CHAPTER 2 - PROJECT ALTERNATIVES

This chapter describes and compares alternatives that were evaluated regarding the Project's purpose and need to accommodate electrical load growth and enhance transmission grid reliability in the region through the construction of a new 345kV transmission line.

ALTERNATIVES CONSIDERED IN DETAIL

Alternative A - Proposed Action

The Proposed Action is for the Service to approve UDWR's granting of a right-of-way easement to RMP to allow construction of a new 345kV transmission line through portions of the BFWMA totaling 1.8 miles (1.5 miles of northern area and 0.3 mile of southern area). The Proposed Action would occur on property administered by UDWR that was purchased with a Wildlife Restoration grant from the Service's Sport Fish and Game Program.

The proposed transmission line would cross UDWR lands located in the following townships, ranges, and sections (see Figures 2 and 3):

- Township 9 North, Range 1 West, Section 30
- Township 9 North, Range 2 West, Section 36
- Township 8 North, Range 2 West, Section 1
- Township 7 North, Range 2 West, Section 1

In the northern portion of the BFWMA, the transmission line route traverses between the boundary of the BFWMA and private lands. The proposed route in the northern area is located to minimize impacts to an adjacent sand and gravel mining operation, which needs to conduct operations unimpeded by the transmission line. In the southern portion, the placement of the transmission line through the BFWMA minimizes impacts to an adjacent residential development and the desire of the Box Elder County Planning Commission and County Commissioners to route the line away from residences in South Willard.

The Proposed Action consists of the following:

- Construction of a new 345kV double-circuit transmission line in a new, expanded right-of-way adjacent to an existing 50-foot-wide right-of-way containing a 138kV transmission line within portions of the northern area of the BFWMA (see Figure 2). The expanded right-of-way (containing both the new 345kV and existing 138kV transmission lines) would be 175 feet wide.

- Construction of a new 345kV double-circuit transmission line and relocation of an existing 138kV transmission line in a new 195-foot-wide right-of-way within a portion of the northern area of the BFWMA (see Figure 2).

- Construction of a new 345kV double-circuit transmission line in a new 150-foot-wide right-of-way within a portion of the southern area of the BFWMA (see Figure 3).

- Construction of new access roads and improvements to existing access roads along the 345kV transmission line, to provide for construction and maintenance activities.

- Removal of some juniper and possibly other large vegetation, and periodic ongoing maintenance control of juniper or other large vegetation within the right-of-way.

- Construction of temporary work areas for construction activities and site preparation.

- Rehabilitation and restoration of ground disturbance activities.

Structures

Typical transmission structures would be single-pole steel structures with a self-weathering, steel (rust colored) finish. The structures would typically be 125 to 160 feet tall, set in concrete foundations, and placed approximately 600 to 900 feet apart, or about six to eight structures per mile. Figure 4 shows the typical height of structures and the typical location of an access road within the right-of-way for the 345kV and 138kV transmission lines where they share a common right-of-way corridor through most of the BFWMA. Figure 5 shows the typical height of the proposed 345kV transmission structures and relocated 138kV transmission structures, as well as the typical location of an access road, within the portion of the right-of-way that contains the relocated 138kV transmission line.

Northern Area of BFWMA

The right-of-way containing the new 345kV line and existing or relocated 138kV line would cross approximately 1.5 miles of the northern area of the BFWMA, in the vicinity of Brigham City and Perry, Utah. Approximately 13 single-pole structures for the new 345kV line would be placed in the new right-of-way, east of and uphill from the existing 138kV right-of-way in this area (Table 2-1).

In Section 30 (Township 9 North, Range 1 West), near Brigham City, the 345kV line would be located within a 150-foot-wide right-of-way near the northwestern edge of the BFWMA boundary. The line would run through two portions of the BFWMA in Section 30 for a distance of approximately 0.7 mile.

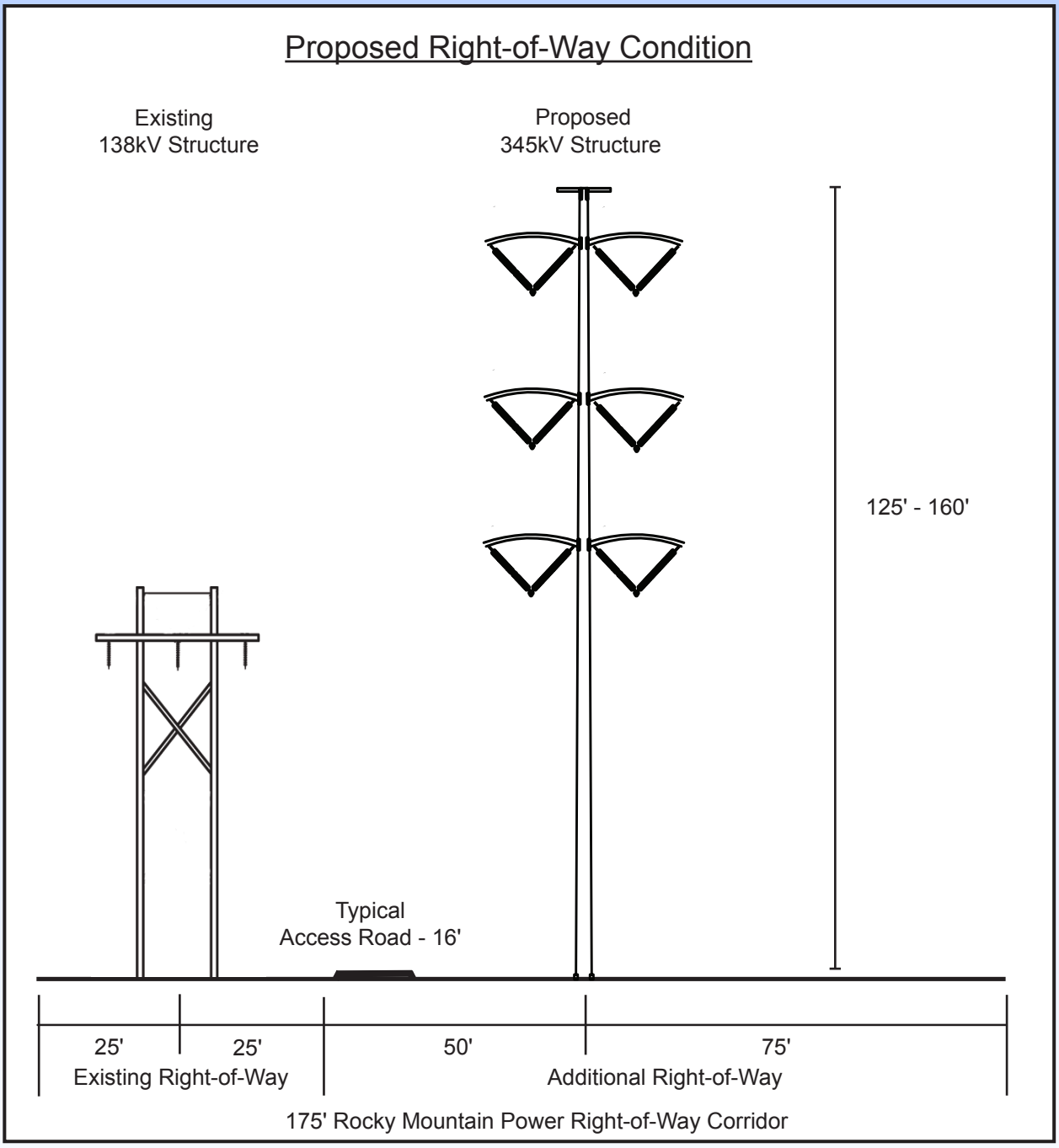
In Section 36 (Township 9 North, Range 2 West), near Perry City, the 345kV line would be located within a 175-foot-wide right-of-way containing both the new line and the existing 138kV line. The new 345kV line would run parallel to the existing 138kV line and be located immediately east of and uphill from it. The line would run through two portions of the BFWMA in Section 36 for a distance of approximately 0.3 mile.

In Section 1 (Township 8 North, Range 2 West), near Perry City, the 345kV line would continue to run parallel to the existing 138kV line and immediately east of it within the 175-foot-wide right-of-way for a distance of approximately 0.2 mile. The right-of-way would then angle slightly to the southwest and continue for a distance of 0.3 mile to the western boundary of the BFWMA. The total length of the new right-of-way within Section 1 would be approximately 0.5 mile. Beginning at the point of the angle, the existing 138kV line would be relocated from its existing alignment

Typical Corridor Condition

Existing 138kV Transmission Line Segment in Brigham Face WMA

(View Looking North)



POPULUS - BEN LOMOND 345kV TRANSMISSION LINE PROJECT

ROCKY MOUNTAIN POWER
A DIVISION OF PACIFICORP

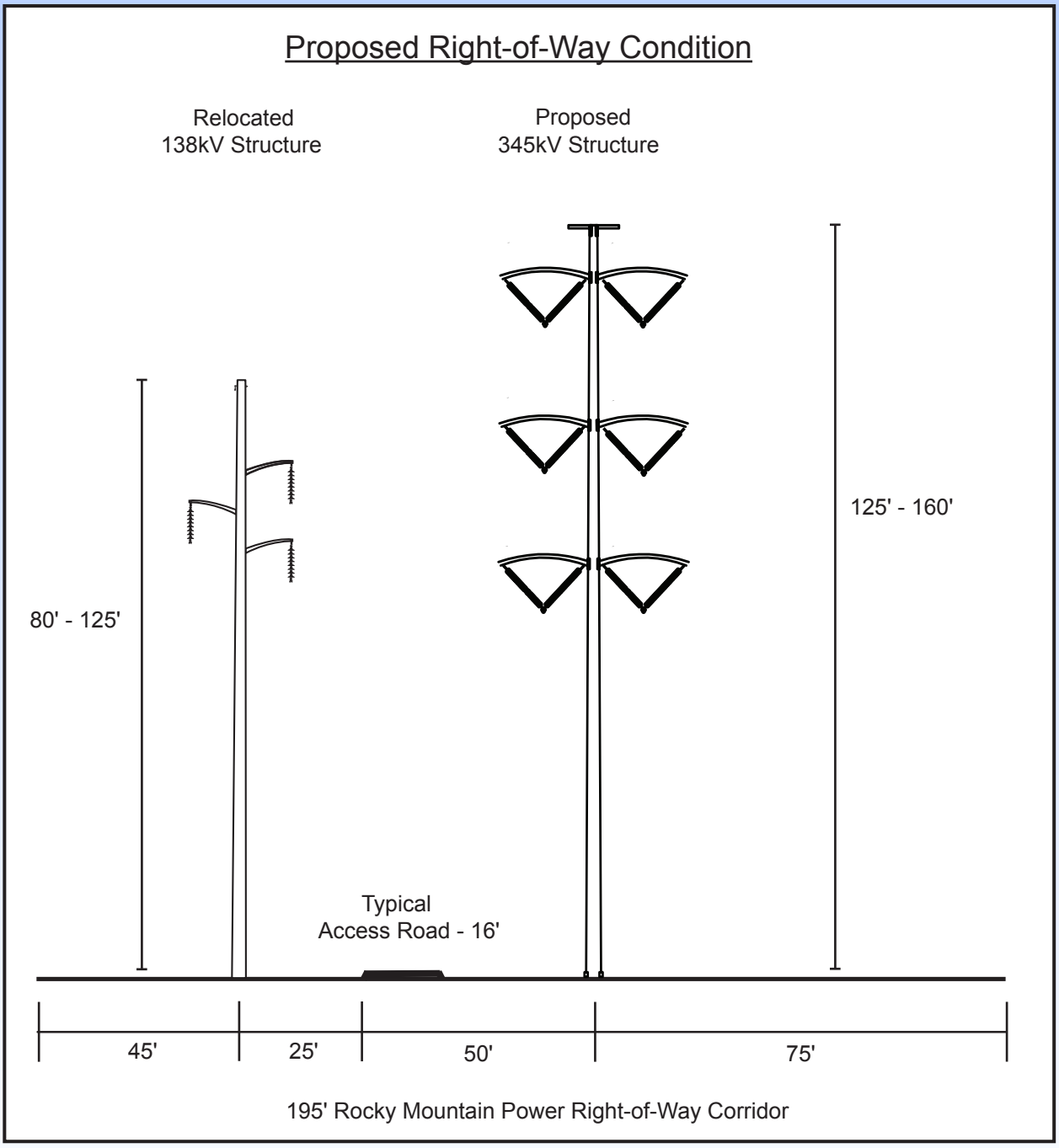
November 26, 2008

Figure 4

Typical Corridor Condition

138kV Transmission Line Relocation Segment in Brigham Face WMA

(View Looking North)



POPULUS - BEN LOMOND 345kV TRANSMISSION LINE PROJECT

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Figure 5

to parallel the new 345kV line within the new 195-foot-wide right-of-way. In this 0.3 mile segment of the line, the relocated 138kV transmission structures would be taller than the existing 138kV structures, in order to match the spans of the new 345kV line. Slightly over 0.5 mile of the existing 138kV line would be relocated and its right-of-way abandoned and revegetated. Nine existing wooden-pole, H-frame 138kV structures would be removed from this existing right-of-way and three new steel-pole 138kV structures would be placed in the new 195-foot-wide right-of-way.

TABLE 2-1
TRANSMISSION LINE RIGHT-OF-WAY DESCRIPTIVE SUMMARY

	Alternative A - Proposed Action				
	Segment	**New Right-of-Way Width**	**No. of Structures**	**Length of Right-of-Way**	**Acres of Right-of-Way**
Northern Area	1	150'	3	2,000' (0.4 mile)	6.9
	2	150'	2	1,600' (0.3 mile)	5.5
	3	125'	1	500' (0.1 mile)	1.4
	4	125'	2	1,107' (0.2 mile)	3.2
	5	125'	2	1,130' (0.2 mile)	3.2
	6	195'	3	1,573' (0.3 mile)	7
		TOTALS (NORTH)	**13**	**7,910' (1.5 miles)**	**27.2**
Southern Area	7	150'	2	1,476' (0.3 mile)	5
		TOTALS (SOUTH)	**2**	**1,476' (0.3 mile)**	**5**
		TOTALS	**15**	**9,386' (1.8 miles)**	**32.2**

NOTE: Numbers shown for right-of-way lengths, areas, and structures are preliminary and approximate and may be refined upon further engineering.

Proposed new access roads that would need to be constructed on the northern area of the BFWMA are shown on Figure 2. Construction of new access roads within the northern area of the BFWMA would be minimal because the project would use the existing 138kV transmission line access roads for much of the length of the right-of-way. Some portions of existing roads may require minor improvements or widening. The length of new access roads outside of the right-of-way within the northern area of the BFWMA would total approximately 1.0 mile.

Southern Area of BFWMA

The right-of-way containing the new 345kV line would cross approximately 0.3 mile of the southwestern corner of the southern area of the BFWMA in the vicinity of Willard, Utah. This portion of the transmission line right-of-way is located northeast of the community of South Willard, southeast of Willard City, and entirely within Section 1 (Township 7 North, Range 2 West). Two single-pole structures would be placed in the right-of-way southwest of and downhill from the existing canal in this area (Table 2-1). An access road would be constructed in the right-of-way to provide access for maintenance and construction.

Construction Process

Construction of the project in this area is planned to begin in April 2009 to meet an in-service date of May 2010. The construction process will occur in sequential and distinct steps, characterized by periods of inactivity after steps are completed within the BFWMA and as construction continues on other segments of the line.

The general process for construction would involve the following steps:

- Surveying Activities
- Geotechnical Surveys
- Access Road Improvement/Construction
- Structure Site and Work Area Development
- Foundation Installation
- Structure Assembly and Erection
- Conductor Installation
- Ground Rod Installation
- Site Reclamation

Surveying Activities – Construction survey work would consist of surveying centerline locations, tower locations, right-of-way boundaries, access and spur roads, and temporary work areas. The specified centerline and right-of-way boundaries would be marked at reasonable intervals, and the temporary work areas marked at the four corners with painted laths or flags. Closer intervals may be flagged as needed. Flagging would be maintained until final cleanup and/or restoration is completed. At a minimum, reference stakes for all angle stations would be set on the right-of-way, with stakes for each structure prior to construction.

Geotechnical Surveys – Geotechnical boring surveys would need to be performed in order to determine soil conditions that may affect design or construction. Borings would be drilled with a truck-mounted drilling rig to diameters between 4 and 6 inches and depths to 80 feet, using continuous flight auger drilling techniques. In addition, disturbed split-spoon samples may be obtained from the borings at varying intervals. Where feasible, tube samples may be obtained, if the appropriate cohesive soils are encountered. Field earth resistivity testing will also be conducted at most boring sites; this test will be performed using pin electrodes spaced at 5, 10, 20, and 40 feet. Geotechnical surveys will not be conducted during periods of saturated soil conditions when surface ruts deeper than 4 inches would occur. Bore holes will be located so that no clearing of vegetation will be required, unless approved by the UDWR. Bore holes will not be located within 500 feet of springs, flowing streams or within any wetland unless approved by the UDWR. Upon completion of drilling, all bore holes and soils disturbed during geotechnical surveys will be restored. A special use permit would need to be obtained from UDWR, in order to conduct geotechnical surveys within the BFWMA; a special use permit was submitted to UDWR for review on May 30, 2008.

Access Road Improvement/Construction – It is necessary to provide road access to each transmission structure. The project would utilize existing access roads wherever practical, thus minimizing the need for new road construction. In general, new roads would not exceed 16 feet in width. Roads running across slopes may be slightly wider to ensure safe access. Some short spur roads would be constructed from existing access roads to the structures, as necessary. Because RMP requires 16-foot-wide access roads, some existing roads may need to be improved and widened to meet this requirement.

The construction contractor would lay out and stake all approved access roads in the field. To the maximum extent possible, drainages would be crossed at grade. Where at-grade crossings would not be feasible, culverts would be constructed. In addition, meandering roads may be used in some areas in response to specific geologic conditions. Figure 6 shows typical details for access road construction, including details for a rock-hardened creek crossing, access road cross-sections, and a culvert crossing.

Structure Site and Work Area Development – Work areas would be needed at each structure site to facilitate safe operations for equipment and construction. Generally, work areas in flat terrain would require a temporary disturbance area of approximately 200 feet by 150 feet (right-of-way width). Typically, the structure footings would entail permanent disturbance of an area of approximately 8 feet by 8 feet within work areas. Vegetation in work areas would be cleared to the extent necessary. Access within the work area would be by overland travel. Generally, grading at the work area would be minimal.

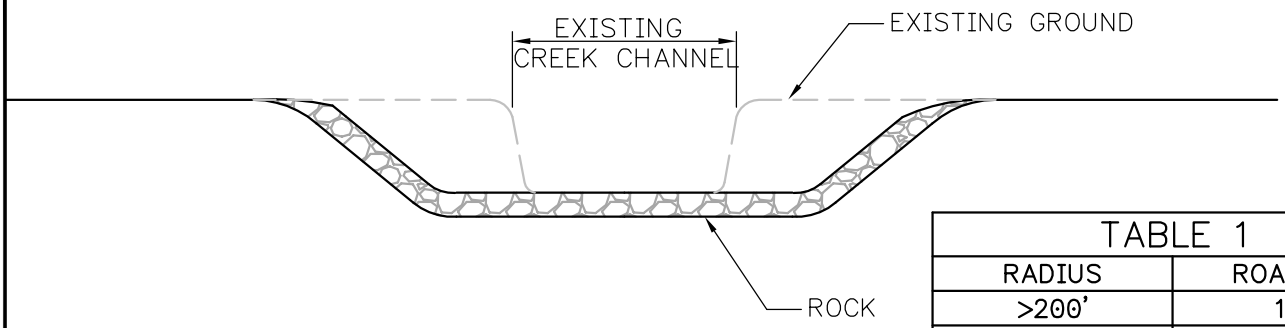
Foundation Installation – Power equipment would be used for foundation excavation. Generally, a vehicle-mounted power auger or backhoe would be used in all areas where the soil is suited to use of this equipment. In extremely sandy areas, soil stabilization by water or a gelling agent may be used prior to excavation.

Following excavation, cast-in-place footings would be installed by placing reinforcing steel and a structure stub into the foundation hole, positioning the stub, and encasing it in concrete. Spoil material would be used for fill where suitable. Excess spoil material would be disposed of off-site, at an approved location. Foundation excavation and installation would require use of access roads to the site by a power auger or drill, a crane, materials trucks, and concrete trucks.

Immediately following excavation, foundation holes would be covered to protect the public and wildlife. If practical, fencing may be used. Soil removed from foundation holes and stockpiled at the work area would be used to backfill holes. The topmost layer of soil would be distributed over the work area. To wash concrete chutes, a depression would be created in the center of the stockpiled soil near the center of the permanently disturbed structure location site. The first 6 inches of topsoil would be placed on one side of the depression, and the remainder of the soil on the other side. Material would be washed off of the chute into the depression and the soil replaced in the same order it was removed. This technique would help salvage the seed bank.

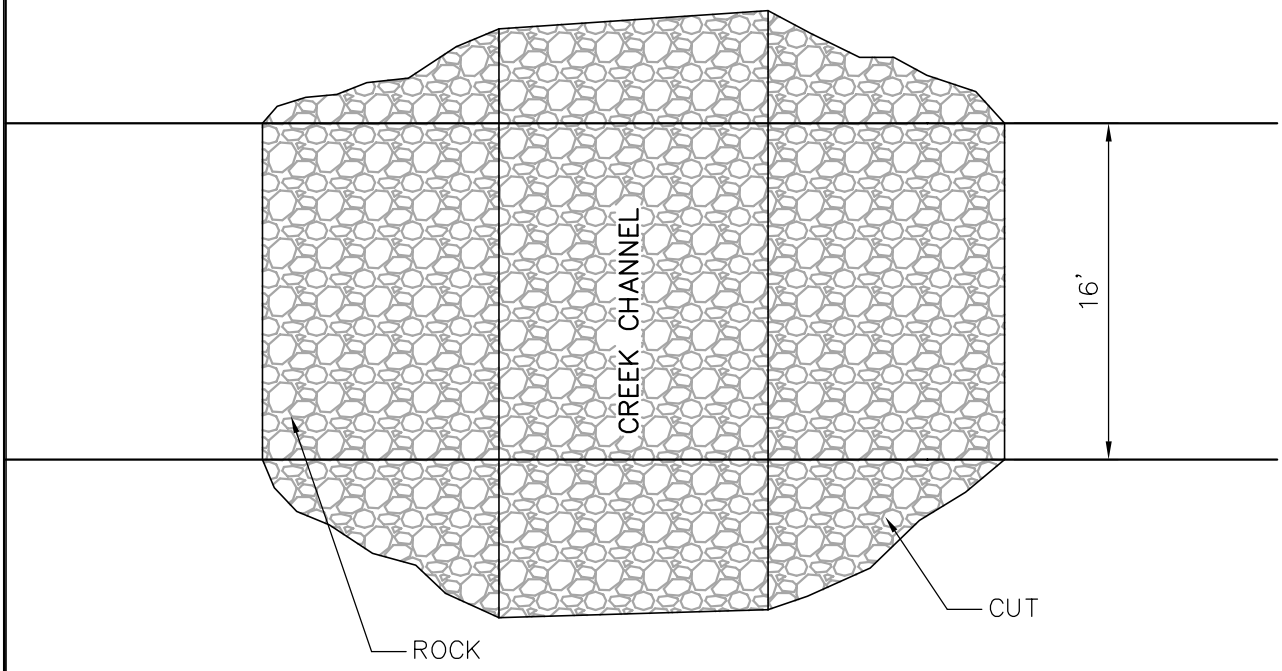
Structure Assembly and Erection – Steel tubes and associated hardware would be transported to each structure site by truck. Steel members would be assembled into subsections of convenient size and weight. The assembled subsections would be hoisted into place by a large crane and then fastened together to form a complete structure.

Conductor Installation – Insulators, hardware, and stringing sheaves would be delivered to each structure site following erection of the structures. The structures would then be rigged with insulator strings and stringing sheaves at each ground wire and conductor position. For public protection during wire installation, guard structures would be erected over highways, railroads, power lines, structures, and other features requiring protection. Guard structures generally consist of H-frame poles placed on either side of a feature to be protected. These structures prevent ground wire, conductor, or equipment from falling on a feature.



CREEK CROSSING
N.T.S.

TABLE 1	
RADIUS	ROADBED
>200'	16'
100' TO 200'	18'
50' TO 100'	20'



ROCK HARDENED CREEK CROSSING
N.T.S.

NOTES:

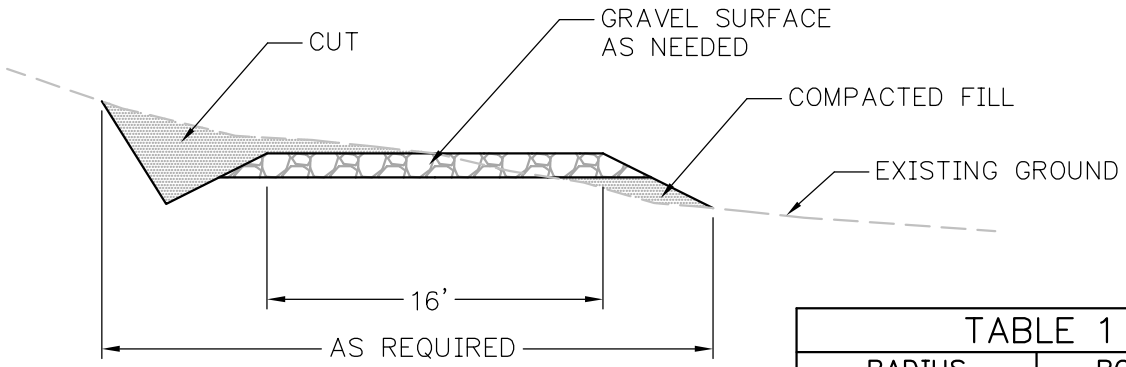
1. RADIUS OF CURVES SHALL BE 200 FT.. WHEN CURVES ARE LESS THAN 200 FT., ROADBED SHALL BE WIDENED AS SHOWN ON TABLE 1

NO.	DATE	WO# REVISIONS	ENGINEER	DES./ DR.	CHECKED	APPROVED

REVISED 11.01.06 D. HURLEY CAD NO.:

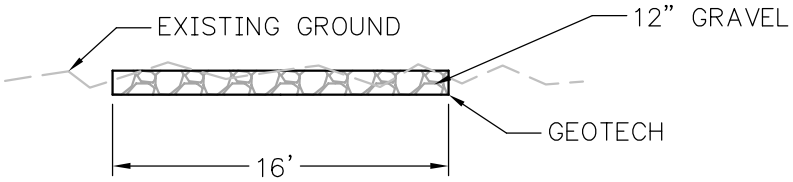
CIVIL			POPULUS TO TERMINAL TRANSMISSION ROCK HARDENED CREEK CROSSING	
DISCIPLINE ENG.	PROJ/ER# 10033458	PL# 085051		PACIFICORP A MIDAMERICAN ENERGY HOLDING COMPANY
	DATE: 7-09-2008			
PROJECT ENG.	ENG:	DES:		
	DR:	CH:		
APPROVAL ENG.	SCALE: NONE		SHEET 1 of 3	REVISION

Figure 6

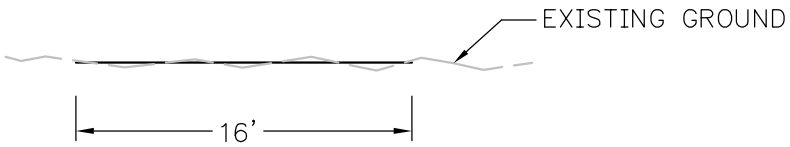


TYPICAL CUT & FILL SLOPE
N.T.S.

TABLE 1	
RADIUS	ROADBED
>200'	16'
100' TO 200'	18'
50' TO 100'	20'



TYPICAL ON FLAT GROUND ON SOFT MATERIAL
N.T.S.



TYPICAL FLAT GROUND ON SOLID SURFACE
N.T.S.

NOTES:

1. RADIUS OF CURVES SHALL BE 200 FT.. WHEN CURVES ARE LESS THAN 200 FT., ROADBED SHALL BE WIDENED AS SHOWN ON TABLE 1

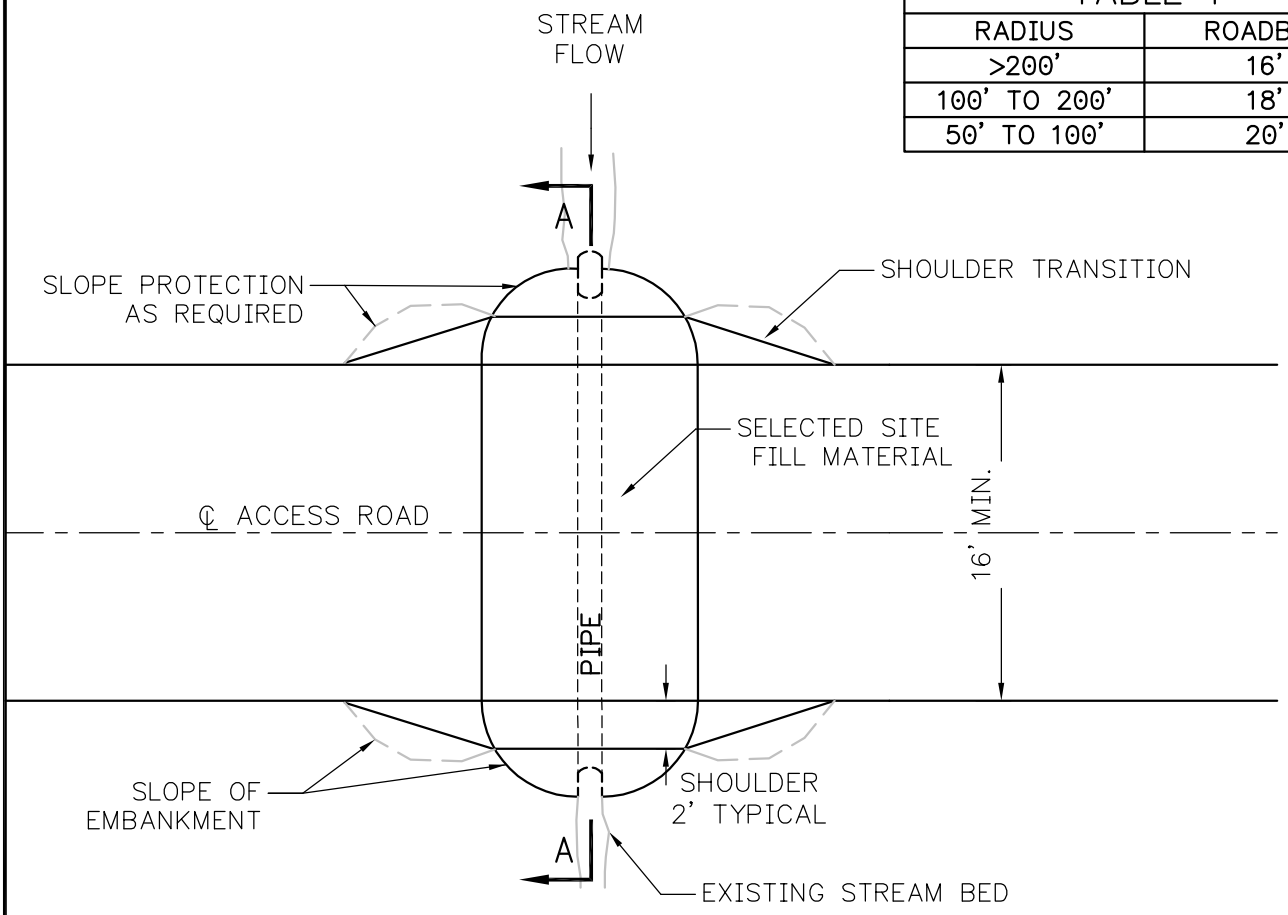
NO.	DATE	WO# REVISIONS	ENGINEER	DES./ DR.	CHECKED	APPROVED

CIVIL			POPULUS TO TERMINAL TRANSMISSION ACCESS ROAD DETAILS	
DISCIPLINE ENG.	PROJ/ER# 10033458	PL# 085051		PACIFICORP
	DATE: 7-09-2008			
PROJECT ENG.	ENG:	DES:		
	DR:	CH:		
APPROVAL ENG.	SCALE: NONE		SHEET 2 of 3	REVISION

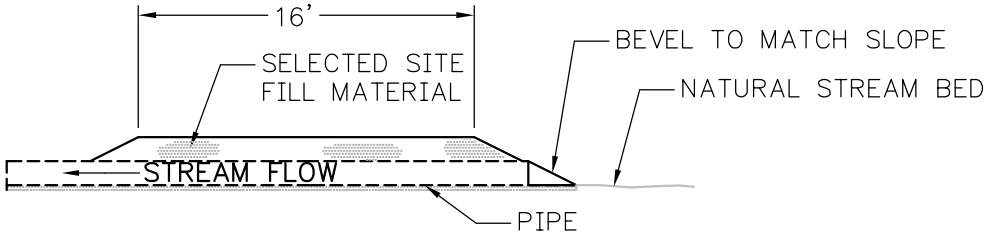
REVISED 11.01.06 D. HURLEY CAD NO.:

Figure 6

TABLE 1	
RADIUS	ROADBED
>200'	16'
100' TO 200'	18'
50' TO 100'	20'



PLAN



SECTION A–A

CULVERT INSTALLATION
N.T.S.

NOTES:

1. RADIUS OF CURVES SHALL BE 200 FT.. WHEN CURVES ARE LESS THAN 200 FT., ROADBED SHALL BE WIDENED AS SHOWN ON TABLE 1

NO.	DATE	WO# REVISIONS	ENGINEER	DES./ DR.	CHECKED	APPROVED

CIVIL			POPULUS TO TERMINAL TRANSMISSION ACCESS ROAD CULVERT CROSSING	
DISCIPLINE ENG.	PROJ/ER# 10033458	PL# 085051		
	DATE: 7-09-2008			
PROJECT ENG.	ENG:	DES:		
	DR:	CH:		
APPROVAL ENG.	SCALE: NONE		SHEET 3 of 3	REVISION

PACIFICORP
A MIDAMERICAN ENERGY HOLDINGS COMPANY

REVISED 11.01.06 D. HURLEY CAD NO.:

Figure 6

A pilot line would be pulled (i.e., strung) from pole to pole by ground equipment (e.g., ATV or 4-wheel drive truck) and threaded through the stringing sheaves at each structure. A larger diameter, stronger line would then be attached to the pilot line and strung. This process would be repeated until the ground wire and conductor are pulled through all sheaves. Ground wire and conductor would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end.

Typically, areas required for tensioning and pulling equipment would be approximately 200 feet by 200 feet. However, construction occurring in steep or rough terrain may require larger, less symmetrical pulling and tensioning areas.

Ground Rod Installation – Prior to wire installation, tower footing resistance along the route would be measured as a part of standard construction practices. Where resistance to remote earth for each transmission tower is greater than 25 ohms, counterpoise (grounds) would be installed to lower the resistance to 25 ohms or less. Counterpoise consists of a bare copper clad or galvanized steel cable buried at least 12 inches deep, extending from one or more structure legs for approximately 200 feet within the right-of-way.

Site Reclamation – RMP and its construction contractors will employ various techniques to ensure that erosion is controlled and vegetation cover is adequately replaced in areas disturbed during construction of the transmission line and construction access roads. The following best management practices and techniques would be employed, as appropriate, to ensure the success of erosion control and vegetation establishment:

1) In construction areas (e.g., marshalling yards, tower sites, spur roads from existing access roads) where ground disturbance is significant or where re-contouring is required, surface restoration will occur, as required by the landowner or land management agency. The method of restoration will normally consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, cross drains installed for erosion control, placing water bars in the road, and filling ditches.

2) Reseeding would be performed using a seed mixture that will be developed and is appropriate for the area. As an example, the UDWR has recommended a seed mixture (Table 2-2, on following page) for application on disturbed areas in the BFWMA. The UDWR recommended seed mixture consists of both native and non-native species beneficial to wildlife. The seed mixture would also help control erosion on disturbed areas.

The seed mixture would be applied at or above the application rates identified. Disturbed ground areas would be disked or raked to reduce surface compaction and provide a suitable bed for germination. Seeds would be applied using standard broadcast, drill, or hydro-seeding methods. Depending on the application technique, seeded areas may be dragged, to improve cover and seed contact with the soil. Seeding would typically be performed in the fall prior to the rainy season or during the early spring to maximize potential for germination.

3) Suitable cover establishment success rates would be identified prior to application. For any areas that do not meet identified cover success rates, the seed mix would be reapplied and monitoring continued for a reasonable period until suitable cover rates are achieved.

4) For erosion control, it will be the responsibility of the Construction Contractor to develop and implement Stormwater Pollution Prevention Plan (SWPPP) erosion control measures necessary to protect drainages and maintain project compliance with National Pollutant Discharge Elimination System (NPDES) regulations.

5) To minimize the potential for surface disturbance of vegetation and soil during construction, all construction personnel will be instructed on the protection of cultural, ecological, and other natural resources prior to construction. To assist in this effort, the Construction Contractor will address: (a) federal and state laws regarding antiquities and plants and wildlife (including collection and removal) and; (b) the importance of these resources and the purpose and necessity of protecting them.

6) Roads will be built as near as possible at right angles to streams and washes. Culverts will be installed where necessary. All construction and maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks. Road construction will include dust-control measures during construction in sensitive areas. All existing roads will be left in a condition equal to or better than their condition prior to the construction of the transmission line. Also, to the extent feasible, transmission towers will be located at least 200 feet from streams.

Typically, RMP would avoid steep and unstable slopes wherever feasible. Such areas are generally not suitable for large construction equipment or maintenance access roads. Where steep or unstable slopes cannot be avoided, techniques to ensure establishment of native seed for revegetation and erosion control would be similar to the techniques described above. If needed in specific areas, additional biotechnical slope stabilization techniques may be used, including landform contour grading, rock revetment placement, use of fiber coirs on contour, fabric mats, straw or other mulch placement and stabilization, or brush wattle placement. Other biotechnical slope stabilization techniques may also be employed where appropriate.

The seed mixture recommended by the UDWR for application on disturbed areas in the BFWMA is identified below in Table 2-2. The UDWR recommended seed mixture consists of both native and non-native species beneficial to wildlife and appropriate for controlling erosion in the BFWMA. The quantities of seed are shown in bulk pounds per acre. A seed mixture appropriate for revegetation and erosion control will be developed for use on private lands along the transmission line route.

TABLE 2-2
REVEGETATION SEED MIXTURE

Common Name /*Scientific Name*	**Quantities**
Western wheatgrass/ *Pascoppyrum smithii*	2.0 pounds/acre
Western wheatgrass (Snake River variety)/ *Pascoppyrum sp.*	2.0 pounds/acre
Needle and thread grass/ *Hesperostipa comata*	0.5 pounds/acre
Small burnett/*Sanguisorba minor*	3.0 pounds/acre
Globemallow/ *Sphaeralcea sp.*	0.2 pounds/acre
Lewis flax/ *Linum lewisii*	0.5 pounds/acre
White stem rubber rabbitbrush/ *Chrysothamnus sp.*	1.0 pounds/acre (at 30% purity)
Wyoming sagebrush/ *Artemisia sp.*	1.0 pounds/acre (at 20% purity)
Kochia (prostrate)/ *Kochia sp.*	1.5 pounds/acre
TOTAL	**11.7 pounds/acre**

Potential Ground Disturbance

The new right-of-way for the 345kV line would cross approximately 1.5 miles of the Northern Area of the BFWMA and approximately 0.3 mile of the Southern Area of the BFWMA. The new right-of-way (excluding the existing right-of-way for the 138kV line in the Northern Area of the BFWMA) would cover a total area of approximately 27.2 acres of the Northern Area of the BFWMA and approximately 5.0 acres of the Southern Area of the BFWMA.

In addition, several access roads would be either constructed or improved outside of the right-of-way in the Northern Area of the BFWMA (see Figure 2). The total length of these new access roads would be approximately 1.0 mile, which would cause ground disturbance to an area of approximately 3.0 acres.

Approximately 15 new 345kV structures and 3 new 138kV structures would be constructed on the BFWMA. Assuming an average of 64 square feet per footing, approximately 0.03 acre would be permanently disturbed for each foundation installation. However, approximately 0.01 acre of disturbed ground for the existing 138kV structures will be restored upon removal and relocation of the 138kV line, resulting in a net permanent potential ground disturbance of 0.02 acre for each structure foundations/footprints.

Although slopes vary along the bench, some work areas would need to be graded level for temporary structure work areas (200 feet x150 feet, or approximately 0.69 acre per structure). Assuming each of the structures requires grading for assembly, a total of up to 10.4 acres of land may be temporarily disturbed during construction of the proposed route. The temporary work areas would be recontoured and revegetated upon completion of construction activities.

Table 2-3 shows the total temporary and permanent ground disturbance anticipated for the proposed project.

TABLE 2-3
POTENTIAL GROUND DISTURBANCE CALCULATIONS

	Alternative A (Proposed Action)	
	Temporary Disturbance	**Permanent Disturbance**
Structure foundations/footprint	0.02 acre	0.02 acre
Structure assembly site	10.4 acres	0 acres (after revegetation)
New or improved access roads	3.0 acres	3.0 acres
Total	13.42 acres	3.02 acres

Existing access roads would be used along most of the right-of-way, requiring minimal improvements or additions of new roads. Assuming moderately sloping terrain and the presence of existing graded roads, approximately 3.0 acres of new or improved access roads would be required for the proposed route. The proposed route also includes the relocation of approximately 0.5 mile of the existing 138kV transmission line, which includes four structures.

Maintenance and Operations

The typical inspection activities for the Project after construction include:

1. *A visual assurance inspection on an annual basis.* This inspection is typically performed with an observer (line patrolman) in a helicopter. As the helicopter flies along the transmission line, the observer identifies any damage or right-of-way activity that may compromise the operation of the transmission line. The observer looks for damage to insulators, conductor and shield wire, structures, tall trees, or construction in the right-of-way. Items are noted, documented in the inspection program, and corrected as needed.

2. *A detailed inspection on an annual basis.* This inspection is performed by a line patrolman on the ground using existing access roads with a 4X4 pickup or ATV. The line patrolman inspects each structure as well as the conductor and shield wire between each structure with binoculars and spotting scopes. The inspector looks for damage to insulators, conductor and shield wire, and structures, and for any issues along the right-of-way. Any issues are noted and entered into RMP's inspection program and corrected as needed.

3. *Outage caused inspections.* Outage caused inspections are performed if there are outages on the line. These inspections may be performed from a helicopter or on the ground using existing access. When conditions requiring repair are found during outage inspections, crews and equipment are mobilized to the location requiring corrective action. Critical conditions are repaired immediately. Less critical maintenance activities are scheduled for repair at a later date.

4. *Right-of-Way Maintenance.* Vegetation that exceeds 12 feet will be periodically removed from the right-of-way to meet safety requirements. All maintenance activities will be conducted in a manner that will minimize disturbance to vegetation, drainage channels, and intermittent or perennial stream banks.

No Action Alternative

Under this alternative, the right-of-way easement application would not be approved and the transmission line would not be constructed in the BFWMA. The new 345kV transmission line would not be constructed and the existing 138kV transmission line through the northern area of the BFWMA would remain in its present location. Existing access roads would not be improved and no new access roads would be constructed within the BFWMA. There would be no ground disturbance or resource impacts. However, the No Action Alternative would not meet the Project need of accommodating electrical load growth and enhancing transmission grid reliability in the region.

Alternatives Considered But Eliminated From Further Analysis

System Alternatives

This section describes the system alternatives considered but eliminated from further consideration based on an inability to meet the Project's purpose and need statement.

Two system alternatives to the proposed Project were considered but eliminated from further review. The first alternative was to not build the new 345kV line (No Action Alternative). This alternative was rejected because it did not provide any new incremental transmission capacity

and precluded the ability of new resources to be delivered into Utah from Wyoming, Idaho, or the Northwest in general. New incremental transmission capacity is needed for both load service and contingencies.

Another system alternative considered was to rebuild portions of the existing 138kV lines interconnecting Utah and southeastern Idaho. This alternative provided only a small incremental increase of 300 Megawatts (MWs) in transmission capacity across the currently constrained path between southeastern Idaho and Utah. In addition to the marginal increase in transmission capacity, this alternative had constructability issues because it required key segments of the line to be removed from service for extended periods as existing facilities were upgraded. This alternative would produce significant exposure for the overall transmission system serving the area, as well as exposure to RMP customers during construction. This alternative was determined to be insufficient to meet long-term customer needs because it did not meet the long-range resource plans for the 10- and 20-year periods, provided only a small increase in overall transmission capacity, and would cause an unacceptable level of reliability exposure during construction.

Alternative Routes

RMP conducted an extensive alternative route analysis, comparison, and selection process to identify the proposed route. Over 450 miles of alternative routes were compared and characterized based on the following criteria:

- Maximize system reliability (separation from existing extra high-voltage lines)
- Ability to meet project schedule and in-service date
- Minimize length of route
- Minimize estimated construction cost (including right-of-way acquisition costs)
- Minimize potential engineering, construction, and operation issues (including natural hazards, accessibility, and safety concerns)
- Maximize utilization of existing linear corridors, where possible
- Maximize consolidation of public infrastructure facilities, where possible
- Minimize effects on existing and future community land uses and visual resources
- Minimize effects on environmental resource issues (biological, cultural, earth, and water resources)
- Potential permit requirements (federal, state, county, and municipal)
- Stakeholder/agency/public issues (where known)

Alternative routes that avoided the BFWMA were studied, such as obtaining new right-of-way through the Bear River Migratory Bird Refuge and converting the existing single-circuit 345kV transmission line to a double-circuit 345kV transmission line. These alternatives were eliminated from consideration because they would not meet the system reliability separation criteria for the project.

Alternative routes that paralleled Interstate 15 or the railroad from Honeyville to the Ben Lomond Substation were also analyzed and compared. Key issues with these alternatives included existing residential and commercial structures/properties located adjacent to the railroad right-of-way in Brigham City and Willard. Routing the transmission line adjacent to the railroad could potentially require the relocation of several existing residences and structures.

The railroad route and the existing 345kV transmission line in the Bear River Migratory Bird Refuge are also located within known wetland complexes. Constructing and maintaining a new transmission line within wetlands would increase the costs of construction and maintenance operations and could have potential adverse effects on biological resources.

In the Right-of-Way Easement Application submitted to UDWR in September 2008, an alternative route in the northern area of the BFWMA was identified. It paralleled the existing 138kV line in its current location and bisected the Geneva Rock gravel mining operation located immediately west and adjacent to the BFWMA boundary. In September and October, discussions between RMP and Geneva concluded that the preferred location of the new 345kV was downhill of the current and future mining operations, and would therefore require moving both the 138kV line and 345kV line out of the BFWMA at an earlier point to avoid the gravel operation's future expansion area. Therefore, this alternative route was considered and eliminated to avoid land use conflicts with adjacent private lands.

In the southern area of the BFWMA, an alternative route was also identified in the Right-of-Way Easement Application of September 2008. This alternative route would have spanned the southwest corner of the BFWMA and been located immediately adjacent to 17 residential properties in South Willard. As a result of public concern and direction from the Box Elder County Planning Commission and County Commission, RMP adjusted the preferred route adjacent to the canal, which re-located the transmission line further away and uphill from the residences in South Willard. The County approved this re-route location in August and October 2008 as part of the General Plan Amendment and Conditional Use Permit approvals required for the project.

The preferred route (Alternative A) along the Bonneville Bench, and adjacent to the existing 138kV line, minimizes crossing of wetlands and effects on existing and future residential, commercial, and agricultural land uses. In addition, when siting a new high voltage transmission line, RMP seeks to achieve as much separation as possible from existing extra-high voltage transmission lines. The proposed route along the Bonneville Bench and through the BFWMA would provide the greatest separation from the existing 345kV line adjacent to Willard Bay and the Great Salt Lake, and therefore best meets the Project purpose and need statement.

Alternative Transmission Technologies

Underground transmission lines are utilized in certain circumstances for short distances where an overhead line is not feasible (e.g., in the vicinity of airports or urban centers). However, underground high voltage transmission lines require extremely expensive cooling systems to dissipate heat generated by the transmission of electricity along the lines. They also result in extensive ground disturbance and require other special design requirements and large cooling facilities at either end of the proposed transmission line. In summary, the costs of such facilities are upwards to 10-12 times the cost of overhead facilities and this alternative was determined to be cost prohibitive. Therefore, underground construction was eliminated from further consideration.

MITIGATION MEASURES

Mitigation measures were developed to reduce, avoid, and/or compensate for the potential impacts of the proposed Project. As part of standard operating procedures, Best Management Practices (BMPs) would be implemented throughout the lifetime of the Project in order to reduce potential environmental impacts. Mitigation measures for the proposed Project are outlined in Tables 2-4 and 2-5.

TABLE 2-4
BMPs/MITIGATION MEASURES – STANDARDS AND GUIDELINES

	Standards	Guidelines
Air Quality	Minimize impacts to air quality	All requirements of those entities having jurisdiction over air quality matters will be adhered to. Any necessary dust control plans will be developed, and permits for construction activities will be obtained. Open burning of trash will not be allowed.
Aquatic and Riparian Habitat Management	Trees shall not be felled into streams, lakes, or bogs, except when needed to improve aquatic habitat.	Avoid equipment operation in stream courses, open water, seeps, or springs. If use of equipment in such areas is required, impacts should be minimized.
		A SPPP with be developed and implemented to control erosion, to protect drainages, and to keep the project in compliance with National Pollutant Discharge Elimination System regulations.
Wastes, hazardous or solid	Ensure compliance with applicable hazardous materials regulations	Hazardous material shall not be drained onto the ground or into streams or drainage areas. Totally enclosed containment shall be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials shall be removed to a disposal facility authorized to accept such materials.
Soil and Water Resource Management	Maintain or improve long-term soil productivity and hydrologic function of the soil by limiting activities that would cause detrimental soil disturbance. Detrimental soil disturbance consists of severely burned soils, loss of ground cover, or detrimental soil displacement, erosion, puddling, or compaction applicable Intermountain Region supplements.	Avoid construction, maintenance and land use practices that reduce soil moisture effectiveness, increase average erosion, cause invasion of exotic plants, and reduce abundance and diversity of forbs in the long-term (some short-term practices that would seem to contradict this direction may be beneficial in the long-term).
		Maintain at least 70 percent of potential effective ground cover to provide nutrient cycling and protect the soil from erosion in excess of soil loss tolerance limits.
		Where practical, on-site topsoil should be conserved and replaced on disturbed areas.
		To the extent practical, require concurrent reclamation of all permitted surface-disturbing activities.
		Riprap or other erosion protection materials should be sufficient in size, and placed in such a manner, as to withstand peak flows comparable to a 100-year flood.
		Where channel changes are necessary, natural channel velocities should not be increased over the total length of the affected stream channel.

TABLE 2-4 BMPs/MITIGATION MEASURES – STANDARDS AND GUIDELINES		
	Standards	**Guidelines**
Wildlife and Fish Habitat Management	Provide for wildlife movement through and/or around structures or project sites such as fences, spring developments, guzzlers, roads, and ditches.	Minimize or avoid construction activities during critical wildlife seasons – calving, fawning, etc.
		Special status species or other species of particular concern will be considered in accordance with management policies set forth by appropriate land management agencies (e.g., U.S. Fish and Wildlife etc.). This may entail conducting surveys for plant and wildlife species of concern along access routes and right-of-way. In cases where such species are identified, appropriate action will be taken to avoid adverse impacts on the species and its habitat.
		Provide a physical barrier to deter unauthorized motorized vehicle use. After construction, RMP will install gates or other barriers on the perimeter access roads as necessary. The UDWR lock will be used and a key will be provided to RMP and UDWR.
Noxious Weeds Management	All seed used will be free of seeds from weeds listed on the current Utah Noxious Weed List and the supplemental "Additional Noxious Weeds Declared by Utah Counties" list (UDAF 2006) and meet or exceed all standards set in the Utah Noxious Weed Act.	Avoid or minimize all types of travel, including driving and skidding, through noxious weed-infested areas whenever possible.
	Designated wash areas shall be established and utilized on projects where highly aggressive or extensive infestations of noxious weeds are present and where equipment moving about the project has the potential to spread these infestations.	Treat invading noxious weeds, as needed, on areas impacted by ground-disturbing operations, for at least 3 years after a project is completed.
	Utah Department of Natural Resources policies and guidance and Environmental Protection Agency label instructions for pesticide application will be followed in implementing all treatment methods.	Stockpiles of topsoil should be kept free of weeds. Topsoil should not be imported from off-site, except when absolutely necessary. If soil is to be brought in from off-site, it should be tested for the presence of noxious weed seed and transported onto the BFWMA only if it is found to be weed-free.
		Gravel or borrow material source sites with noxious weed species present should not be used unless effective treatment or other mitigation measures are implemented.
		Prior to beginning ground-disturbing activities, spray or remove weeds on sites that will be disturbed.
		Integrated Pest Management strategies, including biological, physical, and chemical treatments, may be used to control noxious weeds and other undesirable plants on the BFWMA.
		For all proposed projects and activities, implement appropriate mitigation measures to prevent the establishment and aid the control of noxious weeds.

TABLE 2-4 BMPs/MITIGATION MEASURES – STANDARDS AND GUIDELINES		
	Standards	**Guidelines**
Vegetation Management		Revegetation should be initiated as promptly as practical. Seed only where natural regeneration of desirable species is unlikely or is expected to be slow. Select low, nutrient-demanding native species to reduce the need for fertilization. Spot reseed as necessary.
		In work areas where recontouring is not required, vegetation will be left in place wherever possible and original contour would be maintained to avoid excessive root damage and allow for resprouting.
		In areas where ground disturbance is significant or where recontouring is required, surface restoration will occur as required by the landowner or land management agency. The method of restoration will normally consist of, but is not limited to, returning disturbed areas back to their natural contour, reseeding, cross drains installed for erosion control, placing water bars in the road, and filling ditches. All areas on UDWR lands that are disturbed by construction activities will be drill seeded with a seed mixture appropriate for those areas. UDWR will prescribe a seed mixture that fits each range site. Drill seeding will be done in September or October, to maximize the chance of success.
Cultural Resources	Protect cultural resources discovered during pre-construction surveys and potential new site discoveries during construction	In order to protect any cultural resources that may be located within the project right-of-way or other areas that may be disturbed by the proposed action, the project will be designed to avoid any cultural resources or properties recommended as eligible to NRHP. Structures, access roads (both temporary and permanent), and areas that would be disturbed by construction will be located to avoid any cultural resources identified during pre-construction cultural resource surveys.
		Prior to construction activities, all personnel will be instructed on the protection of cultural, ecological and other natural resources. To assist in this effort, the Construction Contractor will address: (a) federal and state laws regarding antiquities and plants and wildlife, including collection and removal; (b) the importance of these resources, and (c) the purpose and necessity of protecting them.
		In consultation with appropriate land managing agencies and state historic preservation officers, specific mitigation measures for cultural resources will be developed and implemented to mitigate any identified adverse impacts. These may include project modifications to avoid adverse impacts, monitoring of geotechnical testing activities, and data recovery studies.
Fire Management	The holder or its contractors will notify the UDWR of any fires and comply with all rules and regulations administered by the UDWR concerning the use, prevention, and suppression of fires on federal lands, including any fire	The holder or its contractors will: 1. Operate all internal and external combustion engines on federally managed lands per 36 CFR 261.52, which requires all such engines to be equipped with a qualified spark arrester that is maintained and not modified. 2. Carry shovels, water, and fire extinguishers that are rated at a minimum as ABC - 10

TABLE 2-4 BMPs/MITIGATION MEASURES – STANDARDS AND GUIDELINES		
	Standards	**Guidelines**
	prevention orders that may be in effect at the time of the permitted activity. The holder or its contractors may be held liable for the cost of fire suppression, stabilization, and rehabilitation. In the event of a fire, personal safety will be the first priority of the holder or its contractors.	pound on all equipment and vehicles. If a fire spreads beyond the suppression capability of workers with these tools, all will cease fire suppression action and leave the area immediately via pre-identified escape routes. 3. Initiate fire suppression actions in the work area to prevent fire spread to or on federally administered lands. If fire ignitions cannot be prevented or contained immediately, or it may be foreseeable to exceed the immediate capability of workers, the operation must be modified or discontinued. No risk of ignition or re-ignition will exist upon leaving the operation area. 4. Notify the Northern Utah Interagency Fire Center (801) 908-1901 (or 911) immediately of the location and status of any escaped fire. 5. Prior to any operation involving potential sources of fire ignition from vehicles, equipment, or other means, weather forecasts and potential fire danger will be reviewed. Prevention measures to be taken each workday will be included in the specific job briefing. Consideration for additional mitigation or discontinuing the operation must be given in periods of extreme wind and dryness. 6. Operate all vehicles on designated roads or park in areas free of vegetation. Operate welding, grinding, or cutting activities in areas cleared of vegetation within range of the sparks for that particular action. A spotter is required to watch for ignitions.

Selective Mitigation Measures

Table 2-5 presents the selective mitigation measures that would be used for the Project, in addition to the BMPs. Specific locations for the implementation of the selective mitigation measures will be finalized and approved by the UDWR.

TABLE 2-5 TYPICAL SELECTIVE MITIGATION MEASURES	
1.	Construction and maintenance activities will be restricted in designated areas, to minimize disturbance of wildlife during sensitive periods as follows: • No construction activities on mule deer and elk winter ranges from December 1 – April 15 • Spatial buffers and seasonal restrictions for nesting raptors in accordance with U.S. Fish and Wildlife Service – Utah Field Office Guidelines for Raptor Protection From Human and Land Use Disturbances
2.	Pre-construction surveys will be conducted along access routes and right-of-way for select biological resources. These include, but are not limited to, special status plants and raptor nests. Data collected during these surveys will be incorporated into the project design as well as the implementation of seasonal restrictions and buffers on construction activities.