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BUREAU OF LAND MANAGEMENT

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MANUAL TRANSMITTAL SHEET

Subject

9113 – Roads Manual (Public)

1. Explanation of Materials Transmitted:

This is an update of current manual and handbook on Roads; with the creation of Handbook 2 for Condition Assessment Protocols. Attached is the Manual Section only, per Directives instructions. Handbooks 1 and 2 are under separate clearance sheets for each.

2. Reports Required: None.

3. Material Superseded: The material superseded by this Manual Release is listed under "REMOVE" below.

4. Filing Instructions:

REMOVE

9113 – Roads
(Rel. 9-247)

(Total: 83 Sheets)

INSERT

9113 – Roads Electronic Version

(Total: 17 Sheets)

/s/ Janine Velasco
Assistant Director, Business and Fiscal Resources

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- H-9113-1 Roads Design Handbook
- H-9113-2 BLM Roads National Inventory and Condition Assessment Guidance
& Instructions

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.01 Purpose. This Manual Section provides for: inventory, functional classification, condition assessment, and establishment of maintenance intensities of the Bureau's roads for incorporation into the Bureau Planning System; Bureau road standards; and guidelines for road project planning, design, construction, and maintenance.

.02 Objectives. The objectives are to:

- A. Identify the role each organizational unit plays in providing engineering expertise for the management of BLM road programs. Provide direction for appropriate coordination with other organizations.
- B. Provide direction for safe and adequate BLM roads for users.
- C. Provide adequate information to ensure that planning, design, construction, maintenance and condition assessment activities for road projects meet BLM needs and are performed in an acceptable manner.

.03 Authority. See also Manual Sections 9100.03 – Facility Planning, Design, Construction, and Maintenance - Authority, 9103.03 – Facility Construction - Authority, and 9104 – .03 - Facility Maintenance – Authority. The authority for providing road facilities is contained in the Federal Land Policy and Management Act of 1976 (FLPMA), as amended. Authorities affecting planning, design, construction, maintenance, and condition assessment of roads include:

- A. Federal Highway Act of 1962, as amended.
- B. Highway Beautification Act of 1965, as amended.
- C. Highway Safety Act of 1966, as revised.
- D. Surface Transportation Act of 1978, as amended.
- E. Surface Transportation Assistance Act of 1982.
- F. Government Performance and Results Act of 1993 (GPRA).

.04 Responsibility. The responsibilities described below are commensurate with those approved functional statements and Manual Sections 9100.04, 9103.04, 9104.04 and 9110.04.

- A. The Chief, Division of Business Services, as exercised through the Chief, Engineering and Asset Management Policy Branch, is responsible for:

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1. Providing Bureau-wide leadership and guidance for planning, design, construction, maintenance, and condition assessment of roads associated with managing public lands.
2. Establishing Bureau-wide road standards.
3. Developing Bureau-wide systems and standards for road inventory, road classification, and maintenance intensities.
4. Providing overall direction and quality of the Bureau Facilities Asset Management System (FAMS) database for the BLM roads inventory.
5. Coordinating with other Federal agencies, national interest groups, and road associations to ensure that Bureau interests are represented and that the Bureau is kept abreast of the newest developments regarding road-related activities.

B. The Chief, Branch of Engineering and Asset Management, National Operations Center (NOC), is responsible for:

1. Providing stewardship of the Bureau FAMS database for the BLM roads inventory.
2. Providing technical manual and handbook updates and revisions for approval and issuance by WO.
3. Providing technical engineering support to the WO/State/Field Offices, when requested.
4. Providing Contracting Officer's Representative services, on Indefinite Delivery/Indefinite Quantity Architectural and Engineering contracts, when requested on State planning, design, construction, maintenance, and condition assessment projects.

C. The State Engineer in each State is responsible for:

1. Providing State-wide leadership and guidance for planning, design, construction, maintenance, and condition assessment of roads associated with managing public lands within their geographic area of responsibility.
2. Providing overall direction and quality of the State FAMS database for the BLM roads inventory.

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3. Ensuring that personnel assigned to road design, construction inspection, and condition assessment duties receive training and are otherwise qualified.
 4. Ensuring all road designs are reviewed and approved by qualified individuals before construction work begins.
 5. Coordinating with State Department of Transportation, Federal Highway Administration (FHWA) Regional and Division officials, and various other organizations as necessary to ensure that the statewide road program interests are represented.
- D. The District Manager or Field Manager, as appropriate, is responsible for:
1. Coordinating an interdisciplinary review and approval of all route selections for new or relocated routes.
 2. Making determinations on the location of new or relocated roads based on environmental and route analysis reports generated by the interdisciplinary review team.
 3. Ensuring the overall quality of the District/Field Office FAMS database for the BLM roads inventory.
 4. Ensuring that proposed roads are designed and constructed to BLM road standards or approved plan/permit.
- E. The District Engineer, Field Engineer, Zone Engineer, or other engineer as designated by the responsible line manager, is responsible for:
1. Accomplishing assigned road project tasks, such as inventory work, condition assessments, designs, design reviews, in a timely manner, within budget, and in conformity with this Manual Section.
 2. Assigning construction inspection tasks only to those personnel who have completed the required training or are otherwise qualified.
 3. Recommending training for local personnel to ensure that road design and construction inspection capabilities meet the District or Field Office needs.

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4. Coordinating with County road officials, State Department of Transportation (DOT) officials and other appropriate officials to ensure the District or Field Office road program interests are represented.
5. Coordinating with field personnel to ensure road inventories and condition assessments are accomplished in a timely manner and that the data is properly input into the FAMS database.

.05 Policy. It is Bureau policy that:

- A. Bureau roads must be designed and maintained to an appropriate standard no higher than necessary to accommodate their intended functions; and planning, design, construction, maintenance, and condition assessment activities must be consistent with national policies for safety, esthetics, protection, and preservation of cultural, historic, wildlife, and scenic values, and accessibility for the physically challenged.
- B. Bureau roads are for use, development, protection, and administration of public lands and resources, and, though administered by a public agency, and “generally open to use by the general public,” are not currently designated as public roads. Bureau roads are subject to rules and regulations of the Secretary of the Interior, and, although public use is generally allowed, roads may be closed or use restricted to fulfill management objectives such as protecting public health and safety, preserving resources, or in support of security issues. Bureau roads may also be subject to State and other Federal regulations as necessary to protect public health and safety.

Reclamations/decommissionings, closures, and use restrictions, except for emergency reasons, are identified prior to construction or through the Land Use Planning Process. Bureau roads which no longer support management objectives are to be reclaimed/decommissioned.

- C. Continuous coordination with other agencies and public road authorities is undertaken to assure that land use, resources, and public interests are represented and that Bureau road management actions and activities are appropriate.
- D. The location, design, construction, and maintenance of roads crossing public lands must comply with all applicable Federal laws.

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- E. All roads controlled by the Bureau must meet appropriate Bureau road standards, whether or not they are constructed by Bureau initiative.
- F. All Bureau road designers must be qualified. Roads constructed by non-governmental entities across public lands must be designed by or under the direction of a licensed professional engineer when the Field Manager identifies road safety and resource protection issues warranting an engineering design. Issues the Field Manager should take into consideration include average daily traffic, design speed, topography, soil types, and anticipated amount of use by the public.
- G. The acquisition of easements may not be initiated until a route analysis has been completed and approved by the appropriate District or Field Office Manager. Technical approval of easement surveys, easement plats, and legal descriptions for acquisitions is delegated through the State Director and the appropriate line manager to the District or Field Office Engineer or the Chief Cadastral Surveyor. If there are no qualified Field Office Engineers, then delegation of authority goes to the next highest organizational level in engineering.
- H. Comprehensive Condition Assessments of Bureau roads are performed on a ten-year cycle and inspected after events such as severe storms to determine emergency actions or priority maintenance needs. These roads do not include roads which fall within the boundaries of administrative and recreation sites. Roads within these boundaries are assessed during the recreation/administrative site assessments.

.06 Scope of Road Program. The management of public lands and resources is affected by continually changing social, economic, and political needs. As management objectives change, road needs could also change. An effective program to provide a road system needed to support these changing management objectives must be predicated on current and future needs and must allocate limited resources by the most effective method. A current inventory of assets and a method of measuring their adequacy are basic to managing a road system. The FAMS has been designated as the central repository of all BLM required road condition and inventory data.

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.1 Road Program Management. The management of the road program requires data collection, information dissemination, and inter- and intra- Bureau coordination to determine the need to construct, improve, maintain, acquire, transfer jurisdiction, restrict use, or close and reclaim/decommission certain roads. Coordination is particularly important, since most Bureau roads affect or are affected by resource management decisions or by road management decisions made by other organizations.

.11 Road Inventory and Condition. The Bureau's official inventory of roads is contained within the FAMS. Guidance on conducting Bureau road condition assessments is contained within H-9113-2 - Roads Condition Assessment Protocols.

A. Route Numbers. Use the same route number throughout the length of the route. Do not duplicate route numbers within the State. The State Office may assign blocks of numbers to each District or Field Office to assure that no duplication occurs. Numbers are assigned by the District or Field Office in which the route originates and continues into the other resource area or District or Field Office jurisdiction if the route crosses a boundary.

B. BLM's Transportation System. Changes to the BLM's transportation system, as recorded in FAMS, may occur as part of the formal evaluation and designation process through one of four events:

- a. Record of Decision (ROD) – for a Resource Management/Environmental Impact Statement (RMP/EIS) or an amendment of an RMP/EIS.
- b. Decision of Record for an Activity Plan, Plan Amendment/Environmental Assessment (EA).
- c. Federal Register Notice Action (under authority of 43 CFR 8341.2, 8364.1, 8365.1-6, or 9268.3) that has a follow-up land-use planning action and associated NEPA action.
- d. Management decision of appropriate routes in an area that has been designated open to off-highway vehicle use.

.12 Functional Classification. The Bureau categorizes its roads as Collector Roads, Local Roads, and Resource Roads.

A. Collector Roads. These Bureau roads normally provide primary access to large blocks of land, and connect with or are extensions of a public road system. Collector roads accommodate mixed traffic and serve many uses. They generally receive the highest volume of traffic

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of all the roads in the Bureau system. User cost, safety, comfort, and travel time are primary road management considerations. Collector roads usually require application of the highest standards used by the Bureau. As a result, they have the potential for creating substantial environmental impacts and often require complex mitigation procedures.

- B. Local Roads. These Bureau roads normally serve a smaller area than collectors, and connect to collectors or public road systems. Local roads receive lower volumes, carry fewer traffic types, and generally serve fewer uses. User cost, comfort, and travel time are secondary to construction and maintenance cost considerations. Low volume local roads in mountainous terrain, where operating speed is reduced by effect of terrain, may be single lane roads with turnouts. Environmental impacts are reduced as steeper grades, sharper curves, and lower design speeds than would be permissible on collector roads are allowable.
 - C. Resource Roads. These Bureau roads normally are spur roads that provide point access and connect to local or collector roads. They carry very low volume and accommodate only one or two types of use. Use restrictions are applied to prevent conflicts between users needing the road and users attracted to the road. The location and design of these roads are governed by environmental compatibility and minimizing Bureau costs, with minimal consideration for user cost, comfort, or travel time.
- .13 Average Daily Traffic (ADT). For Bureau purpose, the average daily traffic (ADT) is defined as the annual traffic divided by 365 or by the actual number of days the road is open to traffic. The amount of traffic is determined by the number of vehicles passing a point, regardless of the direction of travel. ADT provides some criteria for geometric standards and is used for justifications and in the design of structural elements. ADT is used as one of the factors in determining the functional classification. In determining ADT, consider Seasonal Average Daily Traffic (SADT), such as during hunting season, may necessitate a higher geometric design standard for the road and a seasonally adjusted higher level of maintenance. Functional classification then determines the appropriate geometric standards.
- .14 Emergency Relief for Federally Owned Roads (ERFO). The FHWA has responsibility to administer the Emergency Relief for Federally Owned

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Roads (ERFO) program. Refer to the FHWA “Emergency Relief for Federally Owned Roads, Disaster Assistance Manual” for guidance on timelines, coordination, and funding. The ERFO Program is intended to help pay the unusually heavy expenses associated with the repair and reconstruction of Federal roads and bridges seriously damaged by a natural disaster over a wide area of catastrophic failure. Restoration in-kind to pre-disaster conditions is expected to be the predominant type of repair.

- .15 Use of Bureau Funds on Non-Bureau Controlled Roads. Appropriated Bureau funds may not be used to construct, improve, or maintain roads not owned or controlled by the Bureau, or otherwise authorized.

- .2 Road Standards. Standards are values established to ensure adequate uniformity and quality of all roads constructed on lands administered by the Bureau. These standards are applied to all Bureau or non-Bureau initiated road construction, and are used to determine the sufficiency of existing roads.
 - .21 Development of Geometric Standards. To determine the appropriate design application, road functional classification should be used. The American Society of Civil Engineers “Local Low Volume Roads and Streets” manual contains information that relates to the Bureau’s low-volume roads. The American Association of State Highway and Transportation Officials (AASHTO) “A Policy on Geometric Design of Highways and Streets” is applicable for some of the Bureau roads. In addition, it contains a section addressing ‘Special Purpose Roads,’ including recreation and resource development roads that may also be applicable to some of the Bureau roads. AASHTO “Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT<400)” is also applicable for some of the Bureau’s roads. Since AASHTO geometric standards for low-volume, low-speed, single-lane roads, and unpaved roads are not always applicable to Bureau roads, coordination with other agencies in addition to those listed above, continues to be the best source of information for the development of realistic standards.

 - .22 Relationship Between Standards and Design Element Values. The values for curve radii, vertical curve lengths, sight distance, superelevation rates, and runoff lengths are closely related to design speed. The designer must utilize design element values appropriate to the standard. See H-9113-1 - Road Design Handbook.

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- .23 Geometric Standards. Design speed, traveled way widths, and maximum grades for various combinations of estimated average daily traffic (ADT), functional classification, and terrain types are shown below.

GEOMETRIC STANDARDS FOR BUREAU ROADS

Functional Classification	Est. 20 Yr. ADT	Terrain	Design Speed		Traveled Way Width		Maximum Grade	
			Pref.	Min.	Pref.	Min.	Pref.	Max.
Resource	Less Than 20	Level & Rolling	30	*	14	*	8	10*
		Mountainous	15	*	14	*	8	16*
		Local	Less Than 100	Level & Rolling	40	30	20	20
Local	Less Than 100	Mountainous	20	15	14	12	8	15
		More Than 75	Level & Rolling	50	40	24	20	6
	More Than 75	Mountainous	30	15	24	20	8	14
		Collector	50 - 100	Level & Rolling	50	30	24	20
Collector	50 - 100	Mountainous	30	20	20	20	8	12
		More Than 100	Level & Rolling	50	40	24	20	6
	More Than 100	Mountainous	30	20	24	20	8	12

Note: Design speeds and surface widths chosen are limited to values shown, except that greater widths are allowed when oversized traffic justifies wider widths.

* If preferred design, speed, traveled way width, and maximum grade are not feasible for specific resource roads, alternative values are determined by the State Engineer.

- .24 Loadings. Design roads and structures for H-20 or HS-20 loadings, as appropriate, and as specified by the AASHTO. Designs with heavier loadings will be used if the road is used by overweight traffic from adjacent roads.
- .25 Structure Widths. Bridges, culverts, tunnels, cattleguards, and other structures must have a minimum curb-to-curb or rail-to-rail width (whichever is less) of 14 feet for single lane roads and 24 feet for double lane roads, but in all cases not less than the nominal width of the adjacent traveled way as measured at right angles to the road centerline.

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- .26 Vertical Clearance. Overhead vertical clearance must be a minimum of 16-feet from the traveled way elevation. See H-9113-1 - Road Design Handbook.
 - .27 Horizontal Clearance. A horizontal clearance of 4-feet from edge of roadway is recommended. See H-9113-1 - Road Design Handbook.
 - .28 Traffic Control Signs and Markers. Signs and markers placed on or adjacent to the roadway to regulate, inform, or guide vehicle occupants must conform to the requirements of Manual Section 9130 – Sign Manual and the latest version of FHWA’s Manual on Uniform Traffic Control Devices (MUTCD). However, compliance with new releases and updates to the MUTCD (i.e. sign reflectivity requirements) will be accomplished via normal maintenance and component replacement, or otherwise directed by the Washington Office.
 - .29 Easement Widths. The width of easements for Bureau roads is limited to the minimum width necessary for construction and maintenance operations, and for user safety. A minimum width of 50-feet or the width of construction plus 10-feet on each side (whichever is greater) is generally required. Maintain uniform widths through varying ownerships or legal subdivisions whenever possible, rather than allowing frequent width changes
- .3 Road Project Planning. Road project planning ensures that the project provides safe and adequate service to the user and is compatible with environmental values. Prior to final selection of a route, alternative locations and environmental factors must be analyzed.
- .31 Route Analysis. Perform a route analysis to identify feasible routes that satisfy the required road function. In cases where an existing road could be acquired, the existing road is an alternative and is assessed with other feasible routes. This ensures that the selected route best meets management needs and is not a short-term solution.
 - A. Management Requirements. Identify the anticipated vehicle type and traffic volume to include additional traffic that may be attracted to the new route. Identify the functional classification of the road and specific locations that the road must serve. Map any areas that the road must not penetrate because of withdrawals, easements, private lands, or reservations, and identify any other special considerations or constraints on selection of feasible routes.

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- B. Feasible Route Locations. Plot feasible route locations (those that meet management requirements and the appropriate road standards) on a topographic map. Make route locations as wide as possible, as this gives the greatest freedom in selecting the alignment to ensure free traffic flow, minimal impact on the environment, and relative economy of construction and maintenance.
- C. Route Selection Review. Determine the most desirable route locations and analyze these locations for the Field review. Document the reasons for eliminating the less desirable feasible route locations (or portions thereof) from further consideration in the analysis report.
- D. Field Review. Perform an in-depth field review for each feasible location. Prior to field review, affected private land must be identified and appropriate documented permission secured to perform any needed survey work, soil borings, etc. For each feasible location, consider environmental impacts, resource value impacts, user cost, safety, construction and maintenance costs, acquisition costs (if applicable), suitability of soil and geology for construction, and any other factors relevant to choosing the best locations. If an existing road is to be acquired, consider construction costs necessary to meet appropriate road standards.
- E. Report. Upon completing the field review listed above, the team prepares a report for management review and approval.

.32 Route Selection. Using the route analysis report and any required environmental analysis, the District/Field Office Manager selects the location. If the route analysis report or the environmental analysis addresses special problems, the selection decision may include specific mitigation requirements or limitations that must be addressed in the design.

.4 Design. Final design work, whether "in-house," by another agency or by an architectural and engineering firm commences when project planning is complete and the project has been programmed and funded in an approved Annual Work Plan. Work on non-Bureau road designs should normally not begin until the preliminary location has been approved and the road stipulations have been provided to the applicant. Bureau road standards are provided in .2 of this Manual Section and the design guides found in H-9113-1 – Road Design Handbook.

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Designer Qualifications. Any road designer and reviewer assigned responsibility for the design and/or review of any road must have a working knowledge of highway engineering principles and procedures, and have satisfactorily completed a college or other approved road design course.

All "in-house" designs must receive an independent technical review by a qualified road designer. The State Engineer reviews and determines the procedures and organizational level for such reviews. Roads designed by non-Bureau personnel are approved for technical correctness by a qualified registered engineer or another agency's design chief, and are reviewed by the State Engineer, qualified District engineering personnel, or a qualified reviewer appointed by the District Engineer, to assure that the design meets the appropriate Bureau road standards.

Approved Road Design Courses. Satisfactory completion of the following are acceptable for qualifying BLM road design personnel:

1. U.S. Forest Service Basic and Advanced Road Design Courses.
2. University Level Engineering Curriculum Road Design Courses.
3. Other qualifications approved by the State Engineer.

.5 Construction. See Manual 9103 - Facility Construction.

.51 **Signing.** Roads under construction are required to be signed according to the current edition of the FHWA "Manual of Uniform Traffic Control Devices."

.52 **Inspections.** Construction inspection must be done by qualified inspectors regardless of the method of construction, such as force account, contract, timber sale, etc. See Manual 9103 – Facility Construction.

.6 Maintenance. See Manual 9104 - Facility Maintenance.

.61 **Maintenance Management.** Follow guidance in Manual 9104 - Facility Maintenance for the establishment of a maintenance management program.

.62 **Maintenance Intensities – Transportation System Assets** BLM route Maintenance Intensities provide guidance for appropriate "standards of care" to recognized routes within the BLM. Recognized routes by definition include Roads, Primitive Roads, and Trails carried as assets within the BLM FAMS.

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Maintenance Intensities provide consistent objectives and standards for the care and maintenance of BLM routes based on identified management objectives. Maintenance Intensities are consistent with land-use planning management objectives (for example, natural, cultural, recreation setting, and visual). Maintenance Intensities provide operational guidance to field personnel on the appropriate intensity, frequency, and type of maintenance activities that should be undertaken to keep the route in acceptable condition and provide guidance for the minimum standards of care for the annual maintenance of a route.

Maintenance Intensities do not describe route geometry, route types, types of use or other physical or managerial characteristics of the route. Those terms are addressed as other descriptive attributes to a route.

Maintenance Intensities provide a range of management objectives and standards. See Appendix A – Maintenance Intensities.

Appendix A - Maintenance Intensities

Level 0

Maintenance Description: Existing routes that will no longer be maintained and no longer be declared a route. Routes identified as Level 0 are identified for removal from the Transportation System entirely.

Maintenance Objectives:

- No planned annual maintenance.
- Meet identified environmental needs.
- No preventative maintenance or planned annual maintenance activities.

Maintenance Funds: No annual maintenance funds.

Level 1

Maintenance Description: Routes where minimum (low intensity) maintenance is required to protect adjacent lands and resource values. These roads may be impassable for extended periods of time.

Maintenance Objectives:

- Low (Minimal) maintenance intensity.
- Emphasis is given to maintaining drainage and runoff patterns as needed to protect adjacent lands. Grading, brushing, or slide removal is not performed unless route bed drainage is being adversely affected, causing erosion.
- Meet identified resource management objectives.
- Perform maintenance as necessary to protect adjacent lands and resource values.
- No preventative maintenance.
- Planned maintenance activities limited to environmental and resource protection.
- Route surface and other physical features are not maintained for regular traffic.

Maintenance Funds: Maintenance funds provided to address environmental and resource protection requirements. No maintenance funds provided to perform preventative maintenance.

Level 2 *Reserved for Possible Future Use*

Level 3

Maintenance Description: Routes requiring moderate maintenance due to low volume use (for example, seasonally or year-round for commercial, recreational, or administrative access). Maintenance Intensities may not provide year-round access but are intended to generally provide resources appropriate to keep the route in use for the majority of the year.

Maintenance Objectives:

- Medium (Moderate) maintenance intensity.
- Drainage structures will be maintained as needed. Surface maintenance will be

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conducted to provide a reasonable level of riding comfort at prudent speeds for the route conditions and intended use. Brushing is conducted as needed to improve sight distance when appropriate for management uses. Landslides adversely affecting drainage receive high priority for removal; otherwise, they will be removed on a scheduled basis.

- Meet identified environmental needs.
- Generally maintained for year-round traffic.
- Perform annual maintenance necessary to protect adjacent lands and resource values.
- Perform preventative maintenance as required to generally keep the route in acceptable condition.
- Planned maintenance activities should include environmental and resource protection efforts, annual route surface.
- Route surface and other physical features are maintained for regular traffic.

Maintenance Funds: Maintenance funds provided to preserve the route in the current condition, perform planned preventive maintenance activities on a scheduled basis, and address environmental and resource protection requirements.

Level 4 *Reserved for Possible Future Use*

Level 5

Maintenance Description: Route for high (maximum) maintenance due to year-round needs, high volume of traffic, or significant use. Also may include route identified through management objectives as requiring high intensities of maintenance or to be maintained open on a year-round basis.

Maintenance Objectives:

- High (Maximum) maintenance intensity.
- The entire route will be maintained at least annually. Problems will be repaired as discovered. These routes may be closed or have limited access due to weather conditions but are generally intended for year-round use.
- Meet identified environmental needs.
- Generally maintained for year-round traffic.
- Perform annual maintenance necessary to protect adjacent lands and resource values.
- Perform preventative maintenance as required to generally keep the route in acceptable condition.
- Planned maintenance activities should include environmental and resource protection efforts, annual route surface.
- Route surface and other physical features are maintained for regular traffic

Maintenance Funds: Maintenance funds provided to preserve the route in the current condition, perform planned preventative maintenance activities on a scheduled basis, and address environmental and resource protection requirements.