

**Appendix C
Tungsten Mountain Geothermal Development Project
Environmental Assessment**

Required Design Features

The Carson City District Consolidated Resource Management Plan (CRMP) has been amended by the Nevada and Northeastern California Greater Sage-Grouse Approved Resource Management Plan Amendment (USDI, BLM 2015b). The Record of Decision (ROD, and hereafter referred to as the Decision) for this planning effort was signed on September 21, 2015. Appendix C of this Decision states that Required Design Features (RDFs) are required for certain activities in all Greater sage-grouse (GRSG) habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:

- A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable;
- An alternative RDF is determined to provide equal or better protection for GRSG or its habitat;
- A specific RDF will provide no additional protection to GRSG or its habitat.”

The following Table identifies the RDFs that apply to all projects within Priority Habitat Management Areas (PHMA), General Habitat Management Areas (GHMA) and Other Habitat Management Areas (OHMA) consistent with applicable laws as identified in Appendix C of the GRSG Decision and states whether this RDF is applicable to this proposed project. If a RDF is not applicable to this proposed project, or requires a variation, the rationale for this is also stated in the table below.

Table 1: Required Design Features and Project Applicability

Required Design Feature	Applicable to Project	Rationale If Not Applied to Project
General RDFs		
RDF Gen 1: Locate new roads outside of GRSG habitat to the extent practical.	Yes	
RDF Gen 2: Avoid constructing roads within riparian areas and ephemeral drainages. Construct low-water crossings at right angles to ephemeral drainages and stream crossings (note that such construction may require permitting under Sections 401 and 404 of the Clean Water Act).	Yes	

Required Design Feature	Applicable to Project	Rationale If Not Applied to Project
RDF Gen 3: Limit construction of new roads where roads are already in existence and could be used or upgraded to meet the needs of the project or operation. Design roads to an appropriate standard, no higher than necessary, to accommodate intended purpose and level of use.	Yes	
RDF Gen 4: Coordinate road construction and use with ROW holders to minimize disturbance to the extent possible.	Yes	
RDF Gen 5: During project construction and operation, establish and post speed limits in GRSG habitat to reduce vehicle/wildlife collisions or design roads to be driven at slower speeds.	Yes	
RDF Gen 6: Newly constructed project roads that access valid existing rights would not be managed as public access roads. Proponents will restrict access by employing traffic control devices such as signage, gates, and fencing.	Yes	
RDF Gen 7: Require dust abatement practices when authorizing use on roads.	Yes	
RDF Gen 9: Upon project completion, reclaim roads developed for project access on public lands unless, based on site-specific analysis, the route provides specific benefits for public access and does not contribute to resource conflicts.	Yes	
RDF Gen 10: Design or site permanent structures that create movement (e.g., pump jack/windmill) to minimize impacts on GRSG habitat.	Yes	
RDF Gen 11: Equip temporary and permanent aboveground facilities with structures or devices that discourage nesting and perching of raptors, corvids, and other predators.	Yes	
RDF Gen 12: Control the spread and effects of nonnative, invasive plant species (e.g., by washing vehicles and equipment, minimize unnecessary surface disturbance; Evangelista et al. 2011). All projects would be required to have a noxious weed management plan in place prior to construction and operations.	Yes	
RDF Gen 13: Implement project site-cleaning practices to preclude the accumulation of debris, solid waste, putrescible wastes, and other potential anthropogenic subsidies for predators of	Yes	

Required Design Feature	Applicable to Project	Rationale If Not Applied to Project
GRSG.		
RDF Gen 14: Locate project related temporary housing sites outside of GRSG habitat.	No	Not applicable because no temporary housing for this project is proposed.
RDF Gen 15: When interim reclamation is required, irrigate site to establish seedlings more quickly if the site requires it.	Yes	
RDF Gen 16: Utilize mulching techniques to expedite reclamation and to protect soils if the site requires it.	Yes	
RDF Gen 17: Restore disturbed areas at final reclamation to the pre-disturbance landforms and desired plant community.	Yes	
RDF Gen 18: When authorizing ground-disturbing activities, require the use of vegetation and soil reclamation standards suitable for the site type prior to construction.	Yes	
RDF Gen 19: Instruct all construction employees to avoid harassment and disturbance of wildlife, especially during the GRSG breeding (e.g., courtship and nesting) season. In addition, pets shall not be permitted on site during construction (BLM 2005b).	Yes	
RDF Gen 20: To reduce predator perching in GRSG habitat, limit the construction of vertical facilities and fences to the minimum number and amount needed and install anti-perch devices where applicable.	Yes	
RDF Gen 21: Outfit all reservoirs, pits, tanks, troughs or similar features with appropriate type and number of wildlife escape ramps (BLM 1990; Taylor and Tuttle 2007).	Yes	
RDF Gen 22: Load and unload all equipment on existing roads to minimize disturbance to vegetation and soil.	Yes	
Lands and Realty RDFs		
RDF LR-LUA 1: Where new ROWs associated with valid existing rights are required, co-locate new ROWs within existing ROWs or where it best minimizes impacts in GRSG habitat. Use existing roads or realignments of existing roads to access valid existing rights that are not yet developed.	Yes	
RDF LR-LUA 2: Do not issue ROWs to counties on newly constructed energy/mining	No	Not applicable because ORMAT is not a county.

Required Design Feature	Applicable to Project	Rationale If Not Applied to Project
development roads, unless for a temporary use consistent with all other terms and conditions included in this document.		
RDF GEN 3: Where necessary, fit transmission towers with anti-perch devices (Lammers and Collopy 2007) in GRSG habitat.	Yes	
Fuels and Fire Management RDFs		
RDF WFM 1: Power-wash all firefighting vehicles, including engines, water tenders, personnel vehicles, and all-terrain vehicles (ATVs), prior to deploying in or near GRSG habitat to minimize the introduction and spread of undesirable and invasive plant species	Yes	
RDF WFM 2: Protect wildland areas from wildfire originating on private lands, infrastructure corridors, and recreational areas.	Yes	
RDF WFM 3: Reduce the risk of vehicle or human-caused wildfires and the spread of invasive species by planting perennial vegetation (e.g., green-strips) paralleling road rights-of-way.	Yes	
Fluid Minerals RDFs		
RDF Lease FM 1: Co-locate power lines, flow lines, and small pipelines under or immediately adjacent to existing roads (Bui et al. 2010) in order to minimize or avoid disturbance.	No	Not applicable based on engineering considerations – while pipelines will follow existing roads to the extent possible in order to deliver geothermal fluids to power plant some pipeline sections will take the shortest route. All pipelines will be above ground except at road crossings.
RDF Lease FM 2: Cover, create barriers, or implement other effective deterrents (e.g., netting, fencing, birdballs, and sound cannons) for all ponds and tanks containing potentially toxic materials to reduce GRSG mortality.	Yes	
RDF Lease FM 3: Require installation of noise shields to comply with noise restrictions (see Action SSS 7) when drilling during the breeding, nesting, brood-rearing, and/or wintering season. Require applicable GRSG seasonal timing restrictions when noise restrictions cannot be met (see Action SSS 6).	Yes	
RDF Lease FM 4: Ensure habitat restoration meets GRSG habitat objectives (Table 2-2) for reclamation and restoration practices/sites (Pyke	Yes	

Required Design Feature	Applicable to Project	Rationale If Not Applied to Project
2011).		
RDF Lease FM 5: Maximize the area of interim reclamation on long-term access roads and well pads, including reshaping, topsoil management, and revegetating cut-and-fill slopes.	Yes	
RDF Lease FM 6: Restore disturbed areas at final reclamation to the pre-disturbance landforms and meets the GRSG habitat objectives (Table 2-2).	Yes	
RDF Lease FM 7: Use only closed-loop systems for drilling operations and no reserve pits within GRSG habitat.	No	Not applicable based on engineering considerations – a closed-loop system is not sufficient for the size and depth of the geothermal wells needed for the project.
RDF Lease FM 8: Place liquid gathering facilities outside of GRSG habitat. Have no tanks at well locations within GRSG habitat to minimize vehicle traffic and perching and nesting sites for aerial predators of GRSG.	No	Not applicable because there are no liquid gathering facilities for transferring fluids to trucks for offsite disposal proposed for this project.
RDF Lease FM 9: In GRSG habitat, use remote monitoring techniques for production facilities and develop a plan to reduce vehicular traffic frequency of vehicle use (Lyon and Anderson 2003).	Yes	
RDF Lease FM 10: Use dust abatement practices on well pads.	Yes	
RDF Lease FM 11: Cluster disturbances associated with operations and facilities as close as possible, unless site-specific conditions indicate that disturbances to GRSG habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.	Yes	
RDF Lease FM 12: Apply a phased development approach with concurrent reclamation	Yes	
RDF Lease FM 13: Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007).	Yes	
RDF Lease FM 14: In GRSG habitat, remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit	Yes	

Required Design Feature	Applicable to Project	Rationale If Not Applied to Project
favorable mosquito habitat (Doherty 2007): <ul style="list-style-type: none"> • Overbuild size of ponds for muddy and non-vegetated shorelines. • Build steep shorelines to decrease vegetation and increase wave actions. • Avoid flooding terrestrial vegetation in flat terrain or low lying areas. • Construct dams or impoundments that restrict down slope seepage or overflow. • Line the channel where discharge water flows into the pond with crushed rock. • Construct spillway with steep sides and line it with crushed rock. • Treat waters with larvicides to reduce mosquito production where water occurs on the surface. 		
RDF Lease FM 15: Consider using oak (or other material) mats for drilling activities to reduce vegetation disturbance and for roads between closely spaced wells to reduce soil compaction and maintain soil structure to increase likelihood of vegetation reestablishment following drilling.	Yes	
Locatable Minerals		
RDF LOC 1: Install noise shields to comply with noise restrictions (see Action SSS 7) when drilling during the breeding, nesting, brood-rearing, and/or wintering season. Apply GRSG seasonal timing restrictions when noise restrictions cannot be met (see Action SSS 6).	No	This is not a locatable minerals project.
RDF LOC 2: Cluster disturbances associated with operations and facilities as close as possible, unless site-specific conditions indicate that disturbances to GRSG habitat would be reduced if operations and facilities locations would best fit a unique special arrangement.	No	This is not a locatable minerals project.
RDF LOC 3: Restrict pit and impoundment construction to reduce or eliminate augmenting threats from West Nile virus (Dougherty 2007).	No	This is not a locatable minerals project.
RDF LOC 4: Remove or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus. If surface disposal of produced water continues, use the following steps for reservoir design to limit favorable mosquito habitat (Doherty 2007):	No	This is not a locatable minerals project.

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<ul style="list-style-type: none"> • Overbuild size of ponds for muddy and non-vegetated shorelines. • Build steep shorelines to decrease vegetation and increase wave actions. • Avoid flooding terrestrial vegetation in flat terrain or low lying areas. • Construct dams or impoundments that restrict down slope seepage or overflow. • Line the channel where discharge water flows into the pond with crushed rock. • Construct spillway with steep sides and line it with crushed rock. • Treat waters with larvicides to reduce mosquito production where water occurs on the surface. 		
<p>RDF LOC 5: Address post reclamation management in reclamation plan such that goals and objectives are to protect and improve sage-grouse habitat needs.</p>	No	This is not a locatable minerals project.
<p>RDF LOC 6: Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes.</p>	No	This is not a locatable minerals project.
<p>RDF LOC 7: Cover (e.g., fine mesh netting or use other effective techniques) all pits and tanks regardless of size to reduce sage-grouse mortality.</p>	No	This is not a locatable minerals project.
Comprehensive Travel and Transportation Management		
<p>RDF CTTM 1: Rehabilitate roads, primitive roads, and trails not designated in approved travel management plans.</p>	No	This is not a travel management project.
<p>RDF CTTM 2: Reclaim closed duplicate roads by restoring original landform and establishing desired vegetation in GRSG habitat in accordance with GRSG habitat objectives (Table 2-2) as identified in travel management planning.</p>	No	This is not a travel management project.