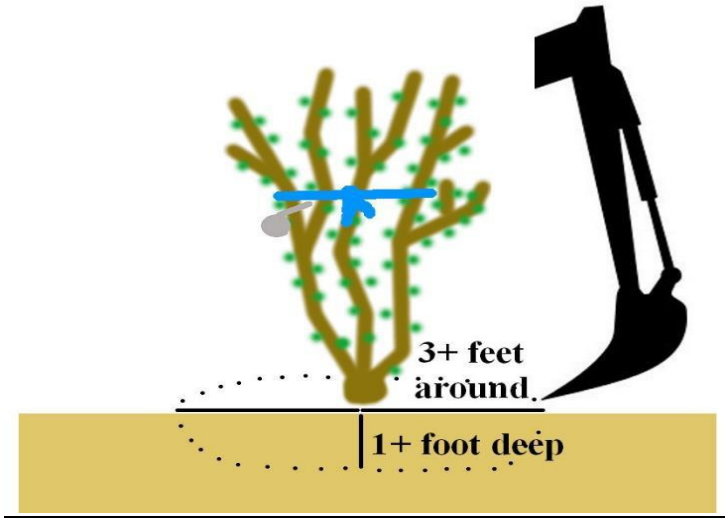

Figure 4. Extracting ocotillo.

- TRIMMING
    - Only roots damaged during salvage should be trimmed.
        - Damaged roots less than a quarter inch in diameter do not require trimming.
        - Roots with pre-existing damage, recent or old, should not be trimmed.
    - Trimming should be cut straight across, not at an angle, with pruners disinfected with at least 10% bleach between plants. (Figure 5).
    - Dust cut roots with sulfur.
    - CACTI: Allow trimmed roots to callus (dry) for 2-3 hours before replanting, if feasible.
    - OCOTILLO: Should be replanted as soon as possible, whether or not roots have been trimmed.

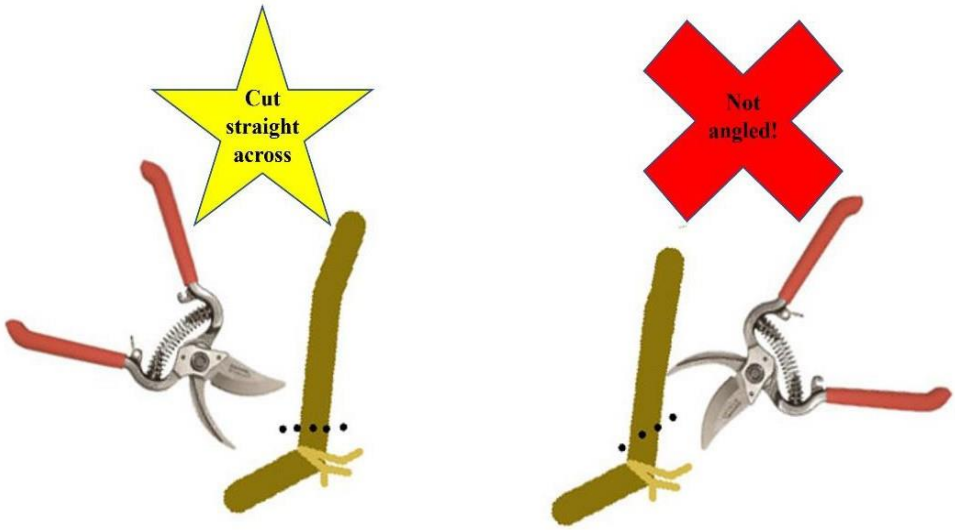

Figure 5. Cut damaged roots/stems straight across, not at an angle.

TRANSPORTING

- Always transport with methods to minimize damage to roots and stems. Use straps, tarps, etc. to carry large plants.
- When moving a plant, ensure it is in a stable position, and keep it as low to the ground as possible to minimize damage should it be accidentally dropped.
- DO NOT handle plants by their roots.
- CACTI:
  - Smaller plants can be transported upside down as long as they are not heavy enough to damage the tops of the stems.
  - Do not carry cacti in plastic bags! Small cacti can be packed loosely in boxes.
  - Don't pack cacti together too tightly.
  - Multiple individuals should only be stacked for transport if their spines do not damage one another.
  - *Cochemiea [Mammillaria]* (fishhook cactus): Prevent individuals from becoming hooked together. Tangled individuals can be planted together instead of potentially damaging them by pulling them apart.
- OCOTILLO:
  - If transporting multiple individuals, ocotillo can be stacked during transport.
  - Carry ocotillo with one strap above the root ball and one on the bundled upper stems (Figure 6).

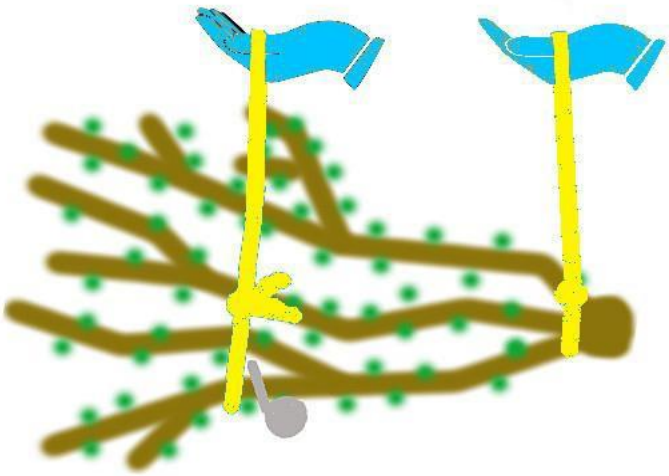

Figure 6. Carrying ocotillo with straps

STORAGE:

- If plants cannot be transplanted the same day they are salvaged, the plants must be stored in the shade, with their roots covered with shade cloth to retain moisture.
- Stored plants must be allowed to re-acclimate to full sun before planting.
- If stored plants cannot be re-acclimated, their tops and south-facing sides must be protected by shade cloth for at least three months after planting.

TRANSPLANTING

Transplant site preparation:

- Plant cacti and ocotillo in separate groups, as ocotillo requires more frequent watering.
- Dig the planting hole to fit the width, depth, and general shape of the root ball, keeping in mind that the stem/root interface must be level with the surrounding area after planting.
- Add a scoop of salvaged soil to the planting hole.
- If necessary, place rocks in the planting hole to support the weight of the plant.
- Never rest the full weight of a large plant on its roots.
- CACTI:
  - Plant cacti with enough distance between them to distinguish locations on database applications (recommend 2 meters/6ft between plants)
  - *Cochemiea (Mammillaria) tetrancistra* should be planted in partial shade or partly shaded with rocks and branches after planting.
- OCOTILLO:
  - Pre-water the planting hole and allow water to soak in.
  - Plant ocotillos at least 3ft apart in an area with easy access for watering.

Placement:

- CACTI:
  - Position the plant in the center of the hole with the correct north-south orientation.
  - If for any reason, the north-south orientation cannot be determined, the top and south-facing side of the cactus should be protected with shade cloth for three months after planting.
- OCOTILLO: do not need to be planted in the same orientation in which they were growing

Backfilling:

- Backfill slowly and carefully, filling all air pockets and repositioning the plant as necessary to maintain the correct north orientation and depth.
- Additional soil from salvage site may be added during backfilling if there is extra.
- Ensure all roots are covered with soil deeply enough to remain covered during watering, rainfall, and windstorms.
- Ensure the unique identification tag is in the correct north orientation, above the soil surface, and accessible. Make sure the wire is secure and allows enough room for stem growth, particularly for cacti.
- Build a low berm around the plant or group of plants to form a water retention basin.
    - Make sure the soil surface inside the basin is level with the surrounding area to avoid excessive pooling or runoff.
    - OCOTILLOS: basins around each individual should be at least six feet in diameter.
    - CACTI: can be grouped together in larger basins, with each individual planted approximately 2 meters (6 feet) apart
- Enter all transplant data in the appropriate database application (i.e. ArcGIS FieldMaps). MAKE SURE each plant point is accurately placed on the map and can be distinguished from adjacent plants. Plants should always be planted more than 2m/6ft apart.

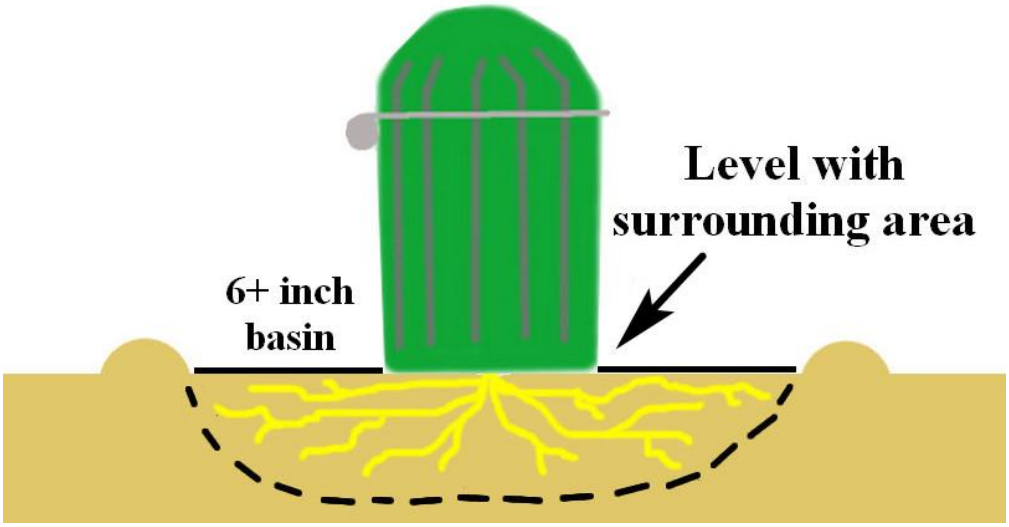

Figure 7. Correct placement for cactus

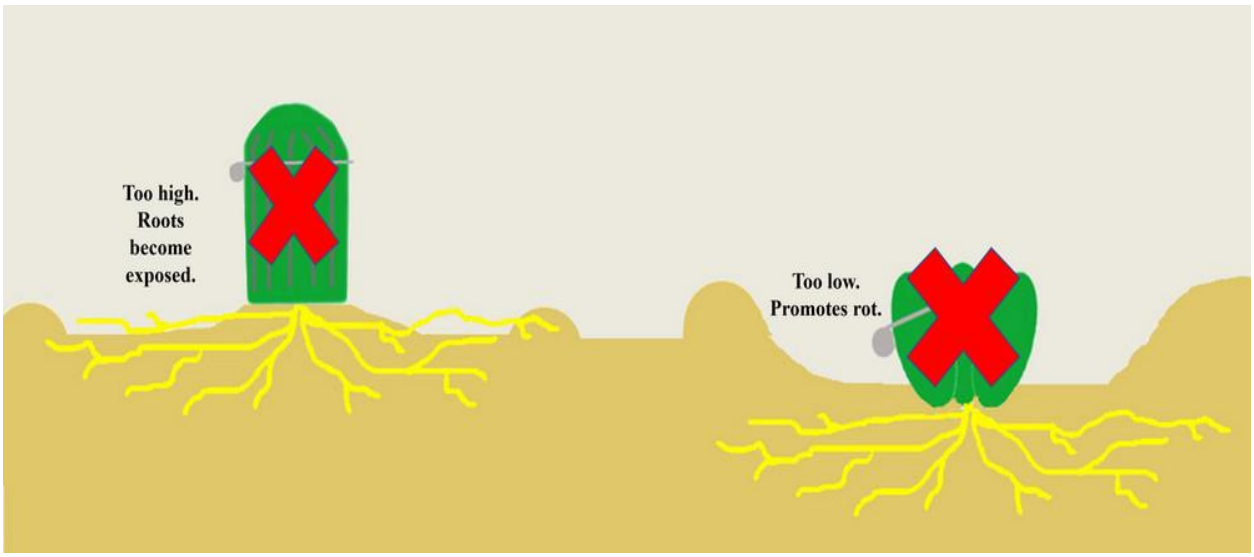

Figure 8. Incorrect cacti placement

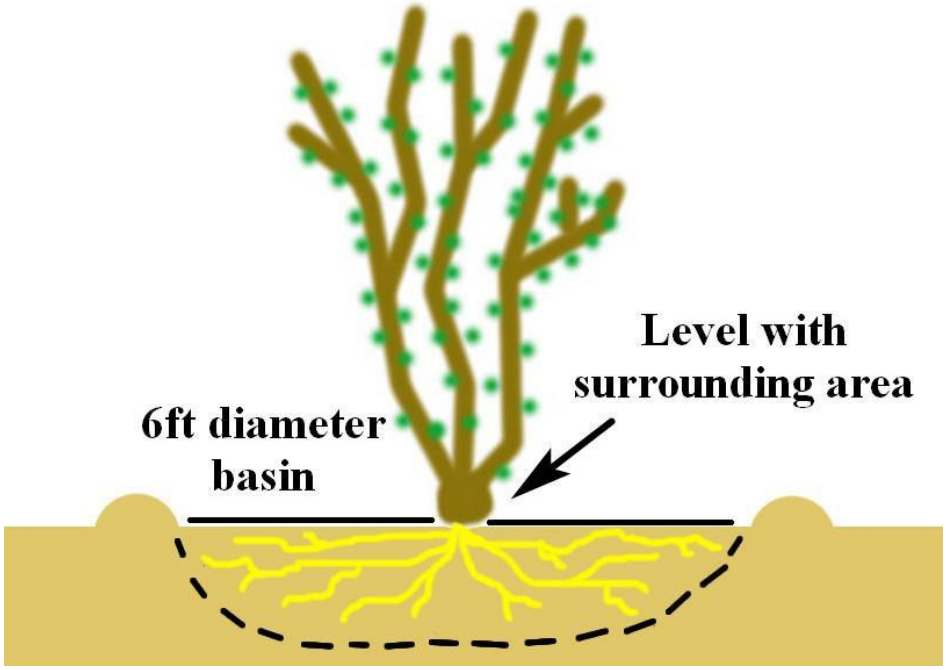

Figure 9. Correct ocotillo positioning

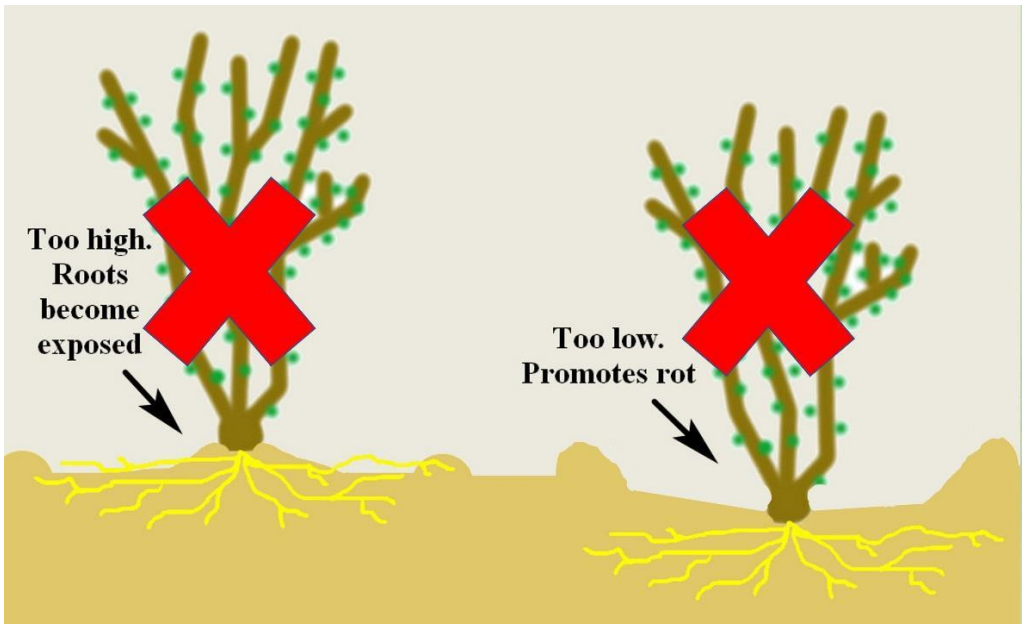

Figure 10. Incorrect ocotillo positioning

MAINTENANCE

Initial Post Transplant Watering

- Water all cacti and ocotillo thoroughly as soon after transplanting as possible.
- Repeat deep watering once every three days for nine days (One post-transplant deep watering plus three additional deep waterings).
- Do not spray water on cactus stems.
- Apply water near the plant, making sure not to remove soil or expose roots.
- Add additional soil from the surrounding area, if necessary, to ensure the soil surface inside the basin remains level with the surrounding area.
- Update maintenance schedule and ensure that follow-up waterings are performed to minimize transplant shock and initiate root re-growth.

Post Transplant Follow-up Watering:

- After the initial post-transplant watering and three follow-up waterings (see initial post transplanting above), follow the watering and maintenance schedule in Table 1.
- Deep water cacti once every two weeks in the hot season (approximately May – September) and once per month in the cool season (approximately October – April).
- Deep water ocotillo once per week in hot months and once every two weeks in cool months.

- Watering schedules may be changed in case of rain or extended hot or cold weather. Please consult the Restoration Biologist and/or Lead Botanist before changing the watering schedule.
- Watering and maintenance will be continued for at least a year after transplanting, or for the length of time specified by the Project Vegetation Management Plan.

Table 1. Watering and maintenance schedule for cacti and ocotillo, following initial post-transplant deep watering

Season	**Cacti**	**Ocotillo**
Approx. May – Sep. (hot)	Once every two weeks	Once every week
Approx. Oct – Apr. (cool)	Once every month	Twice every month

Other Maintenance Tasks:

- Repair and weed basins as needed.
- Make sure plant tags remain securely attached and accessible, and that stem growth has not been restricted.
- Add soil to basins if roots become exposed or air pockets form
- Document all watering on the designated calendar/database/application.
- Report any issues to the Restoration Biologist and/or Lead Botanist, and contact them with any questions.

MONITORING

Monitor transplanted cacti and ocotillo according to the follow schedule in Table 2*:

Table 2. Monitoring schedule

Time since transplanting	Monitoring frequency/type	Tasks
0-3 months	Monthly qualitative	Assess overall plant health; assess needs for additional irrigation or protection; document overall conditions and any problems; address any pressing concerns ASAP; deliver all findings to Lead Biologist for inclusion in reports.
7 months – 3 years	Quarterly quantitative and qualitative	**Quantitative**: record survival for all salvage plants. Deliver all findings to Lead Biologist for inclusion in reports. **Qualitative**: normal monthly assessment, as detailed above.

**The transplant success criterion is 75 percent survival after three (3) years.*

SUPPLEMENT: PLANTS REQUIRING ADDITIONAL TREATMENT

This supplement covers cacti stem cuttings and very small cacti. Stem cuttings that root successfully may be used in supplemental plantings to replace dead salvage plants, with proper approval.

CACTI stem cuttings:

- Cutting method
    - Make a clean cut as low as possible on the green part of the stem.
    - Allow cut stems to dry, cut-side up, in full sun for a few hours or until cut surface appears dry.
- Container Planting
    - Plant cuttings in a flat-bottomed, well-drained container deep enough to accommodate new roots.
    - Plant in extremely well-drained, sandy soil, preferably native soil.
    - Plant stems just deeply enough to keep them from moving and damaging new roots.
    - Planting the stems very densely minimizes motion and helps keep the soil moist.
- Experiment to further determine best practice in the future:
    - Cover some individuals of cut stems with shade cloth, leave others in sun.
    - Once we know which works better, adjustments can be made.
    - There may be variation between species but will be determined by results.

Once stems start to produce roots, shade can be removed gradually.

- Stems can be treated as rooted plants once the roots are a few to several inches long.
- Stems that begin to rot can be recut and put through the whole process again, if this seems reasonable (consult lead botanist)
- Watering
    - Water when soil moisture meter indicates soil is very dry (not just a little dry).
    - If multiple stems begin to show signs of rot, decrease watering by half.

"Fingerling" cacti: Plants too small to survive normal salvage methods

- Container planting
    - Container can be anything providing plenty of drainage and deep enough to accommodate roots.
    - Soil must be sandy/gravelly/rocky and be extremely well-drained - native soil is best, especially from where the plant was extracted.
    - Rock mulch is great for container plants - cacti prefer rocks.

    - Plants can be planted as close together as desired, as covering the exposed surfaces of planting containers as much as possible reduces water loss.

- Watering
    - Deep watering, wait three days, and give another deep watering.
    - Water plants according to the schedule in Table 1.
- Location
    - A substantial amount of sun is necessary for nearly all cacti.
    - Never keep plants in full shade except in extreme heat.
    - Avoid putting container plants against brick walls in extreme heat.
- NEVER fertilize unless the plant remains in captivity forever.

Photo Examples for Salvage and Transplantation

Photo 1. When trimming a damaged root, cut straight across, not at an angle, to reduce surface area for infection.

Photo 2. Shade trimmed roots during the callusing period (two hours, or until cut surface appears dry). Do not shade cacti stems, except fishhook cacti.

Photo 3. Carry large plants on plywood or in canvas or carpet slings, using shovels to guard against potential falls. Always carry and transport cacti on their sides (or tops, for small cacti) to avoid damaging roots.

Photo 4. Dig the hole to fit the root ball. Do not dig too deep. Plants should be level with the surrounding area after transplanting.

Photo 5. Do not allow the weight of the plant to sit on the roots at any time. Support the plant weight by digging the planting hole just large enough for the roots and using rocks and slow, careful backfilling.

Photo 6. *Cochemiea [Mammillaria] tetrancistra* (fishhook cacti) planted in the shade of an ironwood tree.