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environmental assessment

reconstruction of teton park road
and jenny lake road

ENVIRONMENTAL ASSESSMENT
RECONSTRUCTION OF THE TETON PARK ROAD
AND JENNY LAKE ROAD
GRAND TETON NATIONAL PARK

Package No. 171

GRAND TETON



NATIONAL PARK - WYOMING

Prepared by:
National Park Service
Denver Service Center
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U.S. Department of the Interior

National Park Service

Environmental Assessment

Reconstruction of the Teton Park Road

And Jenny Lake Road

Package No. 171

GRTE-EA-001-1988

Grand Teton National Park

Teton County, Wyoming

SUMMARY: Reconstruction is proposed for 12 miles of the Teton Park Road between Moose Junction and North Jenny Lake Junction, as well as 6.5 miles of the Jenny Lake one-way loop road and the 0.5 mile long String Lake road. The project is being planned and designed in two segments. Segment A extends between Moose Junction and a point near the Climbers Ranch road intersection (4 miles north of Moose Junction), and segment B continues from that point to North Jenny Lake junction and includes modification of the String/Jenny Lake road and parking complex. Segment A would be constructed under a single contract, and segment B would be constructed in two phases. This environmental assessment describes three alternatives for reconstruction of the road complex, plus a no-action alternative.

All three reconstruction alternatives propose the same treatment for segment A: utilizing the existing road alignment between Moose and the Climbers Ranch road intersection, and widen the road to provide 11-foot travel lanes and 4-foot paved shoulders, for a total pavement width of 30 feet. Auxiliary features such as turnouts, parking areas, intersections, and bridges would be modified. The aggregate material source and staging area proposed for segment A is a site previously used for reconstruction of the East Side Highway (U.S.-89), 0.3 mile east of the airport junction.

Reconstruction alternatives for segment B (Climbers Ranch road intersection to North Jenny Lake junction) vary, with road realignment proposed by the National Park Service in the preferred alternative (alternative 1). Straight segments of road would be replaced by a curving scenic road more typical of park roads, providing a more varied experience of scenic viewing for the park

visitor. Alteration of the South and North Jenny Lake junctions, the String Lake and Jenny Lake one-way loop road, and parking areas at String and Jenny Lakes is also proposed. The borrow and staging area proposed for segment B is the NPS road maintenance area at the south end of Timbered Island, which would be closed and reclaimed and after road construction.

Environmental impacts such as soil and vegetation disturbance would result from widening of the road base, modification of auxiliary features, and the location of borrow sources and staging areas inside the park. For the entire project, newly disturbed ground would be approximately 37 to 77 acres. A vegetation reclamation project would be funded and performed as part of the construction package. If realignment of segment B is chosen, removal and revegetation of abandoned road segments would be part of the reclamation project. Air quality would be temporarily adversely affected by construction equipment, aggregate crushing, and asphalt production. Four archeological sites would be affected.

Inconvenience and delays to visitors would occur during the period of construction. Closure of the Teton Park Road is proposed only for one fall season for segment A between the Wilson Road intersection at Moose and the Climbers Ranch road intersection. Business at concessions serviced by the road may be reduced during the summer construction period.

Provision for bicycle use would implement alternative C-1 of the 1978 Bicycle Trail Study For Grand Teton National Park (NPS 1978). Traffic safety and circulation would be improved by modification of intersections, parking areas, and turnouts. The experience and safety would be improved for motorists and bicyclists by widening, resurfacing, and repairing the road base, and improving auxiliary features. Construction would temporarily generate jobs in Teton County, Wyoming.

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BACKGROUND

The Teton Park Road provides the only road access to Jenny Lake, Moose, and other park features west of the Snake River (see Vicinity map). The road also provides the park visitor with a scenic drive close to the park's primary scenic resources of mountains and lakes. The road predates the park and was originally constructed in the 1920s as a transportation route, utilizing straight alignments. It has been upgraded in stages, with the last substantial work performed in 1963. The segment between Moose and the Beaver Creek intersection was partially realigned and widened. This segment has a pavement width of approximately 24 feet, including 10-foot paved traffic lanes, 2-foot paved shoulders, and 3-foot graveled shoulders. The road north of the Beaver Creek intersection narrows to a 22-foot pavement width with 9.5-foot lanes and 1.5-foot paved shoulders, plus 3-foot gravel shoulders. The road narrows again from north of the Cottonwood Creek bridge to North Jenny lake junction to a 20-foot pavement width with 9.5-foot lanes and 6-inch paved shoulders, and 2-foot gravel shoulders. Besides being narrow, the road follows two straight alignments for 6.6 miles. Numerous gravel surfaced turnouts are rough or have abrupt pavement edges, making turning out of traffic awkward. No provision is offered for bicycle traffic, except riding in the traffic lanes with motor vehicles. The one-way Jenny Lake Loop and String Lake roads also predate the park, with similar problems of narrow width, rough pavement, and lack of paved turnouts.

The adjacent segment of Teton Park Road north of North Jenny Lake junction was reconstructed in 1970. It has an existing pavement width of approximately 30 feet. This width includes 11-foot traffic lanes and 4-foot paved shoulders which are delineated with a white line and periodic signs warning of bicycle traffic. This segment of road provides a pleasant park travel experience with ample turnouts, good quality riding surface, and separation of bicycle and motor vehicle traffic. It contains a variety of curves and straight segments providing varying views of the park scenery, and stable revegetated roadside slopes which blend the roadway into the terrain.

PURPOSE AND NEED FOR THE PROJECT

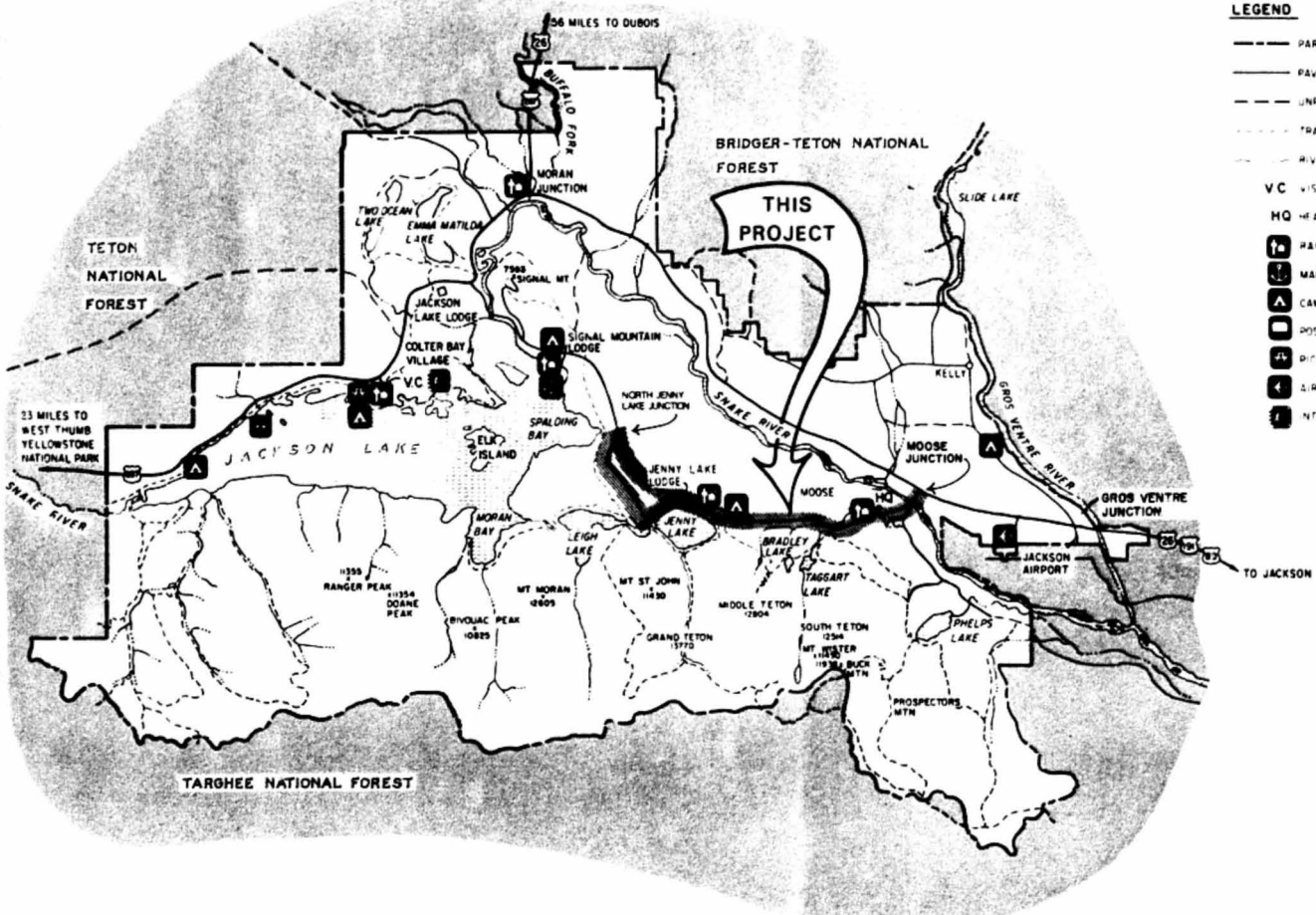
Completion of the proposed road reconstruction, realignment, and modifications of intersections, turnouts, and parking areas is intended to improve the visitor's experience and provide a roadway with smoother driving surface and improved traffic safety characteristics. The proposed improvements are also intended to make bicycle travel safer, more pleasurable, and reduce inconvenience to drivers of motor vehicles.

Reconstruction of the Teton Park Road is needed due to the age of the roadway, deterioration of the road surface, inadequate and varied pavement widths, changes in traffic composition, and increases in traffic beyond the design capacity of the road. In addition, a number of intersections that were adequate at lower traffic levels are now congested and potentially hazardous with the present heavy seasonal traffic loads. Also, traffic speeds on the straight segments of road north of Glacier Gulch turnout have become a safety concern in recent years. Reconstruction of these segments on a new curved alignment more typical of park roads will encourage lower driving speeds, but more importantly, will provide better scenic viewing and a more pleasant driving experience for park visitors.

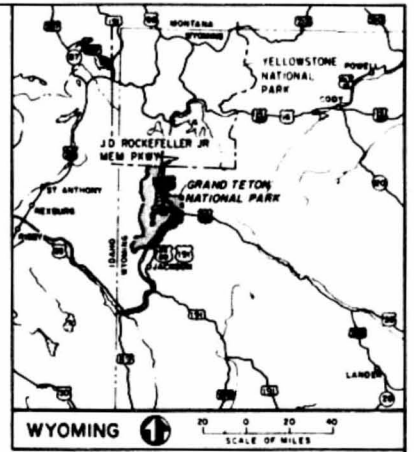
As described above, the Teton Park Road has not received major rehabilitation in over 25 years, pavement widths vary and are substandard, and the roadway is deteriorating. As deterioration continues the road surface will become rougher, resulting in unpleasant and potentially hazardous driving conditions, and in possible damage to vehicles. Park operation costs to patch and maintain the roadway have increased and will continue to rise.

The present pavement varies from 20 to 24 feet with driving lanes of 10 feet or less and paved shoulders of 2 feet or less. These width characteristics were adequate for low traffic volumes composed primarily of passenger vehicles. Traffic volume has increased and the composition has changed since the early 1970s, with greatly increased use by bicycles and large vehicles. Present pavement widths are insufficient to safely accommodate existing heavy traffic, including full-sized busses, wide recreational vehicles, and bicycles. The combination of this traffic volume and vehicle mix on a roadway with narrow traffic lanes and minimal paved shoulders requires a high degree of driver concentration and often results in traffic congestion. These problems will worsen with additional bicycle and large vehicle use.

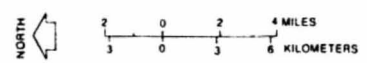
The flat terrain and outstanding scenery of Jackson Hole have attracted heavy bicycle use. The Bicycle Trail Study For Grand Teton National Park (NPS 1978) identified the problem of conflicts between bicyclists and motorists. Because there are no paved shoulders, bicycles must travel in the traffic lanes over most of the route. This causes slowing of motor vehicle traffic, and increases the potential for bicycle/vehicle accidents. Bicyclists are placed in a hazardous situation, particularly by inexperienced drivers of recreational vehicles, and by cars equipped with oversized side mirrors for pulling trailers. Park staff estimates of bicycle traffic are approximately 3,000 to 4,000 cyclists per year passing the Moose entrance station. An additional number of bicyclists enter the park by car, park north of Moose, and bicycle along portions of the road, such as the Jenny Lake loop. Bike use is increasing and park staff believe that it would increase even more if



- LEGEND**
- PARK BOUNDARY
 - PAVED ROAD
 - - - UNPAVED ROAD
 - ... TRAILS
 - ~ RIVER
 - VC VISITOR CENTER
 - HQ HEADQUARTERS
 - RANGER STATION
 - MARINA
 - CAMPGROUND
 - POST OFFICE
 - PICNIC AREA
 - AIRPORT
 - INTERPRETIVE TRAIL



GRAND TETON NATIONAL PARK



VICINITY
 MOOSE JUNCTION TO NORTH JENNY LAKE JUNCTION
 GRAND TETON NATIONAL PARK/WYOMING
 UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE

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paved shoulders were provided on the Teton Park Road.

Federal regulations have recently been changed to permit wider vehicles, such as motor homes and tour buses. Full-sized buses have also recently been allowed to use the road. Traffic/safety conflicts are increasing due to the narrow pavement width and the lack of bicycle lanes.

Traffic studies indicated the average daily traffic between Moose Junction and Jenny Lake was 3,500 vehicles during June through August of 1984. Passenger cars and motorcycles comprise 91.4 percent of traffic, while wider vehicles such as recreational vehicles, vehicles with trailers, buses, and trucks comprise 8.5 percent of traffic (Peccia 1985). Projected 20 year seasonal average daily traffic for the year 2004 is estimated to be 4,300 vehicles (FHWA 1985).

Existing NPS road standards (NPS 1984) recommend roadways designed to accommodate traffic anticipated 20 years in the future. These standards applied to the projected traffic volume would call for a two-lane roadway, with 12-foot driving lanes and 4-foot paved shoulders. The use of 12-foot rather than 11-foot driving lanes is justified whenever large vehicles (trucks, busses, and recreational vehicles) make up more than 5 percent of the traffic.

The present traffic circulation patterns are inefficient and congested at intersections and parking areas in the Moose developed area between Moose Junction and the park entrance station. Staggered intersections on both sides of the road in the park headquarters area create confusion and conflicting turning movements. The lack of left turn lanes causes traffic to back up in the main traffic lanes, resulting in delays. The parking areas for the Moose visitor center/headquarters and post office/concessions have inadequate parking space and lack adequate handicapped access ramps. The relatively heavy float trip traffic to and from the Snake River access area must mix with visitor center traffic, increasing congestion at the park headquarters public parking area. At the Moose entrance station the approach lanes have inadequate vehicle storage capacity and are very narrow. During peak traffic periods backed-up traffic blocks the Wilson Road intersection. Numerous minor traffic accidents are associated with the approaches to the entrance station. East of the Snake River, the access road to Dornan's (Moose Enterprises) is in a deteriorating condition. The road is narrow and has sharp dropoffs at the pavement edges.

The existing road alignment is generally good between Moose Junction and the Climbers Ranch road intersection. Immediately north of the Beaver Creek intersection a dip in the road restricts sight distance (distance of roadway a driver can see ahead) between southbound vehicles and turning vehicles at the intersection.

The Taggart Lake trailhead parking area and several unnamed turnouts along the entire road are too small, gravel-surfaced, difficult to turn into, and tend to gradually expand into the surrounding vegetation due to lack of curbing. Several turnouts have poor sight distance for turning traffic.

The culverts at Beaver and Taggart creeks have inadequate capacity for high runoff, creating a risk of possible road failure from washouts. The Cottonwood Creek bridge lacks approach guard railings.

The South and North Jenny Lake road junctions have identified operational problems. While neither intersection has an exceptionally high accident rate, a substantial number of conflicting turning movements occur. At the South Jenny Lake junction this problem is compounded by a confusing non-standard "Y" configuration. Heavy turning traffic and poor sight distance add to safety problems in the area. The main road passes close by the heavily used facilities of Jenny Lake. The North Jenny Lake junction with the Jenny Lake one-way road is also potentially hazardous due to a tight curve north of the junction, poor sight distance for south-bound traffic approaching the intersection, and icing problems on shaded portions of the curve early and late in the season.

The existing road follows two long straight segments between Glacier Gulch turnout and North Jenny Lake junction. Existing average vehicle speeds on these segments exceed the 45-mile-per-hour speed limit. A general goal of the National Park Service is to provide roads that encourage relatively low-speed, scenic-travel experiences with ample turnout opportunities -- not merely high speed straight roads connecting points of interest. Scenic park roads are generally designed with some curvature to add interest by providing a variety of viewing angles of the landscape. The East Side Highway between Moose and Snake River overlook is an example of this style of park road design over similar flat terrain.

The one-way Jenny Lake Loop and String Lake roads are also deteriorated and rough from repeated patching. The parking areas at String Lake and South Jenny Lake are congested and of inadequate capacity. In both cases traffic and parking intrude upon the natural setting of the lakeshore. Traffic passes through the South Jenny parking area, mixing with vehicles backing out of parking spaces. The approved Development Concept Plan, Jenny Lake (NPS 1976), proposes moving the parking areas east and removing motor vehicle traffic from the lakeshores of String Lake and Jenny Lake. See also, Environmental Assessment, Jenny Lake Development Plan (NPS 1975b).

ALTERNATIVES CONSIDERED

INTRODUCTION

Three alternatives for reconstruction of the Teton Park Road, the Jenny Lake one-way road, the String Lake road, and auxiliary features are described in this section (see maps). A no-action alternative is also presented. Planning, design, and construction would occur in two segments under all three reconstruction alternatives. Segment A would be located between Moose Junction and the south end of Timbered Island near the Climbers Ranch Road intersection. Segment B would continue to the North Jenny Lake junction and include the Jenny Lake/String Lake roads. Segment A construction would occur in one phase and segment B may occur in two phases.

These two segments have been separated for planning purposes because the character of work being considered for each is quite different. Segment A reconstruction would follow the existing road alignment, whereas alternatives for realignment of segment B are being considered. The level of detail in the descriptions of work on each segment also varies. Detailed planning and design work are in progress for segment A. Funding is available to award a construction contract for this segment during the current federal fiscal year that ends September 30, 1988. Planning for segment B is still in the preliminary conceptual stage, and further planning and design will be undertaken for this segment following public review and comment on this document, and selection of an alternative.

In addition to the reconstruction alternatives described in this section, a number of other options and alternative actions have been considered but rejected for a variety of reasons, described below.

Width

The proposed roadway pavement width is the same in all three reconstruction alternatives. Width options of 28 feet and 32 feet were initially considered, but the 30-foot width was selected. The 28-foot width included 3-foot paved shoulders that would be inadequate as bicycle lanes; the 12-foot driving lanes of the 32-foot width option were rejected because the wider traffic lanes would encourage faster driving, and would appear more like a state highway than a park road. The 30-foot proposed width includes 11-foot driving lanes and 4-foot paved shoulders. This width is believed to offer the best compromise for considerations of traffic safety and roadway appearance.

Regrading of the Teton Park Road on its existing alignment without repair of the roadbase, widening, or modifying intersections was also considered. This alternative was rejected because the width of most of the existing road is so narrow that such action would not be responsive to the existing and growing traffic use, would not satisfy minimum safety requirements, or address major structural deficiencies.

Realignment

Realignment of segment B of the Teton Park Road between the south end of Timbered Island and the North Jenny Lake junction is being considered to improve the visitor experience and to improve safety as described below. A decision to realign the road and, if so, where to realign it, will be made only after public review and comment on this document.

There are several reasons for considering realignment of this segment of the Teton Park Road. The original road was built as part of the state highway system prior to establishment of the park and was designed as a transportation route to connect points by the shortest distance, not as a primarily scenic road. Because considerable funds are to be invested in road construction with at least a 50-year lifespan, the National Park Service is considering development of a more typical scenic park road. Only one basic route for realignment of the main road is described in alternatives 1 and 2; other routes were considered both east and west of the existing road. Routes east of the road were rejected because they would extend wholly into unroaded wildlife habitat; provided more distant, less intimate views of the Teton Range; and were less efficient in providing access to the Jenny Lake/String Lake area. Another rejected concept was realignment of the Teton Park Road further west to intersect the existing one-way road at the Cathedral Group turnout area, then continue north along the existing one-way alignment to North Jenny Lake junction. This route choice would utilize an existing disturbed alignment and minimize new ground disturbance, however this area has more dense forest than the nearby proposed alignment. The forest cover would reduce scenic viewing, would conceal elk, and with increased traffic speed would probably have a higher elk/vehicle accident rate.

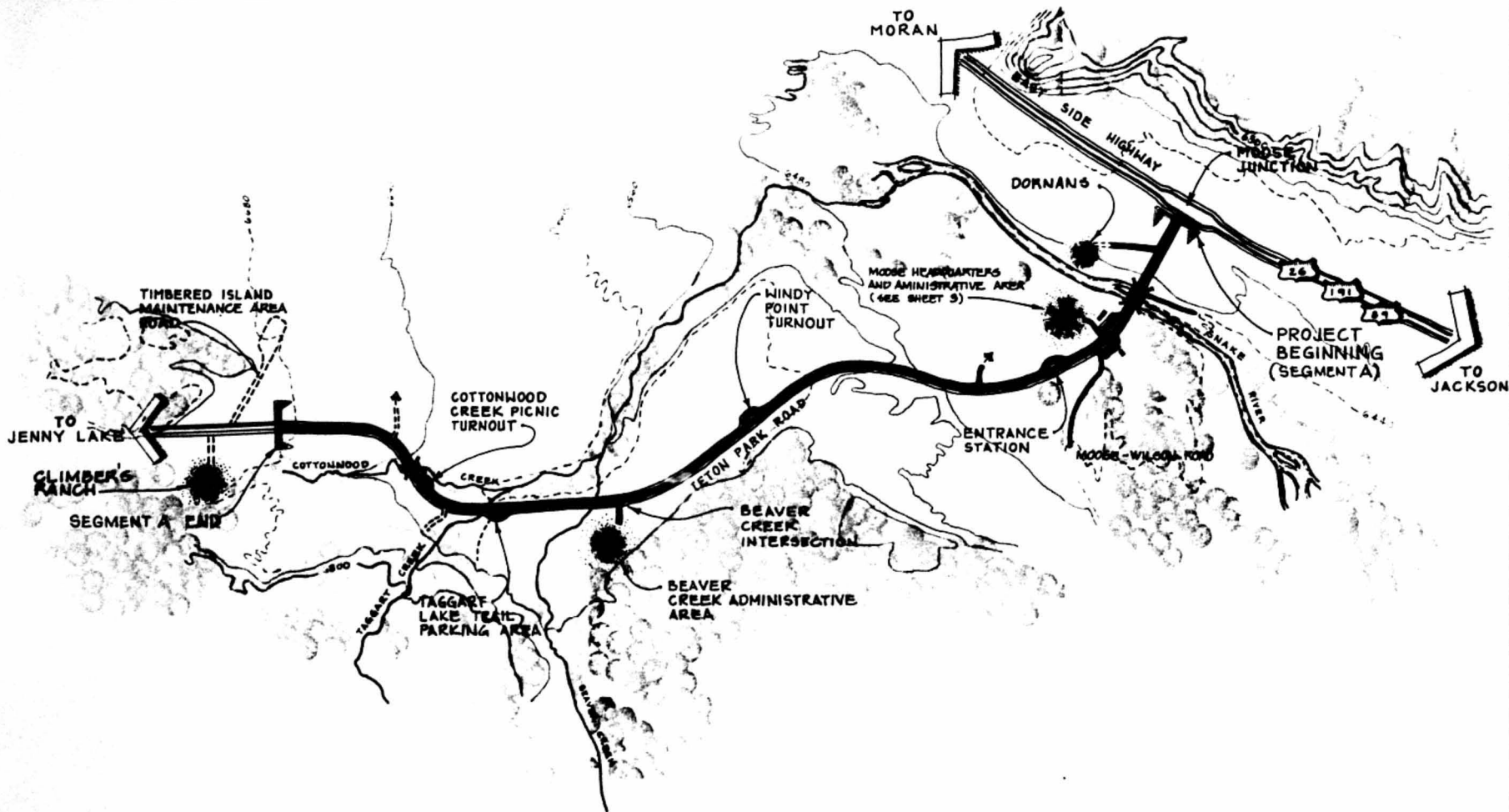
Compared to the existing road, the proposed realignment would introduce more curvature to provide a variety of viewing angles of the landscape (similar to the East Side Highway between Moose and Snake River Overlook). This new alignment has been routed to offer a greater variety of views and experiences, including transitions of foreground vegetation types from sage flats to intermittent forest, and changes in the vertical road alignment from flats to benches.

Realignment would also improve the safety features of the road as follows:

- Move the road west, away from the southwest edge of Timbered Island (south of Glacier Gulch turnout), to avoid hazards presented by elk in forest adjacent to the existing road.
- Move the road east away from the congested South Jenny Lake area, and redesign the South Jenny Lake junction to improve traffic circulation.
- Redesign the North Jenny Lake junction to improve safety engineering characteristics.

Aggregate Sources/Staging Sites

The entire construction project would require an estimated 100,000 cubic yards of aggregate material for roadway surfacing and paving. Aggregate sources inside and outside the park were evaluated for quantity and quality of material, environmental conflicts, social conflicts, distance/cost of hauling, and damage to existing roads.

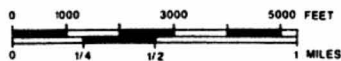


SEGMENT A

MOOSE JUNCTION TO TIMBERED ISLAND

GRAND TETON NATIONAL PARK/WYOMING

UNITED STATES DEPARTMENT OF THE INTERIOR NATIONAL PARK SERVICE



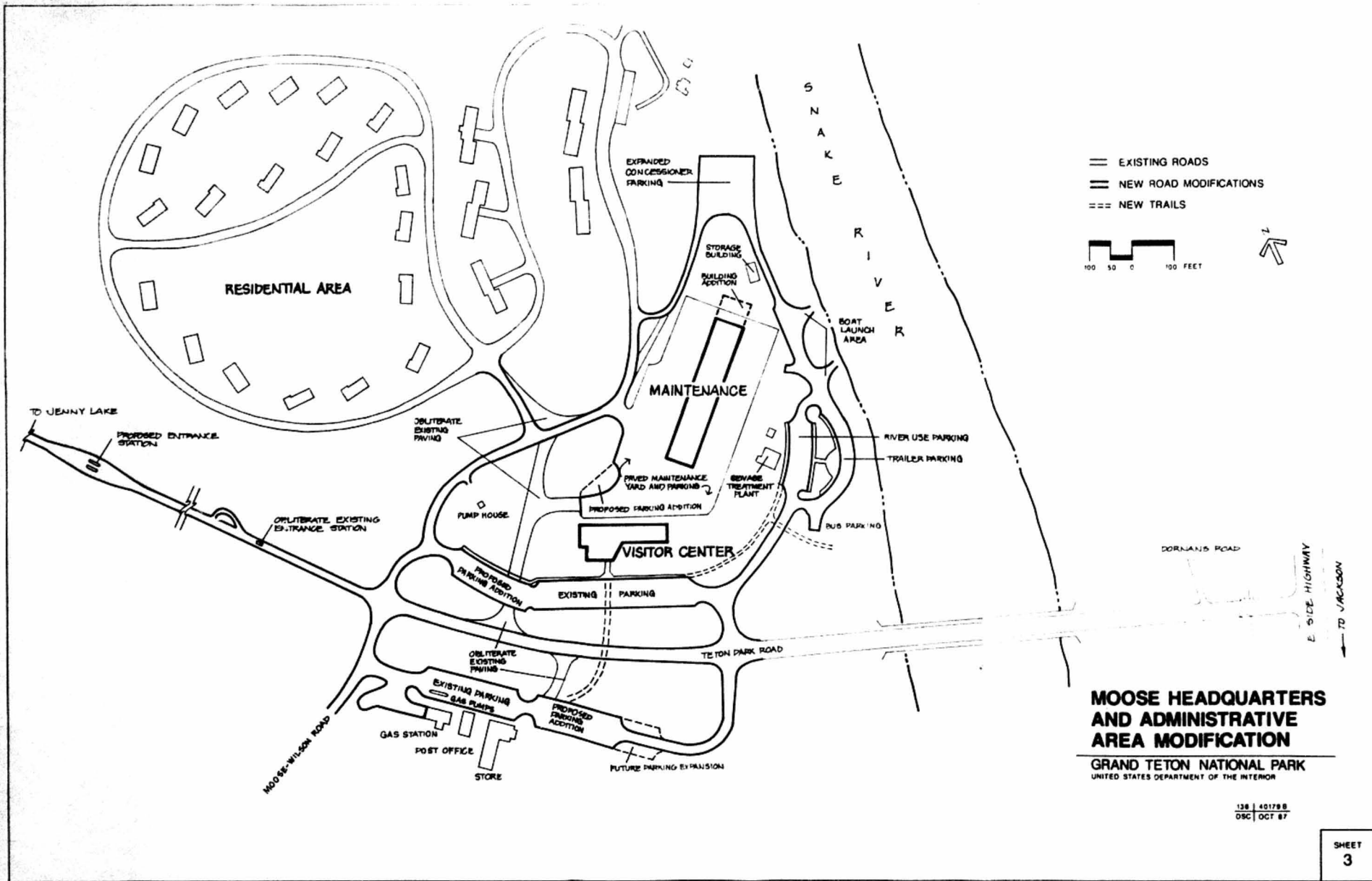
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 DOTTED LINES REPRESENT 40 FOOT CONTOURS

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The preferred alternative site for segment A would use an existing aggregate source inside the park and east of the airport junction on the East Side Highway for material excavation, stockpiling, and processing. The site was excavated in the 1950s for construction of the East Side Highway and was used in 1987 as a staging area for material stockpiling and processing, and equipment storage during reconstruction of the highway between Moose and the south park boundary. Due to the flat terrain and the man-made depression, the site is nearly hidden from view from highway. The site has also been in use as a law enforcement shooting range, and will be referred to as the shooting range site.

Approximately 45,000 cubic yards of finished aggregate material for segment A construction would be excavated, stockpiled, and processed. The site would also be used for an asphalt hot-mix plant and construction equipment storage. Upon completion of segment A, the site would be cleaned up, slopes stabilized, and partially reclaimed. The site would then be operated as a replacement for the existing Timbered Island NPS maintenance area for road repair material mixing and stockpiling, debris burning, and continue to be used as a shooting range. Enlargement of the existing pit would allow maintenance activities to be conducted substantially out of public view from the highway.

Segment B construction would require approximately 55,000 cubic yards of aggregate material. Excavation, processing, and equipment storage would occur at the existing Timbered Island maintenance area. After completion of the project, NPS maintenance functions would be transferred to the shooting range site, and the Timbered Island site would be closed and reclaimed, including the access road. See reclamation section below.

Fifteen other aggregate sources were considered, including commercial sites south and west of Jackson, river floodplain sites within and adjacent to the park, and previously disturbed sites within the park. Four of these other sites are considered feasible, but less desirable, alternative sites; the other eleven have been rejected for various reasons. See the appendix for detailed analysis.

Of the four feasible alternatives, two are commercial sites currently operating outside the park under county and state permits, and one is a previously disturbed BLM site. The Tucker pit and the BLM lot along the Gros Ventre River would require hauling through the city of Jackson or over a restricted weight bridge. Hauling traffic on the Moose-Wilson road would not be feasible due to inadequate bridges, excessively narrow roadway, and structurally inadequate road base and pavement. The Hansen pit would not require hauling through Jackson or over a restricted weight bridge, but neighboring land owners have objected to past operations. The project cost would be increased by \$400,000 to \$1,025,000, due to increased hauling distance to the project. The fourth alternative, the previously disturbed Signal Mountain/RKO road site within the park, is visible from Signal Mountain, would require extensive and costly rehabilitation including importation of topsoil, and may be needed for Jackson Lake dam reconstruction.

Reclamation and Revegetation

Reclamation and revegetation of disturbed sites is considered a highly important component of the overall road construction effort. A detailed reclamation and revegetation plan will be developed as part of the design program, and reclamation will be funded as part of the construction package. General goals are treatment and reclamation of disturbed areas to reestablish original drainage patterns, provide suitable growth conditions, and reestablish native plant communities including shrubs. Areas to be reclaimed would be the disturbed road-side cut and fill slopes, as well as the roads, parking areas, and Timbered Island maintenance site that are to be replaced or closed.

As part of the reclamation and revegetation plan, the park will establish study plots during 1988 on existing disturbed areas with similar soil compaction, drainage, and growing conditions as the proposed construction and reclamation sites.

Prior to construction, road-side plant communities and soil characteristics would be mapped to establish original conditions. During construction, topsoil would be salvaged for reuse. After construction of the road, cut and fill slopes would be dressed with salvaged topsoil and reseeded with a mixture of native grass and shrub species. Follow-up reseeding and weed control would be performed.

Replaced and closed portions of road, parking areas, and the Timbered Island maintenance area would be reclaimed by removing pavement, ripping and scarifying to decompact soil and reestablish original soil permeability, and grading to restore a natural surface contour. Topsoil or fine material would be mixed into the surface as necessary, along with appropriate soil amendments, such as organic material or fertilizer. A mixture of grass and shrub species would be seeded, and lodgepole pine trees transplanted on a selected basis. Follow-up reseeding and weed control would be performed as necessary for 2-3 seasons.

ALTERNATIVE 1 (PREFERRED): RECONSTRUCT TETON PARK ROAD, REALIGN SEGMENT B AND JENNY/STRING LAKE ROADS

The National Park Service (NPS) preferred alternative proposes reconstruction of the Teton Park Road, the Jenny Lake one-way road, the String Lake road, and auxiliary features between Moose Junction and the North Jenny Lake junction (see maps). A total of 12.5 miles of existing two-way road and 6.5 miles of existing one-way road would be replaced by 14.6 miles of two-way road and 1.3 miles of one-way road. Construction would occur in two segments, with segment A occurring between Moose Junction and the south end of Timbered Island near the Climbers Ranch road intersection, and segment B continuing to the North Jenny Lake junction with modification of the String/Jenny Lake one-way road. Segment A reconstruction would follow 5.0 miles of existing road alignment. Segment B would follow new alignments, if, after public comment, this alternative is selected. Construction of segment A would be completed in one contract phase, and segment B may be constructed in two construction phases. Construction of each phase would last from one to two seasons, but not necessarily in consecutive years. Overall completion would take four to six years.

Segment A: Moose Junction To South End of Timbered Island

Road reconstruction would include repair of structural defects in the existing road base and widening the road base where necessary to provide a uniform 30-foot wide asphalt overlay, providing 11-foot travel lanes and 4-foot paved shoulders. Auxiliary features such as intersections, parking lots, turnouts, bridges, signs, and the entrance station approaches would be modified. Minor cut- and fill-slope modification and road base widening would be performed at selected points between Moose Junction and the Beaver Creek intersection to accommodate the increased pavement width, to reinforce shoulders, to flatten selected slopes for safety and reclamation purposes and to reduce snow drifting. The extent of surface disturbance of the existing roadside would be variable depending on the existing road base width, whether the road is crossing slopes with cuts or fills, and on the length and angles of existing cuts and fills. The maximum extent of disturbance (the construction limit) along the route would extend out 40-50 feet from the existing shoulder, with an average distance of approximately 25 feet.

The access road to Dornan's would be widened and shoulder slopes flattened. Public traffic access into Dornan's will be maintained. The segment of road between Moose and the Beaver Creek intersection has some relatively large existing cut and fill slopes. It has previously been widened, reducing the amount of slope modification which would be necessary. Some minor widening would be performed on the Windy Point grade (first major grade north-west of Moose) by filling horizontally into the drainage ditch on the uphill edge of the road and constructing a curb and gutter. The surface of the lower 10 feet of the slope would be temporarily disturbed by excavation for construction of the curb and gutter. Upper portions of the partially revegetated slope would not be disturbed.

At the top of the Windy Point grade approaching the Windy Point turnout, the road climbs two small benches. The steep fill slope on the west edge of the road would be flattened (slope extended by adding fill) to improve safety design and reduce snow drifting. The small cut-slope on the east edge would be disturbed to install a curb. Between Windy Point turnout and the Beaver Creek intersection, widening, slope flattening and vegetation disturbance would vary from zero widening to approximately 10 feet on each side of the road, with a corresponding disturbance of existing roadside vegetation.

The road between the Beaver Creek intersection and the Taggart Creek trailhead would also be widened. The grade would be raised approximately 3 feet to improve traffic sight distance north of the Beaver Creek intersection. The fill slopes would be extended approximately 12-15 feet laterally at the Beaver Creek culvert crossing, tapering to the existing width as one proceeds north. Culverts at Beaver and Taggart creeks would be replaced to increase capacity and to allow fish passage. Widening the road north of Beaver Creek would consist of adding fill and extending the fill slopes to raise the road surface slightly and gain the needed 10-20 feet of additional width on either side for the expanded road surface. Rip-rap would be added to fill slopes on both sides of the road. North of Cottonwood Creek there are no significant cut or fill slopes or stream crossings.

The Snake River bridge would be modified by paving the gravel horse path to convert it to a multi-use bicycle/pedestrian/horse lane.

The four offset intersections in the Moose developed area between the Snake River bridge and the Wilson Road would be consolidated into two four-way intersections to improve safety by reducing confusion caused by conflicting traffic movements (see map). The Teton Park Road would be widened to provide left-turn lanes at those intersections. The gas station/post office parking would be expanded to the east, by addition of fill, and its eastern connection with the main road would be realigned to a point opposite the existing visitor center intersection near the bridge. This would comprise the eastern four-way intersection. The visitor center parking area would be expanded to the west and connected to the existing Wilson Road intersection. The enlarged parking areas would be paved and handicapped-accessible ramps installed where necessary.

The Snake River boat launch road would be paved to a 24-foot width. Short-term parking at the launch ramp would be paved, striped, and somewhat reduced in size, but would accommodate the existing number of vehicles. A road would be provided around the north end of the NPS maintenance yard to connect with the park employee residential road.

The Moose entrance station would be moved approximately 0.2 mile west of its present location. The two westbound approach lanes to the kiosks would be widened and lengthened.

The Windy Point turnout would be repaved, and the log curbing replaced by exposed-aggregate concrete curbing. Handicapped accessible ramps would be provided at these and all other turnouts with wayside exhibits.

The gravel-surfaced parking area at Taggart Lake trailhead would be expanded to increase parking capacity by 50 percent to accommodate 40 cars and 8 RVs. Raised curbing would restrict parking to the paved area, and a vegetated island would separate the area from the road.

Numerous existing gravel-surfaced, unnamed roadside turnouts would be evaluated for safety and need, and would be either paved or removed.

The Cottonwood Creek picnic area turnout would be modified slightly to allow easier turning for snow plows. Approach guardrails would be installed at the Cottonwood Creek bridge to meet current safety standards.

The 4-foot paved shoulders would be designated and posted as bicycle lanes. This would implement alternative C-1 of the Bicycle Trail Study For Grand Teton National Park (NPS 1978). There was no preferred alternative in this study.

Estimated construction cost of segment A, including reclamation and revegetation and traffic management, would be \$2.3 million.

Segment B: Timbered Island to North Jenny Lake Junction

Realignment under this alternative would depart the existing Teton Park Road alignment near the Climbers Ranch road intersection, curve west of the south end of Timbered Island, and then curve back to the existing road and follow it for approximately 0.5 mile. The alignment would then curve east from the existing road to a point 100-200 feet east of the existing South Jenny Lake junction (see map). The Glacier Gulch turnout would be relocated; the new location will be determined following further study of potential turnout locations along the whole segment.

The South Jenny Lake junction would be redesigned to provide one main "T" intersection with the Teton Park Road to a collector road that provides access to Lupine Meadows, Jenny Lake parking, the Jenny Lake campground. The junction may be moved south and a portion of the existing road used as a collector road (see below). Final road design in this area is pending route selection. Circulation roads in this area would be designed to comply with phase I of the Jenny Lake Development Concept Plan (NPS 1976).

Approximately 0.6 miles north of South Jenny Lake junction, realignment would rejoin the existing road for a short distance, then curve to the west and climb onto a bench with isolated trees separated by grass/sage openings (see map). This bench is between the existing two-way road and the Cathedral Group turnout on the one-way road. A turnout with an interpretive wayside exhibit would be placed in this area. Views of Mt. Moran and the Cathedral Group from this area are excellent, with varied foreground vegetation of isolated, gnarled limber pine trees. A junction and connection to String Lake and Jenny Lake Lodge would be provided as described below. The Teton Park Road would then curve to the east, dropping off the bench to the North Jenny Lake junction, and join the existing Teton Park Road at the junction. The curve immediately north of the junction would be realigned (straightened) to improve safety. The forest south of the road curve may be thinned to reduce shading and resulting icing of the curve in early and late season.

The existing Jenny Lake loop and String Lake roads would be extensively modified. The 2.1-mile segment of one-way road between the Cathedral Group turnout and North Jenny Lake junction would be removed and reclaimed. A two-way, dead-end spur road would provide access from the Teton Park Road to the Cathedral Group turnout, String Lake picnic area, and Jenny Lake Lodge. The access road and parking for String Lake would be removed from the lakeshore, and replaced with new access from the east. A one mile portion of existing one-way road south of the lodge would be removed and reclaimed. A junction on the realigned Teton Park Road would connect to the existing one-way road that provides access to the existing scenic turnout overlooking Jenny Lake, then continue south along the existing alignment and turn east on new road segment bypassing the campground on the north. This one-way loop road would connect with the Teton Park Road north of the South Jenny Lake junction. A 0.9-mile portion of existing one-way road between the Jenny Lake Ranger Station and South Jenny Lake junction, and the existing parking area between the ranger station and lakefront, would be closed to motor vehicle traffic. Part of this area would be converted to pedestrian/bicycle use, and the remainder would be reclaimed and revegetated. Additional parking for the area would be provided east of the ranger station. The existing 6.0-mile

String/Jenny Lake road complex would be replaced by a combination of 2.0 miles of two-way road (to String Lake) and 1.3 miles of one-way road (Jenny Lake overlook), totaling 3.3 miles. A total of 3.5 miles of existing one-way road would be removed and reclaimed.

Estimated cost of segment B of alternative 1, including reclamation and revegetation of closed roadway, would be \$7.57 million.

Traffic Management

The preferred traffic management option for segment A construction would entail public closure of the road for one autumn season from the Wilson road intersection at Moose, north to Timbered Island near the Climbers Ranch road intersection. Closure would last from after Labor Day weekend until shut down by winter weather. The road would be reopened for winter recreational access with a graveled surfaced. Park residents and concessioners would be allowed limited access on the road. Public access would be maintained to facilities at Moose, including the post office, Dornan's, 4 Lazy F Ranch, the visitor center, and park headquarters. Traffic on the Moose/Wilson road would be maintained. The contractor would be allowed to operate with full efficiency during the fall season by not maintaining two-way public access. Construction and paving operations would resume the following spring, with public access under flagging and pilot car control.

Other traffic management options considered for segment A include: total public closure during the entire 4-1/2 month construction period; public day-time traffic, night-time construction for 5-1/2 months; and 24-hour public traffic for four months, with traffic control by pilot car and flagging, and delays up to 30 minutes.

Traffic management of segment B would be simplified by realignment since construction would largely occur on new alignment while visitor traffic continued on old alignment. Where mixing of construction and visitor traffic would be necessary, traffic control by flagging and pilot cars would be used, with delays up to 30 minutes.

ALTERNATIVE 2: RECONSTRUCT TETON PARK ROAD, REALIGN SEGMENT B AND JENNY/STRING LAKE ROADS

This alternative would utilize the same alignment described above for segments A and B of the Teton Park Road, however would differ in reconstruction of the String/Jenny Lake road system (see map).

A new portion of two-way road would connect the new Teton Park Road alignment with the existing one-way Jenny/String Lake road, just north of the Cathedral Group turnout, as described under alternative 1. The existing alignment would be upgraded for two-way traffic to String Lake and Jenny Lake Lodge. The access to the String Lake picnic area and parking would be removed from the lake shore and moved east. One-way traffic would then begin past the Jenny Lake Lodge along the existing alignment to the existing Jenny Lake overlook, continue along the existing alignment 0.6 mile, then leave the

existing alignment and curve east to the Teton Park Road, bypassing the campground on the north. The one-way road would intersect the Teton Park Road at a point north of the South Jenny Lake junction. The existing 2.4 miles of one-way road between the Cathedral Group turnout and North Jenny Lake junction would be removed and reclaimed, as in alternative 1. The 0.9 mile portion leading to the parking area by the Jenny Lake Ranger Station and South Jenny Lake junction would be converted to a pedestrian/bicycle lane, with parking provided east of the ranger station, as in alternative 1. Of 6.5 miles of existing one-way road, 4.2 miles would be retained and reconstructed, and 2.3 miles would be removed and reclaimed.

Estimated construction cost of segment B of alternative 2, including reclamation and revegetation of closed road would be \$7.51 million.

ALTERNATIVE 3: RECONSTRUCT EXISTING TETON PARK ROAD AND JENNY/STRING LAKE ROADS

This alternative would largely utilize existing road alignments. It would repair structural defects in the road base, widen the road base, and resurface and pave 12.0 miles of two-way Teton Park Road.

The reconstructed Teton Park Road would provide a uniform 30-foot-wide roadway providing 11-foot travel lanes and 4-foot paved shoulders. The 4-foot paved shoulders would be designated and posted as bicycle lanes. This would implement alternative C-1 of the Bicycle Trail Study For Grand Teton National Park (NPS 1978). Segment A would be reconstructed as described under alternative 1. Segment B would utilize the existing alignment.

Auxiliary features such as intersections, parking lots, turnouts, entrance station, and bridges, would be modified as described under alternative 1. Construction would occur in two segments as described under alternative 1, and would occur over four to six years.

The String/Jenny Lake one-way road would be reconstructed, providing an 18-foot pavement width for a 12-foot lane and 6-foot shoulder. The existing alignments would be utilized, with the exceptions of access and parking for String Lake, the realignment of the south end of one-way road near the south Jenny Lake area, and south Jenny Lake parking and pedestrian/bicycle access; all of which would be treated as described under alternative 1.

The North Jenny Lake junction would be modified by realigning (straightening) the curve immediately north of the junction, and thinning forest near the south edge of the roadway to improve sight distance and reduce shading of the curve. Acceleration/deceleration tapers would be provided for the southbound lane, and a left-turn lane for the north-bound lane. The intersection of the one-way road to String and Jenny lakes would be moved a short distance south to increase sight distance for turning and southbound traffic.

Minor cut- and fill-slope modification and widening of the road base would be performed along the project to accommodate the widened pavement, to reinforce shoulders, and to flatten selected slopes as described under alternative 1.

A reclamation plan would be implemented as described under alternative 1.

Sites for the borrow source and staging area would be the same as described under alternative 1.

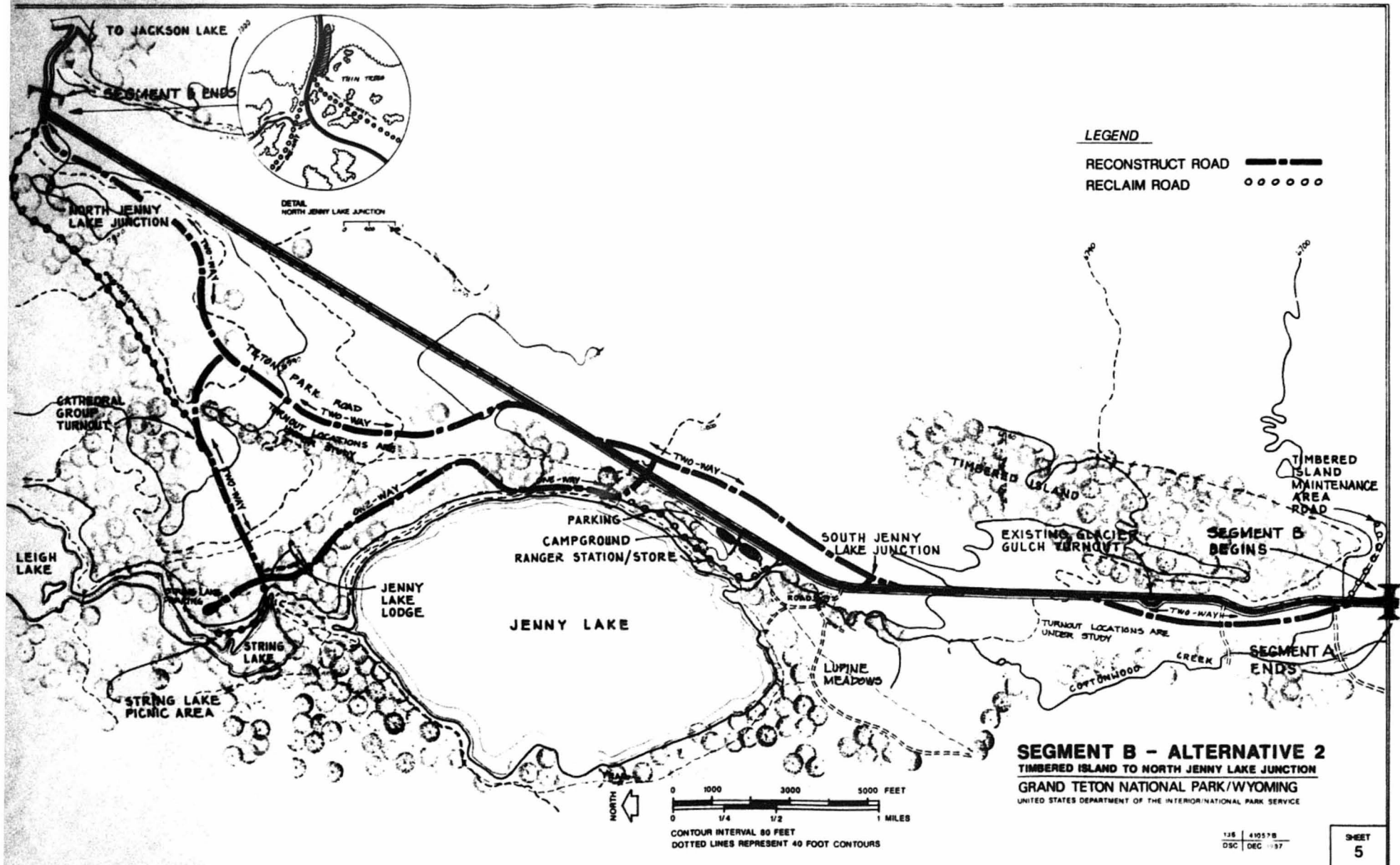
Cost of this alternative, including reconstructing the String/Jenny Lake road system would be \$5.51 million.

NO-ACTION ALTERNATIVE

The existing use and management of the existing Teton Park Road, String/Jenny Lake roads, and auxiliary features such as intersections, parking lots, turnouts, bridges, culverts, and signs would continue in this alternative. Heavy seasonal traffic consisting of bicycles, cars, recreational vehicles, and tour buses would continue to use the narrow and rough roadway. The existing roadway has a non-uniform pavement width varying from 20 to 24 feet, providing traffic lanes north of Taggart Creek as narrow as 9.5 feet. Most of the road has no bicycle lanes or alternate bike routes. Bicyclists would continue to ride in the traffic lanes, conflicting with motor vehicles including large recreational vehicles and buses. No widening of the traffic lanes or shoulders would occur.

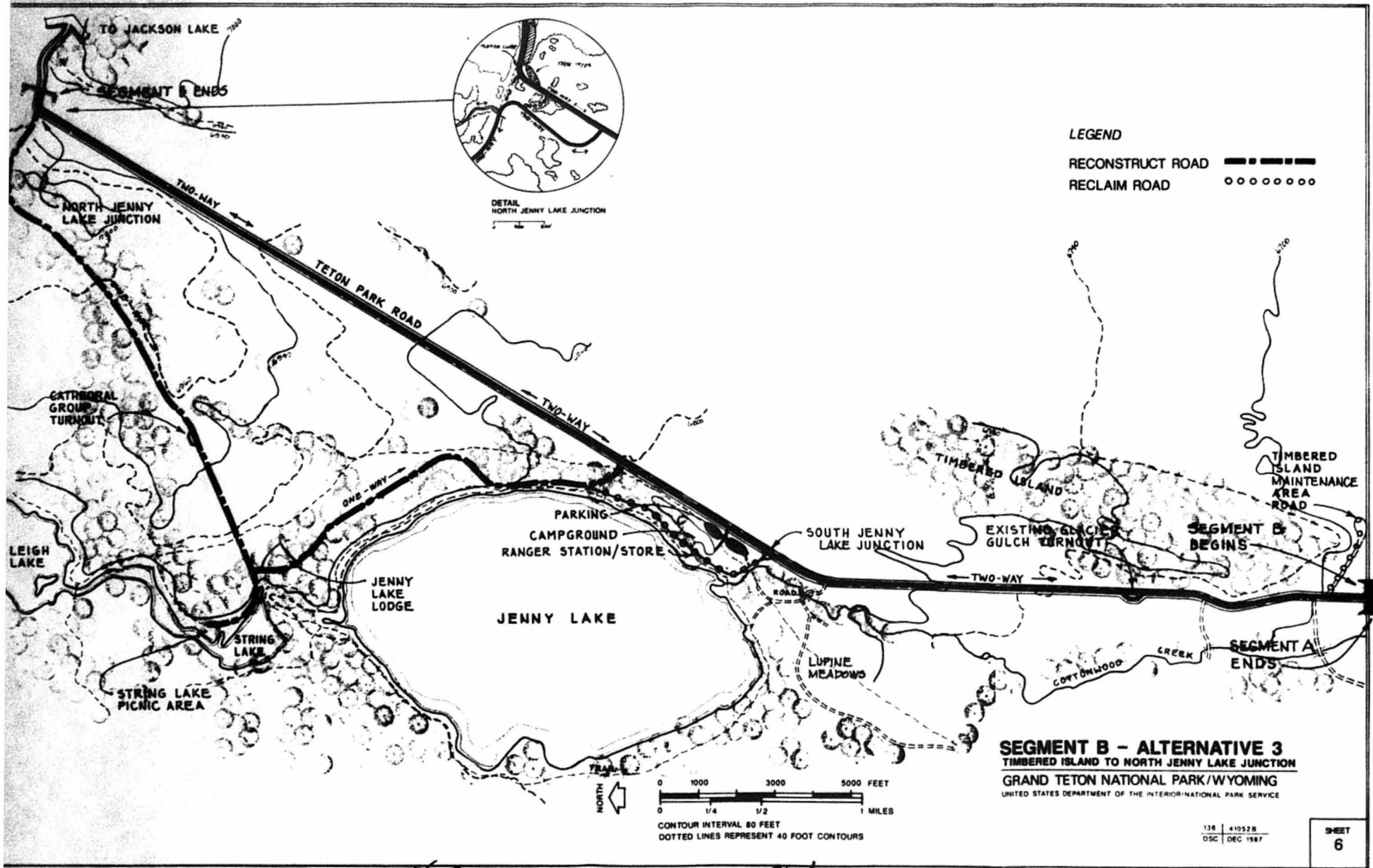
No modification or improvement of the Jenny/String Lake roads or parking areas would occur.

Routine road maintenance would continue, including patching and periodic seal coat applications. No modifications would be made to intersections, parking areas, turnouts, bridges, culverts, or road slopes. The Timbered Island maintenance area would continue to be used for material stockpiling and debris burning.



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AFFECTED ENVIRONMENT

NATURAL ENVIRONMENT

Topography

Beginning at the intersection with the East Side Highway at Moose Junction, the Teton Park Road crosses the Snake River to the west, passes through the river floodplain and the Moose developed area, and then climbs onto a series of upland terraces above the Snake River at Windy Point. The route continues north on a flat glacial outwash plain cut by Beaver, Taggart, and Cottonwood creeks, and then skirts glacial moraines at Timbered Island, Jenny Lake, and Burned Ridge, to the project end near the North Jenny Lake Junction.

Air Quality

Air quality in the park is generally good, with occasional haze of local, regional, and interstate origin. The park is designated as a Class I area under the Clean Air Act. Traffic on the road produces an unknown quantity of pollutants. This may contribute to haze, however quantities are unknown at this time and are not believed to be significant.

Water Resources

Water resources affected by the road are the stream crossings and floodplains of the Snake River and of Beaver, Taggart, and Cottonwood creeks. Water quality of these streams is near pristine. Cottonwood Creek is used by spawning trout from the Snake River, but little or no spawning occurs in Beaver and Taggart creeks. The lack of spawning may be due to existing culverts acting as barriers to spawning trout. The crossings of the Snake River and Cottonwood Creek are on steel/concrete span bridges built in the 1950s. The road and adjacent parking areas between the Snake River bridge and the Moose entrance station lie within the 100-year and 500-year floodplains (Bureau of Reclamation/National Park Service 1984). The existing road and parking areas are built on fill, which would act as a low dike in the event of a 100-year flood. The floodplains of Beaver and Taggart creeks are crossed with roadway fills with culverts to pass the streams. The culvert at Taggart Creek is inadequate to pass high runoff flows, which on occasion results in ponding upstream from the road. The road has been nearly overtopped in recent years during periods of prolonged heavy rain. No wetlands are immediately adjacent to the road.

Soil And Vegetation

The route passes over or near several soil types supporting different plant communities. The route is predominantly underlain by well-drained, glacial-outwash soil of sandy-loam/gravel/cobbles that supports the grass/shrubland plant community of the upland flats characteristic of the floor of Jackson Hole. Common plant species found on the upland flats are big sagebrush, low sagebrush, rabbitbrush, arrowleaf balsamroot, lupine, bluebunch wheatgrass, Idaho fescue, and some colonizing lodgepole pine and narrowleaf cottonwood trees growing in borrow ditches. Floodplains of the Snake River and Beaver, Taggart, and Cottonwood creeks support black cottonwood, lodgepole pine, blue

spruce, willow, aspen, grasses, sedges, and forbs. The road passes by several glacial moraines, composed of soil with a higher clay content and greater water-retention capacity. These moraines support forests of lodgepole pine, subalpine fir, and occasional limber pine. In the area between south and north Jenny Lake junctions and between the existing one-way and two-way roads, there is an intermediate vegetation zone of isolated patches of conifer trees separated by open grass/shrubland.

Non-native plant species, such as butter-and-eggs, Canada thistle, cheatgrass, musk thistle, spotted knapweed, and St. John's-wort have become established along park roadsides. Some of these species, such as knapweed, are adapted to rapid colonization of disturbed well-drained, gravelly soils commonly found along the route. Once established, these species can exclude native plants from the disturbed areas and then spread into undisturbed native vegetation.

The shooting range site east of the airport junction on the East Side Highway was created in the 1950s by excavation of aggregate material for highway construction. The man-made depression makes the site nearly hidden from view from the highway. The site was also used in 1986 as a staging area for material stockpiling and processing, and equipment storage for reconstruction of the East Side Highway. Approximately 13 acres are currently disturbed. Adjacent vegetation is grass/forb/shrubland. Underlying soils are loam/gravel/cobbles typical of Jackson Hole outwash plains.

The potential aggregate source/staging area site at the south end of Timbered Island is a disturbed former grass/shrubland area of approximately 24 acres. An existing 0.5 mile-long, gravel-surfaced road provides access to the area. The site is not visible from the Teton Park Road. The site has been in use for several decades, first as a gravel pit, then as a sanitary landfill, and presently as a maintenance staging area for storage and mixing of road repair material. Several unreclaimed excavated pits and barren compacted areas remain from past activities. Underlying soils are typical loamy/gravel/cobbles of Jackson Hole outwash plains.

Wildlife

Mammals utilizing the area adjacent to the highway include ground squirrel, badger, coyote, mule deer, elk, pronghorn, bison, moose, and black bear. Bird species are represented by a wide range of raptors and perching birds.

The shooting range site proper is not usable habitat for herbivores due to disturbance of vegetation. Adjacent land is used by rodents, hawks and coyote preying on rodents, and occasional antelope and bison. Elk migrate through in spring and late fall.

The Timbered Island site proper is also mostly devoid of vegetation and is not currently usable habitat for herbivores. Adjacent ground is used by rodents, and hawks and coyotes hunting rodents. Antelope and bison occasionally use adjacent land. The adjacent forested Timbered Island is heavily used elk habitat.

Threatened And Endangered Species

There are no known threatened or endangered plant species in the park.

The threatened grizzly bear (*Ursus arctos horribilis*), endangered bald eagle (*Haliaeetus leucocephalus*), endangered whooping crane (*Grus americana*), and endangered peregrine falcon (*Falco peregrinus anatum*) are found elsewhere in the park. Individuals of these species may cross the road corridor, but do not utilize habitat near the road or the aggregate source/staging area sites.

Grizzly bear could potentially use habitat in the northern portion of the project, but have not been sighted south of Jackson Lake in the last 30 years. Grizzly are occasionally sighted in the Teton range west of Jackson Lake, adjacent to the Snake River at the head of Jackson Lake, and east of Colter Bay. The area adjacent to the road right-of-way is rated as a management situation number two area under the Interagency Grizzly Guidelines (Interagency Grizzly Bear Committee 1986). This means the area is considered as lower priority habitat (regardless of occupation), with some restrictions on human use. Management situation number one areas are considered as high quality grizzly habitat, and are managed with the greatest restrictions on human use.

Bald eagles are occasionally sighted flying over the project area during late fall migration. Use of the project area would be foraging on carrion. There are no known roost sites or habitually used food sources in the project area.

Whooping cranes have been observed in the park, on the east shore wetlands of Jackson Lake. There is no suitable habitat offered in the project area, nor is there any known use by cranes.

Peregrine falcon use in the park has occurred north of the project area, around Jackson Lake. There has been no known use of the project area, and no suitable habitat or food sources offered.

This environmental assessment will be submitted to the U.S. Fish and Wildlife Service for review and consultation regarding possible impacts on threatened and endangered species.

CULTURAL ENVIRONMENT

Prehistoric use of the area was seasonal hunting and gathering by Shoshone Indians and their predecessors. Land adjacent to the roadway between Moose and Timbered Island was surveyed for archeological resources, and some cultural material was found at several sites. Archeological survey of the remaining portion of road would be performed, and salvage, and clearance would be accomplished as required prior to disturbance.

Fur trappers used the area near the road during the early 19th century and were succeeded by ranchers beginning in the 1880s. As tourism increased in the 1920s, dude ranching and other recreational uses predominated.

There are no historic structures along the road that would be affected by construction.

Segment A of the road was realigned between Moose and Windy Point turnout, and widened to Cottonwood Creek during reconstruction in the early 1960s. The Cottonwood Creek bridge, and turnouts at Windy Point, Cottonwood Creek, and Glacier Gulch were constructed at the same time. No historic auxiliary road features such as stone headwalls, rustic bridges, or guardrails exist. Segment B of the road basically follows the original alignment, which was selected and constructed in the 1920s prior to establishment of Grand Teton National Park 1929. The original road was constructed as a transportation route using straight lines, not as a scenic park road.

In regard to segment A, the National Park Service has consulted with the Wyoming State Historic Preservation Office, and they have verbally concurred that segment A is a modern road.

Segment B of the road and its features have not been evaluated for historic significance. The National Park Service will evaluate the road according to the procedures developed under the National Historic Preservation Act as amended, and Executive Order 11593.

SOCIOECONOMIC ENVIRONMENT/VISITOR USE

The Teton Park Road is the primary park road west of the Snake River, and provides significant sightseeing opportunities and access to park features at the base of the Teton Range south of Jackson Lake. Travelers enroute to Yellowstone National Park often use this as an optional scenic route. Locally originating traffic comprises a significant portion of road use. Local persons are generally enroute to a specific destination, recreation site, or to a job. Non-local visitors use the road for a more general park sightseeing experience, stopping at turnouts, and probably driving at a lower speed than local users.

Although the main use of the road is recreational in nature, it also provides commercial and visitor access to park concessions in the Moose and Jenny Lake areas. Businesses that would be affected within the project area are the store and gas station at Moose operated by the Grand Teton Lodge Company, Dornan's (store, restaurant, and other services), 12 Snake River float trip concessions plus fishing guides, the 4 Lazy F guest ranch, Climbers Ranch, Exum Mountain Guides, Teton Trail Rides, Teton Boating Company, Jenny Lake Store, and the Jenny Lake Lodge. A post office at Moose provides services for 500 persons, and the primary park information service is located at park headquarters. The road is significant to the regional recreation/tourism industry, because it provides access to prime attractions of the park and helps retain visitor traffic in the region.

The road is closed to motor vehicles for the winter season north of the Cottonwood Creek bridge, and the nearby picnic area turnout is used as a turnaround loop for visitor traffic and snowplows. The roadside between the Taggart Creek trailhead and Cottonwood Creek picnic area is heavily used for winter parking and as a staging area for snowmobilers and cross-country skiers.

Total park visitation reached a reported high in 1978 with 4.16 million visitors, then declined to about 3.5 million visitors per year during 1979

through 1982. Visitation calculation methods changed in 1983 to more accurately report only recreational traffic on park roads. By the new calculation method, reported visitation for 1983 was 1.32 million, with 1.36 million for 1984, 1.33 million for 1985, and 1.31 million for 1986. These figures are considered to be roughly equivalent to recreational traffic between 1979 and 1982, and the early 1970s.

ENVIRONMENTAL CONSEQUENCES

ALTERNATIVE 1 (PREFERRED): RECONSTRUCT TETON PARK ROAD, REALIGN SEGMENT B AND JENNY/STRING LAKE ROADS

Natural Environment

Air Quality - Air quality would be temporarily adversely affected in the project area by emissions and particulates generated by heavy equipment operation, excavation of aggregate material, material crushing and processing, and asphalt production. Operations would be conducted under state and federal permits and would comply with air quality standards. Dust plumes would be visible from the East Side Highway during operation of the shooting range site, and from the Teton Park Road during operation of the Timbered Island site. No measurable effect outside of the construction corridor is anticipated.

Water Resources - Stream channels of the Snake River and Cottonwood Creek would be unaffected by construction or bridge modifications.

Fill would be placed on approximately 2 acres of floodplain at Moose to widen the road, enlarge parking lots, and modify intersections. Downstream hydrology would be unaffected in the event of a flood, due to the existing effect of the Teton Park Road fill. Park roads are exempt from Executive Order 11988 "Floodplain Management" guidelines. About 0.1 acre of floodplain at Beaver Creek would be covered by new fill placed for road widening. No beneficial effects of floodplains would be diminished.

Beaver and Taggart creeks would be temporarily affected during culvert replacement, causing some siltation. New larger culverts would help restore natural stream hydraulics by reducing upstream ponding and eliminating a hydraulic drop below a culvert.

Soil And Vegetation - Reconstruction of segment A along existing road alignment and construction of segment B new road would result in disturbance to approximately 76 acres of undisturbed soil and vegetation. Vegetation reclamation of 145 acres would include road slopes, removal of old roadway replaced by new road, and the existing Timbered Island maintenance area, with a net increase of 69 acres of vegetated area.

Topsoil would be salvaged for re-use in reclamation. Vegetation would be removed for grading and placement of fill. The affected vegetation would typically be bunchgrass, forbs, and shrubs such as rabbitbrush and various sagebrush species. This vegetation is common and typical of Jackson Hole upland flora. Lodgepole pine and cottonwood growing along the existing road edge would be cut and removed, and selected trees along the new alignment would be removed. No clearing of swaths through forest would be necessary, except for short sections between the Teton Park Road and Cathedral Group turnout, and at the south end of the Jenny Lake one-way road bypassing the campground.

Regrowth of native grass and shrubs on road slopes has been successful on previous projects in the park, such as the Teton Park Road between North

Jenny Lake junction and Signal Mountain, which was reconstructed in 1970. Soil compaction seems to be a critical factor discouraging shrub growth in favor of grasses, such as on numerous old dirt roads in the park that were closed to traffic, but never scarified to decompact the soil. Native grasses and shrubs frequently take longer to become well established on disturbed sites compared to volunteer broadleaf annual weeds, which are adapted to rapidly colonizing disturbed ground but are frequently undesirable exotic species. With follow-up reseeding and weed control, including selective herbicide use, native vegetation representative of adjacent plant communities should become established two to three seasons after construction.

Wildlife - Effects on wildlife would include a long-term increase of approximately 69 acres of wildlife habitat. Existing roadkills of rodents, larger mammals, and birds would continue. Realignment of the road near the south end of Timbered Island would help reduce the potential for elk/vehicle accidents by increasing driver's sight distance. Realignment of the road in the region east of the Cathedral Group turnout would pass through heavily used elk summer/fall range. The trees on the proposed alignment are spaced far enough apart to allow for reasonable visibility and driver's sight distance, which would help reduce the potential for accidents. There may be some increased potential for elk/vehicle accidents, however compared to the relatively treeless segment of existing road between South and North Jenny Lake junctions. Elimination of the one-way Jenny Lake road north of the Cathedral Group turnout would eliminate vehicle disturbance to elk on heavily used summer/fall range.

Excavation and construction activity at the shooting range site would displace wildlife from a distance of 0.2-0.5 mile around the site during the construction period. Pronghorn, bison, coyote, and raptors could be affected. After construction of segment A is complete, NPS road maintenance functions would be transferred from Timbered Island to this site, increasing long-term wildlife displacement due to increased truck traffic and activity at the site. This site is lower quality habitat than the Timbered Island area, and there would be a net gain in usable wildlife habitat after the Timbered Island site is closed and reclaimed.

Construction activity at the Timbered Island site for excavation and processing of construction material would temporarily displace wildlife, including elk, pronghorn, and bison, from a distance of approximately 0.2 to 0.5 mile. This would occur over the construction period of two to four years. Post construction closure and reclamation would return the 19-acre site and surrounding area to restored natural habitat in the long term.

Fish spawning may be increased by culvert replacement, removing an existing barrier to potential spawning beds.

Threatened And Endangered Species - There would be no expected negative impacts to threatened or endangered species. Grizzly could potentially use habitat in the northern portion of the project, however they have not historically occupied this area. No grizzlies have been sighted south of Jackson Lake during the past 30-40 years. Nesting bald eagles would not be affected by the project because this area is not occupied or used as a foraging area. Migratory eagles may occasionally forage on roadside carrion

in the project area in late fall. Eagle use in an active construction area would be unlikely, however if this occurred, construction would be temporarily shut down or the attractant food source would be transported to a secure area. Peregrine falcons have not observed in the project area and would not be affected, nor would their food sources. Whooping crane have been observed flying over the area in isolated events (no recurring pattern), but no useful habitat would be affected by road construction. There would be no effect from this project. Cranes, or wetland habitat used by cranes, may be currently affected by the Jackson Lake dam reconstruction project, 6 miles north of the north end of the road project. This has been analyzed in the Final Environmental Impact Statement, Jackson Lake Safety of Dams Project (Bureau of Reclamation/National Park Service 1984). Construction of segment B would not occur until after construction on the dam is complete. There would be no cumulative impact on whooping cranes from the two projects.

No direct or indirect impacts to the above species are anticipated. No short-term change in populations of the above species is anticipated during or after completion of this project. Long-term changes in populations are complex, dependent on many influences external to the park, and are difficult to assess. No effects from this construction project are expected. No coordination measures to reduce or eliminate impacts are considered necessary, because no impacts are anticipated. This project would result in a "no effect" action on the above species.

The above information on populations, behavior, and habitat use patterns is based on consultation with park research and natural resource management staff, park wildlife observations, and ongoing research on other species.

Cultural Environment

Widening the road base would affect four known archeological sites found near the roadway by burial under fill or by redistribution of soil. Archeological clearance would be performed prior to disturbance. Archeological survey would be performed along the unsurveyed portions of segment B and the existing road prior to construction disturbance. Identified sites will be tested for National Register eligibility. Mitigation and clearance would be necessary for eligible archeological sites. The proposed borrow sites are previously disturbed sites. No historic road structures such as bridges, stone headwalls, or guardrails are found along the road. All cultural resources identified by archeological or historical survey will be evaluated for eligibility to the National Register of Historic Places, in compliance with Department of Interior standards and guidelines.

Socioeconomic Environment/Visitor Use

Temporary inconvenience from dust, delays, rough roads, and noise from construction activities would be experienced by visitors and concessioners using the roads from four to six years. During segment A construction, the road between the Moose-Wilson road intersection and the Climbers Ranch road intersection would be closed to public traffic from after Labor Day until winter weather stopped construction. The road would then be reopened to the public for winter access to the Cottonwood Creek area. Public inconvenience would result from being denied access to the Taggart Creek trailhead, or

access to Jenny Lake from the south for one autumn season. Jenny Lake would still be accessible from the north via Jackson Lake, although loop traffic combining the Teton Park Road and East Side Highway would be interrupted. September traffic on park roads in general is about 60 percent of August traffic, and October traffic is about 20 percent of August traffic. During the spring and summer construction season, traffic delays up to 30 minutes would result from flagging for one-way traffic during paving operations on segment A. Overall visitor use on the Teton Park Road is expected to be minimally affected due to the bulk of segment A construction occurring during the fall season.

Segment B construction would largely occur on new alignment, with traffic continuing to use the existing road. There would be some need to route traffic through construction however, with traffic control by flagging and pilot cars and possible delays of up to 30 minutes.

Upon completion, visitors would benefit from the reconstruction by experiencing a road with a smoother pavement surface, improved safety features, and wider traffic lanes that are easier to drive, especially for recreational vehicles. The separation of bicycle and motor vehicle traffic would improve safety and reduce traffic delays. Bicyclists would benefit from improved safety and a more enjoyable experience by riding out of the main traffic stream on the 4-foot paved shoulder. The shoulder would be marked and posted as a bicycle lane. Bicycle traffic is expected to significantly increase on the road after construction.

Realignment of segment B would provide a curving road with a more varied viewing experience than the existing alignment, which is mostly two straight segments totaling 7.0 miles. An additional interpretive turnout and other turnout opportunities would facilitate visitors pulling off the road to enjoy the Teton scenery.

Concessions and business at Moose would be minimally affected by segment A construction, due to most of the construction occurring during the fall, spring, and early summer seasons. Access would be maintained in the Moose area east of the Wilson road intersection, including the post office, visitor center, raft launch area, 4 Lazy F ranch, and Dornan's. Some short-term inconvenience would be incurred by visitors and residents due to construction traffic, noise, dust, rough roads, and detours. Concessions at Jenny Lake would not be affected by the segment A fall closure because these concessions close soon after Labor Day. Segment B construction would have minimal short-term effect because traffic would still use the existing alignment while construction proceeded on the new alignment.

Construction activity would generate construction jobs in Teton County. Local road construction contractors would have the opportunity to bid for the prime contract and sub-contracts for materials, equipment, etc.

Traffic would be altered at the South Jenny Lake junction by moving the junction south, and providing parking on the east edge of the moraine (west of the existing two-way road). The existing lake-front parking area, access road, and one-way road would be reduced in width to provide a pedestrian/bike path. Vehicle traffic to the lake shore would be phased out, and visitors to

Jenny Lake would have to walk 100 yards to reach the lake-front area west of the ranger station. Visitor experience of the Jenny Lake shoreline would be improved by eliminating congestion and the mixture of pedestrians and motor vehicles in a limited space inadequate for existing traffic. This would implement phase I of the Development Concept Plan, Jenny Lake (NPS 1975). See also the Environmental Assessment, Jenny Lake Development Plan (NPS 1975b).

Road maintenance cost would decrease with the reduction in total road mileage. Operational efficiency would be improved by increased accessibility for NPS and concession staff to areas such as String Lake or the Jenny Lake Lodge area, without having to drive the entire existing 6.5 miles of one-way road to reach these sites.

Existing use patterns of the String/Jenny Lake one-way road would change. Access would continue to features such as the Cathedral Group turnout, String Lake, Jenny Lake Lodge, and the Jenny Lake interpretive overlook. The String Lake access and parking would be removed from the lakeshore to a point 50-100 yards east, making the walk from the parking area to the lake longer. The visitor experience would be improved by reducing congestion and mixed pedestrian/vehicle traffic from the lake front.

The existing 6.0-mile one-way loop road would be replaced by 1.3 miles of one-way loop road, plus a 1.7-mile-long, 2-way dead-end access road to String Lake and Jenny Lake Lodge. The existing one-way road provides a low-speed viewing experience different from that provided on conventional two-way 45-mile-per-hour roads. The present low speed (15 miles per hour) and lack of oncoming traffic encourage leisurely viewing either from the car or numerous informal pullouts. The major viewpoints of the existing one-way alignment would continue to be available but there would be a quantitative reduction of experience in the one-way road driving experience. The new alignment and turnouts of the Teton Park Road would provide improved scenic viewing opportunities in this area, compared to the existing alignment.

ALTERNATIVE 2: RECONSTRUCT TETON PARK ROAD, REALIGN SEGMENT B AND JENNY/STRING LAKE ROADS

Natural Environment

Air Quality - Effects on air quality would be the same as described under alternative 1.

Water Quality - Effects on water quality would be the same as described under alternative 1.

Soil And Vegetation - Effects from disturbance to soil and vegetation for new road construction would be similar as described under alternative 1. Approximately 77 acres of undisturbed soil and vegetation would be disturbed. Reclamation would be performed on 143 acres. As under alternative 1, reclamation would be performed on disturbed road slopes, old road replaced by new alignment, and on the Timbered Island borrow site.

Wildlife - Effects on wildlife would be the same as described under alternative 1. A net gain of approximately 66 acres of wildlife habitat would result from vegetation reclamation of closed roads and the Timbered Island site.

Threatened And Endangered Species - Effects on threatened and endangered species would be the same as described under alternative 1.

Cultural Environment

Effects on cultural resources would be the same as alternative 1.

Socioeconomic Environment/Visitor Use

Short-term inconvenience from construction would be the same as for alternative 1. Short and long-term effects on concessions in the Moose and Jenny Lake areas would be the same as for alternative 1.

Benefits to users of the two-way Teton Park Road would also be similar to alternative 1, with a difference in use of the the one-way road between String and Jenny lakes. A 4.2 mile one-way road, mostly along the existing alignment would provide access and viewing, compared to the existing 6.5 miles. Traffic at the south end of the one-way road would also be routed east, bypassing the lakefront near the Jenny Lake ranger station. Modifications at the south Jenny Lake area to parking, intersections, and benefits to visitors would be the same as under alternative 1.

ALTERNATIVE 3: RECONSTRUCT EXISTING TETON PARK ROAD AND JENNY/STRING LAKE ROADS

Natural Environment

Air Quality - Effects on air quality would be the same as described under alternative 1.

Water Quality - Effects on water quality would be the same as described under alternative 1.

Soil And Vegetation - Reconstruction of segment A would be the same as described under alternative 1, with the same results. Reconstruction of existing road along segment B between the south end of Timbered Island and North Jenny Lake junction would result in removal of roadside surface soil and vegetation in preparation for road widening as in segment A. Approximately 37 acres of undisturbed soil and vegetation would be disturbed for reconstruction and widening. Vegetation reclamation would be performed as described under alternative 1, with 93 acres reclaimed, including the Timbered Island maintenance area.

Wildlife - Effects would include a long-term gain of 56 acres of wildlife habitat resulting from reclamation. The existing alignment between South and North Jenny Lake junctions is relatively poor habitat for large mammals

compared to the realignment of alternative 1, and fewer wildlife/vehicle accidents may occur than from alternative 1. Existing roadkills would continue, and possibly increase if average traffic speed increases on the reconstructed road.

Effects on habitat from management and reclamation of borrow sites would be the same as described under alternative 1.

Threatened And Endangered Species - There would be no anticipated negative effects on the above listed species. All construction activity would be confined to the existing roadways, which are not used by the above species.

Cultural Environment

Effects on archeological and cultural resources would be the same as described under alternative 1, segment A. Archeological survey and evaluation of any archeological sites would be performed for segment B prior to construction. If sites were determined eligible, clearance and mitigation would be performed as described under alternative 1.

Socioeconomic Environment/Visitor Use

Inconvenience and benefits to visitors and concessioners from segment A construction would be the same as described under alternative 1. Reconstruction of segment B would result in similar benefits from additional pavement width as described under alternative 1, segment A, but the existing straight alignments of two-way road would be utilized.

Construction of segment B would require mixing of construction and visitor traffic on the same alignment, resulting in inconvenience from delays, rough road surface, dust, and noise. A traffic management program would be developed, with options such as shoulder season road closure, night construction work, or one-way public traffic under pilot car control.

Average traffic speed would increase, given a wider and smoother straight road. Visitors who are more interested in viewing scenery than reaching a destination as rapidly as possible may be at a disadvantage.

Existing use of the String/Jenny Lake one-way road would continue, with the road reconstructed to provide smoother and wider pavement and parking shoulders. Parking and pedestrian access at String and Jenny Lakes would be changed as described under alternative 1, with similar benefits. Traffic safety would improve from modification of North Jenny Lake junctions.

NO-ACTION ALTERNATIVE

Natural Environment

Air Quality - Air quality would continue to be affected by mobile emissions from vehicles using the road, however this quantity is unknown. Visual quality from the roadway would remain the same, because there would be no

road construction or modification of auxiliary features.

Water Resources - Water resources would remain unchanged by continuing the status quo. The Taggart and Beaver Creek culverts would continue to back water up during high run-off.

Soil And Vegetation - Continuation of existing use and management would have few if any new impacts on soil and vegetation. Some soil compaction and vegetation disturbance would continue if parking areas and parking shoulders were allowed to expand. Non-native vegetation would continue to become gradually established along roadways due to transportation of seed by vehicles. Non-native vegetation is spreading out from the roadside into undisturbed native vegetation in some areas of the park.

Wildlife - Fish would continue to be excluded from potential spawning habitat of Taggart Creek due to the barrier the culvert presents. Roadkills of mammals and birds would continue. The forested areas along the roadway tend to conceal wildlife, with a generally greater frequency of nighttime vehicle/wildlife accidents than open sections of roadway.

Threatened And Endangered Species - No new impacts, or known existing impacts, to threatened or endangered species would occur from continuation of current management and visitor use. Such bird and mammal species do not utilize habitat near the roadway.

Cultural Environment

There would be no new effects on archeological or historical resources resulting from this alternative, because there would be no new construction disturbance.

Socioeconomic Environment/Visitor Use

Visitor use and traffic patterns would continue along current trends. The quality of the visitor experience while traveling the road is reduced by the existing condition and design of the road. There are notably poor between Beaver Creek and the North Jenny Lake junctions. The pavement is deteriorated and rough from repeated patching, causing a rough ride. This condition would remain, with continued inconvenience to the public using the road. Numerous unnamed graveled turnouts are often rough with abrupt pavement edges, discouraging use by slower vehicles to allow backed-up traffic to pass.

The narrow traffic lanes would continue to make driving wide vehicles difficult and hazardous, requiring greater than normal driver concentration. If a vehicle leaves the pavement edge, the lack of shoulders makes recovery of control difficult and results in a hazardous situation. Potentially hazardous conditions result from the mixture of wide recreational vehicles, tour buses, and bicycles on the narrow roadway. Bicyclists continue to be exposed to danger from being hit by motor vehicles (or their side mirrors) or being forced off the road while riding in the traffic lane. Bicyclists tend not to report close calls or being forced off the road, so the true incident rate of bicycle/motor vehicle conflicts is not documented. Drivers of motor

vehicles would continue to be inconvenienced when they have to slow down behind a bicyclist to wait for an opportunity to pass.

Safety hazards would continue due to physical characteristics of the road, slopes, and intersections.

Visitor traffic in the Moose area would continue to be congested, slow, and confusing, resulting in visitor inconvenience. Inadequate parking at the visitor center and concession/post office area across the road would continue visitor frustration. Boat launch traffic would continue to be congested.

Use of the existing dirt parking lot at Taggart Lake trailhead and dirt parking shoulders along the roadside would continue, causing some inconvenience from rough surface, dust, and mud. Winter visitor parking and turning space at the Cottonwood Creek picnic area would continue to be congested and complicate snow plowing operations.

Maintenance of the road would continue to be expensive and difficult, due to the age and advanced state of deterioration of the road.

The potential for road failure at Taggart Creek due to inadequate culvert capacity would continue to exist. This could potentially close the road for several days, requiring traffic to drive to Jenny Lake via Jackson Lake.

Concession business in the park area serviced by the road would be unaffected by continuing current management and use patterns.

APPENDIX

POTENTIAL AGGREGATE SOURCES FOR PACKAGE 171

INTRODUCTION

Needs

An estimated 100,000 cubic yards (CY) of new aggregate material are required by this project for fill and paving. An additional 200,000 CY will be needed to complete reconstruction of the East Side Highway (Package 328) over the next several years. Over the next 20 years, park maintenance needs are estimated to be nearly 1,000,000 CY (Federal Highway Administration 1985). A source, or sources, for this material must be located and evaluated prior to soliciting bids for this project.

In order to provide for the material needed to complete Packages 171 and 328 (as well as for park maintenance needs), a number of potential sites in and outside the park have been considered. Table 1 presents a summary of the actual and potential impacts associated with the use of 15 sites. Because of extremely high hauling costs and conflicts with visitor traffic, sites beyond 25 miles of this project were not included in this analysis. Other sites have been evaluated by the Federal Highway Administration which may be included in compliance documents for future projects.

As it became apparent that more than the short-term needs of Package 171 should be considered in this document, the decision was made to evaluate all feasible sites in terms of their long-term use for various Park needs. Several major issues emerged which were common to many in-park sites and these are discussed below. Other issues were common to all sites and the most important of these are also addressed.

Policy Constraints

National Park Service management policy (NPS 1981:111-6) concerning borrow pits is: "Only when economic factors make it totally impractical to import materials will borrow pits be created in the parks, or present pits further utilized." Based on this policy, the park's approved Natural Resource Management Plan (NPS 1986a) committed the National Park Service (NPS) to either import material or obtain it from the Flagg Ranch pit in John D. Rockefeller, Jr. Memorial Parkway. Small amounts of material from certain streambeds are also authorized to meet park maintenance needs if State and Federal requirements are met.

When this policy was approved, it was assumed that adequate material existed in the Flagg Ranch pit to meet long-term needs in Grand Teton, Yellowstone and the Parkway (NPS 1986b). However, subsequent evaluation of the site indicated only 650,000 CY remained if an acceptable rehabilitation program is to be implemented (Federal Highway Administration 1987). Several major road construction projects in southern Yellowstone National Park are scheduled in the near future and some or all may require material from the Flagg Ranch pit. Because of these factors, this site is no longer considered to have long-term potential to provide material for major construction projects in

Grand Teton. This, in combination with the long hauling distance (34 miles to the center of Package 171), eliminated the site from further consideration for this project. Present plans are to amend the Natural Resources Management Plan to account for these changed circumstances.

Economics

According to NPS policy, adverse economics should not dictate the location of material sources in the parks unless this factor makes importation of material "totally impractical." It is not known at what point additional costs become totally impractical, but a cost increase that required doing a project in two years instead of one was considered an important criterion. Any increase in costs which results in less-than-adequate rehabilitation efforts would be detrimental to park objectives and should be avoided.

Transportation And Traffic

This issue is important because of the high volume of visitor traffic in summer and the potential for conflict with heavy trucks. Haul routes through residential, commercial or heavily used recreation areas will increase the potential for accidents and conflicts with local residents. In general, those sites having the shortest hauling distance are preferable, all other factors being equal. Truck traffic to the park from sources to the south or west of Jackson generally has to pass through the town of Jackson or bypass the town to the west and use the Spring Gulch road. Traffic through Jackson cannot avoid residential streets and congested roads, and hauling traffic would create controversy due to noise, dust, and safety concerns. Hauling traffic over the Spring Gulch road would pass through the golf course residential area, with attendant controversy. The Spring Gulch road also has weight-restricted bridges.

The entrance stations at Moose and Moran are areas of particular concern due to traffic congestion and frequent lines of vehicles waiting to enter the park. Much of this problem can be mitigated by scheduling hauling activities after Labor Day. The project will require about 6,700 trips by fully-loaded trucks which can damage roads if the roadbeds are wet. Here again, scheduling the hauling after Labor Day would minimize this impact.

The Moose-Wilson road was eliminated as a potential hauling route from commercial sources to the south of the park. The bridges, road base, and pavement are inadequate for such heavy loads. The road would also have to be closed to public traffic during hauling, due to its narrow and winding design.

Rehabilitation Needs

These will vary with the site(s) chosen for use in this project. Whichever sites within the park that are used (if any) will have a specific reclamation plan which will become part of the construction contract. The NPS in cooperation with the Federal Highway Administration will be responsible for the preparation of all reclamation plans.

SITES CONSIDERED BUT REJECTED

Commercial Sites Outside Of The Park

The Evans pit south of Jackson was eliminated because the owner prefers smaller scale operations than would be required by this project. An 18.2-mile haul (one-way) would be required to Moose Junction. Truck traffic would have to travel through Jackson or up the Spring Gulch road and pass through the golf course residential area. Either route would be controversial due to the dust and noise generated from truck traffic. The latter route has weight-restricted bridges.

The Clark pit west of Jackson is a rock pit primarily used as a rip-rap source and does not have suitable material for this project.

Park Sites In Floodplains

Channel instability due to bed load aggradation is a common feature of a number of streams in Jackson Hole (particularly in the park). Such streams have historically required considerable maintenance of bridge crossings due to the accumulation of bed load material -- primarily cobbles, gravel and sand. Studies (Skinner 1977, 1980) indicated some removal of this material could benefit stream hydrology and improve channel stability. Based on these conclusions, and to protect bridges and roads, removal of aggregates at certain locations in some streams was authorized in the park's Natural Resource Management Plan.

In 1986, the Park removed about 3,000 CY from under bridge openings on Pacific and Spread Creeks. In late 1986, the Park's contractor took 40,000 CY from the Gros Ventre River upstream from the highway bridge although Skinner (1980) recommended only 19,000 CY be taken from this location. In 1987, the Jackson Hole Airport Board's contractor excavated 65,000 CY from the Gros Ventre River near the golf course. (This particular area had not been evaluated by Skinner.) All of these operations occurred during low water periods and had little apparent effect on water quality or other resources at the time. Removal of gravel from below the high water line does not require a Section 404 permit from the Corps of Engineers, but does involve meeting water quality performance standards imposed by the Corps and the State Department of Environmental Quality. Processing or stockpiling of material on the floodplain must be done under a 404 permit and normally requires temporary or permanent levee protection.

Four of the sites under consideration in this document are located in or adjacent to active stream channels (Gros Ventre River, Snake River and two on Spread Creek). While it is likely that some materials could be removed from any of these sites without detrimental effects to stream hydrology or channel stability, it is less certain that the quantities required by this project could be removed without creating such effects. In order to avoid such a possibility, a site-specific investigation should be conducted by a qualified hydrologist and both the design of the excavation and the quantities of material removed should closely follow the investigator's recommendations. As none of the four sites have had such a study, their use for this project was not considered to be desirable, and they were eliminated

from further study.

Abandoned In-Park Sites In Need Of Rehabilitation

Of the 40-plus old gravel pits located in the Park, all but seven have been abandoned and have received no subsequent use of any kind. Most of these abandoned pits show fair to good revegetation and are not considered for further material extraction. Three sites (Signal Mountain, Lost Creek Ranch Road and Pinto Ranch) are near roads scheduled for reconstruction, would benefit from additional reclamation efforts, and were considered for use as aggregate sources to be followed by adequate rehabilitation.

Because of the poor quality of the material at the Pinto Ranch (a high fraction of fine material), that site was dropped from further consideration. Excellent quality material exists at the Lost Creek Ranch Road site, but removal of enough quantities for both the 171 and 328 projects would necessitate expansion of the present excavated area and additional impacts on undisturbed Park lands. The Signal Mountain site is discussed below.

Active In-Park Sites In Need Of Rehabilitation

Of the seven old gravel pits in the Park which still sustain uses, only two very small pits are still used for obtaining material. The others are used for storage, stockpiling and mixing asphalt (Colter Bay, Kelly, Timbered Island) or for special uses (Shooting Range, Trap Club). Four of these mentioned sites are included in this analysis. Colter Bay was not included because of a lack of suitable surfacing material (again too many fines) and the necessity for continuing present maintenance activities in the north district of the Park.

The Kelly site was rejected because of its proximity to a residential area which has substantially increased since the pit was last used as a borrow source in the early 1960's. Additionally, use of the site is constrained by landfill contamination, an adjacent irrigation canal, a high water table and high hauling costs due either to distance from the project or the necessity to upgrade the alternate hauling route. Other factors constraining choice of this site are the long hauling distance for any material stockpiled there to most job sites and seasonal disturbance of wildlife. The Kelly site is in need of substantial reclamation, but this could be accomplished under a multi-year program by the Park.

The Airport/Trap Club site was rejected because of its proximity to residences and a major access road to a developed subdivision. The site has been used (under permit) since 1983 as a shot-fall area by the Jackson Hole Trap Club. Nearly half the area is heavily contaminated by lead which would have to be removed before any of the material could be transported to other portions of the Park. Use of the site for this or other projects would require termination of the Trap Club's special use permit. A recommendation in 1985 not to renew the permit led to considerable controversy. A new 2-mile haul road to the north would be needed to effectively use the site, but such a road would be nearly impossible to maintain in the winter. A serious effort is needed to clean up the lead shot at the Airport site, but this cannot be done as long as the special use permit is allowed to continue.

FEASIBLE ALTERNATIVE SITES

The two preferred sites (Timbered Island, Shooting Range) are considered together. They are both inside of the park, are previously disturbed, actively used, and in need of rehabilitation. If these sites are used for this project, the major Park objectives are to terminate present uses of Timbered Island by transferring them to the Shooting Range site and to totally rehabilitate the Timbered Island site including the access road and nearby irrigation ditch. Present uses there consist of stockpiling of material, mixing of surfacing material and disposal of wood (by burning). Such activities displace elk from a favorable portion of their summer range and are visible to visitors from several locations (primarily the mountains). The general area is one of the most sensitive in the Park in terms of visitor use and abundance of wildlife.

Although proximal to the major park highway, the Shooting Range site occupies a man-made depression in a level outwash plain and is nearly hidden from the road. The site has been used since 1969 as a law-enforcement pistol and rifle range. It was also used for stockpiling and processing of material for segment B of the Package 328 road reconstruction program. Such uses have conflicted with revegetation since the site last served as a material source in 1962. In particular, the activity in 1987 removed much of the new vegetation from the original excavation and stockpile area. Use of this site by the Park to replace those functions now served at Timbered Island offers some advantages. The site can be accessed in the winter, it is closer to many maintenance projects than is Timbered Island, and most of the activity will not be visible from the highway. There may be some increased conflict with grazing permittees in late spring and wood burning in late fall will be visible to more persons. The site would continue to be used as a shooting range, but no conflicts with other park or public uses are anticipated.

The present proposal is to excavate, stockpile and process 45,000 cubic yards from the Shooting Range site and haul these materials to the segment A portion of the job as needed. Upon completion of segment A, the site would be cleaned up and the slopes stabilized. The Timbered Island site would be used only during segment B in order to avoid hauling material over the newly paved road of segment A. Following completion of segment B the Timbered Island site would be cleaned up and scarified, slopes would be stabilized and some topsoil spread to facilitate revegetation. Native grasses, forbs and shrubs would be planted. If these plants or seeds are not available, an annual nursery crop would be planted to aid volunteer revegetation. Selective weed control may be required for several years following.

Excellent quality material also exists at the Signal Mountain site which is relatively close to the north end of Package 171. However, reclamation of this site will require the importation of a large quantity of fine soil (13,000-15,000 CY) to realize any adequate revegetation. Such a quantity of fine material is not available anywhere in the valley except in the active construction area west of the Jackson Lake Dam (3 miles north).

At present, the Bureau of Reclamation is reconstructing the Jackson Lake Dam to insure safety of the structure. This project is scheduled for completion in late 1988 or early 1989. Aggregate material requirements are in excess of

600,000 CY which is presently coming from the dry lakebed west of the dam. There is a possibility that the lakebed site may not provide all the needed pervious material since a large fraction has been rejected as too fine. Should this occur, additional gravel must be obtained elsewhere. As a contingency measure, the Bureau has begun evaluation of and environmental compliance for other sites (including the Signal Mountain Pit).

One of Grand Teton National Park's top priorities is to facilitate the completion of the Jackson Lake Dam reconstruction program without imposing additional impacts on park resources. The park also insists that no additional use be made of the Signal Mountain Pit without the guarantee of adequate rehabilitation. Any use of the Signal Mountain site by the Package 171 road contractor should not conflict with possible use of the site by the dam contractor. Likewise, the use of the site by one or both contractors should be coordinated to permit the excavation and hauling of fine material from the dam site to the Signal Mountain pit for reclamation purposes.

The Hansen pit is a commercial operation outside of the park and west of the Gros Ventre junction. Hauling would not pass through Jackson, however controversy has resulted in the past from neighboring landowners objecting to pit and processing operations. The operation was granted a 10-acre exemption by the Wyoming Department of Environmental Quality (DEQ), but is contested by the Teton County commission. The hauling distance is 8 miles from the pit to Moose.

The Tucker pit is a commercial operation under DEQ permit, outside of the park and west of Jackson and the Snake River. Hauling traffic would have to pass through Jackson or up the Spring Gulch road, with attendant conflicts from dust, noise, safety, and restricted bridges. The hauling distance from the pit to Moose is 19 miles via the Spring Gulch road and 20 miles via Jackson.

The BLM lot is a floodplain site outside the park along the Gros Ventre River and west of the Gros Ventre Junction. The area has been identified as a potential borrow site, however the BLM, DEQ, Army Corps of Engineers, and Teton County would have to give authorization and issue permits. Hauling would have to either pass over a weight restricted bridge or go around through Jackson. Conflicts with golf course users and nearby homeowners could result from truck traffic.

Table 1: Possible Alternative Sites - sources.

Site	Water Resources	Air Quality	Vegetation	Wildlife	Rare Species	Geology/Soils	Recreation/Aesthetics	Serial/Political	Transportation/Traffic	Economics	Policy/Legal Constraints	Riparian	Rehabilitation Needs
Tidaland Island (Pre-Revised)	No Impacts	Particulates from processing during project. Minimal from hauling.	Disturbed by past and existing uses. Big and low sagebrush/bunchgrass.	Temporary displacement of elk and pronghorn from portion of summer range.	No Impacts	Glacial Outwash. Low erosion potential. Contaminated by old landfill in some portions.	Little public use. Not highly visible from highway.	No Impacts.	No Impacts outside of project.	Centrally located. Least hauling costs. Moderate rehab costs.	Conflicts with NPS & GTE policy.	Negligible - No proximal public use areas.	Strongly committed as part of mitigation. Additional topsoil req.
Shooting Range (Pre-Revised)	No Impacts	Particulates from processing and hauling during first phase of project. Smoke from wood burning following project.	Disturbed by past and existing uses. Sagebrush/bunchgrass. Spring livestock grazing area.	Elk migration and pronghorn spring range. Temporary displacement can be mitigated by scheduling.	No Impacts	Glacial Outwash. Low erosion potential.	Little public use. Low visibility from highway. In excavated area. Visible from Blacktail Butte.	Possible conflicts with grazing Permits.	4.0 mile haul on newly reconstructed highway with heavy summer traffic.	Relatively low costs for hauling. Min. rehab. cost as site will be used for other purposes. Overhaul \$700,000.	Conflicts with NPS & GTE policy.	Negligible - No proximal public use areas.	Minimal - some slope reduction. To be used for stockpiling. Storage & wood burning.
Signal Mt./W/O Road	No Impacts. Test well location - no conflicts.	Particulates from processing and hauling during project.	Disturbed by past excavation, very poor re-vegetation since 1970. Sagebrush/bunchgrass scattered landscape.	Temporary displacement of elk and pronghorn from a portion of summer range.	No Impacts	Glacial Outwash. Low erosion potential.	Little public use. Low visibility from highway. Visible from Signal Mt.	No Impacts.	4.0 miles from north end of project. Heavy summer traffic. Road not plowed in winter.	Relatively low hauling cost. High rehab. cost. Some road damage cost. Overhaul \$200,000.	Conflicts with NPS & GTE policy. Under consideration as alternate site for Jackson Lake Dam Project.	No Impacts	Will need extensive rehab. including importation of topsoil (11,000 cu. y.)
Tucker Pit (Commercial)	Covered in DEQ Permit. Existing nonconforming use under Teton County Plan.	Particulates from processing and hauling during project.	None (existing active pit).	No Impacts	No Impacts	Floodplain. Outside levee. Existing nonconforming use under Teton County Plan.	No Impacts	Hauling thru congested residential/commercial areas.	19.5 mile haul thru Jackson, 18.8 mile haul thru Spring Gulch. Heavy traffic. Restricted bridge in Spring Gulch.	Very high hauling costs. Road damage can be reduced by scheduling. Overhaul - \$975,000. Benefit to local economy.	Private land. commercial operation.	Hauling thru residential area.	None
Hansen Pit (Commercial)	No Impact	Particulates from processing and hauling during project.	None (existing inactive pit).	No Impacts	No Impacts	Glacial Outwash. Low erosion potential.	Impacts to adjacent homeowners.	Controversial with area residents.	8.0 mile haul on existing roads. Significant traffic in residential area.	Moderate hauling costs. Overhaul \$400,000. Benefit to local economy. Road damage can be reduced by scheduling.	Use of site contested by Teton County.	Impacts to nearby residential.	As required by DEQ.
BLM lot (Gross Vente R.)	Floodplain/land altered by levees. Erosion potential. 401-408 permit required. Potential to improve present wetland area. Potential to impact water quality and aquatic habitat. Scheduling can mitigate.	Same as above.	Riparian - impacted by gravel extraction and levee construction. Annual livestock grazing.	Phase winter range. Could be improved by reclamation and exclusion of livestock.	Potential bald eagle foraging area - active nest 1 1/2 miles west.	Alluvial type - low erosion potential.	Little public access. Hauling may impact golf use. Not visible from county road due to vegetation.	Potential conflict with Teton County & golf course residents from hauling on county road. Alternative routes possible conflict with grazing Permits.	8.5 mile haul via golf course, 20.5 mile haul via Jackson. Weight limitations on county bridge - alternative route possible.	Moderate to high hauling costs: \$475,000-\$1,025,000. Possibly high reclamation costs.	BLM must authorize. Concurrence of DEQ, Teton County and Corps of Engineers required.	Impacts on golf course from hauling.	BLM-DEQ requirements would apply. Good potential for improving present conditions.

Table 2: Rejected Sites - Summary of impacts at potential aggregate sources.

Site	Water Resources	Air Quality	Vegetation	Wildlife	Rare Species	Geology Soils	Site	Recreation/Aesthetics	Social/Political	Transportation/Traffic	Economics	Policy/Legal Constraints	Noise	Watershed/Other
Commercial Sites														
Evans Pit	General in DEQ Permit. Existing non-conforming use under Teton County Plan.	Particulates from processing and hauling during project.	River (existing active pit).	No impacts	No impacts	River terrace. Existing non-conforming use under Teton County Plan.	Evans Pit	No impacts	Owner prefers not to operate pit for large projects. Hauling thru town of Jackson.	18.2 mile haul thru Jackson.	Very high hauling costs. Road damage can be reduced by scheduling. Overhaul \$990,000. Benefit to local economy.	Private land. Commercial operation. Owner prefers small-scale operation.	Hauling thru Jackson.	None
Floodplain Sites (In-Park)														
Gros Ventre River (active floodplain above highway bridge)	Potential impacts to water quality, channel hydrology and aquatic habitat. Can be mitigated by scheduling. 401-408 compliance required. Site specific study needed to avoid major impacts. High potential for impact on irrigation.	Same as above.	Sparse riparian due to channel instability. Could be aggravated by use of some sites. (Could be improved by same use at other sites.)	Elk migration and Moose winter range. Scheduling could mitigate impacts to aquatic mammals and fish. Limited fishing.	Potential foraging area for bald eagle. Active nest 2-5 miles.	Floodplain silt, sand & cobbles. Small fraction of fine material. Unstable & subject to erosion during high water. Channel avulsions are common.	Gros Ventre River (active floodplain above and below highway bridge)	Portions highly visible from major highway. Moderate public use. Limited fishery.	Potential conflict with Mjo., DEQ, AGS, State Board of Control and Irrigation.	7.0-8.0 mile haul on highway with high summer traffic volume	Hauling costs (\$300,000-\$400,000) moderate. Possibly high rehabilitation costs in floodplain. Possible disruption of irrigation water.	Conflicts with NPS & GRTE policy. My conflict with AGS policy concerning wildlife habitat & migration. Floodplain/wetlands constraints.	No impacts	May require little rehab. With proper design to complement natural channel behavior. Scheduling & design could require extensive structures to connect.
Spread Creek (near highway)	Potential impacts to water quality & channel hydrology. 401-408 compliance needed. Site specific study needed to avoid channel disruption. Temporary levees needed for processing area. Existing levees above bridge to be replaced.	Same as above.	Sparse riparian due to channel instability. Potential loss due to additional channel disruption.	Moose winter range. Very limited fishery. Low impacts likely.	No impacts	Alluvial deposits of sand, gravel and cobbles. Somewhat unstable and subject to erosion during high water periods. Channel avulsions are common.	Spread Creek (near highway)	Visible from highway crossing Little Visitor use.	Probable conflict with Rosebush Ranch operation.	13.9 to 16.5 mile haul to either end of project. Heavy summer traffic particularly thru Moran Junction.	Hauling costs high-\$895,000-\$925,000. Consultant made to replace existing unauthorized levees above highway - a substantial cost.	Conflicts with NPS and GRTE policy. Floodplain/wetlands constraints. Under consideration as a borrow area for Project 328.	No impacts	Removal & reconstruction of existing levees required. Scheduling of temporary levees required. Proper project design could minimize rehab of borrow area & vice-versa.
Spread Creek (near diversion)	Potential impacts to water quality and channel hydrology. Can be avoided and/or mitigated by scheduling and proper design. 401-408 compliance required. Site specific study needed. High potential for impacts to irrigation.	Same as above	Sparse riparian and sagebrush/bunchgrass. Can be converted to wetlands by proper design. Minor impacts.	Elk migration and marginal moose winter range.	No impacts	Alluvial floodplain and terrace. Moderate erosion potential due to upstream diversion structure. Potential for down-stream channel instability.	Spread Creek (near diversion)	Proximal to hunting camp. Moderate public use (hunting).	Conflict with hunting camp use & access.	16.3 to 20.3 hauling distance. Heavy traffic either route. Major conflict at Moran entrance and can be mitigated by scheduling.	High hauling costs \$815,000 - \$1,015,000. Would require upgrading 3 miles of secondary road. New irrigation canal would be required-1 mile.	Forest Service, DEQ & Corps of Engineers concurrence required. Conflict possible with irrigation & cattle grazing permits.	No impacts	Reclamation needs are minor if use does not destabilize main channel - will be high otherwise. Potential is poor.
Snake River (near River)	Potential impacts to water quality & channel hydrology in Class I water. 401-408 compliance needed. Site specific study needed to avoid above impacts.	Same as above.	No impacts - unvegetated gravel bar.	Potential impacts on fish population if activity destabilizes channel hydrology. Channel fairly stable.	Bald eagle roosting and foraging areas. Active nest 1 mile south.	Alluvial floodplain. Area of bar/soil accretion. High potential erosion during high water. Inadequate material for project - would require use of other sites. Removal confined to low water period.	Snake River (near Moran)	Major float trip trip access area. Use could be benefited by gravel removal. Visible from road & public use area-temporary impacts.	Possible conflict with landowner. Possible conflict with conservation groups.	Within project. Heavy traffic visible in immediate area during summer can be mitigated by scheduling.	Low hauling costs. Benefit to float trip concessions.	Conflict with NPS & GRTE policy. Floodplain constraints.	Proximal to residential area. Noise impacts.	No rehab needs. Material would be removed at low water level - water removal of year.
Active In-Park Sites														
Kelly	Conflict with irrigation ditch. High water table.	Same as above	Disturbed River terrace. Revegetation to sage/bunchgrass and willow/cottonwood.	Elk migration, Moose winter range - can be mitigated by scheduling.	No impacts	Alluvial terrace. Low erosion potential. Some lead/pill contamination.	Kelly	Impacts to nearby homeowners.	Potential conflicts with Kelly residents.	12.5 mile haul via Gros Ventre Junction or 9.5 miles via Antelope Flats. Road requires reconstruction prior to haul.	Moderate to high hauling cost - \$475,000-\$625,000. Road upgrade \$300,000.	Conflicts with NPS and GRTE policy.	Impacts to nearby residential neighborhood.	Extensive reclamation entire 25-acre site needed.
Airport/Trap Club	No impacts	Particulates from processing and hauling during first phase of project.	Disturbed by past and existing uses. Sagebrush/bunchgrass. Shot fall area for Trap Club.	Little wildlife	No impacts	Glacial Outwash. Low erosion potential contaminated by lead shot.	Airport/Trap Club	Trap Club special use area. Proximal to residential area, airport & access road.	Highly controversial to Trap Club members. Possible conflicts with neighbors & airport.	8.3 mile haul on existing roads or 4.0 miles on new haul road to north. Traffic moderate to heavy.	Moderate hauling costs. Minimal rehab. cost as site will be used for other purposes. High cost to Trap Club. Overhaul - \$200,000 or \$400,000.	Conflicts with NPS & GRTE policy. Conflicts with special use permit.	Negligible - adjacent to Trap Club & airport.	Minimal - some slope reduction. To be used for stockpiling, storage and wood burning.
Abandoned In-Park Sites														
Pinko Ranch	No impacts	Same as above.	Disturbed Site	Negligible at site due to use as livestock pasture. Elk migrate thru general area.	No impacts	Relatively fine gravel and sand. Low erosion potential.	Pinko Ranch	Little public use. Not visible from highway.	Possible conflict with grazing permits.	14.8 mile haul on highway with heavy traffic. Major conflict at Moran entrance.	High hauling costs \$730,000. Material not suitable for processing.	Conflicts with NPS & GRTE policy.	No impacts	Site should be re-sloped & stabilized & some potential may be due to livestock use.
Lost Creek Ranch Road	No impacts	Same as above.	Sagebrush/bunchgrass reestablishing on disturbed site. Near re-vegetation in some areas.	Elk migration & pronghorn summer range. Proximal activity reduces use of area.	No impacts	Glacial Outwash. Low erosion potential.	Lost Creek Ranch Road	Somewhat visible from nearby highway. Low public use. Somewhat visible from homesite area & date ranch.	Possible conflict with Lost Creek Ranch.	8.5 mile haul on highway - heavy summer traffic.	Hauling costs moderate (\$425,000). Rehabilitation costs moderate.	Conflicts with NPS & GRTE policy. Under consideration as a source for Project 328 material.	Negligible except at Snake River overlook. Can be mitigated by scheduling.	Needs some rehab. use for both 111 & 328 projects would necessitate some additional rehab.

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CONSULTATION/COORDINATION

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