

Water Resources Protection Elements Recommendations

APP# 11967
APN: 210-051-066

Overview

The following recommendations are based on site specific conditions related to the management of waste discharge on cannabis farms. The intention of these design elements is to protect water quality while enhancing ecologic resources.



Forest Restoration (FR)

The indicated area has been impacted by activities of development. Forest side cast material must be processed appropriately. Grading must be managed to prevent erosion and promote the restoration of native vegetation. The forest should be managed for a healthy matrix of hard and soft woods as well as vertical integration from canopy to ground cover. The management of buffers beyond the restoration site and prior to the riparian zone must be of natural slope and native vegetation. This will facilitate a tertiary system of discharge protection from surface waters. Utilize large woody debris as velocity dissipators and natural areas of depression as infiltration sites. The infiltration of rainwater is a key component in recharging groundwater supplies that can have positive, cumulative effects on forest health and in-stream flows. A professional restorationist is recommended for establishing a management plan and some sites may be within the *Stream Side Management Area* which requires specific protocols to management.

Hedge Row (HR)

Hedge rows serve many purposes: wind break to decrease soil desiccation, increase favorable conditions for insect-based pollinators and pest predators, provide habitat for beneficial bird species and provide visual sector barriers from neighboring properties. All hedge rows should be planted and/or maintained in conjunction with an infiltration system to decrease the irrigation requirements and increase the possible diversity of species that can be planted. See attached documents for more information.

Permitted Crossing (PC)

Topographical drainage requires a permitted crossing (culvert, armored ford, etc.) Implement crossing strategy per engineer's design. Permits are required. Implementation should be through a licensed professional.

Remediation Buffer (RB)

Remediation buffers, in conjunction with appropriate setbacks from water resources, serve to off-set and mitigate the surface and subsurface discharge from human-based activities. Examples include: on-contour swales, filter-strips and hedge-rows. On-contour swales (linear ditches) that evenly distribute water throughout the length of the system due to their on-contour (same elevation, level bed) design. Swale size is determined by the infiltration rate of the native soil (high infiltration rate, smaller volume; low infiltration rate, larger volume). All on-contour swales require redundant, armored overflow points to facilitate discharge during high stormwater events. The material removed to create the swale is deposited on the downslope side to act as a berm with its downslope side shaped to match the natural slope and contour of the land. The newly exposed soil should be protected with mulch as soon as possible and a revegetation plan based on seasonal timeline implemented. The berm is an ideal

location to plant *Integrated Pest Management* species (*IPM*). The swales should be backfilled with woody, chip material to facilitate the breakdown of nitrogenous runoff. These chips can be spread throughout the cultivation area after the wet season to enhance soil quality for future plant nutrition. Filter-strips are linear plantings of dense native grasses to serve as sediment traps, habitat for beneficial insects and biomass accumulators. Hedge-rows are linear plantings of diverse, perennial species that serve as wind-blocks, habitat, visual and auditory barriers, sediment traps and enhanced areas of infiltration.

Riparian Buffer Zone (RBZ)

A professional restorationist is recommended for establishing a management plan. This management plan should include elements that protect bed and bank from erosion, manage invasive species and serve as an ecological offset to the loss of habitat as a result of cultivation activities. The plan should also include elements that promote riparian functionality that include but are not limited to: temperature, microclimate, filtration, nutrient cycling, woody debris recruitment, groundwater recharge, bank stability, flood attenuation and flood water storage.

Rainwater Catchment System (RWCS)

Plumb rooftop gutters (GH1,AG) into jumper tanks that are pumped via 12v-solar system to storage. Connection to the two structures can be made to maximize the surface area for catchment. Overflow from this system can be plumbed into the remediation buffer (RB1) to serve as groundwater recharge. It is recommended that water conservation strategies, water use meters and groundwater recharge systems be incorporated to reduce the volume of irrigation water required so that rainwater catchment is the most viable source of agricultural water.

Road Decommission (RD)

Seasonal, satellite roads are difficult to maintain, promote slope instability, disturb habitat and are threats to water quality. Per site design for the consolidation of cultivation related infrastructure, reducing monitoring requirements for water quality and the restoration of natural habitats it is recommended that the indicated section of road be decommissioned. Decommissioning includes, but is not limited to: regrading to match existing natural slope features, revegetation with native species and short term implementation of erosion control strategies.

Surface Water Delineation (SWD)

The identified area forms the headwall of a Class-III surface water course. It is recommended that a surface water delineation be conducted by a license profession to establish the origin of the defined surface water course. Given the extent of drainage, it is recommended that all agricultural activities be setback at a minimum of 200-feet with redundant systems of remediation from the delineated point.

Other Recommended Water Resource Protection Elements

Ecological Offsets

Soils compaction, forest fragmentation and water resource extraction are the results of roads, developed sites and cultivation activities. In the interest of offsetting the impacts

to the natural environment it is recommended that forest management, groundwater recharge and habitat restoration plans be implemented by a ratio of 2:1 (two square feet of offsets for every one square foot of disturbance).

Water Conservation

In an effort to reduce the irrigation requirements for the cultivation site and thus the forbearance storage and demand on surface water diversions the following water conservation strategies are recommended. Increase the organic material in the potting soil to enhance the water holding capacity of the medium. Protect the soil surface from direct insolation through the use of natural and/or living mulches. Irrigate less frequently and at a greater depth to encourage wide and deep root growth. Utilize offseason protocols such as living soil methods that increase the biological and moisture levels to facilitate plant growth with reduced irrigation requirements.

Integrated Pest Management - IPM

In an effort to reduce and ultimately eliminate the need for pesticides - chemical, natural, organic or otherwise - it is recommended that the cultivation site buffers be planted with native and analog plant species that attract and host pest predator species of invertebrates and birds. It is further recommended that habitat be created to attract and host reptile species that also prey on agricultural pests. Through the management of microclimates the need for fungicides can be reduced and ultimately eliminated.

The above are recommendations and not prescriptions of method and manner. Your WRPP provides short term strategies to prevent the discharge of sediment and cultivation related wastes from entering surface waters until permanent systems can be deployed during the appropriate time of year. All features should be engineered and implemented by licensed professionals where applicable.

ehouse Camp, LLC
 ID: 1B161379CHUM
 N: 210-051-060-000

Upper Larabee Valley Rd

Base Map 2018

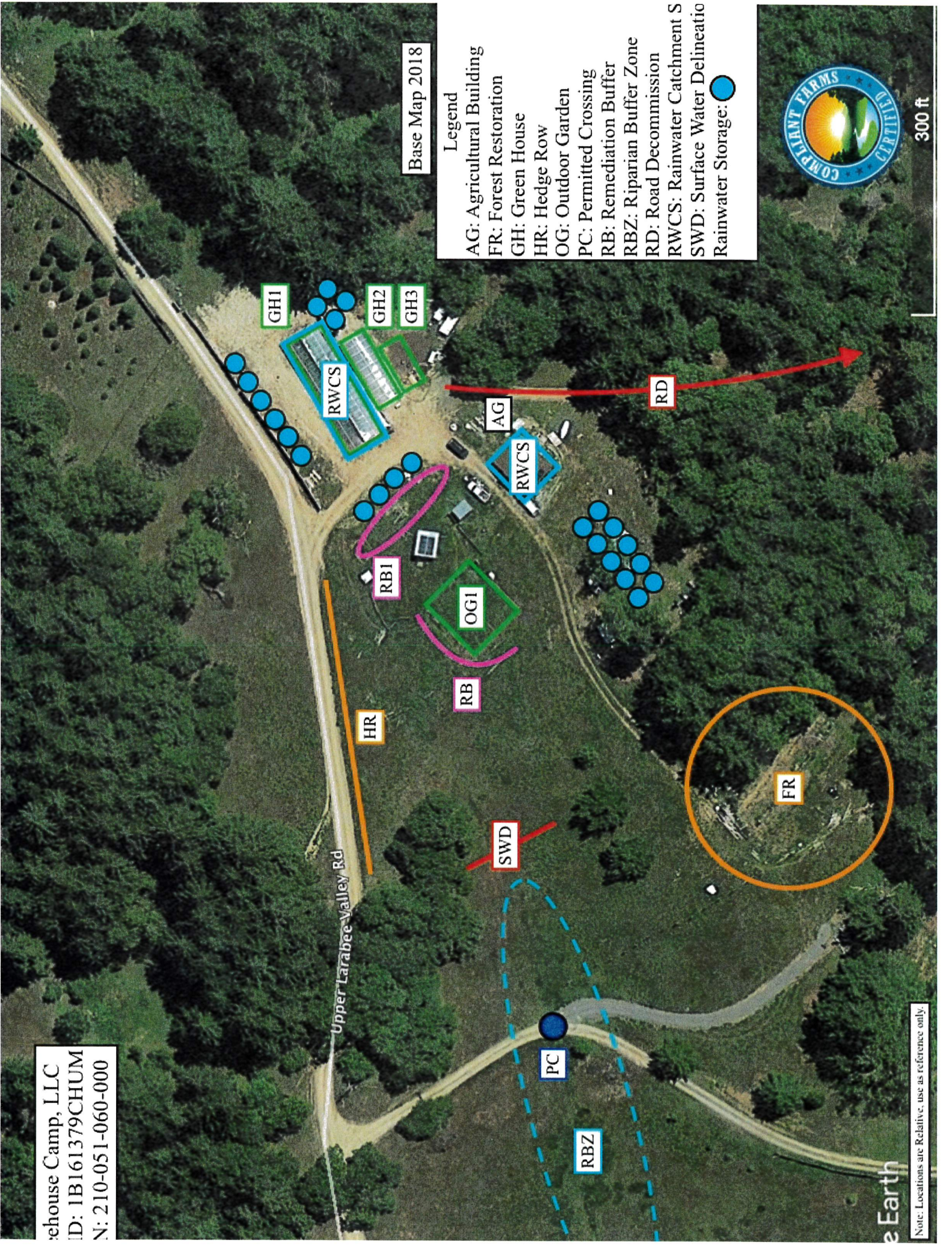
Legend

- AG: Agricultural Building
- FR: Forest Restoration
- GH: Green House
- HR: Hedge Row
- OG: Outdoor Garden
- PC: Permitted Crossing
- RB: Remediation Buffer
- RBZ: Riparian Buffer Zone
- RD: Road Decommission
- RWCS: Rainwater Catchment S
- SWD: Surface Water Delineatio
- Rainwater Storage: ●

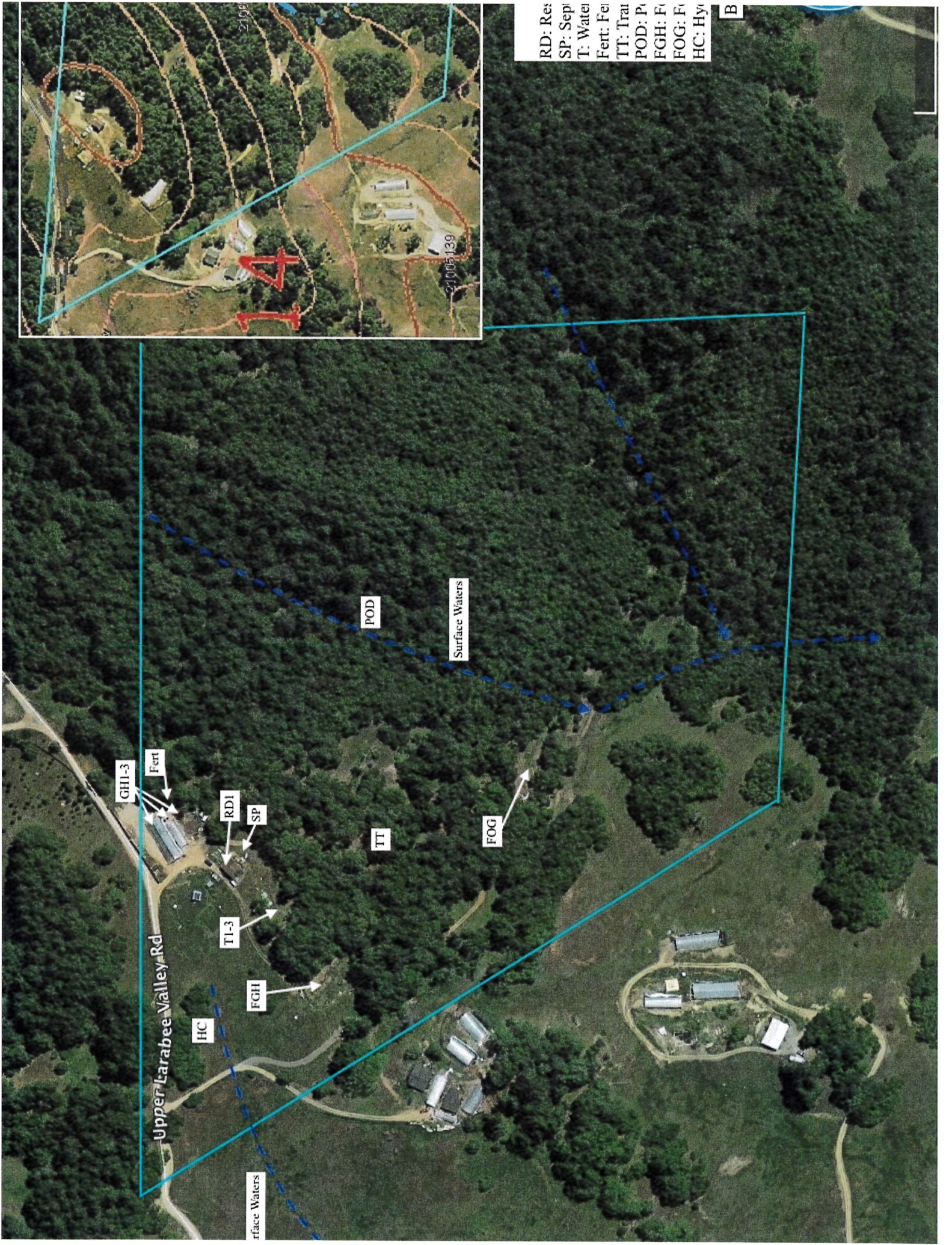


300 ft

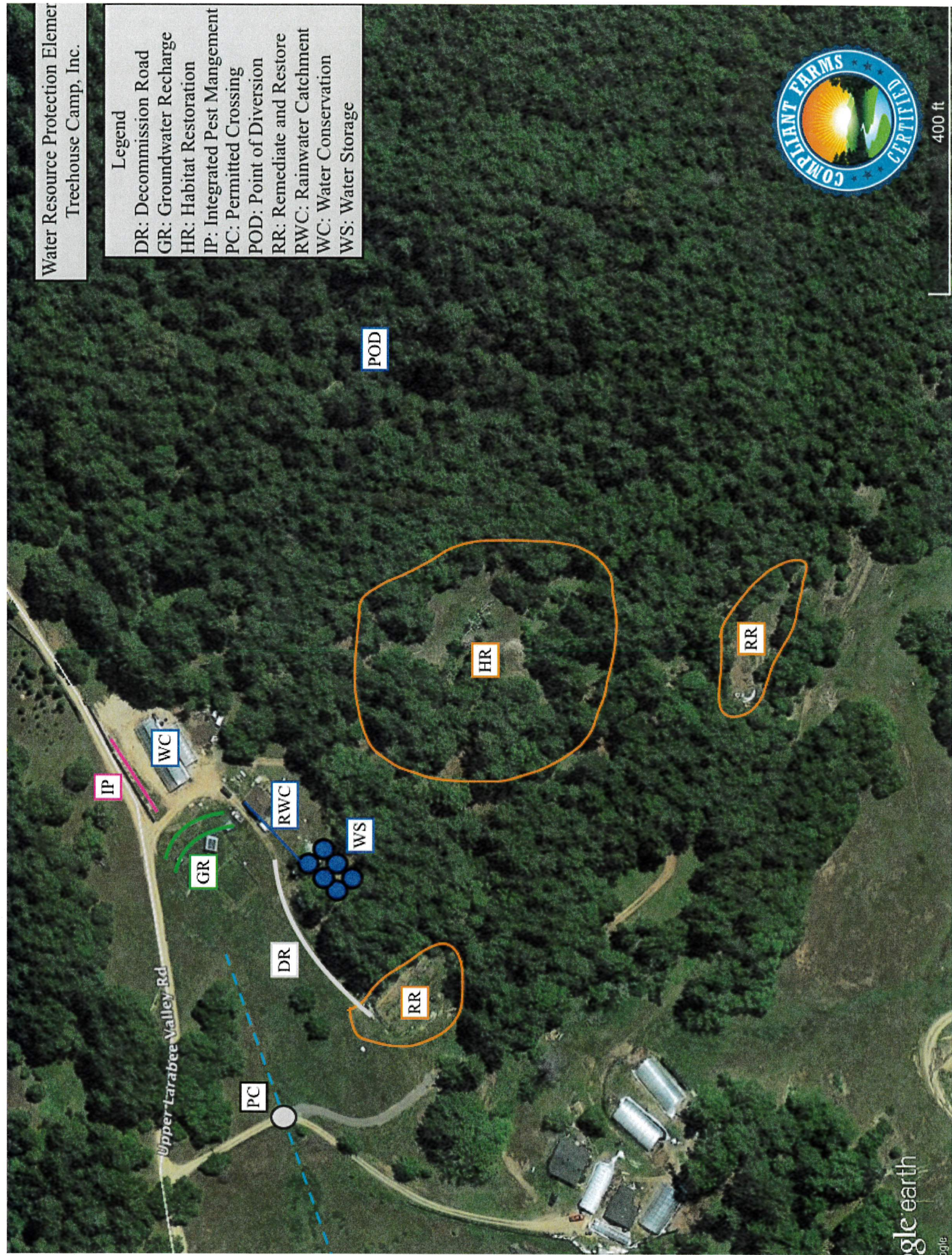
Note: Locations are Relative, use as reference only.



Earth



Legend	
DR:	Decommission Road
GR:	Groundwater Recharge
HR:	Habitat Restoration
IP:	Integrated Pest Management
PC:	Permitted Crossing
POD:	Point of Diversion
RR:	Remediate and Restore
RWC:	Rainwater Catchment
WC:	Water Conservation
WS:	Water Storage



Water Source, Storage, Use and Recharge Volumes													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Totals
Average Total Precip (in) ^a	11.75	10.23	9.11	5.07	2.76	0.71	0.11	0.76	1.29	4.32	9.90	11.53	67.53
Average Total Precip (ft) ^a	0.98	0.85	0.76	0.42	0.23	0.06	0.01	0.06	0.11	0.36	0.83	0.96	5.63
AG1 ^b Catchment Volume (gal)	6,615	5,738	5,130	2,835	1,553	405	68	405	743	2,430	5,603	6,480	38,005
GH1 ^d Catchment Volume (gal)	21,315	18,488	16,530	9,135	5,003	1,305	218	1,305	2,394	7,830	18,053	20,880	122,456
Total Catchment Volume (gal)	27,930	24,226	21,660	11,970	6,556	1,710	286	1,710	3,137	10,260	23,656	27,360	160,461
Total Volume to Storage (gal)	22,000	18,000	16,000	9,000	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f	7,000	20,000	23,000	115,000
Estimated Use (gal)	0	0	0	0	10,000	15,000	20,000	20,000	15,000	10,000	0	0	90,000
Groundwater Recharge (gal)	5,930	6,226	5,660	2,970	NA ^f	NA ^f	NA ^f	NA ^f	NA ^f	3,260	3,656	4,360	29,092 ^f to 45,461 ^f

Average Total Precipitation^a: Source *Western Regional Climate Center*, Station: BRIDGEVILLE 4 NNW, CALIFORNIA (041080)

AG1^b: 900 square feet

GH1^d: 2,900 square feet

NA^f: Data not available. Ag1 and Ag2 will continue to top off storage as precipitation allows; therefore, storage and groundwater recharge totals will vary.



Standard Conditions Compliance Requirements - 2018						
Treehouse Camp, LLC / WDID: 1B161379CHUM / APN: 210-051-060-000						
Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
1. Site Maintenance, Erosion Control and Drainage Feature						
ALL	Roads	Road Maintenance Other Corridors	Triage Items • Monitoring, Maintenance and Protocols • Hand-dig water bars at frequent intervals to discharge road runoff into protected discharge points. • Lay straw-flake checkdams or straw wattles at frequent intervals to discharge road runoff into protected discharge points. • Seed margins and discharge points with erosion mix per manufacturers instructions and mulch with straw. • Clear in-board ditches and the head of relief culverts of accumulated sediment dams and only enough vegetative debris to facilitate functionality. • Install small, rock checkdams in in-board ditches as a sediment control device. • Install trash-rack at the head of the relief culvert. Design • See <i>Water Resources Protection Elements</i> document. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.			
RD	Ditch Relief Culvert					
	Satellite Road					

All	Roads	Discharge Points	Permanent Strategies • Implement road drainage, discharge and maintenance per licensed professional's assessment. • Road elements to include but not limited to: • Shape and grade road to outslope to continually shed stormwater so as not to overwhelm in-board drainage features. • Increase number of rolling dips and/or other discharge strategies. • Upgrade size of ditch relief culvert per assessment. • Surface road with appropriate, high quality rock. • Revegetate margins with native species. • Decommission roads and other corridors based on <i>Cannabis Cultivation Site Matrix</i> results. Decommissioning to include regrading to natural slope and revegetating with native species. Temporary erosion control strategies must be implemented before and immediately after earthworks.		If Applicable
RD	Ditch Relief Culvert		Triage Items • Monitoring, Maintenance and Protocols • Utilize riprap or large woody debris at points of discharge to prevent erosion and disperse flow to promote infiltration. • Install straw bales or straw wattles per erosion prevention protocol. • Establish revegetation protocol. Design • See <i>Water Resources Protection Elements</i> document. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.		
AG	Satellite Road				
GH1	Developed Sites				
GH2	Cultivation Site				
GH3					
OG1					
			Permanent Strategies • Implement discharge strategies per licensed professional's assessment. • Discharge elements to include but not limited to: • Armor the outflow end of discharge point and install a velocity dissipater. • Replace waterbars with rolling dips. • Increase frequency of discharge points. • Install infiltration basins at points of discharge. • Install on-contour swales to promote infiltration and surface flow disconnection. • Implement revegetation protocol. • Temporary erosion control strategies must be implemented before and immediately after earthworks.		If Applicable

All	Roads	Hydrologic Disconnection	Triage Items • Monitoring, Maintenance and Protocols • Reestablish connectivity with designed discharge strategy (i.e. install waterbar to reconnect road runoff with in-board ditch). • Protect discharge point with checkdam, straw flakes, large woody debris, etc. to slow the flow of discharge and allow sediment to fall out of suspension. • Hand-dig water bars at frequent intervals to discharge road runoff into protected discharge points. • Lay straw-flake checkdams or straw wattles at frequent intervals to discharge road runoff into protected discharge points. • Establish straw-flakes or straw wattles along the entire perimeter of developed or cultivated sites (flats) at all potential points of hydrologic connectivity. Design • See <i>Water Resources Protection Elements</i> document. • Establish revegetation protocol. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.		
RD AG GH1 GH2 GH3 OG1	Ditch Relief Culvert Satellite Road Developed Sites Cultivation Site		Permanent Strategies • Implement hydrologic disconnection strategies per licensed professional's assessment. • Disconnection elements to include but not limited to: • Replace waterbars with rolling dips. • Install infiltration basins at points of discharge. • Increase frequency of discharge points. • Regrade flats to shed stormwater into protected infiltration areas. • Implement revegetation protocol.	If Applicable	

			Permanent Strategies		TBD	
			- Restoration of disturbed riparian buffer that resulted from relocation activities. - Install remediation buffer at all downslope points of discharge to riparian zones. - Implement riparian restoration plan.			
Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
4. Spoils Management						
SSP	Soil and Spoils Processing Site	Discharge Setbacks	Triage Items Monitoring, Maintenance and Protocols - Contain used soil pile with a straw bale or wattle perimeter. - Seed and mulch or tarp used soil pile. - Contain non-compostable byproducts, such as rock-wool rooting medium, to be disposed of properly offsite. Design - Create an on-site resource plan for processing forest side-cast material based on seasonal prescriptions. - See attached document <i>Cannabis Waste Management Plan</i> for more information. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.			
GH1 GH2 GH3 OG1	Cultivation Site	Side-Cast Material				
			Permanent Strategies - Establish a 3-tiered composting system for vegetative byproducts. - Rip compacted soils prior to placing spoils to promote the infiltration of tailwater. - Install remediation buffer at all downslope points of discharge to riparian zones. Terminate swale at an infiltration basin. - Plant remediation buffer berm and infiltration basin with appropriate management species. - Process forest side-cast material based on seasonal prescriptions and on-site resource planning.		On Going	

Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
5. Water Storage and Use						
POD	Point of Diversion	Water Quality	Triage Items • Install a water meter and collect monthly data. Separate domestic use from agricultural use. • Establish a secure structure and secondary containment for gas powered pump. • Relocate gas powered pump to a site greater than 50-feet from watercourse. • Install pressure gauge to monitor conveyance system for leaks. • Install back flow prevention device. • Remove all old plumbing from nonuse water systems. Monitoring, Maintenance and Protocols • Monitor take rates to not exceed 10-gallons per minute and 10% of the stream flow. • Check organism exclusion device for functionality. • Check pressure gauge to monitor conveyance system for leaks. • Mulch all exposed soil to reduce evaporative rates. Design • Assessment for microclimate enhancement plan. • Assess total water volume required for full forbearance period. • Assess an alternative source of water such as rainwater catchment. • Assessment for <i>Living Soils</i> style of cultivation to reduce irrigation. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.			
TT	Transfer Tank	Water Quantity				
WS	Water Storage	Water Conservation				
GH1	Cultivation	Size and Scope				
GH2	Site					
GH3		Wetland Protection				
OG1						

			Permanent Strategies • Increase water storage to meet a full period of forbearance (May 15 - November 15). • Armor valves and conveyance. • Install irrigation system so that water is applied at the root zone to promote deep, wide root growth. • Install float valve and redundant overflow at transfer tank. Overflow plumbing should return water to point of diversion. • Replace plastic valves at tank with metal gate valves. • Manifold tanks greater than 3,000-gallons internally. • Install rainwater catchment system at all structures and plumb to main storage. • Install rainwater harvesting systems on the upslope perimeter and within the the cultivation site to recharge groundwater supplies. • Implement microclimate enhancement plan. • Implement <i>Living Soils</i> design plan.		On Going	
Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
6. Irrigation Runoff						
GH1 GH2 GH3 OG1	Cultivation Site	Discharge	Triage Items • Monitor irrigation volumes to avoid runoff. Monitoring, Maintenance and Protocols • Soil nutrition testing to guide feeding regiment to prevent the overuse of fertilizers and amendments thus preventing excessive leaching. • Maintain and update irrigation system to prevent leaks. • Employ rain-triggered shutoff devices for automated irrigation systems. • Mulch all exposed soil including planting areas, pathways and pads. Design • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.			
			Permanent Strategies • Install remediation buffer at all downslope points of discharge.		On Going	

Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
7. Fertilizers and Soil Amendments						
GH1 GH2 GH3 OG1 FT AG	Cultivation Site Fertigation Materials Storage	Discharge	Triage Items • Monitoring, Maintenance and Protocols • Place all liquid-based materials in secondary containment (totes). • Products shall be labeled properly and applied according to the label. • Periodically calibrate application equipment. • Post inventory of cultivation related materials with application rates. • Store spill-kit at each storage facility. Design • Develop a <i>Living Soils</i> program to replace packaged products. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>. Permanent Strategies • Install remediation basin for fertigation system discharge/clean-out. • Install anti-backflow devices on fertigation systems. • Implement <i>Living Soils</i> program.			
					On Going	

Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
8. Pesticides and Herbicides						
GH1 GH2 GH3 OG1 AG	Cultivation Site Materials Storage	Discharge	Triage Items • Monitoring, Maintenance and Protocols • Place all liquid-based materials in secondary containment (totes). • Products shall be labeled properly and applied according to the label. • Periodically calibrate application equipment. • Post inventory of cultivation related materials with application rates. • Store spill-kit at each storage facility. • Design • Develop an <i>Integrated Pest Management</i> program to replace packaged products. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>. Permanent Strategies • Implement <i>Integrated Pest Management</i> program.			
Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
9. Petroleum Products and Other Chemicals						
AG	Materials Storage	Discharge	Triage Items • Monitoring, Maintenance and Protocols • Place all liquid-based materials in secondary containment (totes). • Assess solar battery system for leaks. • Design • Assess alternative sources of power such as solar, wind or propane. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>. Permanent Strategies •			
					On Going	

Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
10. Cultivation Related Wastes						
SSP	Soil and Spoils Processing Site	Discharge	Triage Items - Establish a 3-tiered composting system for vegetative byproducts. Monitoring, Maintenance and Protocols - Contain used soil pile with a straw bale or wattle perimeter. - Seed and mulch or tarp used soil pile. - Contain non-compostable byproducts such as rock-wool rooting medium to be disposed of properly offsite. Design - Establish a soil management plan for the purpose of reducing off-site soil. - See attached document <i>Cannabis Waste Management Plan</i> for more information. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.			
GH1 GH2 GH3 OG1	Cultivation Site		Permanent Strategies - Rip compacted soils prior to placing spoils to promote the infiltration of tailwater. - Install remediation buffer at all downslope points of discharge to riparian zones. Terminate swale at an infiltration basin. - Plant remediation buffer berm and infiltration basin with appropriate management species. - Implement <i>living-soils</i> management for the purpose of eliminating the need for off-site soil.		On Going	

Site Code	Map Point Description	Standard Condition	Recommendations	Action Priority	Permanent Strategy	Completion Date
11. Refuse and Human Waste						
AG	Residence Materials Storage	Discharge	Triage Items - Assessment of permanent human-waste facility (septic system). Design - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>. Permanent Strategies			
					On Going	

These are recommendations only and not prescriptions for method or manner. All work should be designed and implemented by licensed professionals. We accept no liability for owner-build work based on this management plan.

Water Resources Protection Elements

Parcel 210-051-060-000

Overview

Two former cultivation sites have been abandoned and are in the process of being remediated and restored. The present cultivation site meets setback requirements and poses little threat to water quality. The continued decommissioning of former cultivation sites, road decommissioning and the implementation of water conservation strategies are highly recommended for 2017. The following elements describe the specific portions of the site design features to achieve the above goals. All features should be engineered and implemented by licensed professionals.

Decommission Road (DR)

Seasonal, satellite roads are difficult to maintain, promote slope instability, disturb habitat and are threats to water quality. It is recommended that the satellite road be decommissioned and the affected habitat restored.

On-Contour Swales (GR)

Linear ditches that evenly distribute water throughout the length of the system due to their on-contour (same elevation, level bed) design. Swale size is determined by the infiltration rate of the native soil (high infiltration rate, smaller volume; low infiltration rate, larger volume). All on-contour swales require redundant, armored overflow points to facilitate discharge during high stormwater events. The material removed to create the swale is deposited on the downslope side to act as a berm with its downslope side shaped to match the natural slope and contour of the land. The berm is an ideal location to plant native species that promote infiltration, slope stabilization as well as provide a habitat niche for native fauna. The infiltration of rainwater is a key component in recharging groundwater supplies that can have positive, cumulative effects on forest health and in-stream flows.

Habitat Restoration (HR)

Forest should be managed for a healthy matrix of hard and soft woods as well as vertical integration from canopy to ground cover. Utilize large woody debris as velocity dissipators and natural areas of depression as infiltration sites. A professional restorationist is recommended for establishing a management plan and some sites may be within the Stream Side Management Area which requires specific protocols to management.

Integrated Pest Management (IP)

In an effort to reduce and ultimately eliminate the need for pesticides - chemical, natural, organic or otherwise - it is recommended that the cultivation site buffers be planted with native and analog plant species that attract and host pest predator species of invertebrates and birds. It is further recommended that habitat be created to attract and host reptile species that also prey on agricultural pests. Through the management of microclimates the need for fungicides can be reduced and ultimately eliminated.

Permitted Crossing (PC)

Implement crossing strategy per engineer's design. Permits are required. Implementation should be through a licensed professional.

Point of Diversion (POD)

Point of diversion system requires 3/32-inch diameter stainless-steel screen. Take rates not to exceed 10-gallons per minute and 10% of the stream flow. Use the *Measuring Stream Flow* document for determining 10% of the stream flow at a given time.

Remediate and Restore (RR)

Grading, discharge and roads have impacted natural habitat areas. The identified areas should be remediated and restored. Forest should be managed for a healthy matrix of hard and soft woods as well as vertical integration from canopy to ground cover. The management of buffers beyond the remediation site and prior to the riparian zone must be of natural slope and native vegetation. This will facilitate a tertiary system of discharge protection from surface waters. Utilize large woody debris as velocity dissipators and natural areas of depression as infiltration sites. A professional restorationist is recommended for establishing a management plan and some sites may be within the Stream Side Management Area which requires specific protocols to management.

Rainwater Catchment System (RWC)

Plumb rooftop gutters (RD1) into jumper tanks that are pumped via 12v-solar system to storage (WS). This will provide an offset to surface water diversions and provides supplemental volume from summer storm events. The overflow from this system can be plumbed into an infiltration basin to recharge groundwater supplies and enhance in-stream flows. It is recommended that water conservation strategies, water use meters and groundwater recharge systems be incorporated to reduce the volume of irrigation water required so that rainwater catchment is the most viable source of agricultural water.

Water Conservation (WC)

In an effort to reduce the irrigation requirements for the cultivation site and thus the forbearance storage and demand on surface water diversions the following water conservation strategies are recommended. Increase the organic material in the potting soil to enhance the water holding capacity of the medium. Protect the soil surface from direct insolation through the use of natural and/or living mulches. Irrigate less frequently and at a greater depth to encourage wide and deep root growth. Utilize offseason protocols such as living soil methods that increase the biological and moisture levels to facilitate plant growth with reduced irrigation requirements.

Water Storage (WS)

Surface waters can not be used for cannabis irrigation without proper permitting and require a full forbearance period of May 15 - November 1. This can be achieved through various methods: 1) reduce the footprint of cultivation to fit the existing water storage volume, 2) deploy water conservation strategies to reduce the required irrigation storage

volume to meet the existing storage volume, 3) increases the volume of stored irrigation water.

Ecological Offsets

Soils compaction, forest fragmentation and water resource extraction are the results of roads, developed sites and cultivation activities. In the interest of offsetting the impacts to the natural environment it is recommended that forest management, groundwater recharge and habitat restoration plans be implemented by a ratio of 2:1 (two square feet of offsets for every one square foot of disturbance).

The above are recommendations and not prescriptions of method and manner. Your WRPP provides short term strategies to prevent the discharge of sediment and cultivation related wastes from entering surface waters until permanent systems can be deployed during the appropriate time of year.

Standard Conditions Compliance Requirements 2017					
Site Code	Map Point Description	Standard Condition	Recommendations Short Term / Permanent	Action Priority	Permanent BMP Completion Date
1. Site Maintenance, Erosion Control and Drainage Feature					
DR FOG	Roads	Road Maintenance Other Corridors	• Full road assessment by a licensed professional. • Hand-dig water bars at frequent intervals to discharge road runoff into protected discharge points. • Lay straw-flake checkdams at frequent intervals to discharge road runoff into protected discharge points. • Seed with erosion mix per manufacturers instructions and mulch with straw. • Clear in-board ditches and the head of relief culverts of accumulated sediment dams and only enough vegetative debris to facilitate functionality. • Install small, rock checkdams in in-board ditches as a sediment control device. • Install trash-rack at the head of the relief culvert. • See the attached document <i>Cannabis Cultivation Site Matrix</i> to determine the decommissioning of roads and other corridors. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.	6	
	Satellite Road		• Implement road drainage, discharge and maintenance per licensed professional's assessment. • See <i>Water Resources Protection Elements</i> document. • Road elements to include but not limited to: • Shape and grade road to outslope to continually shed stormwater so as not to overwhelm in-board drainage features. • Increase number of rolling dips. • Upgrade size of ditch relief culvert per assessment. • Surface road with appropriate, high quality rock. • Revegetate margins. • Decommission roads and other corridors based on <i>Cannabis Cultivation Site Matrix</i> results.		December 2016

DR FOG	Roads Satellite Road	Discharge Points	• Assessment by a licensed professional. • Utilize riprap or large woody debris at points of discharge to prevent erosion and disperse flow to promote infiltration. • Establish revegetation protocol. • Seed with erosion mix per manufacturers instructions and mulch with straw. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.	6		
RD1 GH1 GH2 GH3	Developed Sites Cultivation Site		• Implement discharge strategies per licensed professional's assessment. • See Water Resources Protection Elements document. • Discharge elements to include but not limited to: • Armor the outflow end of discharge point and install a velocity dissipater. • Replace waterbars with rolling dips. • Install infiltration basins at points of discharge. • Install on-contour swales to promote infiltration and surface disconnection. • Increase frequency of discharge points. • Implement revegetation protocol. • See attached documents <i>Satellite Roads and Disturbed Soil Management</i> for more information.		December 2016	
DR FOG	Roads Satellite Road	Hydrologic Disconnection	• Assessment by a licensed professional. • Reestablish connectivity with designed discharge strategy (i.e. install waterbar to reconnect road runoff with in-board ditch). • Protect discharge point with checkdam, straw flakes, large woody debris, etc. to slow the flow of discharge and allow sediment to fall out of suspension. • Hand-dig water bars at frequent intervals to discharge road runoff into protected discharge points. • Lay straw-flake checkdams at frequent intervals to discharge road runoff into protected discharge points. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.	6		
RD1 GH1 GH2 GH3	Developed Sites Cultivation Site					

			- Implement hydrologic disconnection strategies per licensed professional's assessment. See <i>Water Resources Protection Elements document</i>. - Disconnection elements to include but not limited to: - Replace waterbars with rolling dips. - Install infiltration basins at points of discharge. - Increase frequency of discharge points. - Implement revegetation protocol.		December 2016	
MS	Materials Storage	Stockpiled Materials	- Utilize secure structure for potentially hazardous materials (materials that pose a threat to water quality). - Place all petroleum-based materials in secondary containment (put gas and oil containers into totes) within a secure structure. - Organize benign materials (materials that do not pose a threat to water quality). - Remove refuse and other unwanted materials from the property and dispose of offsite at an appropriate disposal facility. - Process byproducts related to road/site maintenance. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.	7		
			- Construct secure structure for potentially hazardous materials (materials that pose a threat to water quality). - Install a certified secondary containment for diesel tank. Armor fuel lines and install an auto shut-off valve on fuel line to generator.		December 2016	
2. Stream Crossing Maintenance						
PC	Culverts	Functionality	- Assessment by a licensed professional. - Ensure that road surfaces approaching the crossing drain into protected discharge points prior to watercourse. - Remove vegetative debris from the head of the culvert. - Establish revegetation protocol for bank of riparian zone. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.	5		

			- Implement stream crossing maintenance strategies or upgrade per licensed professional's assessment. - Assure that pipe diameter will facilitate a 100-year storm event and is sufficient for the passage of aquatic life during all life stages. - Crossing elements to include but not limited to: - Increase basin size at culvert head and protect with riprap. - Install riprap at the toe of the culvert to reduce erosive force. - Surface road with appropriate, high quality rock. - Ensure that road surfaces approaching the crossing drain into protected discharge points prior to watercourse. - Implement revegetation protocol for riparian zone. - Install critical dip or other redundant system to protect the fill prism in the event of a plugged crossing.		TBD
3. Riparian and Wetland Protection and Management					
FGH FOG Fert RR GR	Cultivation Site	Discharge Setbacks	- Immediate relocation of cultivation site, associated facilities and other sites of similar effect to beyond the required minimum riparian setbacks (50-feet for Class III watercourses and wetlands; 100-feet for Class I and II watercourses). See attached document <i>Cannabis Cultivation Site Matrix</i> for more information. - Deploy temporary strategies to disconnect cultivation site from surface water via surface runoff. - Soil nutrition testing to guide feeding regiment to prevent the overuse of fertilizers and amendments thus preventing excessive leaching. - Mulch all exposed and disturbed soil including pathways, slope faces and pads or deploy other forms of erosion prevention. - Install remediation basin at fertigation tank to process discharge from clean out. - Establish riparian restoration plan with a licensed professional to restore the functionality of riparian buffer. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.	3	

			- Restoration of cultivation site and other sites of similar effect to beyond the required minimum riparian setbacks (50-feet for Class III watercourses and wetlands; 100-feet for Class I and II watercourses). See attached document <i>Cannabis Cultivation Site Matrix</i> for more information. See Water Resources Protection Elements document. - Restoration of disturbed riparian buffer that resulted from relocation activities. - Install remediation buffer at all downslope points of discharge to riparian zones. See attached document <i>Cannabis Cultivation Buffers</i> for more information. - Regrade buffer zone within 200-feet of a watercourse to meet original, natural slope. - Implement riparian restoration plan. - See attached document <i>Site Design for Cannabis Cultivation</i> for more information.		December 2016	
4. Spoils Management						
SP	Soil and Spoils Processing Site	Discharge Setbacks	- Location of spoils (used soil and vegetative material) management site that is beyond 200-feet of a watercourse as well as hydrologically disconnected. - Contain used soil pile with a straw bale or wattle perimeter. - Seed and mulch or tarp used soil pile. - Establish a 3-tiered composting system for vegetative byproducts. - Contain non-compostable byproducts, such as rock-wool rooting medium, to be disposed of properly offsite. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.	4		
GH1 GH2 GH3	Cultivation Site		- Rip compacted soils prior to placing spoils to promote the infiltration of tailwater. - Install remediation buffer at all downslope points of discharge to riparian zones. Terminate swale at an infiltration basin. See attached document <i>Cannabis Cultivation Buffers</i> for more information. - Plant remediation buffer berm and infiltration basin with appropriate management species.		December 2016	

5. Water Storage and Use				8
POD	Point of Diversion	Water Quality		
TT	Transfer Tank	Wetland Protection	• Install an appropriate organism exclusion device at the point of diversion that includes 3/32” stainless steel screen. • Monitor take rates to not exceed 10-gallons per minute and 10% of the stream flow. • Assess total water volume required for full forbearance period. • Divert water to storage during the wet months (Jan-Apr). • File a water use and diversion permit with the appropriate authority (State Water Rights, Department of Fish and Wildlife). • Assess an alternative source of water such as rainwater catchment. • Relocate gas powered pump to a site greater than 50-feet from watercourse. • Establish a secure structure and secondary containment for gas powered pump. • Install float valve and redundant overflow at transfer tank. Overflow plumbing should return water to point of diversion. • Install a water meter and collect monthly data. Separate domestic use from agricultural use. • Install pressure gauge to monitor conveyance system for leaks. • Assessment of storage pond (levee and slope stability, spillway) by a licensed professional. • Remove all old plumbing from nonuse water systems. • Armor valves and conveyance. • Install irrigation system so that water is applied at the root zone to promote deep, wide root growth. • Mulch all exposed soil to reduce evaporative rates. • Assessment for microclimate enhancement plan. • Assessment for <i>Living Soils</i> style of cultivation to reduce irrigation. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.	
T1-3 WS	Water Storage	Water Conservation		
GH1 GH2 GH3	Cultivation Site			
WC RWC GR				

				• Increase water storage to meet a full period of forbearance (May 15 - November 15). • Relocate water storage to a site with stable soil. • Replace plastic valves at tank with metal gate valves. • Manifold tanks greater than 3,000-gallons internally. • Install rainwater catchment system at all structures and plumb to main storage. • Implement <i>Living Soils</i> design plan. • Implement microclimate enhancement plan.		December 2016	
6. Irrigation Runoff							
GH1 GH2 GH3	Cultivation Site	Discharge	• Monitor irrigation volumes to avoid runoff. • Soil nutrition testing to guide feeding regimen to prevent the overuse of fertilizers and amendments thus preventing excessive leaching. • Maintain and update irrigation system to prevent leaks. • Employ rain-triggered shutoff devices for automated irrigation systems. • Mulch all exposed soil including planting areas, pathways and pads. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.				
			• Install remediation buffer at all downslope points of discharge.			On Going	

7. Fertilizers and Soil Amendments				
	Cultivation Site	Discharge		
GH1 GH2 GH3 Fert			• Reference Department of Pesticide Regulations Guidance (Attachment E1 and E2). • Establish/utilize a secure storage facility for all cultivation related materials. • Place all liquid-based materials in secondary containment (totes). • Products shall be labeled properly and applied according to the label. • Periodically calibrate application equipment. • Install anti-backflow devices on fertigation systems. • Install remediation basin for fertigation system discharge/clean-out. • Post inventory of cultivation related materials with application rates. • Store spill-kit at each storage facility. • Develop an <i>Integrated Pest Management</i> program to replace packaged products. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.	1
MS	Materials Storage			
IP				October 2016
8. Pesticides and Herbicides				
	Cultivation Site	Discharge		
GH1 GH2 GH3			• Establish/utilize a secure storage facility for all cultivation related materials. • Place all liquid-based materials in secondary containment (totes). • Products shall be labeled properly and applied according to the label. • Periodically calibrate application equipment. • Post inventory of cultivation related materials with application rates. • Store spill-kit at each storage facility. • Develop an <i>Integrated Pest Management</i> program to replace packaged products. • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.	
MS	Materials Storage			
IP				On Going

9. Petroleum Products and Other Chemicals				
MS	Materials Storage	Discharge	- Establish/utilize a secure storage facility for all petroleum-based materials. - Place all liquid-based materials in secondary containment (totes). - Establish a secure facility for generator and external fuel storage tank that includes certified secondary containment. - Armor fuel lines from fuel storage to generator. - Install auto-shutoff device on all external fuel storage. - Store spill-kit at each storage facility. - Provide appropriate fire prevention strategies and fire suppression equipment at each facility. - Assess solar battery system for leaks. - Assess alternative sources of power such as solar, wind or propane. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.	1
			Install alternative source of power system.	October 2016
10. Cultivation Related Wastes				
SP	Soil and Spoils Processing Site	Discharge	- Location of spoils (used soil and vegetative material) management site that is beyond 200-feet of a watercourse as well as hydrologically disconnected. - Contain used soil pile with a straw bale or wattle perimeter. - Seed and mulch or tarp used soil pile. - Establish a 3-tiered composting system for vegetative byproducts. - Contain non-compostable byproducts such as rock-wool rooting medium to be disposed of properly offsite. - Establish a soil management plan for the purpose of reducing off-site soil. - See attached documents for more information related to <i>short term strategies for protecting water quality</i>. - See attached documents for information related to <i>monitoring requirements</i>.	2
GH1 GH2 GH3	Cultivation Site			

			• Rip compacted soils prior to placing spoils to promote the infiltration of tailwater. • Install remediation buffer at all downslope points of discharge to riparian zones. Terminate swale at an infiltration basin. • Plant remediation buffer berm and infiltration basin with appropriate management species. • Implement <i>living-soils</i> management for the purpose of eliminating the need for off-site soil.		October 2016	
11. Refuse and Human Waste						
RD1 SP MS	Residence Materials Storage	Discharge	• Establish/utilize a secure storage facility for all refuse to be disposed of offsite. • Maintenance of permanent human-waste facility (septic system). • See attached documents for more information related to <i>short term strategies for protecting water quality</i>. • See attached documents for information related to <i>monitoring requirements</i>.	9		
					December 2016	