

CUMULATIVE IMPACT PLAN ELU A18-495 WELL PAD OGD

RULES 304.C.(19) AND 303.A.(5)

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Cumulative Impact Plan
Caerus Piceance LLC
ELU A18-495 Well Pad OGDG

This Cumulative Impact Plan has been prepared in accordance with the Colorado Oil and Gas Conservation Commission (COGCC or Commission) Rule 304.c.(19) and follows the resources analyzed for potential cumulative impacts pursuant to Rule 303.a.(5).

The Plan provides an overview of the ELU A18-495 Well Pad OGDG Project, specifically the proposed disturbance for the Location and associated facilities, and the methodology used for determining cumulative impacts. Finally, the Plan includes the following sections, as prescribed in Rule 304.c.(19):

Resources Impacted (Section 3.0) – A description of all resources to which cumulative adverse impacts are expected to be increased.

Minimization Measures (Section 4.0) – A description of specific measures taken to avoid or minimize the extent to which cumulative adverse impacts are increased.

Mitigation Measures (Section 5.0) – A description of all measures taken to mitigate or offset cumulative adverse impacts to any of the resources.

Additional Information (Sections 1.0 and 2.0) – Information determined to be reasonable and necessary to the evaluation of cumulative impacts by the Operator, the Director, CDPHE, CPW, or the Relevant Local Government.

1.0 Project Overview

Caerus Piceance LLC (Caerus) is proposing to construct one new oil and gas well pad location, the Expanded Liberty Unit A18-495 (ELU A18-495) and associated access road and pipeline, under this proposed Oil and Gas Development Plan (OGDG). The proposed ELU A18-495 Well Pad would have 35 new oil and gas wells and would be located in Lot 3, Section 18, Township 4S, Range 95W, in Rio Blanco County. The proposed ELU A18-495 Well Pad would house only the newly proposed wells and some minimal operational support equipment. Production generated from the new wells will be transferred via 3-phase gathering to the existing ELU G13-495 Central Delivery Point (CDP) located in the SWNE of Section 13, Township 4S Range 96W. The COGCC approved the ELU G13-495 CDP on January 13, 2021 (Facility Location ID: 479215, document no. 402505441). This Oil and Gas Location does not fall into a Proximate Local Government designation. This Oil and Gas Location is situated on fee surface owned by the Oil Shale Corporation and is accessing federal minerals. The White River Field Office (WRFO) BLM approved the Federal APDs for the ELU A18-495 on December 9, 2020, with an expiration date of December 8, 2022. The National Environmental Policy Act (NEPA) review for the Oil and Gas Location (with other proposed well pads in the area) was issued in November of 2020. Note, Caerus anticipates requesting Federal APD extensions from the BLM at the same time as the OGDG will be submitted to the COGCC. The proposed new location is situated in

the south-central portion of the BLM White River Field Office area and is located on a ridge top with mixed mountain shrubs, including sagebrush, and scattered pockets of aspen trees. The terrain surrounding the Location consists primarily of northerly sloping ridge tops and steep adjacent hillsides. Elevation in the project area is approximately 8,000 feet. The current primary uses of the land are natural gas development and rangeland. This CI Plan provides information from Caerus' ELU A18-495 Form 2B analysis, Caerus' Wildlife Mitigation Plan, Compensatory Mitigation Plan as well as the completed NEPA analysis Caerus approved in 2020 for the BLM WRFO.

1.1 Well Pad

The proposed location would support a total of 35 new wells and limited production equipment, as production for the ELU A18-495 wells would go to the G13-495 CDP. The well pad would be constructed from the native earthen materials present and graded by standard cut-and-fill techniques. The well pad would be constructed by clearing vegetation, stripping, and stockpiling topsoil, and leveling the pad area. Construction of a typical well pad involves the use of heavy equipment, such as a dozer, flat blade, and dump truck, however, equipment needs may vary depending on the site-specific conditions of the individual well pad.

Separate stockpiles for both topsoil and subsoil would be established within the permitted location boundary and would be maintained for future backfilling and rehabilitation of the disturbed areas of each well pad for interim reclamation and final abandonment after the life of the wells. Caerus will follow the Topsoil Management Plan attached to ELU A18-495 Form 2A.

Construction of the proposed Location, with associated cut and fill slopes, would initially disturb approximately 11.2 acres. Following interim reclamation, the total Project residual surface disturbance for the ELU A18-495 Well Pad would be reduced to approximately 3.2 acres.

1.2 Access Roads

Access to the ELU A18-495 Well Pad would primarily be achieved via existing access roads. The Location would require the construction and reroute of approximately 4,598 feet of new access road on the southwest side of the well pad. This new segment of access road would have a 60-foot right-of-way (ROW) and would result in approximately 6.2 acres of initial surface disturbance, with 6.0 acres of residual disturbance for the life of the Location. Additionally, for the purposes of safe access and egress and for supporting Simultaneous Operations (SimOps) where wells are drilled and completed in batches, a 770-foot length road will be built on the north side of the pad. The additional access road is a requirement by the WRFO BLM to ensure safe ingress and egress. Once SimOps are completed the road will be reclaimed upon interim reclamation. The acreage of this temporary road is included in the Oil and Gas Location acreage.

1.3 Pipelines

The ELU A18-495 Well Pad would have approximately 4,500 ft of new 75-foot-wide pipeline corridor that is co-located with the access road. This corridor will result in approximately 9.3 acres of disturbance and will run north and then southwest connecting back to the proposed

G13 CDP pad for remote completions and well production operations. The pipeline corridor would include an up to 12-inch buried 3-phase gathering line; an up to 8-inch remote frac pipeline to transport water for downhole operations during completion activities; and an up to 6-inch buried gas lift/fuel line. Additionally, Caerus would have a temporary up to 12-inch flowback pipeline that would transport flowback during completion operations to the CDP for processing. Once all of the wells on the ELU A18-495 Well Pad have been completed this surface pipeline will be removed.

1.4 Interim Reclamation

In accordance with COGCC Rule 1003, interim reclamation at the ELU A18-495 Well Pad would commence as soon as practicable and, at minimum, within 6 months following drilling and subsequent operations, weather permitting. Debris, waste material, and equipment associated with drilling, re-entry, and completion operations would be removed from the Location. All disturbed, non-Working Pad Surface areas of the Location would be reclaimed to their designated final land use. The disturbed areas would be reseeded in the first favorable season following rig demobilization. Seed mixes would include species consistent with the native plant community identified during the baseline vegetation survey and are included in the Interim Reclamation Plan attached to Caerus' Form 2A. Interim reclamation efforts would include regular maintenance for noxious and invasive weeds. Areas of each Location needed for production operations would be stabilized and maintained to minimize erosion and weeds to the extent possible.

1.5 Surface Disturbance

Construction associated with the ELU A18-495 Well Pad and associated access road and pipeline corridor would result in an estimated initial disturbance of approximately 26.8 acres and residual disturbance of 9.2 acres. Total initial and residual disturbance, including well pad, access road, and pipeline disturbance, is summarized in Table 1. Residual disturbance includes acreage that would remain disturbed for the life of the project (LOP), which is approximately 25 years plus the time required to successfully reestablish vegetation (those acres not subject to interim reclamation). As previously stated, site reclamation would be initiated for portions of the well pad not required for the continued operation of the wells within 6 months of completion, weather permitting.

Table 1
Total Estimated Surface Disturbance

OGDP Location Component	#/feet	Initial (acres)	Residual (acres)¹
ELU A18-495 Well Pad	1 well pad – 35 wells	11.3	3.2
Access Road	4,598 feet	6.2	6.0
Pipeline Corridor	4,500 feet	9.3	0.0
ELU A18-495 OGD Total²		26.8	9.2

¹ Residual disturbance is based on proposed interim reclamation.

² Total acreage estimates are based on Geographic Information System (GIS) software calculations and match what is presented in the Form 2A Plat package. These totals may not equal the total summation when using mathematic equation due to rounding, removal of overlapping development and minute boundary discrepancies. GIS-based

calculations are considered more accurate than estimates calculated using simple addition and therefore will be used throughout this document.

2.0 Cumulative Impact Methodology

Cumulative impacts on the environment may result when the environmental effects associated with a proposed project are added to other past, current, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Information for this cumulative impact assessment was obtained from county, state, and federal websites, and other public domain sources, as well as recent drone activity and site visits. The proposed ELU A18-495 Well Pad is within the BLM's WRFO area in Rio Blanco County, Colorado. There are approximately 3,420 active wells (e.g., producing, shut-in, temporarily abandoned, injection, and drilling status) within the WRFO. The COGCC online database indicates 88 wells have been spud since January 2019.

Some of the past, present, and reasonably foreseeable development in the vicinity of the ELU A18-495 Well Pad OGDG includes oil and gas exploration. In 2015 the BLM published the Oil and Gas Development Proposed RMP Amendment/FEIS, which considered changes in the location, type, and level of oil and gas development within the resource area. Based on an updated 2007 Reasonably Foreseeable Development (RFD) scenario, it is assumed that the majority of oil and gas development would occur within the Mesaverde Play Area (MPA; Piceance Basin) and consist of multi-well pads. The Proposed RMPA/FEIS considered drilling up to 15,040 wells from 1,100 well pads with an associated surface disturbance of 13,200 acres (Section 2.4.6, page 2-29 of the Proposed RMPA/FEIS). In the RMPA/FEIS, it was assumed an estimated 12 acres per pad would be disturbed initially (including areas needed for associated infrastructure) however that would be reduced to approximately 5 acres per pad following interim reclamation. It should be noted that the proposed size of the ELU A-18 well pad during construction (11.3 acres) and after interim reclamation (3.2 acres) would be less than the assumed acreages in the RMPA.

Other past, present, and reasonably foreseeable actions in the project area include livestock grazing and associated range improvement projects, vegetation treatments, and both wildfires and prescribed burns. Other mineral development within the area includes sodium solution mining. Recreation use is characterized by dispersed camping, OHV use, and hunting.

Specific to existing oil and gas activity, the ELU A18-495 Well Pad has approximately two oil and gas locations considered "active" within a 1-mile radius of the proposed location, according to the COGCC location files online.

In an effort to provide information relevant to COGCC decision making, a practical delineation of the spatial and temporal scales is needed for an informative cumulative impacts' analysis. The geographic extent of each specific Cumulative Impact Analysis Area (CIAA) varies by resource and is larger for resources that are mobile or migrate, as compared to those that are stationary. For some resources, the CIAA is smaller due to the geographically confined nature of

cumulative impacts (e.g., vegetation), while for others the CIAA is much larger (e.g., air quality). Table 2 provides the geographic extent for cumulative impact analysis that was applied for the ELU A18-495 Well Pad location. For most resources, the temporal boundary is assumed to be the 25-year life of production. For wildlife and vegetation, the temporal boundary is extended an additional 5 years to account for the time required to reach 75-100 percent reclamation.

Table 2
Geographic Scope for COGCC OGDG Cumulative Impact Analysis

Environmental Resource	Cumulative Impact Assessment Area (CIAA)
Air Quality	1-mile radius
Public Health	1-mile radius
Water Resources	½-mile radius
Terrestrial and Aquatic Wildlife Resources and Ecosystems	1-mile radius (specifically High Priority Habitats [HPH] within 1-mile)
Soil Resources	Limits of disturbance for the location (including access roads and pipeline rights-of-ways [ROWs])
Vegetation	1-mile radius
Public Welfare – Noise, Odor, Light	1-mile radius

3.0 Resources Impacted

The following section describes the resources for which cumulative impacts are anticipated, based on the information included on Form 2B and the site-specific plans associated with Form 2A.

3.1 Air Resources and Public Health¹

3.1.1 Air Resources

Air quality in an area is generally influenced by the quantities of pollutants that are released within and upwind of the area, and it can be highly dependent upon the pollutants' chemical and physical properties. Air quality regulations and source-specific permits limit the allowable quantities of pollutants that may be emitted. The topography, weather, and land use in an area would also affect how pollutants are transported and dispersed and the resulting ambient concentrations.

The proposed project is in south-central Rio Blanco County, Colorado on private surface. It is situated a straight-line distance of 15 miles north of Parachute, Colorado and 25 miles southwest of Meeker, Colorado on ridgelines with an average elevation of roughly 8,100 feet. This area is within the Colorado Department of Public Health and Environment's (CDPHE) Western Slope air quality region which is designated as attainment and is in full compliance with the National Ambient Air Quality Standards (NAAQS) for Criteria Pollutants. No private residences are within two miles of the proposed wells.

The location of the ELU A18-495 and broader CIAA currently contains various emission sources including rangeland activities, vehicle traffic, and oil and gas production activities. The addition

¹ As the Public Health analysis is tied directly to the effects of Hazardous Air Pollutants, the Air Resources and Public Health cumulative impact analyses are combined in Section 3.1.

of the infrastructure needed to construct, drill, and operate the well pad and associated wells would have a cumulative impact contribution to air quality within the 1-mile CIAA. However, the proposed wells' contribution to cumulative effects would be minor, as demonstrated by the Emissions Inventory results reflected in Form 2B (see Ref #120, 121, and 130).

Impacts to air resources would be minimized and mitigated by the measures included in Sections 4 and 5 of this Plan. Emissions would be permitted and regulated by the CDPHE, Air Pollution Control Division, and would be subject to appropriate controls to reduce emissions to minimal levels. However, in the context of cumulative impact assessment, any contribution to emissions, no matter how small, adds to the cumulative effects from past, present, and reasonably foreseeable future projects.

3.1.2 Public Health

Per the qualitative evaluation provided in Reference Numbers 131 and 132 of Form 2B, a Public Health incremental impacts evaluation was conducted as a high-level and conservative screening. This screening method used the total amount of each Hazardous Air Pollutant (HAP) that may be emitted from equipment or activities during pre-production and production (as reported in Form 2B, Ref# 129 and 130) to estimate the steady state air concentration of each HAP within the facility using a box model methodology. The highest potential concentrations of each HAP were then used to evaluate both acute and chronic exposures. Acute exposure comparison was based on the U.S. Environmental Protection Agency (USEPA) Acute Exposure Guideline Levels for Airborne Chemicals (AEGs) for commercial/Industrial exposure. For acute exposure for residential properties, the Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) for acute duration exposure were used as a comparison. For chronic exposure, the reference calculations were obtained from the USEPA Regional Screening Level tables. The default exposure values prepared by USEPA were used in the risk evaluation.

Based on the airborne HAP concentrations estimated using HAP emission rates and the box model methodology, no HAP is expected to exceed the target cancer risk or noncancer hazard index for chronic duration exposures within the well pad location during pre-production or production. Additionally, no HAPs exceed the residential or industrial screening levels for acute duration exposures within the well pad location during pre-production or production. These results support the conclusion that HAP emissions are not expected to contribute to acute or chronic risks to human health within or beyond the well pad Location. In simpler terms, since no acute or chronic human health risks are anticipated on the Location, no impacts are anticipated further away from the pad where receptors are located.

It should also be noted that the ELU A18-495 well pad is not located within a disproportionately impacted community (DIC), which means that DICs would not be impacted by the HAP emissions.

3.2 Water Resources

There are no public water system intakes located within a mile of the proposed ELU A18-495 Well Pad. Construction of oil and gas facilities and associated infrastructure and industrial

development would likely have the greatest potential impact on water resources within the ½-mile radius CIAA due to the potential for increased erosion and sedimentation rates. Soils compacted on existing roads, new access roads, and well pads contribute to slightly greater runoff than undisturbed sites.

The nearest mapped NWI wetland along the probable migration pathway from the proposed Location is 1,160 feet southwest of the Location. This NWI-mapped wetland is listed as a Palustrine emergent wetland and is located along an unnamed dry intermittent streambed. Based on field exploration of the Location, the area is very dry, and it is unlikely that this wetland is actually present. Additionally, the nearest surface water of the State is an unnamed dry intermittent streambed approximately 1,300 feet southwest of the Location following the probable migration pathway. This unnamed streambed is listed as Riverine habitat according to NWI and based on field verification of the Project Location is dry most of the year. BMPs employed by Caerus, and COAs required by the BLM in the federal Environmental Assessment for this Project, would stop sediment or stormwater from reaching this potential wetland and/or dry intermittent streambed during construction and operation of the Location. These BMPs and COAs are included in Section 4 and 5 of this Plan and are included in the Mitigation Measures section of the Form 2B.

Minimization and mitigation measures intended to protect water resources within the CIAA are described in Section 4 and 5. Caerus' commitment to implementation of these measures would further limit impacts to water resources within the CIAA.

3.2.1 Onsite Fluid Storage

Fluid storage activities at the proposed ELU A18-495 Well Pad or other past, present, or reasonably foreseeable production facilities or industrial development could increase the potential for accidental spills of fuels, lubricants, and other petroleum products. Because the proposed ELU A18-495 would be a "feeder" pad with no production facilities on it, there would be minimal and temporary storage of oil, produced water, etc. on this Location. Specifically, the ELU A18-495 would have approximately 20 temporary tanks to store up to 500 barrels (bbls) each of produced water. Notably, these produced water tanks would be temporary and would be removed after initial production which would reduce the potential for spills on the well pad.

While the potential might be limited, spills of fuels or produced fluids from drilling, completion or production activities have the potential to contaminate surface waters and shallow alluvial groundwater. However, oil and gas development regulatory requirements to prevent spills from reaching surface and groundwater make these impacts unlikely, and therefore, represent a negligible potential cumulative impact within the CIAA. For example, the Caerus Spill Prevention, Control, and Countermeasure (SPCC) Plan details the protocols for each location. The ELU A18-495 would not have permanent hydrocarbon liquid storage tanks so sized secondary containment is not required, however the general secondary containment requirement for all other equipment would include a pad perimeter berm and administrative best practices. Further protection is also provided with stormwater best management practices (BMPs). Stormwater BMPs provide additional containment capable of containing a typical failure

in accordance with 40 CFR 112.7(c). Stormwater BMPs would remain in place until the wells on the Location are plugged and abandoned, and all equipment removed.

3.2.2 Water Use

Total water volume needed for ELU A18-495 Well Pad OGDG would be approximately 9,838,850 bbls. Water for the Project would come from a combination of permitted surface water sources (approximately 2,953,125 bbls) outside of the ELU A18-495 Well Pad area and from recycled produced water (approximately 6,885,725 bbls). Caerus is not proposing any new water wells or water storage areas as part of this OGDG. The use of 2.9 million bbls of fresh water represents a cumulative contribution to overall water use within the CIAA from other oil and gas development within the CIAA, however, Caerus is deeply committed to avoiding, when possible, the use of freshwater for operations, and as such is proposing to use up to 70 percent recycled produced water for the ELU A18-495 Well Pad. Caerus continually seeks opportunities for beneficial reuse by utilizing another Operator's produced water via water sharing agreements to avoid or offset freshwater use.

Minimization and mitigation measures intended to protect water resources within the CIAA are described in Section 4 and 5. Caerus' commitment to implementation of these measures would further limit impacts to water resources within the CIAA.

3.3 Terrestrial and Aquatic Wildlife Resources and Ecosystems

Cumulative impacts on terrestrial wildlife populations and habitats primarily result from surface-disturbing activities. The ELU A18-495 Location would contribute to water depletion due to the use of surface water, but the Location does not have any sensitive aquatic species identified nearby that would be directly affected by the construction or operation of the Location.

3.3.1 Surface Disturbance Impacts

Development of the ELU A18-495 Well Pad would incrementally increase the acres of cumulative surface disturbance from past, present, and reasonably foreseeable development within the 1-mile CIAA. Cumulative impacts to wildlife species can include habitat fragmentation, habitat loss, loss of foraging opportunities, and animal displacement; impacts that can last until successful final reclamation is completed. However, given the vast extent of available habitat for terrestrial wildlife species beyond the 1-mile CIAA and the relatively small size of the final ELU A18-495 Well Pad after interim reclamation (approximately 3.2 acres); implementation of the Project is expected to have a minimal contribution to cumulative impacts on habitat loss. Directional drilling from this multi-well pad will also help reduce the "spider web" habitat fragmentation effect of historic vertical single-well pads and their associated linear infrastructure.

Surveys of 479 acres of suitable woodland raptor nesting habitat of mature aspen woodlands and oak brush shrublands that were conducted for the multiple locations in the EA document which includes the ELU A18-495 Location located a red-tailed hawk nest downslope of the ELU A18-495 Well Pad (WestWater 2020). Mature aspen woodlands within the area provide poor to

good quality raptor nesting habitat. In most aspen stands, many of the trees were dead with some re-sprouting occurring.

Several additional species of raptors may potentially inhabit the region; common species include Cooper's hawk, great horned owl, long-eared owl, northern harrier falcon, red-tailed hawk, and sharp-shinned hawk, flammulated owl (a Bird of Conservation Concern), and northern goshawk (special status species). These raptors generally initiate nesting in April. Nestlings are fledged and generally independent of the nest and associated nest habitat by late July or early August. Development of the proposed Locations would not directly remove raptor nest habitat. Impacts to raptors and migratory bird species can be minimized if surface disturbing and disruptive activities take place outside the nesting season. Timing limitations are intended to prevent disruption of ongoing nest efforts, including development-induced absences of the adult birds sufficient to jeopardize egg or nestling survival from malnourishment, exposure, or predation. Impacts to nesting raptors and migratory bird species would be somewhat mitigated by implementing a timing restriction from February 1 through August 1 on surface disturbing and disruptive activities within 0.25 miles of an active raptor nest. Sections 4.0 and 5.0 include minimization and mitigation measures Caerus will implement to protect raptors.

The ELU A18-495 Location is located in the following High Priority Habitat (HPH) areas designated by the Colorado Parks and Wildlife (CPW):

- Greater Sage Grouse Priority Habitat Management Area (PHMA)
- Elk Winter Concentration
- Mule Deer Severe Winter Range
- Mule Deer Winter Concentration Area
- Elk Production Area

The ELU A18-495 Well Pad is located in the Piceance-Parachute-Roan (PPR) greater sage-grouse PHMA and GHMA in Management Zone 17. PHMA are areas identified by the BLM in coordination with Colorado Parks and Wildlife (CPW) as possessing the highest conservation value in maintaining sustainable sage-grouse populations and include breeding, late brood-rearing, and winter concentration areas. The proposed ELU A18-495 Well Pad would be located within the PHMA, where there are no active or inactive nests within 2.5 miles. Due to the parallel ridge and valley terrain of the OGDG area, intervening terrain provides a degree of visual and aural isolation from those leks. Based on recent seasonal habitat modeling (Walker et al. 2015) the majority of the Proposed Action from the NEPA analysis that included the ELU A18-495 Well Pad is in habitat that would likely be used for sage-grouse nesting, brood-rearing, and wintering habitat, with sagebrush and sagebrush-grassland habitats at intermediate elevations used during breeding and winter and higher elevations of more diverse sagebrush habitats used during summer and fall. During 2019 surveys, biologists walked pedestrian surveys across all suitable greater sage-grouse habitat on the ridge top within both project areas; no sage-grouse sign (i.e., fecal pellets, caecal pellets, feathers, etc.) or birds were observed (WestWater 2019). There are 53 active (and 45 inactive) leks within Management Zone 17. CPW's high male count

data in 2020 was 70 and the 3-year average was 53 males for the population (CPW 2020). CPW's high male count data in 2021 was 102. The data for 2018 and 2019 is incomplete due to logistical and protocol issues with data collection, causing lower counts. The proposed ELU A18-495 Well Pad OGDG would temporarily remove approximately 26.8 acres of nesting, brood-rearing, and wintering habitat in PHMA, and would contribute to the loss of habitat in PHMA from other past, present, and reasonably foreseeable projects in the CIAA and the WRFO area. Caerus developed a Wildlife Mitigation Plan (WMP) with CPW that contains a Compensatory Mitigation Plan (CMP) which details the habitat improvement project that is designed to offset direct and indirect impacts to species including greater sage-grouse, mule deer, and elk from construction and operation of the ELU A18-495 Well Pad. This CMP was also developed in consultation with BLM's Natural Resource Specialist, Wildlife Biologist, and Sage-grouse Natural Resource Specialist. Additional detail regarding the minimization and mitigation measures from the WMP and CMP are listed in Section 4.0 and 5.0 of this CI Plan.

The ELU A18-495 Well Pad is located within GMU 22 and is delineated by CPW as elk calving grounds, summer range and winter for mule deer and elk, as well as the edge of severe winter range for mule deer. These seasonal ranges receive heaviest use from May through November, depending on snow accumulation. Typically, deer and elk herds winter at lower elevations along Piceance Creek and migrate to spring and summer ranges in the upper elevations on the Roan Plateau as green-up occurs. Pad, access road, and pipeline construction would create approximately 26.8 acres of disturbance for the ELU A18-495 Well Pad OGDG, the majority of which is grass and sagebrush shrublands. Interim reclamation would return approximately 17.6 acres to a grass/forb mix and would be capable of serving as a source of herbaceous forage once that vegetation becomes established. Adverse impacts to big game from energy development result from the direct habitat removal for the footprint of the development and indirect impacts caused by traffic, noise and light, invasive plants, and the overall fragmentation of habitat as the density of facilities accumulates (CPW, 2020). The ELU A18-495 Well Pad would result in about 26.8 acres big game habitat loss and fragmentation. In addition, construction, drilling and completion activities could result in temporary avoidance of the habitat by big game species. These impacts would be diminished after drilling and completion activities cease, and interim reclamation of the pad and pipeline disturbance is revegetated and available as forage. Minimization and mitigation measures developed between CPW and Caerus in their WMP and CMP are listed in Sections 4.0 and 5.0 of this Cumulative Impact Plan will help to lessen the impacts to big game and their habitat.

3.3.2 Noise and Light Impacts

Activities associated with development of the OGDG (noise, light, odors, and vehicle traffic) have the potential to impact wildlife resources by causing avoidance of forage, cover, disruption to nesting and brood rearing activities for Greater Sage-grouse and migratory birds, and direct mortality with vehicle collisions from truck traffic.

Noise generated by oil and gas development and production activity has been found to prompt declines in lek attendance and use of nesting habitat. Recent studies in Wyoming, suggest that loud noises transmitted at decibels (70 dB at the source and 40 dB at 100 m) to approximate a

noise source 400 m (1,300 ft) from leks caused decrease lek activity. These noises attenuate with distance and have been found to decline to levels generally accepted as noise management objectives for sage-grouse lek and nesting habitats (i.e., <10 dB over ambient) 0.75 to 1.5 miles from the source (Blickley et al. 2012, Patricelli et al. 2012). Additionally, Conditions of Approval (COAs) and mitigation and/or minimization measures based on COGCC Rules 604 c.(2)A for drilling and 802 for rural development designed to restrict noise generated to <70 dB while drilling and 55 dB during long-term production would lessen residual impacts to nesting and brood-rearing habitat associated within 0.6 miles of the well pad.

The pre-production potential for light and noise related impacts on wildlife would be decreased at the ELU A18-495 Well Pad Location because Caerus intends to down-shield lighting during drilling and completion and the layout of the facilities on the Pad would decrease the pre-production potential for noise related impacts on wildlife. In addition, no permanent lighting would be located on the well pad, so long-term light related impacts would be limited to headlights from operational vehicles on location and enroute to and from the location during production, which would be minimal as production for the Locations will occur on the existing ELU G13-495 CDP. Such light exposure would be brief, as vehicle travel to the location in the dark would be minimal. Similarly, long-term noise impacts would largely be limited to vehicles going to and from the Location during production, as most of the production activity and equipment would be located at the ELU G13-495 CDP.

As previously stated, Caerus has worked closely with CPW to produce a WMP that contains mitigation measures that were designed to reduce impacts to wildlife (including sage-grouse), these measures are outlined in Sections 4 and 5 of this Plan would further diminish cumulative impacts on terrestrial wildlife within the CIAA.

3.4 Soil Resources

The CIAA for soils is a ½-mile radius around the Location. No surface disturbing activities for the ELU A18-495 OGDG would occur on lands classified as prime farmland or fragile soil. New disturbance from the proposed pad, access road, and pipeline corridor would be approximately 26.8 acres. Upon project completion and successful achievement of interim reclamation there would be roughly 9.2 acres that would remain disturbed during the life of the wells (approximately 25 years). Final reclamation would occur after all wells on a pad are plugged and abandoned. Construction of the ELU A18-495 would result in the disturbance of four soil types. The soil disturbance for the Location is summarized in the following table:

Table 3
Soil Disturbance

Project Feature	Soil Type	Acreage Disturbed
ELU A18-495 Well Pad	Irigul channery loam, 5 to 50 percent slopes	0.46
	Parachute loam, 25 to 75 percent slopes	1.37
	Starman-Vandamore complex, 5 to 40 percent slopes	9.38

Cumulative impacts on soil resources can occur from any surface-disturbing activity that removes native vegetation and topsoil. These impacts can result in soil compaction, increased erosion, and sediment yield, all of which reduce soil productivity, stability, and viability. Of these impacts, compaction may be the most deleterious. Compaction affects the movement of water and air across the soil surface boundary. Infiltration, the movement of water into the soils, is critical for plant and soil health. If water can't move into the soil quickly, it would pond and run off, leaving vegetation dry and dying, increasing erosion, and increasing flood frequency and magnitude. Compaction can also cause a shift from aerobic to more anaerobic organisms and may increase losses of nitrogen to the atmosphere (denitrification). Surface disturbance can also impact soil biological functions and viability because the disturbance can 1) enhance or degrade the microbial habitat, 2) add to or remove food resources, and/or 3) directly add or kill soil organisms.

Most soil organisms – especially larger ones that contribute to soil health and viability – live in the top few inches of soil. Surface disturbance, compaction, and erosion disrupts and removes that habitat for soil organisms. As such, one of the most effective ways to reduce impacts to soil viability from surface disturbance is to protect and preserve topsoil. As cited in Section 4.5, during initial pad construction, topsoil on all of the Locations would be stripped from the disturbance area and stored onsite for future use during pad pull-back and interim reclamation. All stockpiled topsoil would be protected from degradation due to contamination, compaction, and, to the extent practicable, from wind and water erosion. Site specific BMPs will be implemented at each phase of construction to protect topsoil; these BMPs are specifically spelled out in the Stormwater Management Plan and the Topsoil Management Plan attached to Form 2A. Caerus also employs a weed management program that addresses annual and noxious weeds during all phases of construction, including the management of weeds on the topsoil pile.

Implementation of the above described, and other minimization and/or mitigation measures listed in Sections 4 and 5 of this Plan will help to lessen the potential for impacts to soils at the ELU A18-495 Well Pad, and therefore, reduce the cumulative contribution to soil disturbance and loss of soil viability.

3.5 Vegetation

The CIAA for vegetation is defined as a 1-mile buffer around the proposed ELU A18-495 Well Pad. Past, present, and other reasonably foreseeable activities within the CIAA that have or would continue to affect vegetation communities include oil and gas development and livestock grazing. The vegetation community present in the project area includes a relatively barren ridge top with fringe of sagebrush shrublands and dense stands of Gamble's Oak, scattered aspen stands intermixed with mountain shrublands composed primarily of serviceberry on the hillsides. Invasive non-native plant species are currently a minor component within the surrounding areas; biological surveys performed by a third-party contractor found minimal invasive species within the project area.

Surface disturbing activities for the ELU A18-495 well pad would result in a direct loss of 10.67 acres of shrub land (specifically Southern Rocky Mountain Montane Shrubland, Great Basin-Intermountain Tall Sagebrush Steppe & Shrubland, and Southern Rocky Mountain Montane Shrubland) and 0.54 acres of forest, (Rocky Mountain Subalpine-High Montane Conifer Forest), according to the GAP data for the Location. In addition to direct vegetation loss, the increased traffic and soil disturbance could potentially result in the introduction and establishment of noxious and/or invasive weeds. Without prompt establishment of desirable species from reseeding and continued weed control, noxious and/or invasive weeds could readily establish in the disturbed areas. Construction of the of the ELU A18-495, when combined with all past, present, and reasonably foreseeable activities in the CIAA, would have minimal to moderate impacts on vegetation across the CIAA. Yet in the context of cumulative impacts, each acre of vegetation disturbance would incrementally add to other existing and future surface disturbances in the CIAA by increasing erosion, incrementally adding to the overall native vegetation loss, and potentially increasing invasion or expansion of invasive and noxious weeds.

Cumulative impacts for general vegetation, specifically the approximately 11.2 acres of shrub land and forest land listed as impacted on Form 2B, would be mitigated in accordance with COGCC requirements. Interim reclamation would reduce the ELU A18-495 Well pad to 3.2 acres. Minimization and mitigation measures (listed in Section 4 and 5 of this Plan) used to implement noxious weed management, erosion control, and apply dust abatement, would reduce impacts to native vegetation communities by reducing the potential for competition with invasive and noxious weed species, minimizing soil erosion and sedimentation, and reducing fugitive dust on plant surfaces.

The ELU A18-495 Well Pad is constructed to host multiple, directionally drilled wells in a consolidated location that requires far fewer miles of access road and pipelines needed for production. Directional drilling from a single, multi-well well pad helps reduce the “spider web” effect of vegetative community fragmentation that occurred as a result of historic vertical single-well pads and their associated linear infrastructure. Based on the analysis above, the ELU A18-495 Well Pad’s cumulative effect on vegetation resources (and the wildlife communities that rely on those resources) would be minimal.

3.6 Public Welfare – Noise, Odor, and Light

The ELU A18-495 Well pad is wholly located within rangeland area in Rio Blanco County with no zoning defined. There are no Residential Building Units (RBUs) or other receptors within 1 mile of the proposed Location.

3.6.1 Noise

The area that the proposed ELU A18-495 is in, is considered rangeland with very minimal traffic in the area. Caerus evaluated possible noise implications and reviewed the following receptors which are greater than 1-mile from the proposed working pad surface: railroads, RBU, High Occupancy Building Units (HOBUs), school property, childcare centers or facilities, Designated Outside Activity Areas (DOAA), established public trails, and Disproportionately Impacted

Communities (DIC). Caerus has determined that there is a public road within 2,760-feet from the working pad surface and an existing building within 4,170-feet which is not occupied as a residence. Due to the distance from the proposed working pad surface to these two receptors and the ridges and peaks presented by the natural topography Caerus does not believe that these two receptors would be affected by noise during the pre-production phase.

Caerus also evaluated High Priority Habitat (HPH) receptors for the ELU A18-495 that are within a 1-mile proximity radius to the proposed location and the following Rule 1202.d HPH are applicable: Greater Sage Grouse PHMA; Elk Production Area and Winter Concentration; Mule Deer Winter Concentration Area and Severe Winter Range (see Wildlife HPH Map attached to Form 2A). The proposed ELU A18-495 working pad surface resides at an elevation of 8,039-feet and is located between natural ridges to the east and west of the working pad surface which would reduce potential noise to any nearby habitat. Seasonal timing stipulations for construction activity will apply to big-game (elk and mule deer) in addition to sage-grouse. These timing limitations would result in the avoidance or minimization of construction noise during important wildlife seasons. These seasonal timing stipulations for construction are addressed in the WRFO's EA, Final Decision and Finding of No Significant Impact dated November 20, 2020. These timing limitations would result in the avoidance or minimization of pre-production noise during important wildlife seasons.

Additionally, Caerus obtained Behrens and Associates to develop of a site-specific drilling noise model representing the Helmerich & Payne (H&P) 445 rig. The site-specific noise model was developed to predict the future noise impact of the proposed operations and determine what noise mitigation measures, if any, would be required to demonstrate compliance with the COGCC maximum permissible noise levels. The noise modeling results were calculated utilizing the ISO 9613-2 standard and include the effects of local topography, and ground cover. The noise sensitive receptors utilized in the drilling modeling were positioned to be consistent with the requirements of the COGCC noise standards. There are no RBU's within 2,000 ft. of the pad so no COGCC dBA receptors were not included in the study. The nearest RBU is several miles away and therefore no COGCC dBC receptors were included in the study. The unmitigated modeling is based off current drilling plans and does not include sound walls or other third-party acoustical mitigation measures. The results of the unmitigated noise modeling indicate that the drilling operations would comply with the COGCC / CPW A-weighted noise level limits. Therefore, mitigation would not be required for drilling operations. The noise levels during drilling and completions would be kept to a maximum noise level of 70 decibels or less measured 350-feet (4-feet above ground level) from the source to reduce any disturbance to sage-grouse. This is also addressed in the WRFO's Environmental Assessment, Final Decision and Finding of No Significant Impact dated November 20, 2020.

Production activities typically include standard well and facility maintenance and scheduled inspections that occur frequently throughout the life of the wells. Please also note that the gathering, compression, and separating of production will occur at the ELU G13-496 CDP located approximately 4,955-feet to the southwest of the proposed ELU A18-495 working pad surface, therefore any noise generated from these activities will not occur on the ELU A18-495.

Therefore, for the reasons and commitments stated herein, Caerus does not believe that the temporary noise emitted during the pre-production phase or noise during the production phase would adversely impact members of the public or wildlife resources.

3.6.2 Odor

There are no RBUs located within a 1-mile radius from the proposed Location, therefore, odor impacts on human receptors during pre-production are not anticipated. The Location is situated on private lands and are not accessible by the general public. There is a small potential for odors generated during drilling and completions to impact wildlife in the pre-production phase, however due to the short duration of the pre-production phase and with the implementation measures of the BMPs laid out in the WMP it is unlikely that odors would impact wildlife species primarily because Caerus does not utilize oil-based mud. In the unlikely event of an odor complaint, Caerus would determine the source of the odor and employ mitigation measures accordingly. The implementation of the minimization and mitigation measures listed in Sections 4 and 5 would further limit the impacts of odor within the CIAA.

3.6.3 Light

Caerus' development of the ELU A18-495 would require work activities to be performed 24 hours per day during drilling, completion, drill-out, and flowback stages; all of which require the use of temporary lighting for safety purposes. Lighting needed for these activities would conform to nationally recognized industry and federally mandated safety standards. Lighting utilized during drilling activities is stationed on the drill rig; therefore, the lighting is centered within the site perimeter and lighting is casted outward. For safety reasons, lighting may extend slightly beyond the working pad surface perimeter. Where possible, lighting would be directed downward and inward to avoid excess lighting beyond perimeter. The footcandle site plan included with the Light Mitigation Plan shows that no surface beyond the larger area of disturbance would be lit during drilling activities. During completions and flowback activities, the site would be lit to provide adequate lighting for personnel. While most completions activities occur during daylight, personnel may access the site throughout a 24-hour day period during flowback activities, or in the rare instance when lighting is necessary in an emergency. All lighting for completions and flowback operations would be casted downward and inward towards the center of the site. Lighting would not extend past the larger area of disturbance for the Location. Portable lighting equipment would be utilized during this phase. The Completions and Flowback Phase Lighting Site Plan, and Diagram included in the Light Mitigation Plan shows that no surface beyond the larger area of disturbance for the Location would be lit during completions and flowback activities. As a result of these minimization measures it is expected that the temporary lighting utilized during pre-production would not exceed the maximum permissible light level of 2.5 lumens per square foot (LM/SF) of the total WPS, and there would be no cumulative light impacts on wildlife.

The ELA A18 495 Well Pad will not have fixed lighting installed or utilized during the production phase. Production activities are conducted during daylight hours and do not require lighting. Therefore, light impacts to the public and wildlife resources are minimal to non-existent for the

long-term production life of the wells, and adverse lighting impacts on human or wildlife receptors are not anticipated.

4.0 Minimization Measures

COGCC defines “minimizing adverse impacts” as provided by § 34-60-106(2.5), C.R.S., as “providing necessary and reasonable protections to reduce the extent, severity, significance, or duration of unavoidable direct, indirect and cumulative adverse impacts to public health, safety, welfare, the environment, or wildlife resources from oil and gas operations. Minimization measures reduce impacts to the smallest amount possible and can include operational and engineering controls. Caerus has committed to the following minimization measures for resources based on the cumulative impact analysis provided in this Plan. These minimization measures are included within the operational plans submitted as attachments to Caerus’ Form 2As for the proposed ELU A18-495 OGDG.

4.1 Air Quality

- Caerus will employ practices for continuous control of fugitive dust caused by operations. These practices shall include but are not limited to:
 - The use of speed restrictions.
 - Regular road maintenance.
 - Restriction of construction activity during high-wind days.
 - Caerus will provide dust control, during new location construction, around tanks and wellheads, and on lease roads if excess dust is present with a temporary suppressant such as water.
 - Automation is used on all new wells to minimize truck traffic.
- Caerus will use green completions to reduce venting of natural gas to atmosphere during new well completions.
- Caerus will not flare produced gas during normal operations.
- Caerus will use supervisory control and data acquisition (SCADA) systems to monitor well operations, which will reduce emissions from vehicle traffic due to the reduced number of vehicle trips to the site.
- Caerus has a 24/7 Field Monitoring that allows for continuous monitoring operating conditions when personnel are not on-site in order to identify and correct any improper operations as soon as possible.
- Caerus has a Preventative Maintenance (PM) program that contributes to the decrease in fugitive emissions and spills related to non-functioning or aging equipment.
- Caerus will implement a Leak Detection and Repair program (LDAR) including monthly inspections using infrared (e.g., FLIR) cameras.

- Caerus is committed to closed-loop drilling, therefore, there will be no emission-producing reserve pits.
- Caerus has volunteered to be a member of One Future and The Environmental Partnership which are voluntary programs that require a commitment to reduce methane emissions. Caerus will report reduction targets and annual metrics through the Caerus ESG Report.
- Caerus will use Project Canary for fence line air monitoring during pre-production operations on all new locations.

4.2 Public Health

- Based on the airborne HAP concentrations estimated using HAP emission rates and the box model methodology described in Section 3.1, no HAP is expected to exceed the target cancer risk or noncancer hazard index for chronic duration exposures within the well pad Locations during pre-production or production. Additionally, no HAPs exceed the residential or industrial screening levels for acute duration exposures within the well pad Locations during pre-production or production. These results support the conclusion that HAP emissions are not expected to contribute to acute or chronic risks to human health within or beyond the well pad Locations. Therefore, no additional minimization measures are required.

4.3 Water Resources

- Caerus will implement a site-specific Stormwater Management Plan (SWMP) to protect Waters of the State that could receive stormwater runoff from the Location.
- Caerus will have no staging, refueling, or chemical storage areas associated with the Project within 500 feet of water resources.
- Caerus will implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan to protect water resources from potential spills.
- Caerus will manage potential pollutants located onsite by sealing, wrapping, covering, or having containment/protection while not actively being used to eliminate and/or minimize contact with stormwater runoff, and prevent discharges of chemicals or other materials from the site.
- Caerus will practice proper storage, safe-handling, good housekeeping and spill prevention practices and procedures to prevent pollutants or contaminants from leaving the site.
- Energy dissipaters such as surface roughening, straw mulch/hydro mulch, or straw wattles will be installed during construction and will be left in place and maintained for the life of the project or until disturbed slopes have been revegetated and stabilized. Locations for these BMPs are dictated by the Site Specific SWMP.

- Upon surface owner authorization and per COGCC Rules 615 and 318A.e(4), Caerus will collect baseline water quality samples from an appropriate set of water wells within the vicinity of the oil and gas location. Baseline samples will be planned and collected prior to drilling (setting of conductor casing) operations for the initial site well.
- Caerus will use SCADA to allow for rapid well shutdown in the event of a potential release.
- Caerus will disinfect water suction hoses and water transportation tanks withdrawing from or discharging into surface waters used previously in another river, intermittent or perennial stream, lake, pond, or wetland and discard rinse water in an approved disposal facility. Disinfection practices will be repeated prior to completing work and before moving to the next water body. Disinfection will be performed by scrubbing and pre-rinsing equipment away from water bodies to remove all mud, plants, and organic materials and then by implementing one of the following practices:
 - Spray/soak equipment with a CPW-approved disinfectant solution capable of killing whirling disease spores and other aquatic nuisance species defined by CPW; or
 - Spray/soak equipment with water greater than 140° Fahrenheit for at least 10 minutes. All equipment and any compartments they contain will be completely drained and dried between each use.

4.4 *Terrestrial and Aquatic Wildlife Resources and Ecosystems*

4.4.1 *General Wildlife Species*

- Caerus will site new disturbance so as to use topographic features to shield leks from new disturbance whenever feasible.
- Caerus will restrict new disturbance within nesting and brood-rearing habitat as much as possible from April 15 to July 1.
- Caerus will use interim-reclamation to redevelop ground cover that provides for secure ground movements of sage-grouse and is an effective precursor to the reestablishment of appropriate sagebrush cover.
- Caerus will implement three-phase gathering systems to reduce onsite facilities and increase acreage put into interim reclamation.
- Caerus will use well control and monitoring to reduce traffic through work/project prioritization and increase emergency response efficiency.
- No surface disturbing activities from December 1 through April 30 for construction will be permitted in order to reduce the disturbance of big game animals on severe winter range.
- Caerus will work with landowners to identify and protect wildlife populations and habitats.

- Caerus will not utilize reserve pits or other open pits for wastewater, which will reduce the potential impacts to bird species.
- If Caerus installs fencing, the fencing design will comply with CPW's Fencing with Wildlife in Mind guidance (CPW 2015).
 - Such fencing and netting or other CPW-approved exclusion device will be installed within 5 days after the cessation of active drilling and completion activities and maintained until the Pit is removed from service and dried or closed pursuant to the Commission's 900 Series Rules.
- Where applicable, Caerus will adhere to CPW recommended hazing and exclusion measures and pre-construction nest surveys if vegetation removal is to occur between April 1 and August 31.

4.4.2 *Raptor Species*

- Caerus will survey for raptors prior to new development if appropriate habitat exists per Caerus' Initial Baseline Assessment (ISA) process. Caerus will consult with and implement BLM and CPW recommendations regarding raptor protection measures including seasonal timing restrictions and recommended buffer zones.

4.4.3 *Migratory Birds*

- To reduce impacts to Birds of Conservation Concern (BCC), construction, drilling, or completion activities that are initiated prior to March 1st may continue through the breeding season because it is assumed loss of suitable breeding habitat occurred in the oil and gas location prior to the start of the breeding season
- Project will apply the following step-down approach, consistent with state and federal recommendations to avoid disturbing active migratory bird nests during construction:
 - Avoidance – Conduct habitat-disturbing activities (for example, grading, scraping, mowing, and grubbing) in the nonbreeding season (September 1 to March 31) to the extent practicable.
 - Habitat Manipulation/Removal – If work activities are planned between April 1 and August 31, remove or alter vegetation within construction footprints and road rights-of-way prior to April 1 to discourage nesting within areas scheduled for summer construction.
 - Habitat Maintenance – Once vegetation has been removed or mowed, appropriate measures (that is, repeated mowing/trimming) should be implemented to assure vegetation does not grow to more than six inches high.
 - Preconstruction Clearance Surveys – If activities 1 through 3 cannot be completed, preconstruction clearance surveys should be conducted by a trained biologist during the nesting season, as described below, to identify any active nests.

- To prevent access by wildlife, including birds and bats, Caerus will fence and net or install other CPW-approved exclusion devices on conductors and general Oil and Gas Operations that are intended to contain Fluids.
 - The Director may require an operator to fence and net or install other CPW-approved exclusion devices on an existing Pit if the Director determines that the installation is necessary and reasonable to protect Wildlife Resources based on the analysis required by Rule 909.j, or other information that demonstrates additional protections for Wildlife Resources are appropriate.
 - Caerus will properly maintain and repair all fences, nets, and CPW-approved exclusion devices required by this Rule 1202.a.(4).

4.4.4 *Greater Sage Grouse*

- Avoidance and minimization were both used in the planning of each location. Caerus has agreed to avoid Barnes Ridge where there are several active GrSG leks. This location is located ~3-miles to the East of Barnes Ridge with a distance greater than 1-mile and natural terrain features (valleys and ridges) separating the locations from the active lek sites.
- Caerus will reclaim/restore greater sage-grouse habitats with native shrubs, grasses, and forbs identified by CPW that contribute to optimal greater sage-grouse habitat and other wildlife appropriate to the ecological site. In order to offset any direct impacts planned disturbance may cause, Caerus has already removed brush on Caerus owned surface near the location to provide sage-grouse habitats with native shrubs, grasses and forbs as a condition for BLM EA and the Compensatory Mitigation Plan.
- Caerus will conduct oil and gas construction outside the period between March 1st and July 15th. Caerus will complete pad construction and interim/final reclamation activities between July 15th and December 15th; avoiding the greater sage grouse wintering, breeding, and nesting periods that occur during this timeframe.
- Caerus will only permit essential traffic to access sites throughout the North Parachute Ranch where no active operations are occurring. As a general Caerus practice, essential visits to the well pad and production pad will occur between 10 AM and 4 PM during the leking, nesting and early brood rearing season (March 1st - June 30th) within 1.0-mile of an active lek.
- Caerus will continue to provide access to CPW research personnel for ongoing mule deer research and predator research on the North Parachute Ranch, and other Caerus owned property.
- Caerus will consult with CPW and BLM prior to any construction of new surface structures within five primary migratory corridors detailed in the Wildlife Management Plan. Caerus will place multiple gathering lines into a single trench to minimize disturbance and construction. Caerus will install trench plugs (sloped to allow wildlife or

livestock to exit the trench should they enter) at known wildlife or livestock trails to allow safe crossing on long spans of open trench when trenches are open longer than 48-hours.

- To reduce truck traffic, Caerus will utilize a three-phase gathering system to transfer production fluids from this oil and gas location to the ELU G13-496 CDP where produced water will then be transferred through the existing pipeline system to the Divide Road Water Treatment Facility located to the southwest of this location for treatment and recycling of produced water. Additionally, Caerus will utilize solar panels to reduce the need for additional powerlines and use remote telemetry to reduce the need for daily well site visitation.
- Caerus will use interim reclamation to re-develop, as quickly as possible, ground cover that provides for secure ground movements of GrSG and is an effective precursor to the re-establishment of appropriate sagebrush cover. Caerus will also reseed disturbances exceeding 15-feet in width mapped in the occupied GrSG habitat with local sagebrush seed, where topography and weather conditions allow safe access to do so.

4.4.5 Mule Deer and Elk

- Caerus will only permit essential traffic to access sites through the North Parachute Ranch where no active operations are occurring.
- Caerus will implement three-phase gathering at the ELU G13-496 CDP to reduce the need for onsite separation and fluid storage production facilities and reduce the need for increased acreage put into reclamation. Furthermore, centralized facilities significantly reduce the need for truck traffic that would have been necessary to transport produced water off-location for re-use or disposal.
- Through Caerus' ranch manager, Caerus will manage all grazing lease agreements for the North Parachute Ranch under a consistent monitoring program to ensure that livestock utilization does not negatively impact other natural wildlife resources. Monitoring will include fence inspections, repairs, and improvements; periodic range checks for trespassing cattle or unexpected issues; the use of grazing baskets to determine the percentage of grazing usage so that livestock may be timely removed from an area; continuing the development and maintenance of water sources as a result of Caerus operations; and adopting grazing management guidelines, including grazing lease deferrals, to protect existing wildlife habitat resources. Existing and new lease agreements include provisions to: 1) limit animal grazing unit months; 2) prevent overgrazing; 3) manage the use of salt blocks to protect vegetation; 4) conduct any weed treatment operations consistent with the North Parachute Ranch Integrated Vegetation Management Guidance Document; and 5) utilize sound management practices
- Caerus will prohibit pets on any Caerus-owned property.

- If new oil and gas construction must occur within CPW-mapped elk production areas, the operator agrees to conduct new oil and gas construction outside the time period from May 15th through June 30th.
- Caerus will employ remote well control and monitoring to reduce traffic.
- Caerus conducts annual weed control treatment in areas not associated with oil and gas operations. A team will typically traverse 1000-acres to spray herbicide on weeds to eliminate patches and seed source.

4.5 Soil Resources

- Caerus will implement a site-specific SWMP (Form 2A). Key control measures from that document are included here:
 - All available topsoil will be removed from the well pad areas and stockpiled/stored adjacent to the well pad in order to retain indigenous seed bank and soil microbes that are fundamental to site restoration. Salvaged topsoil will be stabilized using methods outlined in Caerus Topsoil Protection Plan.
 - BMPs such as, straw mulch, hydro mulch or straw wattles, sediment basins, and perimeter berms will be used to prevent excess erosion of soils from disturbed areas. These structures will be installed during construction and left in place and maintained for the life of the project or until the disturbed slopes have been revegetated and stabilized.
 - The site will be inspected as required by CDPHE's inspection frequency by a qualified stormwater inspector. Any deficiencies noted will be brought to the attention of the operator and addressed in a timely manner
 - In addition to installing erosion and sediment controls at the site, Caerus will utilize administrative controls during precipitation events will.
- Based on changes in physical characteristics (e.g., organic content, color, texture, density, or consistency) soil horizons will be segregated and stockpiled separately; topsoil stockpiles will be separated by compacted earthen berms, sediment control logs, straw bale barriers, etc.; and stabilizing stockpile surfaces to control for erosion and sedimentation.
- Caerus will indicate topsoil stockpiles on site with signage; stockpiles will be placed in areas away from vehicle and equipment traffic; and when stockpiling, compaction will be minimized by limiting the number of equipment passes, limiting stockpile height, and using vegetation.
- Caerus will seed topsoil stockpiles with an ecologically site-appropriate seed mix for long-term storage piles to help maintain biological activity and provide a seed bank of viable seed. If long-term stockpiling or deep stockpiling cannot be avoided, application of mycorrhizal inoculants (see section below) may also be used to help ensure the topsoil maintains optimal condition for reclamation purposes.

- Caerus will cross-rip all areas compacted by drilling and subsequent oil and gas operations which are no longer needed following completion of such operations. Ripping will be undertaken to a depth of eighteen (18) inches unless and to the extent bed rock is encountered at a shallower depth.
- Caerus will regrade cut and fill areas awaiting reclamation to match pre-existing contours to the nearest extent possible to provide long term erosion control and site stability.
- Caerus will grade the topsoil stockpile to ensure that all surfaces can be stabilized safely and effectively.
- Caerus will stabilize and maintain areas needed for production operations or for subsequent drilling operations to minimize dust and erosion to the extent possible.
- Caerus will implement an SPCC Plan to protect soil from potential spills.

4.6 Vegetation

- All seed, straw, mulch, or other vegetative material to be used on reclamation will comply with United States Department of Agriculture (USDA) state noxious weed seed requirements and must be certified by a qualified Federal, State, or county office as free of noxious weeds. Any seed lot with test results showing presence of State of Colorado A or B list species will be rejected in its entirety and a new tested lot will be used instead.
- Caerus will confirm that erosion and sedimentation controls are implemented as necessary before and after seeding operations, as detailed in the Site SWMP.
- Caerus will monitor and maintain the vegetation on the topsoil stockpiles to promote native vegetation and to suppress invasive and noxious weeds.

4.7 Public Welfare – Noise, Odor, and Light

4.7.1 Public Welfare – General

- All equipment and vehicles will be confined to the access road, pad and areas specified in the BLM APD. CAERUS will be responsible for continuous inspection and maintenance of the access road and will conform to a schedule of preventive maintenance, which at a minimum, provides for the following corrective measures on a biannual basis. (Problem areas will be corrected as needed.)
 - Road surface grading.
 - Relief ditch, culvert cleaning and cattle guard cleaning.
 - Erosion control measures for cut and fill slopes and all other disturbed areas.
 - Road closures in periods of excessive soil moisture to prevent rutting caused by vehicular traffic.

- Road and slope stabilization measures as required. The road shall be maintained to the standards required for the construction of the road until final abandonment and rehabilitation takes place.
- To minimize the possibility of fires during the construction phase, equipment, including welding trucks, will be equipped with fire extinguishers and spark arresters.
- Vehicle use associated with the oil field will be instructed to travel at low speed and remain on existing roads and the well pad at all times.
- Caerus will limit trucking water to location for development; rather, existing water pipelines will be utilized.
- Caerus will use SCADA to reduce the frequency of vehicle trips to the Oil and gas location to monitor well operations.

4.7.2 *Noise*

- Caerus will site production equipment in a manner to minimize impact to the surrounding area.

4.7.3 *Odor*

- Oil and gas operations will be in compliance with the Department of Public Health and Environment, Air Quality Control Commission, Regulation No. 2 Odor Emission, 5 C.C.R. 1001-4, Regulation No. 3 (5 C.C.R. 1001-5), and Regulation No. 7 Section XVII.B.1 (a-c) and Section XII.
- Caerus will control truck loadouts, well unloads, and swabbing eliminating high pressure venting or flaring.

4.7.4 *Light*

Caerus will utilize BMPs to minimize light pollution which may include the following:

- Working areas within the working pad surface (WPS) will be adequately lit to aid in safe working conditions during all low-light working times (e.g., night-time, dusk, dawn, overcast). Lighting shall conform with all OSHA, IESNA, and ANSI standards.
- No direct light, except those governed by FAA standards, shall shine beyond the boundaries of the WPS, especially onto public roads, adjacent properties, and/or high priority habitats. All lighting shall conform with all COGCC, county, and municipal standards.
- For work-place safety concerns, no direct or reflected direct light shall shine towards the entrance of the WPS.
- All lights capable of adjustment will be angled downward and inward towards working areas on the WPS. No light should shine above the horizontal plane passing through the center point of the light source.

- Any lighting damaged and/or improperly directed or angled will be promptly fixed and/or corrected to conform to the lighting plan.
- Equipment shall be operated and/or orientated in such a manner that lights affixed to equipment do not shine above the horizontal plane passing through the center point of the light source or shine beyond the boundary of the WPS.
- For non-working or shut-down days where no personnel are on-site or in working areas, non-essential temporary lighting will be turned off. If no personnel are on-site and essential temporary lighting is needed, the essential temporary lighting will be inspected every 24 hours.
- All redundant, unused, or not-needed light will be turned off.
- Any additional light units used to address work-place safety concerns that are not shown on the lighting photometric plans will be verified by lighting engineer to ensure that the modified lighting will remain within the required lighting standards stated in this report.

5.0 Mitigation Measures

COGCC defines “mitigating adverse impacts” as “measures that compensate for unavoidable direct, indirect, and cumulative adverse impacts and loss of such resources from oil and gas operations.” Mitigation measures are used to offset the intensity or severity of impacts and can include compensatory actions and administrative controls. Caerus has committed to the following mitigation measures for resources based on the cumulative impact analysis provided in this Plan. These mitigation measures match those listed on the Mitigation Measures tab in Form 2B.

5.1 Air Quality

- Minimization measures listed for air quality in Section 4 will address the potential impacts to air resources within the CIAA. Therefore, no additional mitigation measures for air quality are included.

5.2 Public Health

- HAP emissions are not expected to contribute to acute or chronic risks to human health within or beyond the well pad Location. Therefore, no additional mitigation measures are required.

5.3 Water Resources

- Minimization measures included in the site-specific SWMP and other measures included in Section 4 will address the potential impacts to water resources within the CIAA. Therefore, no additional mitigation measures are required.

5.4 Terrestrial and Aquatic Wildlife Resources and Ecosystems

- Caerus will coordinate with both the BLM and CPW to identify appropriate beneficial actions that will net a minimum of 104.3 credits as per state agency standards and

calculations. (This 104.3 credits are for the complete Proposed Action evaluated in the EA, which evaluated additional Locations located in the BLM WRFO, including the ELU A18-495 Well Pad). Possible beneficial actions could include road decommissioning, conifer removal treatments, removal of invasive species, or brood-rearing habitat improvements. The agreed upon action(s) will take place within Management Zone 17 of the NWCO GRSG population and start prior to or within one year of the construction of the first well pad.

- Caerus will conduct regular contractor and employee training with respect to wildlife awareness. Caerus will also reinforce training at worksite tailgate meetings, monthly safety meetings, and company-side communication emails. Caerus will also employ signs in the field as needed.
- Caerus will perform biological site surveys, using the most recent data sets for wildlife and aquatic resources. Additionally, Caerus will perform pre-disturbance surveys when the on-site inspection and commencement of disturbance occur in different field seasons
- Caerus will only permit essential traffic to access sites throughout the NPR where no active operations are occurring.
- During final reclamation, Caerus will re-contour and re-vegetate all roads and the well pad to a stable condition to restore natural habitats for wildlife species.
- Caerus will only permit essential traffic to access sites throughout the North Parachute Ranch where no active operations are occurring. As a general Caerus practice, essential visits to the well pad and production pad will occur between 10 AM and 4 PM during the lekking, nesting and early brood rearing season (March 1st - June 30th) within 1.0-mile of an active lek. Currently there are no active leks within the vicinity of the ELU A18-495 location.
- Caerus will install raptor perch deterrents, where feasible, on cross arms of power poles and other documented raptor perches, such as radio towers, where birds are noted perching. Caerus will monitor all structures exceeding six feet in height within occupied GrSG habitat for the presence of perching raptors or ravens. Perch deterrents need not be installed if they pose a safety issue (e.g., on the handrails of a tank battery).
- Caerus will restrict new disturbance within nesting and brood-rearing habitat as much as possible from April 15 to July 1.
- Caerus will site new disturbance using topographic features to shield leks from new disturbance whenever feasible.
- Caerus will use interim reclamation to redevelop, as quickly as possible, ground cover that provides for secure ground movements of GrSG and is an effective precursor to the reestablishment of appropriate sagebrush cover. Detailed guidelines and practices for interim and final reclamation are outlined in Caerus' North Parachute Ranch Integrated Vegetation Management Guidance.

- Caerus will reseed disturbances exceeding 15 feet in width in mapped occupied GrSG grouse habitat with local sagebrush seed, where topography and weather conditions allow safe access to do so.

5.5 Soil Resources

- Caerus will place a sign on each topsoil stockpile designating and preserving that material for reclamation purposes throughout the lifetime of the location.

5.6 Vegetation

- Caerus will follow the North Parachute Ranch Integrated Vegetation Management Guidance Document for interim and final reclamation practices, including identifying appropriate seed mixes and invasive weed control measures. Selection of seed mixes will be based upon the type of ecosystem affected.
- Caerus will reseed disturbed areas in the first favorable season following rig demobilization with species consistent with the plant community in the vicinity of the Location.
- Caerus will monitor the site to identify areas of poor growth or areas that fail to germinate; these areas will be reseeded as needed.
- Caerus will monitor and treat the Location for noxious weeds for the life of the project until Final Abandonment has been approved by the BLM. Monitoring will be conducted annually during the growing season to determine the presence of any State-listed noxious weeds. Noxious weeds that have been identified during monitoring will be promptly treated and controlled.
- Caerus will reseed reclamation areas at the first appropriate seeding window (September 1st – March 31st) following disturbance using Standard BLM seed mix #6. Seed mixture rates are Pure Live Seed (PLS) pounds per acre. Drill seeding is the preferred method of application and drill seeding depth shall be no greater than ½ inch. If drill seeding cannot be accomplished, seed should be broadcast at double the rate used for drill seeding and harrowed or raked into the soil.

5.7 Public Welfare – Noise, Odor, and Light

5.7.1 Noise

- Caerus will minimize the temporary noise levels of well operations during drilling, completions, re-completions, workovers, or similar activities to a maximum permissible noise level of 70 decibels or less measured 350 feet (4 feet above ground level) from the source to reduce disturbance to greater sage-grouse.

5.7.2 Odor

- Minimization measures listed for odor in Section 4 will address the potential impacts from odors in the CIAA. Therefore, no additional mitigation measures for odors are included.

5.7.3 *Light*

- Minimization measures listed for lighting in Section 4 will address the potential impacts from lighting to the CIAA. Therefore, no additional mitigation measures for lighting are included.