4.0 ENVIRONMENTAL CONSEQUENCES

This section documents the probable beneficial and adverse social, economic, and environmental effects of each alternative and describes the measures proposed to mitigate adverse impacts. The impact areas listed in FHWA guidance (FHWA, 1987) and evaluated in this environmental assessment are starred in the following table. All other impact categories have been determined to be non-issues for this project as described in this section.

TABLE 3
IMPACT CATEGORIES INCLUDED IN THIS ENVIRONMENTAL ASSESSMENT

Land Use Impacts	*	Coastal Zone Impacts	*
Farmland Impacts		Threatened & Endangered Species/Wildlife	
Social Impacts	*	Historic and Archaeological Preservation	
Relocation Impacts	*	Hazardous Materials	
Economic Impacts	*	Visual Impacts	*
Joint Development		Construction Impacts	*
Pedestrian and Bicyclists	*	Short-Term Use vs. Long-Term Productivity	*
Air Quality Impacts	*	Irreversible & Irretrievable Commitment of Resources	*
Noise Impacts	*	Environmental Justice	
Water Quality Impacts	*	Secondary and Cumulative Impacts	*
Wetland Impacts	*	Section 4(f) Lands	
Water Body and Floodplain Impacts	*	Floodplain/Flood Hazards	*
Wild & Scenic Rivers Impacts		Permits	*
Coastal Barriers			

* Included in the EA discussion of environmental consequences because it has been identified as an "issue" warranting discussion—either because of potential for impact, public comment, or agency interest.

The following paragraphs cover each non-issue category and explain why these are determined "non-issues" for this project.

Farmland Impacts. There is no farmland found along the O'Malley Road project corridor. None of the alternatives would impact any prime farmland, unique farmland, or farmland of state or local importance.

Joint Development. The O'Malley Road project is not being done in conjunction with any other project to "preserve or enhance an affected community's social, economic, environmental, and visual values." There is no joint development along the corridor.

Wild and Scenic Rivers. There are no rivers designated wild, scenic, or recreational within the project area.

Coastal Barrier Resources. There are no coastal barriers in the State of Alaska.

Threatened or Endangered Species. Section 7 of the Endangered Species Act requires consultation with the U.S. Fish and Wildlife Service (USFWS) on projects that could affect protected or sensitive species. No permanent resident species of plants or animals within the project area are listed as endangered or protected under the Endangered Species Act, as revised in 1988 (Balogh, 2000).

Historic and Archaeological Preservation. Review of Alaska Heritage Resource Survey (AHRS) indicates that no known historic properties are located within the project's study area. Through consultation with the State of Alaska Department of Natural Resources State Historic Preservation Office (SHPO), it was determined that the area is unlikely to contain historic properties. Therefore, SHPO recommended that no cultural survey be conducted. The FHWA has determined that Alternative One and Alternative Two would have no effect on historic properties. On August 5, 1999, SHPO concurred with this finding (Bittner, 1999).

Hazardous Materials. A Phase I Environmental Site Assessment (ESA) was conducted along the project corridor to determine the potential of encountering hazardous substances during construction. The ESA included an on-site review, a historical records search, evaluation of aerial photographs, property owner and citizen interviews, and an electronic search of state and federal agency databases. The ESA concluded that a low potential exists for contamination of the project corridor from adjacent properties and that the potential for adverse environmental impacts resulting from construction activities of the build alternatives would be minimal (TPECI, 1999a, Appendix E).

Environmental Justice. No alternative will disproportionately affect minority or low-income populations. (Executive Order 12898, DOT Order 50125)

Section 4(f) Lands. The project will not physically take properties designated as parks, recreation areas, wildlife refuges, or historic sites under "Section 4(f)". Section 4(f) Lands and proposed project right-of-way takes are shown on Figures 8 through 18.

4.1 LAND USE

Land uses along O'Malley Road include residential, private and public schools, churches, the Alaska Zoo, Anchorage Golf Course, a fire station, private and public parks, two greenbelt zones along two separate creeks, and a moderate value wetland area. There is limited commercial development near the New Seward Highway intersection. Commercial development includes the Castle On O'Malley east of the New Seward Highway intersection and a new indoor water park south of the Castle. The Castle houses a sporting goods store, a coffee shop, and a few offices. The water park uses Chelea Street and Brayton Drive next to the Castle for access. Two known businesses exist within private homes along the corridor. Electrical, gas, telephone, water, sewer, and cable utilities exist along the roadway.

The entire project is within the MOA. Zoning adjacent to the roadway is designated as residential except for a small business district on the southern side of O'Malley Road at its

intersection with the New Seward Highway, the Anchorage Golf Course (MOA land leased to Seibu Alaska), Abbott-O-Rabbit Fields (part of MOA parks and recreation division), and the Alaska Zoo (a private non-profit organization). The Abbott-O-Rabbit parking facilities are constructed partially within the DOT&PF right-of-way. The right-of-way permit has recently expired and DOT&PF will not renew the permit because O'Malley Road improvements are planned.

Neither build alternative would change the existing land use or development patterns along the project corridor. The no-action alternative would result in no change to existing land use or development patterns.

4.2 SOCIAL IMPACTS

Neither build alternative would generate adverse impacts to any social group, school, recreation area, or church. The area population and ethnic structure is fairly cohesive and not segregated into diverse social groups. There are no identified social groups (i.e., elderly, physically impaired, non-drivers, minority, or ethnic groups) that would be adversely affected by the project. Since the road already exists and divides major neighborhoods, the project would not add to the divide or disruption of these established communities, impact planned community development, or create an appreciable change in employment.

Traffic safety would be improved by both build alternatives since both propose to upgrade the roadway with widened shoulders, accommodations for left-turning vehicles, and increased sight distance in hilly areas. Both build alternatives also propose to construct a multi-use pathway along the south side of O'Malley Road for the entire project length. In addition, the segment from the New Seward Highway to Lake Otis Parkway would include a 1.5-meter (5 foot) wide concrete sidewalk. These amenities would be beneficial to all social groups, including the elderly and the physically impaired. Inclusion of a sidewalk and multi-use pathway would increase pedestrian and bicycle safety and promote recreational use.

Minor changes in access points to residences and businesses would occur and be identical to both build alternatives. One such access change will impact users of the Abbott-O-Rabbit ball fields have been parking in the DOT&PF right of way along O'Malley Road. DOT&PF permitted this use in July 1995 and the permit expired July 14, 2000. Since DOT&PF plans to upgrade O'Malley Road in the near future, the Department will not renew the permit.

The no-action alternative would preclude construction-induced impacts to the social setting. Negative social impacts are currently occurring with the existing facility. These impacts include a less than acceptable level of service for motor vehicles and difficulties experienced by pedestrians and bicyclists from the lack of multi-use pathways.

4.3 RELOCATION IMPACTS

The Conceptual Stage Relocation Study for the O'Malley Road Corridor (Appendix B) found that the project would relocate two single-family residences and have minor impacts to one business; a private school; and one private non-profit organization, the Alaska Zoo (Figure 7).

Two single-family household residences will be relocated under both build alternatives. These residences have an estimated value of $225,000 and $500,000. Each residence is owner-occupied and it is estimated that five (5) individuals will have to be relocated. There is an adequate supply of replacement housing for sale or for rent currently on the market. Replacement housing for sale or for rent is expected to continue to be available through the relocation phase.

The business is a partnership called Aero Video Ventures. Based on available information, the business does not occupy the affected structure, does not have any employees other than the individual partners, and may continue to occupy the remainder property. A principal partner owns the land and the affected single family home. There is an adequate supply of replacement business property for sale or rent currently on the market.

In addition to the affected residential properties, there is a private school and a non-profit organization that will be affected by the project. The Tom Thumb Montessori School currently has some improvements (fence and playground swing set) that are extremely close to or encroach upon the existing right-of-way. No employees would be affected by this relocation and every effort will be made to assist the school in relocating these encroachments. An adequate area exists to do so.

A similar situation exists with the Alaska Zoo, a private non-profit organization. The zoo currently has some significant improvements that encroach upon the existing right-of-way. The improvements consist of a paved customer parking area. No employees would be affected by the relocation and every effort will be made to assist the zoo in relocating these encroachments. An adequate area exists to do so.

Takes will be required for both build alternatives. Since the proposed roadway configuration is the same for both build alternatives within Segment A (New Seward Highway to Lake Otis Parkway) the right-of-way impact, 3.76 hectares (9.29 Acres), is also the same. The impacts include minor takes (8 properties), total takes (3 properties), and access/structure modification (2 properties). In Segment B (Lake Otis Parkway to Hillside Drive) the right-of-way takes are all minor takes and amount to 0.3 hectares (0.74 acres) for Alternative One and 0.2 hectares (0.49 acres) for Alternative Two as documented in the PER (Lounsbury, 2001). No minor takes will result in the relocation of private residences. The impacts associated with minor takes will result in filling some wetlands. The area of wetlands filled is described in the Wetland Impact Section of this document. The details will be determined in the final design.

As a federal-aid highway project, relocation assistance and advisory services will be in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 P.L. 91-646; 42 U.S.C. 4601 *et. seq)*, as amended, 49 CFR Part 24, 23 CFR Part 710 and AS 34.60.

The no-action alternative would preclude the relocation of any residences or the reestablishment of businesses.

4.4 ECONOMIC IMPACTS

There will be negligible change in the local economy, tax base, or employment in the area as a direct result of either build alternative.

The no-action alternative would preclude economic impacts from construction. Negative economic impacts could result from drivers avoiding congested business areas as the LOS deteriorates over time.

4.5 PEDESTRIANS AND BICYCLISTS

Modes of non-motorized transportation within the project corridor include bicycling, skiing, horseback riding, and walking. Public comments revealed that the bicycle traffic is predominantly recreational within the project corridor (Appendix A). There are few bicycle commuters. Commuting by bicycle occurs mainly in the summer. Each build alternative includes the same separated, paved, 3.0-meter (10-feet) wide multi-use pathway and shoulders throughout the length of the project corridor as identified in the Anchorage Areawide Trails Plan (MOA, 1997). In the segment from the New Seward Highway to Lake Otis Parkway, both build alternatives also include a 1.5-meter (5-feet) wide concrete sidewalk. The roadway shoulders, separated pathway, and sidewalk will improve safety and mobility of pedestrian and bicycle traffic along the project corridor.

Furthermore, public comments have shown an interest in a pedestrian crossing overpass at congested intersections and schools on O'Malley Road (Appendix A). Explicitly, the public suggested the Birch Road and Lake Otis Parkway intersections as candidates for aerial crossings. In the design phase, these requests will be fully analyzed. Hillside residents believe that a separate non-motorized walkway will increase pedestrian/recreational safety.

The no-action alternative offers no pedestrian and bicycle facilities.

4.6 AIR QUALITY IMPACTS

This section discusses the air quality impacts for the O'Malley Road project. Portions of the project area are within an air quality non-attainment area. Beginning at Hillside Drive to 500 feet east of the O'Malley Road/Lake Otis Boulevard, the proposed project is located outside the air quality non-attainment area. This means that the air quality within this section meets or exceeds the U.S. Environmental Protection Agency (EPA) criteria for healthy air. However, beginning 500 feet east of the O'Malley Road/Lake Otis Boulevard and continuing to the New Seward Highway, the proposed project is within a non-attainment zone for carbon monoxide (CO). This means that the air quality in this section sometimes may not meet the EPA standards for CO.

The analysis of CO concentrations for the build alternatives was based on the FHWA CAL3QHC Dispersion Model with emission rates obtained from the EPA Mobile 6B emission rate model. Two different air quality analyses were modeled to determine impacts to ambient CO concentrations along O'Malley Road. The first analysis was a corridor study that reviewed air

quality impacts along O'Malley Road. Appendix C contains the model inputs and results of this study. The study found that the CO concentrations generated by the build alternatives were essentially the same as the No Build alternative and none of the anticipated values were above EPA criteria.

The second study concentrated on the Lake Otis/O'Malley Road intersection. The study was called a Hot Spot Analysis. This intersection is the only major intersection within the non-attainment zone that would become congested during the project life if not upgraded. The ADOT&PF coordinated the analysis with the EPA, ADEC, and the MOA. The study found that the CO concentrations developed by the Build and No Build Alternatives to be the same and none of the anticipated values exceeded EPA criteria. Appendix C contains a copy of the Hot Spot Analysis of the Lake Otis/O'Malley Road intersection and agency comments.

The analyses found that the Build Alternatives would conform to the State and federal implementation plans as required under section 176(c)(4) of the Clean Air Act, as amended in 1990. The ADOT&PF developed a draft Public Review Conformity Determination based on the latest planning assumptions and the use of the latest emission model available. A conforming transportation plan and Transportation Implementation Plan were in effect at the time of this study and the Build Alternatives were identified in the conforming transportation plan and program. According to the hot-spot analyses, the proposed project would not cause or contribute to any new localized CO violations in the CO non-attainment area. After the public has reviewed the draft public review conformity determination, the ADOT&PF will finalize the document. Appendix C contains a copy of the draft document.

Temporary degradation of air quality during construction may occur during the operation of heavy equipment and the moving and placing of soil.

4.7 NOISE IMPACTS

A detailed noise analysis of the O'Malley Road corridor was performed in 2001. The full report is contained in Appendix C. The following is a summary of the noise study.

The criteria for evaluating noise impacts are contained in Title 23 of the Code of Federal Regulations, Part 772 - *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772, 1992) and the DOT&PF *Noise Abatement Policy* dated March 1996. The FHWA Design Noise Level/Activity Relationships used for determining the noise abatement criterion for specific land uses (e.g., residential, commercial, etc.) show that O'Malley Road falls within Category B and Category C. Category B criterion applies to residences, churches, schools, recreation areas and similar uses. Category C criterion corresponds to developed lands such as commercial and business properties. FHWA and DOT&PF consider a traffic noise impact to occur if predicted peak-hour traffic noise levels approach or exceed 67 dBA. DOT&PF defines "approach" as noise levels within 2 dBA of 67 dBA. In other words, if the noise levels reach or exceed 65 dBA, then a noise impact is said to exist and noise abatement must be considered.

Existing and project future (2031) traffic noise levels were evaluated using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM) Version 1.0. In this study, traffic noise levels calculated by the TNM were validated using on-site traffic noise level measurement data and concurrent traffic counts obtained at seven locations, M1 through M7, in the project corridor (Table 4). To model the roadways, receptor locations, and intervening topography within the project area, existing and proposed terrain information and roadway geometry data were obtained.

Traffic noise level measurements and concurrent traffic counts were conducted within the project corridor in the afternoons of July 25 and 26, 2001. Measurement equipment consisted of a Metrosonics Metrologger DB 380 Noise Measurement Meter.

The noise monitoring locations are described below.

M1. Independence Park - This site is just west of Commodore Drive, the entrance to the Independence Park residential area on the existing multi-use pathway. The site is located about 16 meters (52.5 feet) north of centerline. The site elevation is approximately the same as the roadway.

M2. Montessori School, West building - This site is located on a small deck of the western-most building at the Tom Thumb Montessori School. The noise meter was placed about 32 meters (105 feet) north of centerline. The deck elevation is approximately the same as the roadway.

M3. Abbott-O-Rabbit Ball Fields - This site is located at the entrance to the Abbott-O-Rabbit sports fields. The noise meter was placed about 49 meters (161 feet) north of centerline. The elevation of the site is approximately 3 meters (10 feet) above the roadway.

M4. 4110 O'Malley Road - This site is in the back yard of the duplex residence at 4110 O'Malley Road. Noise was measured approximately 22 meters (72 feet) south of centerline. The elevation is about two meters (6 feet) higher than the roadway.

M5. Alaska Zoo - This site is near the entrance to the Alaska Zoo approximately 60 meters (198 feet) north of centerline at an elevation approximately 5 meters (16 feet) lower than the roadway.

M6. Rock Ridge Drive - This site is in the ditch north of O'Malley Road and across from Rock Ridge Drive. The noise meter was placed approximately 20 meters (66 feet) north of the centerline. This location was chosen because it is very close to a private deck and residence. The site elevation was approximately two meters (6 feet) lower than the roadway.

M7. 10800 Ridgecrest Road - This site is on the front porch facing O'Malley Road for the house at 10800 Ridgecrest Road. Noise was measured approximately 28 meters (92 feet) south of centerline at an elevation about six meters (20 feet) higher than the roadway.

Table 4 is a summary of noise levels obtained during the traffic noise measurements and their comparison to levels predicted by the FHWA TNM.

TABLE 4
COMPARISON OF MEASURED AND PREDICTED TRAFFIC NOISE LEVELS

Location	Centerline Station	Distance to Roadway (meters)	Measured Leq (dBA)	Predicted Leq (dBA)	Difference (dbA)
M1. Independence Park	10+640	16	71.2	72.9	+1.7
M2. Montessori School	11+400	32	69.6	67.4	-2.2
M3. Abbott-O-Rabbit	11+820	49	63.2	63.2	0
M4. 4110 O'Malley Rd	13+160	22	67.3	65.6	-1.7
M5. Alaska Zoo	13+920	60	57.8	58.0	0.2
M6. Rock Ridge Drive	15+280	20	67.1	65.4	-1.7
M7. 10800 Ridgecrest	15+600	28	67.1	64.2	-2.9

From the data in Table 4, it is apparent that noise levels predicted by the TNM were within +1.7 and -2.9 dBA of those measured. Such small differences are within acceptable tolerances and show agreement between measured and calculated noise levels. Therefore, the FHWA TNM may be used to accurately calculate traffic noise exposure for existing and projected future conditions.

Twelve receptor locations were selected for estimating existing and future traffic noise levels. Seven of the receptor locations are identified as M1 through M7 and are the same as those measured in July 2001. The other five, R8 through R12, are sites that represent worst-case scenarios for Category B land uses along O'Malley Road (Figure 7). The noise at these additional receptors was not measured, but was modeled using data collected and calibrated from sites M1 through M5. These sites are described below:

R8. Greek Orthodox Church - This site is just outside of the Holy Transfiguration Greek Orthodox Church at 2800 O'Malley Road. The point modeled is located approximately 32 meters (105 feet) south of centerline and at an elevation approximately equal with the roadway.

R9. 4820 O'Malley Road - This site is a residence just south of the Alaska Zoo. The point modeled is located approximately 40 meters (131 feet) south of centerline at an elevation approximately equal with the roadway.

R10. 10770 Spada Circle - This site is a residence located approximately 35 meters (115 feet) north of centerline at an elevation approximately 3 meters (10 feet) below the roadway.

R11. 6900 O'Malley Road - This site is a residence located 3 meters (10 feet) above the roadway at centerline. The location is approximately 45 meters south of the roadway centerline.

R12. 7001 O'Malley Road - This site is a residence located approximately 40 meters (131 feet) north of the roadway and approximately 1 meter (3 feet) below the roadway.

To calculate existing peak-hour noise levels for 2001, ADT traffic volumes provided in the PER (Lounsbury, 2003) were used. Only traffic along O'Malley Road was considered in this modeling. In the case of Independence Park (M1), the modeling showed that the noise along O'Malley Road completely overwhelmed the noise generated from the New Seward Highway. Models with and without traffic from the New Seward Highway resulted in identical noise levels for site M1. Peak-hour traffic noise levels in 2001 for the selected receptor locations are summarized in Table 5.

The data in Table 5 show that the existing peak-hour noise levels for 2001 on O'Malley Road exceeded the DOT&PF Noise Abatement Criteria (NAC) at all locations modeled except M5, R11, and R12.

TABLE 5
EXISTING 2001 PEAK-HOUR NOISE LEVELS

Location	Centerline Station	Distance to Roadway (meters)	2001 Noise Level (dBA)	Approach/Exceed FHWA NAC (67 dBA)
M1. Independence Park	10+640	16	76.8	Yes
M2. Montessori School	11+400	32	70.8	Yes
M3. Abbott-O-Rabbit*	11+820	49	67.2	Yes
M4. 4110 O'Malley Rd	13+160	22	71.4	Yes
M5. Alaska Zoo	13+920	60	62.3	No
M6. Rock Ridge Drive	15+280	20	70.3	Yes
M7. 10800 Ridgecrest	15+600	28	69.1	Yes
R8. Greek Orthodox Church	11+980	32	69.3	Yes
R9. 4820 O'Malley Rd	13+890	40	66.8	Yes
R10. 10770 Spada Circle	14+355	35	66.7	Yes
R11. 6900 O'Malley Road	15+955	45	64.2	No
R12. 7001 O'Malley Road	16+060	40	64.8	No

* This noise receiver represents the Abbott-O-Rabbit/Ruth Arcand Park/Anchorage Golf Course recreation complex.

TABLE 6
PROJECT FUTURE (2031) PEAK-HOUR NOISE LEVELS

		Future (2031)		
Location	Existing (2001)	No-Action Alternative (dBA)	Alternative One (dBA)	Alternative Two(dBA)
M1. Independence Park	76.8	79.4	79.5	79.5
M2. Montessori School	70.8	69.9	70.4	70.4
M3. Abbot-O-Rabbit*	67.2	66.4	68.9	66.4
M4. 4110 O'Malley Road	71.4	72.5	74.3	72.5
M5. Alaska Zoo	62.3	63.9	63.2	63.9
M6. Rock Ridge Drive	70.3	70.7	70.5	70.7
M7. 10800 Ridgecrest Road	69.1	70.3	72.3	70.3
R8. Greek Orthodox Church	69.3	69.1	72.1	69.1
R9. 4820 O'Malley Road	66.8	68.6	69.5	68.6
R10. 10770 Spada Circle	66.7	67.6	66.9	67.6
R11. 6900 O'Malley Road	64.2	65.7	68.5	65.7
R12. 7001 O'Malley Road	64.8	66.7	67.0	66.7

* This noise receiver represents the Abbott-O-Rabbit/Ruth Arcand Park/Anchorage Golf Course recreation complex.

Both build alternatives will bring traffic closer to some of the receptor sites. In these cases, the noise will increase. The roadway improvements allow for free flow of traffic along the corridor. Traffic moving at a higher speed makes more noise than traffic at a lower speed. The results show that both build alternatives would generate almost equal noise levels. The build alternatives increase the 2031 noise levels over the no-action alternative by a maximum of 2.8 dBA and increase the 2001 noise levels by a maximum of 4.3 dBA. However, in many instances as shown in Table 6, the 2031 build alternatives noise levels are less than the no action noise levels. Changes in noise levels of 2.0 dBA or less are not discernible by the human ear. Consequently, changes in noise levels are not expected to be easily discernible in the design year whether the project is constructed or not.

The noise level at the Abbott-O-Rabbit ball fields and Ruth Arcand Park/Anchorage Golf Course complex is not projected to change substantially as a result of the proposed project. Design year noises for Alternative One are projected to be 2.5 dBA greater than the 2031 no-action levels. This change would not be easily perceived by the human ear. Under Alternative Two, the project design year noise levels would be equal to the design year no-action levels. In conclusion, while existing and future noise levels at the ball park and golf course exceed the federal NAC, the resulting change in noise levels from the proposed project would not be perceptible to the human ear.

Federal regulations (23 CFR 772) dictate that when the NAC are approached and/or exceeded that noise abatement must be considered. As such, noise abatement measures were evaluated for the corridor according to the 1996 DOT&PF Noise Policy. The following noise abatement measures were considered, but are not proposed for the reasons given.

Transportation Demand and Transportation System Management (TDM/TSM) are techniques that may be used to overcome roadway congestion without widening the roadway to increase the number of travel lanes. Since one of the identified needs for the O'Malley Road Reconstruction Project is increased capacity, TSM and TDM techniques were investigated to determine if their implementation alone would result in an acceptable LOS. The single occupancy vehicle analysis, contained in the Preliminary Engineering Report (Lounsbury, 2002), showed that additional travel lanes are needed on O'Malley Road to obtain an acceptable LOS despite the implementation of TSM and TDM strategies. Further strategies, such as alternative work hours, rideshare programs, education programs, etc., can only be implemented by the MOA on a system wide bases and are not considered as abatement measures within this analysis.

Alternatives of horizontal and vertical alignments were considered. O'Malley Road is a horizontally straight road with deep cuts and high fills. The existing right of way varies from approximately 38 m (125 ft) to 53 m (175 ft). Nearly all the adjacent lots are served by private onsite wells and septic systems. Due to these onsite systems, right of way impacts resulting in remainder lots being less than 0.4 ha (1 ac) are considered total takes. Deviating from the existing alignment substantially increases the number of total takes and residential relocations and was determined to be unreasonable.

Acquisition of real property to serve as a buffer was considered but determined unrealistic. Vegetation in the project corridor is primarily deciduous with little undergrowth and would offer

a minimal noise buffer. A buffer (in the case of O'Malley Road) would need to be a densely wooded area with tree growth at least 5 meters (16 feet) above the line of sight with a depth of 30 meters (98 feet). These conditions would reduce the noise levels by 5 dba. If the wooded area was deeper than 30 meters (98 feet), the reduction would be greater with a maximum reduction of 10 dba (FHWA, 1980). Property acquisition of this magnitude is impractical and the right-of-way impacts would outweigh the reduction in noise levels. Vegetation that currently shields a residence from the road does provide a visual barrier, and thus, a perceived benefit.

Noise barriers were analyzed and determined not feasible throughout the corridor. It was not feasible due to the numerous breaks for cross streets and driveways. No noise abatement measures are proposed as part of the project because they are not considered feasible. Structural noise insulation (e.g., storm windows, wall insulation, etc) was considered for the churches along the corridor, however, it is not proposed. Peak hour noise impacts typically do not correspond with regular church services. This recommendation is based upon the best information at this time and will be reevaluated during the design phase of the project. See Appendix C for more detail.

4.8 WATER QUALITY IMPACTS

Two options for the collection and conveyance of storm water runoff were evaluated for use within the O'Malley Road project corridor. The first is an urban design that consists of a piped storm drain collection system with curb intakes. The second is a rural design with paved roadway shoulders and vegetated V-ditches. The build alternatives include a combination of these two storm water conveyance methods. Neither option would change the contributing areas for the individual drainage basins along the corridor. All drainage patterns outside the right-of-way would remain as they currently exist. However, the build alternatives would increase the amount of paved surfaces and, therefore, increase the flow rates during rainstorm events.

The two build alternatives, from New Seward Highway to Lake Otis Parkway, would have a curb and gutter storm drain system. Where grades allow, drainage would flow to the Moose Meadows wetlands to help recharge the area. The runoff not directed towards Moose Meadows would discharge into an existing vegetated swale along the New Seward Highway.

From Lake Otis Parkway to Hillside Drive, both build alternatives would collect and convey storm runoff via vegetated ditches to existing drainage ways and wetlands along the roadway. Portions of the vegetated ditches would be engineered as biofiltration swales to treat the storm water prior to leaving the right-of-way. Additionally, the ditches allow for infiltration and recharge of the subsurface water table.

Development of any road improvements within the O'Malley Road corridor requires implementation of storm water runoff quality control measures. Storm runoff from road surfaces usually contains small quantities of roadway contaminants such as oil, grease, exhaust residues, and trace metals. According to the FHWA design manual, Pollutant Loading and Impacts for Highway Stormwater Runoff, (FHWA-RD-88-006), significant contaminant runoff does not occur until the AADT exceeds 30,000 vehicles per day. Traffic projections for O'Malley Road do not exceed this threshold (Table 1).

During construction, DOT&PF will implement Best Management Practices to control pollution and storm water runoff. On October 28, 1998, EPA issued a Municipal Separate Storm Sewer System (MS4) National Pollution Discharge Elimination System (NPDES) permit for the MOA and DOT&PF (Permit No. AKS-05255-8) to discharge from municipal storm sewer system outfalls to Little Campbell Creek and Craig Creek. The project would comply with the terms of the MS4 NPDES permit and the NPDES General Permit for Construction Activities in Alaska.

During a public meeting in September 2000, some Spring Forest Subdivision homeowners abutting O'Malley Road between Birch Road and the fire station commented on the flooding along their property during spring breakup. Based on existing contour data, it appears that the problem is a result of development within a natural drainage way. Portions of the drainage along O'Malley Road east of Birch Road will be contained in a ditch and discharged west of Birch Road. This would minimize the problem but not eliminate it. The drainage within this area will be fully evaluated in the design phase.

4.9 PERMITS

Both build alternatives would require the following permits:

- U.S. Army Corps of Engineers Section 404 Wetland Fill Permit;
- Alaska Department of Environmental Conservation (ADEC) Section 401 Water Quality Certification;
- Division of Governmental Coordination, Coastal Zone Management Consistency Determination;
- Alaska Department of Fish and Game (ADF&G) Title 16.05.840 Fish Passage Permit;

The no-action alternative would eventually require permits to maintain some drainage structures including Little Campbell Creek, Craig Creek, and the crossing of Moose Meadows. The drainage structures could become restricted and fail to adequately pass annual discharges. Fish passage through the Little Campbell Creek would gradually become restrictive and hamper summer migrations of resident fish. Water in Moose Meadows wetland would become restricted and saturate the road embankment. This would aggravate the existing road subsidence and adversely impact the wetlands downstream. Work within any of these wetlands would require design-specific permits from the ADF&G, ADEC, and the U.S. Army Corps of Engineers.

4.10 WETLAND IMPACTS

Wetlands were delineated in the project corridor in 1999 (TPECI, 2000a, Appendix D). Two wetland systems, palustrine and riverine, were identified. The palustrine wetlands along the project corridor include scrub/shrub, broad-leaved deciduous, forested needle-leaved evergreen, and moss-lichen wetlands. The majority of the palustrine wetlands are ditches that were created during the initial construction of O'Malley Road. The riverine wetlands systems in the project corridor include Little Campbell Creek and Craig Creek.

The primary function of the wetlands along O'Malley Road was assessed using methods developed by the U.S. Army Corps of Engineers. The primary function of the palustrine wetlands along the project corridor is the storage of flood flows and rainfall runoff. The primary function of the riverine wetlands along the project corridor is fish habitat. Appendix D contains a detailed functional analysis for each wetland area in the project corridor.

The wetlands along O'Malley Road are regionally of low value with the exception of the two riverine systems associated with Little Campbell Creek and Craig Creek and the palustrine Moose Meadows wetland system. The total estimated acreage of wetlands within 150-feet of the centerline of the existing road is 2.4-hectares (6.2-acres) with 92 percent or 2.3-hectares (5.8-acres) of the total being palustrine and the remainder being riverine. Ditches and artificially created wetlands account for 1.4-hectares (3.4-acres) or approximately 60 percent of the palustrine wetland total.

Either build alternative would widen the road, including separated pathways on both sides, to 31.9 meters (105 feet) from the New Seward Highway to Lake Otis Parkway and would impact the same amount of wetlands in this segment. This impact would occur at the Moose Meadows

wetland (Figures 9 and 10). The types of wetlands found at Moose Meadows, as well as within the entire project corridor, are described in the following table.

Table 7
Wetland Descriptions

TYPE	SYSTEM	WETLAND DESCRIPTION
PEM1K	Palustrine	Persistent emergent, perennial, artificially flooded
$PF^{O4}/_{SS}1B$	Palustrine	Forested, needle leaved evergreen, scrub shrub saturated
$P^{FO4}B$	Palustrine	Forested green needle leaved evergreen, saturated wetlands
$P^{SS}/_{EM}1B$	Palustrine	Scrub shrub/emergent, broad leaved, deciduous, saturated wetlands
$PF^{O4}/_{SS}BK$	Palustrine	forested, needle leaved evergreen, scrub shrub saturated wetlands (ditch)
R2US1	Riverine	Lower perennial, unconsolidated shore, cobble-gravel (Little Campbell Creek)
R2US5	Riverine	Lower perennial, unconsolidated shore, vegetated (Craig Creek)

The Moose Meadows palustrine wetland consists of two specific wetland types--PEM1K and $PF^{O4}/_{SS}1B$. The impacts within the construction limits would be 400 square meters (0.10 acres) PEM1K and 4,600 square meters (1.14 acres) $PF^{O4}/_{SS}1B$. The first wetland type, PEM1K is a persistent emergent, perennial, artificially flooded wetland located at the toe of the slope on the western portion of the affected wetlands. Observable seepage indicated that infiltration and groundwater flow through the road fill. The PEM1K is a separate hydraulic system, not connected to a wildlife corridor (Appendix D). The second wetland type, $PF^{O4}/_{SS}1B$, consists of a forested, needle leaved evergreen, scrub shrub saturated wetland, also part of a separate hydraulic system not connected to a wildlife corridor. For both wetland types, the function of the unfilled portion would improve after construction because a new drainage structure would allow water to pass under the roadway embankment.

Alternative One, from Lake Otis Parkway to Hillside Drive, would widen the road to approximately 22.3 meters (73 feet) and impact a total of approximately 0.4 hectares (1.0 acres) of palustrine and riverine wetlands. Of this total, approximately 0.2 hectares (0.4 acres) would result from the filling of the wetlands. The function of the unfilled wetlands would not change after construction.

Alternative Two, from Lake Otis Parkway to Hillside Drive, would widen the road to approximately 18 meters (59 feet). However, this width would be increased by the proposed left-turn lanes at major intersections; resulting in impacts to a total of approximately 0.4 hectares (1.0 acres) of palustrine and riverine wetlands.

Alternatives One and Two impact the same palustrine and riverine wetlands in the segment from Lake Otis Parkway to Hillside Drive, each to a varying degree. The wetlands are shown on Figures 10 through 18. The palustrine wetland in this segment consists of three specific wetland types $PF^{O4}/_{SS}BK$, $P^{FO4}B$, and PEM1K. The segment also contains two riverine wetland types

R2US1 (Little Campbell Creek) and R2US5 (Craig Creek).

The impacts to $PF^{O4}/_{SS}BK$ type wetlands would be 2,808 square meters (0.69 acres) for Alternative One and 2850 square meters (0.70 acres) for Alternative Two. For the $P^{FO4}B$ type wetlands these numbers would be 232 square meters for Alternative One and 250 square meters for Alternative Two, or about 0.06 acres. For the PEM1K type wetlands these numbers would be 508 square meters and 500 square meters for Alternatives One and Two respectively, or about 0.12 acres.

The $PF^{O4}/_{SS}BK$ wetland type consists of forested, needle leaved evergreen, scrub shrub saturated wetlands (ditch). The $P^{FO4}B$ wetland type consists of forested green needle leaved evergreen, saturated wetlands that receives and retains overland or sheet flow from surrounding uplands. It can retain higher volumes of water. Finally, the PEM1K wetland type consists of persistent emergent, perennial, artificially flooded wetlands.

The impacts to the R2US1(Little Campbell Creek) type wetlands for Alternatives One and Two are 112 square meters and 120 square meters (about 0.03 acres) respectively. For the R2US5 (Craig Creek) type wetlands these figures are 267 square meters (about 0.07 acres) and 280 square meters (0.07 acres) for alternatives one and two respectively. The riverine wetland types, R2US1 (Little Campbell Creek) and R2US5 (Craig Creek), are both associated with a perennial or intermittent water course.

Both build alternatives will have equal impacts on wetland functions. Under the build alternatives, the fill applied to palustrine wetlands from construction will diminish flood retention. However, the build alternatives will improve the filtration function of the palustrine wetlands by directing the storm water runoff into biofiltration swales located along the reconstructed roadway. The build alternatives will also restore flow to wetlands north and south of the roadway by constructing an improved drainage structure beneath the roadway. The build alternatives will improve the riverine wetland function of providing fish habitat by upgrading the Little Campbell Creek and Craig Creek drainage structures and improving fish passage in these streams.

The no-action alternative would not fill additional wetlands. However, the natural drainage flow of the Moose Meadows wetlands could become increasingly restricted as the drainage structure fails under the road.

Guidelines established under Section 404(b)(1) of the Clean Water Act require project proponents to consider means to minimize the impacts to wetlands through avoidance, minimization, mitigation, and/or compensation. Each of these mechanisms for minimizing the impacts to wetlands along O'Malley Road corridor is considered in subsections 4.10.1, 4.10.2, 4.10.3 and 4.10.4.

4.10.1 Wetlands Avoidance

Possible wetlands avoidance techniques include:

- Realignment of the roadway; and
- Retaining walls.

Realignment of O'Malley Road to avoid the Moose Meadows wetlands is not possible at this location because O'Malley Road extends east and west while the wetland area extends north and south. Installation of retaining walls was considered and rejected because of the deep excavation required to key the walls into solid material (bedrock or gravel) would disturb a larger area than the proposed fill slopes.

The no-action alternative is the only means by which the proposed project would avoid further impacts to adjacent wetlands. The failure of the culvert at Moose Meadows will impede water flow and significantly impair the storm water conveyance and flood discharge attenuation functions of the wetland. The no-action alternative does not resolve the failing culvert at Moose Meadows nor improve fish passage at the Little Campbell Creek culvert.

4.10.2 Minimization of Wetland Impacts

Possible techniques that will minimize impacts to wetlands are:

- Slope steepening; and
- Reducing the separation distance between the pedestrian facilities and the roadway.

Slope steepening will be performed as far as is practicable. The separation distances between the pedestrian facility and roadway have been minimized with the selection of an urban section through the New Seward Highway to Lake Otis Parkway section of O'Malley Road, which minimizes the project footprint. Both build alternatives have only standard lane and median widths. Narrowing lanes and median widths beyond the proposed was not considered practicable because it could not be done and still maintain the desirable standards for new arterial construction and it would reduce roadway capacity.

4.10.3 Wetlands Mitigation

Both build alternatives incorporated wetlands mitigation into the design of O'Malley Road. Proposed mitigation includes:

- Improving fish passage at the Little Campbell Creek crossing by constructing step-pools and installing a new culvert (Figure 19);
- Improving drainage into Moose Meadows by removing a collapsed culvert and replacing it with a geomembrane-covered large rock subdrain to act as an equalization drain across the fill embankment; and

- Enhancing the water flow by directing storm water along the curb and gutter into the Moose Meadows wetland.

The no-action alternative would not improve fish passage in Little Campbell Creek or flow in Moose Meadows.

4.10.4 Only Practicable Alternative Finding

Executive Order, 11990, Protection of Wetlands, requires that there be no practicable alternative to the proposed action and that the project includes all practicable measures to minimize harm to wetlands.

Wetland impacts appear unavoidable if the purposes of the project are to be achieved. As described in the previous sections, both proposed build alternatives, while meeting the purpose and need of the project, would impact wetlands. Total avoidance of wetlands is not practicable because of the linear configuration of O'Malley Road and the perpendicular crossing of the wetlands. Although the wetland impacts for the alternative preferred by DOT&PF, Alternative One, are slightly greater; this alternative provides increased mobility by accommodating all left-turning traffic, enhanced safety by reducing rear-end collisions and separating opposing traffic, as well as a continuity of roadway width. The no-action alternative would not impact wetlands but would also not meet the purpose and need of the project.

The impact of these wetland losses is considered minor since they are regionally of low value with the exception of the two riparian systems associated with Little Campbell Creek and Craig Creek. The alternative preferred by DOT&PF, Alternative One, includes all practicable measures to minimize harm to wetlands as well as mitigation at Moose Meadows and Little Campbell Creek. Based upon the considerations outlined above and in the previous sections, it is determined that there is no practicable alternative to the proposed construction in wetlands. The proposed action includes all practicable measures to minimize harm to wetlands that may result from such use.

4.11 WATER BODY MODIFICATION

Two stream crossings were identified in the project corridor (Figures 19 and 20). Little Campbell Creek crosses O'Malley Road between Birch Road and Baronik Street. Craig Creek crosses O'Malley Road between Stony Brook Drive and Ridgecrest Drive. Little Campbell Creek is classified by the ADF&G as an anadromous stream (AWC#247-60-10340-2018) from tidewater to downstream of O'Malley Road. The anadromous designation does not extend across O'Malley Road. The anadromous fish are found downstream of the project below several dams and stream obstructions (Seaberg, 2001). Craig Creek is not classified by ADF&G as an anadromous stream in this area and does not support fish habitat within this reach.

Little Campbell Creek drains the area south of O'Malley Road between Hillside Drive and Birch Road. At its crossing of O'Malley Road, the creek is approximately three meters (10 feet) wide and flows to the northwest. The creek flows under the roadway through a 0.914-meter (36-inch) diameter culvert. The project corridor was visually inspected in June 1999 (TPECI, 2000a).

Project personnel observed no sediment in the creek. The streambed material consisted of coarse, unsorted gravel with some sand. The creek was confined to the channel.

The culvert outfall for Little Campbell Creek was perched two feet above the stream channel. Normally, a plunge pool below a culvert enhances fish passage, but in this case, an erosion control apron had been installed on the culvert. The sill extends two to three feet downstream of the culvert. The flat bottom sill appeared to cause very fast flow conditions. During the field investigation, a six-inch Dolly Varden was observed feeding approximately 31 meters (100 feet) above the O'Malley Road culvert. Since no over-wintering habitat occurs in this section of Little Campbell Creek, the fish must have negotiated the culvert.

Both build alternatives will replace and improve the culvert crossing at Little Campbell Creek. Both build alternatives will generate a positive impact by enhancing fish passage at Little Campbell Creek by installing step pools at the culvert outlet. Headwalls will be installed at the inlet and outlet of the culvert to shorten the crossing. The culvert size will remain the same because this crossing attenuates flood flow from possible dam break upstream (see section 4.13). The Little Campbell Creek crossing the length of the impacted area (culvert length plus step pools) will be the same for both build alternatives. Alternative One has a longer culvert length (54 meters/177 feet) but a lesser number of step pools to reach the desirable stream gradient for fish passage. Alternative One will fill 21 meters (69 feet) of the creek to place the culvert. Alternative Two has a shorter culvert length (46 meters/151 feet) but additional step pools are needed to reach the desirable stream gradient for fish passage. Alternative Two will fill 21 meters (69 feet) of the creek to place the culvert. (See Figure 19)

Craig Creek drains the area along the south side of O'Malley Road between Hillside Drive and Stony Brook Drive. At its crossing of O'Malley Road, the creek is approximately three meters (10 feet) wide and flows to the north. The creek flows under the roadway through a 0.61-meter (24-inch) diameter culvert. No evidence of sediment was observed in the creek. The bed appeared to be coarse, unsorted gravel with some sand. The creek was confined to the channel.

The culvert outfall for Craig Creek was in poor condition. The outfall sill had separated from the culvert and was in the stream channel approximately 6 meters (20 feet) downstream. The culvert itself appeared to be failing under the weight of backfill. The upstream opening of the culvert could not be seen during a visual inspection for alignment. This indicates that the culvert is no longer horizontally aligned.

Both build alternatives will replace and improve the Craig Creek culvert crossing and will not change the creek course or alter its ability to flow under the road. Alternative One will place a culvert 48 meters (157 feet) in length and fill 20 meters (65 feet) of the creek. Alternate Two has a shorter culvert length, 46 meters, (151 feet) and will fill 18 meters (59 feet) of the creek. Alternative One will fill 2 meters (6.5 feet) more of the creek to place the culvert than Alternative Two (Figure 20).

The no-action alternative would not improve these deficiencies.

4.12 WILDLIFE AND FISHERIES

4.12.1 Wildlife

Wildlife frequents the greater Anchorage bowl. According to the Living with Wildlife in Anchorage (ADF&G, 1999), 52 species of mammals and at least 230 bird species use the Anchorage area for permanent or seasonal habitat needs. Within the O'Malley Road corridor, residents occasionally see black and brown bears and moose. Other furbearers and small mammals within the corridor may include: coyote, lynx, snowshoe hare, red fox, mink, weasel, martin, porcupine, red squirrels, northern flying squirrels, little brown bats, mice voles and shrews. Bird species exist along the O'Malley Road corridor, however; their species and numbers are not quantified even though the local residents would confirm the presence of songbirds, owls, hawks and bald eagles. The wildlife habitat within the O'Malley Road right-of-way consists of second growth uplands (previously cleared road right-of-way), and a minor amount of riparian habitat adjacent to wetlands along Little Campbell Creek and Craig Creek. Much of the wildlife is supported in the Hillside area because of the predominance of large-lot development. The value of this wildlife habitat within the O'Malley Road rights-of-way is low due to the high volume of traffic and human presence within this residential area.

Project scoping found that the public was mostly concerned about vehicle collisions with moose and preserving moose habitat. O'Malley Road has been ranked number 14th in the state for moose-vehicle collisions (DOT&PF, 1995). Eleven percent (11%) of the collisions between 1995 and 1997 were moose/vehicle collisions. The build alternatives include widening the roadway corridor, constructing trails, flattening some road grades, lighting at major intersections, and clearing and removing vegetation within the construction limits, and where needed to provide intersection sight distance.

Both build alternatives predominantly occupy the existing O'Malley Road ROW. This existing road and utility corridor is occasionally maintained (brushed) by both the DOT&PF and individual utility companies. Both build alternatives will have minor adverse impacts to wildlife resulting from increased traffic, a widened roadway, vegetation clearing, sidewalk, pathway construction and lighting. The clearing and pathway construction will help prevent the presence of moose near the roadway but may negatively impact other wildlife such as birds and small mammals due to loss of habitat. However, these impacts should be offset by the potential reduction in moose related collisions. Both build alternatives also accommodate wildlife by increasing driver visibility at lighted intersections and where clearing will improve the motorist and wildlife visibility.

Build alternatives will not impact riparian habitat. Alternative One will require clearing of 19 hectares (47 acres). Alternative Two will require clearing of 18 hectares (46 acres). Clearing along both build alternatives accommodates wildlife, primarily moose, by improving the motorist and wildlife visibility and creating a larger buffer between the wildlife food source and adjacent travel lanes. The roadway widening (Alternative One) and left turn channelization (Alternative Two) will require wildlife crossing the roadway to negotiate a wider road.

The no-action alternative would have no effect on the prevalence of moose collisions in the

project corridor. Wildlife habitat would remain unaffected by the no-action alternative. The no-action alternative would not provide the reduction in moose kills anticipated with the build alternatives.

4.12.2 Fisheries

According to the ADF&G Anadromous Stream Catalogue (ADF&G, 1998), fish species that use some portion of Little Campbell Creek include:

- Coho salmon;
- Dolly Varden;
- Round whitefish; and
- Spiny sculpin.

Little Campbell Creek provides rearing habitat and fish access to wetlands and small tributaries along the stream. At its crossing of O'Malley Road, Little Campbell Creek flows underneath the roadway through a 0.914-meter (36-inch) culvert. The culvert outfall for Little Campbell Creek was perched two feet above the stream channel. Normally, a plunge pool below a culvert enhances fish passage, but in this case, a scour apron had been installed on the culvert. Both build alternatives will remove the scour apron and construct a step-pool outlet control structure to improve fish passage. Both build alternatives will impact the same length of the stream (culvert plus step pool). All in stream work will be done according to ADF&G permit stipulations.

Both build alternatives will enhance the Little Campbell Creek fisheries habitat.

The reach of Craig Creek in the project area does not support any fish species and, therefore, neither build alternative nor the no action alternative will have an impact to the fish species listed above.

4.12.3 Essential Fish Habitat Assessment

Discussions with Voss (2001) of the National Marine Fisheries Service, indicated no essential fish habitat exists within the study area or in the affected portions of Little Campbell Creek and Craig Creek.

4.13 FLOODPLAIN/FLOOD HAZARDS

As stated in Section 4.11 "Water Body Modifications," both build alternatives will replace and improve existing culvert crossings at Little Campbell Creek and Craig Creek. The build alternatives are within the 100-year base floodplain of each respective creek. National Flood Plain Program (NFIP) maps are not available for this area and no drainage studies have been performed along the upper reaches of these creeks.

Neither build alternative nor the no-action alternative would produce foreseeable changes to the existing flow characteristics or flood hazards along each respective creek. The MOA Flood

Hazard and Watershed Management Divisions are not aware of any naturally occurring flooding problems along either of these creeks within the project corridor. The primary flood risk is associated with the Lake O' the Hills dam.

O'Malley Road is located downstream of an impounded water body (Lake O' the Hills) (Figure 21). Lake O' the Hills-East Homeowners Association owns, operates, and maintains the low earth fill dam. The Lake O' the Hills dam retains approximately 62,000-cubic meters (50-acre-feet) of water. The dam has an approximate maximum crest length of 244-meters (800-feet) and rises to a maximum height of approximately 4-meters (13-feet).

Construction of the original dam was completed in 1954. The original structure is reported to have failed during the Good Friday Earthquake in 1964. The structure was reconstructed and on April 29, 1972, it failed again causing the death of a 10-year old boy along O'Malley Road. The dam was rebuilt between 1975 and 1980.

According to the Alaska Department of Natural Resources (ADNR), Dam Safety Division the dam rebuilt between 1975 and 1980, "… was not built in accordance with the plans [submitted to the Corps of Engineers and the ADNR]" (PN&D, 1991). The ADNR required the Lake O' the Hills-East Homeowners Association to correct these deficiencies. Corrective work was completed between 1980 and 1981. The potential downstream effect of a catastrophic failure of this structure could affect the O'Malley Road Reconstruction Project.

A dam break analysis of the Lake O' the Hills Dam was performed by Peratrovich, Nottingham & Drage, Inc. (PN&D, 1991). This analysis predicts a peak discharge of 31 to 42-cubic meters per second (1,100 to 1,500-cubic feet per second) above base flow. According to the analysis, a flood wave between 1 and 1.2-meters (3 and 4-feet) high above the normal stage would reach O'Malley Road within 30-minutes following failure of the dam. PN&D found that the flood wave generated by the 1972 failure split at O'Malley Road. Part of the discharge flowed north through the Little Campbell Creek culvert with the remainder channeled into the ditch along the south side of O'Malley Road. The flow along the southern side of O'Malley Road, "…flowed over Totem Road and Our Road and collected in the low area across from the Dimond H Ranch between Our Road and Lipscomb Street. The flows continued to the north side of O'Malley Road, both over the top of O'Malley Road and through a culvert. The flows then continued north across the Dimond H Ranch property and eventually back to the Little Campbell Creek Channel" (PN&D, 1991).

Due to this potential flood risk associated with the dam and no known naturally occurring flood problems, the hydraulic capacity of the Little Campbell Creek culvert crossing should remain the same. Both build alternatives include construction of headwalls on Little Campbell Creek to withstand a surge of floodwaters from a dam break. Constructing adequate ditches along both sides of the road facilitates channeling of surge of water from a dam break. A cursory review of the upstream drainage basin for Craig Creek indicates the proposed crossing improvements will convey a 100 year storm without backing up. The recommendation not to increase the culvert flow capacity at Little Campbell Creek and Craig Creek is based upon the most current information available at this time and will be reevaluated during the design phase of the project.

The build alternatives will also have minimal impacts on the creeks' natural floodplain values. The effects to the R2US1(Little Campbell Creek) type wetlands for Alternatives One and Two are 112 square meters and 120 square meters (about 0.03 acres) respectively. Impacts to the R2US5 (Craig Creek) type wetlands are 267 square meters (about 0.07 acres) and 280 square meters (0.07 acres) for Alternatives One and Two respectively. The riverine wetland types, R2US1 (Little Campbell Creek) and R2US5 (Craig Creek), are both associated with a perennial or intermittent water course. Neither build alternative will not open up or encourage additional incompatible development with in the floodplain.

The no-action alternative would not change the current conditions with respect to breach discharge conveyance.

4.14 COASTAL ZONE MANAGEMENT

The Division of Governmental Coordination (DGC) determined the project is in the coastal district in two areas, where it crosses Little Campbell Creek and Craig Creek. DGC will implement a formal consistency review during the permit phase of the project. The project appears to be consistent with the policies and standards of the Alaska Coastal Management Plan (ACMP).

Both build alternatives will improve the culvert structures for both Little Campbell Creek and Craig Creek. The Little Campbell Creek culvert installation would include improvement to fish passage.

The no-action alternative would preclude construction-induced impacts in the coastal zone.

4.15 VISUAL IMPACTS

The build alternatives would change adjacent property owners' views of the roadway. Residents on the south side would see a multipurpose path close to their property. Right of way brush clearing will make the road more visible and provide more open space. Lighting at major intersections will provide more visibility. The build alternatives do not have grade-separated interchanges or frontage roads that would cause a dramatic change.

Vehicle occupants would see more open space adjacent to the road and approximately the same views of the Chugach Mountains while traveling east along the road. The surrounding character of the area should not be substantially changed. The right-of-way would be cleared of aboveground vegetation to reduce sight obstructions and accidents with moose. Cut slopes and disturbed areas would be re-vegetated with grass.

Both build alternatives would change the lighting levels thereby affecting some property owners. Currently, none of O'Malley Road is continuously illuminated. High-tower lighting exists at the New Seward Highway/O'Malley Road interchange. Standard luminaires exist at the Lake Otis Parkway, Elmore Road, and Birch Road intersections. Single luminaires on wooden utility poles are located at the Rockridge Drive, East Tree Drive, and Crooked Tree Drive intersections.

Both build alternatives include continuous illumination from New Seward Highway to Lake Otis Parkway. This is supported by the type of facility proposed, the minimal impact to the adjacent residences, and the desire to avoid frequent, abrupt changes in light levels.

Continuous illumination is not included in the build alternatives for the section from Lake Otis Parkway to Hillside Drive. A cursory review of the preliminary design plans identified 87 residences that would be impacted by continuous illumination.

The no-action alternative would leave the view of the roadway and surrounding vistas unchanged.

4.16 CONSTRUCTION IMPACTS

Construction equipment, by its nature, is a disturbance to the normal everyday activities of neighborhoods and urban centers. Both build alternatives would have temporary construction impacts that would cease once construction is completed. Prior planning and proactive construction sequencing should minimize impacts normally associated with construction including: air quality, surrounding noise levels, water quality, and availability of gravel and topsoil from local material sources.

During construction, both build alternatives would temporarily impact the local economy. Businesses in construction areas may experience a temporary decrease in activity due to disturbances from heavy equipment and traffic detours. This is anticipated to be short-term and there are currently few businesses in the project area. In the long-term, the upgraded roadway would improve customer access for existing and future businesses. Some Anchorage businesses, outside the project area, may benefit from the purchase of construction material and supplies, construction related jobs, and providing services to construction workers.

Air quality could temporarily deteriorate along the project corridor due to the increased dust and vehicle emissions from construction equipment during construction of either build alternative. Dust would be controlled through regular watering. Construction equipment would be required to meet state standards for emissions.

Temporary increases in noise levels could be expected during construction. Measures to minimize construction noise could include:

- Traffic management measures;
- Whenever possible, limit operations of heavy equipment and other noisy procedures to the daylight hours;
- Locate equipment and vehicle staging areas as far from residential areas as possible;
- Install and maintain effective mufflers on construction equipment; and
- Limit unnecessary idling of equipment.

Water would be required for compaction and dust control. If the contractors desire to use water bodies close to the project for water, they must acquire an ADNR Temporary Water Use Permit before withdrawing the water from any source including Little Campbell Creek or Craig Creek.

Little Campbell Creek, Craig Creek, and bordering wetlands would be protected from sediment through use of silt fences and other erosion control measures. To protect against erosion and water damage to exposed surfaces during construction, the Contractor would follow the DOT&PF Best Management Practices as outlined in the DOT&PF Storm Water Pollution Guide, October 1, 2001.

All work will be done in compliance with the NPDES General Permit for Construction Activities in Alaska.

To minimize construction related traffic delays and detours, a traffic control plan would be prepared by the contractor and approved by DOT&PF. The plan would also maintain safety during construction. Access to businesses and residences would be maintained during construction. The impacts would be minimized by directional detours, large "reader" signs with daily messages, 1-800 phone numbers, and notices in newspapers describing the construction activities and possible alternate routes, as appropriate.

Material required consists of unclassified fill, gravel, riprap, crushed rock, and topsoil. Material would be Contractor supplied. Any permits required for material acquisition or disposal of unusable or waste material would be the responsibility of the Contractor.

Although the probability is low, if hazardous substances are encountered during construction, the ADEC would be contacted and appropriate measures taken. All contaminated soils would be handled and disposed of per ADEC and EPA corrective action plan, as appropriate.

During construction there is a potential for fuel spills. The Contractor would be required to develop and implement a hazardous materials control plan prior to the beginning of construction. The plan would detail how construction generated waste oil and other hazardous substances would be contained, cleaned up and disposed of, and how fueling operations would be carried out, and accidental spills handled. The plan would also include a list of the quantities and types of materials available on site for hazardous substance containment and cleanup. The plan would comply with the requirements of 18 AAC 75 and Title 46 of the Alaska Statutes.

The no-action alternative would preclude any construction impacts.

4.17 RELATIONSHIP OF SHORT-TERM USES TO LONG-TERM PRODUCTIVITY

Local short-term uses of the human environment refer to utilization of resources from the area of the reconstruction project. Resources include gravel, concrete, topsoil, construction equipment, labor, and funds. Use of these resources is anticipated to benefit the community productivity directly and on a long-term basis.

Either build alternative would increase or maintain the existing productivity of the area. With additional travel lanes, commercial business activities would be completed in a more efficient manner. Vehicle engine efficiency would be increased with fewer stops and starts in congested traffic.

Both build alternatives are based on state and local government comprehensive planning that considers the need for present and future traffic requirements and land use development. Local short-term impacts and use of resources for the build alternative are consistent with the long-term maintenance of the improved road and the enhancement of the local area and state productivity.

The no-action alternative would have no effect on the short-term use of the human environment since lack of construction precludes utilization. Long-term productivity would decrease due to the absence of an effective and efficient transportation system.

4.18 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The build alternatives would impact resource supplies in the area with a one-time withdrawal. Use of gravel for this project is not expected to impact resource utilization on a long-term basis. The build alternatives would permanently remove material from availability. Other construction materials such as pavement, topsoil, grass seed, and concrete are also readily available but would be irretrievably committed. The commitment of these resources could be justified by residents benefiting from the improved overall quality of the transportation in the area. These benefits would consist of improved safety, accessibility, and access for pedestrians and bicyclists.

The no-action alternative would preclude any commitment of resources.

4.19 SECONDARY AND CUMULATIVE IMPACTS

Secondary impacts are those that are impacts caused by reconstruction of O'Malley Road that will occur in the reasonably foreseeable future. Currently all the east-west arterial streets in Anchorage's Hillside area are in similar condition. They are generally two-lane facilities, with minimal shoulders, limited left turn channelization, etc. The build alternatives will lead to O'Malley Road being one of the first parallel east-west arterial streets reconstructed in the Hillside area. In addition, the north-south arterial roadway grid is missing some planned links, such as Bragaw between O'Malley Road and Abbott Road. The reconstruction of O'Malley Road will cause short-term impacts due to increased traffic on Abbott, Huffman, and DeArmoun Road during construction. When improved, O'Malley Road will attract additional vehicle trips, additional bicycle, pedestrian and equestrian trips until other parallel routes (Abbott Road and Huffman Road) are also improved. Future construction of Bragaw Street (O'Malley to Abbott) will again redistribute Hillside area traffic. The build alternatives will also provide a safer street, improve visibility of wildlife and road users. None of these secondary impacts is considered adverse.

Cumulative impacts result from incremental consequences of an action when added to other past and reasonably foreseeable future actions. The Hillside area, where O'Malley Road is located, is a fast growing area. The long-term development in the area has had a cumulative impact on the natural environment. Wetlands have been filled, streams have been crossed and the rural character has been supplanted by large-lot subdivision development. The O'Malley Road reconstruction project is one of many projects being planned in response to the development and population growth. When constructed to current standards, both O'Malley Road build alternatives will serve current and future growth in the area.

East-west arterials, DeArmoun Road, Abbott Road, and Huffman Road are all scheduled for improvement; as are changes to the north-south arterials including the extension of Abbott Loop from Tudor to Abbott and Bragaw Street from O'Malley to Abbott. These projects will be subject to separate environmental reviews. There will be impacts such as wetlands and habitat losses, increased noise and stream impacts, reduction in the rural character of the neighborhoods and increase the urban nature of the corridor.

No adverse cumulative impacts to wetlands along the project corridor are anticipated. About 92% of the wetland fills will occur in Moose Meadows. This wetland does not share a common drainage with Little Campbell Creek or Craig Creek. Therefore, no incremental damage will occur to a single watershed. Wetland impacts will be offset by improvements to Little Campbell Creek water quality and fisheries habitat contained in the build alternatives. The no-action alternative would have larger impacts on air quality and safety in the future than the build options.

The direct impact of the project would be to ease congestion and facilitate safe access to and from the Hillside neighborhoods. Increased ease and speed of access to grocery stores, work, schools, and the daily needs of the residents may make the neighborhood feel more like an urban area, and less like a rural neighborhood.