

## Pronghorn 13-30 Alternative Location Analysis

January 28, 2020 (Revised 6/8/2020)

At the request of the Colorado Oil and Gas Conservation Commission (“COGCC”), Bonanza Creek Energy Operating Company (“Bonanza”) has prepared an Alternative Location Analysis below for the Pronghorn development project in Sections 30 and 31, Township 5 North, Range 61 West and Section 25, Township 5 North, Range 62 West.

After review of multiple locations, the Pronghorn 13-30 pad (Site E) is proposed to develop approximately 1,699 subsurface mineral acres from one consolidated location, comprised of 7.6 acres during drilling and completion operations and 3.5 acres once the wells enter the production phase. Production is planned to travel from the proposed Pronghorn 13-30 via new flowline to the existing State Antelope 34-24 pumping pad located in the SESE Section 24, T 5N, R 62W. Existing equipment on the State Antelope 34-24 location will then send production through an existing Oil line to an existing central production facility. Bonanza Creek works to develop minerals from multiple pads in this area by utilizing a centralized pumping pad instead of constructing multiple pumping pads. By combining multiple pads of production to a single pumping pad we reduce the safety concern and overall disturbance for development of this area. Bonanza Creek has the shut in capabilities if production travels through the existing pumping pad of the State Antelope 34-24.

Bonanza Creek has received approval of the Weld County 1041 WOGLA permit for the Pronghorn 13-30 as of 12/19/2019. The following agencies were part of this permit process: Colorado Department of Public Health and Environment, Weld County Department of Public Health and Environment, Weld County Office of Emergency Management, and the COGCC. The department of OGED (Weld County Oil and Gas Energy Department) did not receive any applications for intervention regards the Weld County 1041 application.

The alternative locations Bonanza evaluated prior to contractually securing the current location for the Pronghorn 13-30 Pad are detailed below (See Figure 1, 2, and 3):

Alternative Location Analysis:

### Site A: SESE Sec. 25, 5N-62W (Figure 1)

Ownership Information:

- Surface Owner: The Riverside Club Company
  - State Land Board of Colorado O&G lease (Third Party Grantee)
    - Bonanza Creek does not possess the O&G lease for right to construct.
- Fee Surface / Will **not** produce from minerals directly beneath.

Location Concerns:

- Closer proximity to Riverside Reservoir and shallower potentiometric surface.
- State Land Board of Colorado requires flowlines and access roads right of way to follow parcel and/or section lines, which would result in increased surface disturbance and cumulative impact along the

right of way back to the State Antelope 34-24 pumping pad located in the SESE Section 24, T 5N, R 62W.

- Does not significantly provide direct benefit to the underlying oil and gas leasehold.
- Will not concurrently provide direct benefit to both Split Estate entities.
- Will require additional third party contracting for right of way that will not directly benefit from the operations.

#### **Site B: SWNW, Sec. 30, 5N-61W (Figure 1)**

##### Ownership Information:

- Surface Owner: State Land Board of Colorado
  - State Land Board of Colorado O&G lease (Bonanza Creek, Grantee)
- Fee Surface/ Will **not** produce from minerals directly beneath.

##### Location Concerns:

- Topography would dictate Site B to be placed within and or closer to floodplain boundaries.
- Due to State Land Board surface siting rationale, Bonanza Creek Energy wells will not meet the minimum State Land Board mineral ownership percentage requirement.
- Site would be on top of a livestock water well (Colorado Division of Water Resources Permit # 64751).
- Extensive lateral build during drilling and completion to reach target formations.
- Lower modeled production rates.
- Forecasted increased frequency of maintenance on equipment and wells.
  - Increase in maintenance requiring workover rig and associated equipment.
  - Increase in motorized equipment on site.
  - Increase in maintenance derived waste to be hauled for disposal.
  - Increase in overall traffic during life of the well.
- Does not significantly provide direct benefit to the underlying mineral owner and oil and gas leasehold.
- Will not concurrently provide direct benefit to both Split Estate entities.

#### **Site C: NENE, Sec. 30, 5N-61W (Figure 1 and 2)**

##### Ownership Information:

- Surface Owner: State Land Board of Colorado
  - State Land Board of Colorado O&G lease (Bonanza Creek, Grantee)
- Fee Surface/ Will **not** produce from minerals directly beneath.

##### Location Concerns:

- Within 1 linear mile from Building Unit (Additional residence just outside 1 linear mile).
- State Land Board of Colorado requires flowlines and access roads right of way to follow parcel and/or section lines, which would result in increased surface disturbance and cumulative impact to tie into the State Pronghorn 41-32 CPF or the State Antelope 34-24 pumping pad.
- Due to State Land Board surface siting rationale, Bonanza Creek Energy wells will not meet the minimum State Land Board mineral ownership percentage requirement.

- Extensive well lateral build during drilling and completion to reach target formations.
- Lower modeled production rates.
- Forecasted increased frequency of maintenance on equipment and wells.
  - Increase in maintenance requiring workover rig and associated equipment.
  - Increase in motorized equipment on site.
  - Increase in maintenance derived waste to be hauled for disposal.
  - Increase in overall traffic during life of the well.
- Does not significantly provide direct benefit to the underlying mineral owner and oil and gas leasehold.
- Will not concurrently provide direct benefit to both Split Estate entities.
- Proximity to CPW Sensitive Wildlife Habitat buffers.

#### **Option 1 (Tie into the existing State Antelope 34-24 Pump Pad)**

- Constructing new flowline(s) and a new access road right of way to Site C would require crossing a floodplain to access the existing State Antelope 34-24 Pumping pad.
  - Increase impacts to possible wetlands/waterways
  - Potential corrosion issues
- State Land Board of Colorado requires flowlines and access roads right of way to follow parcel and/or section lines, which would result in increased surface disturbance and cumulative impact along the right of way back to the State Antelope 34-24 pumping pad located in the SESE Section 24, 5N 62W.

#### **Option 2 (Tie into the existing State Pronghorn 41-32 Central Production Facility)**

- Increased pad disturbance by at least 40% to construct a new well pad and a new pumping pad to tie into the State Pronghorn 41-32 Central Production Facility.
- Facility equipment is required to operate a new pumping pad:
  - ECD's/VOC's
  - Compressors
  - Buildings
  - PDC (Power Distribution Center) Building
  - Pigging Station
  - Produced Liquid Storage
- New disturbance for overhead power line(s) will be needed to operate pumping pad equipment.
- Adding a new pump station to tie directly into the State Pronghorn 41-32 CPF will create significant emissions to the area and will add a new facility to the basin.
- Production would need compression to be added to the site due to a 50' +/- elevation gain to tie into the State Pronghorn 41-32 CPF.
  - Increased Noise
  - Increased Emissions
  - Proximity to Building Units
- State Land Board of Colorado requires flowlines and access roads right of way to follow parcel and/or section lines, which would result in increased surface disturbance and cumulative impact to tie into the State Pronghorn 41-32 CPF.
- Approximately 120' of working "temporary" right-of-way construction would be needed for a new road, new pipeline(s), and new power infrastructure to access the State Pronghorn 41-32 CPF.
  - 60' of permanent disturbance for road and pipeline would be needed

- 30' of permanent disturbance for power would be needed

#### **Site D: SESE, Sec. 30, 5N-61W (Figure 1 and 2)**

##### Ownership Information:

- Surface Owner: State Land Board of Colorado
  - State Land Board of Colorado O&G lease (Bonanza Creek, Grantee)
- Fee Surface / Will produce minerals directly beneath.

##### Location Concerns:

- Within 1 linear mile from Building Unit (Additional residence just outside 1 linear mile).
- State Land Board of Colorado requires flowlines and access roads right of way to follow parcel and/or section lines, which would result in increased surface disturbance and cumulative impact to tie into the State Pronghorn 41-32 CPF or the State Antelope 34-24 pumping pad.
- Due to State Land Board surface siting rationale, Bonanza Creek Energy wells will not meet the minimum State Land Board mineral ownership percentage requirement.
- Extreme step-outs that would increase the anti-collision risk due to density of wells already drilled in the area. The ellipse of uncertainty on directional drilling for E-W orientation is larger.
- Extensive well lateral build during drilling and completion to reach target formations.
- Lower modeled production rates.
- Step-outs would be detrimental to production long-term and would require increased frequency of maintenance on equipment and wells.
  - Increase in maintenance requiring workover rig and associated equipment.
  - Increase in motorized equipment on site.
  - Increase in maintenance derived waste to be hauled for disposal.
  - Increase in overall traffic during life of the well.
- Proximity to CPW Sensitive Wildlife Habitat buffers

#### **Option 1 (Tie into the existing State Antelope 34-24 Pump Pad)**

- State Land Board of Colorado requires flowlines and access roads right of way to follow parcel and/or section lines, which would result in increased surface disturbance and cumulative impact to tie into the State Antelope 34-24 pumping pad located in the SESE Section 24, 5N, R62W.
- Constructing new flowline(s) and a new access road right of way to Site D would require crossing a floodplain to access the existing State Antelope 34-24 Pumping pad.
  - Increase impacts to possible wetlands/waterways
  - Potential corrosion issues

#### **Option 2 (Tie into the existing State Pronghorn 41-32 Central Production Facility)**

- Increased pad disturbance by at least 40% to construct a new well pad and a new pumping pad to tie into the State Pronghorn 41-32 Central Production Facility.
- Facility equipment is required to operate a new pumping pad:

- ECD's/VOC's
- Compressors
- Buildings
- PDC (Power Distribution Center) Building
- Pigging Station
- Produced Liquid Storage
- New disturbance for Overhead power line(s) will be needed to operate pumping pad equipment.
- Adding a new pump station to tie directly into the State Pronghorn 41-32 CPF will create significant emissions to the area and will add a new facility to the basin.
- Production would need compression to be added to the site due to a 50' +/- elevation gain to tie into the State Pronghorn 41-32 CPF.
  - Increased Noise
  - Increased Emissions
  - Proximity to Building Units
- Approximately 120' of working "temporary" right-of-way construction would be needed for new road, new pipeline(s), and new power infrastructure to access the State Pronghorn 41-32 CPF.
  - 60' of permanent disturbance for road and pipeline would be needed
  - 30' of permanent disturbance for power would be needed

#### **Site E: NWSW, Sec. 30, 5N-61W (Figure 1 and 3)**

##### Ownership Information:

- Surface Owner: The Riverside Club Company
- SUA with surface owner who is also the operator of the adjacent surface water body executed on 9/19/2019.
- Road and flowline agreements executed with Colorado State Land Board of Commissioners on 8/1/2019.
- Fee Surface / Fee Minerals / Will produce minerals directly beneath.

##### Location Concerns:

- Within proximity to a surface water body.
- Within 500 feet of a floodplain.

##### Benefits:

- No building units within 1 linear mile.
- Higher elevation on ridgeline, increased distance to water table.
- Direct benefit to surface owner as fee mineral owner.
- Optimized road and flowline right of way.
  - Shortest available route decreases surface disturbance and cumulative impact.
  - Traverses highest topography.
  - Avoids crossing floodplain.
- Existing wildlife RSO and SWH areas are greater than 2.5 miles south of the Pronghorn 13-30.

- There were no raptor nests observed within 0.50 mile of the proposed location, thus the project will likely have no effect on nesting raptors during the 2020-nesting season. Per the BLM Protocol, survey results are valid for two years.
- There were no prairie dog colonies or suitable burrowing owl habitat observed within 0.25 mile of the Pronghorn 13-30.
- Bonanza Creek will use existing production facilities at the State Antelope 34-24 and State Pronghorn 41-32 CPF to reduce the Pronghorn 13-30 surface disturbance and risk of surface releases. Produced fluid storage will occur far away from the surface water body and floodplain.
- Optimal lateral reaches and the ellipse of uncertainty on directional drilling is minimized with step-outs.
  - Optimal modeled production rates.
  - Reduced maintenance frequency and traffic due to optimized well plan.

#### Alternative Location Analysis Conclusion:

#### **Surface Considerations:**

When selecting the current proposed location for the Pronghorn 13-30 Pad (Site E), Bonanza Creek evaluated multiple options for locations that would prevent stranding minerals, provide for the opportunity to produce difficult to reach minerals beneath a surface water body, and meet the requirements of surface and mineral owners.

#### **Pronghorn 13-30 Cumulative Impact Review:**

Upon Bonanza's comprehensive review of the current proposed location, six key areas were evaluated.

**Environmental:** Per the Department of the Interior - Bureau of Land Management criteria and based upon a third party study; no significant impacts or restrictions apply to the Pronghorn 13-30.

**Wildlife:** Upon initial siting evaluation, Bonanza consulted the Colorado Parks and Wildlife ("CPW") 2019 Restricted Surface Occupancy Area ("RSO") and Sensitive Wildlife Habitat Area ("SWH") map data as supplied by CPW and COGCC. RSO or SWH areas were evaluated within the vicinity of the well pad location and access road and are determined to be greater than one linear mile from the Pronghorn 13-30.

**Archeology:** Per the Department of the Interior - Bureau of Land Management criteria and based upon a third-party study, no significant impacts or restrictions apply to the Pronghorn 13-30.

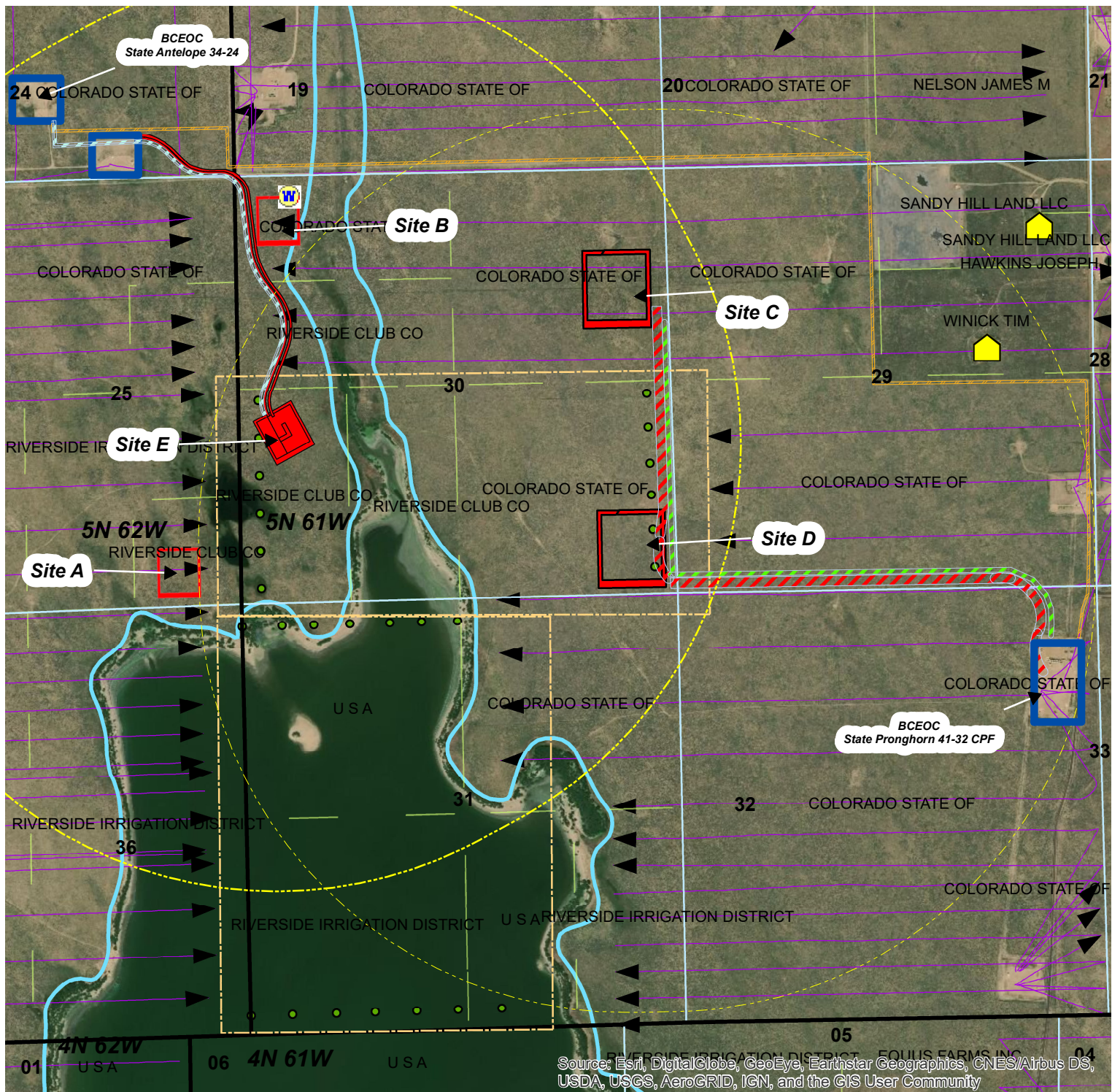
**Cultural:** Per the requirements of the rules and regulations of the Colorado Oil and Gas Conservation Commission ("COGCC"), all cultural items within the vicinity of the well pad location and access road were evaluated and are determined to be greater than one linear mile from the Pronghorn 13-30.

#### **Surface**

**Disturbance:** This project will use existing production facilities and eliminates the need for construction of new production facilities.

#### **Additional**

**Abandonment:** The Pronghorn 13-30 wells will penetrate undeveloped minerals. As such, no existing wells will be plugged and abandoned, or existing facilities removed as part of the development project.



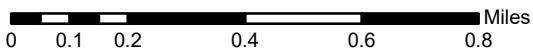
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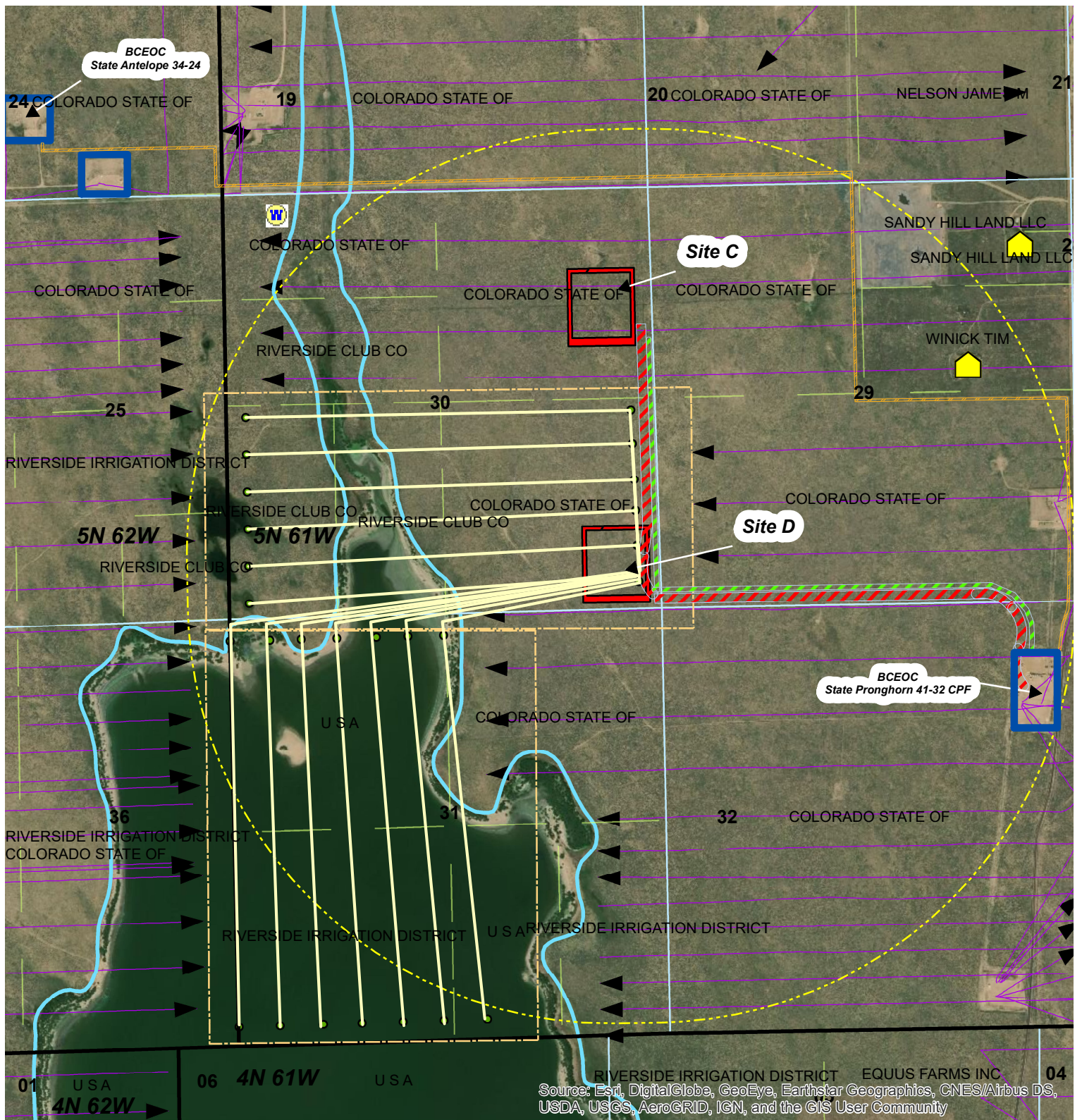
**FIGURE 1**  
**ALTERNATIVE SITING ANALYSIS**  
**Pronghorn Development**  
**Sec 30/31, T5N, R61W, 6th PM**  
**Weld County, Colorado**



**Legend**

- Site A-D Alternative Pads
- 1 Mile Cultural Data
- Building Units
- Existing Bonanza Pads
- NEW Site E Pipeline System Corridor
- NEW Alt. Proposed Road/Pipe Corridors
- NEW Site C & D Power Corridor
- Existing RMI Pipeline Corridor
- Water Well Permit #64751
- Weld Co. Parcel Boundaries
- 100 yr Flood Plain
- COGCC Directional Well Data
- Township Line
- Section Line

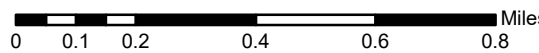




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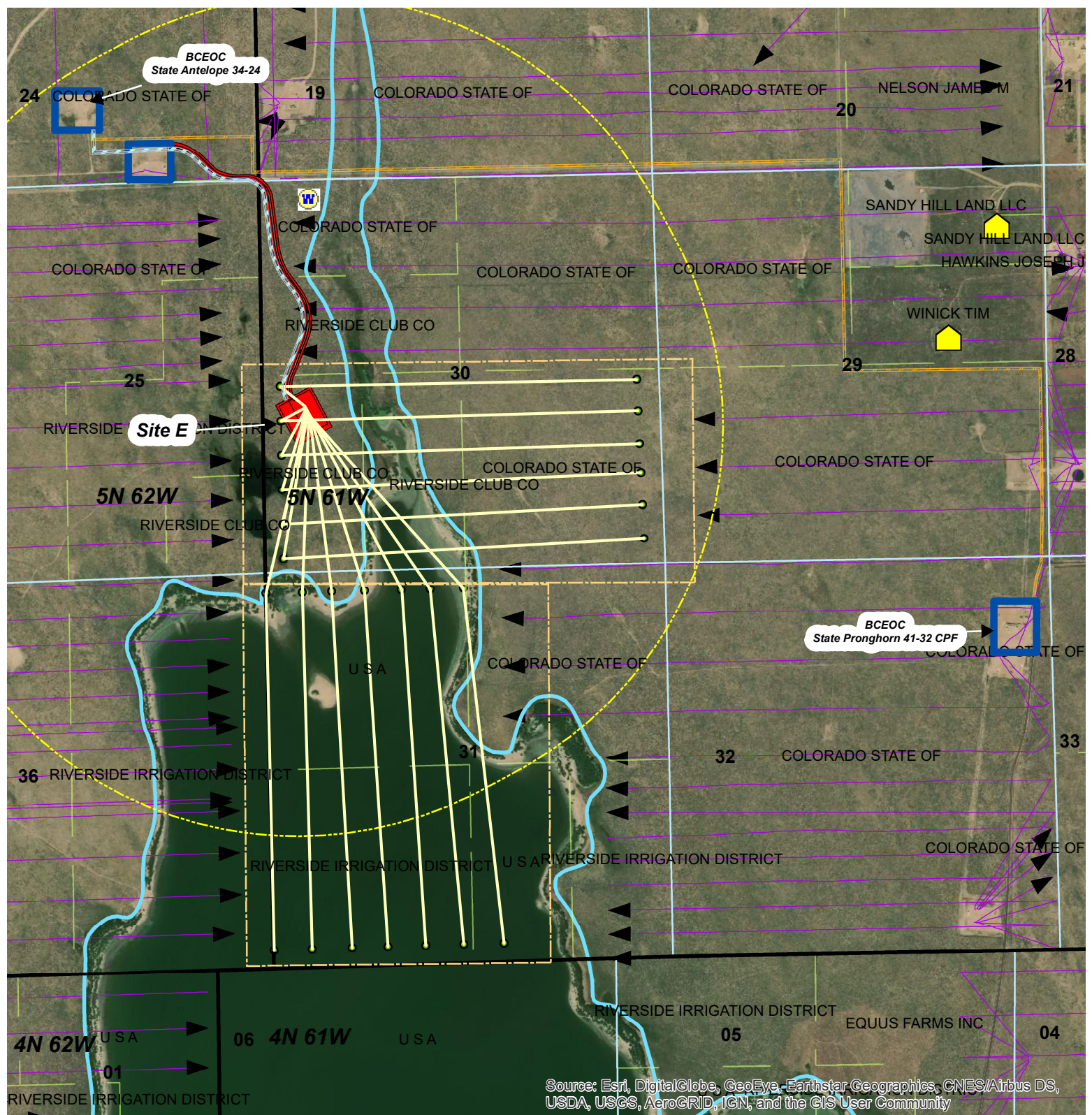
**FIGURE 2**  
**ALTERNATIVE SITING ANALYSIS**

**SESE Sec 30, T5N, R61W, 6th PM**  
**Weld County, Colorado**



**Legend**

- Site C & D Pads
- 1 Mile Cultural Data
- Building Units
- Existing Bonanza Pads
- Existing RMI Pipeline Corridor
- NEW Alt. Proposed Road/Pipe Corridors
- NEW Site C & D Power Corridor
- Well Bore Spacing Units
- W Water Well Permit #64751
- Weld Co. Parcel Boundaries
- 100 yr Flood Plain
- Township Line
- Section Line



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**FIGURE 3**

**ALTERNATIVE SITING ANALYSIS**  
**Pad Name: Pronghorn 13-30**  
**NWSW Sec 30, T5N, R61W, 6th PM**  
**Weld County, Colorado**



0 0.075 0.15 0.3 0.45 0.6 Miles

**Legend**

- NEW Site E Pad & Road
- NEW Site E Pipeline Corridor
- Existing Pipeline Corridor
- Site E - Proposed Wellbores
- Building Units
- 1 Mile Cultural Data
- Existing Bonanza Pads
- Well Bore Spacing Units
- 100 yr Flood Plain
- COGCC Directional Well Data
- Township Line
- Parcel Boundaries
- Water Well Permit #64751